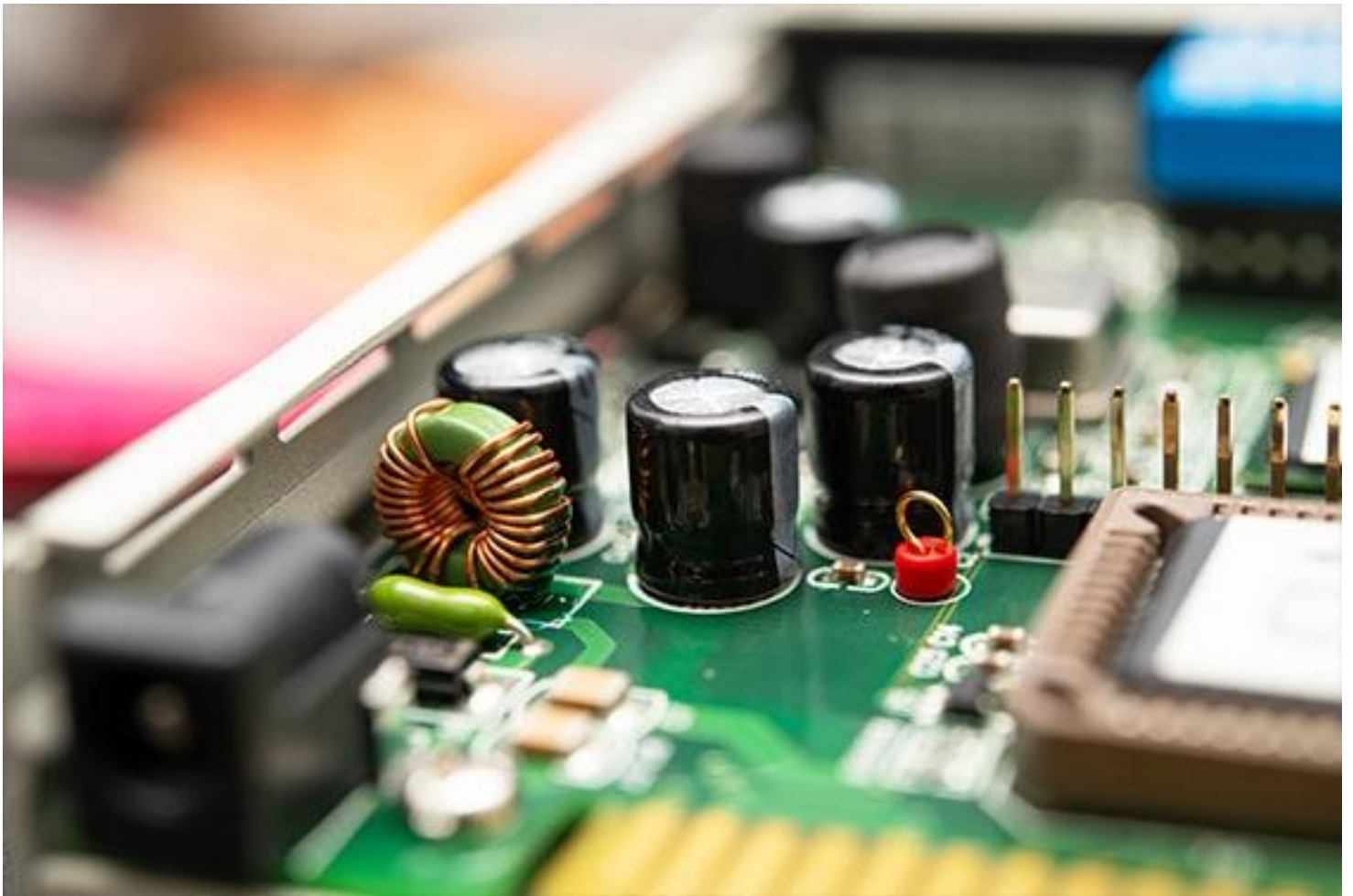




Aluminum Electrolytic Capacitor Catalogue

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Aluminum Electrolytic Capacitor – Series Index

Conductive Polymer Hybrid Aluminum Electrolytic Capacitors

Series	INX Series	Applications	Rated Voltage(V)	Capacitance Range(uF)	Temperature Range(°C)	Load Life (hrs)	AEC-Q200 compliant
Radial Type	HRA	Low ESR	16~125	10~560	-55 to +105	5,000~10,000	●
	HRB	High temperature, Low ESR	16~50	15~560	-55 to +125	2,000~4,000	●
Type SMD	HSA	Low ESR	16~125	10~560	-55 to +105	5,000~10,000	●
	HSB	High temperature, Low ESR	16~125	10~560	-55 to +125	2,000~4,000	●
	HSC	High temperature, Low ESR, Anti-vibration	16~125	10~560	-55 to +105	10,000	●
	HSD	High temperature, Low ESR, Anti-vibration	16~125	10~560	-55 to +125	4,000	●
	HSE	High temperature 135°C, Low ESR	25~63	10~330	-55 to +135	1,000~2,000	●

Conductive Polymer Solid Aluminum Capacitors

Series	INX Series	Applications	Rated Voltage(V)	Capacitance Range(uF)	Temperature Range(°C)	Load Life (hrs)	AEC-Q200 compliant
Radial Type	PRA	Standard	2.5~25	6.8~2,700	-55 to +105	2,000	
	PRB	Ultra impedance, high ripple current	2.5~16	82~2,700	-55 to +105	2,000	
	PRC	Long life	2.5~50	10~2,200	-55 to +105	5,000	●
	PRD	High voltage standard, high ripple current	35~100	12~470	-55 to +105	2,000	
	PRE	High temperature, Low ESR	4~50	10~2,500	-55 to +125	1,000	●
	PRF	High temperature, Long Life	6.3~35	56~1800	-55 to +125	2,000	●
	PRG	Long life Low ESR	2.5~50	10~2,200	-55 to +105	20,000	
	PRH	Ultra impedance, high ripple current	2.5~63	10~2,700	-55 to +105	15,000	
SMD Type	PSA	Standard	2.5~25	22~2,700	-55 to +105	2,000	
	PSB	Low impedance, high ripple current	2.5~16	68~2,700	-55 to +105	2,000	
	PSC	Long life, Low ESR, high ripple current	4~50	10~2,200	-55 to +105	5,000	●
	PSD	Low ESR, high voltage, High ripple current	35~100	12~220	-55 to +105	2,000	
	PSE	High temperature, Low ESR	4~50	10~2,200	-55 to +125	1,000	●
	PSF	High temperature, Long life	6.3~35	56~1800	-55 to +125	2,000	●
	PSG	Ultra impedance, high ripple current	2.5~63	10~2,700	-55 to +105	15,000	
	PSH	Long life Low ESR	2.5~50	10~2,200	-55 to +105	20,000	

Aluminum Electrolytic Capacitor – Surface Mount Type

Series	INX Series	Applications	Rated Voltage(V)	Capacitance Range(uF)	Temperature Range(°C)	Load Life (hrs)	AEC-Q200 compliant
Surface mount	SMA	Standard, 85°C	4~100	0.1~1,500	-55 to +85	2,000	
	SMB	Standard, 105°C	4~50	0.1~1,500	-55 to +105	1,000	
	SMC	Bi-Polarized	6.3~50	0.1~100	-55 to +85	1,000	●
	SMD	Low impedance	6.3~100	1~1,500	-55 to +105	2,000~3,000	●
	SME	Long life 105°C	6.3~100	1~6,800	-55 to +105	2,000	●



Aluminum Electrolytic Capacitor – Surface Mount Type

Series	INX Series	Applications	Rated Voltage(V)	Capacitance Range(uF)	Temperature Range(°C)	Load Life (hrs)	AEC-Q200 compliant
Surface mount	SMF	Long life 125°C	10~63 80~160	2.2~470	-55 to +125 -40 to +125	2,000~3,000	●
	SMG	High voltage 400V	160~400	2.2~82	-40 to +105	2,000	●
	SMH	Long life, 105°C	6.3~50	22~1000	-40 to +105	5,000	●
	SMDL	Long life, 105°C	6.3~100	22~1500	-55 to +105	5,000	●
	SMN	Low impedance, Long life, 125°C	16~50	33~330	-40 to +125	3,000	●
	SMJ	Low impedance,	6.3~100	1~4700	-55 to +125	1,000~2,000	●
	SMK	Low impedance, Anti-vibration.	6.3~100	1~4700	-55 to +125	1,000~2,000	●
	SML	Low impedance, Long life, 125°C	16~50	33~2200	-40 to +125	2,000~5,000	●
	SMM	Low impedance, Long life, 125°C, Anti-vibration	16~50	33~2200	-40 to +125	2,000~5,000	●
	SMP	Downsizing and Lower Impedance	6.3~50	22~2200	-55 to +105	2,000	●
	SMQ	Long life, 135°C	10~63	33~2200	-40 to +135	2,000	●

Aluminum Electrolytic Capacitor – Radial Type

Series	INX Series	Applications	Rated Voltage(V)	Capacitance Range(uF)	Temperature Range(°C)	Load Life (hrs)	AEC-Q200 compliant
Miniature	RMB	5mm height, 105°C	4~50	0.1~220	-40 to +105	1,000	
	RMC	5mm height, Low impedance	6.3~35	1~100	-40 to +105	1,000	
	RME	7mm height, 105°C	6.3~50	0.1~330	-40 to +105	1,000	
	RMG	7mm height, Low impedance	6.3~35	6.8~220	-40 to +105	1,000	
	RMH	7mm height, Long life	6.3~50	0.1~220	-40 to +105	5,000	
Standard	RSA	Standard, 85°C	6.3~250 350~500	0.1~33,000	-40 to +85 -25 to +85	2000	
	RSE	Long life, 85°C	400 450~500	10~150	-40 to +85 -25 to +85	8,000	
	RSB	Standard, 105°C	6.3~250 350~500	0.1~22,000	-40 to +105 -25 to +105	2,000	
	RSF	High voltage, High ripple current	400 450~500	10~150	-40 to +105 -25 to +105	2,000	
	RSC	High ripple current	160~400 450	22~470	-40 to +105 -25 to +105	2,000	
	RSD	High ripple current, 3000hrs	6.3~250 350~450	0.1~22,000	-40 to +105 -25 to +105	3,000	
	RSG	-55°C Low temperature resistant product	400~450	10~150	-55 to +105	2000	
High Reliability	RHA	Long life, 5000hrs	6.3~250 350~450	0.47~22,000	-40 to +105 -25 to +105	3,000~5,000	
	RHK	High voltage, High ripple current	400 450~500	10~150	-40 to +105 -25 to +105	5,000	
	RHB	Long life, High ripple current, 5000hrs	160~400 450	22~470	-40 to +105 -25 to +105	5,000	
	RHC	Long life, 10000hrs	160~400 450	6.8~220	-40 to +105 -25 to +105	10,000	
	RMI	Miniaturized and Long life	10~100	0.47~330	-25 to +105	10,000	
	RHI	Long life, 12000hrs	160~400 450	6.8~680	-40 to +105 -25 to +105	10,000~12,000	
	RHD	High reliability, 125°C	10~250 350~450	0.47~1,000	-40 to +125 -25 to +125	2,000	
	RHJ	High reliability, 130°C	10~250 350~450	1.8~4,700	-40 to +130 -25 to +130	2,000~3,000	
	RHL	Long life, 20000hrs (ask engineering bulletin detail)	400~450	6.8~120	-25 to +105	15,000~20,000	
	RHM	On the basis of RHK series ripple promotion product	160~400 450~460	10~150	-40 to +105 -25 to +105	5,000	

Aluminum Electrolytic Capacitor – Radial Type

For Ballast	RHE	For ballast, 3000hrs	160~400 450	1~220	-40 to +105 -25 to +105	3,000	
	RHF	For ballast, 5000hrs	160~400 450	1~220	-40 to +105 -25 to +105	5,000	
	RHH	For ballast, 10000hrs	160~450	1~220	-25 to +105	10,000	
Low Impedance	RLA	Low impedance	6.3~400 450	0.47~15,000	-40 to +105 -25 to +105	2,000	
	RLK	High voltage, High ripple current	400 450~500	10~150	-40 to +105 -25 to +105	2,000	
	RLB	Low impedance, high ripple current	6.3~400 450	1~15,000	-40 to +105 -25 to +105	2,000~3,000	
	RLC	Low impedance, high ripple current, than RLB series	6.3~400 450	1~15,000	-40 to +105 -25 to +105	2,000~5,000	
	RLD	Lower impedance	6.3~100	5.6~18,000	-40 to +105	4,000~8,000	
	RLE	Lower impedance, high ripple current	6.3~50	22~6,800	-40 to +105	2,000~5,000	
	RLM	Lower impedance, high ripple current	10~50	100~2,700	-40 to +105	4,000~5,000	
	RLF	Lower impedance, high ripple current, than RLE series	6.3~35	47~8,200	-40 to +105	5,000~6,000	
	RLG	Low impedance, high ripple current, long life 10000hrs	6.3~100	6.8~18,000	-40 to +105	4,000~10,000	
	RLJ	Higher ripple current, long life 10000hrs	6.3~100	5.6~18,000	-40 to +105	6,000~10,000	
	RLO	On the basis of RLA series ripple promotion product	400-500	4.7-100	-40 to +105	3,000	
	RLN	125°C , Low ESR, 30G Vibration resistance	10~100	220~8200	-40 to +125	4000~5000	●
Non-Polarized	RNC	Standard, 85°C	6.3~100	0.1~6,800	-40 to +85	2,000	
	RND	Standard, 105°C	6.3~160	0.1~1,000	-40 to +105	2,000	
	RNE	Horizontal deflection current correction use	25, 35, 50, 100	2.2~10	-40 to +105	1,000	
Special	RPB	Low Leakage current, 85°C	6.3~100	0.1~4,700	-40 to +85	2,000	
	RPC	Low Leakage current, 105°C	6.3~100	0.1~4,700	-40 to +105	1,000	
	RPD	For permissible abnormal voltage	200, 400	22~470	-25 to +105	2,000	
	RPE	For audio equipment, 105°C	6.3~100	1~10000	-40 to +105	2,000	

Aluminum Electrolytic Capacitor – Anhydrous Type

Series	INX Series	Applications	Rated Voltage(V)	Capacitance Range(uF)	Temperature Range(°C)	Load Life (hrs)	AEC-Q200 compliant
Anhydrous	ATA	Low impedance standard	6.3~100 160~400	0.47~15,000	-55 to +105 -40 to +105	2,000	●
	ATB	Lower impedance	6.3~50 63~100	5.6~18,000	-55 to +105 -40 to +105	4,000~8,000	●
	ATC	Lower impedance, high ripple current	6.3~50	22~6,800	-55 to +105	2,000~5,000	●
	ATD	Low impedance, high ripple current, long life 10000hrs	6.3~50 63~100	6.8~18,000	-55 to +105 -40 to +105	4,000~10,000	●
	ATE	High voltage, long life, 5000hrs	160~400	2.2~120	-25 to +105	3,000~5,000	●

Remark: Water content of Anhydrous Type
Low voltage:<1%
High voltage:<5%
Water content of electrolyte

Aluminum Electrolytic Capacitor – Snap-in Type

Series	INX Series	Applications	Rated Voltage(V)	Capacitance Range(uF)	Temperature Range(°C)	Load Life (hrs)	AEC-Q200 compliant
Snap-in Type	SIA	Standard, 85°C	10~100 160~500	47~68,000	-40 to +85 -25 to +85	2,000	
	SIC	Standard, 105°C	10~250 350~500	68~68,000	-40 to +105 -25 to +105	2,000	
	SID	Long life 3000hrs	16~250 350~450	47~47,000	-40 to +105 -25 to +105	3,000	
	SIE	Long life 5000hrs	10~100 160~450	82~47,000	-40 to +105 -25 to +105	5,000	●
	SIG	Long life 10000hrs	200~450	220~1800	-25 to +105	10,000	
	SIF	For over voltage vent operation test	200, 400, 420	33~1,200	-25 to +105	2,000	
	SIH	Standard, 85°C	10~100 160~500	47~68,000	-40 to +85	3000	
	SIJ	Standard, 85°C	10~100 160~500	47~68,000	-40 to +85	5000	
	SIK	Snap-in Type. For audio equipment,105°C	16~250 400~450	56~33000	-40 to +105 -25 to +105	2000	

Aluminum Electrolytic Capacitor – Screw Terminal Type

Series	INX Series	Applications	Rated Voltage(V)	Capacitance Range(uF)	Temperature Range(°C)	Load Life (hrs)	AEC-Q200 compliant
Screw Terminal	STA	Standard, 85°C	16~250 350~500	470~500,000	-40 to +85 -25 to +85	3,000	
	STC	85°C High ripple current	350~500	1,000~150,000	-25 to +85	5,000	
	STD	85°C High voltage	500~650	470~500,000	-25 to +85	5,000	
	STE	85°C Long life 10,000hrs	350~450	1,000~15,000	-25 to +85	10,000	
	STB	Long life, 105°C	10~100 160~450	220~1,000,000	-40 to +105 -25 to +105	2,000~5,000	

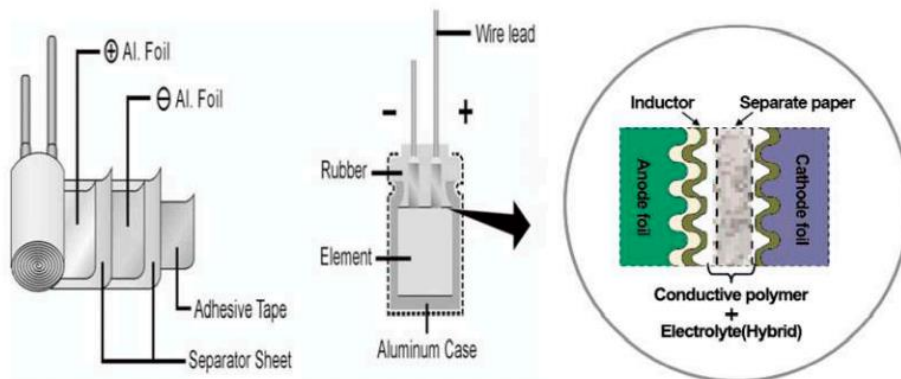
Aluminum Electrolytic Capacitor – LUG Terminal Type

Series	INX Series	Applications	Rated Voltage(V)	Capacitance Range(uF)	Temperature Range(°C)	Load Life (hrs)	AEC-Q200 compliant
LUG Terminal	LTC	Standard, 85°C	16~250 315~450	68~150,000	-40 to +85 -25 to +85	2,000	
	LTD	Standard, 105°C	16~250 315~450	22~10,000	-40 to +105 -25 to +105	2,000	

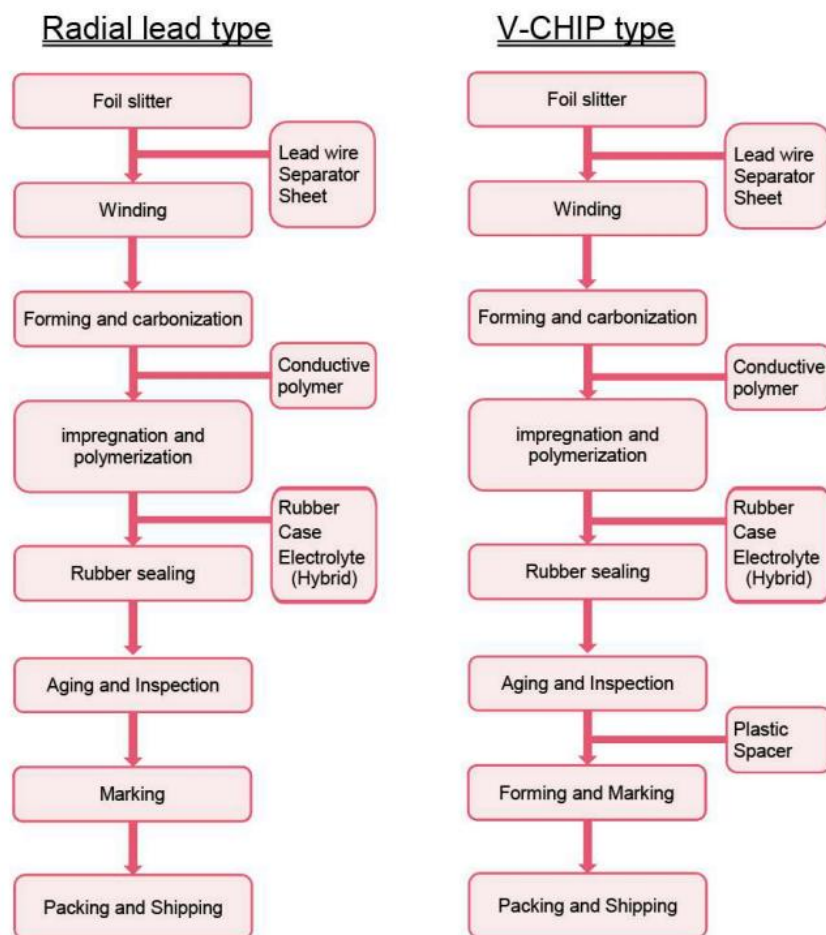
Electrolytic Capacitors - Application Guide

Conductive Polymer Hybrid Aluminum Electrolytic Capacitors

- BASIC STRUCTURE**



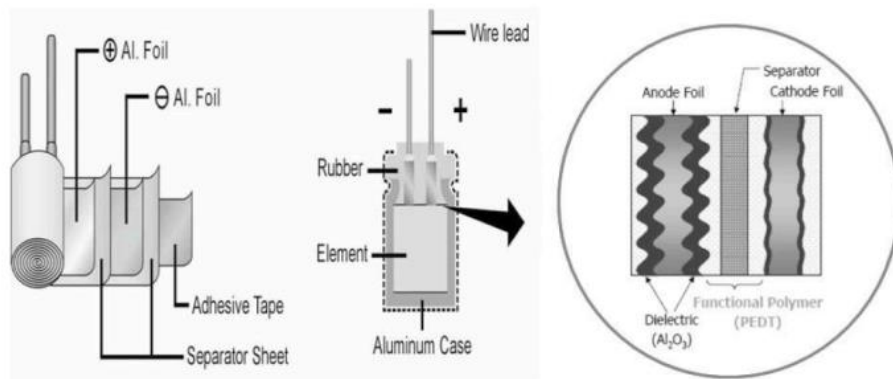
- MANUFACTURING METHOD**



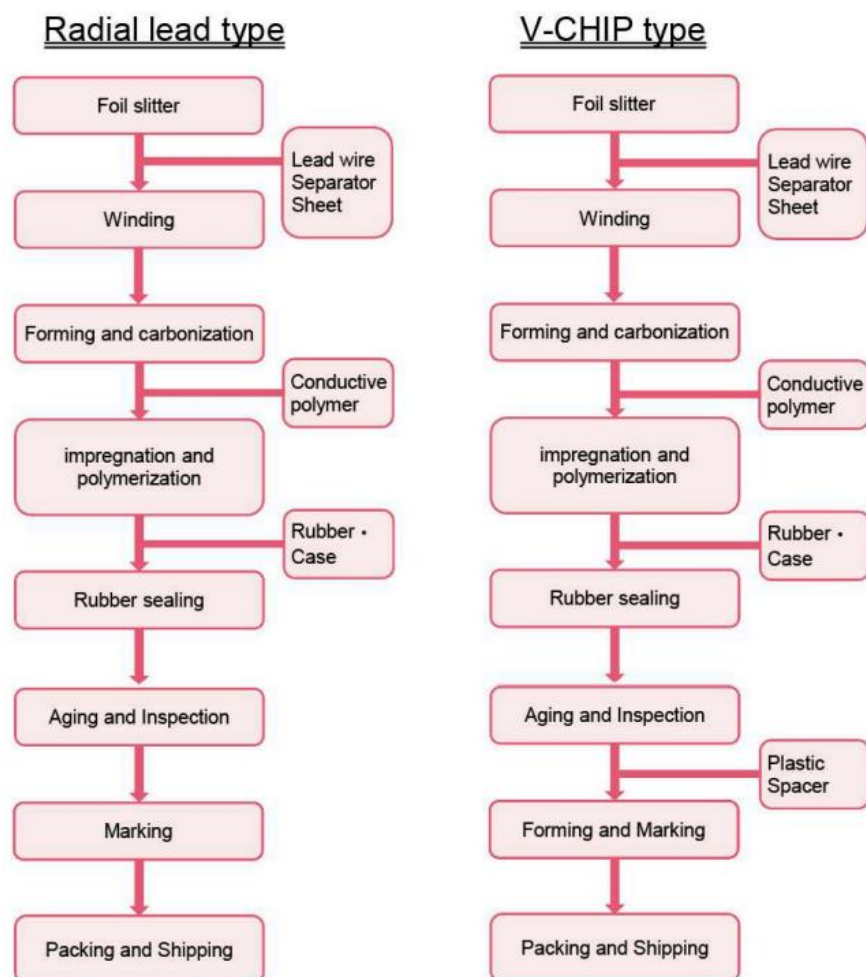
Electrolytic Capacitors - Application Guide

Conductive Polymer Aluminum Solid Capacitors

- BASIC STRUCTURE**



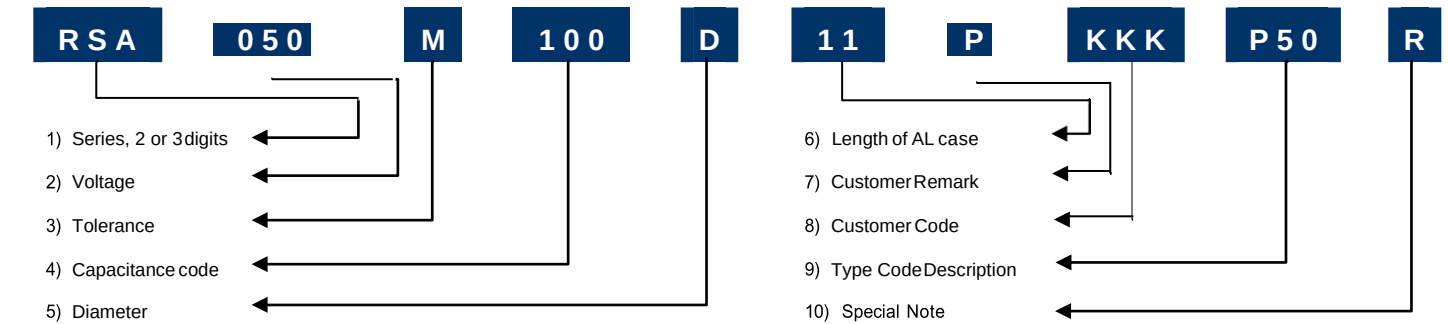
- MANUFACTURING METHOD**





Aluminum Electrolytic Capacitor

Explanation of Part Numbers



1) **Series Code:** for details please view "Series Index" table (page 2,3,4)

2) **Voltage Code:**

Voltage (V) Code	4 004	6.3 006	10 010	16 016	25 025	35 035	50 050	63 063	80 080	100 100	160 160
Voltage (V) Code	180 180	200 200	250 250	315 315	330 330	350 350	400 400	420 420	450 450	500 500	

3) **Capacitance Tolerance:**

Tolerance (%) Code	-5 / +15 C	+/- 10 K	+/- 20 M	-0 / +20 A	-0 / +40 S	-0 / +50 R	-5 / +20 D	+/- 5 J	-5 / +10 H	-25 / +20 L	-10 / +30 F	-20 / +50 W
Tolerance (%) Code	-10 / +20 V	-10 / +30 Q	-10 / +50 T	-15 / +20 E	-30 / +20 I	+10 / +30 B	+10 / +25 N	-20 / 0 G	-5 / +20 P	-20 / +100 X	-6.5 / +20 Y	-40 / +0 O

4) **Capacitance Code:**

Capacitance (uF) Code	0.1 0R1	1 1R0	10 100	100 101	1000 102	10000 103	100000 104	22000 223
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5) **Diameter:**

Diameter (mm) Code	100 B	4 C	5 D	6.3 E	8 F	10 G	12 H	12.5 X	13 I	14.5 Y	16 J	18 K	42 W	14 1	21 3	7.5 7	5.5 5
Diameter (mm) Code	20 L	22 M	25 N	30 O	35 P	40 Q	51 R	64 S	76 T	90 U	6.5 V	5.2 A	25.4 Z	15.5 2	33 4	45 8	

6) **Length rule for Aluminum case:** Length <100mm **Integer**, use length(mm) directly. Ex: 35mm is 35 (For other lengths, refer below "Note").

****TABLE**:**

Value First Code	10 A	11 B	12 C	13 D	14 E	15 F	16 G	17 H	18 I	19 J	20 K	35 L	22 M	31 N
Value Second Code	0.4 A	0.5 B	0.6 C	0.7 D	0.8 E	0.9 F	0.1 G	0.2 H	0.3 I					

Note:

- Length <100mm **Decimal**, refer ****TABLE****. Ex: 12.5 is CB
- Length ≥100mm, refer ****TABLE****. Ex: 115 is B5, 224 is M4, 136 is D6

7) **Customer Remark:** to define customizations and special customer needs

8) **Customer code:** for customization of product, can be modified based on customer request (standard is KKK)

9) **Type code description:**

A: Radial & V-Chip code: 1st letter for processing method, 2nd & 3rd refer to sheet "Lead cutting & forming" (page 245)

Description Code	Long Lead S**	Lead cut C*	Lead cut & crimp D*	Lead cut, crimp & form H*	Lead cut & form (5mm) F*	Forming B**
Description Code	Lead cut & bending (+) Z*	Lead cut & bending (-) L*	Taping (Ammo pack) P***	Tape & Reel R*	V-Chip type (SMD) V*	

* : 2nd and 3rd letter should be lead length
** : 2nd and 3rd letter should be "00"
*** : 2nd and 3rd letter should be lead pitch

B: Terminal Diagram Code for Snap-in, LUG & Screw Terminal Type

Description Code	Snap-In long terminal YL	Snap-In short terminal YS	LG Type terminal G	Straight Type terminal ST	PC board pin-out straight terminal PCS	PC board pin-out LUG terminal PCY	PC board pin-out U-insert terminal PCU	PC board pin-out bend terminal PCB	5 pin straight terminal U	screw terminal W
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10) **Special Note : R: Commercial and RoHS compliant**
A: Automotive and RoHS compliant

Precautions in Using (Solid & Hybrid)



Precautions for circuit designing

1. Polarity

Conductive Polymer Aluminum Electrolytic Capacitors have the positive and negative electrodes. Using reversed polarity may cause leakage current increased or life span decreased.

2. Prohibited circuits

Conductive Polymer Aluminum Electrolytic Capacitors leakage current may become larger as the following conditions.

- (a) Soldering
- (b)) High temperature no-load test, high temperature and high humidity no-load test, rapidly changing temperature test, etc.

Avoid the use of Conductive Polymer Aluminum Electrolytic Capacitors in the following type of circuits because leakage current may increase.

- (a) High-impedance circuits
- (b)) Coupling circuits
- (c) Time constant circuits
- (d)) Other circuits that are significantly affected by leakage current

▲ If you plan to use 2 or more Conductive Polymer Aluminum Electrolytic Capacitors in a series connection, please contact us before use.

3. Circuit Design

Verify the following before designing the circuit:

- (a) The electrical characteristics of the capacitor will vary depending on differences in temperature and frequency. Only Design after verifying the scope of these factors.
- (b)) When connecting two or more capacitors in parallel ensure that the design takes current balancing into account.
- (c) When two or more capacitors are connected in series, variability in applied voltage may cause over-voltage conditions. Contact Coreworks before using capacitors connected in series.

4. Operating temperature voltages and ripple current

- (a) Operating temperature must be under the category temperature range of specification.
- (b)) Do not apply voltages exceeding the full rated voltage.
- (c) Do not apply currents that excess the rated ripple current.

When excessive ripple current is applied, the Conductive Polymer Aluminum Electrolytic Capacitors may result in shorter life due to the internal heat increase.

1. Sudden charge and discharge

An excessive surge current by sudden charge or discharge may result in a short circuit or a large leakage current. Protection circuits are recommended to retain high reliability in case of the following conditions.

- (a) The surge current value exceeds 10A
- (b) The value exceeds 10 times of the rated ripple current

▲ When you measure leakage current, a protection resistor of approximately 1k Ω must be inserted to the circuit before charge and discharge.

2. Failure

The failure rate is 0.5% / 1000h (with a 60% reliability standard) based on JIS C 5003.

The mainly failure modes are as follows.

6-1. Contingency failure

1.The product of electrostatic capacitance decrease caused by temperature rise and the rise of the ESR open mode caused by the wear. that is the main failure mode. Sometimes accidental short-circuit caused by excessive voltage and large current mode

2. Decrease the failure rate we can reduce ambient temperature, ripple current and use voltage.

3.When the load voltage exceeds the rated voltage will cause a short circuit or ripple current is too large, internal pressure increased and the rubber expansion or peeling, smelliness

4. The installation method of products, Position, Graphic design please consider the following points to ensure the safety A. Set the protection circuit and Protector to ensure the safety.

B. Setting a redundant circuit, so that the equipment will not be unstable because of a single fault.

6-2. Wear-out failure (life-span)

When life span exceeded the specified guarantee time of Endurance and Damp heat, electrolyte might insulate and cause electric characteristic changed. This is called an open circuit. The electric characteristics of capacitance and ESR may possibly change within the specified range in specifications when it is used under the condition of the rated voltage, electric and mechanical performance. Please note it when design.

Lifetime (hours)of the capacitor to be estimated:

A: $L_x = L_0 \times 10^{(T_0 - T_x) / 20}$ B: $L_x = L_0 \times 2^{(T_0 - T_x) / 10}$

Lifetime (hours) of the capacitor to be estimated (15 Years Life is Maximum)

Base lifetime (hours) of the capacitor

Actual ambient temperature ($^{\circ}\text{C}$) of the capacitor

A	B
PRA,PRB,PRC,PRD,PRF, PSA,PSB,PSC,PSD,PSE,PSF	PRH,PRG,PSG,PSH is similar To the lifetime estimation of Al Electrolytic capacitor
105 $^{\circ}\text{C} \geq 2,000\text{hrs}$	105 $^{\circ}\text{C} \geq 2,000\text{hrs}$
95 $^{\circ}\text{C} \geq 6,324\text{hrs}$	95 $^{\circ}\text{C} \geq 4,000 \text{ hrs}$
85 $^{\circ}\text{C} \geq 20,000\text{hrs}$	85 $^{\circ}\text{C} \geq 8,000 \text{ hrs}$
75 $^{\circ}\text{C} \geq 63,245\text{hrs}$	75 $^{\circ}\text{C} \geq 16,000\text{hrs}$

▪ **Caution For Assembling Capacitors**

1. Leakage Current

Mechanical stress may cause Conductive Polymer Aluminum Electrolytic Capacitors leakage current increased. In such a case, leakage current will gradually decrease by applying voltage within the category voltage and the upper category temperature. Then, self-healing speed of leakage current is faster when it is near to the upper category temperature and the category voltage.

The cause of Leakage current rise again

- a. soldering
- b. High Temp shelf, High Temp High Humidity and Temp rapid change etc.

2. Capacitor insulation

(a) The space between the case and the negative electrode terminal is insulated and has some resistance.

(b)) Be sure to completely separate the case, negative lead terminal, positive lead terminal and PC board patterns

3. Operating environmental restrictions

Do not use the Conductive Polymer Aluminum Electrolytic Capacitors in the following environments.

(a) Places where water, salt water or oil can directly fall on it, and places where condensation may form.

(b)) Places filled with noxious gas (hydrogen sulfide, sulfurous acid, nitrous acid, chlorine, ammonia, etc.)

(c) Places susceptible to ozone, ultraviolet rays and radiation

4. PCB design

(a) Avoid locating heat-generating components around the Conductive Polymer Aluminum Electrolytic Capacitors and on the underside of the PC board.

(b) For the surface mount capacitor, design the copper pads on the PC board in according with the recommended land pattern or dimensions in the series specifications.

(c) For radial capacitor, design the terminal pitch and hole size after conforming the dimensional tolerance in the series specifications.

5. Parallel connection

A large amount of ripple current may be applied to the Conductive Polymer Aluminum Electrolytic Capacitors when it is used in parallel with another capacitor. Carefully select the type of capacitor.

6. Others

Design circuits after checking the following items.

(a) Electric characteristics are affected by temperature or frequency fluctuations. Design circuits after checking the changes.

(b)) When mounting a Conductive Polymer Aluminum Electrolytic Capacitors on a double-sided PC board, extra PC board holes or through holes for connecting the front and back of the PCB must not exist underneath the Conductive Polymer Aluminum Electrolytic Capacitors.

▪ Precautions for mounting on-board

1. Considerations when soldering

The soldering conditions as soldering iron, flow soldering, reflow soldering should be under the range prescribed in specifications. If the specifications are not followed, there is a possibility of the cosmetic deflection, the intensive increase of leakage current or the capacitance reduction.

2. Capacitor insulation

(a) Do not reuse Conductive Polymer Aluminum Electrolytic Capacitors that have been assembled in a set and energized. Excluding Conductive Polymer Aluminum Electrolytic Capacitors that have been removed for measuring electrical characteristics during a periodic inspection, Conductive Polymer Aluminum Electrolytic Capacitors cannot be reused.

(b) Leakage current may increase when Conductive Polymer Aluminum Electrolytic Capacitors are stored for long term. In this case, we

recommend that you apply the rated voltage for 1 hour at 60°C~70°C with a resistor load of 1kΩ.

3. Mounting-1

(a) Mount after checking the capacitance and the rated voltage.

(b) Do not drop Conductive Polymer Aluminum Electrolytic Capacitors on the floor and do not use it that is dropped.

(c) Do not mount Conductive Polymer Aluminum Electrolytic Capacitors that is deformed.

(d) Do not break aluminum case surface coating in mounting

4. Mounting-2

(a) Avoid locating heat-generating components around the Conductive Polymer Aluminum Electrolytic Capacitors and on the underside of the PC board.

(b) For the surface mount capacitor, design the copper pads on the PC board in according with the recommended land pattern or dimensions in the series specifications.

(c) For radial capacitor, design the terminal pitch and hole size after conforming the dimensional tolerance in the series specifications.

5. Soldering with a soldering iron

(a) Soldering condition should be under the following ranges.

Conditions	Soldering iron temperature	Time
Soldering condition	380±10°C	within 5s.

(b)) When the lead terminal for radial lead type must be processed because the lead pith and the PCB holes in spacing do not match, process it without any stresses to Conductive Polymer Aluminum Electrolytic Capacitors.

(c) Solder without any excessive stresses to Conductive Polymer Aluminum Electrolytic Capacitors itself.

(d)) When Conductive Polymer Aluminum Electrolytic Capacitors has been soldered once and needs to be removed, remove it after the solder has been completely melted.

(e)) Do not let the tip of the soldering iron touch the Conductive Polymer Aluminum Electrolytic Capacitors itself.

6. Flow soldering

(a) Soldering condition should be under the following ranges.

Recommended flow soldering condition

Conditions	Temperature	Time	Flow number
Preheating	120°C or less (ambient temperature)	120 sec. or less	1 time
Soldering conditions	260 ± 5°C or less	10 ± 1 sec. or less	2 times or less ※1

※1. When soldering 2 times, immersion time should be 10 ± 1 sec. or less.

(b) Do not apply flow soldering to SMD type.

(c) Do not solder Conductive Polymer Aluminum Electrolytic Capacitors itself by submerging it in melted solder. Solder the opposite side that the Conductive Polymer Aluminum Electrolytic Capacitors is mounted on.

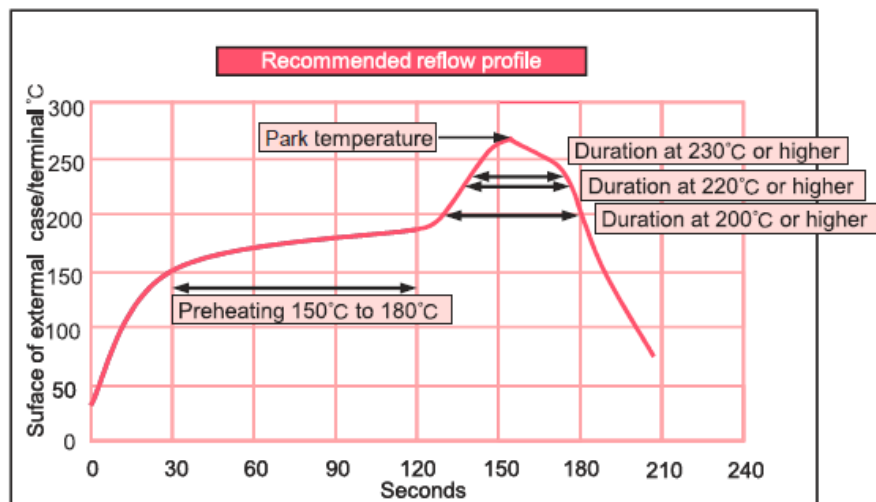
(d) Note that flux does not adhere to anywhere except the lead terminal.

(e) Note that other components do not fall over and touch the Conductive Polymer Aluminum Electrolytic Capacitors when soldering.

7. Reflow soldering

(a) Soldering condition should be under the following ranges.

Recommended reflow soldering condition



※All temperatures are measured on the topside of the Al-can and terminal surface

(b) Conductive Polymer Hybrid Aluminum Electrolytic Capacitors

Voltage Range(V)	16~63	80~125
Peak Temperature	260°C, 5sec. max.	250°C, 5sec. max.
Preheat Temperature	120 sec. max.	120 sec. max.
Duration at 200°C or higher	100 sec. max.	100 sec. max.
Duration at 220°C or higher	80 sec. max.	80 sec. max.
Duration at 230°C or higher	40 sec. max.	40 sec. max.
Reflow number	twice or less	twice or less

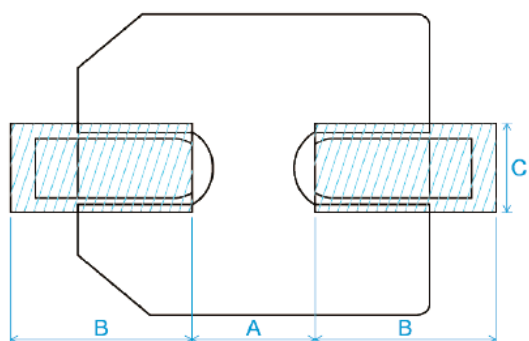
(c) Conductive Polymer Aluminum Solid Capacitors

Item	Polymer	
Peak Temperature	250°C or less	260°C or less
Preheat Temperature	150°C~180°C 90±3sec.	
Duration at 200°C or higher	60 sec. max.	60 sec. max.
Duration at 220°C or higher	50 sec. max.	50 sec. max.
Duration at 230°C or higher	40 sec. max.	40 sec. max.
Reflow number	twice or less	only 1 time

※Reflow should be performed twice or less. Please ensure that the capacitor became cold enough to the room temperature (5 to 35°C) before the second reflow.

(d) Do not apply reflow soldering to Radial Lead type.

(e) RECOMMENDED LAND PATTEND DIMENSION OFPCB



ØD	a	b	c
Ø5	1.4	3.0	1.6
Ø6.3	1.9	3.5	1.6
Ø8	3.1	4.2	2.2
Ø10	4.5	4.4	2.2
Ø10(G)	3.8	4.8	4.1

“(G)” – Anti vibration structure.

8. Handling after soldering

- (a) Do not tilt, bend or twist Conductive Polymer Aluminum Electrolytic Capacitors.
- (b)) Do not move the PCB with catching Conductive Polymer Aluminum Electrolytic Capacitors itself.
- (c) When stacking PCBs, make sure that the Conductive Polymer Aluminum Electrolytic Capacitors does not touch other PCBs or components.
- (d)) Do not dump the Conductive Polymer Aluminum Electrolytic Capacitors with objects.

9. Cleaning PCB

Check the following items before washing PC board with these detergents: high quality alcohol-based cleaning fluid such as Pine- α ST-100S, clean thru 750H, 750L, 710M, 750K or Techno Care FRW 14 through 17 or detergents including substitute Freon as AK-225AES or IPA.

- (a) Use immersion or ultrasonic waves to clean within 2 minutes on polymer conductive type.
- (b) The temperature of the cleaning fluid should be less than 60°C.
- (c) Watch the contamination of the detergent as conductivity, ph, specific gravity, water content, etc.
- (d)) Do not store the Conductive Polymer Aluminum Electrolytic Capacitors in a location subject to gases from the cleaning fluid or in an airtight container after cleaning.
- (e)) Dry the PCB or Conductive Polymer Aluminum Electrolytic Capacitors with hot air that should be less than the maximum operating temperature. Please note that Indication may disappear when rubbing print side after washing as a cleaner.
- (f) Please contact us for details about detergents, cleaning methods and about detergents other than those listed above.

10. Fixatives and coating materials

- (a) Select the appropriate covering and sealant materials for Conductive Polymer Aluminum Electrolytic Capacitors. In particular, make sure the fixative, coating and thinner do not contain acetone.
- (b)) Before applying a fixative or coating, completely remove any flux residue and foreign matter from the area where the board and Conductive Polymer Aluminum Electrolytic Capacitors will be jointed together.
- (c) Allow any detergent to dry before applying the fixative or coating.
- (d)) Please contact us for fixative and coating heat curing conditions.

▪ Environmental Consideration

Compliance with RoHS Directive

Substance	Symbol	Maximum Limit (ppm)
Cadmium and Cadmium Compounds	Cd	100
Lead and Lead Compounds	Pb	1000
Mercury and Mercury Compounds	Hg	1000
Hexavalent Chromium Compounds	Cr6+	1000
Polybrominated Biphenyls	PBBs	1000
Polybrominated Diphenyl Ethers	PBDEs	1000
Dibutyl phthalate	DBP	1000
Benzyl butyl phthalate	BBP	1000
Bis(2-Ethylhexyl) phthalate	DEHP	1000
Diisobutyl phthalate	DIBP	1000

Conductive Polymer Hybrid Aluminum Electrolytic Capacitors

HRA Series

- Low ESR.
- High Voltage, Long Life.
- 105°C, 5,000~10,000hrs.
- RoHS compliant & Halogen Free
- For high reliability applications. (Automotive equipment, Base station equipment, etc.)

Specifications

Items	Conditions	Characteristics
Category Temperature Range	-	-55 to +105°C
Rated Voltage Range	-	16 ~ 125V
Capacitance Tolerance	at 20°C, 120 Hz	±20% (M)
Surge Voltage	at 15 ~ 35°C	Rated voltage x 1.15V
Leakage Current	at 20°C after 2 minutes	$I \leq 0.01CV$ or $3(\mu A)$ Whichever is greater measured, after 2 minutes application of rated working voltage at +20°C. Please see the attached characteristics list
Dissipation Factor (tan δ)	at 20°C, 120 Hz	Please see the attached characteristics list
Endurance	The following specifications shall be satisfied when the capacitors are restored to 20°C after the rated voltage is applied for 5,000 to 10,000 hours at 105°C. Φ 6.3=5,000hrs, D ≥ Φ 8=10,000hrs.	Appearance NO significant damage.
		Capacitance change $\leq \pm 30\%$ of the initial value.
		DF (tan δ) $\leq 200\%$ of the initial specified value.
		ESR $\leq 200\%$ of the initial specified value.
		Leakage current $\leq$ The initial specified value.
Damp Heag (Steady State)	The following specifications shall be satisfied when the capacitors are restored to 20°C after subjecting them to store at 60°C, 90 to 95% RH for 1,000 hours, without DC applied.	Appearance NO significant damage.
		Capacitance change $\leq \pm 30\%$ of the initial value.
		DF (tan δ) $\leq 200\%$ of the initial specified value.
		ESR $\leq 200\%$ of the initial specified value.
		Leakage current $\leq$ The initial specified value.
Surge Voltage	The capacitors shall be subjected to 1,000 cycles each consisting of charge with the surge voltages specified at 15~35°C for 30 seconds through a protective resistor ($R = 1 k\Omega$) and discharge for 5 minutes 30 seconds.	Appearance NO significant damage.
		Capacitance change $\leq \pm 30\%$ of the initial value.
		DF (tan δ) $\leq 200\%$ of the initial specified value.
		ESR $\leq 200\%$ of the initial specified value.
		Leakage current $\leq$ The initial specified value.

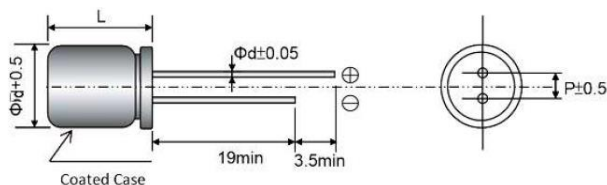
※ Note: If any doubt arises, measure the leakage current after following voltage treatment.
Voltage treatment: DC rated voltage are applied to the capacitors for 120 minutes at 105°C.

Frequency Coefficient of Permissible Ripple Current

Capacitance (μF)	Frequency (Hz)			
	100 ≤ F < 1K	1K ≤ F < 10K	10K ≤ F < 100K	100K ≤ F
4.7 < C ≤ 33	0.05	0.32	0.67	1.00
33 < C	0.10	0.35	0.70	1.00



Dimensions



(UNIT: mm)

Size (ΦDxL)	6.3×7.2	8×9.5	10×9.5	10×11.5
ΦD	6.3	8.0	10	10
L	L+1.5 max	L+1.5 max	L+1.5 max	L+1.5 max
Φd	0.5	0.6	0.6	0.6
P	2.5	3.5	5.0	5.0

HRA SERIES STANDARD CHARACTERISTICS LIST

Rated Voltage (S.V.)	Cap (μF)	Size DxL	Leakage current (μA) max.	ESR (mΩ) max. 100k to 300 KHz / 20°C	Rated Ripple Current (mA rms) 100 KHz / 105°C	D.F. (tanδ) max. 120 Hz / 20°C
16 (18.4)	120	6.3×7.2	19	40	1,500	0.16
	270	8×9.5	43	26	2,000	0.16
	470	10×9.5	75	21	2,600	0.16
	560	10×11.5	90	15	3,000	0.16
25 (28.8)	68	6.3×7.2	17	45	1,400	0.16
	150	8×9.5	38	27	1,900	0.16
	270	10×9.5	68	22	2,500	0.16
	330	10×11.5	83	16	2,900	0.16
35 (40.3)	47	6.3×7.2	16	60	1,300	0.16
	100	8×9.5	35	30	1,800	0.16
	150	10×9.5	53	23	2,400	0.16
	220	10×11.5	77	17	2,800	0.16
40 (46)	27	6.3×7.2	11	70	1,200	0.16
	56	8×9.5	22	32	1,700	0.16
	100	10×9.5	40	24	2,400	0.16
	120	10×11.5	48	18	2,700	0.16
50 (57.5)	15	6.3×7.2	8	80	1,200	0.16
	33	8×9.5	17	35	1,600	0.16
	56	10×9.5	28	25	2,300	0.16
	82	10×11.5	41	19	2,600	0.16
63 (72.5)	10	6.3×7.2	6	100	1,000	0.16
	22	8×9.5	14	40	1,500	0.16
	33	8×9.5	21	40	1,500	0.16
		10×9.5	21	30	2,100	0.16
	47	10×9.5	30	30	2,100	0.16
	56	10×11.5	35	22	2,400	0.16
80 (92)	12	10×9.5	10	70	1,600	0.16
	15	10×9.5	12	70	1,600	0.16
	18	10×11.5	14	50	1,800	0.16
100 (115)	10	10×9.5	10	80	1,400	0.16
	12	10×9.5	12	80	1,400	0.16
	15	10×11.5	15	60	1,600	0.16
125 (143.8)	10	10×9.5	13	90	1,200	0.16

Conductive Polymer Hybrid Aluminum Electrolytic Capacitors

HRB Series

- Low ESR.
- High Voltage, Long Life.
- 125°C, 2,000~4,000hrs.
- RoHS Compliant & Halogen Free
- For automotive modules and other high temperature applications

Specifications

Items	Conditions	Characteristics
Category Temperature Range	-	-55 to +125°C
Rated Voltage Range	-	16 ~ 50V
Capacitance Tolerance	at 20°C, 120 Hz	±20% (M)
Surge Voltage	at 15 ~ 35°C	Rated voltage x 1.15V
Leakage Current	at 20°C after 2 minutes	$I \leq 0.01CV$ or $3(\mu A)$ Whichever is greater measured, after 2 minutes application of rated working voltage at +20°C. Please see the attached characteristics list
Dissipation Factor (tan δ)	at 20°C, 120 Hz	Please see the attached characteristics list
Endurance	The following specifications shall be satisfied when the capacitors are restored to 20°C after the rated voltage is applied for 2,000 to 4,000 hours at 125°C. $\Phi 6.3=2,000\text{hrs}, D \geq \Phi 8=4,000\text{hrs}$.	Appearance NO significant damage.
		Capacitance change $\leq \pm 30\%$ of the initial value.
		DF (tan δ) $\leq 200\%$ of the initial specified value.
		ESR $\leq 200\%$ of the initial specified value.
		Leakage current $\leq$ The initial specified value.
Damp Heag (Steady State)	The following specifications shall be satisfied when the capacitors are restored to 20°C after subjecting them to store at 60°C, 90 to 95% RH for 1,000 hours, without DC applied.	Appearance NO significant damage.
		Capacitance change $\leq \pm 30\%$ of the initial value.
		DF (tan δ) $\leq 200\%$ of the initial specified value.
		ESR $\leq 200\%$ of the initial specified value.
		Leakage current $\leq$ The initial specified value.
Surge Voltage	The capacitors shall be subjected to 1,000 cycles each consisting of charge with the surge voltages specified at 15~35°C for 30 seconds through a protective resistor ($R = 1\text{ k}\Omega$) and discharge for 5 minutes 30 seconds.	Appearance NO significant damage.
		Capacitance change $\leq \pm 30\%$ of the initial value.
		DF (tan δ) $\leq 200\%$ of the initial specified value.
		ESR $\leq 200\%$ of the initial specified value.
		Leakage current $\leq$ The initial specified value.

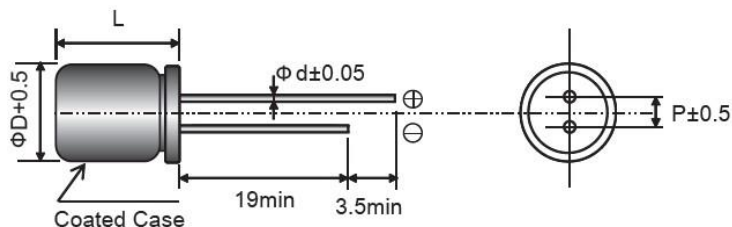
※ Note : If any doubt arises, measure the leakage current after following voltage treatment.
 Voltage treatment : DC rated voltage are applied to the capacitors for 120 minutes at 125°C.

Frequency Coefficient for Ripple Current

Capacitance (μF)	Frequency (Hz)			
	$100 \leq F < 1K$	$1K \leq F < 10K$	$10K \leq F < 100K$	$100K \leq F$
$4.7 < C \leq 33$	0.05	0.32	0.67	1.00
$33 < C$	0.10	0.35	0.70	1.00



Dimensions



(UNIT: mm)

Size (ΦDxL)	6.3×7.2	8×9.5	10×9.5	10×11.5
ΦD	6.3	8.0	10	10
L	L+1.5 max	L+1.5 max	L+1.5 max	L+1.5 max
Φd	0.5	0.6	0.6	0.6
P	2.5	3.5	5.0	5.0

HRB SERIES STANDARD CHARACTERISTICS LIST

Rated Voltage (S.V.)	Cap (μF)	Size DxL	Leakage current (μA) max.	ESR (mΩ) max. 100k to 300 KHz / 20°C	Rated Ripple Current (mA rms) 100 KHz / 125°C	D.F. (tanδ) max. 120 Hz / 20°C
16 (18.4)	120	6.3×7.2	19	40	1,100	0.16
	270	8×9.5	43	26	1,500	0.16
	470	10×9.5	75	21	2,000	0.16
	560	10×11.5	90	15	2,300	0.16
	68	6.3×7.2	17	45	1,000	0.16
25 (28.8)	150	8×9.5	38	27	1,300	0.16
	270	10×9.5	68	22	1,500	0.16
	330	10×11.5	83	16	1,700	0.16
	47	6.3×7.2	16	60	900	0.16
35 (43.3)	100	8×9.5	35	30	1,200	0.16
	150	10×9.5	53	23	1,400	0.16
	220	10×11.5	77	17	1,600	0.16
	27	6.3×7.2	11	70	900	0.16
40 (46)	56	8×9.5	22	32	1,200	0.16
	100	10×9.5	40	24	1,400	0.16
	120	10×11.5	48	18	1,600	0.16
	15	6.3×7.2	8	80	800	0.16
50 (57.5)	33	8×9.5	17	35	1,100	0.16
	56	10×9.5	28	25	1,300	0.16
	82	10×11.5	41	19	1,500	0.16

Conductive Polymer Hybrid Aluminum Electrolytic Capacitors

HSA Series

- Low ESR.
- High Voltage, Long Life.
- 105°C, 5,000~10,000hrs.
- RoHS Compliant
- For high reliability applications. (Automotive equipment, Base station equipment, etc.)

Specifications

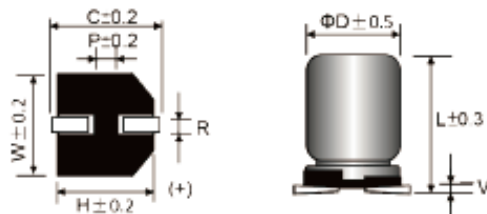
Items	Conditions	Characteristics
Category Temperature Range	-	-55 to +105°C
Rated Voltage Range	-	16 ~ 125V
Capacitance Tolerance	at 20°C, 120 Hz	±20% (M)
Surge Voltage	at 15 ~ 35°C	Rated voltage x 1.15V
Leakage Current	at 20°C after 2 minutes	$I \leq 0.01CV$ or $3(\mu A)$ Whichever is greater measured, after 2 minutes application of rated working voltage at +20°C. Please see the attached characteristics list
Dissipation Factor (tan δ)	at 20°C, 120 Hz	Please see the attached characteristics list
Endurance	The following specifications shall be satisfied when the capacitors are restored to 20°C after the rated voltage is applied for 5,000 to 10,000 hours at 105°C. $\Phi 6.3=5,000\text{hrs}, D \geq \Phi 8=10,000\text{hrs}.$	Appearance NO significant damage.
		Capacitance change $\leq \pm 30\%$ of the initial value.
		DF (tan δ) $\leq 200\%$ of the initial specified value.
		ESR $\leq 200\%$ of the initial specified value.
		Leakage current $\leq$ The initial specified value.
Damp Heag (Steady State)	The following specifications shall be satisfied when the capacitors are restored to 20°C after subjecting them to store at 60°C, 90 to 95% RH for 1,000 hours, without DC applied.	Appearance NO significant damage.
		Capacitance change $\leq \pm 30\%$ of the initial value.
		DF (tan δ) $\leq 200\%$ of the initial specified value.
		ESR $\leq 200\%$ of the initial specified value.
		Leakage current $\leq$ The initial specified value.
Surge Voltage	The capacitors shall be subjected to 1,000 cycles each consisting of charge with the surge voltages specified at 15~35°C for 30 seconds through a protective resistor ($R = 1\text{ k}\Omega$) and discharge for 5 minutes 30 seconds.	Appearance NO significant damage.
		Capacitance change $\leq \pm 30\%$ of the initial value.
		DF (tan δ) $\leq 200\%$ of the initial specified value.
		ESR $\leq 200\%$ of the initial specified value.
		Leakage current $\leq$ The initial specified value.

※ Note : If any doubt arises, measure the leakage current after following voltage treatment.
Voltage treatment : DC rated voltage are applied to the capacitors for 120 minutes at 105°C.

Frequency Coefficient for Ripple Current

Capacitance (μF)	Frequency (Hz)			
	$100 \leq F < 1K$	$1K \leq F < 10K$	$10K \leq F < 100K$	$100K \leq F$
$4.7 < C \leq 33$	0.05	0.32	0.67	1.00
$33 < C$	0.10	0.35	0.70	1.00

Dimensions



(UNIT: mm)

Size	ψD	L	W	H	C	R	P	V max
6.3x6.0	6.3	6.0	6.6	6.6	7.3	0.5~0.8	2.1	0.3
6.3x7.7	6.3	7.7	6.6	6.6	7.3	0.5~0.8	2.1	0.3
8x10.5	8.0	10.5	8.3	8.3	9.0	0.7~1.1	3.2	0.3
10x10.5	10.0	10.5	10.3	10.3	11.0	0.7~1.3	4.5	0.3
10x12.5	10.0	12.5	10.3	10.3	11.0	0.7~1.3	4.5	0.3

HSA SERIES STANDARD CHARACTERISTICS LIST

Rated Voltage (S.V.)	Cap (μF)	Size DxL	Leakage current (μA) max.	ESR (mΩ) max. 100k to 300 KHz / 20°C	Rated Ripple Current (mA rms) 100 KHz / 105°C	D.F. (tanδ) max. 120 Hz / 20°C
16 (18.4)	82	6.3 x 6.0	13	55	1,380	0.16
	120	6.3x7.7	19	40	1,500	0.16
	270	8x10.5	43	26	2,000	0.16
	470	10x10.5	75	21	2,600	0.16
	560	10x12.5	90	15	3,000	0.16
25 (28.8)	47	6.3 x 6.0	12	60	1,270	0.16
	68	6.3x7.7	17	45	1,400	0.16
	150	8x10.5	38	27	1,900	0.16
	270	10x10.5	68	22	2,500	0.16
	330	10x12.5	83	16	2,900	0.16
35 (40.3)	27	6.3 x 6.0	9	100	1,080	0.16
	47	6.3x7.7	16	60	1,300	0.16
	100	8x10.5	35	30	1,800	0.16
	150	10x10.5	53	23	2,400	0.16
	220	10x12.5	77	17	2,800	0.16
40 (46)	18	6.3 x 6.0	7	110	1,030	0.16
	27	6.3x7.7	11	70	1,200	0.16
	56	8x10.5	22	32	1,700	0.16
	100	10x10.5	40	24	2,400	0.16
	120	10x12.5	48	18	2,700	0.16
50 (57.5)	10	6.3 x 6.0	5	120	980	0.16
	15	6.3x7.7	8	80	1,200	0.16
	33	8x10.5	17	35	1,600	0.16
	56	10x10.5	28	25	2,300	0.16
	82	10x12.5	41	19	2,600	0.16



HSA SERIES STANDARD CHARACTERISITICS LIST

Rated Voltage (S.V.)	Cap (μ F)	Size DxL	Leakage current (μ A) max.	ESR (m Ω) max. 100k to 300 KHz / 20°C	Rated Ripple Current (mA rms) 100 KHz / 105°C	D.F. (tan δ) max. 120 Hz / 20°C
63 (72.5)	6.8	6.3 x 6.0	4	150	960	0.16
	10	6.3x7.7	6	100	1,000	0.16
	22	8x10.5	14	40	1,500	0.16
	33	8x10.5	21	40	1,500	0.16
		10x10.5	21	30	2,100	0.16
	47	10x10.5	30	30	2,100	0.16
80 (92)	56	10x12.5	35	22	2,400	0.16
	12	10x10.5	10	70	1,600	0.16
	15	10x10.5	12	70	1,600	0.16
	18	10x12.5	14	50	1,800	0.16
100 (115)	10	10x10.5	10	80	1,400	0.16
	12	10x10.5	12	80	1,400	0.16
	15	10x12.5	15	60	1,600	0.16
125 (143.8)	10	10x10.5	13	90	1,200	0.16

Conductive Polymer Hybrid Aluminum Electrolytic Capacitors

HSB Series

- Low ESR.
- High Voltage, Long Life.
- 125°C, 2,000~4,000hrs.
- RoHS Compliant
- For automotive modules and other high temperature applications

Specifications

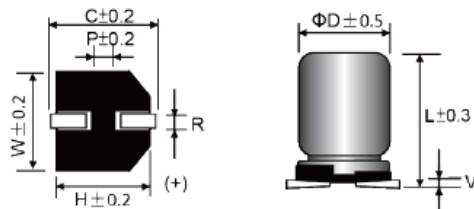
Items	Conditions	Characteristics
Category Temperature Range	-	-55 to +125°C
Rated Voltage Range	-	16 ~ 125V
Capacitance Tolerance	at 20°C, 120 Hz	±20% (M)
Surge Voltage	at 15 ~ 35°C	Rated voltage x 1.15V
Leakage Current	at 20°C after 2 minutes	$I \leq 0.01CV$ or $3(\mu A)$ Whichever is greater measured, after 2 minutes application of rated working voltage at +20°C. Please see the attached characteristics list
Dissipation Factor (tan δ)	at 20°C, 120 Hz	Please see the attached characteristics list
Endurance	The following specifications shall be satisfied when the capacitors are restored to 20°C after the rated voltage is applied for 2,000 to 4,000 hours at 125°C. $\Phi 6.3=2,000\text{hrs}, D \geq \Phi 8=4,000\text{hrs}.$	Appearance NO significant damage.
		Capacitance change $\leq \pm 30\%$ of the initial value.
		DF (tan δ) $\leq 200\%$ of the initial specified value.
		ESR $\leq 200\%$ of the initial specified value.
		Leakage current $\leq$ The initial specified value.
Damp Heag (Steady State)	The following specifications shall be satisfied when the capacitors are restored to 20°C after subjecting them to store at 60°C, 90 to 95% RH for 1,000 hours, without DC applied.	Appearance NO significant damage.
		Capacitance change $\leq \pm 30\%$ of the initial value.
		DF (tan δ) $\leq 200\%$ of the initial specified value.
		ESR $\leq 200\%$ of the initial specified value.
		Leakage current $\leq$ The initial specified value.
Surge Voltage	The capacitors shall be subjected to 1,000 cycles each consisting of charge with the surge voltages specified at 15~35°C for 30 seconds through a protective resistor ($R = 1\text{ k}\Omega$) and discharge for 5 minutes 30 seconds.	Appearance NO significant damage.
		Capacitance change $\leq \pm 30\%$ of the initial value.
		DF (tan δ) $\leq 200\%$ of the initial specified value.
		ESR $\leq 200\%$ of the initial specified value.
		Leakage current $\leq$ The initial specified value.

※ Note : If any doubt arises, measure the leakage current after following voltage treatment.
Voltage treatment : DC rated voltage are applied to the capacitors for 120 minutes at 125°C.

Frequency Coefficient for Ripple Current

Capacitance (μF)	Frequency (Hz)			
	$100 \leq F < 1K$	$1K \leq F < 10K$	$10K \leq F < 100K$	$100K \leq F$
$4.7 < C \leq 33$	0.05	0.32	0.67	1.00
$33 < C$	0.10	0.35	0.70	1.00

Dimensions



(Unit: mm)

Size	Φ D	L	w	H	C	R	P	Vmax
6.3x6.0	6.3	6.0	6.6	6.6	7.3	0.5-0.8	2.1	0.3
6.3x7.7	6.3	7.7	6.6	6.6	7.3	0.5-0.8	2.1	0.3
8x10.5	8.0	10.5	8.3	8.3	9.0	0.7-1.1	3.2	0.3
10x10.5	10.0	10.5	10.3	10.3	11.0	0.7-1.3	4.5	0.3
10x12.5	10.0	12.5	10.3	10.3	11.0	0.7-1.3	4.5	0.3

HSB SERIES STANDARD CHARACTERISTICS LIST

Rated Voltage (S.V)	Cap (μF)	Size Code DxL	Leakage Current (μA) max.	ESR (mΩ) max. 100k to 300kHz/20°C	Rated Ripple Current(mA rms) 100kHz / 125° C	D.F. (tanδ) max. 120Hz/20°C
16 (18.8)	82	6.3x6.0	13	55	970	0.16
	120	6.3x7.7	19	40	1,100	0.16
	270	8x10.5	43	26	1,500	0.16
	470	10x10.5	75	21	2,000	0.16
	560	10x12.5	90	15	2,300	0.16
25 (28.8)	47	6.3x6.0	12	60	890	0.16
	68	6.3x7.7	17	45	1,100	0.16
	150	8x10.5	38	27	1,300	0.16
	270	10x10.5	68	22	1,500	0.16
	330	10x12.5	83	16	1,700	0.16
35 (40.3)	27	6.3x6.0	9	100	760	0.16
	47	6.3x7.7	16	60	900	0.16
	100	8x10.5	35	30	1,200	0.16
	150	10x10.5	53	23	1,400	0.16
	220	10x12.5	77	17	1,700	0.16
40 (46.0)	18	6.3x6.0	7	110	720	0.16
	27	6.3x7.7	11	70	900	0.16
	56	8x10.5	22	32	1,200	0.16
	100	10x10.5	40	24	1,400	0.16
	120	10x12.5	48	18	1,600	0.16
50 (57.5)	10	6.3x6.0	5	120	690	0.16
	15	6.3x7.7	8	80	800	0.16
	33	8x10.5	17	35	1,100	0.16
	56	10x10.5	28	25	1,300	0.16
	82	10x12.5	41	19	1,500	0.16



HSB SERIES STANDARD CHARACTERISTICS LIST

Rated Voltage (S.V)	Cap (μ F)	Size Code DxL	Leakage Current (μ A) max.	ESR (m Ω) max. 100k to 300kHz/20°C	Rated Ripple Current(mA rms) 100kHz / 125° C	D.F. (tan δ) max. 120Hz/20°C
63 (72.5)	6.8	6.3x6.0	4	150	670	0.16
	10	6.3x7.7	6	100	700	0.16
	22	8x10.5	14	40	1,000	0.16
	33	8x10.5	21	40	1,000	0.16
		10x10.5	21	30	1,200	0.16
	47	10x10.5	30	30	1,200	0.16
	56	10x12.5	35	22	1,400	0.16
80 (92.0)	12	10x10.5	10	70	900	0.16
	15	10x10.5	12	70	900	0.16
	18	10x12.5	14	50	1,100	0.16
100 (115)	10	10x10.5	10	80	800	0.16
	12	10x10.5	12	80	800	0.16
	15	10x12.5	15	60	1,000	0.16
125 (143.8)	10	10x10.5	13	90	700	0.16

Conductive Polymer Hybrid Aluminum Electrolytic Capacitors

HSC Series

- Low ESR, Anti-vibration, Peak acceleration:30G
- High Voltage, Long Life.
- 105°C, 10,000hrs.
- RoHS compliant
- For high reliability applications. (Automotive equipment, Base station equipment, etc.)

Items	Conditions	Characteristics
Category Temperature Range	—	-55 to +105°C
Rated Voltage Range	—	16 ~ 125V
Capacitance Tolerance	at 20°C,120Hz	±20%(M)
Surge Voltage	at 15 ~ 35°C	Rated voltage ×1.15V
Leakage Current	at 20°C after 2 minutes	$I \leq 0.01CV$ or $3(\mu A)$ Whichever is greater measured, after 2 minutes application of rated working voltage at +20°C. Please see the attached characteristics list
Dissipation Factor (tanδ)	at 20°C,120Hz	Please see the attached characteristics list
Endurance	The following specifications shall be satisfied when the capacitors are restored to 20°C after the rated voltage is applied for 10,000 hours at 105°C.	Appearance NO significant damage.
		Capacitance change $\leq \pm 30\%$ of the initial value.
		DF (tan δ) $\leq 200\%$ of the initial specified
		ESR $\leq 200\%$ of the initial specified
		Leakage $\leq$ The initial specified value.
Damp Heag (SteadyState)	The following specifications shall be satisfied when the capacitors are restored to 20°C after subjecting them to subjecting them to store at 60°C, 90 to 95% RH for 1,000 hours, without DC applied.	Appearance NO significant damage.
		Capacitance change $\leq \pm 30\%$ of the initial value.
		DF (tan δ) $\leq 200\%$ of the initial specified
		ESR $\leq 200\%$ of the initial specified
		Leakage $\leq$ The initial specified value.
Surge Voltage	The capacitors shall be subjected to 1,000 cycles each consisting of charge with the surge voltages specified at 15~35°C for 30 seconds through a protective resistor (R = 1 kΩ) and discharge for 5 minutes 30 seconds.	Appearance NO significant damage.
		Capacitance change $\leq \pm 30\%$ of the initial value.
		DF (tan δ) $\leq 200\%$ of the initial specified
		ESR $\leq 200\%$ of the initial specified
		Leakage $\leq$ The initial specified value.

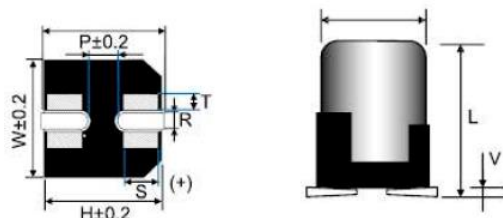
※ Note : If any doubt arises, measure the leakage current after following voltage treatment.
 Voltage treatment : DC rated voltage are applied to the capacitors for 120 minutes at 105°C.

Frequency Coefficient of Permissible Ripple Current

Capacitance (μF)	Frequency (Hz)			
	$100 \leq F < 1K$	$1K \leq F < 10K$	$10K \leq F < 100K$	$100K \leq F$
$4.7 < C \leq 33$	0.05	0.32	0.67	1.00
$33 < C$	0.10	0.35	0.70	1.00



Conductive Polymer Hybrid Aluminum Electrolytic Capacitors Dimensions



(Unit: mm)

Size	D ±0.5	L ±0.5	W ±0.2	H ±0.2	C ±0.2	R	p ±0.2	V _{max}
6.3×6.0	6.3	6.0	6.6	6.6	7.3	0.5~0.8	2.1	0.3
6.3×8.0	6.3	8.0	6.6	6.6	7.3	0.5~0.8	2.1	0.3
8×10.5	8.0	10.5	8.3	8.3	9.0	1.0~1.4	3.2	0.3
10×10.5	10.0	10.5	10.3	10.3	11.0	1.0~1.4	4.5	0.3
10×12.5	10.0	12.5	10.3	10.3	11.0	1.0~1.4	4.5	0.3

HSC SERIES STANDARD CHARACTERISTICS LIST

Rated Voltage (S.V)	Cap (μF)	Size Code D×L	Leakage Current (μA) max.	ESR (mΩ) max. 100k to 300kHz/20°C	Rated Ripple Current (mA rms) 100kHz / 105° C	D.F (tanδ) max. 120Hz/20°C
16 (18.4)	82	6.3 x6.0	13	55	1,380	0.16
	120	6.3x8.0	19	40	1,500	0.16
	270	8x10.5	43	26	2,000	0.16
	470	10x10.5	75	21	2,600	0.16
	560	10x12.5	90	15	3,000	0.16
25 (28.8)	47	6.3x6.0	12	60	1,270	0.16
	68	6.3x8.0	17	45	1,400	0.16
	150	8x10.5	38	27	1,900	0.16
	270	10x10.5	68	22	2,500	0.16
	330	10x12.5	83	16	2,900	0.16
35 (40.3)	27	6.3x6.0	9	100	1,080	0.16
	47	6.3x8.0	16	60	1,300	0.16
	100	8x10.5	35	30	1,800	0.16
	150	10x10.5	53	23	2,400	0.16
	220	10x12.5	77	17	2,800	0.16
40 (46.0)	18	6.3x6.0	7	110	1,030	0.16
	27	6.3x8.0	11	70	1,200	0.16
	56	8x10.5	22	32	1,700	0.16
	100	10x10.5	40	24	2,400	0.16
	120	10x12.5	48	18	2,700	0.16
50 (57.5)	10	6.3x6.0	5	120	980	0.16
	15	6.3x8.0	8	80	1,200	0.16
	33	8x10.5	17	35	1,600	0.16
	56	10x10.5	28	25	2,300	0.16
	82	10x12.5	41	19	2,600	0.16



HSC SERIES STANDARD CHARACTERISTICS LIST

Rated Voltage (S.V)	Cap (μ F)	Size Code DxL	Leakage Current (μ A) max.	ESR (m Ω) max. 100k to 300kHz/20°C	Rated Ripple Current (mA rms) 100kHz / 105° C	D.F (tan δ) max. 120Hz/20°C
63 (72.5)	6.8	6.3x6.0	4	150	960	0.16
	10	6.3x8.0	6	100	1,000	0.16
	22	8x10.5	14	40	1,500	0.16
	33	8x10.5	21	40	1,500	0.16
		10x10.5	21	30	2,100	0.16
	47	10x10.5	30	30	2,100	0.16
80 (92.0)	56	10x12.5	35	22	2,400	0.16
	12	10x10.5	10	70	1,600	0.16
	15	10x10.5	12	70	1,600	0.16
	18	10x12.5	14	50	1,800	0.16
100 (115.0)	10	10x10.5	10	80	1,400	0.16
	12	10x10.5	12	80	1,400	0.16
	15	10x12.5	15	60	1,600	0.16
125 (143.8)	10	10x10.5	13	90	1,200	0.16

Conductive Polymer Hybrid Aluminum Electrolytic Capacitors

HSD Series

- Low ESR, Anti-vibration, Peak acceleration:30G
- High Voltage, Long Life.
- 125°C, 4,000hrs.
- RoHS compliant
- For automotive modules and other high temperature applications

Item	Conditions	Characteristics
Category Temperature Range	—	-55 to +125°C
Rated Voltage Range	—	16 ~ 125V
Capacitance Tolerance	at 20°C,120Hz	±20%(M)
Surge Voltage	at 15 ~ 35°C	Rated voltage ×1.15V
Leakage Current	at 20°C after 2 minutes	$I \leq 0.01CV$ or $3(\mu A)$ Whichever is greater measured, after 2 minutes application of rated working voltage at +20°C. Please see the attached characteristics list
Dissipation Factor (tanδ)	at 20°C,120Hz	Please see the attached characteristics list
Endurance	The following specifications shall be satisfied when the capacitors are restored to 20°C after the rated voltage is applied for 4,000 hours at 125°C.	Appearance NO significant damage.
		Capacitance change $\leq \pm 30\%$ of the initial value.
		DF (tan δ) $\leq 200\%$ of the initial specified value
		ESR $\leq 200\%$ of the initial specified value
		Leakage Current $\leq$ The initial specified value.
Damp Heag (SteadyState)	The following specifications shall be satisfied when the capacitors are restored to 20°C after subjecting them to subjecting them to store at 60°C, 90 to 95% RH for 1,000 hours, without DC applied.	Appearance NO significant damage.
		Capacitance change $\leq \pm 30\%$ of the initial value.
		DF (tan δ) $\leq 200\%$ of the initial specified value
		ESR $\leq 200\%$ of the initial specified value
		Leakage Current $\leq$ The initial specified value.
Surge Voltage	The capacitors shall be subjected to 1,000 cycles each consisting of charge with the surge voltages specified at 15~35°C for 30 seconds through a protective resistor (R = 1 kΩ) and discharge for 5 minutes 30 seconds.	Appearance NO significant damage.
		Capacitance change $\leq \pm 30\%$ of the initial value.
		DF (tan δ) $\leq 200\%$ of the initial specified value
		ESR $\leq 200\%$ of the initial specified value
		Leakage Current $\leq$ The initial specified value.

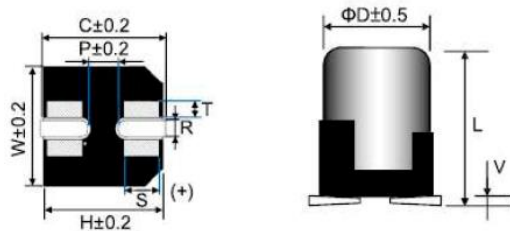
※ Note: If any doubt arises, measure the leakage current after following voltage treatment.
Voltage treatment: DC rated voltage are applied to the capacitors for 120 minutes at 125°C.

Frequency Coefficient of Permissible Ripple Current

Capacitance (μF)	Frequency(Hz)			
	$100 \leq F < 1K$	$1K \leq F < 10K$	$10K \leq F < 100K$	$100K \leq F$
$4.7 < C \leq 33$	0.05	0.32	0.67	1.00
$33 < C$	0.10	0.35	0.70	1.00

Conductive Polymer Hybrid Aluminum Electrolytic Capacitors

Dimensions



(Unit: mm)

Size	D±0.5	L±0.5	W±0.2	H±0.2	C±0.2	R	P±0.2	V _{max}
6.3x6.0	6.3	6.0	6.6	6.6	7.3	0.5~0.8	2.1	0.3
6.3x8.0	6.3	8.0	6.6	6.6	7.3	0.5~0.8	2.1	0.3
8x10.5	8.0	10.5	8.3	8.3	9.0	1.0~1.4	3.2	0.3
10x10.5	10.0	10.5	10.3	10.3	11.0	1.0~1.4	4.5	0.3
10x12.5	10.0	12.5	10.3	10.3	11.0	1.0~1.4	4.5	0.3

HSD SERIES STANDARD CHARACTERISTICS LIST

Rated Voltage (S.V)	Cap (μF)	Size Code DxL	Leakage Current (μA) max.	ESR (mΩ) max.100k to 300kHz / 20°C	Rated Ripple Current (mA rms) 100kHz / 125°C	D.F (tanδ) max. 120Hz / 20°C
16 (18.4)	82	6.3x6.0	13	55	970	0.16
	120	6.3x8.0	19	40	1,100	0.16
	270	8x10.5	43	26	1,500	0.16
	470	10x10.5	75	21	2,000	0.16
	560	10x12.5	90	15	2,300	0.16
25 (28.8)	47	6.3x6.0	12	60	890	0.16
	68	6.3x8.0	17	45	1,100	0.16
	150	8x10.5	38	27	1,300	0.16
	270	10x10.5	68	22	1,500	0.16
	330	10x12.5	83	16	1,700	0.16
35 (40.3)	27	6.3x6.0	9	100	760	0.16
	47	6.3x8.0	16	60	900	0.16
	100	8x10.5	35	30	1,200	0.16
	150	10x10.5	53	23	1,400	0.16
	220	10x12.5	77	17	1,700	0.16
40 (46.0)	18	6.3x6.0	7	110	720	0.16
	27	6.3x8.0	11	70	900	0.16
	56	8x10.5	22	32	1,200	0.16
	100	10x10.5	40	24	1,400	0.16
	120	10x12.5	48	18	1,600	0.16
50 (57.5)	10	6.3x6.0	5	120	690	0.16
	15	6.3x8.0	8	80	800	0.16
	33	8x10.5	17	35	1,100	0.16
	56	10x10.5	28	25	1,300	0.16



HSD SERIES STANDARD CHARACTERISTICS LIST

Rated Voltage (S.V)	Cap (μF)	Size Code DxL	Leakage Current (μA) max.	ESR (mΩ) max.100k to 300kHz / 20°C	Rated Ripple Current (mA rms) 100kHz / 125°C	D.F (tanδ) max. 120Hz /20°C
	82	10x12.5	41	19	1,500	0.16
63 (72.5)	6.8	6.3×6.0	4	150	670	0.16
	10	6.3×8.0	6	100	700	0.16
	22	8x10.5	14	40	1,000	0.16
	33	8x10.5	21	40	1,000	0.16
		10x10.5	21	40	1,200	0.16
		10x10.5	30	30	1,200	0.16
	56	10x12.5	35	22	1,400	0.16
80 (92.0)	12	10x10.5	10	70	900	0.16
	15	10x10.5	12	70	900	0.16
	18	10x12.5	14	50	1,100	0.16
100 (115.0)	10	10x10.5	10	80	800	0.16
	12	10x10.5	12	80	800	0.16
	15	10x12.5	15	60	1,000	0.16
125 (143.8)	10	10x10.5	13	90	700	0.16

Conductive Polymer Hybrid Aluminum Electrolytic Capacitors

HSE Series

- Low ESR. High Temperature
- High Voltage, Long Life.
- 135°C, 1,000 to 2,000hrs.
- RoHS compliant
- For automotive modules and other high temperature applications

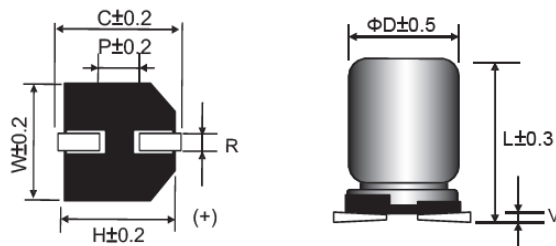
Items	Conditions	Characteristics	
Category Temperature Range	—	-55 to +135°C	
Rated Voltage Range	—	25 ~ 63V	
Capacitance Tolerance	at 20°C, 120Hz	±20%(M)	
Surge Voltage	at 15 ~ 35°C	Rated voltage ×1.15V	
Leakage Current	at 20°C after 2 minutes	$I \leq 0.01CV$ or $3(\mu A)$ Whichever is greater measured, after 2 minutes application of rated working voltage at +20°C. Please see the attached characteristics list	
Dissipation Factor (tan δ)	at 20°C, 120Hz	Please see the attached characteristics list	
Endurance	The following specifications shall be satisfied when the capacitors are restored to 20°C after the rated voltage is applied for 1,000 to 2,000 hours at 135°C. Φ6.3=1,000hrs, D≥Φ8=2,000hrs.	Appearance	NO significant damage.
		Capacitance change	≤ ±30% of the initial value.
		DF (tan δ)	≤ 200% of the initial specified value.
		ESR	≤ 200% of the initial specified value.
		Leakage Current	≤ The initial specified value.
Damp Heag (Steady State)	The following specifications shall be satisfied when the capacitors are restored to 20°C after subjecting them to subjecting them to store at 60°C, 90 to 95% RH for 1,000 hours, without DC applied.	Appearance	NO significant damage.
		Capacitance change	≤ ±30% of the initial value.
		DF (tan δ)	≤ 200% of the initial specified value.
		ESR	≤ 200% of the initial specified value.
		Leakage Current	≤ The initial specified value.
Surge Voltage	The capacitors shall be subjected to 1,000 cycles each consisting of charge with the surge voltages specified at 15~35°C for 30 seconds through a protective resistor (R = 1 kΩ) and discharge for 5 minutes 30 seconds.	Appearance	NO significant damage.
		Capacitance change	≤ ±30% of the initial value.
		DF (tan δ)	≤ 200% of the initial specified value.
		ESR	≤ 200% of the initial specified value.
		Leakage	≤ The initial specified value.

※ Note: If any doubt arises, measure the leakage current after following voltage treatment.
Voltage treatment: DC rated voltage are applied to the capacitors for 120 minutes at 135°C.

Frequency Coefficient of Permissible Ripple Current

Capacitance (μF)	Frequency(Hz)			
	$100 \leq F < 1K$	$1K \leq F < 10K$	$10K \leq F < 100K$	$100K \leq F$
$4.7 < C \leq 33$	0.05	0.32	0.67	1.00
$33 < C$	0.10	0.35	0.70	1.00

Dimensions



(UNIT: mm)

Size	Φ D	L	W	H	C	R	P	V max
6.3×7.7	6.3	7.7	6.6	6.6	7.3	0.5~0.8	2.1	0.3
8×10.5	8.0	10.5	8.3	8.3	9.0	0.7~1.1	3.2	0.3
10×10.5	10.0	10.5	10.3	10.3	11.0	0.7~1.3	4.5	0.3
10×12.5	10.0	12.5	10.3	10.3	11.0	0.7~1.3	4.5	0.3

HSE SERIES STANDARD CHARACTERISITICS LIST

Rated voltage (S.V.)	Cap (μF)	Size Code DxL	Leakage current (μA) max.	ESR (mΩ) max. 100k to 300kHz / 20°C	Rated Ripple Current (mA rms) 100kHz / 135°C	D.F. (tanδ) max. 120Hz / 20°C
25 (28.8)	68	6.3×7.7	17	45	750	0.16
	150	8×10.5	38	27	1,000	0.16
	270	10×10.5	68	22	1,200	0.16
	330	10×12.5	83	16	1,350	0.16
35 (40.3)	47	6.3×7.7	16	60	730	0.16
	100	8×10.5	35	30	1,000	0.16
	150	10×10.5	53	23	1,100	0.16
	220	10×12.5	77	17	1,300	0.16
40 (46)	27	6.3×7.7	11	70	700	0.16
	56	8×10.5	22	32	950	0.16
	100	10×10.5	40	24	1,100	0.16
	120	10×12.5	48	18	1,300	0.16
50 (57.5)	15	6.3×7.7	8	80	650	0.16
	33	8×10.5	17	35	900	0.16
	56	10×10.5	28	25	1,100	0.16
	82	10×12.5	41	19	1,250	0.16
63 (72.5)	10	6.3×7.7	6	100	550	0.16
	22	8×10.5	14	40	850	0.16
	33	8×10.5	21	40	850	0.16
		10×10.5	21	30	1,000	0.16
	47	10×10.5	30	30	1,000	0.16
	56	10×12.5	35	22	1,100	0.16



PRA Series

- Standard radial lead type
- Rated voltage: 2.5~25V
- Endurance: 2,000 hours at 105°C
- Applications: motherboards, servers, VGA, etc
- RoHS Compliant
- Halogen Free compliant

Specifications

Items	Conditions	Characteristics
Category Temperature Range	-	-55 to +105°C
Rated Voltage Range	-	2.5 ~ 25V
Capacitance Tolerance	at 20°C, 120 Hz	±20% (M)
Surge Voltage	at 105°C	Rated voltage x 1.15V
Leakage Current	at 20°C after 2 minutes	$I \leq 0.2CV$ or $300(\mu A)$ Whichever is greater measured, after 2 minutes application of rated working voltage at +20°C. Please see the attached characteristics list
Dissipation Factor (tan δ)	at 20°C, 120 Hz	Please see the attached characteristics list
Characteristics of Impedance at low, high temperature	at -55°C, 100 KHz	$Z(-55^{\circ}C) / Z(+20^{\circ}C) \leq 1.25$
	at -25°C, 100 KHz	$Z(-25^{\circ}C) / Z(+20^{\circ}C) \leq 1.15$
Endurance	The following specifications shall be satisfied when the capacitors are restored to 20°C after the rated voltage is applied for 2,000 hours at 105°C.	Appearance NO significant damage.
		Capacitance change $\leq \pm 20\%$ of the initial value.
		DF (tan δ) $\leq 150\%$ of the initial specified value.
		ESR $\leq 150\%$ of the initial specified value.
		Leakage current $\leq$ The initial specified value.
Damp Heag (Steady State)	The following specifications shall be satisfied when the capacitors are restored to 20°C after subjecting them to store 60°C, 90 to 95% RH for 1,000 hours, without DC applied.	Appearance NO significant damage.
		Capacitance change $\leq \pm 20\%$ of the initial value.
		DF (tan δ) $\leq 150\%$ of the initial specified value.
		ESR $\leq 150\%$ of the initial specified value.
		Leakage current $\leq$ The initial specified value.
Surge Voltage	The capacitors shall be subjected to 1,000 cycles each consisting of charge with the surge voltages specified at 105°C for 30 seconds through a protective resistor (R = 1 kΩ) and discharge for 5 minutes 30 seconds.	Appearance NO significant damage.
		Capacitance change $\leq \pm 20\%$ of the initial value.
		DF (tan δ) $\leq 150\%$ of the initial specified value.
		ESR $\leq 150\%$ of the initial specified value.
		Leakage current $\leq$ The initial specified value.

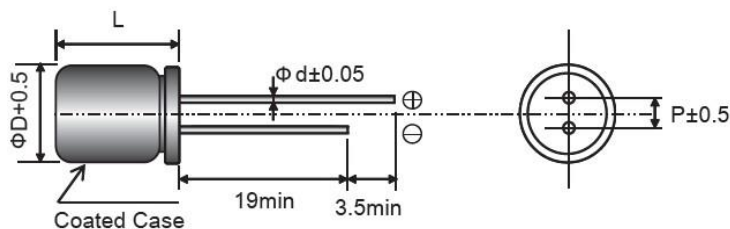
※ Note : If any doubt arises, measure the leakage current after following voltage treatment.
Voltage treatment : DC rated voltage are applied to the capacitors for 120 minutes at 105°C.

Frequency Coefficient for Ripple Current

Frequency	$120\text{Hz} \leq f < 1\text{KHz}$	$1\text{KHz} \leq f < 10\text{KHz}$	$10\text{KHz} \leq f < 100\text{KHz}$	$100\text{KHz} \leq f < 500\text{KHz}$
Coefficient	0.05	0.3	0.7	1



Dimensions



(UNIT: mm)

Size (ΦDxL)	5x6	5x8	6.3x6	6.3x8	6.3x11	8x8	8x12	10x12, 14
ΦD	5	5	6.3	6.3	6.3	8.0	8.0	10
L	L+1.0 max	L+1.0 max	L+1.0 max	L+1.5 max	L+1.0 max	L+1.0 max	L+1.0 max	L+1.0 max
Φd	0.45	0.5	0.45	0.5	0.5	0.6	0.6	0.6
P	2	2	2.5	2.5	2.5	3.5	3.5	5.0

PRA SERIES STANDARD CHARACTERISTICS LIST

Rated Voltage (S.V.)	Cap (μF)	Size DxL	Leakage current (μA) max. ※2	ESR (mΩ) max. 100k to 300 KHz / 20°C	Rated Ripple Current (mA rms) 100 KHz / 105°C	D.F. (tanδ) max. 120 Hz /
2.5 (2.9)	390	6.3x6	300	35	2,100	0.12
	560	6.3x8	300	12	3,500	0.12
	560	8x8	300	12	4,320	0.12
	820	6.3x8	410	12	5,200	0.12
	1,200	8x8	600	12	5,200	0.12
	1,500	8x12	750	10	5,200	0.12
	2,700	10x12	1,350	10	5,230	0.12
4 (4.6)	270	6.3x6	300	35	2,000	0.12
	560	6.3x8	448	15	3,500	0.12
	680	6.3x8	544	15	3,500	0.12
	820	8x8	656	13	5,100	0.12
	1,000	8x12	800	12	5,100	0.12
	2,200	10x12	1,760	12	5,560	0.12
6.3 (7.2)	82	5x6	300	40	1,700	0.12
	100	6.3x6	300	35	1,900	0.12
	220	6.3x6	300	35	1,900	0.12
	470	6.3x8	592	15	3,630	0.12
	560	6.3x8	706	15	3,630	0.12
	560	8x8	706	15	4,210	0.12
	680	8x8	857	15	4,710	0.12
	1,000	8x12	1,260	14	5,100	0.12
	1,500	10x10	1,890	15	5,400	0.12
	2,200	10x12	2,772	15	5,400	0.12
10 (11.5)	47	5x8	300	25	2,200	0.12
	220	5x8	440	25	2,200	0.12
	330	6.3x8	660	25	3,560	0.12
	680	8x8	1,360	25	3,700	0.12
	820	8x12	1,640	12	4,500	0.12
	1,500	10x12	3,000	12	5,440	0.12
16 (18.4)	47	6.3x6	300	25	1,620	0.12
	82	6.3x6	300	25	1,890	0.12
	100	6.3x6	320	25	1,890	0.12
	270	6.3x8	864	15	2,680	0.12
	470	8x8	1,504	15	2,820	0.12
	560	8x12	1,792	20	3,640	0.12
	680	10x12	2,176	16	4,270	0.12
	820	10x12	2,624	16	4,270	0.12
	1,000	10x12	3,200	16	4,270	0.12

※※ 1. Capacitance tolerance : ±20% (M)

※※ 2. After 2 minutes



PRA SERIES STANDARD CHARACTERISITICS LIST

Rated Voltage (S.V.)	Cap (μ F)	Size DxL	Leakage current (μ A) max. ※2	ESR (m Ω) max. 100k to 300 KHz / 20°C	Rated Ripple Current (mA rms) 100 KHz / 105°C	D.F. (tan δ) max. 120 Hz /
20 (23.0)	22	6.3x6	300	60	1,450	0.12
	82	6.3x6	328	60	1,450	0.12
	220	6.3x8	880	40	1,620	0.12
	330	8x8	1,320	40	2,400	0.12
	470	8x12	1,880	24	3,320	0.12
	820	10x12	3,280	20	3,800	0.12
25 (28.7)	6.8	6.3x6	300	80	1,200	0.12
	47	6.3x6	300	40	2,000	0.12
	100	6.3x8	500	30	2,150	0.12
	180	8x8	900	30	2,580	0.12
	220	8x12	1,100	25	3,200	0.12
	330	10x10	1,650	28	3,800	0.12
	470	10x12	2,350	25	4,100	0.12
	560	10x14	2,800	20	4,500	0.12
	680	8x16	3,400	20	4,600	0.12
	820	10x14	4,100	20	5,000	0.12

※※ 1. Capacitance tolerance : $\pm 20\%$ (M)

※※ 2. After 2 minutes

PRB Series

- Low ESR at high frequency range
- Rated voltage : 2.5~16V
- Endurance : 2,000 hours at 105°C
- Applications: LCD Monitor, LCD-TV, D/A Inverter, SPS, D/D Converter. etc
- RoHS Compliant
- Halogen Free compliant

Specifications

Items	Conditions	Characteristics
Category Temperature Range	-	-55 to +105°C
Rated Voltage Range	-	2.5 ~ 16V
Capacitance Tolerance	at 20°C, 120 Hz	±20% (M)
Surge Voltage	at 105°C	Rated voltage x 1.15v
Leakage Current	at 20°C after 2 minutes	I ≤ 0.2CV or 300(μA) Whichever is greater measured, after 2minutes application of rated working voltage at +20°C. Please see the attached characteristics list
Dissipation Factor (tan δ)	at 20°C, 120 Hz	Please see the attached characteristics list
Characteristics of Impedance at low, high temperature	at -55°C, 100 KHz	$Z(-55^{\circ}\text{C}) / Z(+20^{\circ}\text{C}) \leq 1.25$
	at -25°C, 100 KHz	$Z(-25^{\circ}\text{C}) / Z(+20^{\circ}\text{C}) \leq 1.15$
Endurance	The following specifications shall be satisfied when the capacitors are restored to 20°C after the rated voltage is applied for 2,000 hours at 105°C.	Appearance NO significant damage.
		Capacitance change ≤ ±20% of the initial value.
		DF (tan δ) ≤ 150% of the initial specified value.
		ESR ≤ 150% of the initial specified value.
		Leakage current ≤ The initial specified value.
Damp Heag (Steady State)	The following specifications shall be satisfied when the capacitors are restored to 20°C after subjecting them to store 60°C, 90 to 95% RH for 1,000 hours, without DC applied.	Appearance NO significant damage.
		Capacitance change ≤ ±20% of the initial value.
		DF (tan δ) ≤ 150% of the initial specified value.
		ESR ≤ 150% of the initial specified value.
		Leakage current ≤ The initial specified value.
Surge Voltage	The capacitors shall be subjected to 1,000 cycles each consisting of charge with the surge voltages specified at 105°C for 30 seconds through a protective resistor (R = 1 kΩ) and discharge for 5 minutes 30 seconds.	Appearance NO significant damage.
		Capacitance change ≤ ±20% of the initial value.
		DF (tan δ) ≤ 150% of the initial specified value.
		ESR ≤ 150% of the initial specified value.
		Leakage current ≤ The initial specified value.

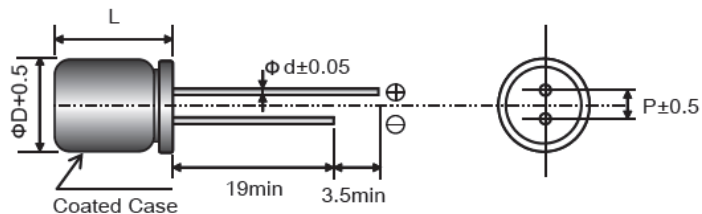
※ Note : If any doubt arises, measure the leakage current after following voltage treatment.
 Voltage treatment : DC rated voltage are applied to the capacitors for 120 minutes at 105°C.

Frequency Coefficient for Ripple Current

Frequency	120Hz ≤ f < 1KHz	1KHz ≤ f < 10KHz	10KHz ≤ f < 100KHz	100KHz ≤ f < 500KHz
Coefficient	0.05	0.3	0.7	1



Dimensions



(UNIT: mm)

ΦDxL	5x6, 8	6.3x6	6.3x8	6.3x11	8x8	8x12	8x16	8x20	10x12	10x16, 20
ΦD	5	6.3	6.3	6.3	8	8	8	8	10	10
L	L+1.0 max	L+1.0 max	L+1.5 max	L+1.0 max	L+1.5 max	L+1.0 max	L+1.0 max	L+1.5 max	L+1.0 max	L+1.5 max
Φd	0.45	0.45	0.5	0.5	0.6	0.6	0.6	0.6	0.6	0.6
P	2	2.5	2.5	2.5	3.5	3.5	3.5	3.5	5.0	5.0

PRB SERIES STANDARD CHARACTERISTICS LIST

Rated Voltage (S.V.)	Cap (μF)	Size DxL	Leakage current (μA) max. ※2	ESR (mΩ) max. 100k to 300 KHz / 20°C	Rated Ripple Current (mA rms) 100 KHz / 105°C	D.F. (tanδ) max. 120 Hz /
2.5 (2.9)	560	6.3x8	300	8	5,080	0.12
	560	8x8	300	7	5,820	0.12
	820	6.3x8	410	8	5,080	0.12
	1,200	8x8	600	7	5,580	0.12
	1,500	8x12	750	7	5,820	0.12
	2,700	10x12	1,350	7	6,100	0.12
4 (4.6)	560	6.3x8	448	8	5,080	0.12
	560	8x8	448	7	5,580	0.12
	680	8x8	544	7	5,580	0.12
	820	8x12	656	7	5,820	0.12
	2200	10x12	1,760	7	6,100	0.12
6.3 (7.2)	100	5x6	300	30	1,500	0.12
	270	5x8	340	15	2,400	0.12
	470	6.3x8	592	10	4,500	0.12
	560	6.3x8	706	10	5,080	0.12
	560	8x8	706	10	5,580	0.12
	1,000	8x12	1,260	7	5,820	0.12
	1,000	10x12	1,260	7	6,200	0.12
	2,200	10x12	2,772	7	6,200	0.12
10 (11.5)	220	6.3x8	440	10	2,820	0.12
	270	6.3x8	540	10	3,580	0.12
	560	8x8	1,120	8	5,580	0.12
	680	8x8	1,360	9	5,580	0.12
	820	8x12	1,640	9	5,820	0.12
	1,000	10x12	2,000	9	6,100	0.12
	1,500	10x12	3,000	9	6,100	0.12

※※ 1. Capacitance tolerance : ±20% (M)

※※ 2. After 2 minutes



PRB SERIES STANDARD CHARACTERISITICS LIST

Rated Voltage (S.V.)	Cap (μ F)	Size DxL	Leakage current (μ A) max. ※2	ESR (m Ω) max. 100k to 300 KHz / 20°C	Rated Ripple Current (mA rms) 100 KHz /	D.F. (tan δ) max. 120 Hz /
16 (18.4)	82	6.3×6	300	30	2,200	0.12
	100	6.3×6	320	30	2,20	0.1
	220	6.3×8	704	15	3,500	0.1
	270	6.3×8	864	15	3,50	0.1
	330	6.3×1	1,05	15	3,500	0.12
	470	8×8	1,50	13	4,50	0.1
	470	8×12	1,50	13	5,400	.12
	470	10×12	1,504	13	6,100	0.1
	560	8x12	1,79	16	5,400	0.12
	680	10×12	2,17	16	6,10	0.1
	820	10×12	2,62	10	6,10	0.1
	100	8x16	3,20	10	6,10	0.1
	100	10×12	3,20	10	6,10	0.1
	150	8x20	4,80	8	6,10	0.1
	150	10x16	4,80	8	6,500	0.10
	1800	10x20	5,76	8	6,800	0.1
	2200	10×20	7,04	8	6,800	0.10

※※ 1. Capacitance tolerance : $\pm 20\%$ (M)

※※ 2. After 2 minutes



PRC Series

- Super low ESR, High ripple current capability
- Rated voltage : 2.5~50V
- Endurance : 5,000 hours at 105°C
- Applications: Servers, LCD-TV power, Inverter etc
- RoHS Compliant
- Halogen Free compliant

Specifications

Items	Conditions	Characteristics
Category Temperature Range	-	-55 to +105°C
Rated Voltage Range	-	2.5 ~ 50V
Capacitance Tolerance	at 20°C, 120 Hz	±20% (M)
Surge Voltage	at 105°C	Rated voltage x 1.15v
Leakage Current	at 20°C after 2 minutes	$I \leq 0.2CV$ or $300(\mu A)$ Whichever is greater measured, after 2minutes application of rated working voltage at +20°C. Please see the attached characteristics list
Dissipation Factor (tan δ)	at 20°C, 120 Hz	Please see the attached characteristics list
Characteristics of Impedance at low, high temperature	at -55°C, 100 KHz	$Z(-55^{\circ}C) / Z(+20^{\circ}C) \leq 1.25$
	at -25°C, 100 KHz	$Z(-25^{\circ}C) / Z(+20^{\circ}C) \leq 1.15$
Endurance	The following specifications shall be satisfied when the capacitors are restored to 20°C after the rated voltage is applied for 5,000 hours at 105°C.	Appearance NO significant damage.
		Capacitance change $\leq \pm 20\%$ of the initial value.
		DF (tan δ) $\leq 150\%$ of the initial specified value.
		ESR $\leq 150\%$ of the initial specified value.
		Leakage current $\leq$ The initial specified value.
Damp Heag (Steady State)	The following specifications shall be satisfied when the capacitors are restored to 20°C after subjecting them to store 60°C, 90 to 95% RH for 1,000 hours, without DC applied.	Appearance NO significant damage.
		Capacitance change $\leq \pm 20\%$ of the initial value.
		DF (tan δ) $\leq 150\%$ of the initial specified value.
		ESR $\leq 150\%$ of the initial specified value.
		Leakage current $\leq$ The initial specified value.
Surge Voltage	The capacitors shall be subjected to 1,000 cycles each consisting of charge with the surge voltages specified at 105°C for 30 seconds through a protective resistor (R = 1 kΩ) and discharge for 5 minutes 30 seconds.	Appearance NO significant damage.
		Capacitance change $\leq \pm 20\%$ of the initial value.
		DF (tan δ) $\leq 150\%$ of the initial specified value.
		ESR $\leq 150\%$ of the initial specified value.
		Leakage current $\leq$ The initial specified value.

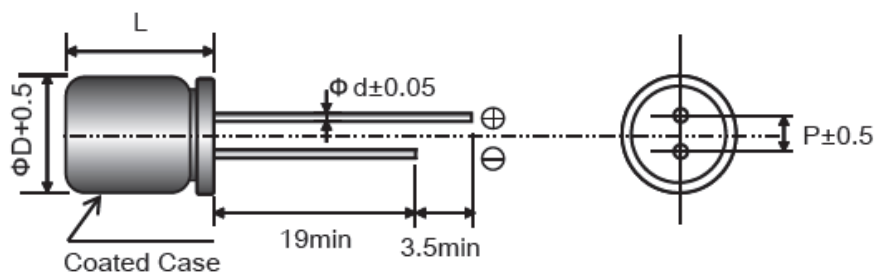
※ Note : If any doubt arises, measure the leakage current after following voltage treatment.
Voltage treatment : DC rated voltage are applied to the capacitors for 120 minutes at 105°C.

Frequency Coefficient for Ripple Current

Frequency	$120\text{Hz} \leq f < 1\text{KHz}$	$1\text{KHz} \leq f < 10\text{KHz}$	$10\text{KHz} \leq f < 100\text{KHz}$	$100\text{KHz} \leq f < 500\text{KHz}$
Coefficient	0.05	0.3	0.7	1



Dimensions



(UNIT: mm)

ΦDxL	5x7	6.3x6	6.3x8	6.3x9	8x8	8x12	10x10	10x12
ΦD	5	6.3	6.3		8.0	8.0	10	10
L	L+1.0 max	L+1.0 max	L+1.5 max		L+1.5 max	L+1.0 max	L+1.0 max	L+1.0 max
Φd	0.45	0.45	0.5		0.5	0.6	0.6	0.6
P	2	2.5	2.5		2.5	3.5	5.0	5.0

PRC SERIES STANDARD CHARACTERISTICS LIST

Rated Voltage (S.V.)	Cap (μF)	Size DxL	Leakage current (μA) max. ※2	ESR (mΩ) max. 100k to 300 KHz / 20°C	Rated Ripple Current (mA rms) 100 KHz / 105°C	D.F. (tanδ) max. 120 Hz / 20°C
2.5 (2.9)	560	6.3 x8	300	7	5000	0.10
	560	8x8	300	7	5,70	0.12
	820	6.3x8	410	7	5000	0.10
	820	8x8	410	7	5,70	0.12
	1200	8x8	600	15	5,70	0.12
	1500	8x12	750	12	5,80	0.12
	2,70	10x12	1,350	12	6,10	0.12
4 (4.6)	150	5x7	300	20	1.50	0.10
	220	5x7	300	20	1.50	0.10
	220	6.3x6	300	35	2,00	0.12
	560	6.3x8	448	20	5,00	0.12
	1000	8x8	800	15	3,64	0.12
	1200	10x10	960	10	5,20	0.12
	1800	8x12	1,440	10	5,20	0.12
6.3 (7.2)	2,20	10x12	1,760	10	5,50	0.12
	100	6.3x6	300	35	2,00	0.12
	220	6.3x6	300	35	2,00	0.12
	330	6.3x8	415	20	2,000	0.12
	470	6.3x8	592	20	2,00	0.12
	560	8x8	705	15	3,64	0.12
	680	8x8	856	15	3,64	0.12
	1000	8x12	1,260	10	5,00	0.12
	1,00	s x12	1,260	10	5,500	0.12
	1,20	10x10	1,512	10	5,50	0.12
	1,80	10x12	2,268	10	5,50	0.12
10 (11.5)	100	6.3x6	300	20	2,000	0.12
	330	6.3x8	660	20	2,00	0.12
	560	8x8	1,120	15	3,00	0.12
	680	8x12	1,360	15	4,50	0.12
	1000	10x10	2,000	10	4,500	0.12
	1200	10x12	2,400	10	5,50	0.12



PRC SERIES STANDARD CHARACTERISTICS LIST

Rated Voltage (S.V.)	Cap (μ F)	Size DxL	Leakage current (μ A) max. ※2	ESR (m Ω) max. 100k to 300 KHz / 20°C	Rated Ripple Current (mA rms) 100KHz / 105°C	D.F. (tan δ) max. 120Hz / 20°C
16 (18.4)	82	6.3x6	300	24	2,400	0.12
	100	6.3x6	300	24	2,400	0.12
	220	6.3x8	704	24	2,400	0.12
	300	8x8	1056	15	4000	0.12
	470	8x12	1504	15	4500	0.12
	820	10x12	2624	15	4720	0.12
	1000	10x12	3200	15	4720	0.12
25 (28.75)	47	6.3x6	300	40	1500	0.12
	100	6.3x8	500	40	2100	0.12
	180	8x8	900	30	2100	0.12
	22	8x12	1100	30	2300	0.12
	330	10x10	1650	25	2500	0.12
	330	10x12	1650	20	2500	0.12
	470	10x12	2350	25	2800	0.12
35 (40.25)	22	6.3x6	300	70	1450	0.12
	68	6.3x8	476	60	1450	0.12
	100	8x8	700	50	2100	0.12
	120	8x8	840	50	2100	0.12
	150	8x12	1050	50	2100	0.12
	220	10x10	1540	40	2500	0.12
	270	10x12	1890	40	2500	0.12
	330	10x12	2310	40	2500	0.12
50 (57.5)	12	6.3x6	300	100	660	0.12
	33	6.3x9	330	50	900	0.12
	47	8x8	470	45	1,850	0.12
	100	10x12	1,000	28	2,560	0.12
	180	10x12	1,800	28	2,560	0.12
63 (72.5)	22	6.3x	300	65	1,350	0.1
	33	8x8	415	40	1,600	0.1
	47	8x12	592	38	2,100	0.1
	56	10x1	705	38	2,100	0.1
	82	10x1	1,033	26	2,500	0.1
	100	10x1	1,260	26	2,550	0.1
	180	10x1	2,268	22	3,200	0.1

※ 1. Capacitance tolerance: $\pm 20\%$ (M)

※ 2. After 2 minutes

PRD Series

- Low ESR, High Voltage, High ripple current capability
- Rated voltage: 35~100V
- Endurance: 2,000hours at 105°C
- Applications: LED Driver, LED Power Supply, etc.
- RoHS Compliant
- Halogen Free compliant

Specifications

Items	Conditions	Characteristics
Category Temperature Range	-	-55 to +105°C
Rated Voltage Range	-	35 ~ 100V
Capacitance Tolerance	at 20°C, 120 Hz	±20% (M)
Surge Voltage	at 105°C	Rated voltage x 1.15v
Leakage Current	at 20°C after 2 minutes	$I \leq 0.2CV$ or $300(\mu A)$ Whichever is greater measured, after 2minutes application of rated working voltage at +20°C. Please see the attached characteristics list
Dissipation Factor (tan δ)	at 20°C, 120 Hz	Please see the attached characteristics list
Characteristics of Impedance at low, high temperature	at -55°C, 100 KHz	$Z(-55^{\circ}C) / Z(+20^{\circ}C) \leq 1.25$
	at -25°C, 100 KHz	$Z(-25^{\circ}C) / Z(+20^{\circ}C) \leq 1.15$
Endurance	The following specifications shall be satisfied when the capacitors are restored to 20°C after the rated voltage is applied for 2,000 hours at 105°C.	Appearance NO significant damage.
		Capacitance change $\leq \pm 20\%$ of the initial value.
		DF (tan δ) $\leq 150\%$ of the initial specified value.
		ESR $\leq 150\%$ of the initial specified value.
		Leakage current $\leq$ The initial specified value.
Damp Heag (Steady State)	The following specifications shall be satisfied when the capacitors are restored to 20°C after subjecting them to store 60°C, 90 to 95% RH for 1,000 hours, without DC applied.	Appearance NO significant damage.
		Capacitance change $\leq \pm 20\%$ of the initial value.
		DF (tan δ) $\leq 150\%$ of the initial specified value.
		ESR $\leq 150\%$ of the initial specified value.
		Leakage current $\leq$ The initial specified value.
Surge Voltage	The capacitors shall be subjected to 1,000 cycles each consisting of charge with the surge voltages specified at 105°C for 30 seconds through a protective resistor (R = 1 kΩ) and discharge for 5 minutes 30 seconds.	Appearance NO significant damage.
		Capacitance change $\leq \pm 20\%$ of the initial value.
		DF (tan δ) $\leq 150\%$ of the initial specified value.
		ESR $\leq 150\%$ of the initial specified value.
		Leakage current $\leq$ The initial specified value.

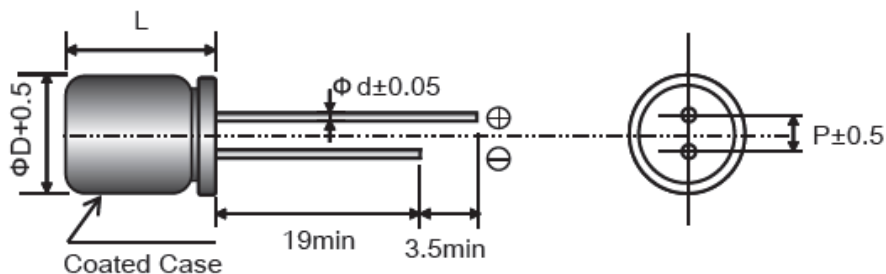
※ Note: If any doubt arises, measure the leakage current after following voltage treatment.
 Voltage treatment: DC rated voltage are applied to the capacitors for 120 minutes at 105°C.

Frequency Coefficient for Ripple Current

Frequency	$120\text{Hz} \leq f < 1\text{KHz}$	$1\text{KHz} \leq f < 10\text{KHz}$	$10\text{KHz} \leq f < 100\text{KHz}$	$100\text{KHz} \leq f < 500\text{KHz}$
Coefficient	0.05	0.3	0.7	1



Dimensions



(UNIT: mm)

ΦDxL	6.3×6	6.3×8	8×7	8×8	8×12	10×10	10×12	10×16
ΦD	6.3	6.3	8	8	8	10	10	10
L	L+1max	L+1.5 max	L+1.0 max	L+1.0 max	L+1.0 max	L+1.0 max	L+1.0 max	L+1.0 max
Φd	0.45	0.5	0.5	0.6	0.6	0.6	0.6	0.6
P	2.5	2.5	3.5	3.5	3.5	5.0	5.0	5.0

PRD SERIES STANDARD CHARACTERISTICS LIST

Rated Voltage (S.V.)	Cap (μF)	Size DxL	Leakage current (μA) max. ※2	ESR (mΩ) max. 100k to 300 KHz / 20°C	Rated Ripple Current (mA rms) 100 KHz / 105°C	D.F. (tanδ) max. 120 Hz / 20°C
35 (40.3)	22	6.3x6	300	70	1,450	0.12
	68	6.3x8	476	40	1,500	0.12
	82	8x7	574	60	1,800	0.12
	100	8x8	700	30	2,100	0.12
	100	8x12	700	26	2,300	0.12
	100	10x12	700	24	3,000	0.12
	150	8x8	1,050	30	2,500	0.12
	180	8x12	1,260	26	2,800	0.12
	220	10x10	1,540	26	3,000	0.12
	220	10x12	1,540	24	3,200	0.12
	330	10x12	2,310	24	3,600	0.12
50 (57.5)	470	10x16	3,290	20	5,000	0.12
	12	6.3x8	300	60	1,500	0.12
	33	6.3x8	330	60	1,500	0.12
	33	8x7	330	60	1,500	0.12
	47	8x8	470	32	1,850	0.12
	68	8x12	680	30	2,250	0.12
	47	8x12	470	30	2,250	0.12
	100	10x12	1,000	28	2,560	0.12
63 (72.5)	150	10x12	1,500	28	2,620	0.12
	22	6.3x8	300	60	1,500	0.12
	33	8x8	415	32	2,050	0.12
	33	10x10	415	32	2,200	0.12
	47	8x12	592	26	2,200	0.12
	56	10x10	705	30	2,300	0.12
	82	10x12	1,033	26	2,350	0.12
80 (92.0)	100	10x12	1,260	25	2,550	0.12
	22	8x8	352	35	1,850	0.12
	33	8x12	528	32	1,950	0.12
	47	10x10	752	33	2,200	0.12
100 (115.0)	68	10x12	1,088	28	2,350	0.12
	15	8x12	300	40	1,850	0.12
	22	10x12	440	38	2,250	0.12
	27	10x12	540	38	2,250	0.12

※ 1. Capacitance tolerance : ±20% (M)

※ 2. After 2 minutes

PRE Series

- High temperature, low ESR, High ripple current capability
- Rated voltage: 4~50V
- Endurance: 1,000hours at 125°C
- Applications: DC-DC Converters, Voltage Regulators, Decoupling
- Applications for Computer Motherboards, etc.
- RoHS Compliant
- Halogen Free compliant

Specifications

Items	Conditions	Characteristics
Category Temperature Range	-	-55 to +125°C
Rated Voltage Range	-	4 ~ 50V
Capacitance Tolerance	at 20°C, 120 Hz	±20% (M)
Surge Voltage	at 125°C	Rated voltage x 1.15v
Leakage Current	at 20°C after 2 minutes	$I \leq 0.2CV$ or $300(\mu A)$ Whichever is greater measured, after 2minutes application of rated working voltage at +20°C. Please see the attached characteristics list
Dissipation Factor (tan δ)	at 20°C, 120 Hz	Please see the attached characteristics list
Characteristics of Impedance at low, high temperature	at -55°C, 100KHz	$Z(-55^{\circ}C)/Z(+20^{\circ}C) \leq 1.25$
	at -25°C,100KHz	$Z(-25^{\circ}C)/Z(+20^{\circ}C) \leq 1.15$
Endurance	The following specifications shall be satisfied when the capacitors are restored to 20°C after the rated voltage is applied for 1,000 hours at 125°C.	Appearance NO significant damage.
		Capacitance change $\leq \pm 20\%$ of the initial value.
		DF (tan δ) $\leq 150\%$ of the initial specified value.
		ESR $\leq 150\%$ of the initial specified value.
		Leakage current $\leq$ The initial specified value.
Damp Heag (Steady State)	The following specifications shall be satisfied when the capacitors are restored to 20°C after subjecting them to store 60°C, 90 to 95% RH for 1,000 hours, without DC applied.	Appearance NO significant damage.
		Capacitance change $\leq \pm 20\%$ of the initial value.
		DF (tan δ) $\leq 150\%$ of the initial specified value.
		ESR $\leq 150\%$ of the initial specified value.
		Leakage current $\leq$ The initial specified value.
Surge Voltage	The capacitors shall be subjected to 1,000 cycles each consisting of charge with the surge voltages specified at 105°C for 30 seconds through a protective resistor ($R = 1\text{ k}\Omega$) and discharge for 5 minutes 30 seconds.	Appearance NO significant damage.
		Capacitance change $\leq \pm 20\%$ of the initial value.
		DF (tan δ) $\leq 150\%$ of the initial specified value.
		ESR $\leq 150\%$ of the initial specified value.
		Leakage current $\leq$ The initial specified value.

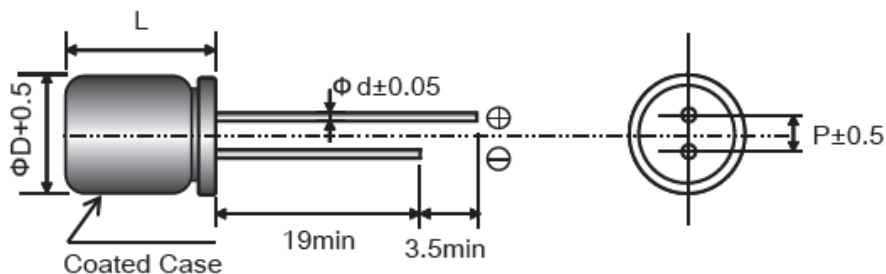
※ Note : If any doubt arises, measure the leakage current after following voltage treatment.
 Voltage treatment : DC rated voltage are applied to the capacitors for 120 minutes at 125°C.

Frequency Coefficient for Ripple Current

Frequency	$120\text{Hz} \leq f < 1\text{KHz}$	$1\text{KHz} \leq f < 10\text{KHz}$	$10\text{KHz} \leq f < 100\text{KHz}$	$100\text{KHz} \leq f < 500\text{KHz}$
Coefficient	0.05	0.3	0.7	1



Dimensions



(UNIT: mm)

ΦDxL	6.3x6	6.3x8	8x7	8x8	8x12	10x10	10x12
ΦD	6.3	6.3	8	8	8	10	10
L	L+1.0 max	L+1.5 max	L+1.0 max	L+1.5 max	L+1.0 max	L+1.0 max	L+1.0 max
Φd	0.45	0.5	0.5	0.6	0.6	0.6	0.6
P	2.5	2.5	3.5	3.5	3.5	5.0	5.0

PRE SERIES STANDARD CHARACTERISTICS LIST

Rated Voltage (S.V.)	Cap (μF)	Size DxL	Leakage current (μA) max. ※2	ESR (mΩ) max. 100k to 300 KHz / 20°C	Rated Ripple Current (mA rms)		D.F. (tanδ) max. 120 Hz / 20°C
					105°C 100 KHz	125°C 100 KHz	
4 (4.6)	100	6.3x6	300	40	2390	797	0.12
	330	6.3x8	300	20	3200	1067	0.12
	560	6.3x8	448	20	3200	1067	0.12
	1,000	8x8	800	20	3800	1267	0.12
	1,200	8x12	960	16	4200	1400	0.12
	2,500	10x12	2,000	16	5460	1820	0.12
6.3 (7.2)	100	6.3x6	300	40	2100	700	0.12
	470	6.3x8	592	20	3100	1033	0.12
	560	8x8	705	20	4300	1433	0.12
	1,000	8x12	1,260	16	5100	1700	0.12
	1,200	8x12	1,512	16	5100	1700	0.12
	1,500	10x10	1,890	20	5200	1733	0.12
	1,800	10x12	2,268	16	5440	1813	0.12
10 (11.5)	100	6.3x6	300	40	1800	600	0.12
	330	6.3x8	660	20	2360	787	0.12
	330	8x7	660	40	2560	853	0.12
	560	8x8	1,120	20	3200	1067	0.12
	820	8x12	1,640	16	4200	1400	0.12
	1,000	10x10	2,000	20	5120	1707	0.12
	1,200	10x12	2,400	16	5600	1867	0.12
16 (18.4)	47	6.3x6	300	30	1620	540	0.12
	82	6.3x6	300	30	1620	540	0.12
	100	6.3x8	320	20	2120	707	0.12
	330	8x8	1,056	20	4300	1433	0.12
	470	8x12	1,504	16	4500	1500	0.12
	560	10x12	1,792	16	4700	1567	0.12
	820	10x12	2,624	16	4700	1567	0.12
25 (28.8)	47	6.3x6	300	50	2000	667	0.12
	100	6.3x8	500	30	2000	667	0.12
	180	8x8	900	28	3100	1033	0.12
	220	8x12	1,100	26	3600	1200	0.12
	330	10x12	1,650	24	4250	1417	0.12
	470	10x12	2,350	24	4200	1400	0.12

PRE SERIES STANDARD CHARACTERISITICS LIST

Rated Voltage (S.V.)	Cap (μ F)	Size DxL	Leakage current (μ A) max. ※2	ESR (m Ω) max. 100k to 300 KHz / 20°C	Rated Ripple Current (mA rms)		D.F. (tan δ) max. 120 Hz / 20°C
					105°C 100 KHz	125°C 100 KHz	
35 (40.3)	22	6.3x6	300	70	1450	483	0.12
	68	6.3x8	476	60	1500	500	0.12
	120	8x8	840	30	2200	733	0.12
	150	8x12	1,050	28	2600	867	0.12
	220	10x10	1,540	28	2950	983	0.12
	270	10x12	1,890	28	3200	1067	0.12
50 (57.5)	10	6.3x6	300	60	1400	467	0.12
	33	6.3x8	330	60	1500	500	0.12
	47	8x8	470	30	2000	667	0.12
	68	8x12	680	28	2200	733	0.12
	100	10x10	1,000	28	2300	767	0.12
	100	10x12	1,000	28	2500	833	0.12

※ 1. Capacitance tolerance : $\pm 20\%$ (M)

※ 2. After 2 minutes

PRF Series

- High temperature, low ESR, High ripple current capability
- Rated voltage: 6.3~35V
- Endurance: 2,000hours at 125°C
- Applications: Lamps Power, LED Power, Service Equipment
- RoHS Compliant
- Halogen Free compliant

Specifications

Items	Conditions	Characteristics
Category Temperature Range	-	-55 to +125°C
Rated Voltage Range	-	6.3 ~ 35V
Capacitance Tolerance	at 20°C, 120 Hz	±20% (M)
Surge Voltage	at 125°C	Rated voltage x 1.15v
Leakage Current	at 20°C after 2 minutes	$I \leq 0.2CV$ or $300(\mu A)$ Whichever is greater measured, after 2minutes application of rated working voltage at +20°C. Please see the attached characteristics list
Dissipation Factor (tan δ)	at 20°C, 120 Hz	Please see the attached characteristics list
Characteristics of Impedance at low, high temperature	at -55°C, 100 KHz	$Z (-55^{\circ}C) / Z (+20^{\circ}C) \leq 1.25$
	at +25°C, 100 KHz	$Z (-25^{\circ}C) / Z (+20^{\circ}C) \leq 1.15$
Endurance	The following specifications shall be satisfied when the capacitors are restored to 20°C after the rated voltage is applied for 2,000 hours at 125°C.	Appearance NO significant damage.
		Capacitance change $\leq \pm 20\%$ of the initial value.
		DF (tan δ) $\leq 150\%$ of the initial specified value.
		ESR $\leq 150\%$ of the initial specified value.
		Leakage current $\leq$ The initial specified value.
Damp Heag (Steady State)	The following specifications shall be satisfied when the capacitors are restored to 20°C after subjecting them to store 60°C, 90 to 95% RH for 1,000 hours, without DC applied.	Appearance NO significant damage.
		Capacitance change $\leq \pm 20\%$ of the initial value.
		DF (tan δ) $\leq 150\%$ of the initial specified value.
		ESR $\leq 150\%$ of the initial specified value.
		Leakage current $\leq$ The initial specified value.
Surge Voltage	The capacitors shall be subjected to 1,000 cycles each consisting of charge with the surge voltages specified at 105°C for 30 seconds through a protective resistor ($R = 1 \text{ k}\Omega$) and discharge for 5 minutes 30 seconds.	Appearance NO significant damage.
		Capacitance change $\leq \pm 20\%$ of the initial value.
		DF (tan δ) $\leq 150\%$ of the initial specified value.
		ESR $\leq 150\%$ of the initial specified value.
		Leakage current $\leq$ The initial specified value.

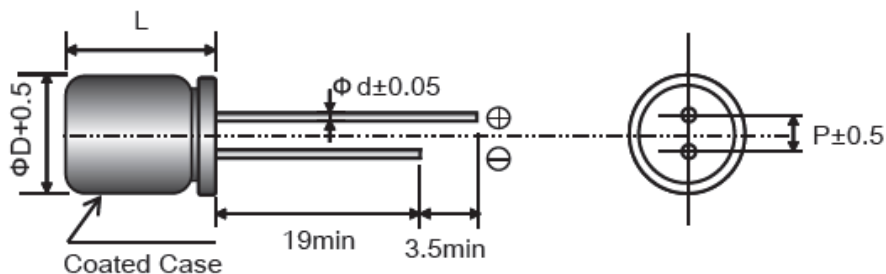
※ Note : If any doubt arises, measure the leakage current after following voltage treatment.
Voltage treatment : DC rated voltage are applied to the capacitors for 120 minutes at 125°C.

Frequency Coefficient for Ripple Current

Frequency	$120\text{Hz} \leq f < 1\text{KHz}$	$1\text{KHz} \leq f < 10\text{KHz}$	$10\text{KHz} \leq f < 100\text{KHz}$	$100\text{KHz} \leq f < 500\text{KHz}$
Coefficient	0.05	0.3	0.7	1



Dimensions



(UNIT: mm)

ΦDxL	6.3x8	8x8	8x12	10x10	10x12
ΦD	6.3	8.0	8.0	10	10
L	L+1.5 max	L+1.5 max	L+1.0 max	L+1.0 max	L+1.0 max
Φd	0.5	0.6	0.6	0.6	0.6
P	2.5	3.5	3.5	5.0	5.0

PRF SERIES STANDARD CHARACTERISTICS LIST

Rated Voltage (S.V.)	Cap (μF)	Size DxL	Leakage current (μA) max. ※2	ESR (mΩ) max. 100k to 300 KHz / 20°C	Rated Ripple Current (mA rms)		D.F. (tanδ) max. 120Hz / 20°C
					105°C 100kHz	125°C 100kHz	
6.3 (7.2)	470	6.3x8	592	25	3,800	1,267	0.12
	680	8x8	857	25	4,000	1,333	0.12
	1,000	8x12	1,260	20	4,200	1,400	0.12
	1,200	10x10	1,512	25	5,500	1,833	0.12
	1,800	10x12	2,268	20	6,100	2,033	0.12
10 (11.5)	330	6.3x8	660	25	3,700	1,233	0.12
	560	8x8	1,120	25	4,000	1,333	0.12
	680	8x12	1,360	20	4,500	1,500	0.12
	820	10x10	1,640	25	4,200	1,400	0.12
	1,000	10x10	2,000	25	4,500	1,500	0.12
16 (18.4)	1,200	10x12	2,400	20	5,600	1,867	0.12
	220	6.3x8	704	25	2,850	950	0.12
	330	8x8	1,056	25	4,000	1,333	0.12
	470	8x12	1,504	20	4,500	1,500	0.12
	680	10x10	2,176	25	5,100	1,700	0.12
20 (23.0)	820	10x12	2,624	20	5,600	1,867	0.12
	120	6.3x8	480	25	2,510	837	0.12
	220	8x8	880	25	2,750	917	0.12
	270	8x12	1,080	20	2,950	983	0.12
	330	10x10	1,320	25	4,700	1,567	0.12
25 (28.8)	470	10x12	1,880	20	4,950	1,650	0.12
	100	6.3x8	500	40	2,380	793	0.12
	180	8x8	900	30	2,900	967	0.12
	220	8x8	1,100	28	3,500	1,167	0.12
	330	10x10	1,650	30	4,250	1,417	0.12
35 (40.3)	470	10x12	2,350	28	4,500	1,500	0.12
	56	6.3x8	392	60	2,300	767	0.12
	100	8x8	700	50	2,500	833	0.12
	120	8x12	840	30	2,950	983	0.12
	150	10x10	1,050	30	2,950	983	0.12
	220	10x12	1,540	28	3,400	1,133	0.12

※ 1. Capacitance tolerance : ±20% (M)

※ 2. After 2 minutes

PRG Series

- Super low ESR, High ripple current capability
- Rated Voltage: 2.5 ~ 50V
- Endurance: 20,000 hours at 105°C
- Applications: Servers, LCD-TV power, Inverter etc.
- RoHS Compliant
- Halogen Free compliant

Specifications

Items	Conditions	Characteristics
Category Temperature Range	-	-55 to +105°C
Rated Voltage Range	-	2.5 ~ 50V
Capacitance Tolerance	at 20°C, 120 Hz	±20% (M)
Surge Voltage	at 105°C	Rated voltage x 1.15V
Leakage Current	at 20°C after 2 minutes	$I \leq 0.2CV$ or 300(μA) Whichever is greater measured, after 2 minutes application of rated working voltage at +20°C.
Dissipation Factor (tan δ)	at 20°C, 120 Hz	Please see the attached characteristics list
Characteristics of Impedance at low, high temperature	at -55°C, 100kHz	$Z(-55^{\circ}\text{C})/Z(+20^{\circ}\text{C}) \leq 1.25$
	at -25°C, 100kHz	$Z(-25^{\circ}\text{C})/Z(+20^{\circ}\text{C}) \leq 1.15$
Endurance	The following specifications shall be satisfied when the capacitors are restored to 20°C after the rated voltage is applied for 20,000 hours at 105°C.	Appearance NO significant damage.
		Capacitance change $\leq \pm 20\%$ of the initial value.
		DF (tan δ) $\leq 150\%$ of the initial specified value.
		ESR $\leq 150\%$ of the initial specified value.
		Leakage current $\leq$ The initial specified value.
Damp Heag (Steady State)	The following specifications shall be satisfied when the capacitors are restored to 20°C after subjecting them to store at 60°C, 90 to 95% RH for 1,000 hours, without DC applied.	Appearance NO significant damage.
		Capacitance change $\leq \pm 20\%$ of the initial value.
		DF (tan δ) $\leq 150\%$ of the initial specified value.
		ESR $\leq 150\%$ of the initial specified value.
		Leakage current $\leq$ The initial specified value.
Surge Voltage	The capacitors shall be subjected to 1,000 cycles each consisting of charge with the surge voltages specified at 105°C for 30 seconds through a protective resistor (R=1 kΩ) and discharge for 5 minutes 30 seconds.	Appearance NO significant damage.
		Capacitance change $\leq \pm 20\%$ of the initial value.
		DF (tan δ) $\leq 150\%$ of the initial specified value.
		ESR $\leq 150\%$ of the initial specified value.
		Leakage current $\leq$ The initial specified value.

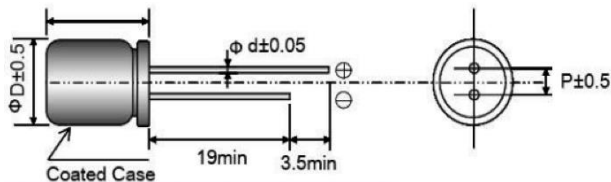
※ Note: If any doubt arises, measure the leakage current after following voltage treatment.
 Voltage treatment: DC rated voltage are applied to the capacitors for 120 minutes at 105°C.

Frequency Coefficient for Ripple Current

Frequency	$120\text{Hz} \leq f < 1\text{kHz}$	$1\text{kHz} \leq f < 10\text{kHz}$	$10\text{kHz} \leq f < 100\text{kHz}$	$100\text{kHz} \leq f < 500\text{kHz}$
Coefficient	0.05	0.3	0.7	1



DIMENSIONS



(Unit: mm)

Size Code	6.3×6	6.3×9	8×8	8×12	10×10	10×12
ΦD	6.3	6.3	8	8	10	10
L	L+1.0 max	L+1.0 max	L+1.5 max	L+1.0 max	L+1.0 max	L+1.0 max
Φd	0.5	0.5	0.6	0.6	0.6	0.6
P	2.5	2.5	3.5	3.5	5.0	5.0

PRG SERIES STANDARD CHARACTERISTICS LIST

Rated Voltage (S.V.)	Cap (μF)	Size DxL	Leakage current (μA) max ※2	ESR (mΩ) max. 100k to 300kHz / 20°C	Rated Ripple Current (mA rms) 100 kHz / 105°C	D.F. (tan δ) max. 120Hz / 20°C
2.5 (2.9)	220	6.3 x6	300	24	2,400	0.12
	560	6.3x9	300	15	3,200	0.12
	1000	8x8	500	15	3,640	0.12
	1200	8x12	600	10	5,200	0.12
	1800	10x12	900	10	5,200	0.12
	2,200	10x12	1,100	10	5,500	0.12
6.3 (7.2)	100	6.3x6	300	24	2,400	0.12
	180	6.3x6	300	24	2,400	0.12
	470	6.3×9	592	20	3,500	0.12
	560	6.3x9	706	20	3,500	0.12
	560	8×8	706	15	4,100	0.12
	680	8x8	856	15	4,300	0.12
	1000	8×12	1,260	12	5,000	0.12
	1,200	10x10	1,512	15	5,200	0.12
10 (11.5)	1800	10x12	2,268	12	5,500	0.12
	120	6.3×6	300	24	2,400	0.12
	330	6.3x9	660	15	3,500	0.12
	560	8x8	1,120	15	4,000	0.12
	680	8x12	1,360	15	4,800	0.12
	1000	10x10	2,000	15	4,800	0.12
16 (18.4)	1200	10x12	2,400	12	5,500	0.12
	82	6.3x6	300	24	2,400	0.12
	100	6.3x9	320	15	3500	0.12
	220	6.3x9	704	15	3500	0.12
	330	8x8	1056	15	4200	0.12
	470	8x12	1504	12	4500	0.12
	470	10x12	1504	10	5100	0.12
	680	10x10	2176	15	5100	0.12
	820	10x12	2624	15	5400	0.12
	1000	10x12	3200	15	5400	0.12



Rated Voltage (S.V.)	Cap (μF)	Size DxL	Leakage current (μA) max ※2	ESR (mΩ) max. 100k to 300kHz / 20°C	Rated Ripple Current (mA rms) 100 kHz / 105°C	D.F. (tan δ) max. 120Hz / 20°C
25 (28.8)	47	6.3x6	300	40	1500	0.12
	100	6.3x9	500	30	2500	0.12
	180	8x8	900	30	3260	0.12
	220	8x12	1100	30	3520	0.12
	330	10x10	1650	20	3850	0.12
	470	10x12	2350	25	4020	0.12
35 (40.3)	22	6.3x6	300	70	1450	0.12
	68	6.3x9	476	60	1520	0.12
	120	8x8	840	30	2100	0.12
	150	8x12	1050	26	2800	0.12
	220	10x10	1540	30	3050	0.12
	270	10x12	1890	26	3650	0.12
50 (57.5)	10	6.3x6	300	90	900	0.12
	33	6.3x9	330	60	1500	0.12
	47	8x8	470	32	2000	0.12
	68	8x12	680	28	2200	0.12
	100	10x10	1000	32	2350	0.12
	100	10x12	1000	28	2550	0.12

※ 1. Capacitance tolerance: ±20%(M)

※ 2. After 2 minutes

PRH Series

- Low ESR at high frequency range
- Rated Voltage: 2.5 ~ 63V
- Endurance: 15,000 hours at 105°C
- Applications: LCD Monitor, LCD-TV, D/A Inverter, SPS, D/D Converter, etc.,
- RoHS Compliant
- Halogen Free compliant

Specifications

Items	Conditions	Characteristics
Category Temperature Range	-	-55 to +105°C
Rated Voltage Range	-	2.5 ~ 63V
Capacitance Tolerance	at 20°C, 120 Hz	±20% (M)
Surge Voltage	at 105°C	Rated voltage x 1.15V
Leakage Current	at 20°C after 2 minutes	$I \leq 0.2CV$ or $300(\mu A)$ Whichever is greater measured, after 2 minutes application of rated working voltage at +20°C.
Dissipation Factor (tan δ)	at 20°C, 120 Hz	Please see the attached characteristics list
Characteristics of Impedance at low, high temperature	at -55°C, 100kHz	$Z(-55^\circ C)/Z(+20^\circ C) \leq 1.25$
	at -25°C, 100kHz	$Z(-25^\circ C)/Z(+20^\circ C) \leq 1.15$
Endurance	The following specifications shall be satisfied when the capacitors are restored to 20°C after the rated voltage is applied for 15,000 hours at 105°C.	Appearance NO significant damage.
		Capacitance change $\leq \pm 20\%$ of the initial value.
		DF (tan δ) $\leq 150\%$ of the initial specified value.
		ESR $\leq 150\%$ of the initial specified value.
		Leakage current $\leq$ The initial specified value.
Damp Heag (Steady State)	The following specifications shall be satisfied when the capacitors are restored to 20°C after subjecting them to store at 60°C, 90 to 95% RH for 1,000 hours, without DC applied.	Appearance NO significant damage.
		Capacitance change $\leq \pm 20\%$ of the initial value.
		DF (tan δ) $\leq 150\%$ of the initial specified value.
		ESR $\leq 150\%$ of the initial specified value.
		Leakage current $\leq$ The initial specified value.
Surge Voltage	The capacitors shall be subjected to 1,000 cycles each consisting of charge with the surge voltages specified at 105°C for 30 seconds through a protective resistor ($R=1\text{ k}\Omega$) and discharge for 5 minutes 30 seconds.	Appearance NO significant damage.
		Capacitance change $\leq \pm 20\%$ of the initial value.
		DF (tan δ) $\leq 150\%$ of the initial specified value.
		ESR $\leq 150\%$ of the initial specified value.
		Leakage current $\leq$ The initial specified value.

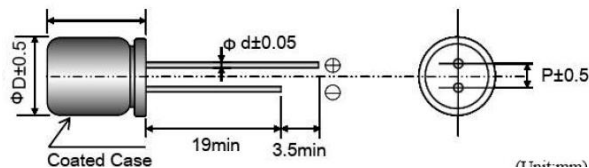
※ Note: If any doubt arises, measure the leakage current after following voltage treatment.
Voltage treatment: DC rated voltage are applied to the capacitors for 120 minutes at 105°C.

Frequency Coefficient for Ripple Current

Frequency	$120\text{Hz} \leq f < 1\text{kHz}$	$1\text{kHz} \leq f < 10\text{kHz}$	$10\text{kHz} \leq f < 100\text{kHz}$	$100\text{kHz} \leq f < 500\text{kHz}$
Coefficient	0.05	0.3	0.7	1



DIMENSIONS



(Unit: mm)

Size Code	5x6	6.3x6	6.3x9	6.3x11	8x8	8x12	8x14	8x16	8x20	10x12	10x14	10x16
ΦD	5	6.3	6.3	6.3	8	8	8	8	8	10.0	10.0	10.0
L	L+1.0 max	L+1.0 max	L+1 max	L+1.0 max	L+1.5 max	L+1.0 max	L+1.0 max	L+1.0 max	L+1.5 max	L+1.0 max	L+1.0 max	L+1.5 max
Φd	0.45	0.45	0.5	0.5	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
P	2	2.5	2.5	2.5	3.5	3.5	3.5	3.5	3.5	5.0	5.0	5.0

PRH SERIES STANDARD CHARACTERISTICS LIST

Rated Voltage (S.V.)	Cap (μF)	Size DxL	Leakage current (μA) max. ※2	ESR (mΩ) max. 100k to 300kHz / 20°C	Rated Ripple Current (mA rms) 100kHz / 105°C	D.F. (tan δ) max 120Hz / 20°C
2.5 (2.9)	560	6.3x9	300	8	5,080	0.12
	560	8x8	300	7	5,820	0.12
	820	6.3x9	410	8	5,080	0.12
	1200	8x8	600	7	5,580	0.12
	1500	8x12	750	7	5,820	0.12
	2,700	10x12	1,350	7	6,100	0.12
4 (4.6)	560	6.3x9	448	8	5,080	0.12
	560	8x8	448	7	5,580	0.12
	680	8x8	544	7	5,580	0.12
	820	8x12	656	7	5,820	0.12
	2200	10x12	1,760	7	6,100	0.12
6.3 (7.2)	100	5x6	300	13	1,500	0.12
	220	5x8	300	12	2,400	0.12
	470	6.3x9	592	10	4,500	0.12
	560	6.3x9	706	10	5,080	0.12
	560	8 x 8	706	10	5,580	0.12
	1,000	8x12	1,260	7	5,820	0.12
	1,000	10x12	1,260	7	6,200	0.12
	2,200	10x12	2,772	7	6,200	0.12
10 (11.5)	220	6.3x9	440	10	2,820	0.12
	270	6.3x9	540	10	5,580	0.12
	560	8x8	1,120	8	5,580	0.12
	680	8x8	1,360	9	5,580	0.12
	820	8x12	1,640	9	5,820	0.12
	1,000	10x12	2,000	9	6,100	0.12
	1500	10x12	3,000	9	6,100	0.12



Rated Voltage (S.V.)	Cap (μF)	Size DxL	Leakage current (μA) max. ※2	ESR (mΩ) max. 100k to 300kHz /20°C	Rated Ripple Current (mA rms) 100kHz / 105°C	D.F. (tan δ) max 120Hz / 20°C
16 (18.4)	82	6.3x6	300	30	2,200	0.12
	100	6.3x6	320	30	2,200	0.12
	220	6.3x9	704	15	3,500	0.12
	270	6.3x9	864	15	3,500	0.12
	330	6.3x11	1,056	15	3,500	0.12
	470	8x8	1,504	13	4,500	0.12
	470	8x12	1,504	13	5,400	0.12
	470	10x12	1,504	13	6,100	0.12
	560	8x12	1,792	16	5,400	0.12
	680	10x12	2,176	16	6,100	0.12
	820	10x12	2,624	10	6,100	0.12
	1000	8x16	3,200	10	6,100	0.12
	1000	10x12	3,200	10	6,100	0.12
	1500	8x20	4,800	8	6,100	0.12
	1500	10x16	4,800	8	6,500	0.12
	1800	10x20	5,760	8	6,800	0.12
	2200	10x20	7,040	8	6,800	0.12
20 (23)	22	6.3x6	300	60	1,450	0.12
	82	6.3x6	328	60	1,450	0.12
	220	6.3x9	880	40	1,620	0.12
	330	8x8	1,320	40	2,400	0.12
	470	8x12	1,880	24	3,320	0.12
	820	10x12	3,280	20	3800	0.12
25 (28.8)	6.8	6.3x6	300	80	1,200	0.12
	47	6.3x6	300	40	2,000	0.12
	100	6.3x9	500	30	2150	0.12
	180	8x8	900	30	2580	0.12
	220	8x12	1100	25	3200	0.12
	330	10x10	1650	28	3800	0.12
	470	10x12	2350	25	4100	0.12
	560	10x14	2800	16	4500	0.12
	680	8x16	3400	16	4600	0.12
	820	10x14	4100	16	5000	0.12
35 (40.3)	22	6.3x6	300	70	1,450	0.12
	68	6.3x9	476	40	1,500	0.12
	82	8x7	574	60	1,800	0.12
	100	8x8	700	30	2,100	0.12
	100	8x12	700	26	2,300	0.12
	100	10x12	700	24	3,000	0.12
	150	8x8	1,050	30	2,500	0.12
	180	8x12	1,260	26	2,800	0.12
	220	10x10	1,540	26	3,000	0.12
	220	10x12	1,540	24	3,200	0.12
	330	10x12	2,310	24	3,600	0.12
	470	10x16	3,290	20	5,000	0.12



Rated Voltage (S.V.)	Cap (μF)	Size DxL	Leakage current (μA) max. ※2	ESR (mΩ) max. 100k to 300kHz / 20°C	Rated Ripple Current (mA rms) 100kHz / 105°C	D.F. (tan δ) max 120Hz / 20°C
0 (57.5)	12	6.3x9	300	60	1,500	0.12
	33	6.3x9	330	60	1,500	0.12
	33	8x7	330	60	1,500	0.12
	47	8x8	470	32	1,850	0.12
	68	8x12	680	30	2,250	0.12
	47	8x12	470	30	2,250	0.12
	100	10x12	1,000	28	2,560	0.12
	150	10x12	1,500	28	2,620	0.12
63 (72.5)	22	6.3x9	300	60	1,500	0.12
	33	8x8	415	32	2,050	0.12
	33	10x10	415	32	2,200	0.12
	47	8x12	592	26	2,200	0.12
	56	10x10	705	30	2,300	0.12
	82	10x12	1,033	26	2,350	0.12
	100	10x12	1,260	25	2,550	0.12

※ 1. Capacitance tolerance: ±20%(M)

※ 2. After 2 minutes



PSA Series

- Standard SMD type
- Rated voltage: 2.5~25V
- Endurance: 2,000 hours at 105°C
- Applications: motherboards, server, VGA. etc.
- RoHS Compliant.
- Halogen Free compliant

Specifications

Items	Conditions	Characteristics
Category Temperature Range	-	-55 to +105°C
Rated Voltage Range	-	2.5 ~ 25V
Capacitance Tolerance	at 20°C, 120Hz	±20% (M)
Surge Voltage	at 105°C	Rated voltage x1.15V
Leakage Current	at 20°C after 2 minutes	$I \leq 0.2CV$ or $300(\mu A)$ Whichever is greater measured, after 2minutes application of rated working voltage at +20°C. Please see the attached characteristics list
Dissipation Factor (tan δ)	at 20°C, 120Hz	Please see the attached characteristics list
Characteristics of Impedance at low, high temperature	at -55°C, 100KHz	$Z(-55^{\circ}C)/Z(+20^{\circ}C) \leq 1.25$
	at -25°C,100KHz	$Z(-25^{\circ}C)/Z(+20^{\circ}C) \leq 1.15$
Endurance	The following specifications shall be satisfied when the capacitors are restored to 20°C after the rated voltage is applied for 2,000 hours at 105°C.	Appearance NO significant damage.
		Capacitance change $\leq \pm 20\%$ of the initial value.
		DF (tan δ) $\leq 150\%$ of the initial specified value.
		ESR $\leq 150\%$ of the initial specified value.
		Leakage current $\leq$ The initial specified value.
Damp Heag (Steady State)	The following specifications shall be satisfied when the capacitors are restored to 20°C after subjecting them to store 60°C, 90 to 95% RH for 1,000 hours, without DC applied.	Appearance NO significant damage.
		Capacitance change $\leq \pm 20\%$ of the initial value.
		DF (tan δ) $\leq 150\%$ of the initial specified value.
		ESR $\leq 150\%$ of the initial specified value.
		Leakage current $\leq$ The initial specified value.
Surge Voltage	The capacitors shall be subjected to 1,000 cycles each consisting of charge with the surge voltages specified at 105°C for 30 seconds through a protective resistor (R = 1 kΩ) and discharge for 5 minutes 30 seconds.	Appearance NO significant damage.
		Capacitance change $\leq \pm 20\%$ of the initial value.
		DF (tan δ) $\leq 150\%$ of the initial specified value.
		ESR $\leq 150\%$ of the initial specified value.
		Leakage current $\leq$ The initial specified value.

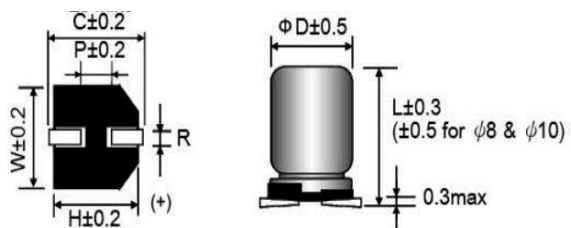
※ Note : If any doubt arises, measure the leakage current after following voltage treatment.
Voltage treatment : DC rated voltage are applied to the capacitors for 120 minutes at 105°C.

Frequency Coefficient for Ripple Current

Frequency	$120Hz \leq f < 1KHz$	$1KHz \leq f < 10KHz$	$10KHz \leq f < 100KHz$	$100KHz \leq f < 500KHz$
Coefficient	0.05	0.3	0.7	1.0



Dimensions



(UNIT: mm)

ΦDxL	ΦD	L	W	H	C	R	P
5×6	5.0	6.0	5.3	5.3	6.0	0.5~0.8	1.4
6.3×6	6.3	6.0	6.6	6.6	7.3	0.5~0.8	2.1
6.3×7	6.3	7.0	6.6	6.6	7.3	0.5~0.8	2.1
6.3×9.5	6.3	9.5	6.6	6.6	7.3	0.5~0.8	2.1
8×7	8.0	7.0	8.3	8.3	9.0	0.5~0.8	3.2
8×9.5	8.0	9.5	8.3	8.3	9.0	0.8~1.1	3.2
8×12	8.0	12.0	8.3	8.3	9.0	0.8~1.1	3.2
10×10.5	10.0	10.5	10.3	10.3	11.0	0.8~1.1	4.6
10×12.5	10.0	12.5	10.3	10.3	11.0	0.8~1.1	4.6

PSA SERIES STANDARD CHARACTERISTICS LIST

Rated Voltage (S.V.)	Cap (μ F)	Size DxL	Leakage current (μ A) max. ※2	ESR (m Ω) max. 100k to 300 KHz / 20°C	Rated Ripple Current (mA rms) 100 KHz / 105°C	D.F. (tan δ) max. 120 Hz / 20°C
2.5 (2.9)	220	6.3x6	300	25	2,390	0.12
	330	6.3x6	300	25	2,390	0.12
	560	6.3x7	300	25	2,390	0.12
	820	6.3x9.5	410	20	3,000	0.12
	1,200	8x9.5	600	20	4,520	0.12
	1,500	8x9.5	750	20	4,520	0.12
	1,800	8x12	900	13	4,520	0.12
	2,200	10x10.5	1,100	18	4,520	0.12
4 (6.6)	2,700	10x12.5	1,350	15	5,200	0.12
	220	6.3x6	300	25	2,000	0.12
	560	6.3x9.5	448	20	4,500	0.12
	820	8x9.5	656	20	4,500	0.12
	1,000	8x9.5	800	20	4,500	0.12
	1,200	8x12	960	15	4,820	0.12
	1,500	10x10	1,200	15	4,820	0.12
	2,200	10x12.5	1,760	15	5,200	0.12
6.3 (7.2)	100	6.3x6	300	25	2,400	0.12
	220	6.3x6	300	25	2,400	0.12
	220	8x7	300	25	3,020	0.12
	560	6.3x9.5	705	20	3,020	0.12
	820	8x9.5	1,033	20	4,500	0.12
	1,000	8x9.5	1,260	20	4,500	0.12
	1,200	8x12	1,512	15	4,800	0.12
	1,500	10x10.5	1,890	15	4,950	0.12
10 (11.5)	2,200	10x12.5	2,772	15	5,200	0.12
	33	5x6	300	45	1,100	0.12
	100	6.3x6	300	30	1,700	0.12
	150	6.3x6	300	45	1,700	0.12
	330	6.3x9.5	660	45	2,050	0.12
	560	8x9.5	1,120	35	2,560	0.12
	680	8x9.5	1,360	35	2,560	0.12
	820	8x12.5	1,640	17	3,950	0.12
16 (18.4)	1,000	10x10.5	2,000	15	3,950	0.12
	1,500	10x12.5	3,000	13	5,230	0.12
	22	5x6	300	40	1,000	0.12
	100	6.3x6	320	35	1,620	0.12
	270	6.3x9.5	864	20	2,500	0.12
	270	8x9.5	864	20	3,200	0.12
	330	8x9.5	1,056	20	3,690	0.12
	470	8x9.5	1,504	20	3,890	0.12
20 (23.0)	560	8x12	1,792	20	3,940	0.12
	680	10x10.5	2,176	20	4,220	0.12
	820	10x12.5	2,624	16	4,720	0.12
	1,000	10x12.5	3,200	16	5,200	0.12
	68	6.3x6	300	38	1,450	0.12
	180	6.3x9.5	720	30	2,450	0.12
	330	8x9.5	1,320	30	3,000	0.12
	470	8x12	1,880	28	3,320	0.12
	560	10x10.5	2,240	28	3,320	0.12
	680	10x12.5	2,720	28	4,220	0.12

※※ 1. Capacitance tolerance : $\pm 20\%$ (M)

※※ 2. After 2 minutes



PSA SERIES STANDARD CHARACTERISTICS LIST

Rated Voltage (S.V.)	Cap (μ F)	Size DxL	Leakage current (μ A) max. ※2	ESR (m Ω) max. 100k to 300 KHz / 20°C	Rated Ripple Current (mA rms) 100 KHz /	D.F. (tan δ) max. 120 Hz /
25 (28.8)	47	6.3x6	300	40	1,200	0.12
	100	6.3x9.5	500	30	2,000	0.12
	100	8x7	500	40	2,000	0.12
	150	8x9.5	750	35	3,000	0.12
	220	8x12	1,100	28	3,500	0.12
	330	10x10.5	1,650	30	3,800	0.12
	470	10x12.5	2,350	28	4,000	0.12

※※1. Capacitance tolerance : $\pm 20\%$ (M)

※※2. After 2 minutes

PSB Series

- Super low ESR, High ripple current capability
- Rated voltage: 2.5~16V
- Endurance: 2,000hours at 105°C
- Applications: motherboards, servers, VGA, etc.
- RoHS compliant
- Halogen Free compliant

Specifications

Items	Conditions	Characteristics
Category Temperature Range	-	-55 to +105°C
Rated Voltage Range	-	2.5 ~ 16V
Capacitance Tolerance	at 20°C, 120 Hz	±20% (M)
Surge Voltage	at 105°C	Rated voltage x1.15V
Leakage Current	at 20°C after 2 minutes	$I \leq 0.2CV$ or $300(\mu A)$ Whichever is greater measured, after 2minutes application of rated working voltage at 20°C. Please see the attached characteristics list
Dissipation Factor (tan δ)	at 20°C, 120 Hz	Please see the attached characteristics list
Characteristics of Impedance at low, high temperature	at -55°C, 100 KHz	$Z(-55^{\circ}C) / Z(+20^{\circ}C) \leq 1.25$
	at -25°C, 100 KHz	$Z(-25^{\circ}C)/Z(+20^{\circ}C) \leq 1.15$
Endurance	The following specifications shall be satisfied when the capacitors are restored to 20°C after the rated voltage is applied for 2,000 hours at 105°C.	Appearance NO significant damage.
		Capacitance change $\leq \pm 20\%$ of the initial value.
		DF (tan δ) $\leq 150\%$ of the initial specified value.
		ESR $\leq 150\%$ of the initial specified value.
		Leakage current $\leq$ The initial specified value.
Damp Heag (Steady State)	The following specifications shall be satisfied when the capacitors are restored to 20°C after subjecting them to store 60°C, 90 to 95% RH for 1,000 hours, without DC applied.	Appearance NO significant damage.
		Capacitance change $\leq \pm 20\%$ of the initial value.
		DF (tan δ) $\leq 150\%$ of the initial specified value.
		ESR $\leq 150\%$ of the initial specified value.
		Leakage current $\leq$ The initial specified value.
Surge Voltage	The capacitors shall be subjected to 1,000 cycles each consisting of charge with the surge voltages specified at 105°C for 30 seconds through a protective resistor (R = 1 kΩ) and discharge for 5 minutes 30 seconds.	Appearance No significant damage.
		Capacitance change $\leq \pm 20\%$ of the initial value.
		DF (tan δ) $\leq 150\%$ of the initial specified value.
		ESR $\leq 150\%$ of the initial specified value.
		Leakage current $\leq$ The initial specified value.

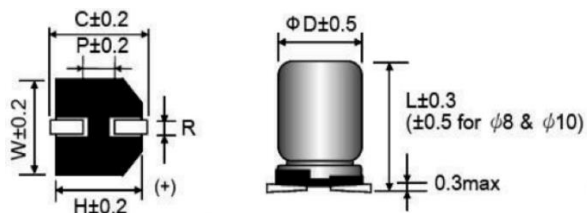
※ Note : If any doubt arises, measure the leakage current after following voltage treatment.
 Voltage treatment : DC rated voltage are applied to the capacitors for 120 minutes at 105°C.

Frequency Coefficient for Ripple Current

Frequency (Hz)	$120Hz \leq f < 1KHz$	$1KHz \leq f < 10KHz$	$10KHz \leq f < 100KHz$	$100KHz \leq f < 500KHz$
Coefficient	0.05	0.3	0.7	1



Marking & Dimensions



(UNIT: mm)

ΦDxL	ΦD	L	W	H	C	R	P
5x6	5.0	6.0	5.3	5.3	6.0	0.5~0.8	1.4
6.3x6	6.3	6.0	6.6	6.6	7.3	0.5~0.8	2.1
6.3x9.5	6.3	9.5	6.6	6.6	7.3	0.5~0.8	2.1
8x7	8.0	7.0	8.3	8.3	9.0	0.5~0.8	3.2
8x9.5	8.0	9.5	8.3	8.3	9.0	0.8~1.1	3.2
8x12	8.0	12.0	8.3	8.3	9.0	0.8~1.1	3.2
10x10.5	10.0	10.5	10.3	10.3	11.0	0.8~1.1	4.6
10x12.5	10.0	12.5	10.3	10.3	11.0	0.8~1.1	4.6



PSB SERIES STANDARD CHARACTERISITICS LIST

Rated Voltage (S.V.)	Cap (μ F)	Size DxL	Leakage current (μ A) max. ※2	ESR (m Ω) max. 100k to 300 KHz / 20°C	Rated Ripple Current (mA rms) 100 KHz / 105°C	D.F. (tan δ) max. 120 Hz / 20°C
2.5 (2.9)	220	5x6	300	40	1,620	0.12
	330	6.3x6	300	20	2,690	0.12
	820	6.3x9.5	410	18	3,200	0.12
	820	8x9.5	410	18	4,520	0.12
	1,500	8x9.5	750	18	4,520	0.12
	1,800	8x12	900	12	5,200	0.12
	2,700	10x12.5	1,350	12	5,500	0.12
4 (4.6)	68	5x6	300	40	1,500	0.12
	150	6.3x6	300	24	2,200	0.12
	680	6.3x9.5	544	16	3,200	0.12
	680	8x7	544	20	3,400	0.12
	1,000	8x9.5	800	16	4,500	0.12
	1,500	8x12	1,200	14	5,100	0.12
	1,800	10x12.5	1,440	12	5,500	0.12
6.3 (7.2)	2,200	10x12.5	2,000	12	5,500	0.12
	100	5x6	300	40	1,500	0.12
	220	5x7	300	20	1,600	0.12
	220	6.3x6	300	20	2,400	0.12
	560	6.3x9.5	705	20	3,200	0.12
	560	8x7	705	20	3,300	0.12
	820	8x9.5	1,033	15	4,450	0.12
	1,000	8x9.5	1,260	15	4,520	0.12
	1,200	8x12	1,512	12	5,020	0.12
	1,500	10x10	1,890	15	5,020	0.12
10 (11.5)	1,800	10x12.5	2,268	12	5,400	0.12
	2,200	10x12.5	2,772	12	5,500	0.12
	68	5x6	300	40	1,500	0.12
	120	6.3x6	300	25	2,420	0.12
	150	8x7	300	22	2,450	0.12
	330	6.3x9.5	660	20	3,200	0.12
	560	8x9.5	1,120	16	4,450	0.12
	680	8x9.5	1,360	16	4,450	0.12
	820	8x12	1,640	14	4,850	0.12
	1,000	10x10	2,000	15	5,020	0.12
16 (18.4)	1,200	10x10	2,400	15	5,200	0.12
	1,500	10x12.5	3,000	14	5,400	0.12
	100	6.3x6	320	24	2,400	0.12
	180	6.3x9.5	576	20	3,200	0.12
	220	6.3x9.5	704	20	3,200	0.12
	270	6.3x9.5	864	20	3,200	0.12
	270	8x7	864	20	3,400	0.12
	270	8x9.5	864	20	4,400	0.12
	470	8x9.5	1,504	20	4,400	0.12
	560	8x12	1,792	16	4,820	0.12
	680	10x10	2,176	18	5,200	0.12
	1,000	10x12.5	3,200	16	5,400	0.12

※※ 1. Capacitance tolerance : $\pm 20\%$ (M)

※※ 2. After 2 minutes

PSC Series

- Super low ESR, Long Life capability
- Rated voltage: 4~50V.
- Endurance: 5,000hours at 105°C
- Applications: DC/DC Converter, Voltage Regulators, Decoupling
- Applications for Computer Motherboards, etc.
- RoHS Compliant.
- Halogen Free compliant

Specifications

Items	Conditions	Characteristics
Category Temperature Range	-	-55 to +105°C
Rated Voltage Range	-	4~50V
Capacitance Tolerance	at 20°C, 120Hz	±20% (M)
Surge Voltage	at 105°C	Rated voltage x1.15V
Leakage Current	at 20°C after 2 minutes	$I \leq 0.2CV$ or $300(\mu A)$ Whichever is greater measured, after 2minutes application of rated Working voltage at +20°C. Please see the attached characteristics list
Dissipation Factor (tan δ)	at 20°C, 120Hz	Please see the attached characteristics list
Characteristics of Impedance at low, high temperature	at -55°C, 100KHz	$Z(-55^{\circ}C) / Z(+20^{\circ}C) \leq 1.25$
	at -25°C, 100KHz	$Z(-25^{\circ}C) / Z(+20^{\circ}C) \leq 1.15$
Endurance		Appearance NO significant damage.
	The following specifications shall be satisfied	Capacitance change $\leq \pm 20\%$ of the initial value.
	when the capacitors are restored to 20°C after the	DF (tan δ) $\leq 150\%$ of the initial specified value.
	rated voltage is applied for 5,000 hours at 105°C.	ESR $\leq 150\%$ of the initial specified value.
		Leakage current $\leq$ The initial specified value.
		Appearance NO significant damage.
Damp Heag (Steady State)	The following specifications shall be satisfied	Capacitance change $\leq \pm 20\%$ of the initial value.
	when the capacitors are restored to 20°C after	DF (tan δ) $\leq 150\%$ of the initial specified
	subjecting them to store 60°C, 90 to 95% RH for	value. ESR $\leq 150\%$ of the initial specified
	1,000 hours, without DC applied.	Leakage current $\leq$ The initial specified value.
Surge Voltage	The capacitors shall be subjected to 1,000	Appearance NO significant damage.
	cycles each consisting of charge with the surge	Capacitance change $\leq \pm 20\%$ of the initial
	voltages specified at 105°C for 30 seconds through	DF (tan δ) $\leq 150\%$ of the initial specified value.
	a protective resistor (R = 1k Ω) and discharge	ESR $\leq 150\%$ of the initial specified value.
	for 5 minutes 30 seconds.	Leakage current $\leq$ The initial specified value.

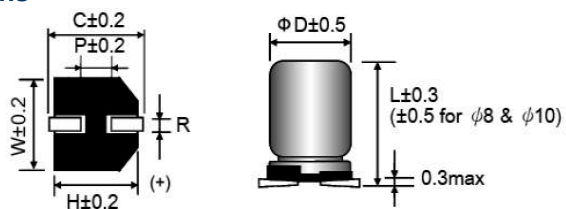
※ Note : If any doubt arises, measure the leakage current after following voltage treatment.
Voltage treatment : DC rated voltage are applied to the capacitors for 120 minutes at 105°C.

Frequency Coefficient for Ripple Current

Frequency (Hz)	$120Hz \leq f < 1KHz$	$1KHz \leq f < 10KHz$	$10KHz \leq f < 100KHz$	$100KHz \leq f < 500KHz$
Coefficient	0.05	0.3	0.7	1



Marking & Dimensions



(UNIT: mm)

ΦDxL	ΦD	L	W	H	C	R	P
6.3×6	6.3	6.0	6.6	6.6	7.3	0.5~0.8	2.1
6.3×7	6.3	7.0	6.6	6.6	7.3	0.5~0.8	2.1
6.3×9.5	6.3	9.5	6.6	6.6	7.3	0.5~0.8	2.1
8×7	8.0	7.0	8.3	8.3	9.3	0.5~0.8	3.2
8×9.5	8.0	9.5	8.3	8.3	9.3	0.8~1.1	3.2
8×12	8.0	12.0	8.3	8.3	9.0	0.8~1.1	3.2
10×10.5	10.0	10.5	10.3	10.3	11.0	0.8~1.1	4.6
10×12.5	10.0	12.5	10.3	10.3	11.0	0.8~1.1	4.6



PSC SERIES STANDARD CHARACTERISTICS LIST

Rated Voltage (S.V.)	Cap (μ F)	Size DxL	Leakage current (μ A) max. ※2	ESR (m Ω) max. 100k to 300KHz / 20°C	Rated Ripple Current (mA rms) 100KHz / 105°C	D.F. (tan δ) max. 120 Hz / 20°C
4 (4.6)	220	6.3X6	300	20	2,800	0.12
	560	6.3x9.5	448	20	3,500	0.12
	560	8x7	448	18	3,700	0.12
	820	8x9.5	656	15	4,000	0.12
	1,200	8x12	960	15	4,450	0.12
	1,500	10x10.5	1,200	13	4,500	0.12
	2,200	10x12.5	1,760	13	5,400	0.12
6.3 (7.3)	100	6.3x6	300	22	2,400	0.12
	220	6.3x6	300	22	2,600	0.12
	470	6.3x9.5	592	22	3,200	0.12
	560	6.3x9.5	705	22	3,200	0.12
	820	8x9.5	1,033	20	3,850	0.12
	1,000	8x12	1,260	20	4,250	0.12
	1,200	10x10.5	1,512	18	4,350	0.12
10 (11.5)	1,800	10x12.5	2,268	18	5,200	0.12
	68	6.3x6	300	30	2,400	0.12
	100	6.3x6	300	30	2,400	0.12
	220	6.3x7	440	30	2,500	0.12
	330	6.3x9.5	660	30	3,150	0.12
	560	8x9.5	1,120	25	3,850	0.12
	680	8x12	1,360	25	4,150	0.12
16 (18.4)	820	10x10.5	1,640	20	4,250	0.12
	1,000	10x10.5	2,000	20	4,250	0.12
	1,200	10x12.5	2,400	20	5,100	0.12
	100	6.3x6	320	30	2,200	0.12
	220	6.3x9.5	704	30	3,050	0.12
	330	8x9.5	1,056	20	3,450	0.12
	470	8x12	1,504	20	4,050	0.12
25 (28.8)	680	10x10.5	2,176	20	4,150	0.12
	820	10x12.5	2,624	20	5,100	0.12
	47	6.3x6	300	40	1,500	0.12
	100	6.3x9.5	500	35	2,800	0.12
	180	8x9.5	900	30	3,250	0.12
	220	8x12	1,100	30	3,900	0.12
	330	10x10.5	1,650	20	4,100	0.12
35 (40.3)	470	10x12.5	2,350	25	4,500	0.12
	22	6.3x6	300	70	1,450	0.12
	68	6.3x9.5	476	60	1,500	0.12
	120	8x9.5	840	50	1,800	0.12
	150	8x12	1,050	50	2,850	0.12
	220	10x10.5	1,540	40	2,950	0.12
	270	10x12.5	1,890	40	3,200	0.12
50 (57.5)	10	6.3x6	300	60	1,400	0.12
	33	6.3x9.5	330	30	1,700	0.12
	47	8x9.5	470	30	2,000	0.12
	68	8x12	680	28	2,200	0.12
	100	10x10.5	1,000	30	2,300	0.12
	100	10x12.5	1,000	26	2,650	0.12

※※ 1. Capacitance tolerance : $\pm 20\%$ (M)

※※ 2. After 2 minutes

PSD Series

- Low ESR, High Voltage, High ripple current capability
- Rated voltage: 35~100V.
- Endurance: 2,000hours at 105°C
- Applications: LED Driver, LED Power Supply, etc.
- RoHS compliant
- Halogen Free compliant

Specifications

Items	Conditions	Characteristics
Category Temperature Range	-	-55 to +105°C
Rated Voltage Range	-	35~100V
Capacitance Tolerance	at 20°C, 120Hz	±20% (M)
Surge Voltage	at 105°C	Rated voltage x1.15V
Leakage Current	at 20°C after 2 minutes	$I \leq 0.2CV$ or $300(\mu A)$ Whichever is greater measured, after 2minutes application of rated Working voltage at +20°C. Please see the attached characteristics list
Dissipation Factor (tan δ)	at 20°C, 120Hz	Please see the attached characteristics list
Characteristics of Impedance at low, high temperature	at -55°C, 100KHz	$Z(-55^{\circ}C) / Z(+20^{\circ}C) \leq 1.25$
	at -25°C, 100KHz	$Z(-25^{\circ}C) / Z(+20^{\circ}C) \leq 1.15$
		Appearance NO significant damage.
		Capacitance change $\leq \pm 20\%$ of the initial value.
Endurance	The following specifications shall be satisfied when the capacitors are restored to 20°C after the rated voltage is applied for 2,000 hours at 105°C.	DF (tan δ) $\leq 150\%$ of the initial specified value.
		ESR $\leq 150\%$ of the initial specified value.
		Leakage current $\leq$ The initial specified value.
		Appearance NO significant damage.
Damp Heag (Steady State)	The following specifications shall be satisfied when the capacitors are restored to 20°C after subjecting them to store 60°C, 90 to 95% RH for 1,000 hours, without DC applied.	Capacitance change $\leq \pm 20\%$ of the initial value.
		DF (tan δ) $\leq 150\%$ of the initial specified value. ESR $\leq 150\%$ of the initial specified
		Leakage current $\leq$ The initial specified value.
		Appearance NO significant damage.
Surge Voltage	The capacitors shall be subjected to 1,000 cycles each consisting of charge with the surge voltages specified at 105°C for 30 seconds through a protective resistor (R = 1 kΩ) and discharge for 5 minutes 30 seconds.	Capacitance change $\leq \pm 20\%$ of the initial
		DF (tan δ) $\leq 150\%$ of the initial specified value.
		ESR $\leq 150\%$ of the initial specified value.
		Leakage current $\leq$ The initial specified value.

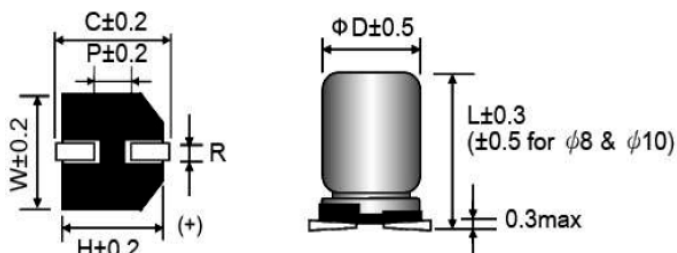
※ Note : If any doubt arises, measure the leakage current after following voltage treatment.
 Voltage treatment : DC rated voltage are applied to the capacitors for 120 minutes at 105°C.

Frequency Coefficient for Ripple Current

Frequency (Hz)	$120Hz \leq f < 1KHz$	$1KHz \leq f < 10KHz$	$10KHz \leq f < 100KHz$	$100KHz \leq f < 500KHz$
Coefficient	0.05	0.3	0.7	1



Marking & Dimensions



(UNIT: mm)

ΦDxL	ΦD	L	W	H	C	R	P
6.3x6	6.3	6.0	6.6	6.6	7.3	0.5~0.8	2.1
6.3x9.5	6.3	9.5	6.6	6.6	7.3	0.5~0.8	2.1
8x7	8.0	7.0	8.3	8.3	9.3	0.5~0.8	3.2
8x9.5	8.0	9.5	8.3	8.3	9.3	0.8~1.1	3.2
8x12	8.0	12.0	8.3	8.3	9.0	0.8~1.1	3.2
10x10.5	10.0	10.5	10.3	10.3	11.0	0.8~1.1	4.6
10x12.5	10.0	12.5	10.3	10.3	11.0	0.8~1.1	4.6

PSD SERIES STANDARD CHARACTERISTICS LIST

Rated Voltage (S.V.)	Cap (μF)	Size DxL	Leakage current (μA) max. ※2	ESR (mΩ) max. 100k to 300KHz / 20°C	Rated Ripple Current (mA rms) 100KHz / 105°C	D.F. (tanδ) max. 120Hz / 20°C
35 (40.3)	22	6.3x6	300	80	1,450	0.12
	56	6.3x9.5	392	50	2,300	0.12
	68	6.3x9.5	476	50	2,300	0.12
	68	8x7	476	60	2,500	0.12
	100	8x12	700	28	2,750	0.12
	220	10x12.5	1,540	28	3,200	0.12
50 (57.5)	12	6.3x6	300	100	1,450	0.12
	33	6.3x9.5	330	50	1,800	0.12
	47	8x9.5	470	45	2,100	0.12
	100	10x12.5	1,000	28	2,560	0.12
	180	10x12.5	1,800	28	2,750	0.12
63 (72.5)	22	6.3x9.5	300	50	1,800	0.12
	33	6.3x9.5	416	50	1,800	0.12
	47	8x12	592	36	2,200	0.12
	56	10x10.5	705	32	2,350	0.12
	100	10x12.5	1,260	28	2,550	0.12
	150	10x12.5	1,890	28	2,550	0.12
80.0 (92.0)	22	8x9.5	352	45	2,100	0.12
	33	8x12	528	45	2,100	0.12
	47	10x10.5	752	45	2,250	0.12
	68	10x12.5	1,088	38	2,550	0.12
100 (115.0)	15	8x12	300	40	2,050	0.12
	22	10x12.5	440	38	2,250	0.12
	27	10x12.5	540	38	2,250	0.12

※※ 1. Capacitance tolerance : ±20% (M)

※※ 2. After 2 minutes

PSE Series

- Super low ESR, High ripple current capability
- Rated voltage: 4~50V.
- Endurance: 1,000hours at 125°C
- Applications: Motherboard, DC/DC Converter, Adapter, SPS, VCR, Camcorder, DSC, PDA, HD Drive, MO Drive, etc.
- RoHS compliant
- Halogen Free compliant

Specifications

Items	Conditions	Characteristics
Category Temperature Range	-	-55 to +125°C
Rated Voltage Range	-	4.0~50V
Capacitance Tolerance	at 20°C, 120 Hz	±20% (M)
Surge Voltage	at 105°C	Rated voltage x1.15V
Leakage Current	at 20°C after 2 minutes	$I \leq 0.2CV$ or $300(\mu A)$ Whichever is greater measured, after 2minutes application of rated Working voltage at +20°C. Please see the attached characteristics list
Dissipation Factor (tan δ)	at 20°C, 120Hz	Please see the attached characteristics list
Characteristics of Impedance at low, high temperature	at -55°C, 100KHz	$Z(-55^{\circ}C) / Z(+20^{\circ}C) \leq 1.25$
	at -25°C, 100KHz	$Z(-25^{\circ}C) / Z(+20^{\circ}C) \leq 1.15$
Endurance	The following specifications shall be satisfied when the capacitors are restored to 20°C after the rated voltage is applied for 1,000 hours at 125°C.	Appearance NO significant damage.
		Capacitance change $\leq \pm 20\%$ of the initial value.
		DF (tan δ) $\leq 150\%$ of the initial specified value.
		ESR $\leq 150\%$ of the initial specified value.
		Leakage current $\leq$ The initial specified value.
Damp Heag (Steady State)	The following specifications shall be satisfied when the capacitors are restored to 20°C after subjecting them to store 60°C, 90 to 95% RH for 1,000 hours, without DC applied.	Appearance NO significant damage.
		Capacitance change $\leq \pm 20\%$ of the initial value.
		DF (tan δ) $\leq 150\%$ of the initial specified value. ESR $\leq 150\%$ of the initial specified
		Leakage current $\leq$ The initial specified value.
Surge Voltage	The capacitors shall be subjected to 1,000 cycles each consisting of charge with the surge voltages specified at 105°C for 30 seconds through a protective resistor (R = 1 kΩ) and discharge for 5 minutes 30 seconds.	Appearance NO significant damage.
		Capacitance change $\leq \pm 20\%$ of the initial
		DF (tan δ) $\leq 150\%$ of the initial specified value.
		ESR $\leq 150\%$ of the initial specified value.
		Leakage current $\leq$ The initial specified value.

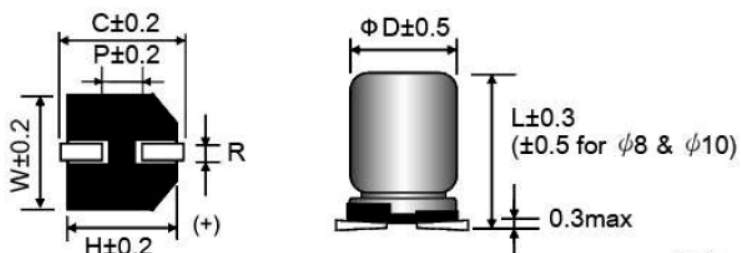
※ Note : If any doubt arises, measure the leakage current after following voltage treatment.
 Voltage treatment : DC rated voltage are applied to the capacitors for 120 minutes at 125°C.

Frequency Coefficient for Ripple Current

Frequency (Hz)	$120Hz \leq f < 1KHz$	$1KHz \leq f < 10KHz$	$10KHz \leq f < 100KHz$	$100KHz \leq f < 500KHz$
Coefficient	0.05	0.3	0.7	1



Marking & Dimensions



(UNIT: mm)

ΦDxL	ΦD	L	W	H	C	R	P
6.3×6	6.3	6.0	6.6	6.6	7.3	0.5~0.8	2.1
6.3×7	6.3	7.0	6.6	6.6	7.3	0.5~0.8	2.1
6.3×9.5	6.3	9.5	6.6	6.6	7.3	0.5~0.8	2.1
8×7	8.0	7.0	8.3	8.3	9.0	0.5~0.8	3.2
8×9.5	8.0	9.5	8.3	8.3	9.0	0.8~1.1	3.2
8×12	8.0	12.0	8.3	8.3	9.0	0.8~1.1	3.2
10×10.5	10.0	10.5	10.3	10.3	11.0	0.8~1.1	4.6
10×12.5	10.0	12.5	10.3	10.3	11.0	0.8~1.1	4.6

PSE SERIES STANDARD CHARACTERISTICS LIST

Rated Voltage (S.V.)	Cap (μ F)	Size DxL	Leakage current (μ A) max. ※2	ESR (m Ω) max. 100k to 300KHz / 20°C	Rated Ripple Current (mA rms)		D.F. (tan δ) max. 120Hz / 20°C
					105°C 100 kHz	125°C 100 kHz	
4 (4.6)	150	6.3x6	300	35	2,450	700	0.12
	220	6.3x6	300	20	2,800	800	0.12
	560	6.3x9.5	448	20	3,000	857	0.12
	560	8x7	448	20	3,000	857	0.12
	820	8x9.5	656	15	3,500	1,000	0.12
	1,200	8x12	960	15	3,800	1,086	0.12
	1,500	10x10.5	1,200	12	4,500	1,286	0.12
6.3 (7.2)	2,200	10x12.5	1,760	12	5,500	1,571	0.12
	100	6.3x6	300	40	2,400	686	0.12
	150	6.3x6	300	40	2,400	686	0.12
	330	6.3x7	415	30	2,800	800	0.12
	470	6.3x9.5	592	25	2,800	800	0.12
	680	8x9.5	856	25	2,800	800	0.12
	820	8x12	1,033	20	3,000	857	0.12
	1,000	8x12	1,260	20	3,000	857	0.12
10 (11.5)	1,200	10x10.5	1,512	20	3,000	857	0.12
	1,800	10x12.5	2,268	18	3,000	857	0.12
	100	6.3x6	300	35	2,800	800	0.12
	330	6.3x9.5	660	25	2,800	800	0.12
	470	8x9.5	940	25	3,000	857	0.12
	560	8x9.5	1,120	25	3,000	857	0.12
	680	8x12	1,360	20	3,500	1,000	0.12
	820	10x10	1,640	20	3,500	1,000	0.12
16 (18.4)	1,000	10x10	2,000	20	3,500	1,000	0.12
	1,200	10x12.5	2,400	12	5,200	1,486	0.12
	100	6.3x6	320	35	2,050	586	0.12
	220	6.3x9.5	704	25	2,050	586	0.12
	330	8x9.5	1,056	25	2,700	771	0.12
	470	8x12	1,504	20	3,930	1,123	0.12
	680	10x10.5	2,176	18	4,520	1,291	0.12
	820	10x12.5	2,624	18	4,900	1,400	0.12
25 (28.8)	47	6.3x6	300	60	1,650	471	0.12
	100	6.3x9.5	500	30	1,650	471	0.12
	220	8x12	1,100	28	3,310	946	0.12
	330	10x10.5	1,650	30	4,320	1,234	0.12
	470	10x12.5	2,350	28	4,500	1,286	0.12
35 (40.3)	22	6.3x6	300	70	1,450	414	0.12
	68	6.3x9.5	476	40	1,450	414	0.12
	120	8x9.5	840	40	1,800	514	0.12
	150	8x12	1,050	30	2,000	571	0.12
	220	10x10.5	1,540	30	2,200	629	0.12
	270	10x12.5	1,890	30	2,500	714	0.12
50 (57.5)	10	6.3x6	300	60	1,400	400	0.12
	33	6.3x9.5	330	40	1,500	429	0.12
	47	8x9.5	470	40	2,000	571	0.12
	68	8x12	680	35	2,300	657	0.12
	100	10x10.5	1,000	35	2,200	629	0.12
	100	10x12.5	1,000	35	2,500	714	0.12

※※ 1. Capacitance tolerance : $\pm 20\%$ (M)

※※ 2. After 2 minutes

PSF Series

- High temperature Low ESR, High ripple current capability
- Rated voltage: 6.3~35V
- Endurance: 2,000 hours at 125°C
- Applications: Lamps Power, LED Driver, Service Equipment.
- RoHS compliance
- Halogen Free compliant

Specifications

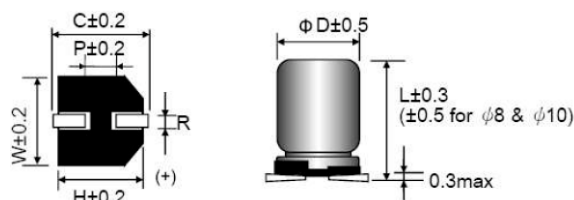
Items	Conditions	Characteristics
Category Temperature Range	-	-55 to +125°C
Rated Voltage Range	-	6.3~35V
Capacitance Tolerance	at 20°C, 120Hz	±20% (M)
Surge Voltage	at 125°C	Rated voltage x1.15V
Leakage Current	at 20°C after 2 minutes	$I \leq 0.2CV$ or $300(\mu A)$ Whichever is greater measured, after 2minutes application of rated Working voltage at +20°C. Please see the attached characteristics list
Dissipation Factor (tan δ)	at 20°C, 120Hz	Please see the attached characteristics list
Characteristics of Impedance at low, high temperature	at -55°C, 100KHz	$Z(-55^{\circ}C) / Z(+20^{\circ}C) \leq 1.25$
	at -25°C, 100KHz	$Z(-25^{\circ}C)/Z(+20^{\circ}C) \leq 1.15$
Endurance	The following specifications shall be satisfied when the capacitors are restored to 20°C after the rated voltage is applied for 2,000 hours at 125°C.	Appearance NO significant damage.
		Capacitance change $\leq \pm 20\%$ of the initial value.
		DF (tan δ) $\leq 150\%$ of the initial specified value.
		ESR $\leq 150\%$ of the initial specified value.
		Leakage current $\leq$ The initial specified value.
Damp Heag (Steady State)	The following specifications shall be satisfied when the capacitors are restored to 20°C after subjecting them to store 60°C, 90 to 95% RH for 1,000 hours, without DC applied.	Appearance NO significant damage.
		Capacitance change $\leq \pm 20\%$ of the initial value.
		DF (tan δ) $\leq 150\%$ of the initial specified value.
		ESR $\leq 150\%$ of the initial specified value.
		Leakage current $\leq$ The initial specified value.
Surge Voltage	The capacitors shall be subjected to 1,000 cycles each consisting of charge with the surge voltages specified at 105°C for 30 seconds through a protective resistor (R = 1 kΩ) and discharge for 5 minutes 30 seconds.	Appearance NO significant damage.
		Capacitance change $\leq \pm 20\%$ of the initial value.
		DF (tan δ) $\leq 150\%$ of the initial specified value.
		ESR $\leq 150\%$ of the initial specified value.
		Leakage current $\leq$ The initial specified value.

※ Note : If any doubt arises, measure the leakage current after following voltage treatment.
Voltage treatment : DC rated voltage are applied to the capacitors for 120 minutes at 125°C.

Frequency Coefficient for Ripple Current

Frequency (Hz)	120Hz $\leq f < 1KHz$	1KHz $\leq f < 10KHz$	10KHz $\leq f < 100KHz$	100KHz $\leq f < 500KHz$
Coefficient	0.05	0.3	0.7	1

Marking & Dimensions



(UNIT: mm)

Φ DxL	Φ D	L	W	H	C	R	P
6.3x9.5	6.3	9.5	6.6	6.6	7.3	0.5~0.8	2.1
8x9.5	8.0	9.5	8.3	8.3	9.0	0.8~1.1	3.2
8x12	8.0	12.0	8.3	8.3	9.0	0.8~1.1	3.2
10x10.5	10.0	10.5	10.3	10.3	11.0	0.8~1.1	4.6
10x12.5	10.0	12.5	10.3	10.3	11.0	0.8~1.1	4.6

PSF SERIES STANDARD CHARACTERISTICS LIST

Rated Voltage (S.V)	Cap (μ F)	Size DxL	Leakage current (μ A) max. ※2	ESR(m Ω) max. 100k to 300kHz / 20°C	Rated Ripple Current (mA rms/100kHz)		D.F (tan δ) max. 120Hz / 20°C
					-55°C $\leq$ 105°C	105°C $\leq$ 125°C	
6.3 (7.2)	470	6.3x9.5	592	25	3,800	1,267	0.12
	680	8x9.5	857	25	4,000	1,333	0.12
	1000	8x12	1,260	20	4,200	1,400	0.12
	1200	10x10.5	1,512	25	5,500	1,833	0.12
	1800	10x12.5	2,268	20	6,100	2,033	0.12
10 (11.5)	330	6.3x9.5	660	25	3,700	1,233	0.12
	560	8x9.5	1,120	25	4,000	1,333	0.12
	680	8x12	1,360	20	4,500	1,500	0.12
	820	10x10.5	1,640	25	4,200	1,400	0.12
	1000	10x10.5	2,000	25	4,500	1,500	0.12
	1200	10x12.5	2,400	20	5,600	1,867	0.12
16 (18.4)	220	6.3x9.5	704	25	2,850	950	0.12
	330	8x9.5	1,056	25	4,000	1,333	0.12
	470	8x12	1,504	20	4,500	1,500	0.12
	680	10x10.5	2,176	25	5,100	1,700	0.12
	820	10x12.5	2,624	20	5,600	1,867	0.12
20 (23.0)	120	6.3x9.5	480	25	2,510	837	0.12
	220	8x9.5	880	25	2,750	917	0.12
	270	8x12	1,080	20	2,950	983	0.12
	330	10x10.5	1,320	25	4,700	1,567	0.12
	470	10x12.5	1,880	20	4,950	1,650	0.12
25 (28.8)	100	6.3x9.5	500	40	2,380	793	0.12
	180	8x9.5	900	30	2,900	967	0.12
	220	8x9.5	1,100	28	3,500	1,167	0.12
	330	10x10.5	1,650	30	4,250	1,417	0.12
	470	10x12.5	2,350	28	4,500	1,500	0.12
35 (40.3)	56	6.3x9.5	392	60	2,300	767	0.12
	100	8x9.5	700	50	2,500	833	0.12
	120	8x12	840	30	2,950	983	0.12
	150	10x10.5	1,050	30	2,950	983	0.12
	220	10x12.5	1,540	28	3,400	1,133	0.12

※※ 1. Capacitance tolerance : $\pm$ 20% (M)

※※ 2. After 2 minutes

PSG Series

- Super low ESR, High ripple current capability
- Rated Voltage: 2.5 ~ 63V
- Endurance: 15,000 hours at 105°C
- Applications: Motherboards, Servers, VGA, etc.,
- RoHS Compliant
- Halogen Free compliant

Specifications

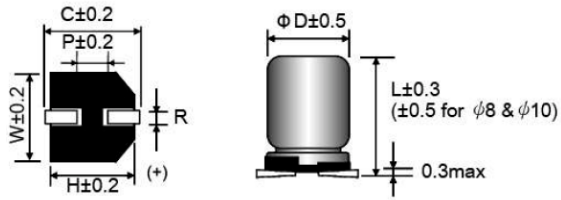
Items	Conditions	Characteristics
Category Temperature Range	-	-55 to +105°C
Rated Voltage Range	-	2.5 ~ 63V
Capacitance Tolerance	at 20°C, 120Hz	±20% (M)
Surge Voltage	at 105°C	Rated voltage x 1.15V
Leakage Current	at 20°C after 2 minutes	$I \leq 0.2CV$ or 300(μA) Whichever is greater measured, after 2 minutes application of rated working voltage at +20°C.
Dissipation Factor (tan δ)	at 20°C, 120Hz	Please see the attached characteristics list
Characteristics of Impedance at low, high temperature	at -55°C, 100kHz	$Z(-55^{\circ}\text{C})/Z(+20^{\circ}\text{C}) \leq 1.25$
	at -25°C, 100kHz	$Z(-25^{\circ}\text{C})/Z(+20^{\circ}\text{C}) \leq 1.15$
Endurance	The following specifications shall be satisfied when the capacitors are restored to 20°C after the rated voltage is applied for 15,000 hours at 105°C.	Appearance NO significant damage.
		Capacitance change $\leq \pm 20\%$ of the initial value.
		DF (tan δ) $\leq 150\%$ of the initial specified value.
		ESR $\leq 150\%$ of the initial specified value.
		Leakage current $\leq$ The initial specified value.
Damp Heag (Steady State)	The following specifications shall be satisfied when the capacitors are restored to 20°C after subjecting them to store at 60°C, 90 to 95% RH for 1,000 hours, without DC applied.	Appearance NO significant damage.
		Capacitance change $\leq \pm 20\%$ of the initial value.
		DF (tan δ) $\leq 150\%$ of the initial specified value.
		ESR $\leq 150\%$ of the initial specified value.
		Leakage current $\leq$ The initial specified value.
Surge Voltage	The capacitors shall be subjected to 1,000 cycles each consisting of charge with the surge voltages specified at 105°C for 30 seconds through a protective resistor (R=1 kΩ) and discharge for 5 minutes 30 seconds.	Appearance NO significant damage.
		Capacitance change $\leq \pm 20\%$ of the initial value.
		DF (tan δ) $\leq 150\%$ of the initial specified value.
		ESR $\leq 150\%$ of the initial specified value.
		Leakage current $\leq$ The initial specified value.

※ Note: If any doubt arises, measure the leakage current after following voltage treatment.
 Voltage treatment: DC rated voltage are applied to the capacitors for 120 minutes at 105°C.

Frequency Coefficient for Ripple Current

Frequency	$120\text{Hz} \leq f < 1\text{kHz}$	$1\text{kHz} \leq f < 10\text{kHz}$	$10\text{kHz} \leq f < 100\text{kHz}$	$100\text{kHz} \leq f < 500\text{kHz}$
Coefficient	0.05	0.3	0.7	1

DIMENSIONS



(Unit: mm)

Size Code	Φ D	L	W	H	C	R	P
5x6	5.0	6.0	5.3	5.3	6.0	0.5~0.8	1.4
6.3x6	6.3	6.0	6.6	6.6	7.3	0.5~0.8	2.1
6.3x9.5	6.3	9.5	6.6	6.6	7.3	0.5~0.8	2.1
8x7	8.0	7.0	8.3	8.3	9.3	0.5~0.8	3.2
8x9.5	8.0	9.5	8.3	8.3	9.3	0.8~1.1	3.2
8x12	8.0	12.0	8.3	8.3	9.0	0.8~1.1	3.2
10x8	10.0	8.0	10.3	10.3	11.0	0.8~1.1	4.6
10x10.5	10.0	10.5	10.3	10.3	11.0	0.8~1.1	4.6
10x12.5	10.0	12.5	10.3	10.3	11.0	0.8~1.1	4.6

PSG SERIES STANDARD CHARACTERISTICS LIST

Rated Voltage (S.V.)	Cap (μ F)	Size DxL	Leakage current (μ A) max. $\times 2$	ESR (m Ω) max. 100k to 300kHz / 20°C	Rated Ripple Current (mA rms) 100kHz / 105°C	D.F. (tan δ) max. 120Hz / 20°C
2.5 (2.9)	220	5x6	300	40	1,620	0.12
	330	6.3x6	300	20	2690	0.12
	820	6.3x9.5	410	18	3200	0.12
	820	8x9.5	410	18	4520	0.12
	1500	8x9.5	750	18	4520	0.12
	1800	8x12	900	12	5200	0.12
	2700	10x12.5	1,350	12	5,500	0.12
4 (4.6)	68	5x6	300	40	1,500	0.12
	150	6.3x6	300	24	2,200	0.12
	680	6.3x9.5	544	16	3,200	0.12
	680	8x7	544	20	3,400	0.12
	1000	8x9.5	800	16	4,500	0.12
	1500	8x12	1,200	14	5,100	0.12
	1800	10x12.5	1,440	12	5,500	0.12
	2200	10x12.5	2,000	12	5,500	0.12
6.3 (7.2)	100	5x6	300	40	1500	0.12
	220	5x7	300	20	1600	0.12
	220	6.3x6	300	20	2400	0.12
	560	6.3x9.5	705	20	3200	0.12
	560	8x7	705	20	3300	0.12
	820	8x9.5	1,033	15	4450	0.12
	1000	8x9.5	1,260	15	4520	0.12
	1200	8x12	1,512	12	5020	0.12



Rated Voltage (S.V.)	Cap (μ F)	Size DxL	Leakage current (μ A) max. $\times 2$	ESR (m Ω) max. 100k to 300kHz / 20°C	Rated Ripple Current (mA rms) 100kHz / 105°C	D.F. (tan δ) max. 120Hz / 20°C
6.3 (7.2)	1500	10x10.5	1,890	15	5020	0.12
	1800	10x12.5	2,268	12	5400	0.12
	2200	10x12.5	2,772	12	5,500	0.12
10 (11.5)	68	5x6	300	40	1,500	0.12
	120	6.3x6	300	25	2,420	0.12
	150	8 x7	300	22	2,450	0.12
	330	6.3x9.5	660	20	3,200	0.12
	560	8 x9.5	1,120	16	4,450	0.12
	680	8 x9.5	1,360	16	4,450	0.12
	820	8x12	1,640	14	4,850	0.12
	1000	10x10.5	2,000	15	5,020	0.12
	1200	10x10.5	2,400	15	5,200	0.12
	1500	10x12.5	3,000	14	5,400	0.12
16 (18.4)	100	6.3x6	320	24	2,400	0.12
	180	6.3x9.5	576	15	3,200	0.12
	220	6.3x9.5	704	15	3,200	0.12
	270	6.3x9.5	864	15	3,200	0.12
	270	8x7	864	20	3,400	0.12
	270	8x9.5	864	20	4,400	0.12
	470	8x9.5	1,504	25	4,400	0.12
	560	8x12	1,792	16	4,820	0.12
	680	10x10.5	2,176	18	5,200	0.12
	1000	10x12.5	3,200	16	5,400	0.12
20 (23.0)	68	6.3x6	300	38	1,450	0.12
	180	6.3x9.5	720	30	1,450	0.12
	330	8x9.5	1320	30	1,890	0.12
	470	8x12	1880	28	3,320	0.12
	560	10x10.5	2240	28	3,320	0.12
	680	10x12.5	2720	28	4,220	0.12
25 (28.8)	47	6.3x6	300	40	1,200	0.12
	100	6.3x9.5	500	30	2,000	0.12
	100	8x7	500	40	2,000	0.12
	150	8x9.5	750	35	3,000	0.12
	220	8x12	1100	32	3,500	0.12
	330	10x10.5	1650	35	3,800	0.12
	470	10x12.5	2350	32	4,000	0.12
35 (40.3)	22	6.3x6	300	80	1,450	0.12
	56	6.3x9.5	392	50	2,300	0.12
	68	6.3x9.5	476	50	2,300	0.12
	68	8x7	476	60	2,500	0.12
	100	8x12	700	28	2,750	0.12
	220	10x12.5	1,540	28	3,200	0.12

Rated Voltage (S.V.)	Cap (μ F)	Size DxL	Leakage current (μ A) max. ※2	ESR (m Ω) max. 100k to 300kHz / 20°C	Rated Ripple Current (mA rms) 100kHz / 105°C	D.F. (tan δ) max. 120Hz / 20°C
50 (57.5)	12	6.3x6	300	100	660	0.12
	33	6.3x9.5	330	50	900	0.12
	47	8x9.5	470	45	1,850	0.12
	100	10x12.5	1,000	28	2,560	0.12
	180	10x12.5	1,800	28	2,560	0.12
63 (72.5)	22	6.3x9.5	300	50	1,800	0.12
	33	6.3x9.5	416	50	1,800	0.12
	47	8x12	592	36	2,200	0.12
	56	10x10.5	705	32	2,350	0.12
	100	10x12.5	1,260	28	2,550	0.12
	150	10x12.5	1,890	28	2,550	0.12

※1. Capacitance tolerance : $\pm 20\%$ (M)

※2. After 2 minutes

PSH Series

- Super low ESR, Long life capability
- Rated Voltage: 4.0 ~ 50V
- Endurance: 20,000 hours at 105°C
- Applications: DC/DC Converter, Voltage Regulators, Decoupling, Applications for Computer Motherboards etc.,
- RoHS Compliant
- Halogen Free compliant

Specifications

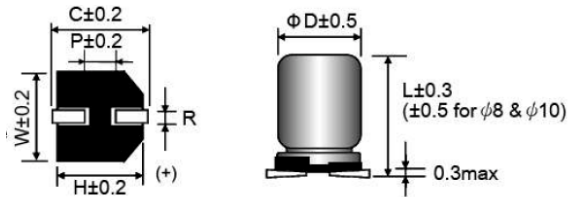
Items	Conditions	Characteristics
Category Temperature Range	-	-55 to +105°C
Rated Voltage Range	-	4.0 ~ 50V
Capacitance Tolerance	at 20°C, 120 Hz	±20% (M)
Surge Voltage	at 105°C	Rated voltage x 1.15V
Leakage Current	at 20°C after 2 minutes	$I \leq 0.2CV$ or $300(\mu A)$ Whichever is greater measured, after 2 minutes application of rated working voltage at +20°C.
Dissipation Factor (tan δ)	at 20°C, 120 Hz	Please see the attached characteristics list
Characteristics of Impedance at low, high temperature	at -55°C,	$Z(-55^{\circ}C)/Z(+20^{\circ}C) \leq 1.25$
	at -25°C,	$Z(-25^{\circ}C)/Z(+20^{\circ}C) \leq 1.15$
Endurance	The following specifications shall be satisfied when the capacitors are restored to 20°C after the rated voltage is applied for 20,000 hours at 105°C.	Appearance NO significant damage.
		Capacitance change $\leq \pm 20\%$ of the initial value.
		DF (tan δ) $\leq 150\%$ of the initial specified value.
		ESR $\leq 150\%$ of the initial specified value.
		Leakage current $\leq$ The initial specified value.
Damp Heag (Steady State)	The following specifications shall be satisfied when the capacitors are restored to 20°C after subjecting them to store at 60°C, 90 to 95% RH for 1,000 hours, without DC applied.	Appearance NO significant damage.
		Capacitance change $\leq \pm 20\%$ of the initial value.
		DF (tan δ) $\leq 150\%$ of the initial specified value.
		ESR $\leq 150\%$ of the initial specified value.
		Leakage current $\leq$ The initial specified value.
Surge Voltage	The capacitors shall be subjected to 1,000 cycles each consisting of charge with the surge voltages specified at 105°C for 30 seconds through a protective resistor ($R=1\text{ k}\Omega$) and discharge for 5 minutes 30 seconds.	Appearance NO significant damage.
		Capacitance change $\leq \pm 20\%$ of the initial value.
		DF (tan δ) $\leq 150\%$ of the initial specified value.
		ESR $\leq 150\%$ of the initial specified value.
		Leakage current $\leq$ The initial specified value.

※ Note: If any doubt arises, measure the leakage current after following voltage treatment.
Voltage treatment: DC rated voltage are applied to the capacitors for 120 minutes at 105°C.

Frequency Coefficient for Ripple Current

Frequency	$120\text{Hz} \leq f < 1\text{kHz}$	$1\text{kHz} \leq f < 10\text{kHz}$	$10\text{kHz} \leq f < 100\text{kHz}$	$100\text{kHz} \leq f < 500\text{kHz}$
Coefficient	0.05	0.3	0.7	1

DIMENSIONS



(Unit: mm)

Size Code	Φ D	L	W	H	C	R	P
6.3 x6	6.3	6.0	6.6	6.6	7.3	0.5~0.8	2.1
6.3x7	6.3	7.0	6.6	6.6	7.3	0.5~0.8	2.1
6.3x9.5	6.3	9.5	6.6	6.6	7.3	0.5~0.8	2.1
8x7	8.0	7.0	8.3	8.3	9.3	0.5~0.8	3.2
8x9.5	8.0	9.5	8.3	8.3	9.3	0.8~1.1	3.2
8x12	8.0	12.0	8.3	8.3	9.0	0.8~1.1	3.2
10x10.5	10.0	10.5	10.3	10.3	11.0	0.8~1.1	4.6
10x12.5	10.0	12.5	10.3	10.3	11.0	0.8~1.1	4.6

PSH SERIES STANDARD CHARACTERISTICS LIST

Rated Voltage (S.V.)	Cap (μ F)	Size DxL	Leakage current (μ A) max.※2	ESR (m Ω) max. 100k to 300kHz / 20°C	Rated Ripple Current (mA rms) 100kHz / 105°C	D.F.(tan δ) max. 120Hz / 20°C
4 (4.6)	220	6.3X6	300	20	2,800	0.12
	560	6.3X9.5	448	20	3,500	0.12
	560	8x7	448	18	3,700	0.12
	820	8X9.5	656	15	3,500	0.12
	1200	8X12	960	15	4,450	0.12
	1500	10x10.5	1,200	13	4,200	0.12
	2200	10x12.5	1,760	13	5,400	0.12
6.3 (7.2)	100	6.3x6	300	35	2,400	0.12
	220	6.3x6	300	22	2,600	0.12
	470	6.3x9.5	592	22	3,200	0.12
	560	6.3x9.5	705	22	3,200	0.12
	820	8X9.5	1,033	20	3,850	0.12
	1000	8X12	1,260	20	4,250	0.12
	1200	10x10.5	1,512	18	4,350	0.12
	1800	10x12.5	2,268	18	5,200	0.12
10 (11.5)	68	6.3X6	300	30	2,400	0.12
	100	6.3x6	300	30	2,400	0.12
	220	6.3X7	440	30	2,500	0.12
	330	6.3x9.5	660	30	3,150	0.12
	560	8X9.5	1,120	25	3,850	0.12
	680	8x12	1,360	25	4,150	0.12
	820	10x10.5	1,640	20	4,250	0.12
	1000	10x10.5	2,000	20	4,250	0.12
	1200	10x12.5	2,400	20	5,100	0.12

Rated Voltage (S.V.)	Cap (μF)	Size DxL	Leakage current (μA) max. ※2	ESR (mΩ) max. 100k to 300kHz / 20°C	Rated Ripple Current (mA rms) 100kHz / 105°C	D.F.(tanδ) max. 120Hz / 20°C
16 (18.4)	100	6.3×6	320	30	2,200	0.12
	220	6.3×9.5	704	30	3,050	0.12
	330	8×9.5	1056	20	3,450	0.12
	470	8×12	1504	22	4,050	0.12
	680	10 × 10.5	2176	20	4,150	0.12
	820	10×12.5	2624	20	5,100	0.12
25 (28.8)	47	6.3×6	300	40	1,500	0.12
	100	6.3×9.5	500	40	2,800	0.12
	180	8×9.5	900	30	3,250	0.12
	220	8×12	1100	30	3,900	0.12
	330	10×10.5	1650	20	4,100	0.12
	470	10×12.5	2350	25	4,500	0.12
35 (40.3)	22	6.3×6	300	70	1,450	0.12
	68	6.3×9.5	476	60	1,500	0.12
	120	8×9.5	840	50	1,800	0.12
	150	8×12	1050	50	2,850	0.12
	220	10×10.5	1540	40	2,950	0.12
	270	10×12.5	1890	40	3,200	0.12
50 (57.5)	10	6.3×6	300	60	1,400	0.12
	33	6.3×9.5	330	30	1,700	0.12
	47	8×9.5	470	30	2,000	0.12
	68	8×12	680	28	2,200	0.12
	100	10×10.5	1000	30	2,300	0.12
	100	10×12.5	1000	28	2,650	0.12

※ 1. Capacitance tolerance: ±20%(M)

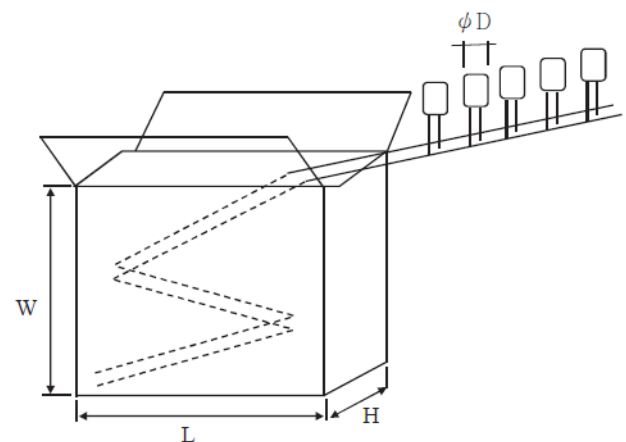
※ 2. After 2 minutes

Packing specifications (Lead type)

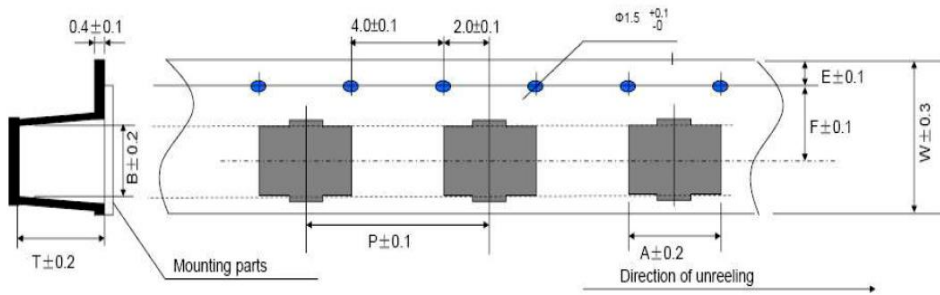
ΦD x L	Bags / Inner Box	Layer Quantity	Quantity (pcs/bag)	Total Quantity (pcs / carton)	Size of Inner Box	Size of Out Box
5x6~7	15	2	1000	30,000	267 X 260 X 135	546 X 277 X 152
5x8~12	10	2	1000	20,000		
6.3x6~9	10	2	1000	20,000		
6.3x10~12	8	2	500	16,000		
8x7~12	10	2	500	10,000		
8x14~16	8	2	500	8,000		
8x20	6	2	500	6,000		
10x8~12	11	2	500	4,400		
10x16~22	9	2	500	3,600		

TAPING PACKAGE

Item	Taping packing					
ΦD(mm)	W±5(mm)	L±5(mm)	H±5(mm)	Qty.(pcs)	Inner Box(pcs)	Total(pcs)
5x6~12	235	320	51	2000	10	20,000
6.3x (6 ~12)	235	320	51	1500		15,000
8x7~16	235	320	51	1000		10,000
8x20	255	320	51	1000	8	8,000
10x8~22	218	325	51	600	5	3,000

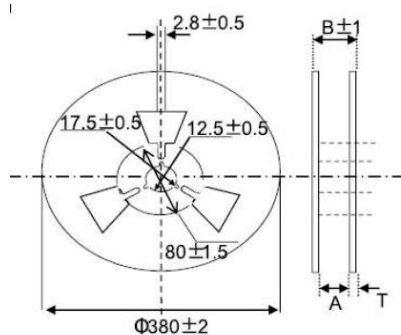


Carrier Tape

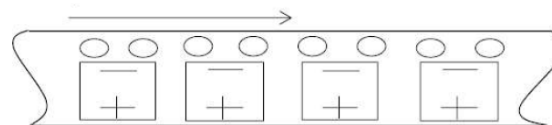


Size ($\phi \times L$)	Item						
	A	B	w	F	E	P	T
5x6.0-7.Q	5.7	5.7	12	5.5	1.75	12.0	7.5
6.3x4.5	7.0	7.0	16	7.5	1.75	12.0	4.8
6.3x5.7-6.Q	7.0	7.0	16	7.5	1.75	12.0	6.5
Aluminum Casex6.Q (=6.8mm)	7.0	7.0	16	7.5	1.75	12.0	8.2
6.3x7.0	7.0	7.0	16	7.5	1.75	12.0	8.2
6.3x7.7	7.0	7.0	16	7.5	1.75	12.0	8.2
6.3x8.Q	7.0	7.0	16	7.5	1.75	12.0	8.2
Aluminum Casex8.Q (=9.3mm)	7.0	7.0	16	7.5	1.75	12.0	9.3
6.3x9.5-10	7.0	7.0	16	7.5	1.75	12.0	10.0
8x7.0	8.7	8.7	24	11.5	1.75	16.0	8.8
8x9.5	8.7	8.7	24	11.5	1.75	16.0	11.0
8x12	8.7	8.7	24	11.5	1.75	16.0	13.0
10x8	10.7	10.7	24	11.5	1.75	16.0	8.5
10x10	10.7	10.7	24	11.5	1.75	16.0	11.0
10x10.5	10.7	10.7	24	11.5	1.75	16.0	11.0
10x12.5	10.7	10.7	24	11.5	1.75	16.0	13/13.

Reel



Polarity



Size code ($\phi \times L$)	A	8±1	T±0.5
5 x6~7	14	18	2.0
6.3x6~10	18	22	
8x7~12	26	30	
10x8~12	26	30	

Size Code $\phi D \times L$	W1	W2	Quantity / Reel	Size of Inner Box (L)x(W)x(H)	Size of Out Box (L)x(W)x(H)
5x6	14.0±1.0	18.0±1.0	1000 pcs.	385x385x106	412x403x255
6.3x (6~8)	18.0±1.0	22.0±1.0	1000 pcs.	385x385x125	412x403x293
6.3x9.5	18.0±1.0	22.0±1.0	800 pcs.	385x385x125	412x403x293
8x(7~10)	26.0±1.0	30.0±1.0	500 pcs.	385x385x106	412x403x255
10x(8~10.5)	26.0±1.0	30.0±1.0	500 pcs.	385x385x106	412x403x255
(8~10)x12.5	26.0±1.0	30.0±1.0	400 pcs.	385x385x106	412x403x255

Application Guidelines for Aluminum Electrolytic Capacitors

Caution During Circuit Design

1. Please make sure the application and mounting conditions to which the capacitor will be exposed are within the conditions specified in the catalog or alternate product specification (Referred as to specification here after).
2. Design Aluminum Electrolytic Capacitors, please pay attention to the points listed below
 1. The capacitor shall not be used in an ambient temperature which exceeds the operating temperature specified in the specification
 2. Do not apply excessive current which exceeds the allowable ripple current
 3. Make sure that no excess voltage (that is higher than the rated voltage) is applied to the capacitor.
 - a. Please pay attention that the peak voltage, which is DC voltage overlapped by ripple current, should not exceed the rated voltage.
 - b. In the case where more than 2 aluminum electrolytic capacitors are used in series, please make sure that applied voltage will be lower than rated voltage and the voltage be will applied to each capacitor equally using a balancing resistor in parallel with the capacitors.
 4. Aluminum electrolytic capacitors are polarized Make sure that no reverse se voltage or AC voltage is applied to the capacitors. Please apply bi-polarized Capacitor to reverse polarity circuit but bi-polarized capacitors cannot be applied to AC circuit.
3. Appropriate capacitors which comply with the life requirement of the products should be selected when designing the circuit.
4. For a circuit that repeats rapid charging/discharging of electricity, an appropriate capacitor that is capable of enduring such a condition must be used.
5. Aluminum case, cathode lead wire, anode lead wire and circuit pattern must be isolated
6. The sleeve of capacitors is not recognized as an insulator, and therefore, the standard capacitor should not be used in a place where insulation function is needed.

If you require a higher grade of insulating sleeve, please consult us
7. Capacitors may fail if they are used under the following conditions:
 - a. Damp conditions such as water, saltwater spray, or oil spray or fumes. High humidity or humidity condensation situations.
 - b. In an atmosphere with toxic gasses (such as hydrogen sulfide, sulfurous acid, nitrous acid, chlorine, ammonia, etc)
 - c. Being exposed to direct sunlight, ozone, Ultraviolet ray, or radiation
 - d. Being exposed to acidic or alkaline solutions
 - e. Under severe conditions where vibration and / or mechanical shock exceed the applicable ranges of the specification
8. In designing a circuit, the following matters should be ensured 1n advance to the capacitor assembly on the P.C board.
 - (1) Design the appropriate hole spacing to match the lead pitch of capacitors.
 - (2) Do not locate any wiring and circuit patterns directly above the capacitor vent. Ensure enough free space above the capacitor vent
$$\begin{aligned} &\varnothing 8(6.3) \sim \varnothing 16:2\text{mm} \\ &\varnothing 8 \sim \varnothing 35:3\text{mm} \\ &\geq \varnothing 40:5\text{mm} \end{aligned}$$
 - (3) Do not design a circuit board so that heat generating components are placed near an aluminum electrolytic capacitor or reverse side of P.C. board (under the capacitor)
 - (4) Do not print any copper trace under the seal (terminal) side of a capacitor. Copper traces should be 2mm spaced apart from the side of the capacitor body.
 - (5) For a screw terminal type capacitor. Tighten in g the terminal screws and the mounting clamp should be within the maximum torque specified in the catalogs or product specifications. Do not mount a screw terminal type capacitor with the terminal facing downward. Also, if the body of a capacitor is installed horizontally such as being laid on its side. Do not position the pressure relief vent downward
9. Electrical characteristics may vary depending on changes 111 temperature and frequency. Please consider this variation when you design circuits
10. When you mount capacitors on the double-sided P.C. boards, avoid excess substrate holes and vias to capacitor location.
11. When you install more than 2 capacitors in parallel, consider the balance of current flowing through the capacitors.
12. If more than 2 aluminum electrolytic capacitors are used 1n series. make sure the applied voltage will be lower than the rated voltage and that voltage will be applied to each capacitor equally using a balancing resistor in parallel with each capacitor.

Application Guidelines for Aluminum Electrolytic Capacitors

Caution for Assembling Capacitors

1. Once a capacitor has been assembled in the set and power applied, even if a capacitor is discharged, an electric potential (restricting voltage) may exist between the terminals.
2. Electric potential between positive and negative terminal may exist as a result of returned electromotive force, so please discharge the capacitor using a 1K Ω resistor.
3. Leakage current of aluminum electrolytic capacitors may be increased during long storage time. In this case, the capacitors should be subjected to voltage treatment a 1K Ω resistor before using
4. Please confirm ratings (voltage and capacitance) and polarity before installing capacitors on the P.C. board
5. Do not drop capacitors on the floors and damage, nor use a capacitors that was dropped
6. Please confirm that lead spacing of the capacitor matches the hole spacing of the P.C. board prior to installation
7. Please pay attention that the clinch force is not too strong when capacitors are placed and fixed by an automatic insertion machine
8. Soldering
 - 1) Soldering condition (temperature and times) must be confirmed to be within Coreworks specification
 - 2) Soldering Iron should never touch the capacitors body and do not dip capacitors body into melted solder
 - 3) Please avoid contact between other components and the aluminum capacitor
 - 4) Please avoid having flux adhere to any portion except the terminal
9. After Soldering
 - 1) Do not bend or twist the capacitors body after soldering on P.C Board
 - 2) Do not hit the capacitors and isolate capacitors from the P.C. board or other device when stacking P.C. boards in store
10. Standard Aluminum Electrolytic Capacitors should be from halogenated solvents during P.C. board cleaning after soldering
11. Do not use halogenated adhesives and coating materials to fix Aluminum Electrolytic Capacitor

Caution for Assembling Capacitors

1. Do not directly touch terminal by hand
2. Keep electric conductor off terminals to avoid short circuit
3. Do not use following conditions for assembling capacitors
 - (1) Damp conditions such as water, saltwater spray, or oil spray or fumes. High humidity or humidity condensation situations
 - (2) In an atmosphere filled with toxic gasses (such as hydrogen sulfide, sulfurous acid, nitrous acid, chlorine, ammonia, etc.)
 - (3) Being exposed to direct sunlight, ozone, ultraviolet ray, or Radiation
 - (4) Being exposed to acidic or alkaline solutions
 - (5) Under severe conditions where vibration and / or mechanical shock exceed the applicable ranges of the specification

Maintenance Inspection

Please periodically inspect the capacitors that are installed in industrial equipment. Remarkable abnormality such as vent operation leaking electrolyte, etc . Capacitance, dielectric loss tangent, leakage current, and items specified in the specification

Safe Precautions

1. If you see smoke due to operation of safety vent, turn off the main switch or pull out the plug from the outlet
2. Do not bring your face near the capacitor when the pressure relief vent operates, because the gases emitted from that
3. Are over 100°C. If the gas gets into your eyes, please flush your eyes immediately with pure water. If electrolyte exposed on your skin, please wash it

with soap and water.

Application Guidelines for Aluminum Electrolytic Capacitors

Storage

1. It is recommended to keep capacitors between the ambient temperatures of 5°C to 35°C and a relative humidity of 75% or below.
2. Confirm that the environment does not have any of the following conditions:
 - 1) Damp conditions such as water, saltwater spray, or oil spray or fumes. High humidity or humidity condensation situations
 - 2) In an atmosphere filled with toxic gasses (such as hydrogen sulfide, sulfurous acid, nitrous acid, chlorine, ammonia, etc.)
 - 3) Being exposed to direct sunlight, ozone, ultraviolet ray, or radiation
 - 4) Being exposed to acidic or alkaline solutions
 - 5) Under severe conditions where vibration and / or mechanical shock exceed the applicable ranges of the specification

3.

Category	Description	Storage life
Mid-High Voltage	160V and above	2yrs; after 1yr, needs to check characteristics; if NG, needs to do aging
Low Voltage	120V and below	2yrs

Remark: Re-aging condition depends on its own spec

Disposal

1. Make a hole the in the capacitor body or crush capacitors and incinerate them.
2. If incineration is not applicable, hand them over to a waste disposal agent and have them buried in a landfill

Special Notice

When choosing capacitors, if clients couldn't find the series or specification in catalogue and data sheet, please contact with our Sales or RD department, we are able to base on clients' needs to develop product with special functions. For further details, please refer to EAIJ RCR-2367B-Guideline of notabilia for fix for use in electronic equipment (Technical Standardization Committee on Passive Components (established in 1995, revised March 2002)

Environment Protection Policy

We are reducing environmentally harmful substances to do our capacitors in global environmental protection activities.

Product compatible with Pb-free and products with non-PVC encasing and RoHS compliance materials are available.

- RoHS compliance

Our capacitors do not use any of the materials specifically identified and restricted hazardous material under RoHS prohibited.

Pb : Lead, Cr6+: Hexavalent chromium, Hg: Mercury, Cd: Cadmium, PBS :Polybrominated biphenyls, PBOE : Polybrominated diphenyl ethers.

PVC: Polyvinyl chloride

- PVC free capacitors

We use PET (Polyethylene Terephthalate) sleeve to instead of PVC (Polyvinyl Chloride) sleeve since 2005 January. As there is a size limitation for this counter measure, Please consult our sales representative their availability in big size capacitors.

- Pb-Free capacitors

Our Capacitors lead wire and terminal doesn't contain lead.

We follow up these conditions as rule and standards to use right materials to production capacitors for maintain earth environment everlasting for human.

Application Guidelines for Aluminum Electrolytic Capacitors

Effects of ambient temperature to life (for reference)

Because an aluminum electrolytic capacitor is essentially an electrochemical component, increase temperatures accelerate the chemical reaction producing gas within the capacitor, diffuse the gas to outside through the end seal, and consequently accelerate a gradual decrease in capacitance and a gradual increase in $\tan \delta$ and ESR, the following equation has been experimentally found to express the relationship between the temperature acceleration factor and the deterioration of the capacitor.

Where :

$$L_x = L_o \cdot K_{temp} = L_o \cdot B^{(T_o - T_x)/10}$$

$$K_{temp} = B^{(T_o - T_x)/10}$$

L_x = Life time (hour) of capacitor to be estimated

L_o = Base life time (hour) of capacitor

T_o = Maximum rated operating temperature (°C) capacitor shown in catalog

T_x = Actual ambient temperature (°C) of capacitor

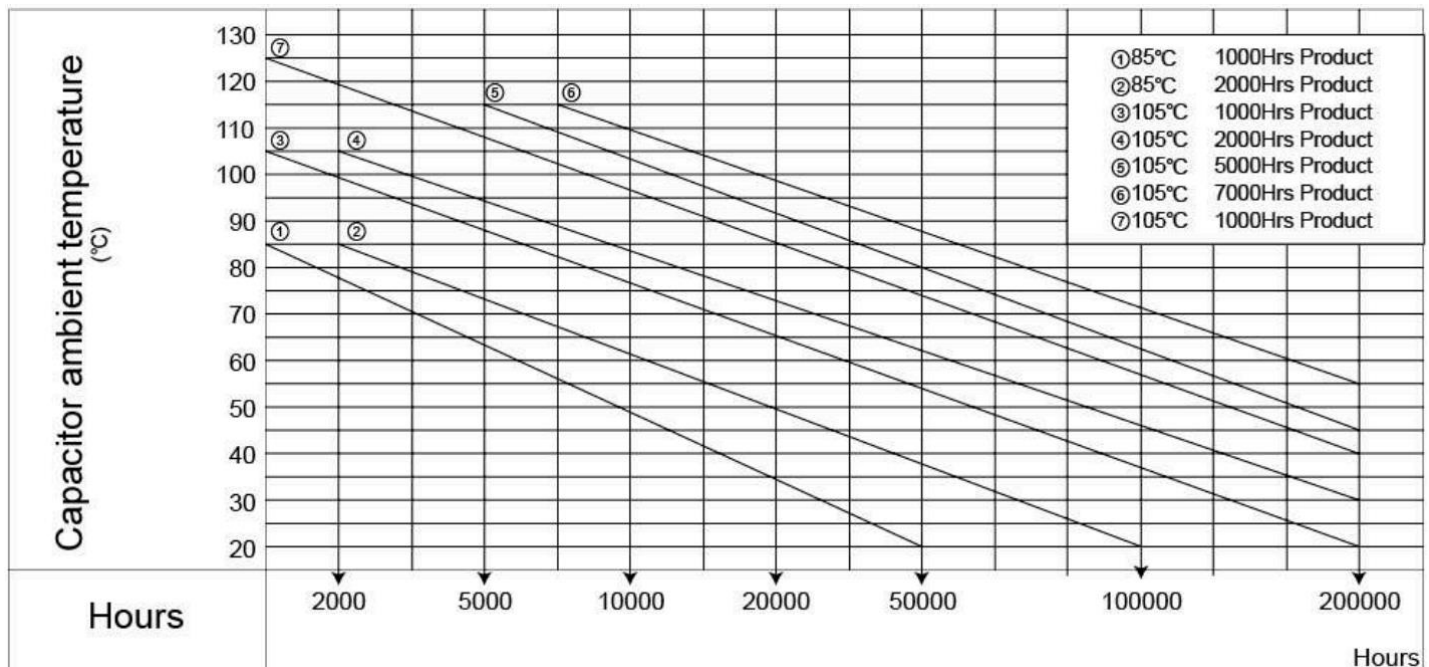
B = Temperature acceleration factor (=2)

This equation is similar to Arrhenius equation that express a relationship between chemical reaction rates and temperature and called Arrhenius rule of aluminum electrolytic capacitors.

The temperature acceleration in factor (B) is approximately 2 over an ambient temperature range (T_x) from 40°C to the maximum rated operating temperature of the capacitor, and it means that the lifetime is approximately halved with every 10°C rise in ambient temperature and can be extended by using the capacitors at low temperatures.

For an ambient temperature range (T_x) 20°C to 40°C, the factor B will be close to 2, and the lifetime will be actually extended.

However, the environment where the devices are placed and their operating conditions influence ambient temperature, and in particular the ambient temperature in this range will be very inconstant. Therefore, a minimum lifetime should be estimated from the above formula by using the 40°C as T_x .

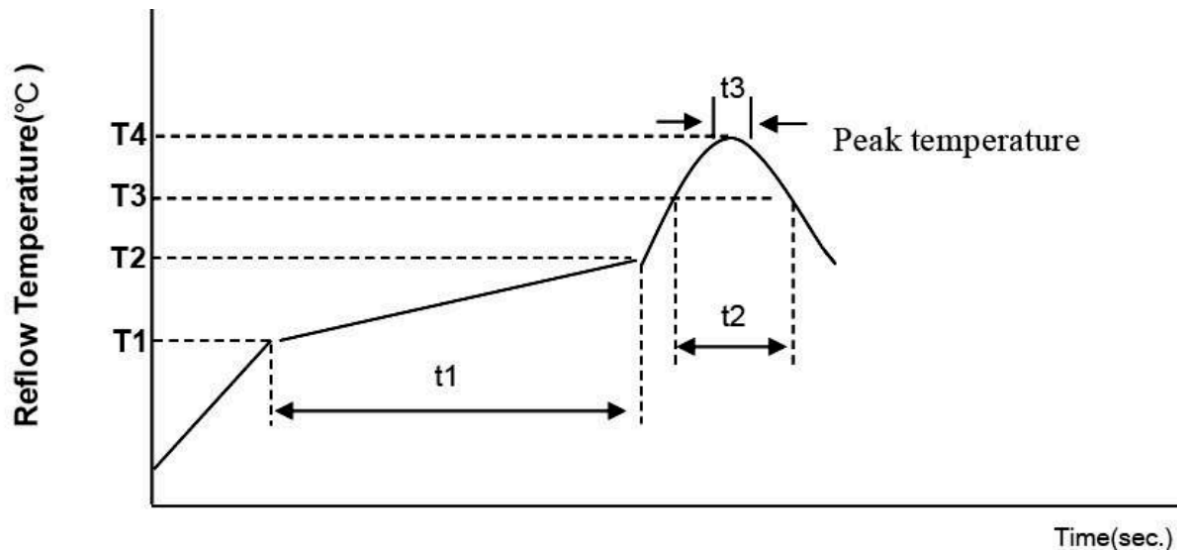


- ※ 1. A guide limit of the calculated like Aimo is 15 years max
2. $T_x \geq 40^\circ\text{C}$

Application Guidelines for Aluminum Electrolytic Capacitors

RECOMMENDED PB-FREE REFLOW SOLDERING CONDITIONS

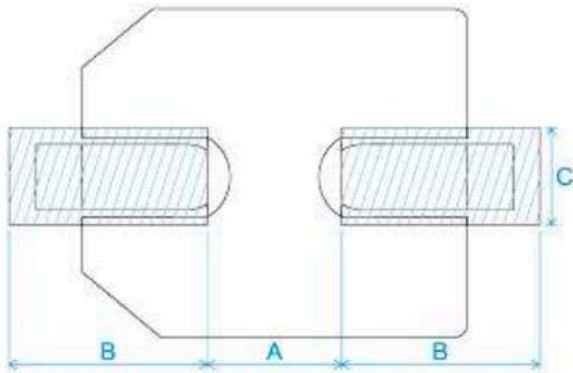
The following conditions are recommended for air or infrared reflow soldering of the surface mount capacitors onto a glass epoxy circuit board of 95 x 50 x 0.8mm (with resist) by cream solder (eutectic solder). The temperatures shown are the surface temperature values of the top of the capacitor.



Profile feature	Pb Free Assembly	
	4~6.3Ø	8~180Ø
Average Ramp-up Rate	3°C/second max.	3°C/second max.
Preheat		
Temperature Min (T1 min)	150°C	150°C
Temperature Max (T2 max)	180°C	180°C
Time (t1 Max)	120sec.	120sec.
Ramp-up Rate (T2 - T3)	3°C/second max.	3°C/second max.
Time maintained above Temperature(T3)	217°C	217°C
Time (t2 Max)	90sec.	40sec.
Peak Temperature(T4)	260°C	245°C
Time (t3 Max)	5sec.	5sec.
Reflow Cycles	1	2 or less

Application Guidelines for Aluminum Electrolytic Capacitors

RECOMMENDED LAND PATTEND DIMENSION OF PCB



DxL	a	b	c
Φ4	1.0	2.6	1.6
Φ5	1.4	3.0	1.6
Φ6.3	1.9	3.5	1.6
Φ8	3.0	3.5	2.5
Φ10	4.0	4.0	2.5
Φ12.5	4.3	5.8	2.5
Φ16	6.6	6.5	5.0
Φ18	6.6	7.7	5.0
Φ8(G)	2.5	4.5	4.7
Φ10(G)	3.8	4.8	4.7
Φ12.5(G)	3.8	6.1	6.9
Φ16(G)	5.0	8.0	9.5
Φ18(G)	5.0	8.6	9.5

“(G)” “Anti-vibration Structure”.

Application Guidelines for Aluminum Electrolytic Capacitors

PRECAUTIONS FOR USERS

Soldering method

The capacitors of Alchip-series have no capability to withstand such dip or wave soldering as totally immerses components into a solder bath.

Reflow soldering

Reflow the capacitors within recommended reflow soldering conditions. Verify no temperature stress to the capacitors because the following differences might degrade capacitors electrically and mechanically. Please consult us if other reflow conditions are employed.

1. Location of components: Temperature increases at the edge of PC board more than the center.
2. Population of PC board: The less the component population is the more temperature rises.
3. Material of PC board: A ceramic made board needs more heat than a glass epoxy made board. The heat increase may cause damage of the capacitors.
4. Thickness of PC board: A thicker board needs more heat than a thinner board. The heat increase may damage the capacitors.
5. Size of PC board: A larger board needs more heat than a smaller board. The heat increase may damage the capacitors.
6. Location of infrared ray lamps: IR reflow as well as hot plate reflow applies heat only on the reverse side of the PC board to lessen heat stress to the capacitors.
7. Vapor heat transfer systems (VPS) are not recommended.

Rework of soldering

Avoid reflow soldering more than once. Use a soldering iron for rework. Do not exceed an iron tip temperature of $380 \pm 10^{\circ}\text{C}$ and an exposure time of 3 ± 0.5 seconds.

Mechanical stress

Do not use the capacitors for lifting the PC board and give stress to the capacitor. Avoid bending the PC board. These may damage the capacitors.

Cleaning assembly board

Immediately after solvent cleaning, remove residual solvent for at least 10 minutes with an air knife. The solvent is so insufficiently dry for a long period of time that the capacitors may be cored.

Coating on assembly board

1. Before curing coating material remove the cleaning solvents from the assembly board.
2. Before conformal coating, a chloride free pre-coat material is recommended to use for lessening stress to the capacitors.

Molding with resin

Internal chemical reaction gradually produces gas in the capacitor; then, internal pressure is increasing. If the end seal of the capacitor is completely molded with a resin. The gas stays inside the capacitor. It will face dangerous situation. The chlorine contained resin will penetrate into the end seal, reach the inside element, and cause damage of the capacitor.

Others

Precautions and Guidelines for Aluminum Electrolytic Capacitors shall be referred.

ATA Series

- Anhydrous product.
- Low impedance at High frequency range, high ripple current resistance.
- Suitable for return-circuit of switching power source.
- RoHS Compliant & Halogen Free.

Specifications

Items	Characteristics											
Capacitance Tolerance	± 20% (120Hz, 20°C)											
Operating Temperature Range	-55 ~ +105°C						-40 ~ +105°C					
Rated Voltage Range	6.3 ~ 100VDC						160 ~ 400VDC					
Leakage Current	V ≤ 100V I ≤ 0.01CV or 3 (μA) (After 2 minutes application of DC rated voltage, at 20°C) V > 100V I ≤ 0.03CV +20 (μA) (After 5 minutes application of DC rated voltage, at 20°C)											
Dissipation Factor	Measurement Frequency: 120Hz. Temperature: 20°C											
	Rated Voltage (V)	6.3	10	16	25	35	50	63	80	100	160 ~250	400
	tan δ(Max)	0.22	0.19	0.16	0.14	0.12	0.10	0.08	0.08	0.07	0.20	0.24
	When nominal capacitance over 1000μF, tan δ shall be added 0.02 to the listed value with increase of every 1000μF.											
Low Temperature Stability Impedance Ratio (Max)	Measurement Frequency: 120Hz.											
	Rated Voltage(V)	6.3	10	16	25	35	50	63	100	160 ~250	400	
	Z(-25°C) / Z(20°C)	4	3	2	2	2	2	2	2	3	6	
	Z(-40°C) / Z(20°C)	-	-	-	-	-	-	3	3	6	12	
	Z(-55°C) / Z(20°C)	8	6	4	3	3	3	-	-	-	-	
Load Life	2000 hours, with application of rated voltage at 105°C											
	Capacitance Change	Within ± 20% of Initial Value										
	tan δ	200% or less of Initial Specified Value										
	Leakage Current	Initial Specified Value or less										
Shelf Life	The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours 105°C without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to them 4.1 of JIS C5101-4.											
	Capacitance Change	Within ± 20% of Initial Value										
	tan δ	200% or less of Initial Specified Value										
	Leakage Current	Initial Specified Value or less										
Standards	JIS C-5101-4(IEC 60384)											

Frequency Coefficient for Ripple Current

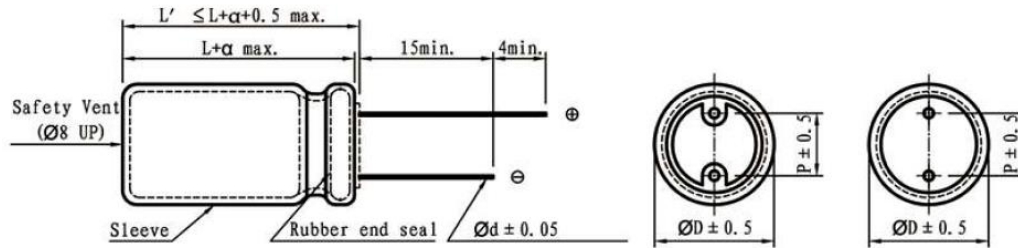
Rated Voltage (V)	Capacitance (μF)	Frequency (Hz)				
		50	120	1K	10K	100K
6.3 ~ 100	47 ~ 100	0.45	0.55	0.75	0.90	1.00
	220 ~ 1000	0.60	0.70	0.85	0.95	1.00
	1500 ~ 15000	0.70	0.80	0.95	0.98	1.00
160 ~ 400	2.2 ~ 330	0.55	0.65	0.80	0.90	1.00

The endurance of capacitors is reduced with internal heating produced by ripple current at the rate of halving the lifetime with every 5°C rise.
 When long life performance is required in actual use, the RMS ripple current has to be reduced.



ATA Series

Dimensions (mm)



Standard Ratings

D×L (mm); R.C. (mA rms) at 105°C 100KHz; IMP (Ω max) at 20°C 100KHz

Cap (μF)	V	6.3			10			16			25		
	Item	D x L	R.C.	IMP	D x L	R.C.	IMP	D x L	R.C.	IMP	D x L	R.C.	IMP
4.7											05x11	50	1.820
10											05x11	80	1.820
22											05x11	110	0.970
47					05x11	140	0.860	05x11	170	0.790	05x11	170	0.790
68					05x11	160	0.860	05x11	210	0.670	6.3x11	210	0.670
100					05x11	180	0.860	6.3x11	270	0.360	6.3x11	270	0.360
220		6.3x11	270	0.430	6.3x11	270	0.400	08x12	440	0.240	08x12	440	0.240
330		6.3x11	320	0.410	08x12	440	0.260	08x12	440	0.240	10x13	650	0.120
470		8x12	440	0.290	08x12	440	0.260	10x13	650	0.120	10x16	800	0.091
680		8x12	440	0.290	10x13	650	0.130	10x16	800	0.091	10x20	1050	0.070
1000		10x13	650	0.140	10x16	800	0.098	10x20	1050	0.070	13x21	1350	0.067
1500		10x16	800	0.100	10x20	1050	0.077	13x21	1350	0.067	13x25	1650	0.048
2200		10x25	1350	0.079	13x21	1350	0.073	13x25	1650	0.052	16x26	2050	0.036
3300		13x21	1350	0.079	13x25	1650	0.065	16x26	2050	0.036	16x32	2550	0.033
4700		13x25	1650	0.051	13x35	2050	0.040	16x32	2550	0.033	18x35	2950	0.031
6800		16x26	2050	0.043	16x32	2550	0.036	18x35	2950	0.031	18x40	3300	0.028
10000		16x32	2550	0.039	18x35	2950	0.034	18x40	3300	0.028			
15000		16x35	2950	0.036	18x40	3300	0.030						

※13mm may be replaced by 12.5mm upon customer's request.

ATA Series

Standard Ratings

D×L (mm); R.C.(mA rms) at 105°C 100KHz; IMP(Ω max) at 20°C 100KHz

Cap (μF)	V	35			50			63			100		
	Item	D x L	R.C.	IMP	D x L	R.C.	IMP	D x L	R.C.	IMP	D x L	R.C.	IMP
0.47					5x11	25	10.730				5x11	20	30.30
1					5x11	40	7.580				5x11	30	28.60
2.2					5x11	55	6.440				5x11	44	14.00
3.3					5x11	65	5.580				5x11	58	9.400
4.7		5x11	85	2.640	5x11	90	3.290	5x11	65	9.880	5x11	74	6.600
10		5x11	100	1.580	5x11	110	2.000	5x11	110	5.450	6.3x11	130	2.600
22		5x11	120	1.320	5x11	140	1.720	6.3x11	200	1.890	8x12	230	2.000
33		5x11	210	0.568	6.3x11	240	0.690	6.3x11	250	1.770	10x13	320	0.700
47		6.3x11	270	0.550	6.3x11	240	0.690	8x12	320	0.800	10x16	390	0.500
68		8x12	360	0.396	8x12	300	0.430	10x13	380	0.760	10x20	420	0.400
100		8x12	440	0.246	8x12	400	0.360	10x13	450	0.670	13x21	580	0.300
220		10x13	650	0.132	10x16	600	0.240	10x20	780	0.340	16x26	880	0.100
330		10x16	800	0.100	10x20	800	0.220	13x21	950	0.210	16x32	930	0.100
470		10x20	1050	0.077	13x21	1050	0.130	13x25	1430	0.170	16x36	1230	0.100
680		13x21	1350	0.073	13x25	1150	0.100	16x26	1780	0.130	18x35	1410	0.091
1000		13x25	1650	0.056	16x26	1550	0.069	16x32	1900	0.100	18x40	1520	0.065
1500		16x26	2050	0.040	16x32	1950	0.061	18x35	2150	0.079			
2200		16x32	2550	0.036	18x35	2250	0.057	18x40	2350	0.077			
3300		18x35	2950	0.034									
4700		18x40	3300	0.030									

※13mm may be replaced by 12.5mm upon customer's request.

Standard Ratings

D×L (mm); R.C.(mA rms) at 105°C 100KHz

Cap (μF)	V	160		200		250		400	
	Item	D x L	R.C.	D x L	R.C.	D x L	R.C.	D x L	R.C.
2.2						8x12	105	8x12	80
3.3		8x12	104	8x12	113	8x12	122	10x13	110
4.7		8x12	112	8x12	126	10x13	140	10x16	160
10		10x13	180	10x13	210	10x16	300	10x20	195
22		10x16	250	10x20	465	13x21	485	13x25	350
33		10x20	570	10x25	600	13x21	620	13x25	580
47		13x21	730	13x21	730	13x25	810	16x26	720
68		13x25	850	13x25	985	16x26	1010	16x32	820
100		16x26	1285	16x26	1285	16x32	1405	18x35	950
150		16x32	1310	16x32	1310	18x32	1455		
220		16x36	1450	18x32	1510	18x40	1490		
330		18x35	1850						

※13mm may be replaced by 12.5mm upon customer's request.

ATB Series

- Anhydrous product.
- Low impedance at High frequency range.
- High ripple current resistance, 105°C 4000~8000 hours long life.
- RoHS Compliant & Halogen Free

Specifications

Items	Characteristics								
Capacitance Tolerance	± 20% (120Hz, 20°C)								
Operating Temperature Range	-55 ~ +105°C				-40 ~ +105°C				
Rated Voltage Range	6.3 ~ 50VDC				63 ~ 100VDC				
Leakage Current	I ≤ 0.01CV or 3 (μA) which is greater. (After 2 minutes application of DC rated voltage, at 20°C)								
Dissipation Factor	Rated Voltage(V)	6.3	10	16	25	35	50	63~80	100
	tan δ(Max)	0.24	0.20	0.16	0.15	0.12	0.10	0.09	0.08
	When nominal capacitance over 1000μF, tan δ shall be added 0.02 to the listed value with increase of every 1000μF.								
Low Temperature Stability Impedance Ratio (Max)	Measurement Frequency: 120Hz.								
	Rated Voltage(V)	6.3	10	16	25	35	50	63	100
	Z(-25°C) / Z(20°C)	4	3	2	2	2	2	2	2
	Z(-40°C) / Z(20°C)	-	-	-	-	-	-	3	3
	Z(-55°C) / Z(20°C)	8	6	4	3	3	3	-	-
Load Life	Time	∅ hours	5 4,000	6.3 4,000	8 5,000	10 6,000	13 7,000	16 8,000	18 8,000
	Capacitance Change	within ± 25% of the Initial Value							
	tan δ	200% or less of the Initial Specified Value							
	Leakage Current	Initial Specified Value or less							
Shelf Life	The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours 105°C without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to them 4.1 of JIS C5101-4.								
	Capacitance Change	within ± 25% of the Initial Value							
	tan δ	200% or less of the Initial Specified Value							
	Leakage Current	Initial Specified Value or less							
Standards	JIS C-5101-4(IEC 60384)								

Frequency Coefficient for Ripple Current

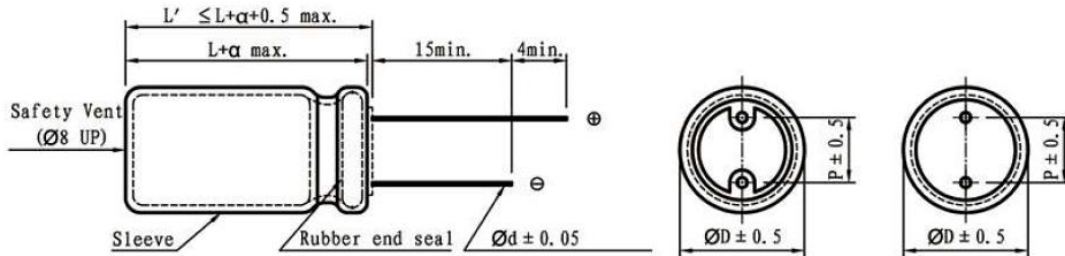
Capacitance (μF)	Frequency (Hz)			
	120	1K	10K	100K
5.6 ~ 180	0.40	0.75	0.90	1.00
220 ~ 560	0.50	0.85	0.94	1.00
680 ~ 1800	0.60	0.87	0.95	1.00
2200 ~ 3900	0.75	0.90	0.95	1.00
4700 ~ 18000	0.85	0.95	0.98	1.00

The endurance of capacitors is reduced with internal heating produced by ripple current at the rate of halving the lifetime with every 5°C rise. When long life performance is required in actual use, the RMS ripple current has to be reduced.



ATB Series

Dimensions (mm)



Ø D	5	6.3	8	10	13	16	18
P	2.0	2.5	3.5	5.0	5.0	7.5	7.5
Ø d	0.5	0.5	0.5	0.6	0.6	0.8	0.8

α	(L < 16) 1.0
	(L ≥ 16) 2.0

Standard Ratings

D×L (mm), R.C. (mA rms) at 105°C 100KHz; IMP (Ω max) at 20°C, -10°C 100KHz.

Cap (µF)	V	6.3				10				16				25			
		D x L	IMP		R.C.	D x L	IMP		R.C.	D x L	IMP		R.C.	D x L	IMP		R.C.
			20°C	-10°C			20°C	-10°C			20°C	-10°C			20°C	-10°C	
47										5x11	0.550	1.100	170	5x11	0.600	1.210	175
100						5x11	0.550	1.100	170	6.3x11	0.290	0.550	295	6.3x11	0.310	0.610	295
150		5x11	0.550	1.100	170					6.3x15	0.190	0.400	410	6.3x15	0.220	0.430	420
220						6.3x11	0.270	0.550	295					8x12	0.150	0.290	650
330		6.3x11	0.270	0.550	295	6.3x15	0.200	0.390	400	8x12	0.140	0.260	660	8x16	0.110	0.220	750
390														10x13	0.110	0.220	770
470		6.3x15	0.200	0.400	400	8x12	0.140	0.260	650					8x20	0.096	0.180	820
560										8x16	0.100	0.200	740	10x16	0.085	0.170	1060
680						8x16	0.100	0.200	830	10x13	0.100	0.200	770				
820		8x12	0.140	0.280	655	10x13	0.100	0.200	860	8x20	0.091	0.180	830	10x20	0.067	0.130	1230
1000		10x13	0.100	0.200	860					10x16	0.077	0.150	1070	10x25	0.057	0.110	1450
1200		8x16	0.100	0.210	830	8x20	0.091	0.170	1010	10x20	0.061	0.120	1270	10x30	0.048	0.092	1720
1500		10x16	0.077	0.150	1250	10x16	0.077	0.150	1250					13x21	0.048	0.097	1670
1800		8x20	0.094	0.190	1060	10x20	0.061	0.120	1420	10x25	0.053	0.100	1450				
2200		10x20	0.059	0.120	1420	10x25	0.052	0.100	1640	10x30	0.043	0.085	1700	13x25	0.040	0.076	1960
2700						13x21	0.045	0.088	1650	13x21	0.045	0.087	1670				
3300		13x21	0.044	0.086	1650	13x25	0.036	0.069	1960	13x25	0.036	0.069	1970	13x30	0.033	0.064	2320
3900						13x30	0.030	0.058	2320	13x30	0.030	0.058	2330	13x35	0.025	0.051	2520
4700		13x30	0.030	0.058	2320	13x35	0.025	0.052	2520	13x35	0.028	0.051	2520	13x40	0.020	0.041	2860
5600						16x26	0.020	0.052	2570	16x26	0.028	0.051	2570	16x26	0.025	0.051	2570
6300										16x32	0.022	0.041	3150	16x32	0.022	0.041	3150
6800		13x40	0.022	0.041	2880	16x32	0.023	0.045	3020	16x32	0.023	0.045	3020	16x36	0.020	0.040	3140
8200		16x26	0.028	0.051	2570	18x25	0.025	0.047	2750	18x25	0.025	0.047	2750	18x32	0.021	0.042	3340
10000		16x32	0.024	0.045	3020	16x36	0.022	0.041	3150	18x32	0.022	0.042	3340	16x40	0.018	0.036	3720
12000						18x32	0.022	0.043	3340	18x35	0.021	0.037	3670	18x35	0.018	0.037	3690
15000		18x40	0.020	0.036	3720	18x40	0.020	0.036	3810	18x40	0.020	0.036	3810	18x40	0.018	0.036	3810
18000																	

ATC Series

- Anhydrous product.
- High ripple current, ultra-low impedance at high frequency range.
- Long life.
- RoHS Compliant

Specifications

Items	Characteristics							
Capacitance Tolerance	± 20% (120Hz, 20°C)							
Operating Temperature Range	-55 ~ +105°C							
Rated Voltage Range	6.3 ~ 50VDC							
Leakage Current	I ≤ 0.01CV or 3 (μA) which is greater. (After 2 minutes application of DC rated voltage, at 20°C)							
Dissipation Factor	Measurement Frequency: 120Hz. Temperature: 20°C							
	Rated Voltage (V)	6.3	10	16	25	35	50	63~100
	tan δ(Max)	0.24	0.	0.16	0.1	0.	0.10	0.09
	When nominal capacitance over 1000μF, tan δ shall be added 0.02 to the listed value with increase of every 1000μF.							
Low Temperature Stability Impedance Ratio (Max)	Measurement Frequency: 120Hz.							
	Rated Voltage(V)	6.3	10	16	25	35	50	
	Z(-25°C) / Z(20°C)	2	2	2	2	2	2	
	Z(-55°C) / Z(20°C)	3	3	3	3	3	3	
Load Life	5,000 hours, with application of rated voltage at 105°C (∅D ≤ 6.3mm, 2,000 hours ; ∅D = 8mm, 3,000 hours ; ∅D = 10mm, 4,000 hours)							
	Capacitance Change	Within ± 25% of Initial Value						
	tan δ	200% or less of Initial Specified Value						
	Leakage Current	Initial Specified Value or less						
Shelf Life	The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours 105°C without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to them 4.1 of JIS C5101-4.							
	Capacitance Change	Within ± 20% of Initial Value						
	tan δ	200% or less of Initial Specified Value						
	Leakage Current	Initial Specified Value or less						
Standards	JIS C-5101-4(IEC 60384)							

Frequency Coefficient of Ripple Current

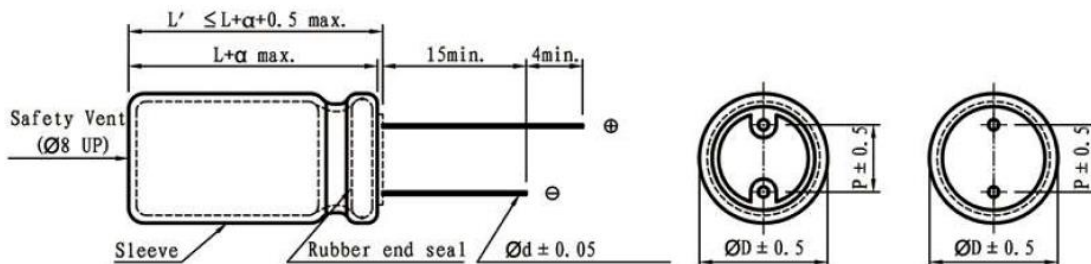
Capacitance (μF)	Frequency (Hz)				
	50	120	1K	10K	100K
≤ 33	0.45	0.55	0.75	0.90	1.00
47 ~ 330	0.60	0.70	0.85	0.95	1.00
470 ~ 1000	0.65	0.75	0.90	0.98	1.00
1200 ~ 6800	0.75	0.80	0.95	1.00	1.00

The endurance of capacitors is reduced with internal heating produced by ripple current at the rate of halving the lifetime with every 5°C rise. When long life performance is required in actual use, the RMS ripple current has to be reduced.



ATC Series

Dimensions (mm)



α	(L < 16) 1.0
	(L ≥ 16) 2.0

Standard Ratings

D×L (mm); R.C. (mA rms) at 105°C 100KHz; IMP (Ω max) at 20°C 100KHz.

Cap (μF)	V	6.3			10			16		
	Item	D x L	R.C.	IMP	D x L	R.C.	IMP	D x L	R.C.	IMP
56								5x11	250	0.500
100					5x11	250	0.500			
120								6.3x11	405	0.210
150		5x11	250	0.845						
220					6.3x11	405	0.380	8x12	700	0.210
330		6.3x11	405	0.230				8x12	760	0.120
470					8x12	760	0.210	8x16	995	0.093
560		8x12	760	0.130				10x13	1030	0.087
680					8x16	995	0.093	8x20	1250	0.068
820					10x13	1030	0.087	10x16	1430	0.062
820		08x16	995	0.099						
1000		10x13	1030	0.093	08x20	1250	0.068	10x20	1820	0.038
					10x16	1430	0.062			
1200		8x20	1250	0.072	10x20	1820	0.038	10x25	2150	0.036
		10x16	1430	0.066						
1500		10x20	1820	0.040	10x25	2150	0.036	13x21	2360	0.035
2200		10x25	2150	0.038	13x21	2360	0.035	13x25	2770	0.030
2700								13x30	3140	0.027
3300		13x21	2360	0.037	13x25	2770	0.030	13x35	3400	0.024
3900		13x25	2770	0.032	13x30	3290	0.027	16x26	3460	0.026
4700		13x30	3290	0.027	13x35	3400	0.024			
5600		13x35	3140	0.026	16x26	3460	0.026			
6800		16x26	3460	0.027						

※13mm may be replaced by 12.5mm upon customer's request.



ATC Series

Standard Ratings

D×L (mm); R.C. (mA rms) at 105°C 100KHz; IMP (Ω max) at 20°C 100KHz.

Cap (μF)	V	25			35			50		
	Item	D x L	R.C.	IMP	D x L	R.C.	IMP	D x L	R.C.	IMP
22								5x11	238	1.310
33					5x11	250	0.330			
47		5x11	250	0.500				6.3x11	385	1.140
56					6.3x11	405	0.230	6.3x11	385	0.540
68										
100		6.3x11.	405	0.380				8x12	724	0.340
120								8x16	950	0.230
150					8x12	760	0.130	10x13	979	0.230
180								8x20	1190	0.180
220		8x12	760	0.150	8x16	995	0.099	10x16	1370	0.160
					10x13	1030	0.093			
270					8x20	1250	0.100	10x20	1580	0.120
330		8x16	995	0.093	10x16	1430	0.100	10x25	1870	0.110
		10x13	1030	0.087						
470		8x20	1250	0.068	10x20	1820	0.085	13x21	2050	0.110
		10x16	1430	0.062						
560					10x25	2150	0.053	13x25	2410	0.088
680		10x20	1820	0.058	13x21	2360	0.051	13x30	2860	0.081
820		10x25	2150	0.036	13x21	2450	0.048	13x35	2960	0.074
1000		13x21	2360	0.035	13x25	2770	0.044	16x26	3010	0.081
1200					13x30	3140	0.037			
1500		13x25	2770	0.030	13x35	3400	0.035			
1800		13x30	3140	0.026	16x26	3460	0.037			
2200		13x35	3400	0.024						
2700		16x26	3460	0.026						

※13mm may be replaced by 12.5mm upon customer's request.

ATD Series

- Anhydrous product.
- High ripple current, Low impedance at high frequency range.
- 105°C, long life 10000hours
- RoHS Compliant.

Specifications

Items	Characteristics								
Capacitance Tolerance	± 20% (120Hz, 20°C)								
Operating Temperature Range	-55 ~ +105°C					-40 ~ +105°C			
Rated Voltage Range	6.3 ~ 50VDC					63 ~ 100VDC			
Leakage Current	I ≤ 0.01CV or 3 (μA) which is greater. (After 2 minutes application of DC rated voltage, at 20°C)								
Dissipation Factor	Measurement Frequency: 120Hz. Temperature: 20°C								
	Rated Voltage (V)	6.3	10	16	25	35	50	63~80	100
	tan δ(Max)	0.24	0.20	0.16	0.15	0.12	0.10	0.09	0.08
	When nominal capacitance over 1000μF, tan δ shall be added 0.02 to the listed value with increase of every 1000μF.								
Low Temperature Stability Impedance Ratio (Max)	Measurement Frequency: 120Hz.								
	Rated Voltage(V)	6.3	10	16	25	35	50	63	100
	Z(-25°C) / Z(20°C)	4	3	2	2	2	2	2	2
	Z(-40°C) / Z(20°C)	-	-	-	-	-	-	3	3
	Z(-55°C) / Z(20°C)	8	6	4	3	3	3	3	3
Load Life	The following specifications shall be satisfied when the capacitors are restored to 20°C after subjected to DC voltage with the rated ripple current is applied for varied hours according to varied Ø and voltage at 105°C								
	Case Size		ØD ≤ 6.3			ØD = 8, 10		ØD ≥ 13	
	Voltage	6.3 ~ 10 V			4,000 hours		6,000 hours		8,000 hours
		16 ~ 100 V			5,000 hours		7,000 hours		10,000 hours
	Capacitance Change	Within ± 25% of Initial Value							
	tan δ	200% or less of Initial Specified Value							
	Leakage Current	Initial Specified Value or less							
Shelf Life	The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours 105°C without voltage applied. Before the measurement the capacitor shall be preconditioned by applying voltage according to them 4.1 of JIS C5101-4.								
	Capacitance Change	Within ± 25% of Initial Value							
	tan δ	200% or less of Initial Specified Value							
	Leakage Current	Initial Specified Value or less							
Standards	JIS C-5101-4(IEC 60384)								

Frequency Coefficient for Ripple Current

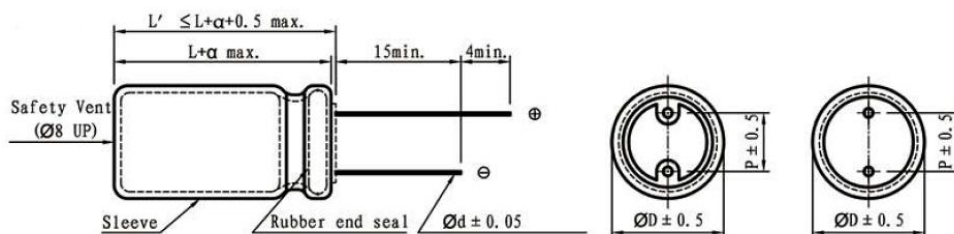
Capacitance (μF)	Frequency (Hz)				
	50	120	300	1K	100K
≤ 33	0.50	0.55	0.70	0.90	1.00
47 ~ 330	0.60	0.70	0.85	0.95	1.00
470 ~ 1000	0.65	0.75	0.90	0.98	1.00
1200 ~ 18000	0.70	0.80	0.95	1.00	1.00

The endurance of capacitors is reduced with internal heating produced by ripple current at the rate of halving the lifetime with every 5°C rise. When long life performance is required in actual use, the RMS ripple current has to be reduced.



ATD Series

Dimensions (mm)



Standard Ratings

D×L (mm); R.C. (mA rms) at 105°C 100KHz; IMP (Ω max) at 20°C, -10°C 100KHz

Cap (μF)	6.3				10			
	V		IMP		D x L	IMP		R.C.
	Item	D x L	20°C	-10°C		20°C	-10°C	
100					5x11	0.640	2.530	215
150		5x11	0.630	2.530	5x11	0.640	2.530	230
220		6.3x11	0.280	0.990	6.3x11	0.250	0.960	340
330		6.3x11	0.230	0.960	6.3x11	0.250	0.960	380
470		8x12	0.170	0.640	8x12	0.150	0.580	640
680		8x12	0.150	0.580	8x16	0.098	0.390	845
					10x13	0.091	0.340	865
820		10x13	0.091	0.360	10x16	0.080	0.310	1015
1000		8x16	0.097	0.390	8x20	0.078	0.300	1050
					10x16	0.069	0.270	1215
1200		8x20	0.081	0.290	10x20	0.053	0.200	1410
		10x16	0.072	0.270				
1500		10x20	0.053	0.210	10x25	0.048	0.190	1610
1800					13x21	0.046	0.170	1710
2200		10x25	0.050	0.190	10x30	0.036	0.140	1920
					13x21	0.042	0.140	1910
2700		10x30	0.036	0.140				
3300		13x21	0.041	0.140	13x25	0.032	0.100	2230
3900		13x25	0.032	0.100	13x30	0.029	0.089	2660
4700		13x30	0.029	0.089	13x35	0.025	0.075	2890
5600		13x35	0.025	0.075	13x40	0.021	0.064	3360
					16x26	0.025	0.069	2940
6800		13x40	0.021	0.064	16x32	0.021	0.058	3460
		16x26	0.025	0.069	18x25	0.025	0.057	3150
8200		16x32	0.021	0.058	16x36	0.020	0.052	3610
					18x32	0.020	0.047	4180
10000		16x36	0.019	0.052	16x40	0.018	0.045	4090
		18x25	0.023	0.057	18x35	0.017	0.045	4150
12000		16x40	0.017	0.045	18x40	0.015	0.039	4290
		18x32	0.019	0.047				
15000		18x35	0.018	0.045				
18000		18x40	0.016	0.035				

※ 13mm may be replaced by 12.5mm upon customer's request.



ATD Series

Standard Ratings

D×L (mm); R.C.(mA rms) at 105°C 100KHz ; IMP (Ω max) at 20°C,-10°C100KHz.

Cap (μF)	V	16			25			
	Item	D x L	IMP		R.C.	D x L	IMP	
			20°C	-10°C			20°C	-10°C
47						5x11	0.760	3.040
56		5x11	0.760	3.040	220	5x11	0.760	3.040
100		6.3x11	0.280	1.150	310	6.3x11	0.280	1.150
120		6.3x11	0.280	1.150	340			
220		8x12	0.250	1.130	510	8x12	0.160	0.690
330		8x12	0.160	0.690	650	8x16	0.120	0.470
						10x13	0.110	0.430
470		8x16	0.120	0.470	840	8x20	0.096	0.360
		10x13	0.110	0.430	865	10x16	0.083	0.320
680		8x20	0.095	0.360	1060	10x20	0.064	0.240
		10x16	0.083	0.320	1210			
820		10x20	0.073	0.290	1310	10x25	0.058	0.230
1000		10x20	0.064	0.240	1410	10x30	0.043	0.160
						13x21	0.049	0.160
1200		10x25	0.061	0.230	1650			
1500		10x30	0.043	0.160	1920	13x25	0.038	0.120
		13x21	0.050	0.160	1910			
1800		13x25	0.041	0.130	2140	13x30	0.036	0.110
2200		13x25	0.038	0.120	2240	13x35	0.030	0.090
2700		13x30	0.035	0.110	2650	13x40	0.025	0.078
						16x26	0.031	0.083
3300		13x35	0.030	0.091	2890	16x32	0.025	0.070
						18x25	0.028	0.067
3900		13x40	0.031	0.078	3350	18x25	0.023	0.061
		16x26	0.028	0.083	2930	18x32	0.024	0.056
4700		16x32	0.025	0.070	3450	16x40	0.020	0.054
		18x25	0.028	0.068	3150	18x35	0.022	0.054
5600		16x36	0.024	0.062	3620	18x40	0.018	0.047
		18x32	0.024	0.056	4180			
6800		16x40	0.020	0.054	4080			
8200		18x35	0.023	0.054	4230			
10000		18x40	0.018	0.047	4290			

※13mm may be replaced by 12.5mm upon customer's request.

ATD Series

Standard Ratings

D×L (mm); R.C.(mA rms) at 105°C 100KHz ; IMP (Ω max) at 20°C, -10°C 100KHz

Cap (μF)	V	35				50			
	Item	D x L	IMP		R.C.	D x L	IMP		R.C.
			20°C	-10°C			20°C	-10°C	
22						5x11	1.540	6.160	180
33		5x11	0.690	2.780	220				
47		6.3x11	0.430	1.700	280	6.3x11	0.780	3.300	220
56		6.3x11	0.400	1.580	340	6.3x11	0.660	2.640	300
100		8x12	0.320	1.180	510	8x12	0.360	1.470	560
120						8x16	0.270	1.060	740
150		8x12	0.160	0.630	650	10x13	0.270	1.060	770
180						8x20	0.200	0.800	920
220		8x16	0.110	0.430	850	10x16	0.190	0.750	1050
		10x13	0.100	0.390	865				
270		8x20	0.088	0.320	1060	10x20	0.140	0.530	1230
330		10x16	0.076	0.290	1210	10x25	0.120	0.490	1450
470		10x20	0.058	0.220	1410	10x30	0.100	0.380	1695
						13x21	0.100	0.340	1670
560		10x25	0.053	0.200	1650	13x25	0.080	0.250	1950
680		10x30	0.040	0.150	1920	13x30	0.072	0.230	2320
		13x21	0.044	0.160	1910				
820						13x35	0.058	0.180	2520
1000		13x25	0.037	0.110	2230	13x40	0.050	0.160	2930
						16x26	0.062	0.170	2555
1200		13x30	0.032	0.098	2660	16x32	0.052	0.150	3020
						18x25	0.062	0.160	2750
1500		13x35	0.028	0.083	2880	16x36	0.046	0.130	3150
1800		13x40	0.023	0.072	3350	16x40	0.042	0.110	3720
		16x26	0.028	0.076	2940	18x32	0.052	0.130	3640
2200		16x32	0.023	0.064	3500	18x35	0.044	0.100	3690
		18x25	0.026	0.063	3140				
2700		16x36	0.022	0.057	3620	18x40	0.038	0.090	3810
		18x32	0.021	0.052	4180				
3300		16x40	0.020	0.050	4090				
		18x35	0.021	0.050	4230				
3900		18x40	0.019	0.044	4290				

※13mm may be replaced by 12.5mm upon customer's request.

ATD Series

Standard Ratings

D×L (mm); R.C.(mA rms) at 105°C 100KHz ; IMP (Ω max) at 20°C,-10°C 100KHz

Cap (μF)	V	63				100			
	Item	D x L	IMP		R.C.	D x L	IMP		R.C.
			20°C	-10°C			20°C	-10°C	
6.8						5x11	2.780	11.640	56
15		5x11	2.20	9.20	56	6.3x11	1.520	6.330	120
27						8x12	0.980	4.390	235
33		6.3x11	1.20	5.00	120				
39						8x16	0.570	2.660	280
47		8x12	0.68	3.10	190	10x13	0.550	2.280	290
56		8x12	0.62	2.80	235	8x20	0.410	2.020	330
68						10x16	0.380	1.900	358
82		8x16	0.45	2.10	310	10x20	0.270	1.190	470
		10x13	0.43	1.80	300				
100		10x16	0.35	1.80	320	10x25	0.260	1.070	536
120		8x20	0.33	1.60	362	10x30	0.190	0.900	666
		10x16	0.30	1.50	357	13x21	0.210	0.810	690
180		10x20	0.20	0.94	470	13x25	0.160	0.570	790
220		10x25	0.20	0.84	531	13x30	0.130	0.530	905
	16x22					0.120	0.470	1050	
270		10x30	0.15	0.70	663	13x35	0.110	0.450	1060
		13x21	0.13	0.65	690	16x26	0.095	0.340	1250
330		13x25	0.12	0.45	790	13x40	0.092	0.380	1190
390						16x32	0.071	0.260	1570
						18x25	0.075	0.270	1490
470		13x30	0.100	0.420	910	16x36	0.061	0.220	1790
	18x32					0.063	0.220	1640	
560		13x35	0.082	0.350	1050	16x40	0.054	0.190	2030
		16x26	0.073	0.270	1250				
680		13x40	0.070	0.300	1190	18x35	0.054	0.190	1790
820		16x32	0.053	0.200	1580	18x40	0.049	0.170	2340
		18x25	0.057	0.210	1490				
1000		16x36	0.045	0.170	1790				
		18x32	0.047	0.170	1640				
1200		16x40	0.039	0.150	2020				
		18x35	0.040	0.150	1790				
1500		18x40	0.035	0.130	2340				

※13mm may be replaced by 12.5mm upon customer's request.



ATE Series

- Anhydrous product.
- 105°C high-temperature, high reliability and long life.
- Suitable for office communicative and industrial equipments.
- RoHS Compliant & Halogen Free.

Specifications

Items	Characteristics					
Capacitance Tolerance	± 20% (120Hz, 20°C)					
Operating Temperature Range	-40 ~ +105°C					
Rated Voltage Range	160 ~ 450V					
Leakage Current	I ≤ 0.03CV + 20 (μA) (After 3 minutes application of DC rated voltage, at 20°C)					
Dissipation Factor	Measurement Frequency: 120Hz. Temperature: 20°C					
	Rated Voltage (V)	160	200	250	350	400~450
	tan δ(Max)	0.20	0.20	0.20	0.25	0.25
	When nominal capacitance over 1000μF, tan δ shall be added 0.02 to the listed value with increase of every 1000μF.					
Low Temperature Stability Impedance Ratio (Max)	Measurement Frequency: 120Hz.					
	Rated Voltage(V)	160	200	250	350	400
	Z(-25°C) / Z(20°C)	3	3	3	6	15
Load Life	5,000 hours, with application of rated voltage at 105°C (∅D ≤ 8 : 3000 hours; ∅D = 10 : 4000 hours)					
	Capacitance Change	Within ± 25% of Initial Value				
	tan δ	200% or less of Initial Specified Value				
	Leakage Current	Initial Specified Value or less				
Shelf Life	The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours 105°C without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to them 4.1 of JIS C5101-4.					
	Capacitance Change	Within ± 20% of Initial Value				
	tan δ	200% or less of Initial Specified Value				
	Leakage Current	Initial Specified Value or less				
Standards	JIS C-5101-4(IEC 60384)					

Frequency Coefficient for Ripple Current

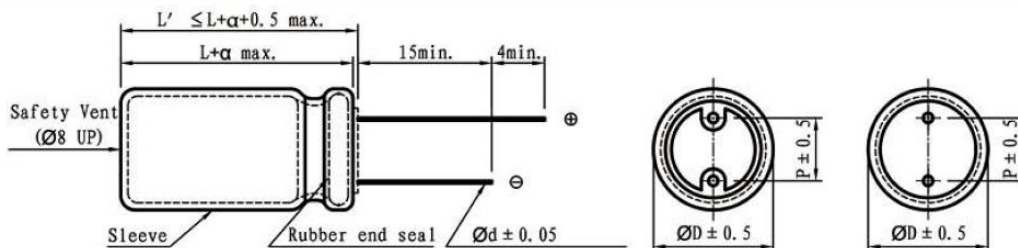
Rated Voltage (V)	Capacitance (μF)	Frequency (Hz)			
		50	120	1K	$\geq 10K$
≥ 160	2.2 ~ 220	0.80	1.00	1.30	1.40

The endurance of capacitors is reduced with internal heating produced by ripple current at the rate of halving the lifetime with every 5°C rise.
When long life performance is required in actual use, the RMS ripple current has to be reduced.



ATE Series

Dimensions (mm)



$\varnothing D$	6.3	8	10	13	16	18
P	2.5	3.5	5.0	5.0	7.5	7.5
$\varnothing d$	0.5	0.5	0.6	0.6	0.8	0.8

α	(L < 16) 1.0
	(L $\geq$ 16) 2.0

Standard Ratings

D x L (mm); R.C. (mA rms) at 105°C 120Hz

Cap (μF)	V	160		200		250		400		450	
	Item	D x L	R.C.	D x L	R.C.	D x L	R.C.	D x L	R.C.	D x L	R.C.
2.2		6.3x11	29	6.3x11	29	8x12	36	8x12	36	8x12	36
3.3		8x12	35	8x12	36	8x12	52	8x12	45	8x12	52
4.7		8x12	44	8x12	52	8x12	57	10x13	57	10x13	62
10		10x13	78	10x16	83	10x16	104	10x20	95	10x20	104
22		10x16	135	10x20	145	13x21	176	13x21	168	13x25	197
33		10x20	176	13x21	208	13x21	234	13x25	213	16x22	249
39		10x20	197	13x21	228	13x25	260	16x22	213	16x26	312
47		13x21	239	13x21	260	13x25	291	16x26	332	16x32	343
68		13x25	270	13x25	291	16x22	322	16x26	364	18x25	364
82		16x22	332	16x26	364	16x32	405	18x25	436	18x32	603
100		16x26	364	16x32	499	16x36	520	18x32	572	18x35	686
120								18x40	676	18x40	800

※13mm may be replaced by 12.5mm upon customer's request.

SIA Series

- Snap-in type, 85°C 2000 hours standard product.
- Suitable for filter circuit of home appliance, e.g. TV set, audio, etc.
- RoHS Compliant.

Specifications

Items	Characteristics								
Capacitance Tolerance	± 20% (120Hz, 20°C)								
Operating Temperature Range	-40 ~ +85°C					-25 ~ +85°C			
Rated Voltage Range	10 ~ 100VDC					160 ~ 500VDC			
Leakage Current	I ≤3Vcv (μA) (After 5 minutes application of DC rated voltage, at 20 °C)								
Dissipation Factor	Measurement Frequency: 120Hz. Temperature: 20°C								
	Rated Voltage (V)	10	16	25	35	50-80	100-250	300	350-500
	tan δ(Max)	0.50	0.40	0.35	0.30	0.25	0.20	0.25	0.25
	When nominal capacitance over 1000μF, tan δ shall be added 0.01 to the listed value with increase of every 1000μF.								
Low Temperature Stability	Measurement Frequency: 120Hz.								
	Rated Voltage(V)	10-100			160-250		350-500		
Impedance Ratio (Max)	Z(-25°C) / Z(20°C)	4			4		8		
	Z(-40°C) / Z(20°C)	12			15		-		
Load Life	2,000 hours, with application of rated voltage at 85°C								
	Capacitance Change	Within ± 20% of Initial Value							
	tan δ	200% or less of Initial Specified Value							
	Leakage Current	Initial Specified Value or less							
Shelf Life	The following specifications shall be satisfied when the capacitors are restored to 25°C after exposing them for 1,000 hours 85°C without voltage applied. Before the measurement the capacitor shall be preconditioned by applying voltage according to them 4.1 of JIS C5101-4.								
	Capacitance Change	Within ± 20% of Initial Value							
	tan δ	150% or less of Initial Specified Value							
	Leakage Current	Initial Specified Value or less							
Standards	JIS C-5101-4(IEC 60384)								

Frequency Coefficient for Ripple Current

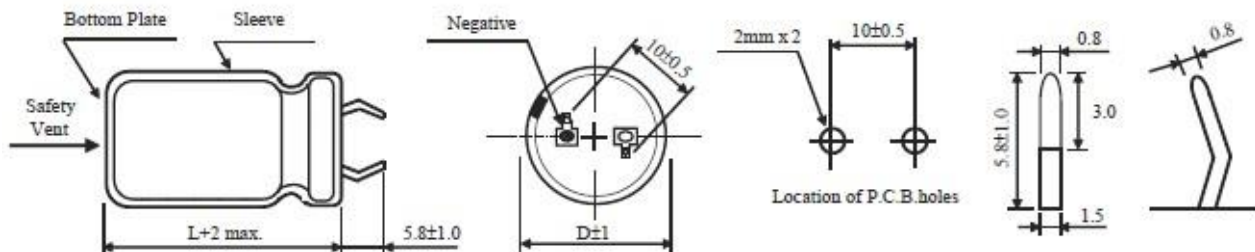
Rated Voltage (V)	Frequency (Hz)			
	50	120	1K	≥ 10K
10-100	0.88	1.00	1.15	1.15
160-250	0.85	1.00	1.15	1.20
350-500	0.88	1.00	1.10	1.15

The endurance of capacitors is reduced with internal heating produced by ripple current at the rate of halving the lifetime with every 10°C rise. When long life performance is required in actual use, the rms ripple current has to be reduced.



SIA Series

Dimensions (mm)



Standard Ratings

D×L(mm) ; R.C.(mA RMS) at 85°C 120Hz.

Cap (μF)	V	10		16		25		35		50		63		80	
	Item	D x L	R.C.	D x L	R.C.	D x L	R.C.	D x L	R.C.	D x L	R.C.	D x L	R.C.	D x L	R.C.
820														22x25	1.34
1000												22x25	1.52	22x25	1.64
1500												22x25	1.68	22x30 25x25	1.80
2200										22x25	2.08	22x30 25x25	2.58	22x35 25x30	2.65
2700										22x30	2.32	22x35 25x30	2.80	22x40 25x30	2.82
3300										22x30 25x25	2.65	22x40 25x30	2.88	22x45 25x40	3.30
3900								22x25	2.44	22x35 25x30	2.72	22x45 25x35	3.15	25x45 30x35	3.40
4700						22x25	2.49	22x30 25x25	2.64	22x40 25x35	3.09	22x50 25x40	3.39	25x50 30x40	3.62
6800				22x25	2.40	22x30 25x25	2.57	22x40 25x30	2.81	22x50 25x40	3.86	25x50 30x40	4.34	30x50 35x40	4.68
8200				22x25	2.90	22x35 25x25	2.96	22x45 25x35	3.12	25x50 30x40	4.42	30x45 35x35	4.84	35x45	4.96
10000		22x25	2.08	22x30	3.08	22x40 25x30	3.40	22x50 25x40	3.55	25x50 30x40	4.98	35x40	5.51	35x50	6.08
12000		22x25	2.40	22x30 25x25	3.50	22x45 25x35	3.61	25x45 30x35	4.02	30x50 35x35	5.16	35x50	6.22		
15000		22x30	2.76	22x35 25x30	3.95	25x45 30x35	4.10	30x40 35x35	5.01	35x45	6.45				
18000		22x35 25x25	3.14	22x40 25x35	4.40	25x45 30x35	4.47	30x45 35x40	5.55	35x50	6.72				
22000		22x40 25x30	3.53	22x50 25x40	4.71	25x50 30x45	5.22	35x45	6.02						
27000		22x45 25x35	4.18	25x45 30x35	5.51	30x50 35x40	6.02	35x50	6.85						
33000		22x50 25x40	5.21	25x50 30x40	5.82	35x45	6.78	35x45	6.95						
39000		25x45 30x35	5.30	30x45 35x35	6.36	35x45	7.60	35x50	7.16						
47000		30x40	5.98	30x50 35x40	6.99	35x50	7.88								
56000		30x45	6.60	35x45	7.17										
68000		35x40	7.28	35x50	10.10										



SIA Series

Standard Ratings

D×L(mm) ; R.C.(mA rms) at 85°C 120Hz.

Cap (μF)	V	100		160		200		250		350		400		450		500	
	Item	D x L	R.C.	D x L	R.C.	D x L	R.C.	D x L	R.C.	D x L	R.C.	D x L	R.C.	D x L	R.C.	D x L	R.C.
47												22x25	0.42	22x25	0.46	22x35	0.47
100										22x25	0.77	22x30 25x25	1.05	22x35 25x25	1.10	25x40	1.13
120										22x30 25x25	0.93	22x35 25x25	1.15	22x40 25x30	1.21	25x45	1.25
150								22x25	1.1	22x35 25x30	1.16	22x40 25x30	1.25	22x45 25x35	1.44	25x50 30x35	1.50 1.48
220				22x20	1.12	22x25 25x20	1.37	22x30 25x25	1.44	22x45 25x35	1.47	22x50 25x40	1.76	25x45 30x40	1.77	30x45	1.78
330				22x25 25x20	1.45	22x30 25x25	1.88	22x35 25x30	1.93	25x50 30x40	1.99	30x40 35x30	2.30	30x45 35x40	2.79	35x45	2.81
470				22x30 25x25	1.83	22x40 25x30	2.25	22x45 25x35	2.39	30x50 35x40	2.44	35x45	2.82	35x50	2.92	35x60	3.00
560				22x35 25x30	2.03	22x40 25x30	2.57	25x40 30x35	2.81	35x45	3.29	35x50	3.36	35x55	3.15	35x60	3.03
680		22x25	1.54	22x35 25x30	2.37	22x50 25x40	2.84	25x50 30x40	3.22	35x50	3.44	35x50	3.50	35x60	3.36	35x70	3.27
820		22x25 25x20	1.88	22x40 25x35	2.75	25x45 30x35	3.35	30x45 35x40	3.51	35x50	3.58	35x60	3.83	35x65	3.59	40x70	3.76
1000		22x30 25x25	1.94	25x40 30x35	3.22	25x50 30x40	3.79	30x50 35x45	3.94	35x55	3.89	35x65	4.20	35x70	3.81	45x80	4.21
1200		22x30 25x25	2.11	25x40 30x35	3.41	25x50 30x40	4.08	30x50 35x45	4.45	35x60	4.17	35x70	4.41	40x70	4.01	45x90	4.50
1500		22x35 25x30	2.47	30x45 35x35	3.96	30x50 35x40	5.02	35x50	5.36	35x65	4.56	40x70	4.52	45x70	4.13	45x100	4.80
2200		22x45 25x40	3.15	35x45	4.68	35x50	6.09	40x60	6.13	47x75	5.75	45x85	5.64	45x100	5.22		
2700		25x45 30x35	3.72	35x50	5.35												
3300		25x50 30x40	4.06														
3900		30x45 35x35	4.55														
4700		30x50 35x40	5.12														
6800		35x50	5.85														

SIC Series

- Snap-in type, 105°C 2000 hours standard product.
- High temperature and high ripple current resistance.
- Suitable for computer equipment, inverter air conditioner etc.
- RoHS Compliant.

Specifications

Items	Characteristics																
Capacitance Tolerance	± 20% (120Hz, 20°C)																
Operating Temperature Range	-40 ~ +105°C							-25 ~ +105°C									
Rated Voltage Range	10 ~ 250 VDC							350 ~ 500 VDC									
Leakage Current	I ≤ 3V(CV) (μA) (After 5 minutes, application of DC rated voltage, at 20°C)																
Dissipation Factor	Measurement Frequency: 120Hz. Temperature: 20°C																
	Rated Voltage(V)	6.3	10	16	25	35	50	63	80	100	160 ~ 250	315	350 ~ 500	550~ 600			
	tan δ(Max)	0.50	0.45	0.40	0.35	0.30	0.25	0.25	0.20	0.20	0.15	0.20	0.20	0.20			
	When nominal capacitance over 1000μF, tanδ shall be added 0.01 to the listed value with increase of every 1000μF.																
Low Temperature Stability	Measurement Frequency: 120Hz.																
Impedance Ratio (Max)	Rated Voltage(V)	10		16		25		35		50		63 ~ 100		160 ~ 250		350 ~ 500	
	Z(-25°C) / Z(20°C)	6		6		4		4		4		4		4		8	
	Z(-40°C) / Z(20°C)	16		15		10		10		8		6		15		-	
Load Life	2,000 hours, with application of rated voltage at 105°C																
	Capacitance Change	Within ± 20% of Initial Value															
	tan δ	200% or less of Initial Specified Value															
	Leakage Current	Initial Specified Value or less															
Shelf Life	The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours 105°C without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to them 4.1 of JIS C5101-4.																
	Capacitance Change	Within ± 15% of Initial Value															
	tan δ	200% or less of Initial Specified Value															
	Leakage Current	Initial Specified Value or less															
Standards	JIS C-5101-4 (IEC 60384)																

Frequency Coefficient for Ripple Current

Rated Voltage (V)	Frequency (Hz)				
	50	120	1K	10K	100K
10 ~ 100	0.88	1.00	1.15	1.15	1.20
160 ~ 250	0.85	1.00	1.15	1.20	1.20
350 ~ 500	0.88	1.00	1.10	1.15	1.20

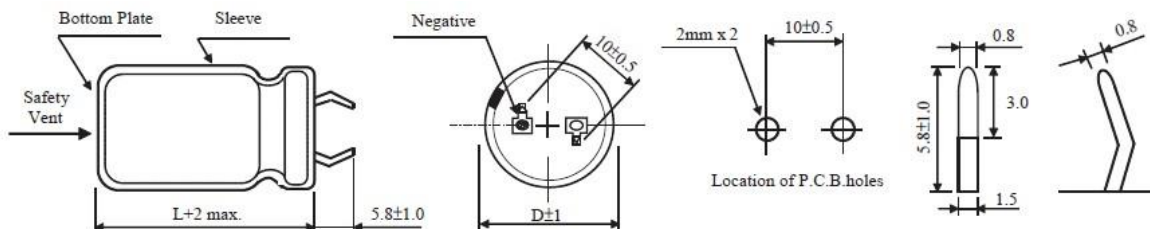
The endurance of capacitors is reduced with internal heating produced by ripple current at the rate of having the lifetime with every 5°C rise.

When long life performance is required in actual use, the rms ripple current has to be reduced.



SIC Series

Dimensions (mm)



Standard Ratings

D×L(mm); R.C. (mA rms) at 105°C 120Hz.

Cap (μF)	V	10		16		25		35		50	
	Item	D x L	R.C.	D x L	R.C.	D x L	R.C.	D x L	R.C.	D x L	R.C.
1500										22x25	1.20
1800										22x30	1.40
2200										22x30	1.60
										25x25	1.60
2700								22x25	1.21	22x35	1.73
								25x30		25x30	1.73
3300								22x30	1.36	22x40	1.97
								25x30		25x30	1.97
3900						22x25	1.35	22x30	1.57	22x45	2.23
								25x35		25x35	2.23
4700						22x30	1.58	22x35	1.77	22x50	2.45
						25x25		25x25		25x40	2.45
5600						22x30	1.75	22x40	1.99	25x45	2.74
						25x25		25x30		30x35	2.74
6800				22x25	1.80	22x35	2.02	22x45	2.29	30x40	3.31
				25x30		25x30		25x35		35x30	3.31
8200				22x30	2.08	22x40	2.18	22x50	2.58	30x45	3.60
				25x25		25x35		25x40		35x35	3.60
10000		22x25	1.88	22x35	2.15	22x45	2.48	25x45	2.90	35x40	4.02
		25x30		25x30		25x40		30x35			
12000		22x30	2.18	22x40	2.31	22x50	2.86	25x50	3.24	35x50	4.52
		25x25		25x30		25x45		30x40			
15000		22x35	2.27	22x45	2.69	25x50	3.15	30x45	3.65		
		25x30		25x35		30x40		35x35			
18000		22x40	2.41	22x50	3.20	30x45	3.55	35x40	4.13		
		25x30		25x40		35x35					
22000		22x45	2.68	25x45	3.40	30x50	4.00	35x50	4.78		
		25x35		30x35		35x40					
27000		25x40	3.17	30x40	3.85	35x45	4.55				
		30x35		35x35							
33000		25x45	3.39	30x50	4.32	35x50	5.56				
		30x35		35x40							
39000		25x50	3.72	35x40	4.85						
		30x40									
47000		30x45	4.22	35x50	5.56						
		35x35									
56000		35x40	5.00								
68000		35x50	5.21								



SIC Series

Standard Ratings

D×L(mm) ; R.C.(A rms) at 105°C 120Hz.

Cap (μF)	V	63		80		100		160		200	
	Item	D x L	R.C.	D x L	R.C.	D x L	R.C.	D x L	R.C.	D x L	R.C.
220										22x25	0.82
270								22x25	1.04	22x30	1.07
330								22x30	1.26	22x30	1.28
							25x25				
390								22x30	1.29	22x35	1.31
							25x25	25x30			
470								22x35	1.56	22x40	1.58
							25x30	25x30			
560						22x25	1.02	22x40	1.69	22x45	1.72
					25x30			25x35			
680						22x30	1.12	22x45	1.72	25x40	1.75
					25x35			30x30			
820				22x25	1.04	22x30	1.32	22x50	1.99	25x50	2.04
			25x25			25x40		30x35			
1000				22x30	1.21	22x35	1.45	25x45	2.20	30x45	2.30
			25x30			30x35		35x35			
1200	25x25	1.21	22x35	1.29	22x40	1.68	30x40	2.45	30x50	2.65	
			25x25		25x35		35x35		35x40		
1500	22x30	1.45	22x40	1.57	22x45	1.98	30x50	3.06	35x45	3.07	
	25x25		25x30		25x40		35x40				
1800	22x35	1.59	22x45	1.72	25x45	2.23	35x45	3.14			
	25x30		25x35		30x35						
2200	22x40	1.84	25x40	2.01	25x50	2.53	35x50	3.50			
	25x30		30x30		30x40						
2700	22x45	2.12	25x45	2.32	30x45	2.82					
	25x35		30x35		35x35						
3300	25x40	2.30	30x40	2.62	30x50	3.32					
	30x30		35x30		35x40						
3900	25x45	2.42	30x45	2.84	35x45	3.62					
	30x35		35x35								
4700	25x50	2.91	30x50	3.29	35x50	3.80					
	30x40										
5600	30x45	3.18	35x45	3.82							
	35x35										
6800	30x50	3.54	35x50	3.92							
	35x40										
8200	35x45	3.82	35x50	4.05							
10000	35x50	4.50	35x55	4.85							



SIC Series

Standard Ratings

D×L(mm) ; R.C.(A rms) at 105°C 120Hz.

Cap (μF)	V (Code) Item	250		350		400		450		500	
		D x L	R.C.	D x L	R.C.	D x L	R.C.	D x L	R.C.	D x L	R.C.
68						22x25	0.52	22x35	0.55	22x40	0.56
								25x30			
82				22x25	0.60	22x30	0.66	22x35	0.65	25x35	0.68
								25x30			
100				22x30	0.69	22x35	0.72	22x40	0.75	25x35	0.78
						25x25		25x30			
120		20x20	0.65	22x35	0.76	22x40	0.75	22x45	0.83	25x45	0.85
				25x30		25x30		25x40			
150		22x25	0.76	22x40	0.79	22x45	0.89	22x50	0.95	25x50	1.01
				25x30		25x35		25x40		30x40	
180		22x30	0.98	22x45	0.88	22x50	0.98	25x45	1.15	30x45	1.21
				25x35		25x40		30x40		35x35	
220		22x30	1.09	22x50	0.98	25x45	1.12	30x45	1.24	30x45	1.35
		25x25		25x40		30x35		35x40		35x40	
270		22x35	1.19	25x45	1.10	25x50	1.29	30x50	1.46	35x45	1.53
		25x30		30x35		30x40		35x45			
330		22x40	1.35	30x40	1.22	30x45	1.45	35x50	1.65	35x50	1.75
		25x35		35x35		35x35					
390		22x45	1.52	30x45	1.42	30x50	1.59	35x55	1.78		
		25x35		35x40		35x40					
470		22x50	1.63	35x45	1.62	35x45	1.75				
		25x40									
560		25x45	1.84	35x50	1.89	35x50	2.12				
		30x35									
680		25x50	2.05	35x50	2.10	35x50	2.20				
		30x40									
820		30x45	2.29	35x65	2.35	35x65	2.50				
		35x35									
1000		35x40	2.49								
1200		35x45	2.84								

SID Series

- Down size, load life extend to 3000 hours.
- 105°C, high temperature, high ripple current resistance and high reliability.
- RoHS Compliant.

Specifications

Items	Characteristics												
Capacitance Tolerance	± 20% (120Hz, 20°C)												
Operating Temperature Range	-40 ~ +105°C						-25 ~ +105°C						
Rated Voltage Range	16 ~ 250						350 ~ 450 VDC						
Leakage Current	I ≤ 3VCV (μA) (After 5 minutes application of DC rated voltage, at 20°C)												
Dissipation Factor	Measurement Frequency: 120Hz. Temperature: 20°C												
	Rated Voltage (V)	16	25	35	50	63	80	100	160	180	200 ~ 250	280	350 ~ 450
	tan δ(Max)	0.50	0.45	0.40	0.35	0.30	0.25	0.20	0.15	0.15	0.15	0.15	0.20
	When nominal capacitance over 1000μF, tan δ shall be added 0.01 to the listed value with increase of every 1000μF.												
Low Temperature Stability Impedance Ratio (Max)	Measurement Frequency: 120Hz.												
	Rated Voltage(V)	16	25	35	50	63	80	100	160 ~ 250	180	200 ~ 250	280	350 ~ 450
	Z(-25°C) / Z(20°C)	6	6	4	4	4	4	4	4	4	4	4	8
	Z(-40°C) / Z(20°C)	16	15	10	10	8	6	6	6	6	15	15	-
Load Life	3,000 hours, with application of rated voltage at 105°C												
	Capacitance Change	Within ± 20% of Initial Value											
	tan δ	200% or less of Initial Specified Value											
	Leakage Current	Initial Specified Value or less											
Shelf Life	The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours 105°C without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to them 4.1 of JIS C5101-4.												
	Capacitance Change	Within ± 15% of Initial Value											
	tan δ	200% or less of Initial Specified Value											
	Leakage Current	Initial Specified Value or less											
Standards	JIS C-5101-4(IEC 60384)												

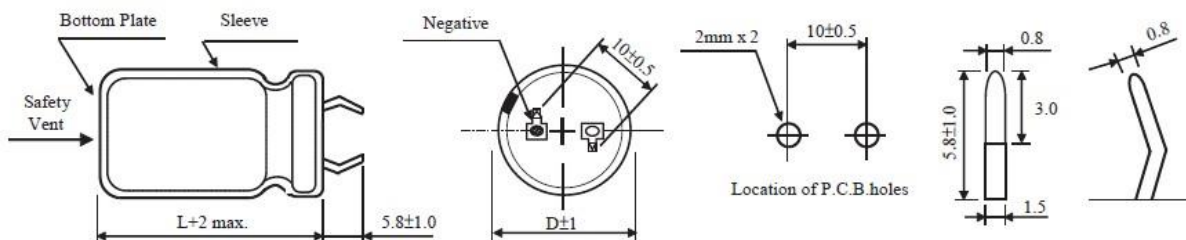
Frequency Coefficient for Ripple Current

Rated Voltage (V)	Frequency (Hz)				
	50	120	1K	10K	100K
16 ~ 100	0.88	1.00	1.05	1.10	1.15
160 ~ 250	0.85	1.00	1.20	1.30	1.50
350 ~ 450	0.88	1.00	1.20	1.25	1.40

The endurance of capacitors is reduced with internal heating produced by ripple current at the rate of halving the lifetime with every 5°C rise. When long life performance is required in actual use, the RMS ripple current has to be reduced.



Dimensions (mm)



Standard Ratings

D×L (mm); R.C. (A rms) at 105°C 120Hz.

Cap (μF)	V	16		25		35		50		63		80		100	
	Item	D x L	R.C.	D x L	R.C.	D x L	R.C.	D x L	R.C.	D x L	R.C.	D x L	R.C.	D x L	R.C.
560														20x25	0.95
680														20x30	1.15
820												20x25	1.04	20x35	1.32
1000										20x25	1.35	20x30 22x25	1.24	20x35 22x30	1.47
1500								20x25	1.02	20x30 22x25	1.47	20x35 22x30	1.59	22x40 25x35	1.98
2200								20x30 22x25	1.60	20x40 22x35	1.82	22x40 25x30	2.03	25x45 30x35	2.55
2700						20x25	1.29	20x35 22x30	1.73	22x35 25x30	2.11	22x45 25x35	2.39	25x50 30x40	2.89
3300						20x30	1.57	20x40 22x35	1.97	22x45 25x35	2.33	25x40 30x35	2.64	30x45 35x35	3.30
3900				20x25	1.65	22x25	1.78	22x40 25x30	2.22	22x50 25x40	2.55	25x50 30x35	2.97	30x50 35x40	3.67
4700				20x25	1.75	20x35 22x30	2.02	22x45 25x35	2.43	25x45 30x35	2.97	30x40 35x35	3.38	35x45	3.80
6800		20x25	1.50	20x35 22x30	2.11	22x40 25x30	2.41	25x45 30x35	3.30	30x40 35x35	3.65	35x45	4.10	35x50	4.05
8200		20x30	1.70	20x40 22x30	2.34	22x45 25x35	2.85	25x50 30x40	3.60	30x50 35x40	4.04	35x50	4.30		
10000		20x35 22x30	1.85	22x35 25x30	2.65	22x50 25x40	3.05	30x45 35x35	4.05	35x45	4.48				
12000		20x40 22x30	2.01	22x40 25x30	2.81	25x45 30x35	3.37	30x50 35x40	4.56	35x50	4.75				
15000		22x35 25x30	2.39	22x45 25x35	3.13	25x50 30x40	3.72	35x50	4.77						
18000		22x40 25x30	2.90	25x40 30x30	3.56	30x45 35x35	4.37								
22000		22x45 25x35	3.10	25x50 30x35	4.04	30x50 35x40	4.92								
27000		22x50 25x40	3.55	30x45 35x35	4.74	35x50	5.30								
33000		25x45 30x35	4.05	30x50 35x40	5.50										
39000		25x50 30x40	4.55	35x45	5.80										
47000		30x45 35x40	5.36	35x50	6.30										
56000		30x50 35x45	5.60												



Standard Ratings

D×L (mm); R.C. (A rms) at 105°C 120Hz.

Cap (μF)	V Item	160		200		250		350		400		450	
		D x L	R.C.	D x L	R.C.	D x L	R.C.	D x L	R.C.	D x L	R.C.	D x L	R.C.
47										22x25	0.45	22x25	0.43
68										22x25	0.50	22x30	0.50
82								22x30	0.55	22x25	0.65	22x30 25x25	0.60
100								22x30 22x25	0.60	22x30 25x25	0.68	22x35 25x30	0.70
120								22x30 25x25	0.70	22x35 25x25	0.75	22x40 25x30	0.78
150						22x25	0.65	22x35 25x30	0.83	22x40 25x30	0.85	22x45 25x35	0.89
220		20x25	1.10	20x25	1.00	20x30 22x25	1.00	22x45 25x35	1.05	22x50 25x40	1.05	25x45 30x35	1.15
330		20x30 22x25	1.21	20x30	1.25	20x40 22x35	1.20	25x45 30x35	1.35	30x40 35x30	1.35	30x50 35x40	1.45
390		20x30 22x25	1.30	22x30 25x25	1.31	22x40 25x30	1.35	25x50 30x40	1.52	30x45 35x35	1.75	35x40	1.65
470		20x35 22x30	1.41	22x35 25x30	1.45	22x45 25x35	1.57	30x45 35x35	1.65	35x40	1.85	35x50	1.85
560		20x40 22x35	1.54	22x40 25x30	1.60	22x50 25x40	1.80	30x50 35x40	1.90	35x45	2.05		
680		20x45 22x40	1.74	22x45 25x35	1.78	25x45 30x35	2.00	35x45	2.00	35x50	2.45		
820		20x45 25x35	2.00	22x50 25x40	1.95	25x50 30x40	2.18	35x55	2.30				
1000		22x50 25x40	2.25	25x45 30x35	2.30	30x45 35x35	2.35						
1200		25x45 30x35	2.49	30x40 35x35	2.65	35x40	2.50						
1500		30x40 35x30	2.84	30x50 35x40	3.08	35x50	3.00						
2200		35x45	3.50	35x50	3.55								
2700		35x50	4.00										

SIE Series

- 105°C 5000 hours, long life.
- High temperature, high ripple current resistance and high reliability.
- RoHS Compliant.

Specifications

Items	Characteristics											
Capacitance Tolerance	± 20% (120Hz, 20°C)											
Operating Temperature Range	-40 ~ +105°C						-25 ~ +105°C					
Rated Voltage Range	10 ~ 100VDC						160 ~ 450VDC					
Leakage Current	I ≤ 3VCV (μA) (After 5 minutes application of DC rated voltage, at 20°C)											
Dissipation Factor	Measurement Frequency: 120Hz. Temperature: 20°C											
	Rated Voltage (V)	10	16	25	35	50	63	80 ~ 100	160 ~	410	420~ 450	550
	tan δ(Max)	0.60	0.	0.30	0.25	0.2	0.15	0.15	0.15	0.20	0.20	0.20
	When nominal capacitance over 1000μF, tan δ shall be added 0.01 to the listed value with increase of every 1000μF.											
Low Temperature Stability Impedance Ratio (Max)	Measurement Frequency: 120Hz.											
	Rated Voltage(V)	10	16	25	35	50	63	80 ~ 100	160 ~ 400	420 ~ 450		
	Z(-25°C) / Z(20°C)	4	4	3	3	2	2	2	4	8		
	Z(-40°C) / Z(20°C)	15	15	10	8	6	6	5	-	-		
Load Life	5,000 hours, with application of rated voltage at 105°C											
	Capacitance Change	Within ± 20% of Initial Value										
	tan δ	200% or less of Initial Specified Value										
	Leakage Current	Initial Specified Value or less										
Shelf Life	The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours 105°C without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to them 4.1 of JIS C5101-4.											
	Capacitance Change	Within ± 15% of Initial Value										
	tan δ	200% or less of Initial Specified Value										
	Leakage Current	Initial Specified Value or less										
Standards	JIS C-5101-4 (IEC 60384)											

Frequency Coefficient for Ripple Current

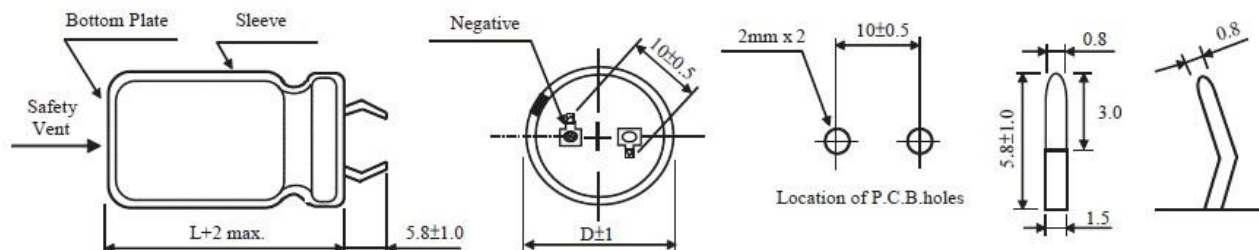
Rated Voltage (V)	Frequency (Hz)				
	50	120	1K	10K	50K
10 ~ 100	0.90	1.00	1.05	1.10	1.15
160 ~ 250	0.80	1.00	1.15	1.45	1.50
315 ~ 450	0.76	1.00	1.14	1.40	1.42

The endurance of capacitors is reduced with internal heating produced by ripple current at the rate of halving the lifetime with every 5°C rise. When long life performance is required in actual use, the rms ripple current has to be reduced.



SIE Series

Dimensions (mm)



Standard Ratings

D×L (mm); R.C. (A rms) at 105°C 120Hz

Cap (μF)	V	10		16		25		35		50	
	Item	D × L	R.C.	D × L	R.C.	D × L	R.C.	D × L	R.C.	D × L	R.C.
1500										22x25	1.02
1800										22x30	1.18
										25x25	1.17
2200								22x25	1.11	22x35	1.32
2700										22x40	1.51
										25x30	1.48
										30x25	1.51
3300								22x30	1.42	25x35	1.71
										30x30	1.72
								25x25	1.41	35x25	1.74
3900						22x25	1.32	22x35	1.58	22x50	1.91
								25x30	1.59	25x40	1.89
4700						22x30	1.51	22x40	1.78	30x35	2.12
						25x25	1.52	30x25	1.78	35x30	2.16
5600				22x25	1.45	22x35	1.71	25x35	1.98	25x50	2.39
								30x30	1.99	30x40	2.39
								35x25	2.03	35x35	2.41
6800		22x25	1.31	22x30	1.67	22x40	1.92	22x50	2.26	30x50	2.79
				25x25	1.66	25x30	1.88				
						30x25	1.90	25x40	2.25	35x40	2.79
8200				22x35	1.88	25x35	2.15	25x50	2.57		
						30x30	2.16	30x35	2.51		
						35x25	2.19	35x30	2.56		
10000		22x30	1.65	22x40	2.12	22x50	2.45	30x40	2.87		
				25x30	2.08					35x50	3.56
		25x25	1.63	30x25	2.12	25x40	2.44	35x35	2.88		



SIE Series

D×L(mm) ; R.C.(A rms) at 105°C 120Hz

Cap (μF)	V	10		16		25		35		50	
	Item	D x L	R.C.	D x L	R.C.	D x L	R.C.	D x L	R.C.	D x L	R.C.
12000		22x35	1.84	25x35	2.38	25x50	2.78	30x50	3.32		
		25x30	1.85	30x30	2.37	30x35	2.71				
		30x25	1.88	35x25	2.41	35x30	2.76	35x40	3.31		
15000		22x40	2.11	22x50	2.74	30x40	3.14				
		25x35	2.15	25x40	2.72	35x35	3.16				
18000		22x50	2.45	25x50	3.12	30x50	3.63	35x50	4.28		
		25x40	2.42								
		30x30	2.38	35x30	3.09	35x40	3.62				
		35x25	2.41								
22000		30x35	2.72	30x40	3.47						
		35x30	2.78	35x35	3.49						
27000		25x50	3.12	30x50	4.07	35x50	4.72				
		30x40	3.14	35x40	4.05						
33000		35x35	3.48								
39000		30x50	3.98	35x50	5.15						
		35x40	3.95								
47000		35x50	4.62								

SIE Series

Standard Ratings

D×L (mm) ; R.C.(A rms) at 105°C 120Hz.

Cap (μF)	V	63		80		100		160		180	
	Item	D x L	R.C.	D x L	R.C.	D x L	R.C.	D x L	R.C.	D x L	R.C.
330										22x25	1.22
390						22x25	0.78	22x25	1.32		
470										22x30	1.53
										25x25	1.52
560						22x30	0.99	22x30	1.66	22x35	1.70
						25x25	0.98	25x25	1.67	30x25	1.78
680				22x25	0.97	22x35	1.12	22x35	1.87	22x40	1.91
								25x30	1.89		
								30x25	1.95	25x30	1.89
820				22x30	1.12	22x40	1.26	22x40	2.09	22x45	1.99
						25x30	1.24			25x35	2.16
						30x25	1.25			30x30	2.17
										35x25	2.31
1000	22x25	1.00		22x35	1.26	25x35	1.41	22x45	2.41	22x50	2.25
						30x30	1.42	25x40	2.38	25x45	2.47
				25x25	1.24	35x25	1.44	30x30	2.39		
								35x30	2.53	30x35	2.46
1200	22x30	1.16		22x40	1.42	22x50	1.60	25x45	2.71	25x50	2.76
				25x30	1.40	25x40	1.59	30x40	2.76	30x40	2.77
	25x25	1.15		30x25	1.41	30x35	1.61	35x30	2.85	35x35	2.85
						25x50	1.86	25x50	3.09	30x45	3.17
1500	22x35	1.32		25x35	1.62	30x40	1.87	30x45	3.16	30x50	3.20
						35x30	1.85	35x40	3.21	35x35	3.22
1800	22x40	1.49		22x50	1.84	35x35	2.06	30x50	3.53	35x45	3.73
	25x30	1.46		25x40	1.83						
				30x30	1.79						
	30x25	1.48		35x25	1.82			35x45	3.64		
2200	25x35	1.67		25x50	2.10	30x50	2.40	35x50	4.14	35x50	4.23
	30x30	1.68		30x35	2.06						
	35x25	1.70		35x25	2.09	35x40	2.39				
2700	22x50	1.92		30x40	2.35	35x50	2.81				
	25x40	1.91									
	30x35	1.93		35x35	2.36						
3300	25x50	2.20		30x50	2.75						
	35x30	2.18		35x40	2.73						
3900	30x40	2.41									
	35x35	2.43									
4700	30x50	2.79		35x50	3.46						
	35x40	2.78									
6800	35x50	3.55									



SIE Series

Standard Ratings

D×L (mm); R.C. (A rms) at 105°C 120Hz.

Cap (μF)	V Item	200		220		250		315	
		D x L	R.C.	D x L	R.C.	D x L	R.C.	D x L	R.C.
150								22x25	0.80
180								22x30	0.93
								25x25	0.94
220		22x25	1.00			22x25	1.01	22x35	1.04
								25x25	1.16
270		22x25	1.11	22x25	1.11	22x30	1.20	22x40	1.18
								25x30	1.19
330				22x30	1.18	25x30	1.32	22x45	1.33
								25x35	1.37
								30x30	1.40
								35x25	1.48
390		22x30	1.38	22x35	1.39	22x40	1.44	22x50	1.49
						25x30	1.43		
		25x25	1.39	25x25	1.39	30x25	1.50	25x40	1.52
470		22x35	1.55	22x35	1.55	22x45	1.62	25x45	1.70
				25x30	1.56	25x35	1.70	30x35	1.71
				30x25	1.62	30x30	1.74	35x30	1.81
560		22x40	1.73	22x45	1.73	22x50	1.84	25x50	1.88
						25x40	1.78	30x40	1.92
		25x30	1.72	25x35	1.81	30x35	1.83	30x45	1.97
		30x25	1.77	30x30	1.85	35x25	1.90	35x35	1.99
680		22x45	1.82	22x50	1.98	25x45	2.04	30x50	2.21
		25x35	1.86	25x40	1.96				
		30x30	1.97	30x35	2.02	30x40	2.06		
		35x25	2.09	35x25	2.09	35x30	2.14	35x40	2.28
820		25x50	2.17	25x45	2.24	25x50	2.28		
		25x40	2.09	30x40	2.29	30x45	2.38	35x45	2.57
		30x35	2.21	35x30	2.35	35x35	2.37		
1000		25x50	2.39	25x55	2.52	30x50	2.68		
		30x40	2.53	30x45	2.58			35x50	2.89
		35x30	2.60	35x35	2.63	35x40	2.71		
1200		30x45	2.85	30x50	2.89				
		35x40	2.88	35x40	2.97	35x45	3.05		
1500		35x45	3.34	35x45	3.41	35x50	3.49		
1800		35x50	3.82	35x50	3.82				



SIE Series

Standard Ratings

D×L (mm); R.C. (A rms) at 105°C 120Hz.

Cap (μF)	V	350		400		420		450	
	Item	D x L	R.C.	D x L	R.C.	D x L	R.C.	D x L	R.C.
82								22x25	0.60
100				22x25	0.66	22x25	0.66	22x30	0.69
								25x25	0.70
120		22x25	0.72	22x30	0.75	22x30	0.76	22x35	0.76
150						25x25	0.77		
				22x35	0.85	22x35	0.86	22x45	0.90
		22x30	0.84	25x25	0.86			25x35	0.92
								30x25	0.93
180				22x40	0.96	22x45	0.98	22x50	1.01
								25x40	1.02
		25x25	0.94	25x30	0.97	25x35	1.01	30x30	1.03
				30x25	1.03	30x25	1.02	35x25	1.09
220		22x40	1.06	22x45	1.09	22x50	1.11	25x45	1.16
						25x40	1.13		
		25x30	1.07	25x35	1.12			30x35	1.17
						30x30	1.14		
		30x25	1.12	35x25	1.21	35x25	1.21	35x30	1.23
270		22x45	1.21						
		25x35	1.24	22x50	1.24	25x45	1.29	25x50	1.31
				25x45	1.29	30x35	1.30	30x40	1.33
		30x30	1.27						
		35x25	1.34	30x35	1.27	35x30	1.37	35x35	1.38
330		22x50	1.37	25x50	1.44	25x50	1.45		
		25x40	1.39	30x35	1.43	30x40	1.48	30x45	1.51
		30x35	1.42	35x30	1.51	35x35	1.54		
390		25x45	1.55						
		30x40	1.59	30x40	1.61	30x45	1.65	30x50	1.67
		35x30	1.65	35x35	1.66	35x40	1.73	35x45	1.76
470		25x50	1.73						
		30x45	1.81	30x50	1.85	30x50	1.85	35x50	1.98
		35x35	1.82	35x40	1.89	35x45	1.93		
560		30x50	2.01						
		35x40	2.06	35x45	2.13	35x50	2.17		
680		35x45	2.34	35x50	2.38				
820		35x50	2.62						

SIF Series

- Protective countermeasure against DC over-voltage
- 105°C 2000 hours load life.
- RoHS Compliant.

Specifications

Items	Characteristics			
Capacitance Tolerance	± 20% (120Hz, 20°C)			
Operating Temperature Range	-25 ~ +105°C			
Rated Voltage Range	200VDC, 400VDC, 420VDC			
Leakage Current	I ≤ 3 vCV (μA) (After 5 minutes application of DC rated voltage, at 20°C)			
Dissipation Factor	Measurement Frequency: 120Hz. Temperature: 20°C			
	Rated Voltage (V)	200	400	420
	tan δ(Max)	0.15	0.15	0.15
Low Temperature Stability Impedance Ratio (Max)	Measurement Frequency: 120Hz.			
	Rated Voltage(V)	200	400, 420	
	Z(-25°C) / Z(20°C)	3	8	
Load Life	2,000 hours, with application of rated voltage at 105°C			
	Capacitance Change	Within ± 20% of Initial Value		
	tan δ	200% or less of Initial Specified Value		
	Leakage Current	Initial Specified Value or less		
Shelf Life	The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours 105°C without voltage applied. Before the measurement the capacitor shall be preconditioned by applying voltage according to them 4.1 of JIS C5101-4.			
	Capacitance Change	Within ± 15% of Initial Value		
	tan δ	≤150% of Initial Specified Value		
	Leakage Current	Initial Specified Value or less		
Standards	JIS C-5101-4(IEC 60384)			

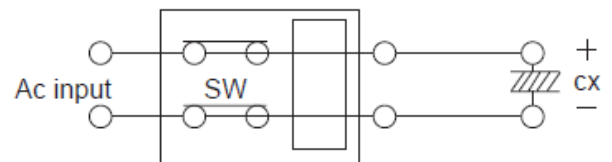
DC over voltage test conditions

The vent will be operated, and the capacitor shall become an open circuit without burning materials when the following excess DC voltage is applied.

TEST DC VOLTAGE

Rated Voltage (Vdc)	Current Limit (A)	Test DC Voltage
200 Vdc	1A	375V
400 Vdc	1A	600V
420 Vdc	1A	630V
450 Vdc	1A	675V

TEST CIRCUIT



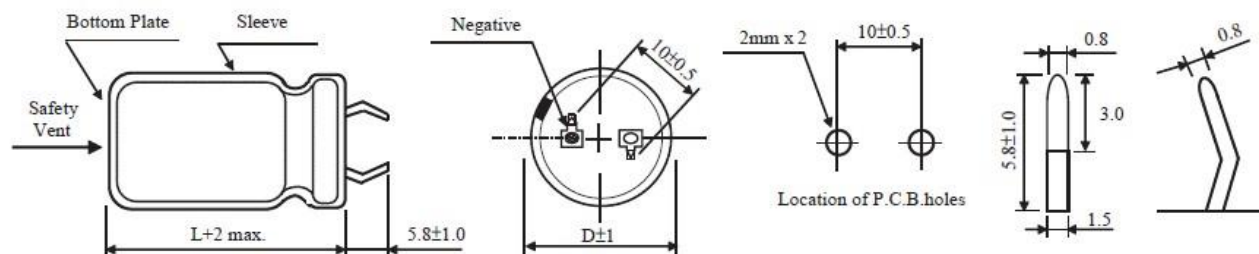
Frequency Coefficient for Ripple Current

Rated Voltage (V)	Frequency (Hz)					
	50	60	120	500	1K	$\geq 10K$
200	0.80	0.80	1.00	1.10	1.14	1.18
400, 420	0.80	0.80	1.00	1.05	1.10	1.15

The endurance of capacitors is reduced with internal heating produced by ripple current at the rate of halving the lifetime with every 5°C rise. When long life performance is required in actual use, the RMS ripple current has to be reduced.

SIF Series

Dimensions (mm)



Standard Ratings

D×L(mm) ; R.C.(A rms) at 105°C 120Hz.

Cap (μF)	V	200		400		420	
	Item	D x L	R.C.	D x L	R.C.	D x L	R.C.
33				22x20	0.22	22x25	0.25
39				22x20	0.30		
47	22x20	0.35		22x25	0.35	d 22x25	0.35
				25x20	0.35		
				30x20	0.40		
56				22x25	0.38	22x25	0.38
				25x20	0.38		
68				22x25	0.40	22x30	0.45
				25x25	0.45		
				30x20	0.50	25x25	0.45
82				22x30	0.50	22x35	0.64
				25x25	0.50		
				30x20	0.50	25x30	0.64
100	22x20	0.50		22x35	0.55	22x40	0.69
				25x30	0.53	25x30	0.69
				30x25	0.53		
				35x20	0.55	30x25	0.69
120				22x40	0.60	22x45	0.75
				25x30	0.60	25x35	0.75
				30x25	0.60	30x30	0.75
						35x25	0.75
150				22x45	0.70	25x40	0.82
				25x35	0.70		
				30x30	0.70	30x30	0.82
				35x25	0.70		
180	22x25	0.70		22x50	0.80	25x45	0.90
				25x40	0.80		
	30x20	0.70		30x30	0.80	30x35	0.90
				35x25	0.80		
220	22x25	0.74		25x45	0.90	30x40	1.00
				30x35	0.90		
				35x30	0.90	35x35	1.00



SIF Series

Standard Ratings

D×L(mm) ; R.C.(A rms) at 105°C 120Hz.

Cap (μF)	V	200		400		420	
	Item	D x L	R.C.	D x L	R.C.	D x L	R.C.
270		22x30	0.90	30x40	0.98	30x45	1.10
		25x25	0.85				
		30x20	1.10	35x35	0.96	35x40	1.10
330		22x30	1.05	30x50	1.21	35x45	1.20
		25x30	1.05				
		30x25	1.05	35x40	1.21		
390		22x35	1.20	35x45	1.32		
		25x30	1.20				
		30x25	1.20				
470		22x40	1.30	35x50	1.45		
		25x35	1.30				
		30x25	1.35				
560		22x45	1.50				
		25x40	1.50				
		30x35	1.55				
		35x25	1.55				
680		25x50	1.70				
		30x40	1.70				
		35x30	1.70				
820		30x45	1.99				
		35x35	1.99				
1000		30x50	2.10				
		35x40	2.10				
1200		35x50	2.30				

SIH Series

- Long life of SIA Series
- Suitable for filter circuit of home appliance, e.g.TV set, audio, etc.
- RoHS Compliance.

Specifications

Items	Characteristics								
Capacitance Tolerance	± 20% (120Hz, 20°C)								
Operating Temperature Range	-40~ +85°C					-25~ +85°C			
Rated Voltage Range	10~ 100VDC					160~ 550VDC			
Leakage Current	I ≤ 3VCV (μA) (After 5 minutes application of DC rated voltage, at 20°C)								
Dissipation Factor	Measurement Frequency: 120Hz. Temperature: 20°C								
	Rated Voltage(V)	10	16	25	35	50~100	135	160~250	330~500
	tan δ	0.50	0.40	0.35	0.30	0.25	0.25	0.20	0.25
	When the nominal capacitance over 1000μF, tan δ shall be added 0.01 to the listed value with increase of every 1000μF.								
Low Temperature Stability	Measurement Frequency: 120Hz.								
	Rated Voltage(V)		10 ~ 100		160 ~ 250		330 ~ 500		
	Z(-25°C) / Z(20°C)		4		4		8		
	Z(-40°C) / Z(20°C)		12		15		-		
Load Life	3000 hours, with application of rated voltage at 85°C								
	Capacitance Change		Within ± 20% of Initial Value (Within ±25% for 4V)						
	tan δ		200% or less of Initial Specified Value						
	Leakage Current		Initial Specified Value or less						
Shelf Life	The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours 85°C without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to them 4.1 of JIS C5101-4.								
	Capacitance Change		Within ± 20% of Initial Value						
	tan δ		150% or less of Initial Specified Value						
	Leakage Current		Initial Specified Value or less						
Standard	JIS C 5101-4- 1 (IEC 60384)								

Frequency Coefficient of Permissible Ripple Current

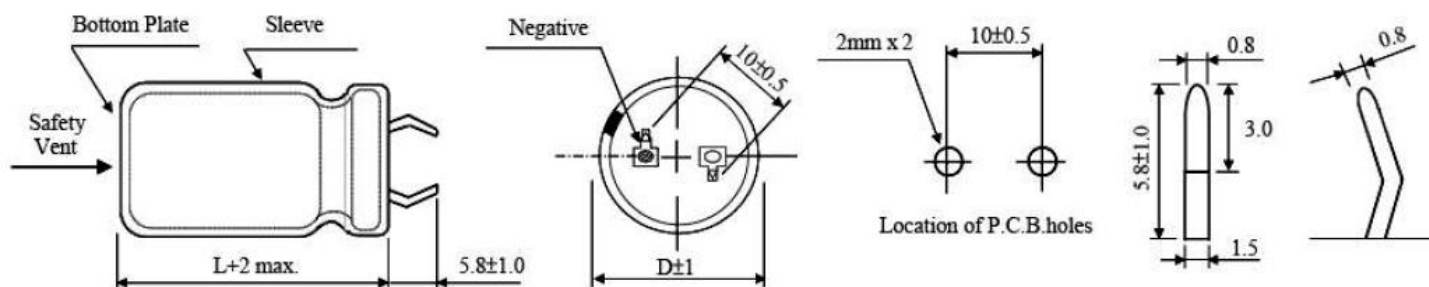
Rated Voltage (V)	Frequency (HZ)			
	50	120	1K	≥10K
10 ~ 100	0.88	1.00	1.15	1.15
160 ~ 250	0.85	1.00	1.15	1.20
330 ~ 550	0.88	1.00	1.10	1.15

The endurance of capacitors is reduced with internal heating produced by ripple current at the rate of halving the lifetime with every 10°C rise. When long life performance is required in actual use, the rms ripple current has to be reduced.



SIH Series

Dimensions (mm)



Standard Ratings

D×L (mm); R.C. (A rms) at 85°C 120Hz

Cap (μF)	V Item	10		16		25		35		50		63		80	
		DxL	R.C.	DxL	R.C.	DxL	R.C.	DxL	R.C.	DxL	R.C.	DxL	R.C.	DxL	R.C.
820														22x25	1.35
1000												22x25	1.54	22x25	1.66
1500												22x25	1.70	22x30 25x25	1.82
2200										22x25	2.10	22x30 25x25	2.61	22x35 25x30	2.68
2700										22x30	2.34	22x35 25x30	2.83	22x40 25x30	2.85
3300										22x30 25x25	2.68	22x40 25x30	2.91	22x45 25x40	3.33
3900								22x25	2.46	22x35 25x30	2.75	22x45 25x35	3.18	25x45 30x35	3.43
4700						22x25	2.51	22x30 25x25	2.67	22x40 25x35	3.12	22x50 25x40	3.42	25x50 30x40	3.66
6800				22x25	2.42	22x30 25x25	2.60	22x40 25x30	2.84	22x50 25x40	3.90	25x50 30x40	4.38	30x50 35x40	4.73
8200				22x25	2.93	22x35 25x25	2.99	22x45 25x35	3.15	25x50 30x40	4.46	30x45 35x35	4.89	35x45	5.01
10000	22x25	2.10		22x30	3.11	22x40 25x30	3.43	22x50 25x40	3.59	25x50 30x40	5.03	35x40	5.57	35x50	6.14
12000	22x25	2.42		22x30 25x25	3.54	22x45 25x35	3.65	25x45 30x35	4.06	30x50 35x35	5.21	35x50	6.28		
15000	22x30	2.79		22x35 25x30	3.99	25x45 30x35	4.14	30x40 35x35	5.06	35x45	6.51				
18000	22x35 25x25	3.17		22x40 25x35	4.44	25x45 30x35	4.51	30x45 35x40	5.61	35x50	6.79				
22000	22x40 25x30	3.57		22x50 25x40	4.76	25x50 30x45	5.27	35x45	6.08						
27000	22x45 25x35	4.22		25x45 30x35	5.57	30x50 35x40	6.08	35x50	6.92						
33000	22x50 25x40	5.26		25x50 30x40	5.88	35x45	6.85	35x45	7.02						
39000	25x45 30x35	5.35		30x45 35x35	6.42	35x45	7.68	35x50	7.23						
47000	30x40	6.04		30x50 35x40	7.06	35x50	7.96								
56000	30x45	6.67		35x45	7.24										
68000	35x40	7.35		35x50	10.20										

Standard Ratings

Cap (µF)	V	100		160		200		250		350		400		450		500	
	Item	D x l	R.C.	D x l	R.C.	D x l	R.C.	D x l	R.C.	D x l	R.C.	D x l	R.C.	D x l	R.C.	D x l	R.C.
47												22x25	0.42	22x25	0.46	22x35	0.47
100										22x25	0.78	22x30 25x25	1.06	22x35 25x25	1.11	25x40	1.14
120										22x30 25x25	0.94	22x35 25x25	1.16	22x40 25x30	1.22	25x45	1.26
150								22x25	1.11	22x35 25x30	1.17	22x40 25x30	1.26	22x45 25x35	1.45	25x50 30x35	1.52 1.49
220				22x20	1.13	22x25 25x20	1.38	22x30 25x25	1.45	22x45 25x35	1.48	22x50 25x40	1.78	25x45 30x40	1.79	30x45	1.80
330				22x25 25x20	1.46	22x30 25x25	1.90	22x35 25x30	1.95	25x50 30x40	2.01	30x40 35x30	2.32	30x45 35x40	2.82	35x45	2.84
470				22x30 25x25	1.85	22x40 25x30	2.27	22x45 25x35	2.41	30x50 35x40	2.46	35x45	2.85	35x50	2.95	35x60	3.03
560				22x35 25x30	2.05	22x40 25x30	2.60	25x40 30x35	2.84	35x45	3.32	35x50	3.39	35x55	3.18	35x60	3.06
680	22x25	1.56		22x35 25x30	2.39	22x50 25x40	2.87	25x50 30x40	3.25	35x50	3.47	35x50	3.54	35x60	3.39	35x70	3.30
820	22x25 25x20	1.90		22x40 25x35	2.78	25x45 30x35	3.38	30x45 35x40	3.55	35x50	3.62	35x60	3.87	35x65	3.63	40x70	3.80
1000	22x30 25x25	1.96		25x40 30x35	3.25	25x50 30x40	3.83	30x50 35x45	3.98	35x55	3.93	35x65	4.24	35x70	3.85	45x80	4.25
1200	22x30 25x25	2.13		25x40 30x35	3.44	25x50 30x40	4.12	30x50 35x45	4.49	35x60	4.21	35x70	4.45	40x70	4.05	45x90	4.55
1500	22x35 25x30	2.49		30x45 35x35	4.00	30x50 35x40	5.07	35x50	5.41	35x65	4.61	40x70	4.57	45x70	4.17	45x100	4.85
2200	22x45 25x40	3.18		35x45	4.73	35x50	6.15	40x60	6.19	45x75	5.81	45x85	5.70	45x100	5.27		
2700	25x45 30x35	3.76		35x50	5.40												
3300	25x50 30x40	4.10															
3900	30x45 35x35	4.60															
4700	30x50 35x40	5.17															
6800	35x50	5.91															

SIJ Series

- Long life of SIA Series
- Suitable for filter circuit of home appliance, e.g.TV set, audio, etc.
- RoHS Compliance.

Specifications

Items	Characteristics							
Capacitance Tolerance	± 20% (120Hz, 20°C)							
Operating Temperature Range	-40~ +85°C					-25~ +85°C		
Rated Voltage Range	10~ 100VDC					160~ 550VDC		
Leakage Current	I ≤ 3VCV (μA) (After 5 minutes application of DC rated voltage, at 20°C)							
Dissipation Factor	Measurement Frequency: 120Hz. Temperature: 20°C							
	Rated Voltage(V)	10	16	25	35	50~100	160~250	330~500
	tan δ	0.50	0.40	0.35	0.30	0.25	0.20	0.25
	When the nominal capacitance over 1000μF, tan δ shall be added 0.01 to the listed value with increase of every 1000μF.							
Low Temperature Stability	Measurement Frequency: 120Hz.							
	Rated Voltage(V)		10 ~ 100		160 ~ 250		350 ~ 500	
	Z(-25°C) / Z(20°C)		4		4		8	
	Z(-40°C) / Z(20°C)		12		15		-	
Load Life	5000 hours, with application of rated voltage at 85°C							
	Capacitance Change		Within ± 20% of Initial Value (Within ±25% for 4V)					
	tan δ		200% or less of Initial Specified Value					
	Leakage Current		Initial Specified Value or less					
Shelf Life	The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours 85°C without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to them 4.1 of JIS C5101-4.							
	Capacitance Change		Within ± 20% of Initial Value					
	tan δ		150% or less of Initial Specified Value					
	Leakage Current		Initial Specified Value or less					
Standard	JIS C 5101-4- 1 (IEC 60384)							

Frequency Coefficient of Permissible Ripple Current

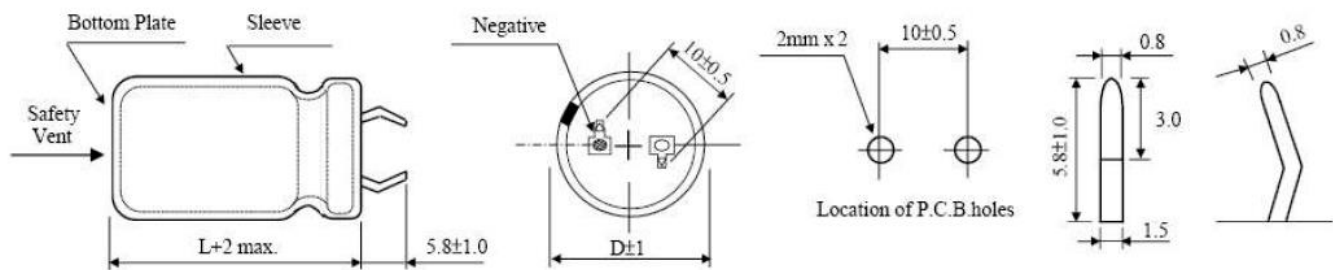
Rated Voltage (V)	Frequency (Hz)			
	50	120	1K	≥10K
10 ~ 100	0.88	1.00	1.15	1.15
160 ~ 250	0.85	1.00	1.15	1.20
330 ~ 550	0.88	1.00	1.10	1.15

The endurance of capacitors is reduced with internal heating produced by ripple current at the rate of halving the lifetime with every 10°C rise. When long life performance is required in actual use, the rms ripple current has to be reduced.



SIJ Series

Dimensions (mm)



Standard Ratings

D×L (mm); R.C. (A rms) at 85°C 120Hz

Cap (μF)	V	10		16		25		35		50		63		80	
	Item	D x l	R.C.	D x l	R.C.	Dx l	R.C.	Dx l	R.C.	Dx l	R.C.	D x l	R.C.	Dx l	R.C.
820														22x25	1.37
1000												22x25	1.55	22x25	1.67
1500												22x25	1.71	22x30 25x25	1.84
2200										22x25	2.12	22x30 25x25	2.63	22x35 25x30	2.70
2700										22x30	2.37	22x35 25x30	2.86	22x40 25x30	2.88
3300										22x30 25x25	2.70	22x40 25x30	2.94	22x45 25x40	3.37
3900								22x25	2.49	22x35 25x30	2.77	22x45 25x35	3.21	25x45 30x35	3.47
4700						22x25	2.54	22x30 25x25	2.69	22x40 25x35	3.15	22x50 25x40	3.46	25x50 30x40	3.69
6800				22x25	2.45	22x30 25x25	2.62	22x40 25x30	2.87	22x50 25x40	3.94	25x50 30x40	4.43	30x50 35x40	4.77
8200				22x25	2.96	22x35 25x25	3.02	22x45 25x35	3.18	25x50 30x40	4.51	30x45 35x35	4.94	35x45	5.06
10000	22x25	2.12	22x30	3.14	22x40 25x30	3.47	22x50 25x40	3.62	25x50 30x40	5.08	35x40	5.62	35x50	6.20	
12000	22x25	2.45	22x30 25x25	3.57	22x45 25x35	3.68	25x45 30x35	4.1	30x50 35x35	5.26	35x50	6.34			
15000	22x30	2.82	22x35 25x30	4.03	25x45 30x35	4.18	30x40 35x35	5.11	35x45	6.58					
18000	22x35 25x25	3.20	22x40 25x35	4.49	25x45 30x35	4.56	30x45 35x40	5.66	35x50	6.85					
22000	22x40 25x30	3.60	22x50 25x40	4.80	25x50 30x45	5.32	35x45	6.14							
27000	22x45 25x35	4.26	25x45 30x35	5.62	30x50 35x40	6.14	35x50	6.99							
33000	22x50 25x40	5.31	25x50 30x40	5.94	35x45	6.92	35x45	7.09							
39000	25x45 30x35	5.41	30x45 35x35	6.49	35x45	7.75	35x50	7.30							
47000	30x40	6.10	30x50 35x40	7.13	35x50	8.04									
56000	30x45	6.73	35x45	7.31											
68000	35x40	7.43	35x50	10.30											

Standard Ratings

Cap (µF)	V	100		160		200		250		350		400		450		500	
	Item	D x L	R.C.	DxL	R.C.	DxL	R.C.	D x L	R.C.	DxL	R.C.	D x L	R.C.	DxL	R.C.	D x L	R.C.
47												22x25	0.43	22x25	0.47	22x35	0.48
100										22x25	0.79	22x30 25x25	1.07	22x35 25x25	1.12	25x40	1.15
120										22x30 25x25	0.95	22x35 25x25	1.17	22x40 25x30	1.23	25x45	1.28
150								22x25	1.12	22x35 25x30	1.18	22x40 25x30	1.28	22x45 25x35	1.47	25x50 30x35	1.53 1.51
220				22x20	1.14	22x25 25x20	1.40	22x30 25x25	1.47	22x45 25x35	1.50	22x50 25x40	1.80	25x45 30x40	1.81	30x45	1.82
330				22x25 25x20	1.48	22x30 25x25	1.92	22x35 25x30	1.97	25x50 30x40	2.03	30x40 35x30	2.35	30x45 35x40	2.85	35x45	2.87
470				22x30 25x25	1.87	22x40 25x30	2.30	22x45 25x35	2.44	30x50 35x40	2.49	35x45	2.88	35x50	2.98	35x60	3.06
560				22x35 25x30	2.07	22x40 25x30	2.62	25x40 30x35	2.87	35x45	3.36	35x50	3.43	35x55	3.21	35x60	3.09
680	22x25	1.57		22x35 25x30	2.42	22x50 25x40	2.90	25x50 30x40	3.28	35x50	3.51	35x50	3.57	35x60	3.43	35x70	3.34
820	22x25 25x20	1.92		22x40 25x35	2.81	25x45 30x35	3.42	30x45 35x40	3.58	35x50	3.65	35x60	3.91	35x65	3.66	40x70	3.84
1000	22x30 25x25	1.98		25x40 30x35	3.28	25x50 30x40	3.87	30x50 35x45	4.02	35x55	3.97	35x65	4.28	35x70	3.89	45x80	4.29
1200	22x30 25x25	2.15		25x40 30x35	3.48	25x50 30x40	4.16	30x50 35x45	4.54	35x60	4.25	35x70	4.50	40x70	4.09	45x90	4.59
1500	22x35 25x30	2.52		30x45 35x35	4.04	30x50 35x40	5.12	35x50	5.47	35x65	4.65	40x70	4.61	45x70	4.21	45x100	4.90
2200	22x45 25x40	3.21		35x45	4.77	35x50	6.21	40x60	6.25	45x75	5.87	45x85	5.75	45x100	5.32		
2700	25x45 30x35	3.79		35x50	5.46												
3300	25x50 30x40	4.14															
3900	30x45 35x35	4.64															
4700	30x50 35x40	5.22															
6800	35x50	5.97															

SLK Series

- Snap-in type, 105°C10000 hours specially designed for audio equipment
- Select structural materials with high sound quality
- Create high definition audio equipment with high sound quality
- Suitable for high quality audio equipment
- RoHS Compliance.

Specifications

Items	Characteristics						
Capacitance Tolerance	± 20%(M)						
Operating Temperature Range	-40~ +85℃				-25~ +85℃		
Rated Voltage Range	16~ 250VDC				400~ 450VDC		
Leakage Current	I ≤ 3VCV (μA) or 5Ma, Which is smaller (After 5 minutes application of DC rated voltage, at 20℃)						
Dissipation Factor	Measurement Frequency: 120Hz. Temperature: 20℃						
	Rated Voltage(V)	16	25 ~ 75	80 ~ 100	180	200 ~ 400	450
	tan δ	0.35	0.30	0.25	0.15	0.15	0.20
	When the nominal capacitance over 22000μF, tan δ shall be added 0.01 to the listed value with increase of every 1000μF.						
Low Temperature Stability	Measurement Frequency: 120Hz.						
	Rated Voltage(V)	16 ~ 250			400 ~ 450		
	Z(-25℃) / Z(20℃)	4			8		
	Z(-40℃) / Z(20℃)	12			-		
Load Life	2000 hours, with application of rated voltage at 105℃						
	Capacitance Change	Within ± 20% of Initial Value (Within ±25% for 4V)					
	tan δ	200% or less of Initial Specified Value					
	Leakage Current	Initial Specified Value or less					
Shelf Life	The following specifications shall be satisfied when the capacitors are restored to 20℃ after exposing them for 1,000 hours 105℃ without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to them						
	Capacitance Change	Within ± 20% of Initial Value					
	tan δ	200% or less of Initial Specified Value					
	Leakage Current	Initial Specified Value or less					
Standard	JIS C 5101-4- 1 (IEC 60384)						

Frequency Coefficient of Permissible Ripple Current

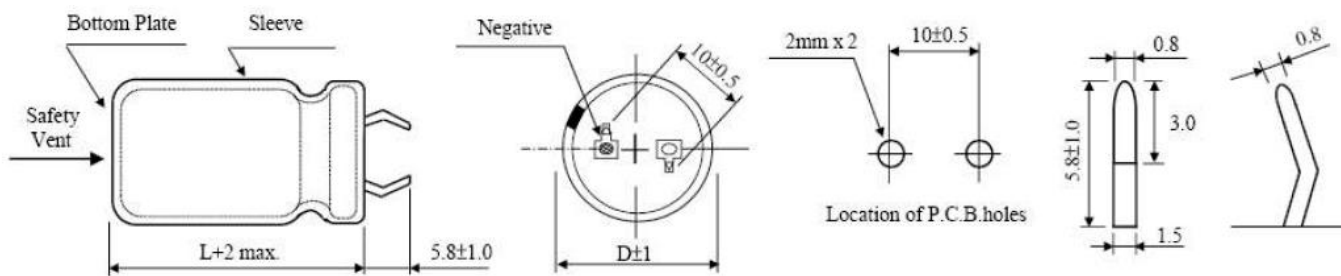
Rated Voltage (V)	Frequency (Hz)					
	50	120	300	1K	10K	50K
16 ~ 250	0.81	1.00	1.17	1.32	1.45	1.50
400 ~ 450	0.77	1.00	1.16	1.30	1.41	1.43

The endurance of capacitors is reduced with internal heating produced by ripple current at the rate of halving the lifetime with every 5°C rise. When long life performance is required in actual use, the rms ripple current has to be reduced.



SIK Series

Dimensions (mm)



Standard Ratings

Cap (µF)	V Item	16		25		35		50	
		D x l	R.C.	D x l	R.C.	D x l	R.C.	D x l	R.C.
1500								22x20	1.34
1800								20x25	1.47
2200						22x20	1.26	25x20	1.43
2700						20x25	1.39	20x30	1.6
3300				22x20	1.30	22x25	1.52	22x25	1.6
3900				20x25	1.39	25x20	1.34	20x35	1.73
4700	22x20	1.17		20x30	1.47	22x30	1.91	22x30	1.73
5600	20x25	1.26		22x25	1.47	25x20	1.34	25x25	1.69
6800	25x20	1.47		25x20	1.34	30x20	1.6	30x20	1.78
8200	20x30	1.65		20x35	1.91	20x35	1.91	20x40	1.95
10000	22x25	1.65		22x30	1.91	22x30	1.91	22x35	1.91
12000	25x25	1.73		25x25	1.86	25x25	1.86	25x40	2.13
15000	30x20	1.82		20x40	2.08	20x40	2.08	22x40	2.04
				22x35	2.04	22x35	2.04	25x30	2.17
				25x30	2.00	25x30	1.95	30x25	2.04
				35x20	1.95	35x20	1.95	35x20	2.13
				20x35	1.91	20x50	2.17	25x30	2.17
				22x30	1.91	22x40	2.26	30x25	2.04
				25x25	1.86	30x25	2.26	35x20	2.13
				20x40	2.08	22x40	2.26	20x50	2.39
				22x35	2.04	30x25	2.26	22x45	2.26
				25x30	1.95	25x40	2.34	25x35	2.34
				35x20	1.95	30x30	2.39	22x50	2.52
				20x35	1.91	35x20	1.95	25x40	2.52
				22x30	1.91	20x50	2.17	30x30	2.60
				25x25	1.86	22x40	2.26	35x25	2.47
				20x40	2.08	30x25	2.26	25x45	2.86
				22x35	2.04	25x40	2.34	30x35	2.82
				25x30	2.00	30x30	2.39	30x40	3.08
				35x20	1.95	35x30	2.78	35x30	3.17
				20x35	1.78	20x50	2.21	30x45	3.47
				22x30	1.78	22x40	2.3	35x35	3.47
				25x25	1.73	25x35	2.17		
				30x20	1.82	30x25	2.3		
				20x40	1.95	22x45	2.52		
				22x35	1.91	25x40	2.39		
				25x30	1.86	30x30	2.43		
				35x20	1.82	35x25	2.3		
				20x45	2.26	25x45	2.73		
				22x40	2.17	30x45	3.30		
				25x35	2.06	35x35	3.30		
				30x25	2.17	30x50	3.73		
				22x45	2.43				



18000	25x40	2.26	30x40	2.95	35x40	3.60		
	30x30	2.30	35x30	3.04				
22000	25x45	2.56	30x45	3.34	35x45	4.08		
	30x35	2.52	35x35	3.34				
	35x25	2.52						
27000	25x50	2.95	35x40	3.73				
	30x40	2.82						
	35x30	2.91						
33000	30x45	3.21	35x45	4.21				
	35x35	3.17						

Standard Ratings

Cap	V	63		80		100	
(μF)	Item	D x l	R.C.	D x l	R.C.	D x l	R.C.
680						20x30	1.47
						22x25	1.52
820	22x20	1.13	20x25	1.47	20x35	1.60	
					22x30	1.60	
			25x20	1.43	25x25	1.56	
					30x20	1.65	
1000	20x25	1.26	20x30	1.56	20x40	1.78	
			22x25	1.60			
1200	25x20	1.43	20x35	1.69	20x45	2.00	
			22x30	1.69	22x40	1.91	
			25x25	1.65	25x30	2.04	
			30x20	1.73	30x25	1.91	
					35x20	2.00	
1500	20x30	1.65	20x40	1.91	20x50	2.3	
	22x25	1.65	22x35	1.86	22x45	2.21	
			25x30	1.82	25x35	2.26	
1800	20x35	1.78	20x45	2.13	22x50	2.47	
	22x30	1.73	22x40	2.04	25x40	2.47	
	25x25	1.73	30x25	2.08	30x30	2.52	
	30x20	1.78	35x20	2.17	35x25	2.39	
2200	20x40	1.95	22x45	2.34	25x45	2.78	
	22x35	1.91	25x35	2.39	30x35	2.78	
	25x30	1.86	30x30	2.21	35x30	2.6	
	35x20	1.82					
2700	20x50	2.08	30x35	2.43	30x40	3.08	
	22x40	2.13					
	25x35	2.04	35x25	2.60	35x35	2.82	
	30x25	2.17					
3300	22x45	2.43	25x50	2.82	30x50	3.26	
	25x40	2.26	30x40	2.73			
	30x30	2.34	35x30	2.78			
3900	25x45	2.47	30x45	3.00	35x40	3.73	
	30x35	2.47	35x35	2.95			
	35x25	2.60					
4700	25x50	2.78	30x45	3.34	35x50	3.91	
	30x40	2.69	35x40	3.26			
	35x30	2.78					
5600	30x45	3.00	35x45	3.56			
	35x35	2.95					
6800	30x50	3.39	35x50	4.04			
	35x40	3.26					
8200	35x45	3.65					
10000	35x50	4.17					

SIG Series

- Snap-in type, 105°C10000 hours long life product.
- Long life. and high ripple current resistance.
- Suitable for computer equipment, inverter air conditioner etc.
- RoHS Compliance.

Specifications

Items	Characteristics					
Capacitance Tolerance	± 20%(M)					
Operating Temperature Range	-25 ~ +105°C					
Rated Voltage Range	200 ~ 450VDC					
Leakage Current	I ≦ 3VCV (μA) or 5mA, which is greater. (After 5 minutes application of DC rated voltage, at 20 °C)					
Dissipation Factor (tan δ)	Measurement Frequency: 120Hz. Temperature: 20°C					
	Rated Voltage(V)	160	200~400	420	450	500
	tan δ (Max)	0.15	0.15	0.15	0.20	0.20
Temperature Stability	Measurement Frequency: 120Hz.					
	Rated Voltage(V)	200~400V			450V	
	Z(-25°C) / Z(20°C)	4			8	
Load Life	10000hours, with application of rated voltage at 105°C					
	Capacitance Change		Within ± 20% of the Initial Value			
	tan δ		250% or less of Initial Specified Value			
	Leakage Current		Initial Specified Value or less			
Shelf Life	The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours 105°C without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to them 4.1 of JIS C5101-4.					
	Capacitance Change		Within ± 15% of the Initial Value			
	tan δ		150% or less of initial Specified Value			
	Leakage Current		Initial Specified Value or less			
Standards	JIS C 5101-4-1 (IEC 60384)					

Frequency Coefficient of Permissible Ripple Current

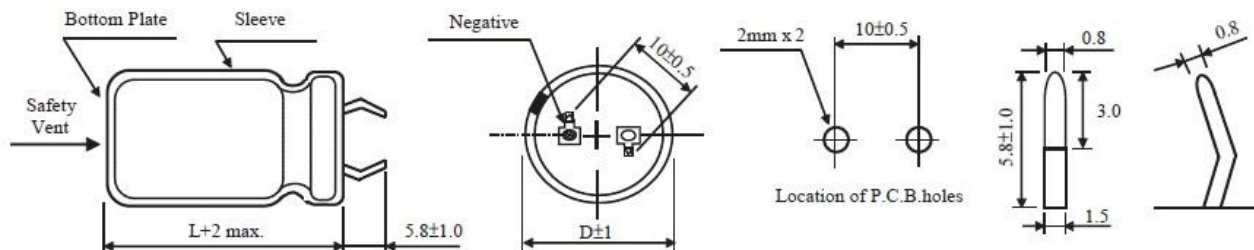
Rated Voltage (V)	Frequency (Hz)					
	50	120	300	1K	10K	50K
200~250	0.81	1.00	1.17	1.32	1.45	1.50
400~450	0.77	1.00	1.16	1.30	1.41	1.43

The endurance of capacitors is reduced with internal heating produced by ripple current at the rate of halving the lifetime with every 5°C rise. When long life performance is required in actual use, the rms ripple current has to be reduced.



SIG Series

Dimensions (mm)



Standard Ratings

D×L (mm); R.C. (A rms) at 105°C 120Hz

Cap (μF)	V (Code)	200		250		400		450	
	Item	D x L	R.C.	D x L	R.C.	D x L	R.C.	D x L	R.C.
220						30x35	1.01	30x40	1.05
								35x30	1.03
270						30x40	1.20	30x45	1.20
						35x30	1.15	35x35	1.15
330						30x45	1.30	30x50	1.32
						35x35	1.28		
						40x30	1.28	35x40	1.35
390				30x30	1.31	30x50	1.45	35x45	1.50
					35x40	1.45			
470				30x35	1.42	35x45	1.61	35x50	1.65
					40x35	1.60			
560		30x30	1.51	35x30	1.60	35x50	1.80	40x60	2.00
					40x40	1.80			
680		30x35	1.65	30x45	1.78	40x50	2.05		
				35x35	1.78				
820		30x40	2.02	30x50	2.05	40x60	2.35		
				35x40	2.02				
		35x30			40x30				
1000		30x45	2.21	35x45	2.20				
		35x35		40x35	2.30				
		40x30	2.15						
1200		35x40	2.38	35x50	2.58				
		40x35	2.45	40x40	2.55				
1500		35x50	2.85	40x50	2.98				
		40x40	2.80						
1800		40x50	3.25	40x60	3.40				

SMA Series

- Standard type of V-chip, -55 ~ +85°C
- Applicable to SMT process
- RoHS Compliant.

Specifications

Items	Characteristics								
Capacitance Tolerance	± 20% (120Hz, 20°C)								
Operating Temperature Range	-55 ~ +85°C								
Rated Voltage Range	4 ~ 100VDC								
Capacitance Range	0.1 ~ 1500μF								
Leakage Current	I ≤ 0.01CV or 3(μA) , which is greater. (After 2 minutes application of DC rated voltage, at 20°C)								
Dissipation Factor	Measurement Frequency: 120Hz. Temperature: 20°C								
	Rated Voltage(V)	4	6.3	10	16	25	35	50	63~100
	tan δ(Max)	0.42	0.30	0.26	0.22	0.16	0.14	0.14	0.12
Low Temperature Stability	Measurement Frequency: 120Hz.								
	Rated Voltage(V)	4	6.3	10	16	25	35	50	63~100
Impedance Ratio (Max)	Z(-25°C) / Z(20°C)	7	4	3	2	2	2	2	2
	Z(-55°C) / Z(20°C)	15	8	8	4	4	3	3	3
Load Life	2000 hours, with application of rated voltage at 85°C								
	Capacitance Change	Within ± 20% of Initial Value (Within ±25% for 4V)							
	tan δ	200% or less of Initial Specified Value							
	Leakage Current	Initial Specified Value or less							
Shelf Life	The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours 85°C without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to them 4.1 of JIS C5101-4.								
	Capacitance Change	Within ± 20% of Initial Value							
	tan δ	200% or less of Initial Specified Value							
	Leakage Current	Initial Specified Value or less							
Resistance to Soldering Heat	The capacitors shall be kept on the hot plate maintained at 250°C for 30 seconds. After removing from the hot plate and restored at room temperature they meet the characteristics requirements listed at right.				Capacitance Change		Within ±10% of Initial Value		
					tan δ		Initial Specified Value		
					Leakage Current		Initial Specified Value or less		
Marking	Black print on the case top								

Frequency Coefficient for Ripple Current

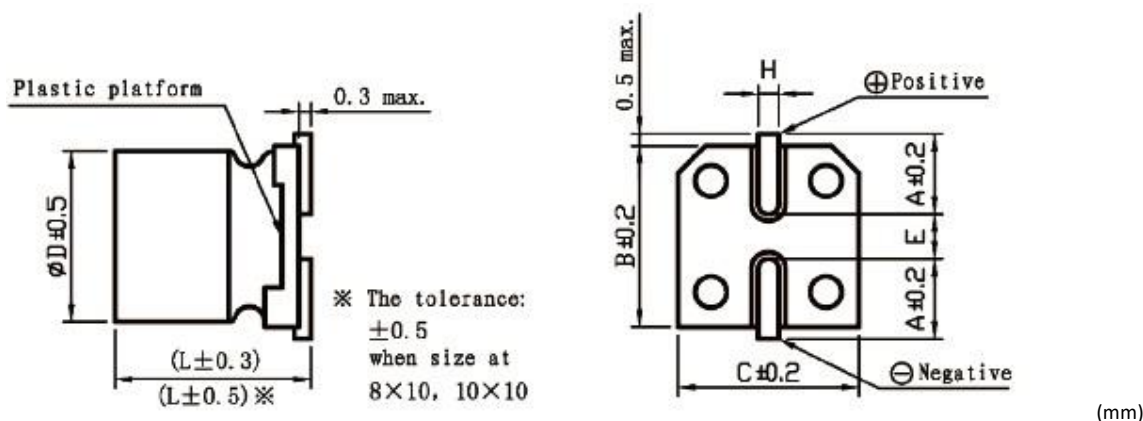
Frequency(Hz)	50	120	300	1K	≥ 10K
Coefficient	0.70	1.00	1.17	1.36	1.50

The endurance of capacitors is reduced with internal heating produced by ripple current at the rate of having the lifetime with every 10°C rise. When long life performance is required in actual use, the rms ripple current has to be reduced.

SMA Series

Dimensions (mm)

Chip Type



ØD×L	4x5.4	5x5.4	6.3x5.4	6.3x7.7	8x10	10x10
A	1.8	2.1	2.4	2.4	2.9	3.2
B	4.3	5.3	6.6	6.6	8.3	10.3
C	4.3	5.3	6.6	6.6	8.3	10.3
E	1.0	1.3	2.2	2.2	3.1	4.5
L	5.4	5.4	5.4	7.7	10.0	10.0
H	0.5 ~ 0.8	0.5 ~ 0.8	0.5 ~ 0.8	0.5 ~ 0.8	0.8 ~ 1.1	0.8 ~ 1.1

Standard Ratings

D×L(mm) ; R.C.(mA RMS) at 85°C 120Hz.

Cap (µF)	V (Code)	4		6.3		10		16		25	
	Item	DxL	R.C.	DxL	R.C.	DxL	R.C.	DxL	R.C.	DxL	R.C.
4.7										4x5.4	16
10						4x5.4	28	4x5.4	23	4x5.4	23
22		4x5.4	28	4x5.4	28	5x5.4	33	5x5.4	37	5x5.4	34
33		4x5.4	28	4x5.4	28	5x5.4	41	5x5.4	49	6.3x5.4	47
47		4x5.4	33	5x5.4	45	5x5.4	52	6.3x5.4	58	6.3x5.4	57
56		5x5.4	42	6.3x5.4	52	6.3x5.4	57	6.3x5.4	63	6.3x5.4	62
100		5x5.4	56	6.3x5.4	65	6.3x5.4	76	6.3x5.4	86	6.3x7.7	130
150		6.3x5.4	79	6.3x5.4	71	6.3x7.7	130	6.3x7.7	130		
220		6.3x5.4	96	6.3x5.4	105	6.3x7.7	130	6.3x7.7	130	8x10	250
330		6.3x7.7	130	6.3x7.7	130	8x10	250	8x10	250	10x10	310
470		6.3x7.7	130								
		8x10	250	8x10	280	8x10	280	10x10	280		
680		8x10	300	8x10	300	10x10	350	10x10	350		
1,000		10x10	430	10x10	430	10x10	430				
1,500		10x10	480	10x10	480						



SMA Series

Standard Ratings

DxL(mm) ; R.C.(mA RMS) at 85°C 120Hz.

Cap (μF)	V	35		50		63		100	
	Item	DxL	R.C.	DxL	R.C.	DxL	R.C.	DxL	R.C.
0.1				4x5.4	3.0	4x5.4	2.0		
0.22				4x5.4	5.0	4x5.4	3.0		
0.33				4x5.4	6.0	4x5.4	4.0		
0.47				4x5.4	7.0	4x5.4	5.0		
1				4x5.4	10	4x5.4	8.0	4x5.4	6.0
2.2		4x5.4	12	4x5.4	14	5x5.4	12	5x5.4	10
3.3		4x5.4	16	4x5.4	19	5x5.4	17		
4.7		4x5.4	18	4x5.4	26	5x5.4	23		
10		5x5.4	29	5x5.4	31	6.3x5.4	42		
22		6.3x5.4	46	6.3x5.4	59	6.3x7.7	60	10x10	90
33		6.3x5.4	51	6.3x7.7	75	8x10	110	10x10	90
47		6.3x5.4	63	6.3x7.7	75	8x10	130		
56		6.3x7.7	70	8x10	175	10x10	160		
100		6.3x7.7	70	8x10	175	10x10	170		
		8x10	175						
220		10x10	320	10x10	320				
330		10x10	360						

SMB Series

- Standard type of V-chip, -55 ~ +105°C
- Applicable to SMT process
- RoHS Compliant.

Specifications

Items	Characteristics							
Capacitance Tolerance	± 20% (120Hz, 20°C)							
Operating Temperature Range	-55 ~+105°C							
Rated Voltage Range	4 ~ 50VDC							
Capacitance Range	0.1 ~ 1500μF							
Leakage Current	I ≤ 0.01CV or 3(μA) , which is greater. (After 2 minutes application of DC rated voltage, at 20°C)							
Dissipation Factor (tan δ)	Measurement Frequency: 120Hz. Temperature: 20°C							
	Rated Voltage (V)	4	6.3	10	16	25	35	50
	tan δ(Max)	0.42	0.30	0.26	0.22	0.16	0.14	0.14
Low Temperature Stability	Measurement Frequency: 120Hz.							
	Rated Voltage (V)	4	6.3	10	16	25	35	50
Impedance Ratio (Max)	Z(-25°C)/Z(20°C)	7	4	3	2	2	2	2
	Z(-55°C)/Z(20°C)	15	8	8	4	4	3	3
Load Life	1000 hours, with application of rated voltage at 105°C							
	Capacitance Change	Within ± 25% of Initial Value						
	tan δ	200% or less of Initial Specified Value						
	Leakage Current	Initial Specified Value or less						
Shelf Life	The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours 105°C without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to them 4.1 of JIS C5101-4.							
	Capacitance Change		Within ± 20% of Initial Value					
	tan δ		200% or less of Initial Specified Value					
	Leakage Current		Initial Specified Value or less					
Resistance to Soldering Heat	The capacitors shall be kept on the hot plate maintained at 250°C for 30 seconds. After removing from the hot plate and restored at room temperature they meet the characteristics requirements listed at right.				Capacitance Change		Within ± 10% of Initial Value	
					tan δ		Initial Specified Value	
					Leakage Current		Initial Specified Value or less	
Marking	Black print on the case top							

Frequency Coefficient for Ripple Current

Frequency(Hz)	50	120	300	1K	≥10K
Coefficient	0.70	1.00	1.17	1.36	1.50

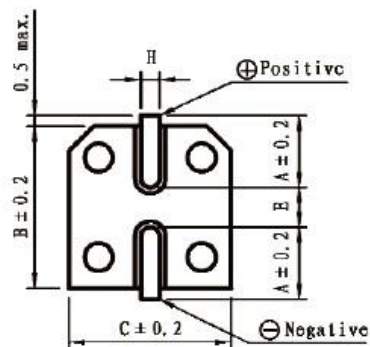
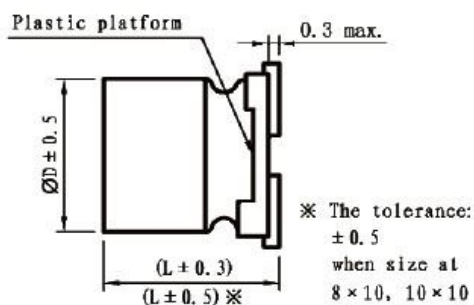
The endurance of capacitors is reduced with internal heating produced by ripple current at the rate of having the lifetime with every 5°C rise. When long life performance is required in actual use, the rms ripple current has to be reduced.



SMB Series

Dimensions (mm)

Chip Type



Unit (mm)

$\varnothing D \times L$	4x5.4	5x5.4	6.3x5.4	6.3x7.7	8x10	10x10
A	1.8	2.1	2.4	2.4	2.9	3.2
B	4.3	5.3	6.6	6.6	8.3	10.3
C	4.3	5.3	6.6	6.6	8.3	10.3
E	1.0	1.4	2.1	2.1	3.2	4.5
L	5.4	5.4	5.4	7.7	10	10
H	0.5~0.8	0.5~0.8	0.5~0.8	0.5~0.8	0.8~1.1	0.8~1.1

Standard Ratings

D×L(mm); R.C. (mA RMS) at 105°C 120Hz.

Cap (μF)	V	4		6.3		10		16	
	Item	D x L	R.C.	D x L	R.C.	D x L	R.C.	D x L	R.C.
10								4x5.4	18
22		4x5.4	22	4x5.4	24	5x5.4	27	5x5.4	30
33		5x5.4	30	5x5.4	33	5x5.4	35	6.3x5.4	40
47		5x5.4	36	5x5.4	40	5x5.4	40	6.3x5.4	50
100		6.3x5.4	60	6.3x5.4	66	6.3x5.4	79	6.3x5.4	90
						6.3x7.7	121		
150		6.3x5.4	65	6.3x5.4	75	6.3x7.7	121	8x10	210
220		6.3x5.4	79	6.3x5.4	79	6.3x7.7	121	8x10	210
						8x10	210		
330		6x.3x7.7	121	6.3x7.7	121	8x10	210	8x10	210
470		8x10	210	8x10	210	8x10	210	10x10	250
680		8x10	210	8x10	210	10x10	310	10x10	310
1000		8x10	230	10x10	350	10x10	410		
1500		10x10	410	10x10	410				



SMB Series

Standard Ratings

D×L(mm) ; R.C.(mA RMS) at 105°C 120Hz.

Cap (μF)	V	25		35		50	
	Item	D x L	R.C.	D x L	R.C.	D x L	R.C.
0.1						4x5.4	1.0
0.22						4x5.4	2.6
0.33						4x5.4	3.2
0.47						4x5.4	3.8
1						4x5.4	6.3
2.2						4x5.4	11
3.3						4x5.4	14
4.7		4x5.4	13	4x5.4	15	4x5.4	18
10		4x5.4	22	5x5.4	25	6.3x5.4	30
22		6.3x5.4	32	6.3x5.4	42	6.3x5.4	39
33		6.3x5.4	48	6.3x5.4	47	6.3x7.7	60
						8x10	70
47		6.3x5.4	58	6.3x5.4	56	6.3x7.7	60
						8x10	110
100		6.3x7.7	84	6.3x7.7	84	8x10	140
				8x10	131		
150		8x10	140	8x10	155	10x10	180
220		8x10	155	8x10	190	10x10	220
330		8x10	190	10x10	300		
470		10x10	300				

SMC Series

- Non-polarity V-chip
- Applicable to SMT process
- RoHS Compliant.
- V-Chip
- Universal for SMT Process

Specifications

Items	Characteristics							
Capacitance Tolerance	± 20% (120Hz, 20°C)							
Operating Temperature Range	-55 ~ +85°C							
Rated Voltage Range	6.3 ~ 50VDC							
Capacitance Range	0.1 ~ 100μF							
Leakage Current	I ≤ 0.03CV or 5 (μA) , which is greater. (After 2 minutes application of DC rated voltage, at 20°C)							
Dissipation Factor	Measurement Frequency: 120Hz. Temperature: 20°C							
	Rated Voltage(V)	6.3	10	16	25	35	50	
	tan δ(Max)	0.30	0.25	0.20	0.17	0.15	0.15	
Low Temperature Stability	Measurement Frequency: 120Hz.							
	Rated Voltage(V)	6.3	10	16	25	35	50	
	Impedance Ratio (Max)	Z(-25°C) / Z(20°C)	4	3	2	2	2	2
		Z(-55°C) / Z(20°C)	8	6	4	4	3	3
Load Life	1000 hours, with application of rated voltage at 85°C							
	Capacitance Change	Within ± 20% of Initial Value						
	tan δ	200% or less of Initial Specified Value						
	Leakage Current	Initial Specified Value or less						
Shelf Life	The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours 85°C without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to them 4.1 of JIS C5101-4.							
	Capacitance Change	Within ± 20% of Initial Value						
	tan δ	200% or less of Initial Specified Value						
	Leakage Current	Initial Specified Value or less						
Resistance to Soldering Heat	The capacitors shall be kept on the hot plate maintained at 250°C for 30 seconds. After removing from the hot plate and restored at room temperature they meet the characteristics requirements listed at right.			Capacitance Change		Within ±10% of Initial Value		
				tan δ		Initial Specified Value		
				Leakage Current		Initial Specified Value or less		
Marking	Black print on the case top							

Frequency Coefficient for Ripple Current

Frequency (Hz)	50	120	300	1K	$\geq 10K$
Coefficient	0.70	1.00	1.17	1.36	1.50

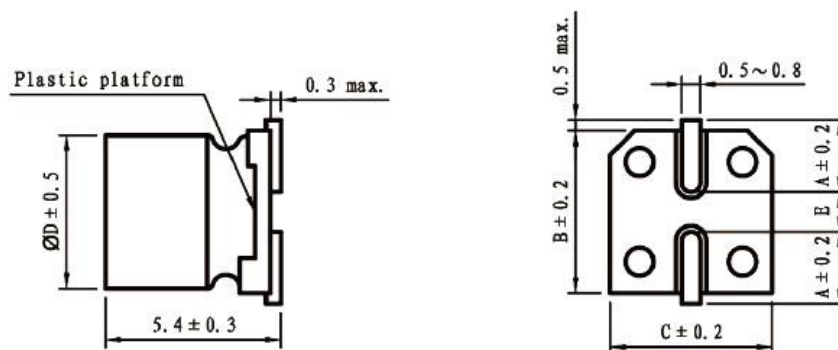
The endurance of capacitors is reduced with internal heating produced by ripple current at the rate of having the lifetime with every 10°C rise. When long life performance is required in actual use, the rms ripple current has to be reduced.



SMC Series

Dimensions (mm)

Chip Type



(mm)

ØD×L	4x5.4	5x5.4	6.3x5.4
A	1.8	2.1	2.4
B	4.3	5.3	6.6
C	4.3	5.3	6.6
E	1.0	1.3	2.2

Standard Ratings

D×L(mm) ; R.C.(mA rms) at 85°C 120Hz.

Cap (µF)	V	6.3		10		16		25		35		50	
	Item	DxL	R.C.	DxL	R.C.	DxL	DxL	R.C.	R.C.	DxL	R.C.	DxL	R.C.
0.1												4x5.4	1.0
0.22												4x5.4	2.0
0.33												4x5.4	2.8
0.47												4x5.4	4.0
1												4x5.4	8.4
2.2										4x5.4	8.4	5x5.4	13
3.3								5x5.4	12	5x5.4	16	5x5.4	17
4.7						4x5.4	12	5x5.4	16	5x5.4	18	6.3x5.4	20
10				4x5.4	17	5x5.4	23	6.3x5.4	27	6.3x5.4	29	6.3x5.4	40
22		4x5.4	28	4x5.4	33	5x5.4	37	6.3x5.4	50				
33		6.3x5.4	37	6.3x5.4	41	6.3x5.4	49						
47		6.3x5.4	45	6.3x5.4	54								
100		6.3x5.4	65										

SMD Series

- Low impedance, 105°C V-chip
- Applicable to SMT process
- RoHS Compliant.
- V-Chip
- Universal for SMT Process

Specifications

Items	Characteristics									
Capacitance Tolerance	± 20% (120Hz, 20°C)									
Operating Temperature Range	-55 ~ +105°C									
Rated Voltage Range	6.3 ~ 100VDC									
Capacitance Range	1 ~ 1500μF									
Leakage Current	I ≤ 0.01CV or 3(μA) , which is greater. (After 2 minutes application of DC rated voltage, at 20°C)									
Dissipation Factor	Measurement Frequency: 120Hz. Temperature: 20°C									
	Rated Voltage(V)	6.3	10	16	25	35	50	63	80	100
	tan δ(Max)	0.30	0.26	0.22	0.16	0.13	0.10	0.08	0.08	0.07
Low Temperature Stability	Measurement Frequency: 120Hz.									
	Rated Voltage(V)	6.3	10	16	25	35	50	63	80	100
Impedance Ratio (Max)	Z(-25°C) / Z(20°C)	4	3	2	2	2	2	2	2	2
	Z(-55°C) / Z(20°C)	8	5	4	3	3	3	3	3	3
Load Life	3000 hours, with application of rated voltage at 105°C (ØD=4~6.3mm: 2000hrs)									
	Capacitance Change	Within ± 30% of Initial Value								
	tan δ	300% or less of Initial Specified Value								
	Leakage Current	Initial Specified Value or less								
Shelf Life	The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours 105°C without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to them 4.1 of JIS C5101-4.									
	Capacitance Change	Within ± 30% of Initial Value								
	tan δ	300% or less of Initial Specified Value								
	Leakage Current	Initial Specified Value or less								
Resistance to Soldering Heat	The capacitors shall be kept on the hot plate maintained at 250°C for 30 seconds. After removing from the hot plate and restored at room temperature they meet the characteristics requirements listed at right.				Capacitance Change		Within ±10% of Initial Value			
					tan δ		Initial Specified Value			
					Leakage Current		Initial Specified Value or less			
Marking	Black print on the case top									

Frequency Coefficient for Ripple Current

Frequency (Hz)	$120 \leq F < 1K$	$1K \leq F < 10K$	$10K \leq F < 100K$	$100K \leq F$
≤ 33	0.35	0.70	0.90	1.00
33 ~ 150	0.40	0.85	0.92	1.00
> 150	0.60	0.85	0.95	1.00

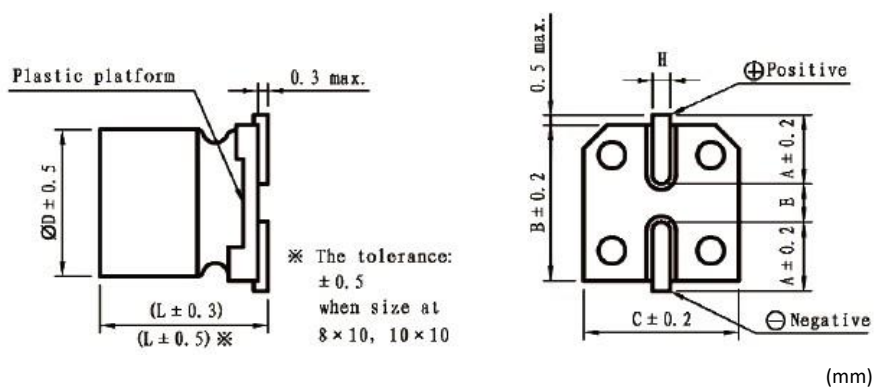
The endurance of capacitors is reduced with internal heating produced by ripple current at the rate of having the lifetime with every 5°C rise. When long life performance is required in actual use, the rms ripple current has to be reduced.



SMD Series

Chip Type

Dimensions (mm)



ØD×L	4x5.4	5x5.4	6.3x5.4	6.3x6.0	6.3x7.7	8x6.5	8x10	10x10
A	1.8	2.1	2.4	2.4	2.4	3.3	2.9	3.2
B	4.3	5.3	6.6	6.6	6.6	8.3	8.3	10.3
C	4.3	5.3	6.6	6.6	6.6	8.3	8.3	10.3
E	1.0	1.4	2.1	2.1	2.2	2.3	3.2	4.5
L	5.4	5.4	5.4	6.0	7.7	6.5	10	10
H	0.5 ~ 0.8	0.5 ~ 0.8	0.5 ~ 0.8	0.5 ~ 0.8	0.5 ~ 0.8	0.5 ~ 0.8	0.8 ~ 1.1	0.8 ~ 1.1

Standard Ratings

D×L(mm) ; R.C.(mA rms) at 105°C 100KHz, IMP (Ω max) at 20°C 100KHz.

Cap (μF)	V	6.3			10			16			25			35		
	Item	DxL	R.C.	IMP	DxL	R.C.	IMP	DxL	R.C.	IMP	DxL	R.C.	IMP	DxL	R.C.	IMP
4.7														4x5.4	80	2.0
10								4x5.4	80	2.0	4x5.4	80	2.0	5x5.4	150	1.20
22		4x5.4	80	2.0	4x5.4	80	2.0	5x5.4	150	1.20	5x5.4	150	1.20	6.3x5.4	230	0.80
33		4x5.4	80	2.0	5x5.4	150	1.20	5x5.4	150	1.20	6.3x5.4	230	0.80	6.3x5.4	230	0.80
47		5x5.4	150	1.20	5x5.4	150	1.20	5x5.4	150	1.20	6.3x5.4	230	0.80	6.3x5.4	230	0.80
100		6.3x5.4	230	0.80	6.3x5.4	230	0.80	6.3x5.4	230	0.80	6.3x7.7	280	0.58	8x10	450	0.22
150		6.3x5.4	230	0.80	6.3x5.4	230	0.80	6.3x7.7	280	0.58	8x10	450	0.22	8x10	450	0.22
220		6.3x5.4	230	0.80	6.3x7.7	280	0.58	6.3x7.7	280	0.58	8x10	450	0.22	10x10	670	0.15
330		8x10	450	0.22	8x10	450	0.22	8x10	450	0.22	8x10	450	0.22			
470		8x10	450	0.22	8x10	450	0.22	8x10	450	0.22	10x10	670	0.15			
680		8x10	450	0.22	10x10	670	0.15	10x10	670	0.15						
1000		8x10	450	0.22	10x10	670	0.15									
1500		10x10	670	0.15												

SMD Series

Standard Ratings

DxL(mm) ; R.C.(mA rms) at 105°C 100KHz, IMP (Ω max) at 20°C 100KHz.

Cap (μF)	V	50			63			80			100		
	Item	DxL	R.C.	IMP	DxL	R.C.	IMP	DxL	R.C	IMP	DxL.	R.C.	IMP
1		4x5.4	60	9.0									
2.2		4x5.4	60	9.0									
3.3		4x5.4	60	9.0	5x5.4	85	5.0	5x5.4	50	5.3			
4.7		5x5.4	85	5.0	5x5.4	85	5.0	6.3x5.4	60	4.8			
10		6.3x5.4	165	2.2	6.3x5.4	165	2.2				8x10	130	1.88
22		6.3x5.4	165	2.2	6.3x7.7	185	1.4	8x10	130	1.88	10x10	200	0.90
33		6.3x7.7	185	1.4	8x10	369	0.85	10x10	200	0.90	10x10	200	0.90
47		6.3x7.7	185	1.4	8x10	369	0.85	10x10	200	0.90	10x10	200	0.90
68		8x10	369	0.68	10x10	450	0.48	10x10	200	0.90			
100		8x10	369	0.68	10x10	553	0.48						
		10x10	553	0.48									
150		10x10	553	0.48									



SME Series

- Standard type of V-chip, 2000 hours, 105°C
- Applicable to SMT process
- RoHS Compliant.

Specifications

Items	Characteristics						
Capacitance Tolerance	± 20% (120Hz, 20°C)						
Operating Temperature Range	-55 ~ +105°C						
Rated Voltage Range	6.3 ~ 100VDC						
Capacitance Range	1 ~ 6800μF						
Leakage Current	I ≤ 0.01CV or 3 (μA) , which is greater. (After 2 minutes application of DC rated voltage, at 20°C)						
Dissipation Factor	Measurement Frequency: 120Hz. Temperature: 20°C						
	Rated Voltage(V)	6.3	10	16	25	35	50
	tan δ(Max)	0.32	0.28	0.24	0.18	0.15	0.14
Low Temperature Stability	Measurement Frequency: 120Hz.						
	Rated Voltage(V)	6.3	10	16	25	35	50
Impedance Ratio (Max)	Z(-25°C) / Z(20°C)	4	3	2	2	2	2
	Z(-55°C) / Z(20°C)	8	8	4	4	3	3
Load Life	2000 hours, with application of rated voltage at 105°C						
	Capacitance Change	Within ± 20% of Initial Value					
	tan δ	200% or less of Initial Specified Value					
	Leakage Current	Initial Specified Value or less					
Shelf Life	The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours 105°C without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to them 4.1 of JIS C5101-4.						
	Capacitance Change	Within ± 20% of Initial Value					
	tan δ	200% or less of Initial Specified Value					
	Leakage Current	Initial Specified Value or less					
Resistance to Soldering Heat	The capacitors shall be kept on the hot plate maintained at 250°C for 30 seconds. After removing from the hot plate and restored at room temperature they meet the characteristics requirements listed at right.			Capacitance Change		Within ±10% of Initial Value	
				tan δ		Initial Specified Value	
				Leakage Current		Initial Specified Value or less	
Marking	Black print on the case top						

Frequency Coefficient for Ripple Current

Frequency(Hz)	50	120	300	1K	≥ 10K
Coefficient	0.70	1.00	1.17	1.36	1.50

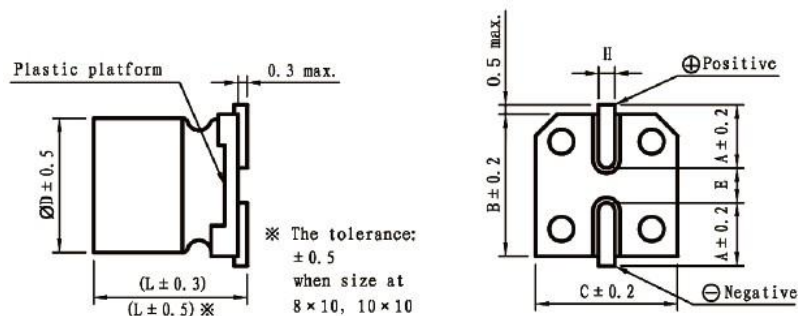
The endurance of capacitors is reduced with internal heating produced by ripple current at the rate of having the lifetime with every 5°C rise. When long life performance is required in actual use, the rms ripple current has to be reduced.



SME Series

Chip Type

Dimensions (mm)



(mm)

ØD×L	4x5.4	5x5.4	6.3x5.4	6.3x7.7	8x10	10x10
A	1.8	2.1	2.4	2.4	2.9	3.2
B	4.3	5.3	6.6	6.6	8.3	10.3
C	4.3	5.3	6.6	6.6	8.3	10.3
E	1.0	1.3	2.2	2.2	3.1	4.5
L	5.4	5.4	5.4	7.7	10.0	10.0
H	0.5 ~ 0.8	0.5 ~ 0.8	0.5 ~ 0.8	0.5 ~ 0.8	0.8 ~ 1.1	0.8 ~ 1.1

Standard Ratings

D×L(mm) ; R.C.(mA rms) at 105°C 120Hz.

Cap (µF)	V	6.3		10		16		25		35		50	
	Item	DxL	R.C.	DxL	R.C.	DxL	DxL	R.C.	R.C.	DxL	R.C.	DxL	R.C.
0.1												4x5.4	1.0
0.22												4x5.4	2.6
0.33												4x5.4	3.2
0.47												4x5.4	3.8
1												4x5.4	8
2.2								4x5.4	6.6	4x5.4	8	4x5.4	11
3.3						4x5.4	7	4x5.4	12	4x5.4	13	4x5.4	16
4.7				4x5.4	7	4x5.4	9	4x5.4	13	4x5.4	15	5x5.4	19
10	4x5.4	10		4x5.4	13	4x5.4	28	5x5.4	28	5x5.4	28	6.3x5.4	35
22	4x5.4	26		5x5.4	35	5x5.4	39	6.3x5.4	45	6.3x5.4	70	6.3x7.7	65
33	4x5.4	29		6.3x5.4	43	6.3x5.4	51	6.3x5.4	65	6.3x5.4	70	8x10	140
47	5x5.4	45	6.3x5.4	62	6.3x5.4	70		6.3x5.4	70	6.3x7.7	80	8x10	170
								6.3x7.7	80				
100	6.3x5.4	71		6.3x5.4	90	6.3x7.7	100	6.3x7.7	100	8x10	305	8x10	315
220	6.3x7.7	100	6.3x7.7	120		6.3x7.7	125	8x10	355	10x10	450	10x10	450
						8x10	215						
330				8x10	215	10x10	440	10x10	450				
470	10x10	310		10x10	440	10x10	460	10x10	490				
1000	10x10	495											



SMF Series

- Wide range of -55~+125°C, long life product.
- Applicable to SMT process.
- RoHS Compliant & Halogen Free

Specifications

Items	Characteristics									
Capacitance Tolerance	± 20% (120Hz, 20°C)									
Operating Temperature Range	-55 ~ +125°C					-40 ~ +125°C				
Rated Voltage Range	10 ~ 63VDC					80 ~ 160VDC				
Capacitance Range	10 ~ 470μF					2.2 ~ 4.7μF				
Leakage Current	I ≤ 0.01CV or 3(μA) , which is greater. (After 2 minutes application of DC rated voltage, at 20°C)									
Dissipation Factor	Measurement Frequency: 120Hz. Temperature: 20°C									
	Rated Voltage(V)	10	16	25	35	50	63	80	100	160
	tan δ(Max)	0.32	0.24	0.21	0.18	0.18	0.15	0.15	0.12	0.20
Low Temperature Stability	Measurement Frequency: 120Hz.									
	Rated Voltage(V)	10	16	25	35	50	63	80	100	160
Impedance Ratio (Max)	Z(-25°C)/Z(20°C)	3	2	2	2	2	2	2	2	-
	Z(-40°C)/Z(20°C)	-	-	-	-	-	-	3	3	-
	Z(-55°C)/Z(20°C)	6	4	4	3	3	3	-	-	-
Load Life	3000 hours, with application of rated voltage at 125°C (ØD=4~6.3x5.4mm: 1000hrs;6.3x7.7mm : 2000hrs)									
	Capacitance Change	Within ± 30% of Initial Value								
	tan δ	300% or less of Initial Specified Value								
	Leakage Current	Initial Specified Value or less								
Shelf Life	The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours 125°C without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to them 4.1 of JIS C5101-4.									
	Capacitance Change	Within ± 30% of Initial Value								
	tan δ	300% or less of Initial Specified Value								
	Leakage Current	500% or less Initial Specified Value								
Resistance to Soldering Heat	The capacitors shall be kept on the hot plate maintained at 250°C for 30 seconds. After removing from the hot plate and restored at room temperature they meet the characteristics requirements listed at right.				Capacitance Change		Within ±10% of Initial Value			
					tan δ		Initial Specified Value			
					Leakage Current		Initial Specified Value or less			
Marking	Black print on the case top									

Frequency Coefficient for Ripple Current

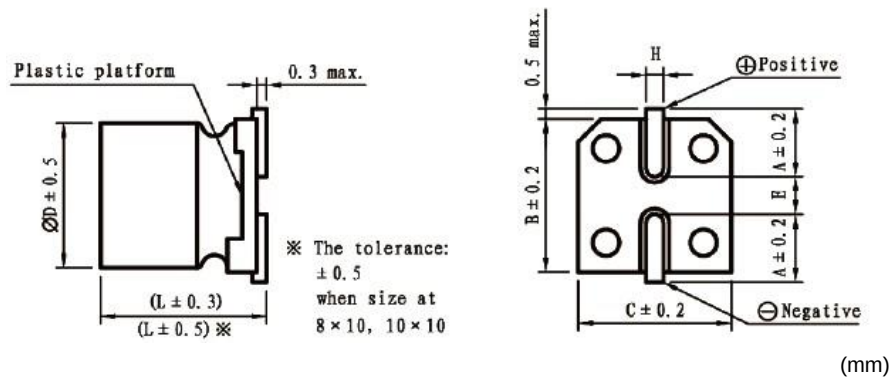
Frequency (Hz)	50	60	120	1K	≥ 10K
Coefficient	0.64	0.64	1.00	1.36	1.50

The endurance of capacitors is reduced with internal heating produced by ripple current at the rate of having the lifetime with every 5°C rise. When long life performance is required in actual use, the rms ripple current has to be reduced.

SMF Series

Chip Type

Dimensions (mm)



ØD × L	6.3x5.4	6.3x7.7	8x10	10x10
A	2.4	2.4	2.9	3.2
B	6.6	6.6	8.3	10.3
C	6.6	6.6	8.3	10.3
E	2.1	2.1	3.2	4.5
L	5.4	7.7	10	10
H	0.5 ~ 0.8	0.5 ~ 0.8	0.8 ~ 1.1	0.8 ~ 1.1

Standard Ratings

D×L(mm) ; R.C.(mA rms) at 125°C 120Hz.

Cap (µF)	V	10		16		25		35		50	
	Item	DxL	R.C.	DxL	R.C.	DxL	DxL	R.C.	R.C.	DxL	R.C.
10								6.3x5.4	46	6.3x7.7	34
22								6.3x5.4	46	6.3x7.7	55
33						6.3x5.4	46	6.3x7.7	73	8x10	106
47				6.3x5.4	40	6.3x7.7	73	6.3x7.7	73	8x10	106
										10x10	164
100		6.3x7.7	58	6.3x7.7	73	6.3x7.7	73	8x10	131	10x10	164
						8x10	131	10x10	164		
220		6.3x7.7	58	8x10	131	8x10	131	10x10	164		
				10x10	164	10x10	164				
330		8x10	90	10x10	164	10x10	164				
		10x10	112								
470		10x10	130								



SMF Series

Standard Ratings

D×L(mm) ; R.C.(mA rms) at 125°C 120Hz.

Cap (μF)	V	63		80		100		160	
	Item	DxL	R.C.	DxL	R.C.	DxL	DxL	R.C.	R.C.
2.2								8x10	22
3.3								8x10	22
4.7								10x10	70
10		6.3x7.7	40	8x10	46	8x10	46		
22		8x10	66	8x10	46	8x10	46		
				10x10	76	10x10	76		
33		8x10	66	8x10	46	10x10	76		
		10x10	113	10x10	76				
47		8x10	66						
		10x10	113						

SMG Series

- 105°C 2000 hours Life
- Suitable for lighting and power charger
- RoHS Compliant.

Specifications

Items	Characteristics			
Capacitance Tolerance	± 20% (120Hz, 20°C)			
Operating Temperature Range	-40 ~ +105°C			
Rated Voltage Range	160 ~ 400VDC			
Capacitance Range	2.2 ~ 82μF			
Leakage Current	I ≤ 0.04CV + 100(μA) , which is greater. (After 2 minutes application of DC rated voltage, at 20°C)			
Dissipation Factor (tan δ)	Measurement Frequency: 120Hz. Temperature: 20°C			
	Rated Voltage (V)	1		
	tan δ(Max)	0		
Low Temperature Stability	Measurement Frequency: 120Hz.			
	Rated Voltage (V)		200	
Impedance Ratio (Max)	Z(-25°C)/Z(20°C)			
	Z(-40°C)/Z(20°C)			
Load Life	2000 hours, with application of working voltage at 105°C			
	Capacitance Change	Within ± 20% of Initial Value.		
	tan δ	200% or less of Initial Specified Value		
	Leakage Current	Initial Specified Value or less		
Shelf Life	The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 500 hours 105°C without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to them 4.1 of JIS C5101-4.			
	Capacitance Change		Within ± 20% of Initial Value	
	tan δ		200% or less of Initial Specified Value	
	Leakage Current		Initial Specified Value or less	
Resistance to Soldering Heat	The capacitors shall be kept on the hot plate maintained at 250°C for 30 seconds. After removing from the hot plate and restored at room temperature they meet the characteristics requirements listed at right.		Capacitance Change	Within ± 10% of Initial Value
			tan δ	Initial Specified Value
			Leakage Current	Initial Specified Value or less
Marking	JIS C 5101-4-1 (IEC 60384)			

Frequency Coefficient for Ripple Current

Frequency (Hz)	50	120	300	1K	≥10K
Capacitance (μF)					
2.2 ~ 6.8	0.70	1.00	1.17	1.36	1.50

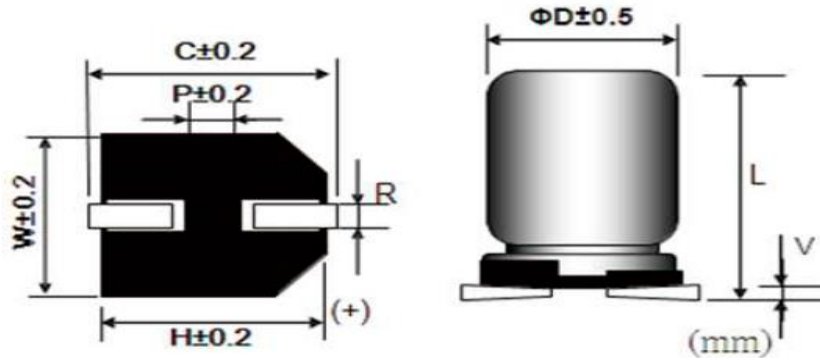
The endurance of capacitors is reduced with internal heating produced by ripple current at the rate of having the lifetime with every 5°C rise. When long life performance is required in actual use, the rms ripple current has to be reduced.



SMG Series

Dimensions (mm)

Chip Type



(mm)

Size	ØD	L±0.5	W	H	C	R	P	Vmax
8x0.5	8.0	10.5	8.3	8.3	9.0	0.7~1.1	3.2	0.3
10x10.5	10.0	10.51	10.3	10.3	11.0	1.0~1.3	4.5	0.3
12.5x13.5	12.5	13.5	13.0	13.0	13.7	1.1~1.4	4.5	0.4
16x16.5	16.0	16.5	17.0	17.0	18.0	1.4~1.8	6.4	0.4

Standard Ratings

D×L(mm) ; R.C.(mA RMS) at 105°C 120Hz.

Cap (µF)	V	160		200		250		400	
	Item	D x l	R.C.	D x l	R.C.	D x l	R.C.	D x l	R.C.
2.2								8x10.5	25
3.3						8x10.5	31	10x10.5	36
4.7						8x10.5	37	10x10.5	38
6.8						8x10.5	44	12.5x13.5	47
10		8x10.5	57	10x10.5	64	10x10.5	64	12.5x13.5	57
22		12.5x13.5	112	12.5x13.5	112	12.5x13.5	112	16x16.5	115
33		12.5x13.5	137	12.5x13.5	137	16x16.5	150		
47		16x16.5	180	16x16.5	180	16x16.5	180		
68		16x16.5	215	16x16.5	215				
82		16x16.5	235						

SMDL Series

- Low impedance, 105°C 5000 hour.
- Applicable to SMT process.
- RoHS Compliance.

Specifications

Items	Characteristics									
Capacitance Tolerance	±20%(120Hz, 20°C)									
Operating Temperature Range	-55~+105°C									
Rated Voltage Range	6.3~100VDC									
Capacitance Range	22~1500μF									
Leakage Current	I≤0.01CVor3(μA), which is greater. (After2minutesapplicationofDCratedvoltage,at20°C)									
Dissipation Factor (tanδ)	Measurement Frequency: 120Hz.Temperature:20°C									
	Rated Voltage(V)	6.3	10	16	25	35	50	63	80	100
	Tan δ (Max)	0.3	0.26	0.22	0.16	0.14	0.14	0.08	0.08	0.07
Low Temperature Stability Impedance Ratio (Max)	Measurement Frequency:120Hz.									
	Rated Voltage(V)	6.3	10	16	25	35	50	63	80	100
	Z(-25°C) / Z(20°C)	4	3	2	2	2	2	2	2	2
Load Life	Z(-55°C) / Z(20°C)	8	5	4	3	3	3	3	3	3
	5000hours, with application of rated voltage at 105°C									
	Capacitance Change	Within±30%ofInitialValue								
	Tan δ	300%orlessofInitialSpecifiedValue								
	Leakage Current	initial Specified Value or less								
Shelf Life	Thefollowingspecificationsshallbesatisfiedwhenthecapacitorsarerestoredto20°Cafter exposing them for 1000hours105°C without voltage applied. Before the measurement, the capacitor shall be preconditionedbyapplyingvoltageaccordingtothem4.1ofJISC5101-4.									
	Capacitance Change	Within±30%ofInitialValue								
	Tan δ	300%orlessofInitialSpecifiedValue								
	Leakage Current	Initial Specified Value orless								
Resistance to Soldering Heat	The capacitors shall be kept on the hot plate maintained at 250°C for 30 seconds. After removing from the hot plate and restored at room temperature they meet the characteristics requirements listed at right.					Capacitance Change		Within±10% of Initial Value		
						Tan δ		Initial Specified Value		
						Leakage Current		Initial Specified Value or less		
Standards	JISC5101-4-1(IEC60384)									

Frequency Coefficient of Permissible Ripple Current

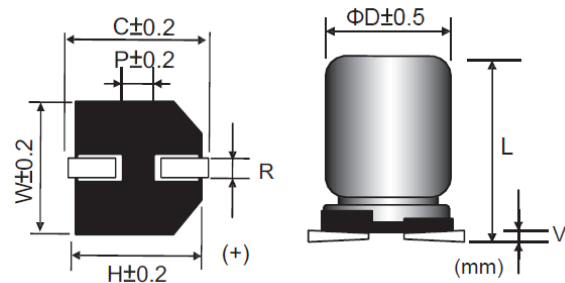
Frequency(Hz)	$120 \leq F < 1K$	$1K \leq F < 10K$	$10K \leq F < 100K$	$100K \leq F$
≤ 33	0.35	0.70	0.90	1.00
33 ~ 150	0.40	0.85	0.92	1.00
> 150	0.60	0.85	0.95	1.00

The endurance of capacitors is reduced with internal heating produced by ripple current at the rate of halving the lifetime with every 5°C rise. When long life performance is required in actual use, the rms ripple current has to be reduced.

SMDL Series

Chip Type

Dimensions (mm)



(mm)

Size	ØD	L±0.5	W	H	C	R	P	Vmax
8×10	8.0	10.0	8.3	8.3	9.0	0.7~1.1	3.2	0.3
10×10	10.0	10.0	10.3	10.3	11.0	0.7~1.3	4.5	0.3
12.5×13.5	12.5	13.5	13.0	13.0	13.7	1.1~1.4	4.5	0.4
16×16.5	16.0	16.5	17.0	17.0	18.0	1.4~1.8	6.4	0.4
18×16.5	18.0	16.5 ^{±1.0}	19.0	19.0	20	1.4~1.8	7.0	0.4
18×12.5	18.0	16.5 ^{±1.0}	19.0	19.0	20	1.4~1.8	7.0	0.4

Standard Ratings

D×L(mm);R.C.(mA rms)at105°C100KHz,IMP(Ωmax)at20°C100KHz.

Cap I V	6.3			10			16			25			35		
(μF) Item	D x l	R.C.	IMP	D x l	R.C.	IMP	D x l	R.C.	IMP	D x l	R.C.	IMP	D x l	R.C.	IMP
100													8x10	600	0.17
150										8x10	600	0.17	8x10	600	0.17
220										8x10	600	0.17	10x10	850	0.09
330				8x10	600	0.17	8x10	600	0.17	8x10	600	0.17			
470	8x10	600	0.17	8x10	600	0.17	8x10	600	0.17	10x10	850	0.09	12.5x13.5	1100	0.06
680	8x10	600	0.17	10x10	850	0.09	10x10	850	0.09	12.5x13.5	1100	0.06	12.5x13.5	1100	0.06
1000	8x10	600	0.17	10x10	850	0.09	10x10	850	0.09	12.5x13.5	1100	0.06	16x16.5	1800	0.035
							12.5x13.5	1100	0.06						
1500	10x10	850	0.09	12.5x13.5	1100	0.06	12.5x13.5	1100	0.06	16x16.5	1800	0.035	16x16.5	1800	0.035
2200	12.5x13.5	1100	0.06	12.5x13.5	1100	0.06				16x16.5	1800	0.035	18x16.5	2060	0.033
2700													18x21.5	2060	0.028
3300							16x16.5	1800	0.035	18x16.5	2060	0.033			
3900										18x21.5	2060	0.028			
4700				16x16.5	1800	0.035	18x16.5	2060	0.033						
5600							18x21.5	2060	0.028						
6800	16x16.5	1800	0.035	18x16.5	2060	0.033									
8200	18x16.5	2060	0.033	18x21.5	2060	0.028									
10000	18x16.5	2060	0.033												
12000	18x21.5	2060	0.028												

Cap V	50			63			80			100		
(μF) Item	D x l	R.C.	IMP	D x l	R.C.	IMP	D x l	R.C.	IMP	D x l	R.C.	IMP
22										8x10	130	1.88
33							8x10	130	1.88	10x10	200	0.65
47				8x10	200	0.70	10x10	200	0.90	12.5x13.5	500	0.32
56	8x10	330	0.34	10x10	369	0.48						
68	8x10	330	0.34							12.5x13.5	500	0.32
100	8x10	330	0.34	2.5x13.5	800	0.16	12.5x13.5	500	0.32	16x16.5	793	0.17
150	10x10	670	0.18	2.5x13.5	800	0.16	12.5x13.5	500	0.32	16x16.5	793	0.17
220				2.5x13.5	800	0.16				18x16.5	917	0.153
330	12.5x13.5	900	0.12	16x16.5	1410	0.082	16x16.5	793	0.17	18x21.5	1230	0.083
470	16x16.5	1610	0.073	16x16.5	1410	0.082	18x16.5	917	0.153			
680	16x16.5	1610	0.073	18x16.5	1690	0.080						
1000	16x16.5	1610	0.073	18x21.5	1960	0.055						
1200	18x16.5	1900	0.068									
1500	18x21.5	2100	0.042									

SMH Series

- 105°C 5000 Hours long life.
- Applicable to SMT process.
- RoHS Compliance.

Specifications

Items	Characteristics							
Capacitance Tolerance	±20%(120Hz, 20°C)							
Operating Temperature Range	-40~+105°C							
Rated Voltage Range	6.3~50VDC							
Capacitance Range	22~1000μF							
Leakage Current	I ≤0.01CVor3(μA), which is greater. (After 2 minutesapplicationofDCratedvoltage,at20°C)							
Dissipation Factor (tan δ)	Measurement Frequency: 120Hz.Temperature:20°C							
	Rated Voltage(V)	6.3	10	16	25	35	50	
	tan δ(Max)	32	28	22	16	13	12	
Low Temperature Stability Impedance Ratio (Max)	Measurement Frequency:120Hz.							
	Rated Voltage(V)	6.3	10	16	25	35	50	
	Z(-25°C) /Z(20°C)	4	3	2	2	2	2	
	Z(-40°C) /Z(20°C)	10	7	5	3	3	3	
Load Life	5000hours, with application 0ofratedvoltageat105°C							
	Capacitance Change	Within±30%ofInitialValue						
	tan δ	300%orlessofInitialSpecifiedValue						
	Leakage Current	Initial Specified Value or less						
Shelf Life	The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing themfor1,000 hours 105°C without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to them 4.1 of JIS C5101-4.							
	Capacitance Change	Within±300%ofInitialValue						
	tan δ	300% or less of Initial Specified Value						
	Leakage Current	Initial Specified Value or less						
Resistance to Soldering Heat	The capacitors shall be kept on the hot plate maintained at 250°C for 30seconds.			Capacitance Change	Within±10% Of Initial Value			
	After removing from the hot plate and restored at room temperature they meet the characteristics requirements listed at right.			tanδ		Initial Specified Value		
				Leakage Current		Initial Specified Value or less		
Standards	JIS C 5101-4-1(IEC60384)							

Frequency Coefficient of Permissible Ripple Current

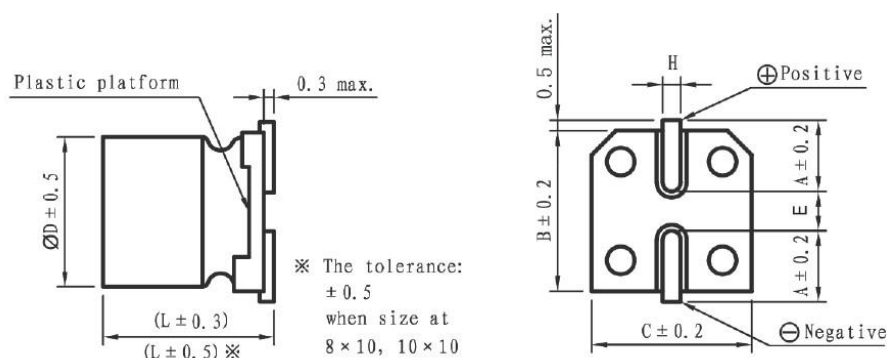
Capacitance (μ F)	Frequency (Hz)			
	100 $\leq$ F < 1K	1K $\leq$ F < 10K	10K $\leq$ F < 100K	100K $\leq$ F
4.7 ~ 33	1.00	1.20	1.30	1.45
>33	1.00	1.10	1.20	1.30

The endurance of capacitors is reduced with internal heating produced by ripple current at the rate of having the lifetime with every 5°C rise. When long life performance is required in actual use, the rms ripple current has to be reduced.

SMH Series

Chip Type

Dimensions (mm)



(mm)

ØD×L	8x10	10x1
A	2.9	3.2
B	8.3	10.3
C	8.3	10.3
E	3.1	4.5
L	10	10
H	0.8~1.1	0.8~1.1

Standard Ratings

D×L(mm); R.C. (mA rms) at 105°C120Hz

Cap(μF)	V	6.3		10		16		25		35		50	
	Item	Dx L	R.C.	D x L	R.C.	D x L	R.C.	D x L	R.C.	D x L	R.C.	D XL	R.C.
22													
33												8x10	80
47										8x10	92	8x10	95
100								8x10	116	10x10	150	10x10	160
220				8x10	140	10x10	216	10x10	240	10x10	280		
330		8x10	160	10x10	240	10x10	300	10x10	375				
470		10x10	260	10x10	280	10x10	320						
1000		10x10	340										

SMJ Series

- Chip type with 6.3Ø~16Ø, 125°C, 2,000 hours, long life product
- Designed For automobile modules and other high temperature applications.
- RoHS Compliance.
- 6.3Ø~16ØV-Chip, 125°C, 2,000

Specifications

Items	Characteristics								
Capacitance Tolerance	± 20% (120Hz, 20°C)								
Operating Temperature Range	-55 ~ +125°C								
Rated Voltage Range	6.3~100VDC								
Capacitance Range	1 ~ 4700μF								
Leakage Current	I ≤ 0.01CV or 3(μA), which is greater. (After 3 minutes application of DC rated voltage, at 20°C)								
Dissipation Factor (tan δ)	Measurement Frequency: 120Hz. Temperature: 20°C								
	Rated Voltage(V)	6.3	10	16	25	35	50	63	100
	tan δ(Max)	0.30	0.24	0.20	0.16	0.14	0.14	0.12	0.10
Low Temperature Stability	Measurement Frequency: 120Hz.								
	Rated Voltage(V)	6.3	10	16	25	35	50	63	100
Impedance Ratio (Max)	Z(-25°C) / Z(20°C)	4	3	2	2	2	2	2	2
	Z(-40°C) / Z(20°C)	8	6	4	3	3	3	3	3
Load Life	6.3V~50V:2,000hours (ΦD =6.3mm1,000hours); 63V~100V:1,500 hours with application of rated voltage at 125°C								
	Capacitance Change			Within ± 30% of Initial Value					
	tan δ			300% or less of Initial Specified Value					
	Leakage Current			Initial Specified Value or less					
Shelf Life	The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours 125°C without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage								
	Capacitance Change			Within ± 30% of Initial Value					
	tan δ			300% or less of Initial Specified Value					
	Leakage Current			Initial Specified Value or less					
Resistance to Soldering Heat	The capacitors shall be kept on the hot plate maintained at 250°C for 30 seconds. After removing from the hot plate and restored at room temperature they meet the characteristics requirements listed at right.				Capacitance Change		Within ±10% of Initial Value		
					tan δ		Initial Specified Value		
					Leakage Current		Initial Specified Value or less		
Standards	Black print on the case top								

Frequency Coefficient of Permissible Ripple Current

Frequency (Hz) \ Capacitance (μF)	100 ≤ F < 1K	1K ≤ F < 10K	10K ≤ F < 100K	100K ≤ F
C ≤ 22	0.50	0.80	0.90	1.00
22 < C ≤ 150	0.65	0.85	0.92	1.00
150 < C	0.70	0.85	0.95	1.00

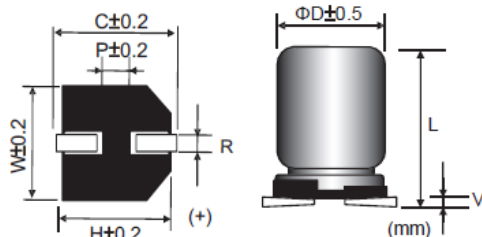
The endurance of capacitors is reduced with internal heating produced by ripple current at the rate of having the lifetime with every 5°C rise. When long life performance is required in actual use, the rms ripple current has to be reduced.



SMJ Series

Chip Type

Dimensions (mm)



Size	ØD	L±0.5	W	H	C	R	P	Vmax
6.3×6	6.3	6.0±0.3	6.6	6.6	7.3	0.5~0.8	2.1	0.3
6.3×7.7	6.3	7.7±0.3	6.6	6.6	7.3	0.5~0.8	2.1	0.3
8×10	8.0	10.0±0.5	8.3	8.3	9.0	0.7~1.1	3.2	0.3
10×10	10.0	10.0±0.5	10.3	10.3	11.0	0.7~1.3	4.5	0.3
12.5×13.5	12.5	13.5±0.5	13.0	13.0	13.7	1.1~1.4	4.5	0.4
16×16.5	16.0	16.5±0.5	17.0	17.0	18.0	1.1~1.8	6.4	0.4

Standard Ratings

D×L(mm): R.C. (mA rms) at 105°C 100KHz, IMP (Ω max) at 20°C 100KHz

Cap(μF)	V Item	6.3			10			16			25		
		D x L	R.C.	IMP	DxL	R.C.	IMP	D x L	R.C.	IMP	D x L	R.C.	IMP
33 47											6.3x6.0	70	1.6
					6.3x6.0	70	1.6	6.3x6	70	1.6	6.3x7.7	110	0.90
100		6.3x6.0	70	1.6	6.3x7.7	110	0.90	8x10	160	0.40	6.3x7.7	110	0.90
											8x10	160	0.40
220		6.3x7.7	110	0.90	6.3x7.7	110	0.90	8x10	160	0.40	8x10	160	0.40
					8x10	160	0.40				10x10	220	0.30
330		8x10	160	0.40	8x10	160	0.40	10x10	220	0.30	10x10	220	0.30
											12.5x13.5	550	0.12
470		8x10	160	0.40	10x10	220	0.30	12.5x13.5	550	0.12	12.5x13.5	550	0.12
680		10x10	220	0.30	12.5x13.5	550	0.12	12.5x13.5	550	0.12	12.5x13.5	550	0.12
1000		12.5x13.5	550	0.12	12.5x13.5	550	0.12	12.5x13.5	550	0.12	16x16.5	900	0.080
1500		12.5x13.5	550	0.12	12.5x13.5	550	0.12	16x16.5	900	0.080	16x16.5	900	0.080
2200		12.5x13.5	550	0.12	16x16.5	900	0.080	16x16.5	900	0.080			
3300		16x16.5	900	0.08	16x16.5	900	0.080						
4700		16x16.5	900	0.08									



Cap (µF)	V	35			50			63			100		
	Item	D x L	R.C.	IMP	D x L	R.C.	IMP	D x L	R.C.	IMP	D x L	R.C.	IMP
1					6.3x6.0	45	3.5						
2.2					6.3x6.0	45	3.5						
3.3					6.3x6.0	45	3.5						
4.7		6.3x6.0	60	2.0	6.3x6.0	45	3.5						
10		6.3x6.0	70	1.6	6.3x6.0	50	2.8						
22		6.3x6.0	70	1.6	6.3x7.7	80	2.0	8x10	100	1.00	8x10	70	1.00
33		6.3x7.7	110	0.90	6.3x7.7	80	2.0	8x10	100	1.00	10x10	115	0.80
					8x10	140	0.70						
47		6.3x7.7	110	0.90	8x10	140	0.70	8x10	100	1	12.5x13.5	350	0.33
		8x10	160	0.40	10x10	240	0.50	10x10	150	0.5			
100		8x10	160	0.40	10x10	240	0.50	10x10	150	0.5	16x16.5	500	0.240
		10x10	220	0.30	12.5x13.5	490	0.23	12.5x13.5	350	0.250			
220		10x10	220	0.30	12.5x13.5	490	0.23	12.5x13.5	350	0.250			
		12.5x13.5	550	0.12				16x16.5	500	0.18			
330		12.5x13.5	550	0.12	12.5x13.5	490	0.23	16x16.5	500	0.18			
					16x16.5	800	0.15						
470.0		12.5x13.5	550	0.12	16x16.5	800	0.15	16x16.5	500	0.18			
		16x16.5	900	0.080									
680.0		16x16.5	900	0.080	16x16.5	800	0.15						
1000.0		16x16.5	900	0.080									

SMK Series

- Chip type with 8Ø~16Ø, 125°C, 2,000 hours, long life product
- Peak acceleration: 30G
- RoHS Compliance.

Specifications

Items	Characteristics								
Capacitance Tolerance	± 20% (120Hz, 20°C)								
Operating Temperature Range	-55 ~ +125°C								
Rated Voltage Range	6.3~100VDC								
Capacitance Range	1 ~ 4700μF								
Leakage Current	I ≤0.01CV or 3(μA) , which is greater. (After 3 minutes application of DC rated voltage, at 20°C)								
Dissipation Factor (tan δ)	Measurement Frequency: 120Hz. Temperature: 20°C								
	Rated Voltage(V)	6.3	10	16	25	35	50	63	100
	tan δ(Max)	0.30	0.24	0.20	0.16	0.14	0.14	0.12	0.10
Low Temperature Stability	Measurement Frequency: 120Hz.								
	Rated Voltage(V)	6.3	10	16	25	35	50	63	100
	Z(-25°C)/Z(20°C)	4	3	2	2	2	2	2	2
Impedance Ratio (Max)	Z(-40°C)/Z(20°C)	8	6	4	3	3	3	3	3
Load Life	6.3V~50V: 2,000hours; 63V~100V: 1,500 hours with application of rated voltage at 125°C								
	Capacitance Change		Within ± 30% of Initial Value						
	tan δ		300% or less of Initial Specified Value						
	Leakage Current		Initial Specified Value or less						
Shelf Life	The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours 125°C without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to them 4.1 of JIS C5101-4.								
	Capacitance Change		Within ± 300% of Initial Value						
	tan δ		300% or less of Initial Specified Value						
	Leakage Current		Initial Specified Value or less						
Resistance to Soldering Heat	The capacitors shall be kept on the hot plate maintained at 250°C for 30 seconds. After removing from the hot plate and restored at room temperature they meet the characteristics requirements listed at right.			Capacitance Change			Within ±10% of Initial Value		
				tan δ			Initial Specified Value		
				Leakage Current			Initial Specified Value or less		
Standards	Black print on the case top								

Frequency Coefficient of Permissible Ripple Current

Frequency (Hz)				
Capacitance (μ F)	100 $\leq$ F <1K	1K $\leq$ F <10K	10K $\leq$ F <100K	100K $\leq$ F
C $\leq$ 22	0.50	0.80	0.90	1.00
22<C $\leq$ 150	0.65	0.85	0.92	1.00
150<C	0.70	0.85	0.95	1.00

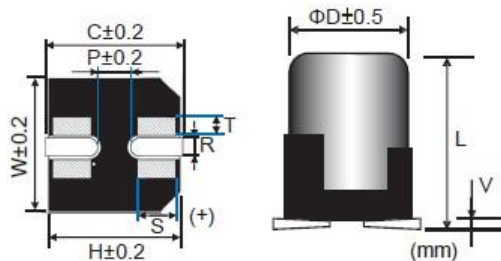
The endurance of capacitors is reduced with internal heating produced by ripple current at the rate of having the lifetime with every 5°C rise. When long life performance is required in actual use, the rms ripple current has to be reduced.



SMK Series

Chip Type

Dimensions (mm)



(mm)

Size	ØD	L	W	H	C	R	P	S	T	Vmax
8×10.5	8.0	10.5±0.5	8.3	8.3	9.0	0.7~1.1	3.2	0.7	1.3	0.3
10×10.5	10.0	10.5±0.5	10.3	10.3	11.0	1.0~1.4	4.5	0.7	1.3	0.3
12.5×13.5	12.5	13.5±1.0	13.5	13.5	14.2	1.1~1.4	4.5	2.2	2.4	0.4
16×16.5	16.0	16.5±1.0	17.0	17.0	18.0	1.4~1.8	6.4	3.0	2.0	0.4

Standard Ratings

D×L(mm): R.C.(mA rms) at 125°C 100KHz, IMP(Ω max) at 20°C 100KHz

Cap(μF)	V	6.3				10			16			25		
	Item	D x L	R.C.	IMP	D x L	R.C.	IMP	D x L	R.C.	IMP	D x L	R.C.	IMP	
100								8x10.5	160	0.40	8x10.5	160	0.40	
220					8x10.5	160	0.40	8x10.5	160	0.40	8x10.5	160	0.40	
330		8x10.5	160	0.40	8x10.5	160	0.40	10x10.5	220	0.30	10x10.5	220	0.30	
470		8x10.5	160	0.40	10x10.5	220	0.30	12.5x13.5	550	0.12	12.5x13.5	550	0.12	
680		10x10.5	220	0.30	12.5x13.5	550	0.12	12.5x13.5	550	0.12	12.5x13.5	550	0.12	
1000		12.5x13.5	550	0.12	12.5x13.5	550	0.12	12.5x13.5	550	0.12	16x16.5	900	0.080	
1500		12.5x13.5	550	0.12	12.5x13.5	550	0.12	16x16.5	900	0.080	16x16.5	900	0.080	
2200		12.5x13.5	550	0.12	16x16.5	900	0.080	16x16.5	900	0.080				
3300		16x16.5	900	0.08	16x16.5	900	0.080							
4700		16x16.5	900	0.08										
Cap(μF)	V	35			50			63			100			
	Item	D x L	R.C.	IMP	D x L	R.C.	IMP	D x L	R.C.	IMP	D x L	R.C.	IMP	
10											8x10.5	70	1.00	
22								8x10.5	100	1.00	8x10.5	70	1.00	
33					8x10.5	140	0.70	8x10.5	100	1.00	10x10.5	115	0.80	
47					8x10.5	140	0.70	8x10.5	100	1.00	12.5x13.5	350	0.33	
100		8x10.5	160	0.40	10x10.5	240	0.50	10x10.5	150	0.50	16x16.5	500	0.24	
		10x10.5	220	0.30	12.5x13.5	490	0.23	12.5x13.5	350	0.25				
220		10x10.5	220	0.30	12.5x13.5	490	0.23	12.5x13.5	350	0.25				
		12.5x13.5	550	0.12				16x16.5	500	0.18				
330		12.5x13.5	550	0.12	12.5x13.5	490	0.23	16x16.5	500	0.18				
					16x16.5	800	0.15							
470.0		12.5x13.5	550	0.12	16x16.5	800	0.15	16x16.5	500	0.18				
		16x16.5	900	0.080										
680.0		16x16.5	900	0.080	16x16.5	800	0.15							
1000.0		16x16.5	900	0.080										

SML Series

- Chip type with 8Ø~16Ø, 125°C, 5,000 hours, long life product
- Designed For automobile modules and other high temperature applications
- RoHS Compliance.

Specifications

Items	Characteristics				
Capacitance Tolerance	± 20% (120Hz, 20°C)				
Operating Temperature Range	-40 ~ +125°C				
Rated Voltage Range	16~50VDC				
Capacitance Range	33 ~ 2200μF				
Leakage Current	I ≤ 0.01CV or 3(μA) , which is greater. (After 2 minutes application of DC rated voltage, at 20°C)				
Dissipation Factor (tan δ)	Measurement Frequency: 120Hz. Temperature: 20°C				
	Rated Voltage(V)	16	25	35	50
	tan δ(Max)	0.20	0.20	0.14	0.14
Low Temperature Stability	Measurement Frequency: 120Hz.				
	Rated Voltage(V)	16	25	35	50
	Z (-25°C)/Z(20°C)	5	2	2	2
Impedance Ratio (Max)	Z (-40°C)/Z (20°C)	8	4	3	3
Load Life	Φ 8~Φ10:2000hours; Φ12.5:3000 hours; Φ16:5000hours with application of rated voltage at 125°C				
	Capacitance Change		Within ± 30% of Initial Value		
	tan δ		300% or less of Initial Specified Value		
	Leakage Current		Initial Specified Value or less		
Shelf Life	The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours 125°C without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to them 4.1 of JIS C5101-4.				
	Capacitance Change		Within ± 300% of Initial Value		
	tan δ		300% or less of Initial Specified Value		
	Leakage Current		Initial Specified Value or less		
Resistance to Soldering Heat	The capacitors shall be kept on the hot plate maintained at 250°C for 30 seconds. After removing from the hot plate and restored at room temperature they meet the characteristics requirements listed at right.		Capacitance Change		Within ±10% of Initial Value
			tan δ		Initial Specified Value
			Leakage Current		Initial Specified Value or less
Standards	Black print on the case top				

Frequency Coefficient of Permissible Ripple Current

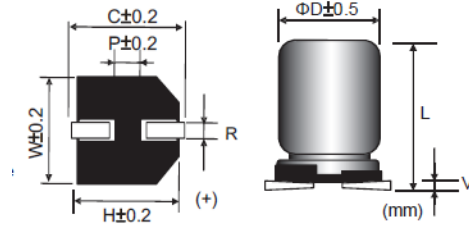
Frequency(Hz)	100 $\leq$ F <1K	1K $\leq$ F <10K	10K $\leq$ F <100K	100K $\leq$ F
Capacitance (μ F)				
All Series	0.60	0.85	0.93	1.00

The endurance of capacitors is reduced with internal heating produced by ripple current at the rate of having the lifetime with every 5°C rise. When long life performance is required in actual use, the rms ripple current has to be reduced.

SML Series

Chip Type

Dimensions (mm)



(mm)

Size	ØD	L	W	H	C	R	P	Vmax
6.3×6.0	6.3	6.0±0.3	6.6	6.6	7.2	0.5~0.8	2.1	0.3
6.3×7.7	6.3	7.7±0.3	6.6	6.6	7.2	0.5~0.8	2.1	0.3
8×10	8.0	10±0.5	8.3	8.3	9.0	0.7~1.1	3.2	0.3
10×10	10.0	10±0.5	10.3	10.3	11.0	0.7~1.1	4.5	0.3
12.5×13.5	12.5	13.5±0.5	13.0	13.0	13.7	1.1~1.4	4.5	0.4
16><16.5	16.0	16.5±0.5	17.0	17.0	18.0	1.4~1.8	6.4	0.4
18><16.5	18.0	16.5±1.0	19.0	19.0	20.0	1.4~1.8	7.0	0.4
18×21.5	18.0	21.5±1.0	19.0	19.0	20.0	1.4~1.8	7.0	0.4

Standard Ratings

D X L(MM); R.C. (mA rms) at 105°C 100KHz, IMP (O max) at 20°C 100KHz

Cap(µF)	V	16.0			25			35			50		
	Item	D x L	R.C.	IMP	D x L	R.C.	IMP	D x	R.C.	IMP	D x L	R.C.	IMP
10											6.3x6.0	70	2.00
22								6.3x6.0	110	1.60			
33					6.3x6.0	110	1.60	6.3x6.0	110	1.60			
								6.3x7.7	200	0.45			
47	6.3x6.0		110	1.60				6.3x7.7	200	0.45	8x10	250	0.45
100	6.3x7.7		200	0.45	6.3x7.7	200	0.45	8x10	300	0.18	10x10	350	0.30
160								8x10	300	0.18			
220					8x10	300	0.18	10x10	500	0.11	12.5x13.5	700	0.15
270					8x10	300	0.18						
300								10x10	500	0.11			
330	8x10		300	0.18	10x10	500	0.11	12.5x13.5	1200	0.08			
390	8x10		300	0.18									
470	10x10		500	0.11	10x10	500	0.11	12.5x13.5	1200	0.08	16x16.5	1000	0.09
620								12.5x13.5	1200	0.08			
680	10x10		500	0.11	12.5x13.5	1200	0.08	16x16.5	1800	0.05	18x16.5	1200	0.07
910					12.5x13.5	1200	0.08						
1000	12.5x13.5		1200	0.08	16x16.5	1800	0.05	16x16.5	1800	0.05	18x21.5	1650	0.05
1500	12.5x13.5		1200	0.08	16x16.5	1800	0.05	18x16.5	2000	0.045			
2200	16x16.5		1800	0.05	18x21.5	2000	0.045	18x21.5	2200	0.04			
3300	18x16.5		2000	0.045	18x21.5	2200	0.04						
3900	18x21.5		2200	0.04									

SMM Series

- Chip type with 8Ø~16Ø, 125°C, 5,000 hours, long life product
- Designed For automobile modules and other high temperature applications
- Peak acceleration: 30G
- RoHS Compliance.

Specifications

Items	Characteristics				
Capacitance Tolerance	± 20% (120Hz, 20°C)				
Operating Temperature Range	-40 ~ +125°C				
Rated Voltage Range	16~50VDC				
Capacitance Range	33 ~ 2200μF				
Leakage Current	I ≤ 0.01CV or 3(μA) , which is greater. (After 2 minutes application of DC rated voltage, at 20°C)				
Dissipation Factor (tan δ)	Measurement Frequency: 120Hz. Temperature: 20°C				
	Rated Voltage(V)	16	25	35	50
	tan δ(Max)	0.20	0.20	0.14	0.14
Low Temperature Stability	Measurement Frequency: 120Hz.				
	Rated Voltage(V)	16	25	35	50
Impedance Ratio (Max)	Z(-25°C)Z(20°C)	5	2	2	2
	Z(-40°C)Z(20°C)	8	4	3	3
Load Life	Φ 8~Φ10:2000hours; Φ12.5:3000 hours; Φ16:5000hours with application of rated voltage at 125°C				
	Capacitance Change		Within ± 30% of Initial Value		
	tan δ		300% or less of Initial Specified Value		
	Leakage Current		Initial Specified Value or less		
Shelf Life	The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours 125°C without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to them 4.1 of JIS C5101-4.				
	Capacitance Change		Within ± 300% of Initial Value		
	tan δ		300% or less of Initial Specified Value		
	Leakage Current		Initial Specified Value or less		
Resistance to Soldering Heat	The capacitors shall be kept on the hot plate maintained at 250°C for 30 seconds. After removing from the hot plate and restored at room temperature they meet the characteristics requirements listed at right.		Capacitance Change		Within ±10% of Initial Value
			tan δ		Initial Specified Value
			Leakage Current		Initial Specified Value or less
Standards	Black print on the case top				

Frequency Coefficient of Permissible Ripple Current

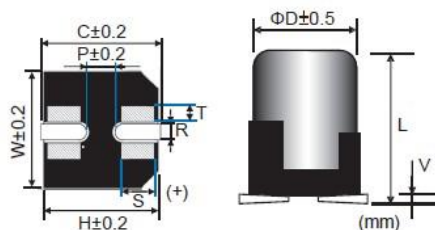
Frequency (Hz)	100 $\leq$ F <1K	1K $\leq$ F <10K	10K $\leq$ F <100K	100K $\leq$ F
Capacitance (μ F)				
All series	0.60	0.85	0.93	1.00

The endurance of capacitors is reduced with internal heating produced by ripple current at the rate of having the lifetime with every 5°C rise. When long life performance is required in actual use, the rms ripple current has to be reduced.

SMM Series

Chip Type

Dimensions (mm)



(mm)

Size	ØD	L	W	H	C	R	P	S	T	Vmax
8×10.5	8.0	10.5±0.5	8.3	8.3	9.0	1.0~1.4	3.2	0.7	1.3	0.3
10×10.5	10.0	10.5±0.5	10.3	10.3	11.0	1.0~1.4	4.5	0.7	1.3	0.3
12.5×13.5	12.5	13.5±1.0	13.5	13.5	14.2	1.0~1.4	4.5	2.2	2.4	0.4
16×16.5	16.0	16.5±1.0	17.0	17.0	18.0	1.4~1.8	6.4	3.0	2.0	0.4

Standard Ratings

D×L(mm) ; R.C.(mA rms) at 125°C 100KHz, IMP(Ω max) at 20°C 100KHz

Cap (μF)	V	16.0			25			35			50		
	Item	D x L	R.C.	IMP	D x L	R.C.	IMP	D x L	R.C.	IMP	D x L	R.C.	IMP
47								8x10.5			250	0.5	
100								8x10.5	300	0.18	10x10.5	350	0.30
160								8x10.5	300	0.18			
220					8x10.5	300	0.18	10x10.5	500	0.11	12.5x13.5	700	0.15
270					8x10.5	300	0.18						
300								10x10.5	500	0.11			
330		8x10.5	300	0.18	10x10.5	500	0.11	12.5x13.5	1200	0.08			
390		8x10.5	300	0.18									
470		10x10.5	500	0.11	10x10.5	500	0.11	12.5x13.5	1200	0.08	16x16.5	1000	0.09
620								12.5x13.5	1200	0.08			
680		10x10.5	500	0.11	12.5x13.5	1200	0.08	16x16.5	1800	0.05			
910					12.5x13.5	1200	0.08						
1000		12.5x13.5	1200	0.08	16x16.5	1800	0.05						
1500		12.5x13.5	1200	0.08	16x16.5	1800	0.05						
2200		16x16.5	1800	0.05									

SMN Series

- Low impedance, 125°C 3000 hours Long Life
- Applicable to SMT process.
- RoHS Compliance.

Specifications

Items	Characteristics				
Capacitance Tolerance	±20% (120Hz, 20°C)				
Operating Temperature Range	-40 ~+125°C				
Rated Voltage Range	16~50VDC				
Capacitance Range	33 ~ 330μF				
Leakage Current	I ≤ 0.01CV or 3(μA) , which is greater. (After 2 minutes application of DC rated voltage, at 20°C)				
Dissipation Factor (tan δ)	Measurement Frequency: 120Hz. Temperature: 20°C				
	Rated Voltage(V)	16	25	35	50
	tan δ(Max)	0.23	0.18	0.16	0.14
Low Temperature Stability	Measurement Frequency: 120Hz.				
	Rated Voltage(V)	16	25	35	50
	Z (-25°C) /Z(20°C)	3	3	2	2
Impedance Ratio (Max)	Z (-40°C) /Z(20°C)	4	4	3	3
Load Life	3000 hours, with application of rated voltage at 125°C				
	Capacitance Change		Within ± 30% of Initial Value		
	tan δ		300% or less of Initial Specified Value		
	Leakage Current		Initial Specified Value or less		
Shelf Life	The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours 105°C without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to them 4.1 of JIS C5101-4.				
	Capacitance Change		Within ± 30% of Initial Value		
	tan δ		300% or less of Initial Specified Value		
	Leakage Current		Initial Specified Value or less		
Resistance to Soldering Heat	The capacitors shall be kept on the hot plate maintained at 250°C for 30 seconds. After removing from the hot plate and restored at room temperature they meet the characteristics requirements listed at right.		Capacitance Change		Within ±10% of Initial Value
			tan δ		Initial Specified Value
			Leakage Current		Initial Specified Value or less
Standards	JIS C 5101-4-1 (IEC 60384)				

Frequency Coefficient of Permissible Ripple Current

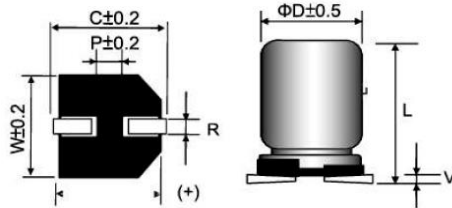
Frequency (Hz)	120 ≤ F < 1K	1K ≤ F < 10K	10K ≤ F < 100K	100K ≤ F
Capacitance (μF)				
33~330	0.4	0.75	0.9	1.00

The endurance of capacitors is reduced with internal heating produced by ripple current at the rate of having the lifetime with every 5°C rise. When long life performance is required in actual use, the rms ripple current has to be reduced.

SMN Series

Chip Type

Dimensions (mm)



(mm)

Size	ØD	L	W	H	C	R	P	Vmax
6.3x6	6.3	6.0±0.3	6.6	6.6	7.2	0.5~0.8	2.1	0.3
6.3x7.7	6.3	7.7±0.3	6.6	6.6	7.2	0.5~0.8	2.1	0.3
8x10	8.0	10.0±0.5	8.3	8.3	9.0	0.7~1.1	3.2	0.3
10x10	10.0	10.0±0.5	10.3	10.3	11.0	0.7~1.1	4.5	0.3
12.5x13.5	12.5	13.5±0.5	13.0	13.0	13.7	1.1~1.4	4.5	0.3
12.5x16	12.5	16.5±0.5	17.0	17.0	18.0	1.4~1.8	6.4	0.4

Standard Ratings

DxL(mm); R.C. (mA rms) at 125°C 100KHz, ESR(Ω max)

Cap (μF)	V	16				25				35				50			
	Item	D x L	ESR		R.C.	D x L	ESR		R.C.	D x L	ESR		R.C.	D x L	ESR		R.C.
			20°C	-40°C			20°C	-40°C			20°C	-40°C			20°C	-40°C	
33	6.3x6	70	1.0	15	6.3x6	70	1.0	15						8x10	250	0.36	4.5
														8x10	250	0.36	4.5
47										8x10	300	0.30	4.5	10x10	350	0.25	3
	6.3x7.7	200	0.70	10	6.3x7.7	200	0.70	10		8x10	300	0.30	4.5	10x10	350	0.25	3
100	8x10	300	0.30	4.5	8x10	300	0.30	4.5		10x10	500	0.20	3				
	8x10	300	0.30	4.5	8x10	300	0.30	4.5		10x10	500	0.20	3				
220	10x10	500	0.20	3	10x10	500	0.20	3									
330	10x10	500	0.20	3	10x10	500	0.20	3									
680										12.5x16	1470	0.056	2				

SMO Series

- Low impedance, 105°C 7000~10000 hours Long life.
- Applicable to SMT process.
- RoHS Compliance.

Specifications

Items	Characteristics						
Capacitance Tolerance	±20 % (120 Hz, 20°C)						
Operating Temperature Range	-25°C ~ +105°C						
Rated Voltage Range	6.3- 50VDC						
Capacitance Range	10 ~ 1000μF						
Leakage Current	I ≤ 0.01CV or 3 (μA), which is greater. (After 2 minutes application of DC rated voltage, at 20°C)						
Dissipation Factor (tan δ)	Measurement Frequency:120Hz. Temperature: 20°C						
	Rated Voltage(V)	6.3	10	16	25	35	50
	tan δ (Max)	0.32	0.28	0.26	0.16	0.14	0.14
Low Temperature Stability	Measurement Frequency: 120Hz.						
	Rated Voltage(V)	6.3	10	16	25	35	50
Impedance Ratio (Max)	Z (-25°C)/ Z (20°C)	4	3	2	2	2	2
Load Life	∅ ≤ 6.3: 7000 hours, ∅ ≥ 8: 10000 with application of rated voltage at 105°C						
	Capacitance Change	within ±30 % of Initial Value					
	Tan δ	300% or less of Initial Specified Value					
	Leakage Current	Initial Specified Value or less					
Shelf Life	The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1000hours 105°C without voltage applied. Before the measurement. The Capacitance shall be preconditioned by applying voltage according to them 4.1 of JIS C5101-4.						
	Capacitance Change	within ±30 % of Initial Value					
	tan δ	300% or less of Initial Specified Value					
	Leakage Current	Initial Specified Value or less					
Resistance to Soldering Heat	The capacitors shall be kept on the hot plate maintained at 250°C for 30 seconds. After removing from the hot plate and restored at room temperature they meet the characteristics requirements listed at right.			Capacitance Change	Within ±10 of Initial Value		
				tan δ	Initial Specified Value		
				Leakage Current	Initial Specified Value or less		
Standards	JIS C 5101-4-1 (IEC 60384)						

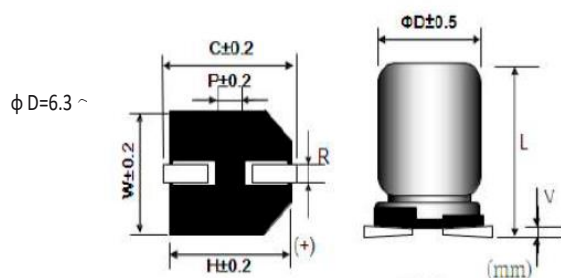
Frequency Coefficient of permissible Ripple Current

Frequency (Hz)	120 $\leq$ F < 1K	1K $\leq$ F < 10K	10K $\leq$ F < 100K	100K $\leq$ F
Capacitance (μ F)				
C $\leq$ 22	0.50	0.80	0.90	1.00
22 < C $\leq$ 150	0.65	0.85	0.92	1.00
C > 150	0.70	0.85	0.95	1.00

The endurance of capacitors is reduced with internal heating produced by ripple current at the rate of halving the lifetime with every 5°C rise. When long life performance is required in actual use. The rms ripple current has to be reduced.

DIMENSIONS

CHIP TYPE



(Unit: mm)

Size	ØD	L	W	H	C	R	P	Vmax
4×7	4.0	7.0±0.3	4.3	4.3	5.1	0.5~0.8	1.0	0.3
5×7	5.0	7.0±0.3	5.3	5.3	5.9	0.5~0.8	1.4	0.3
6.3×7	6.3	7.0±0.3	6.6	6.6	7.2	0.5~0.8	2.1	0.3
6.3×8.4	6.3	8.4±0.3	6.6	6.6	7.2	0.5~0.8	2.1	0.3
8×10	8.0	10±0.5	8.3	8.3	9.0	0.7~1.1	3.2	0.3
10×10	10.0	10±0.5	10.3	10.3	11.0	0.7~1.3	4.5	0.3

STANDARD RATINGS

D×L(mm) ; R.C.(mA rms) at 105°C 100KHz, IMP(Ω max) at 20°C 100KHz.

Cap (μF)	V	6.3			10			16			25			35			50		
		D x L	R.C.	IMP	DxL	R.C.	IMP	D x L	R.C.	IMP	DxL	R.C.	IMP	D x L	R.C.	IMP	D x L	R.C.	IMP
10								4x7.0	27	4.00				5x7.0	95	2.20			
								5x7.0	95	2.20	5x7.0	95	2.20	5x7.0	95	2.20	6.3x8.4	100	1.80
22											6.3x7.0	140	1.10	6.3x8.4	230	1.00	8x10	350	0.53
33					5x7.0	95	2.20	6.3x7.0	140	1.10	6.3x7.0	140	1.10	6.3x8.4	230	1.00	8x10	350	0.53
47	5x7.0	95	2.20					6.3x7.0	140	1.10	6.3x8.4	230	1.00	8x10	600	0.22	10x10	670	0.35
100	6.3x7.0	140	1.10					6.3x8.4	230	1.00	8x10	600	0.22						
150					6.3x7.0	140	1.10	6.3x8.4	230	1.00	8x10	600	0.22	10x10	850	0.16			
220	6.3x8.4	230	1.00					8x10	600	0.220	10x10	850	0.16	10x10	850	0.16			
330	6.3x8.4	230	1.00					10x10	850	0.160									
470	8x10	600	0.22																
1000	10x10	850	0.16																

SMP Series

- Low impedance, 105°C 2000 hours High CV.
- Applicable to SMT process.
- RoHS Compliance.

Specifications

Items	Characteristics						
Capacitance Tolerance	±20 % (120 Hz, 20°C)						
Operating Temperature Range	-55°C ~ +105°C						
Rated Voltage Range	6.3- 50VDC						
Capacitance Range	10 ~ 2200μF						
Leakage Current	I ≤ 0.01CV or 3 (μA), which is greater. (After 2 minutes application of DC rated voltage, at 20°C)						
Dissipation Factor(tan δ)	Measurement Frequency:120Hz. Temperature: 20°C						
	Rated Voltage(V)	6.3	10	16	25	35	50
	tan δ (Max)	0.26	0.19	0.16	0.14	0.12	0.10
Low Temperature Stability	Measurement Frequency: 120Hz.						
	Rated Voltage(V)	6.3	10	16	25	35	50
	Z (-25°C)/ Z (20°C)	4	3	2	2	2	2
Impedance Ratio (Max)	Z (-40°C)/ Z (20°C)	8	5	4	3	3	3
Load Life	2000 hours, with application of rated voltage at 105°C						
	Capacitance Change	within ±30 % of Initial Value					
	tan δ	200% or less of Initial Specified Value					
	Leakage Current	Initial Specified Value or less					
Shelf Life	The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1000hours 105°C without voltage applied. Before the measurement. The Capacitance shall be preconditioned by applying voltage according to them 4.1 of JIS C5101-4.						
	Capacitance Change	Within ±30 % of Initial Value					
	tan δ	200% or less of Initial Specified Value					
	Leakage Current	Initial Specified Value or less					
Resistance to Soldering Heat	The capacitors shall be kept on the hot plate maintained at 250°C for 30 seconds. After removing from the hot plate and restored at room temperature they meet the characteristics requirements listed at right.			Capacitance Change	Within ±10 of Initial Value		
				tan δ	Initial Specified Value		
				Leakage Current	Initial Specified Value or less		
Standards	JIS C 5101-4-1 (IEC 60384)						

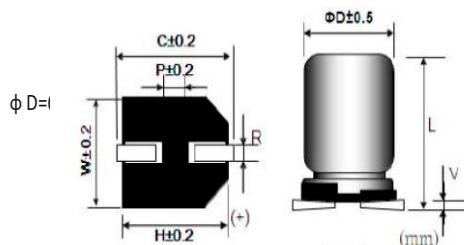
Frequency Coefficient of permissible Ripple Current

Frequency (Hz) Capacitance (μ F)	120 $\leq$ F < 1K	1K $\leq$ F < 10K	10K $\leq$ F < 100K	100K $\leq$ F
≤ 470	0.65	0.85	0.95	1.00
>470	0.70	0.90	0.95	1.00

The endurance of capacitors is reduced with internal heating produced by ripple current at the rate of halving the lifetime with every 5°C rise. When long life performance is required in actual use. The rms ripple current has to be reduced.

DIMENSIONS

CHIP TYPE



(Unit: mm)

Size	φD	L	W	H	C	R	P	Vmax
4x6.0	4.0	6.0±0.3	4.3	4.3	5.1	0.5~0.8	1.0	0.3
5x6.0	5.0	6.0±0.3	5.3	5.3	5.9	0.5~0.8	1.4	0.3
6.3x6.0	6.3	6.0±0.3	6.6	6.6	7.2	0.5~0.8	2.1	0.3
6.3x7.7	6.3	7.7±0.3	6.6	6.6	7.2	0.5~0.8	2.1	0.3
8x10	8.0	10±0.5	8.3	8.3	9.0	0.7~1.1	3.2	0.3
10x10	10.0	10±0.5	10.3	10.3	11.0	0.7~1.3	4.5	0.3

STANDARD RATINGS

D×L(mm); R.C.(mA rms) at 105°C 100KHz, IMP(Ω max) at 20°C 100KHz.

Cap (μF)	V	6.3			10			16			25			35			50		
		DxL	R.C.	IMP	D x L	R.C.	IMP	DxL	R.C.	IMP	DxL	R.C.	IMP	DxL	R.C.	IMP	DxL	R.C.	IMP
10																	4x6.0	85	2.50
																	5x6.0	165	0.90
22											4x6.0	160	0.95	4x6.0	160	0.95	5x6.0	165	0.90
33											4x6.0	160	0.95	5x6.0	240	0.40			
47								4x6.0	160	0.95	5x6.0	240	0.40	5x6.0	240	0.40	6.3x6.0	195	0.70
68					4x6.0	160	0.95	5x6.0	240	0.40	5x6.0	240	0.40	6.3x6.0	300	0.30			
100	4x6.0	160	0.95					5x6.0	240	0.40	6.3x6.0	300	0.30	6.3x6.0	300	0.30	6.3x7.7	350	0.40
150					5x6.0	240	0.40	6.3x6.0	300	0.30	6.3x7.7	600	0.20	6.3x7.7	600	0.20			
220	5x6.0	240	0.40	6.3x6.0	300	0.30	6.3x6.0	300	0.30	6.3x7.7	600	0.20					8x10	670	0.18
330	6.3x6.0	300	0.30	6.3x7.7	600	0.20	6.3x7.7	600	0.20					8x10	850	0.09	10x10	900	0.12
470	6.3x7.7	600	0.20	6.3x7.7	600	0.20					8x10	850	0.09						
560														10x10	1190	0.08			
680	6.3x7.7	600	0.20					8x10	850	0.09									
820											10x10	1190	0.08						
1000					8x10	850	0.09	10x10	1190	0.07									
1500	8x10	850	0.09	10x10	1190	0.08													
2200	10x10	1190	0.08																

SMQ Series

- 135°C 2000 hours Long life.
- Applicable to SMT process.
- RoHS Compliance.

Specifications

Items	Characteristics					
Capacitance Tolerance	±20 %(120 Hz, 20℃)					
Operating Temperature Range	-40℃ ~ +135℃					
Rated Voltage Range	10 - 63VDC					
Capacitance Range	33 ~ 2200μF					
Leakage Current	10~63WV 8~10φ $\leq$ 0.01CV or 3 (μA), 12.5~16φ $\leq$ 0.03CV or 4 (μA), which is greater.					
Dissipation Factor(tan δ)	Measurement Frequency:120Hz. Temperature: 20℃					
	Rated Voltage(V)	10	16	25	35~50	63
	tan δ (Max)	0.24	0.22	0.20	0.16	0.14
Low Temperature Stability	Measurement Frequency: 120Hz.					
	Rated Voltage(V)	10	16	25	35~63	
Impedance Ratio (Max)	Z(-25℃)/ Z(20℃)	4	3	2	2	
	Z(-40℃)/ Z(20℃)	8	6	4	3	
Load Life	2000hours, with application of rated voltage at 135℃					
	Capacitance Change	within ±30 % of Initial Value				
	Tan δ	300% or less of Initial Specified Value				
	Leakage Current	Initial Specified Value or less				
Shelf Life	The following specifications shall be satisfied when the capacitors are restored to 20℃ after exposing them for 1000hours 135℃ without voltage applied. Before the measurement. The Capacitance shall be preconditioned by applying voltage according to them 4.1 of JIS C5101-4.					
	Capacitance Change	within ±30 % of Initial Value				
	Tan δ	300% or less of Initial Specified Value				
	Leakage Current	Initial Specified Value or less				
Resistance to Soldering Heat	The capacitors shall be kept on the hot plate maintained at 250℃ for 30 seconds. After removing from the hot plate and restored at room temperature they meet the characteristics requirements listed at right.			Capacitance Change	Within ±10%of Initial Value	
				tan δ	Initial Specified Value	
				Leakage Current	Initial Specified Value or less	
Standards	JIS C 5101-4-1 (IEC 60384)					

Frequency Coefficient of permissible Ripple Current

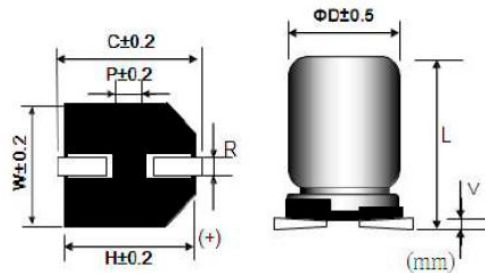
Frequency (Hz)	100 $\leq$ F < 1K	1K $\leq$ F < 10K	10K $\leq$ F < 100K	100K $\leq$ F
Capacitance (μ F)				
1~33	0.55	0.83	0.93	1.00
>33	0.60	0.86	0.93	1.00

The endurance of capacitors is reduced with internal heating produced by ripple current at the rate of halving the lifetime with every 5°C rise. When long life performance is required in actual use. The rms ripple current has to be reduced.

SMQ Series

DIMENSIONS

CHIP TYPE



(Unit: mm)

Size	ØD	L±0.5	W	H	C	R	P	Vmax
8x10	8.0	10.0	8.3	8.3	9.0	0.7~1.1	3.2	0.3
10x10	10.0	10.0	10.3	10.3	11.0	0.7~1.3	4.5	0.3
12.5x13.5	12.5	13.5	13.0	13.0	13.7	1.1~1.4	4.5	0.4
16x16.5	16.0	16.5	17.0	17.0	18.0	1.4~1.8	6.4	0.4
16x21.5	16.0	21.5	17.0	17.0	18.0	1.4~1.8	6.4	0.4
15x16.5	18.0	16.5±1.0	19.0	19.0	20.0	1.4~1.8	6.4	0.4
18x21.5	18.0	21.5±1.0	19.0	19.0	20.0	1.4~1.8	6.4	0.4

STANDARD RATINGS

DxL(mm) ; R.C.(mA rms) at 135°C 100KHz, IMP(Ω max) at 20°C 100KHz.

Cap(μF) V	10		16		25		35		50		63	
Item	D x L	R.C.	DxL	R.C.	DxL	R.C.	DxL	R.C.	D x L	R.C.	D x L	R.C.
33											8x10	100
47									8x10	160	10x10	120
100			8x10	220	8x10	220	8x10	200	10x10	240	10x10	270
220	8x10	220	8x10	220	10x10	216	10x10	300	12.5x13.5	550		
330	8x10	220	10x10	300	10x10	300	12.5x13.5	750				
	10x10	300										
470	10x10	300	10x10	280	12.5x13.5	750			16x16.5	850	16x16.5	820
680			12.5x13.5	280			16x16.5	1000	15x16.5	1200		
1000	12.5x13.5	750			16x16.5	1000	16x16.5	1000	16x21.5	1600		
1500	12.5x13.5	750	16x16.5	1000	16x16.5	1000	16x21.5	1900				
2200	16x16.5	1000			15x16.5	1400	16x21.5	2200				
2700	16x16.5	1000			16x21.5	1900						
3300					15x21.5	2200						

STA Series

- 85°C 3000hours, Screw terminal type.
- High ripple current resistance.
- Suitable for industrial machinery, power converter, communication sets and test equipment.
- RoHS Compliant & Halogen Free

Specifications

Items	Characteristics											
Capacitance Tolerance	± 20% (120Hz, 20°C)											
Operating Temperature Range	-40 ~ +85°C					-25 ~ +85°C						
Rated Voltage Range	16 ~					350 ~ 500VDC						
Rated Capacitance Range	220 ~ 1,000,000μF											
Leakage Current	I ≤ 0.02CV (μA) or 5mA, which is greater. (After 5 minutes application of DC rated voltage, at 20°C)											
Dissipation Factor	Measurement Frequency: 120Hz. Temperature: 20°C											
	Rated Voltage (V)		16	25	35	50	63	80	100	160~250	350~450	600
	tan δ (Max)	35∅	0.7	0.45	0.40	0.30	0.25	0.25	0.20	0.20	0.25	0.25
		51∅	0.9	0.60	0.60	0.45	0.35	0.30	0.20	0.20	0.25	0.25
		64∅	1.3	0.90	0.80	0.50	0.40	0.35	0.25	0.20	0.25	0.25
		76∅	2.0	1.20	0.90	0.70	0.50	0.40	0.35	0.25	0.25	0.25
		90∅	-	-	-	-	-	-	-	0.25	0.25	0.25
Low Temperature Stability	Measurement Frequency: 120Hz.											
	Rated Voltage(V)		16 ~ 250					350 ~ 500				
	Z(-25°C) / Z(20°C)		-					8				
	Z(-40°C) / Z(20°C)		12					-				
Load Life	3,000 hours, with application of rated voltage at 85°C											
	Capacitance Change		Within ± 15% of Initial Value									
	tan δ		175% or less of Initial Specified Value									
	Leakage Current		Initial Specified Value or less									
Shelf Life	The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours 85°C without voltage applied. Before the measurement the capacitor shall be preconditioned by applying voltage according to them 4.1 of JIS C5101-4.											
	Capacitance Change		Within ± 15% of Initial Value									
	tan δ		175% or less of Initial Specified Value									
	Leakage Current		Initial Specified Value or less									
Standards	JIS C-5101-4(IEC 60384)											

Frequency Coefficient of Permissible Ripple Current

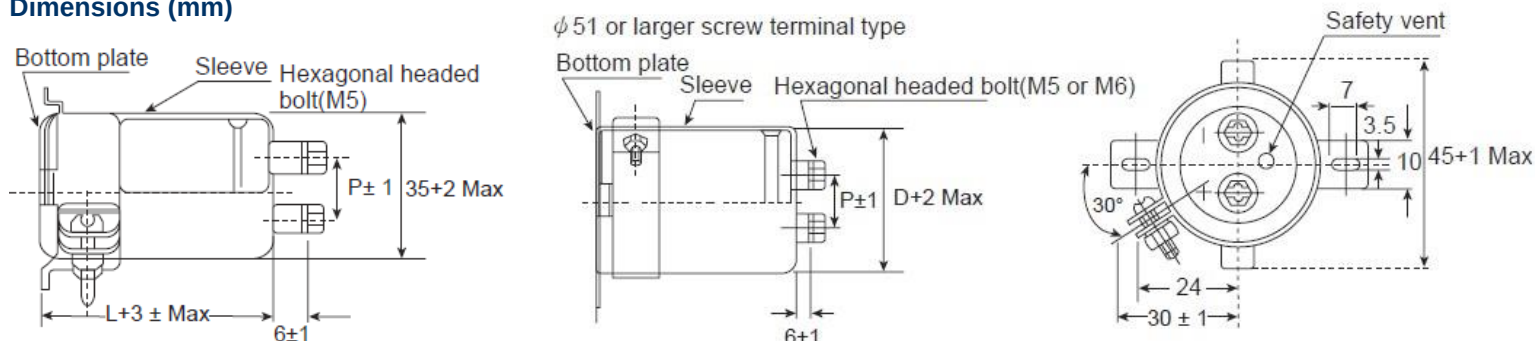
Rated Voltage (V)	Frequency (Hz)			
	50	120	1K	$\geq 10K$
16 ~ 100	0.90	1.00	1.15	1.15
160 ~ 250	0.88	1.00	1.15	1.20
350 ~ 500	0.82	1.00	1.30	1.40

The endurance of capacitors is reduced with internal heating produced by ripple current at the rate of halving the lifetime with every 5°C rise. When long life performance is required in actual use, the RMS ripple current has to be reduced.



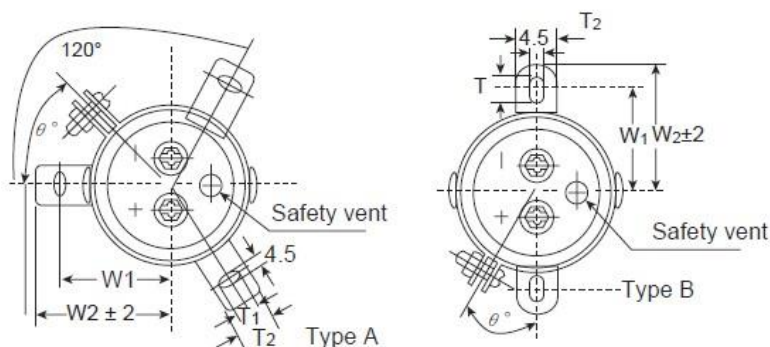
STA Series

Dimensions (mm)



Terminal Pitch (W) & LENGTH (e) TABLE

ϕD	W
35	12.7
51	22.0
64	28.6
76	31.8
90	31.8



Dimensions of Mounting Bracket (mm)

Cap (μF)	Leg Shape	3-Legs				2-Legs			
	ϕD	$\phi 51$	$\phi 64$	$\phi 76$	$\phi 90$	$\phi 51$	$\phi 64$	$\phi 76$	$\phi 90$
	W_1	32.5	38	44.5	50.8	33.2	40.5	46.5	53
	W_2	38	43	49.2	57	39.5	46.5	53	59
	T_1	7	8	7	7	6	6	6	6
	T_2	12	14	16	16	14	14	14	14
	θ°	60	60	60	60	30	30	30	30

Standard Ratings

D×L(mm);R.C.(A rms) at 85°C 120Hz.

Cap (μF)	V	16		25		35		50		63	
	Item	D x L	R.C.	D x L	R.C.	D x L	R.C.	D x L	R.C.	D x L	R.C.
10000										35x80	4.0
15000								35x80	5.4	35x100	5.5
22000								35x100	6.0	35x120	7.0
33000				35x80	6.0	35x80	6.2	51x80	7.0	51x80	8.8
47000		35x80	6.4	35x100	8.2	35x120	8.2	51x100	8.6	51x120	11.7
68000		35x100	7.9	35x120	9.4	51x80	9.3	51x100	11.0	64x100	15.0
100000		35x120	10.6	51x100	12.0	51x120	13.6	64x100	14.2	64x140	20.8
150000		51x120	11.5	51x120	15.3	64x120	16.5	76x120	18.6	76x140	26.0
220000		51x120	15.6	64x120	18.9	76x100	20.1				
330000		64x120	25.0	76x120	23.2	76x150	24.8				
470000		76x120	30.5								
500000		76x160	32.0								

STA Series

Standard Ratings

D×L(mm);R.C.(A rms) at 85°C 120Hz.

Cap (μF)	V	80		100		160		200		250	
	Item	D × L	R.C.	D × L	R.C.	D × L	R.C.	D × L	R.C.	D × L	R.C.
1000										35x80	2.4
1500								35x80	2.9	35x100	3.0
2200						35x80	3.2	35x100	3.5	51x80	4.0
3300						35x120	4.7	51x80	4.8	51x100	5.4
4700				35x80	3.7	51x80	5.0	51x100	6.3	64x100	7.3
6800				35x100	4.5	51x100	6.4	51x140	7.3	64x120	8.9
10000	35x80	4.2	35x120	5.3	64x100	9.0	64x120	9.8	76x120	11.8	
15000	35x120	6.0	51x80	6.0	76x100	12.0	76x120	13.0	90x150	16.4	
22000	51x80	6.5	51x100	6.8	76x140	16.9	90x150	15.9			
33000	51x120	9.2	51x140	10.0	90x150	19.2					
47000	64x120	12.7	64x140	14.1							
68000	64x140	15.5	76x150	18.2							
100000	76x150	21.3									

Cap (μF)	V	350		400		450		500	
	Item	D × L	R.C.	D × L	R.C.	D × L	R.C.	D × L	R.C.
470				35x80	2.0	35x80	2.0	51x75	2.2
680	35x80	2.5	35x100	2.6	35x120	2.9	51x100	3.1	
1000	51x60	3.3	51x80	3.3	51x80	3.6	51x130	3.8	
1200	51x80	3.6	51x80	4.2	51x100	4.2	64x100	4.6	
1500	51x80	4.5	51x100	4.8	51x120	5.0	64x120	5.4	
1800	51x100	5.1	51x120	5.4	64x100	5.4	64x130	5.8	
2200	51x120	6.0	51x140	6.3	64x120	6.6	76x120	6.9	
2700	51x140	6.9	64x120	7.2	64x140	7.5	76x150	7.9	
3300	64x100	8.0	64x140	8.4	76x120	8.4	90x140	8.6	
3900	64x120	9.0	76x100	8.7	76x150	9.6	90x150	10.0	
4700	76x100	9.6	76x150	10.5	76x150	11.4	90x190	12.0	
5600	76x120	11.4	76x150	12.3	76x150	13.2			
6800	76x150	13.5	76x150	13.5	90x150	14.4			
8200	76x150	15.0	90x150	15.9	90x150	15.9			
10000	90x150	16.8	90x150	17.7	90x190	17.5			
12000	90x150	18.4	90x190	20.7					
15000	90x190	22.8							

STB Series

- 105°C 5000hours, Screw terminal type
- High temperature, high ripple current resistance and long life.
- RoHS Compliant & Halogen Free

Specifications

Items	Characteristics												
Capacitance Tolerance	± 20% (120Hz, 20°C)												
Operating Temperature Range	-40 ~ +105°C						-25 ~ +105°C						
Rated Voltage Range	10 ~ 100VDC						160 ~ 450VDC						
Rated Capacitance Range	220 ~ 1,000,000μF												
Leakage Current	I ≤ 0.02CV (μA) or 5mA, which is greater. (After 5 minutes application of DC rated voltage, at 20°C)												
Dissipation Factor	Measurement Frequency: 120Hz. Temperature: 20°C												
	Rated Voltage (V)		10	16	25	35	50	63	80	100	160~250	350~450	
	tan δ (Max)	35Ø	80~140	0.65	0.45	0.40	0.30	0.25	0.25	0.20	0.12	0.15	0.20
		51Ø	80~140	0.90	0.60	0.50	0.40	0.25	0.25	0.20	0.15	0.15	0.20
		64Ø	120~190	1.20	0.80	0.70	0.50	0.35	0.30	0.25	0.20	0.20	0.20
		76Ø	120~190	2.00	1.20	0.90	0.70	0.55	0.50	0.35	0.30	0.20	0.20
		90Ø	150~190	2.40	2.00	1.50	1.00	0.75	0.60	0.40	0.30	0.25	0.20
	100Ø	220	2.00	2.00	1.50	1.00	0.75	0.60	0.40	0.30	0.25	0.20	
Low Temperature Stability Impedance Ratio (Max)	Measurement Frequency: 120Hz.												
	Rated Voltage(V)		10 ~ 100					160 ~ 450					
	Z(-25°C) / Z(20°C)		-					8					
	Z(-40°C) / Z(20°C)		12					-					
Load Life	5,000 hours, (10 ~ 250 V, 2,000 hours), with application of rated voltage at 105°C												
	Capacitance Change		Within ± 20% of Initial Value										
	tan δ		300% or less of Initial Specified Value										
	Leakage Current		Initial Specified Value or less										
Shelf Life	The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours 105°C without voltage applied. Before the measurement the capacitor shall be preconditioned by applying voltage according to them 4.1 of JIS C5101-4.												
	Capacitance Change		Within ± 20% of Initial Value										
	tan δ		300% or less of Initial Specified Value										
	Leakage Current		Initial Specified Value or less										
Standards	JIS C-5101-4(IEC 60384)												

Frequency Coefficient for Ripple Current

Rated Voltage (V)	Frequency (Hz)				
	60	120	360	1K	≥ 10K
10 ~ 100	0.90	1.00	1.08	1.15	1.15
160 ~ 250	0.88	1.00	1.08	1.15	1.20
350 ~ 450	0.82	1.00	1.20	1.35	1.40

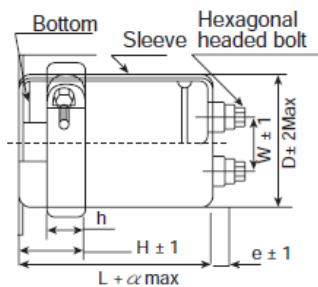
The endurance of capacitors is reduced with internal heating produced by ripple current at the rate of halving the lifetime with every 5°C rise. When long life performance is required in actual use, the RMS ripple current has to be reduced.



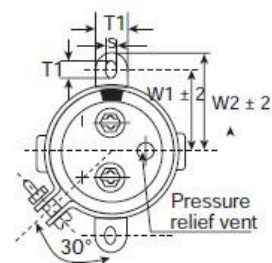
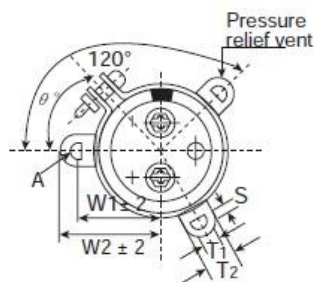
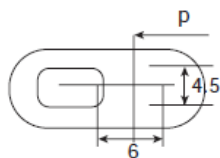
STB Series

Dimensions (mm)

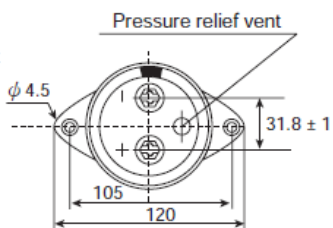
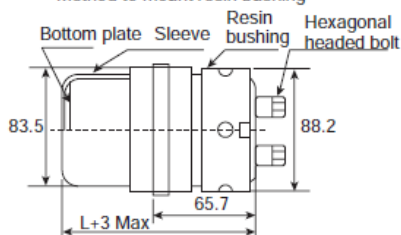
Screw terminal type for $\phi 51$ and larger



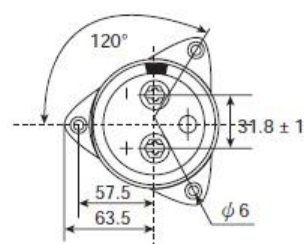
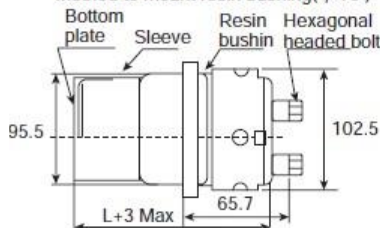
3-leg brackets for $\phi 90$ capacitors have different hole shapes from the ordinary ones as illustrated below.



Method to mount resin bushing



Method to mount resin bushing($\phi 76$)



Terminal Pitch (W) & LENGTH (e) TABLE

φD	W	e	α
35	12.7	1	3
51	22.0	6	3
64	28.6	6	3
76	31.8	6	3
90	31.8	6	3
100	41.5	10	4

Dimensions of Mounting Bracket (mm)

Cap (μF)	Leg Shape	3-Legs					2-Legs			
	φD	φ51	φ64	φ76	φ90	φ100	φ51	φ64	φ76	φ90
	W ₁	32.5	38	44.5	50.8	56.3	33.2	40.5	46.5	53
	W ₂	38.5	43	49.2	57	62	40	46.5	53	59
	T ₁	7.5	8	7	7	8	6	6	6	6
	T ₂	12	14	14	16	16	14	14	14	14
	S	5	5	5	5	5	4.5	4.5	4.5	4.5
	θ°	60	60	60	60	60	30	30	30	30
	H	20	25	30	35	36	25	35	35	35
	h	15	20	24	20	30	15	20	20	20

Standard Ratings

D×L(mm);R.C.(A rms) at 105°C 120Hz.

Cap (μF)	V	10		16		25		35	
	Item	D x L	R.C.	D x L	R.C.	D x L	R.C.	D x L	R.C.
10000								35x100	4.3
15000								35x100	5.0
22000						35x100	4.4	35x120	5.2
33000		35x80	4.7	35x80	4.8	35x120	6.0	35x140	7.0
47000		35x100	6.0	35x100	6.0	51x100	8.0	51x120	8.0
68000		51x80	6.5	51x80	6.5	51x140	10.0	51x140	12.0
100000		51x100	8.2	51x100	9.0	64x120	11.0	64x140	13.2
150000		51x120	10.2	51x120	11.4	64x140	13.5	76x150	15.0
220000		64x120	13.0	64x120	14.5	76x150	16.5	90x150	17.1
330000		76x120	15.2	76x120	17.0	90x150	20.2	90x190	21.0
470000		90x140	16.0	90x140	20.2	90x190	22.0		
680000		90x170	18.0	90x170	22.0				
1000000		90x180	20.0	90x190	23.5				

Standard Ratings

D×L(mm);R.C.(A rms) at 105°C 120Hz.

Cap (μF)	V	50		63		80		100	
	Item	D x L	R.C.	D x L	R.C.	D x L	R.C.	D x L	R.C.
2200								35x100	2.0
3300								35x100	3.0
4700						35x100	3.1	35x120	3.4
6800						35x120	3.4	51x100	5.0
10000		35x100	4.5	35x120	4.5	51x100	5.0	51x120	6.2
15000		35x120	5.2	51x100	5.5	51x120	6.0	64x120	7.4
22000		51x100	6.0	51x120	6.5	64x120	8.0	76x120	9.5
33000		51x140	7.5	64x120	9.0	76x120	9.5	76x150	12.3
47000		64x120	9.5	64x140	11.0	76x150	13.0	90x150	16.5
68000		64x140	12.5	76x150	13.2	90x150	16.5	90x190	18.0
100000		76x150	16.5	90x150	17.3	90x190	18.2	100x220	20.2
150000		90x150	19.5	90x190	20.5	100x220	21.2		
220000		90x190	21.5	100x220	23.2				
330000		100x220	24.0						

Cap (μF)	V	160		200		250	
	Item	D x L	R.C.	D x L	R.C.	D x L	R.C.
680						35x100	1.4
1000		35x100	1.6	35x100	1.7	35x120	1.9
1500		35x100	2.1	35x120	2.3	51x100	2.4
2200		35x120	2.7	51x100	2.9	51x120	3.2
3300		51x100	3.8	51x120	3.9	64x120	4.3
4700		51x120	4.5	64x120	5.1	64x140	5.9
6800		64x120	6.8	64x140	7.0	76x150	7.1
10000		64x150	7.8	76x150	8.2	90x150	9.6
15000		76x150	9.8	76x150	10.4	90x190	12.7
22000		76x150	12.5	90x150	15.1		
33000		90x150	13.4				



Cap (µF)	V	350		400		450	
	Item	D x L	R.C.	D x L	R.C.	D x L	R.C.
220				35x100	1.2	35x100	1.4
330		35x100	2.0	35x100	2.0	35x120	2.0
470		35x100	2.4	35x120	3.0	51x100	3.0
680		51x100	4.0	51x100	4.0	51x120	4.0
1000		51x100	6.2	51x100	6.2	51x120	6.5
1500		51x120	8.2	51x140	9.0	51x140	9.0
2200		51x140	10.6	64x120	11.2	64x120	11.4
2700		64x120	12.2	64x120	13.0	64x140	13.4
						76x120	14.1
3300		64x120	14.0	64x140	15.0	64x170	16.2
						76x150	17.0
3900		64x140	16.4	64x170	17.5	64x190	18.0
				76x120	18.0		
4700		64x140	19.4	64x190	20.3	76x170	21.3
		76x150	19.3	76x150	20.0		
5600		76x150	22.0	76x170	23.3	76x190	26.0
						90x170	24.0
6800		76x170	26.0	76x190	27.2	90x190	28.0
				90x170	26.5		
8200		76x170	30.0	90x190	29.5		
		90x150	29.0				
10000		90x170	32.0				

STC Series

- Load life: 85°C 5000Hours Screw terminal type.
- Suitable for use in industrial equipment industrial power,
- Used in solar pv inverter, wind power, Marine, heavy trucks, and other fields.
- RoHS Compliant & Halogen Free

Specifications

Items	Characteristics					
Capacitance Tolerance	± 20% (120Hz, 20°C)					
Operating Temperature Range	-25 ~ +85°C					
Rated Voltage Range	350 ~ 500VDC					
Rated Capacitance Range	220 ~ 1,000,000μF					
Leakage Current	I ≤ 0.02CV (μA) or 5mA, which is greater. (After 5 minutes application of DC rated voltage, at 20°C)					
Dissipation Factor	Measurement Frequency: 120Hz. Temperature: 20°C					
	Rated Voltage (V)	160	350	400	450	500
	tan δ (Max)	0.20	0.15	0.15	0.15	0.15
Temperature Stability	Measurement Frequency: 120Hz.					
	Capacitance Change C (-25°C) / Z(20°C) ≥ 0.6					
Load Life	5000 hours, with application of rated voltage at 85°C					
	Capacitance Change	Within ± 20% of Initial Value				
	tan δ	200% or less of Initial Specified Value				
	Leakage Current	Initial Specified Value or less				
Shelf Life	The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 500 hours 85°C without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to them 4.1 of JIS C5101-4.					
	Capacitance Change	Within ± 20% of Initial Value				
	tan δ	200% or less of Initial Specified Value				
	Leakage Current	Initial Specified Value or less				
Standards	JIS C 5101-4-1 (IEC 60384)					

Frequency Coefficient for Ripple Current

Rated Voltage (V)	Frequency (Hz)				
	50	120	300	1K	$\geq 10K$
350 ~ 500	0.80	1.00	1.20	1.30	1.40

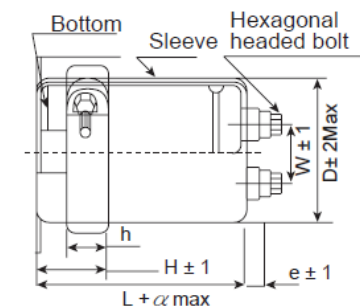
The endurance of capacitors is reduced with internal heating produced by ripple current at the rate of halving the lifetime with every 5°C rise.
When long life performance is required in actual use, the RMS ripple current has to be reduced.



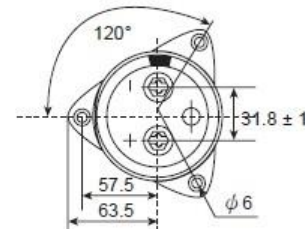
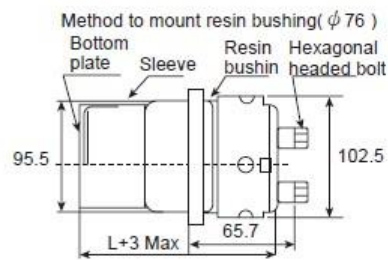
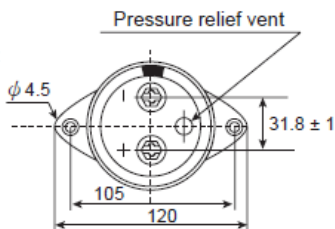
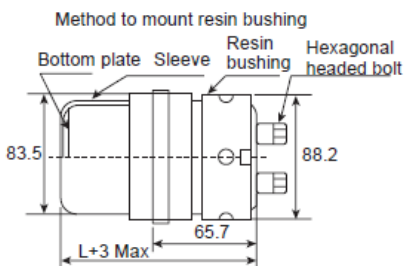
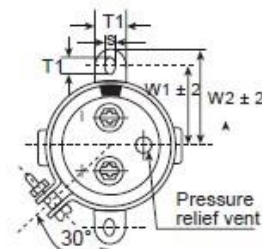
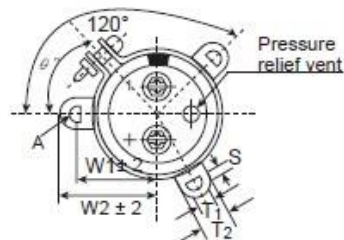
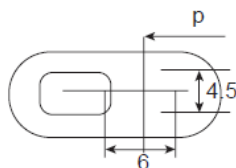
STC Series

Dimensions (mm)

Screw terminal type for $\phi 51$ and larger



3-leg brackets for $\phi 90$ capacitors have different hote shapes from the ordinary ones as illustrated below.



Terminal Pitch (W) & LENGTH (e) TABLE

ØD	W	e	α
51	22	6	3
64	28.6	6	3
76	31.8	6	3
90	31.8	6	3
100	41.5	10	4

Dimensions of Mounting Bracket (mm)

Cap (µF)	Leg Shape ØD	3-Legs				Ø100	2-Legs			
		Ø51	Ø64	Ø76	Ø90		Ø51	Ø64	Ø76	Ø90
	W1	32.5	38	44.5	50.8	56.3	33.2	40.5	46.5	53
	W2	38.5	43	49.2	57	62	40	46.5	53	59
	T1	7.5	8.0	7.0	7.0	8.0	6.0	6.0	6.0	6.0
	T2	12	14	14	16	16	14	14	14	14
	S	5.0	5.0	5.0	5.0	5.0	4.5	4.5	4.5	4.5
	θ°	60	60	60	60	60	30	30	30	30
	H	20	25	30	35	36	25	35	35	35
	h	15	20	24	20	30	15	20	20	20

Standard Ratings

D×L(mm);R.C.(A rms) at 85°C 120Hz.

Cap (μF)	V Item	350		400		450		500	
		D × L	R.C.	D × L	R.C.	D × L	R.C.	D × L	R.C.
1500								64x115	8.6
1800						64x95	6.7	64x130	10.0
2200						64x100	10.4	64x155	11.7
						76x95	11.5		
2700				64x100	11.5	64x130	12.8	76x120	15
3300				64x130	14.2	64x155	15.2	76x145	17.5
						76x120	15.8		
3900		64x115	14.6	64x155	16.5	64x155	16.5	76x155	20.2
				76x120	17.2	76x120	18.0		
4700		64x130	16.9	64x155	18.1	76x145	20.8	90x135	21.8
				76x130	20.8	90x120	21.8		
5600		64x155	19.8	76x140	22.7	76x160	24.2	90x160	25.3
		76x120	21.6	90x120	23.8	90x135	24.9		
6800		76x145	25.0	76x160	26.6	90x160	29.4	90x175	29.0
		90x120	26.2	90x135	27.4				
8200		76x160	29.3	90x160	32.2	90x160	32.2		
		90x135	30.1						
10000		90x160	35.7	90x160	35.7	90x175	36.9		
12000		90x160	39.1						

STD Series

- Load life: 85°C 5000Hours high voltage Screw terminal type.
- Suitable for use in industrial equipment industrial power,
- Suitable for Solar pv inverter, wind power, Marine, heavy trucks, and other fields.
- RoHS Compliant & Halogen Free

Specifications

Items	Characteristics				
Capacitance Tolerance	± 20% (120Hz, 20°C)				
Operating Temperature Range	-25 ~ +85°C				
Rated Voltage Range	500 ~ 650VDC				
Rated Capacitance Range	220 ~ 1,000,000μF				
Leakage Current	I ≤ 0.02CV (μA) or 5mA, which is greater. (After 5 minutes application of DC rated voltage, at 20°C)				
Dissipation Factor	Measurement Frequency: 120Hz. Temperature: 20°C				
	Rated Voltage (V)	500	550	600	650
	tan δ (Max)	0.25	0.25	0.25	0.25
Temperature Stability	Measurement Frequency: 120Hz.				
	Capacitance Change C (-25°C) / Z (20°C) ≥ 0.6				
Load Life	5,000 hours, with application of rated voltage at 85°C				
	Capacitance Change	Within ± 20% of Initial Value			
	tan δ	200% or less of Initial Specified Value			
	Leakage Current	Initial Specified Value or less			
Shelf Life	The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 500 hours 85°C without voltage applied. Before the measurement the capacitor shall be preconditioned by applying voltage according to them 4.1 of JIS C5101-4.				
	Capacitance Change	Within ± 20% of Initial Value			
	tan δ	200% or less of Initial Specified Value			
	Leakage Current	Initial Specified Value or less			
Standards	JIS C-5101-4(IEC 60384)				

Frequency Coefficient for Ripple Current

Rated Voltage (V)	Frequency (Hz)				
	50	120	360	1K	$\geq 3K$
500 ~ 650	0.80	1.00	1.20	1.30	1.40

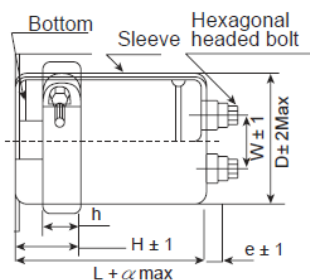
The endurance of capacitors is reduced with internal heating produced by ripple current at the rate of halving the lifetime with every 5°C rise.
 When long life performance is required in actual use, the RMS ripple current has to be reduced.



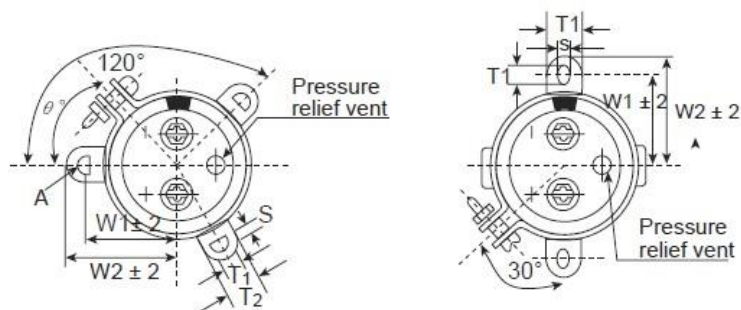
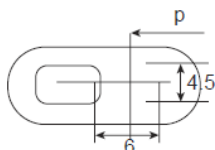
STD Series

Dimensions (mm)

Screw terminal type for $\phi 51$ and larger

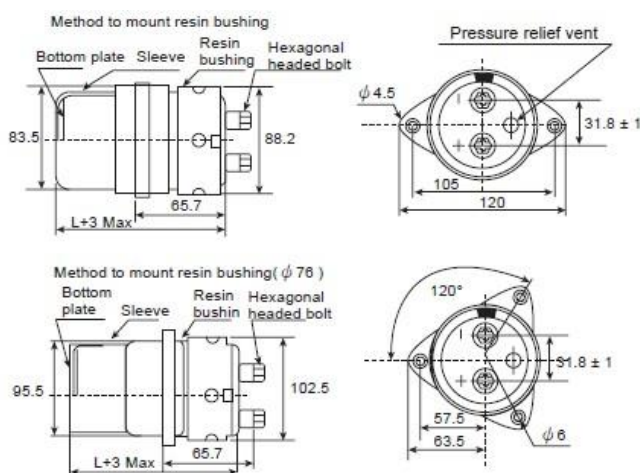


3-leg brackets for $\phi 90$ capacitors have different hole shapes from the ordinary ones as illustrated below.



Terminal Pitch (W) & LENGTH (e) TABLE

ϕD	W	e	α
51	22	6	3
64	28.6	6	3
76	31.8	6	3
90	31.8	6	3
100	41.5	10	4



Dimensions of Mounting Bracket (mm)

Cap (μF)	Leg Shape	3-Legs					2-Legs			
	ϕD	$\phi 51$	$\phi 64$	$\phi 76$	$\phi 90$	$\phi 100$	$\phi 51$	$\phi 64$	$\phi 76$	$\phi 90$
	W1	32.5	38	44.5	50.8	56.3	33.2	40.5	46.5	53
	W2	38.5	43	49.2	57	62	40	46.5	53	59
	T1	7.5	8.0	7.0	7.0	8.0	6.0	6.0	6.0	6.0
	T2	12	14	14	16	16	14	14	14	14
	S	5.0	5.0	5.0	5.0	5.0	4.5	4.5	4.5	4.5
	θ°	60	60	60	60	60	30	30	30	30
	H	20	25	30	35	36	25	35	35	35
	h	15	20	24	20	30	15	20	20	20

STD Series

Standard Ratings

D×L(mm);R.C.(A rms) at 85°C 120Hz.

Cap (μF)	V	500		550		600		650	
	Item	D x L	R.C.	D x L	R.C.	D x L	R.C.	D x L	R.C.
1000				51x95	5.4			64x100	6.3
1200		51x95	5.9	51x110	6.3	64x95	6.7	64x110	7.2
1500		51x115	7.2	51x130	7.6	64x110	8.0	64x130	8.6
1800		51x130	8.3	64x105	8.6	64x125	9.3	64x150	10.1
2200		51x150	9.8	64x120	10.1	64x145	11	64x170	11.7
2700		64x120	11.2	64x150	12.4	64x170	13.1	76x150	13.6
				76x105	11.7	76x125	12.6		
3300		64x140	13.3	64x170	14.5	76x145	14.9	76x170	15.8
				76x130	14.2				
3900		64xx170	15.7	76x140	15.9	76x170	17.3	90x155	15.3
		76xx130	15.4			90x130	14.2		
4700		76x150	18.1	76x170	19.1	76x190	20.0	90x190	18.4
				90xx130	15.6	90x150	16.6		
5600		76x170	20.8	90x150	18.2	90x170	19.1		
		90x130	17.1						
6800		90x150	20	90x170	21.1				
8200		90x190	24.4	100x170	24.8				
10000		90x210	28.2	100x200	29.4				
12000		100x210	32.9						
15000		100x250	39.8						

STE Series

- Load life: 85°C 10000Hours Screw terminal type.
- Suitable for use in industrial equipment industrial power,
- solar pv inverter, wind power, Marine, heavy trucks, and other fields.
- RoHS Compliant & Halogen Free

Specifications

Items	Characteristics			
Capacitance Tolerance	± 20% (120Hz, 20°C)			
Operating Temperature Range	-25 ~ +85°C			
Rated Voltage Range	350 ~ 450VDC			
Rated Capacitance Range	220 ~ 1,000,000μF			
Leakage Current	I ≤ 0.02CV (μA) or 5mA, which is greater. (After 5 minutes application of DC rated voltage, at 20°C)			
Dissipation Factor	Measurement Frequency: 120Hz. Temperature: 20°C			
	Rated Voltage (V)	350	400	450
	tan δ (Max)	0.15	0.15	0.15
Temperature Stability	Measurement Frequency: 120Hz.			
	Capacitance Change C (-25°C) / Z(20°C) ≥ 0.6			
Load Life	10,000 hours, with application of rated voltage at 85°C			
	Capacitance Change	Within ± 20% of Initial Value		
	tan δ	200% or less of Initial Specified Value		
	Leakage Current	Initial Specified Value or less		
Shelf Life	The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 500 hours 85°C without voltage applied. Before the measurement the capacitor shall be preconditioned by applying voltage according to them 4.1 of JIS C5101-4.			
	Capacitance Change	Within ± 20% of Initial Value		
	tan δ	200% or less of Initial Specified Value		
	Leakage Current	Initial Specified Value or less		
Standards	JIS C-5101-4(IEC 60384)			

Frequency Coefficient for Ripple Current

Rated Voltage (V)	Frequency (Hz)				
	50	120	300	1K	≥ 10K
350 ~ 450	0.80	1.00	1.20	1.30	1.40

The endurance of capacitors is reduced with internal heating produced by ripple current at the rate of halving the lifetime with every 5°C rise.

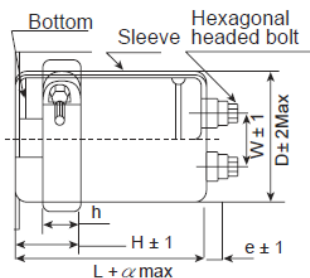
When long life performance is required in actual use, the RMS ripple current has to be reduced.



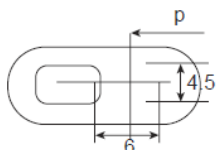
STE Series

Dimensions (mm)

Screw terminal type for $\phi 51$ and larger

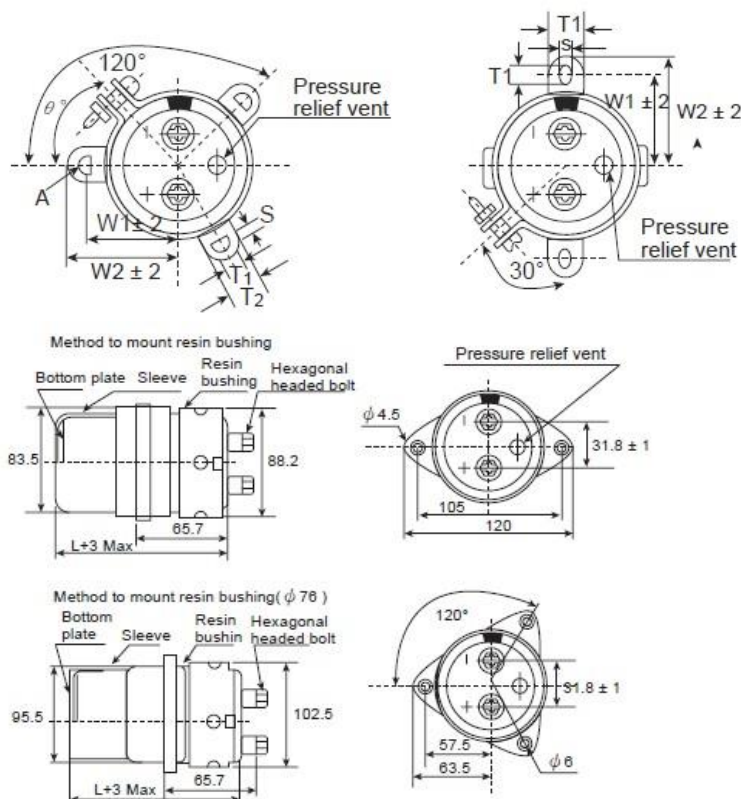


3-leg brackets for $\phi 90$ capacitors have different hole shapes from the ordinary ones as illustrated below.



Terminal Pitch (W) & LENGTH (e) TABLE

ϕD	W	e	α
51	22	6	3
64	28.6	6	3
76	31.8	6	3
90	31.8	6	3
100	41.5	10	4



Dimensions of Mounting Bracket (mm)

Cap (μF)	Leg Shape ϕD	3-Legs					2-Legs			
		$\phi 51$	$\phi 64$	$\phi 76$	$\phi 90$	$\phi 100$	$\phi 51$	$\phi 64$	$\phi 76$	$\phi 90$
	W1	32.5	38	44.5	50.8	56.3	33.2	40.5	46.5	53
	W2	38.5	43	49.2	57	62	40	46.5	53	59
	T1	7.5	8.0	7.0	7.0	8.0	6.0	6.0	6.0	6.0
	T2	12	14	14	16	16	14	14	14	14
	S	5.0	5.0	5.0	5.0	5.0	4.5	4.5	4.5	4.5
	θ°	60	60	60	60	60	30	30	30	30
	H	20	25	30	35	36	25	35	35	35
	h	15	20	24	20	30	15	20	20	20

STE Series

Standard Ratings

D×L(mm);R.C.(A rms) at 85°C 120Hz.

Cap (μF)	V	350		400		500	
	Item	D x L	R.C.	D x L	R.C.	D x L	R.C.
1000		51x85	5.5	51x85	5.0	51x85	5.0
1200		51x85	5.5	51x85	5.5	51x95	6.0
1500		51x85	6.1	51x95	6.7	51x115	7.2
1800		51x95	7.4	51x95	7.4	51x130	8.3
2200		51x95	8.2	51x130	9.2	64x95	9.0
2700		51x130	10.2	64x95	9.9	64x115	10.7
3300		51x130	11.3	64x115	11.8	64x130	12.4
3900		64x115	12.8	64x130	13.5	76x115	13.6
4700		64x130	14.8	76x115	14.9	76x130	15.6
5600		76x115	16.3	76x130	17.0	76x155	18.3
6800		76x130	18.8	76x155	20.2	90x155	21.4
8200		76x155	22.1	90x155	23.5	90x155	23.5
10000		90x155	25.9	90x155	25.9	90x195	28.3
12000		90x155	28.4	90x195	31.0		
15000		90x195	34.6				

LTC Series

- 85°C 2000hours, LUG terminal type.
- High ripple current resistance.
- Suitable for power supply, control circuit of inverter.
- RoHS Compliant & Halogen Free

Specifications

Items	Characteristics					
Capacitance Tolerance	± 20% (120Hz, 20°C)					
Operating Temperature Range	-40 ~ +85°C			-25 ~ +85°C		
Rated Voltage Range	16 ~ 250VDC			315 ~ 450VDC		
Leakage Current	I ≤ 0.02CV (μA) or 5mA, which is greater. (After 5 minutes application of DC rated voltage, at 20°C)					
Dissipation Factor	Measurement Frequency: 120Hz. Temperature: 20°C					
	Rated Voltage (V)	16	25	35 ~ 50	63 ~ 315	350 ~ 450
	tan δ(Max)	0.35	0.30	0.25	0.20	0.25
	When nominal capacitance over 1000μF, tan δ shall be added 0.01 to the listed value with increase of every 1000μF.					
Low Temperature Stability	Measurement Frequency: 120Hz.					
	Rated Voltage(V)	16 ~ 100		160 ~ 250		315 ~ 450
	Z(-25°C) / Z(20°C)	6		4		8
	Z(-40°C) / Z(20°C)	12		-		-
Load Life	2000 hours, with application of rated voltage at 85°C					
	Capacitance Change	Within ± 20% of Initial Value				
	tan δ	200% or less of Initial Specified Value				
	Leakage Current	Initial Specified Value or less				
Shelf Life	The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours 85°C without voltage applied. Before the measurement the capacitor shall be preconditioned by applying voltage according to them 4.1 of JIS C5101-4.					
	Capacitance Change	Within ± 20% of Initial Value				
	tan δ	200% or less of Initial Specified Value				
	Leakage Current	Initial Specified Value or less				
Standards	JIS C-5101-4(IEC 60384)					

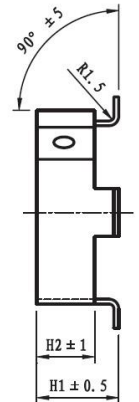
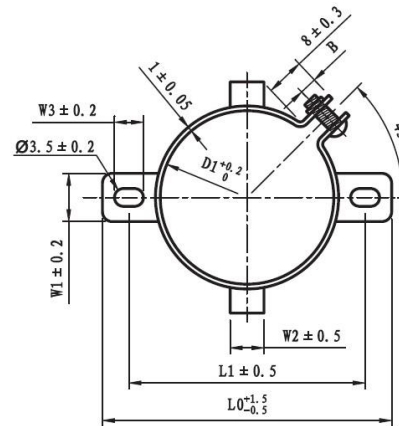
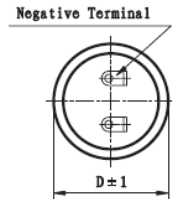
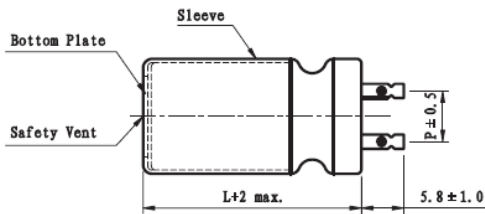
Frequency Coefficient of Permissible Ripple Current

Rated Voltage (V)	Frequency (Hz)			
	50	120	1K	≥ 10K
16 ~ 100	0.90	1.00	1.20	1.25
160 ~ 315	0.95	1.00	1.20	1.25
350 ~ 450	0.98	1.00	1.15	1.20

The endurance of capacitors is reduced with internal heating produced by ripple current at the rate of halving the lifetime with every 5°C rise. When long life performance is required in actual use, the RMS ripple current has to be reduced.



Dimensions (mm)



Ø	P	W1	W2	W3	D1	L0	B	H1	H2	L1
25	10.0	11.0	3.5	6.0	25.4	48.0	3.5	10.0	8.0	38.0
30	10.0	11.0	3.5	6.0	30.0	52.0	4.0	11.0	9.0	42.0
35	14.0	11.0	3.5	6.0	34.9	58.0	3.5	15.0	10.0	48.0
40	18.0	14.0	3.5	7.0	40.0	65.0	3.0	18.5	12.5	53.5
51	20.0	14.0	4.0	7.0	51.0	72.0	5.5	18.5	15.0	61.0

Standard Ratings

D×L (mm); R.C. (A rms) at 85°C 120Hz.

Cap (µF)	V	16		25		35		40		50	
	Item	D × L	R.C.	D × L	R.C.	D × L	R.C.	D × L	R.C.	D × L	R.C.
3300								25x30	2.45	25x30	2.47
4700						25x30	2.88	25x40	3.21	25x40	3.22
6800				25x30	3.12	25x40	3.73	25x50	4.07	25x50	4.09
10000		25x30	3.43	25x40	4.03	25x50	4.71	25x60	5.07	30x50	5.10
15000		25x40	4.42	25x50	5.08	30x50	5.81	30x60	6.24	35x60	6.67
22000		25x50	5.44	30x50	6.15	35x60	7.45	35x60	7.48	35x80	8.34
33000		30x50	6.57	35x60	7.85	35x80	9.17	35x80	9.25	40x100	10.60
47000		35x60	8.19	35x80	9.48	40x100	11.30	51x105	12.50	51x105	12.80
68000		35x80	9.85	40x100	11.60	51x105	13.20				
100000		40x100	12.10	51x105	13.50						
150000		51x105	13.90								

Cap (µF)	V	63		80		100		160		200	
	Item	D × L	R.C.	D × L	R.C.	D × L	R.C.	D × L	R.C.	D × L	R.C.
330								25x30	0.92	25x30	0.95
470								25x40	1.22	25x40	1.25
680								25x50	1.60	25x50	1.63
1000						25x30	1.61	25x60	2.08	30x50	2.12
1500				25x30	1.91	25x40	2.13	30x60	2.68	35x50	2.87
2200		25x30	2.06	25x40	2.52	25x50	2.75	35x60	3.40	35x60	3.81
3300		25x40	2.73	25x50	3.29	30x50	3.53	35x100	5.02	35x80	5.27
4700		25x50	3.50	25x60	4.14	35x60	4.76	40x100	6.15	40x100	6.81
6800		25x60	4.37	30x60	5.15	35x80	6.17	51x105	7.86	51x105	8.12
10000		30x60	5.46	35x80	7.08	40x100	8.16				
15000		35x80	7.48	40x80	8.42	51x105	10.20				
22000		35x100	9.16	51x105	11.20						
33000		51x105	11.70								

Standard Ratings

D×L (mm); R.C.(A rms) at 85°C 120Hz.

Cap (μF)	V	250		315		350		400		450	
	Item	D x L	R.C.	D x L	R.C.	D x L	R.C.	D x L	R.C.	D x L	R.C.
68										25x30	0.38
100						25x30	0.50	25x30	0.50	25x40	0.5
150				25x30	0.61	25x40	0.69	25x40	0.62	25x50	0.68
220		25x30	0.75	25x40	0.84	25x50	0.91	25x50	0.81	30x50	0.88
330		25x40	1.02	25x50	1.12	25x60	1.21	30x60	1.15	35x60	1.24
470		25x50	1.34	25x60	1.43	30x60	1.54	35x60	1.47	35x80	1.65
680		30x50	1.73	30x60	1.85	35x60	1.98	35x80	1.98	35x100	2.18
1000		30x60	2.25	35x70	2.56	35x100	2.95	40x100	2.78	51x80	2.77
1500		35x80	3.21	35x100	3.54	40x100	3.72	51x105	3.69		
2200		35x100	4.19	40x100	4.41	51x105	4.86				
3300		51x80	5.24	51x105	5.82						

LTD Series

- 105°C 2000hours, LUG terminal type.
- High temperature, high ripple current resistance.
- Suitable for machinery, filter circuit of tele-communication.
- RoHS Compliant & Halogen Free

Specifications

Items	Characteristics				
Capacitance Tolerance	± 20% (120Hz, 20°C)				
Operating Temperature Range	-40 ~ +105°C			-25 ~ +105°C	
Rated Voltage Range	16 ~ 250VDC			315 ~ 450VDC	
Leakage Current	I ≤ 0.02CV or 5mA which is greater. (After 5 minutes application of DC rated voltage, at 20°C)				
Dissipation Factor	Measurement Frequency: 120Hz. Temperature: 20°C				
	Rated Voltage (V)	16 ~ 25	35 ~ 50	63 ~ 315	350 ~ 450
	tan δ(Max)	0.35	0.25	0.20	0.25
	When nominal capacitance over 1000μF, tanδ shall be added 0.01 to the listed value with increase of every 1000μF.				
Low Temperature Stability Impedance Ratio (Max)	Measurement Frequency: 120Hz.				
	Rated Voltage(V)	16 ~ 100	160 ~ 250	315 ~ 450	
	Z(-25°C) / Z(20°C)	6	4	8	
	Z(-40°C) / Z(20°C)	12	8	-	
Load Life	2000 hours, with application of rated Voltage at 105°C				
	Capacitance Change	Within ± 25% of Initial Value			
	tan δ	200% or less of Initial Specified Value			
	Leakage Current	Initial Specified Value or less			
Shelf Life	The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours 105°C without voltage applied. Before the measurement the capacitor shall be preconditioned by applying voltage according to them 4.1 of JIS C5101-4.				
	Capacitance Change	Within ± 25% of Initial Value			
	tan δ	200% or less of Initial Specified Value			
	Leakage Current	Initial Specified Value or less			
Standards	JIS C-5101-4(IEC 60384)				

Frequency Coefficient of Permissible Ripple Current

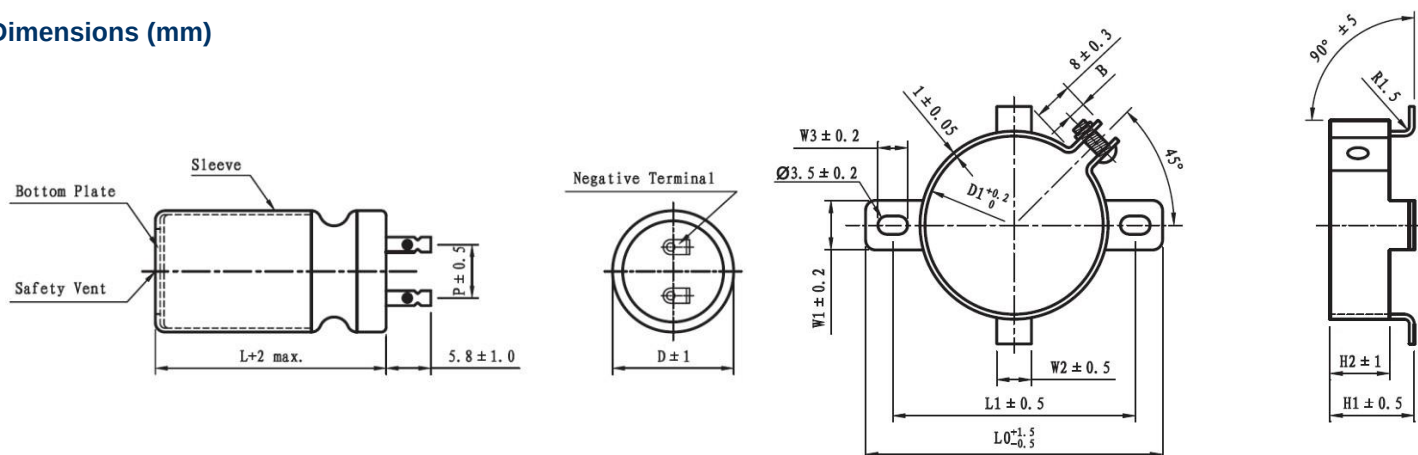
Rated Voltage (V)	Frequency (Hz)			
	50	120	1K	≥ 10K
16 ~ 100	0.90	1.00	1.20	1.25
160 ~ 315	0.95	1.00	1.20	1.25
350 ~ 450	0.98	1.00	1.15	1.20

The endurance of capacitors is reduced with internal heating produced by ripple current at the rate of halving the lifetime with every 5°C rise. When long life performance is required in actual use, the RMS ripple current has to be reduced.



LTD Series

Dimensions (mm)



Ø	P	W1	W2	W3	D1	L0	B	H1	H2	L1
25	10.0	11.0	3.5	6.0	25.4	48.0	3.5	10.0	8.0	38.0
30	10.0	11.0	3.5	6.0	30.0	52.0	4.0	11.0	9.0	42.0
35	14.0	11.0	3.5	6.0	34.9	58.0	3.5	15.0	10.0	48.0
40	18.0	14.0	3.5	7.0	40.0	65.0	3.0	18.5	12.5	53.5

Standard Ratings

D×L (mm); R.C. (A rms) at 105°C 120Hz.

Cap (µF)	V	16		25		35		50		63		80		100	
	Item	D x L	R.C.	D x L	R.C.	D x L	R.C.	D x L	R.C.	D x L	R.C.	D x L	R.C.	D x L	R.C.
470										25x25	0.60	25x25	0.62	25x25	0.85
680										25x25	0.80	25x25	1.03	25x25	1.10
1000						25x25	0.50	25x25	0.80	25x25	1.10	25x35	1.30	25x40	1.40
1500						25x25	0.80	25x25	1.10	25x25	1.50	25x35	1.70	25x40	1.80
2200	25x25	0.70	25x25	1.00	25x35	1.30	25x35	1.60	25x35	1.70	25x50	1.90	30x50	2.40	
3300	25x25	1.02	25x30	1.40	25x40	1.80	25x50	2.10	30x50	2.30	30x60	2.60	30x60	2.80	
4700	25x30	1.50	25x35	1.90	25x50	2.00	30x50	2.60	30x60	2.80	35x60	3.10	40x60	3.70	
6800	25x35	2.01	25x50	2.40	30x50	2.70	35x50	3.00	35x60	3.20	40x60	3.90	40x80	5.10	
10000	25x50	2.40	30x50	2.90	30x60	3.20	35x60	4.40	40x60	4.90	40x80	5.80			

Cap (µF)	V	160		200		250		315		350		400		450	
	Item	D x L	R.C.	D x L	R.C.	D x L	R.C.	D x L	R.C.	D x L	R.C.	D x L	R.C.	D x L	R.C.
22														25x35	0.15
33														25x50	0.21
47												25x40	0.21	25x50	0.22
100						25x50	0.43	25x50	0.44	25x50	0.45	30x50	0.48	30x60	0.53
150						25x50	0.51	25x50	0.62	25x50	0.61	30x50	0.61	30x60	0.61
220	25x50	0.64	30x50	0.71	30x50	0.72	35x50	0.82	35x60	0.82	35x80	0.82	35x80	0.92	
330	30x50	0.92	30x60	0.92	35x60	1.03	35x80	1.05	35x80	1.10	40x80	1.10			
470	30x60	1.20	35x60	1.20	35x80	1.30	40x80	1.40	40x80	1.50					
680	35x60	1.60	40x60	1.70	40x80	1.80									
1000	35x80	2.20													

RHA Series

- 105°C high-temperature, high reliability and long life
- Suitable for office communicative or industrial equipment
- RoHS Compliant & Halogen Free

Specifications

Items	Characteristics												
Capacitance Tolerance	± 20% (120Hz, 20°C)												
Operating Temperature Range	-					-40 ~			-25 ~ +105°C				
Rated Voltage Range	6.3 ~ 100VDC					160 ~			350 ~ 450VDC				
Leakage Current	I ≤ 0.01CV or 3 (μA) which is greater. (After 2 minutes					I ≤ 0.03CV +20 (μA) (After 3 minutes application of DC rated voltage, at 20 °C)							
Dissipation Factor	Measurement Frequency: 120Hz. Temperature: 20°C												
	Rated Voltage (V)	6.3	10	16	25	35	50	63	100	160~25	350~4	500	600
	tan δ(Max)	0.24	0.20	0.17	0.1	0.12	0.10	0.09	0.08	0.15	0.20	0.20	0.25
	When nominal capacitance over 1000μF, tan δ shall be added 0.02 to the listed value with increase of every 1000μF												
Low Temperature Stability Impedance Ratio (Max)	Measurement Frequency: 120Hz.												
	Rated Voltage(V)	6.3	10	16	25	35	50	63	100	160~250	350~400	450	
	Z(-25°C) / Z(20°C)	4	3	3	2	2	2	2	2	4	8	15	
	Z(-40°C) / Z(20°C)	8	6	4	4	4	4	4	4	6	-	-	
Load Life	The following specification shall be satisfied when the capacitors are restored to 20°C after subjected to DC Voltage with the rated ripple current is applied for 5000 hours, (ψD ≤ 8 : 3,000 hrs ; ψD = 10 : 4,000 hrs) at 105°C												
	Capacitance Change	Within ± 20% of Initial Value											
	tan δ	200% or less of Initial Specified Value											
	Leakage Current	Initial Specified Value or less											
Shelf Life	The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours 105°C without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to them 4.1 of JIS C5101-4.												
	Capacitance Change	Within ± 20% of Initial Value											
	tan δ	200% or less of Initial Specified Value											
	Leakage Current	Initial Specified Value or less											
Standards	JIS C-5101-4(IEC 60384)												

Frequency Coefficient of Permissible Ripple Current

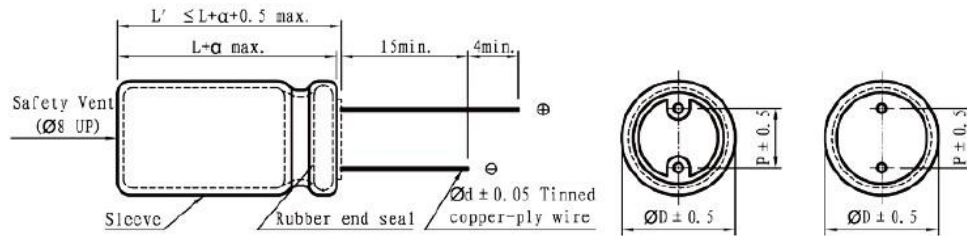
Rated Voltage (V)	Capacitance (μF)	Frequency (Hz)			
		50	120	1K	$\geq 10K$
≤ 100	< 100	0.70	1.00	1.40	1.60
	100 ~ 4700	0.75	1.00	1.30	1.40
	> 4700	0.80	1.00	1.15	1.20
≥ 160	2.2 ~ 820	0.80	1.00	1.30	1.40

The endurance of capacitors is reduced with internal heating produced by ripple current at the rate of halving the lifetime with every 5°C rise. When long life performance is required in actual use, the rms ripple current has to be reduced.



RHA Series

Dimensions (mm)



ØD	5	6.3	8	10	13	14.5	16	18	22	25
P	2.0	2.5	3.5	5.0	5.0	7.5	7.5	7.5	10	12.5
Ød	0.5	0.5	0.5	0.6	0.6	0.8	0.8	0.8	0.8	1.0

Standard Ratings

D×L(mm) ; R.C.(mA rms) at 105°C 120Hz.

Cap (µF)	V Item	6.3		10		16		25		35		50		63	
		D x L	R.C.	D x L	R.C.	D x L	R.C.	D x L	R.C.	D x L	R.C.	D x L	R.C.	D x L	R.C.
0.47												5x11	8		
1												5x11	17		
2.2												5x11	23		
3.3												5x11	31		
4.7												5x11	35		
10								5x11	45	5x11	48	5x11	51	5x11	56
22								5x11	60	6.3x11	78	6.3x11	85	6.3x11	95
33								6.3x11	90	6.3x11	100	8x12	102	8x12	122
47						5x11	85	6.3x11	105	8x12	130	8x12	141	10x13	152
100		5x11	120	5x11	130	6.3x11	140	8x12	185	8x12	190	10x13	231	10x16	250
220		6.3x11	170	6.3x11	190	8x12	240	10x13	290	10x13	320	10x16	368	10x20	415
330		8x12	250	8x12	280	8x12	310	10x13	350	10x16	420	10x20	490	13x21	550
470		8x12	290	8x12	330	10x13	380	10x20	465	13x21	580	13x21	665	16x26	725
1000		10x13	490	10x16	580	10x20	670	13x21	830	13x25	1000	16x26	1080	16x32	1135
2200		10x20	830	13x21	970	13x25	1130	16x26	1210	16x32	1450	18x35	1695		
3300		13x21	1060	13x25	1250	16x26	1350	16x32	1540	18x35	1830	18x40	2070		
4700		13x25	1310	16x26	1400	16x32	1570	18x35	1870	18x40	2150				
6800		16x26	1430	16x32	1690	18x35	1930	18x40	2120						
10000		16x32	1790	18x35	2010	18x40	2190								
15000		18x35	1980	18x40	2260										
22000		18x40	2290												

Cap (µF)	V Item	100		160		200		250		350		400		450	
		D x L	R.C.	D x L	R.C.	D x L	R.C.	D x L	R.C.	D x L	R.C.	D x L	R.C.	D x L	R.C.
2.2		5x11	28	6.3x11	28	6.3x11	28	8x12	35	8x12	35	8x12	35	10x13	36
3.3		5x11	34	8x12	34	8x12	35	8x12	50	8x12	44	8x12	50	10x13	48
4.7		5x11	40	8x12	43	10x13	50	8x12	55	10x13	55	10x13	60	10x16	60
10		6.3x11	66	10x13	75	10x16	80	10x16	100	10x20	92	10x20	100	13x21	110
22		8x12	112	10x16	130	10x20	140	13x21	170	13x21	162	13x25	190	16x22	210
33		10x13	155	10x20	170	13x21	200	13x21	225	13x25	205	16x22	240	16x26	280
39		10x13	160	10x20	190	13x21	220	13x25	250	16x22	220	16x26	300	16x32	330
47		10x16	190	13x21	230	13x21	250	13x25	280	16x26	320	16x32	330	18x25	360
68		10x20	210	13x25	260	13x25	280	16x22	310	16x26	350	18x25	350	18x32	500
82		13x21	240	16x22	320	16x26	350	16x32	390	18x25	420	18x32	580	18x35	600
100		13x21	310	16x26	350	16x32	480	16x36	500	18x32	550	18x35	660	18x40	720
120										18x35	650	18x40	770		
220		16x26	540	18x35	640	18x40	810								
330		16x26	660												
470		16x32	880												
560				22x40	1300	22x50	1400								
680				22x50	1420	25x50	1550								
820						25x50	1700								

※ 13mm may be replaced by 12.5mm upon customer's request.

RHA Series

SLIM TYPE

- 105°C high-temperature and high voltage 350~450V, life 3000~5000hrs
- Specially Size, 8~16mm diameter
- For LCD-TV and LCD-Monitor power
- RoHS Compliant

Standard Ratings

D×L(mm); R.C.(mA rms) at 105°C 120Hz.

Cap (μF)	V	350		400		450	
	Item	D x L	R.C.	D x L	R.C.	D x L	R.C.
22				8x50	135	10x40	280
33				8x61	280	10x50	350
		10x40	210	10x40	260	13x35	300
39		10x40	210	8x61	280	8x61	350
		13x30	270	10x45	300	10x50	350
				13x35	310	13x40	360
47		10x40	300	10x50	330	10x60	410
		13x35	320	13x40	350	13x50	370
		14.5x30	320	14.5x40	370	14.5x40	390
53		13x35	320	13x50	385	10x60	440
68		10x60	400	13x50	385	13x60	450
		13x40	420	14.5x45	400	14.5x50	400
		16x35	430	16x35	420	16x40	440
82		13x50	450	14.5x45	530	14.5x50	600
		16x35	500	16x40	550	16x45	620
100		16x40	530	14.5x50	700	16x50	760
				16x45	720		

※ 13mm may be replaced by 12.5mm upon customer's request.

RHB Series

- 105°C high-temperature resistance, high reliability and long life
- High ripple current
- Suitable for office communicative or industrial equipment
- RoHS Compliant & Halogen Free

Specifications

Items	Characteristics		
Capacitance Tolerance	± 20% (120Hz, 20°C)		
Operating Temperature Range	-40 ~ +105°C	-25 ~ +105°C	
Rated Voltage Range	160 ~ 400VDC	450VDC	
Leakage Current	I ≤ 0.03CV +20 (μA) (After 3 minutes application of DC rated voltage)		
Dissipation Factor	Measurement Frequency: 120Hz. Temperature: 20°C		
	Rated Voltage (V)	160 ~ 250	400 ~ 450
	tan δ(Max)	0.15	0.20
Low Temperature Stability	Measurement Frequency: 120Hz.		
Impedance Ratio (Max)	Rated Voltage(V)	160 ~ 250	400 450
	Z(-25°C) / Z(20°C)	3	5 6
	Z(-40°C) / Z(20°C)	6	6 -
Load Life	The following specifications shall be satisfied when the capacitors are restored to 20°C after subjected to DC voltage with the rated ripple current is applied for 5,000 hours at 105°C.		
	Capacitance Change	Within ± 25% of Initial Value	
	tan δ	200% or less of Initial Specified Value	
	Leakage Current	Initial Specified Value or less	
Shelf Life	The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours 105°C without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to them 4.1 of JIS C5101-4.		
	Capacitance Change	Within ± 20% of Initial Value	
	tan δ	200% or less of Initial Specified Value	
	Leakage Current	Initial Specified Value or less	
Standards	JIS C-5101-4(IEC 60384)		

Frequency Coefficient of Permissible Ripple Current

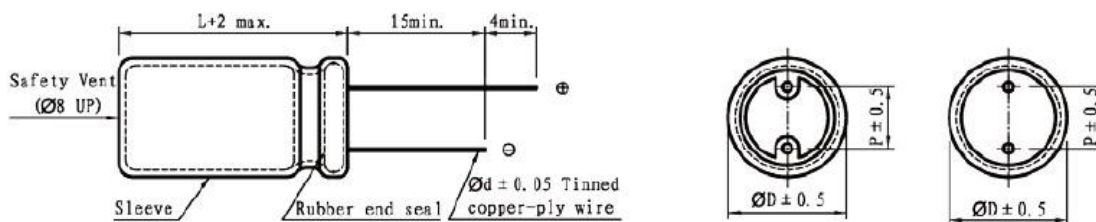
Capacitance (μF)	Frequency (Hz)			
	120	1K	10K	100K
22 ~ 82	1.00	1.25	1.50	1.75
100 ~ 470	1.00	1.15	1.30	1.40

The endurance of capacitors is reduced with internal heating produced by ripple current at the rate of halving the lifetime with every 5°C rise. When long life performance is required in actual use, the rms ripple current has to be reduced.



RHB Series

Dimensions (mm)



ØD	10	13	14.5	16	18	20
P	5.0	5.0	7.5	7.5	7.5	10.0
Ød	0.6	0.6	0.8	0.8	0.8	0.8

Standard Ratings

D×L(mm) ; R.C.(mA rms) at 105°C 120Hz.

Cap (µF)	V	160		200		250		400		450	
	Item	D x L	R.C.	D x L	R.C.	D x L	R.C.	D x L	R.C.	D x L	R.C.
22		10x16	130					10x30	205	10x40	280
33		10x20	210					10x40	260	13x35	290
39		10x20	210					10x45	320	13x40	345
47		10x25	305					13x35	385	10x50	350
										14.5x40	420
56		10x25	305					13x40	420	14.5x40	420
										16x30	477
68		10x25	345	10x30	445	13x25	490	13x45	500	14.5x45	550
								14.5x30	500	18x32	550
82		10x30	445	10x35	485	13x30	550	14.5x40	545	16x40	650
										18x32	650
100		10x35	485	10x40	560	16x25	620	14.5x45	600	18x36	720
								18x32	600		
120		10x40	560	10x45	680	16x32	685	16x40	710	18x40	800
								18x36	710		
150		10x45	680	13x35	720	16x35	815	18x40	835	18x45	960
										20x40	1000
220		13x40	850	13x45	890	18x36	1020				
				14.5x35	890						
270		13x45	945	16x35	1030	18x40	1090				
330		16x35	1100	16x40	1200						
				18x32	1200						
470		18x40	1220	18x45	1305						

※ 13mm may be replaced by 12.5mm upon customer's request.

RHC Series

- High ripple current
- 8000~10000 hours long life product
- RoHS Compliant & Halogen Free

Specifications

Items	Characteristics							
Capacitance Tolerance	± 20% (120Hz, 20°C)							
Operating Temperature Range	-40 ~ +105°C			-25 ~ +105°C				
Rated Voltage Range	160 ~ 400VDC			450VDC				
Leakage Current	I ≤ 0.04CV +100 (μA) (After 1minutes application of DC rated voltage, at 20 °C)							
Dissipation Factor	Measurement Frequency: 120Hz. Temperature: 20°C							
	Rated Voltage (V)	160	200	250	350	400	420	450
	tan δ(Max)	0.15	0.15	0.15	0.20	0.20	0.20	0.20
	When nominal capacitance over 1000μF, tan δ shall be added 0.02 to the listed value with increase of every 1000μF.							
Low Temperature Stability	Measurement Frequency: 120Hz.							
	Rated Voltage(V)	160	200	250	350	400	450	
Impedance Ratio (Max)	Z(-25°C)/Z(20°C)	3	3	3	6	6	6	
	Z(-40°C)/Z(20°C)	6	6	6	6	6	-	
Load Life	The following specifications shall be satisfied when the capacitors are restored to 20°C after subjected to DC voltage with the rated ripple current is applied for 10,000 hours (ØD≤10: 8000hrs) at 105°C.							
	Capacitance Change	Within ± 20% of Initial Value						
	tan δ	200% or less of Initial Specified Value						
	Leakage Current	Initial Specified Value or less						
Shelf Life	The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours 105°C without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to them 4.1 of JIS C5101-4.							
	Capacitance Change	Within ± 20% of Initial Value						
	tan δ	200% or less of Initial Specified Value						
	Leakage Current	Initial Specified Value or less						
Standards	JIS C-5101-4(IEC 60384)							

Frequency Coefficient of Permissible Ripple Current

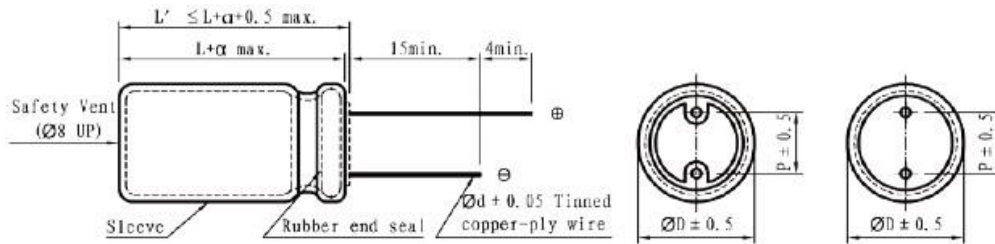
Capacitance (μF)	Frequency (Hz)				
	50	120	1K	10K	100K
1~5.6	0.65	1	1.25	1.5	2.0
6.8 ~ 82	0.70	1.00	1.75	2.25	2.50
100 ~ 330	0.75	1.00	1.67	2.05	2.25

The endurance of capacitors is reduced with internal heating produced by ripple current at the rate of halving the lifetime with every 5°C rise. When long life performance is required in actual use, the rms ripple current has to be reduced.



RHC Series

Dimensions (mm)



ØD	8	10	13	14.5	16	18
P	3.5	5.0	5.0	7.5	7.5	7.5
Ød	0.5	0.6	0.6	0.8	0.8	0.8

α

(L < 16) 1.0
(L ≥ 16) 2.0

Standard Ratings

D×L(mm) ; R.C.(mA rms) at 105°C 120Hz.

Cap (µF)	V	160			200			250		
	Item	D x L	R.C.		D x L	R.C.		D x L	R.C.	
			120Hz	100KHZ		120Hz	100KHZ		120Hz	100KHZ
10		10x16	125	313	10x16	125	313	10x20	140	350
22		10x20	200	500	10x20	200	500	10x20	200	500
33		10x20	250	625	10x20	260	650	13x21	320	800
47		10x20	300	750	13x21	390	975	13x21	390	975
68		13x21	470	1175	13x21	470	1175	16x22	520	1300
82		13x21	510	1275	16x22	550	1375	16x22	550	1375
100		13x25	620	1395	16x22	630	1418	16x26	680	1530
		16x22	630	1418						
150		16x22	770	1733	16x26	840	1890	18x25	860	1935
220		18x25	1020	2295	18x26	1050	2363	18x32	1130	2543
330		18x32	1390	3128	18x36	1430	3218			

Cap (µF)	V	350			400			450		
	Item	D x L	R.C.		D x L	R.C.		D x L	R.C.	
			120Hz	100KHZ		120Hz	100KHZ		120Hz	100KHZ
6.8		10x16	110	275	10x16	110	275	10x20	110	275
10		10x20	140	350	10x20	140	350	13x21	180	450
22		13x21	260	650	13x21	260	650	16x22	290	725
33		16x22	360	900	16x22	360	900	16x26	390	975
								18x22	380	950
47		16x22	430	1075	16x25	470	1175	18x25	480	1200
					18x22	450	1125			
68		16x26	560	1400	18x25	585	1463	18x32	630	1575
		18x22	550	1375						
82		18x25	610	1525	18x25	610	1525	18x35	715	1788
100		18x25	700	1575	18x32	765	1721	18x40	800	1800
120		18x32	830	1868	18x35	865	1946			
150		18x35	960	2160	18x40	985	2216			

※ 13mm may be replaced by 12.5mm upon customer's request.

RHC Series

SLIM TYPE

- 105°C high-temperature and high voltage 350 ~450V,
- Life 8000~10000hrs
- Specially Size, 8~16mm diameter.
- For LCD-TV and LCD-Monitor power.
- RoHS Compliant.

Standard Ratings

D×L(mm) ; R.C.(mA rms) at 105°C 120Hz.

Cap (μF)	V	350			400			450		
	Item	D x L	R.C.		D x L	R.C.		D x L	R.C.	
			120Hz	100KHZ		120Hz	100KHZ		120Hz	100KHZ
22		10x30	212	530	8x50	236	590	8x50	254	635
					10x35	260	650	10x40	280	700
33		8x50	240	600	8x61	280	700	8x61	280	700
					10x40	312	780	10x45	332	830
		10x35	260	650	13x30	336	840	13x40	360	900
39		10x40	280	700	10x50	380	950	10x50	420	1050
					13x35	368	920	13x45	408	1020
47		10x50	380	950	10x60	480	1200	10x60	520	1300
		13x35	400	1000	13x40	460	1150	13x50	560	1400
		14.5x30	400	1000	14.5x35	440	1100	14.5x45	512	1280
53		10x50	440	1100	10x60	480	1200	13x50	600	1500
		13x40	480	1200	13x45	500	1250	14.5x45	512	1280
		14.5x30	400	1000	14.5x35	440	1100	16x35	560	1400
68		10x60	520	1300	13x50	540	1350	13x60	660	1650
		13x45	480	1200				14.5x50	680	1700
		14.5x35	440	1100	14.5x45	600	1500	16x40	628	1570
82		13x50	540	1350	13x60	600	1500	13x60	700	1750
					14.5x50	648	1620	14.5x50	720	1800
		14.5x40	588	1470	16x40	648	1620	16x45	792	1980
					14.5x50	770	1733	14.5x60	855	1924
100		13x60	660	1485	14.5x50	770	1733	14.5x60	855	1924
		14.5x45	682	1534	16x50	902	2030	16x50	990	2228

※ 13mm may be replaced by 12.5mm upon customer's request.

RHD Series

- High temperature resistance, high reliability
- 125°C, 2000 hours long life product
- RoHS Compliant & Halogen Free

Specifications

Items	Characteristics															
Capacitance Tolerance	± 20% (120Hz, 20°C)															
Operating Temperature Range	-40 ~ +125°C								-40 ~ +125°C							
Rated Voltage Range	10 ~ 100VDC								160 ~ 250VDC							
Leakage Current	I ≤ 0.01CV or 3 (μA) which is greater. (After 2 minutes application of DC rated voltage, at 20 °C)								I ≤ 0.03CV +20 (μA) (After 3 minutes application of DC rated voltage, at 20 °C)							
Dissipation Factor	Measurement Frequency: 120Hz. Temperature: 20°C															
	Rated Voltage (V)	6.3	10	16	25	35	50	63	80	100	160	200	250	275	350~450	500
	tan δ(Max)	0.24	0.20	0.16	0.14	0.12	0.10	0.10	0.10	0.10	0.15	0.20	0.20	0.20	0.24	0.24
	When nominal capacitance over 1000μF, tan δ shall be added 0.02 to the listed value with increase of every 1000μF.															
Low Temperature Stability	Measurement Frequency: 120Hz.															
	Rated Voltage(V)	10		16	25	35	50	63	100		160	200	250		350~450	
	Z(-25°C) / Z(20°C)	3		2	2	2	2	2	3		3	3	3		6	
	Z(-40°C) / Z(20°C)	8		6	4	4	4	4	4		6	6	6		-	
Impedance Ratio (Max)	2000hours, with application of rated voltage at 125°C															
	Capacitance	Within ± 25% of Initial Value														
	tan δ	200% or less of Initial Specified Value														
	Leakage Current	Initial Specified Value or less														
Load Life	The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours 125°C without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to them 4.1 of JIS C5101-4.															
	Capacitance	Within ± 25% of Initial Value														
	tan δ	200% or less of Initial Specified Value														
	Leakage Current	Initial Specified Value or less														
Shelf Life	The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours 125°C without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to them 4.1 of JIS C5101-4.															
	Capacitance	Within ± 25% of Initial Value														
	tan δ	200% or less of Initial Specified Value														
	Leakage Current	Initial Specified Value or less														
Standards	JIS C-5101-4(IEC 60384)															

Frequency Coefficient of Permissible Ripple Current

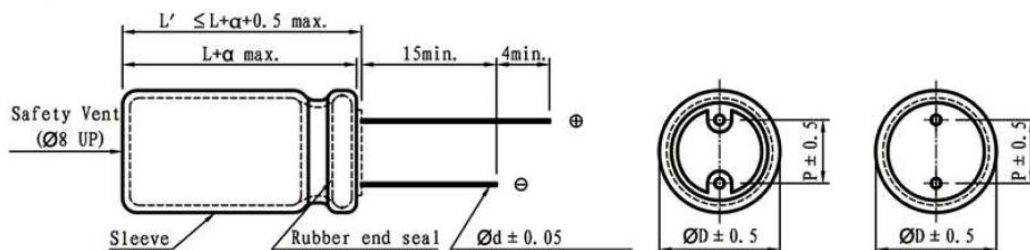
Rated Voltage (V)	Capacitance (μF)	Frequency (Hz)			
		50	120	1K	≥ 10K
≤ 100	< 100	0.75	1.00	1.57	2.00
	100 ~ 470	0.80	1.00	1.34	1.50
	> 470	0.85	1.00	1.10	1.15
≥ 160	1 ~ 100	0.85	1.00	1.40	1.50

The endurance of capacitors is reduced with internal heating produced by ripple current at the rate of halving the lifetime with every 5°C rise. When long life performance is required in actual use, the rms ripple current has to be reduced.



RHD Series

Dimensions (mm)



ØD	6.3	8	10	13	16
P	2.5	3.5	5.0	5.0	7.5
Ød	0.5	0.5	0.6	0.6	0.8

α	(L < 16) 1.0
	(L ≥ 16) 2.0

Standard Ratings

DxL(mm) ; R.C.(mA rms) at 125°C 120Hz.

Cap (µF)	V	10		16		25		35		50		63	
	Item	D x L	R.C.	D x L	R.C.	D x L	R.C.	D x L	R.C.	D x L	R.C.	D x L	R.C.
3.3												8x12	28
4.7												8x12	35
10								6.3x11	40	8x12	45	8x12	54
22						6.3x11	70	8x12	78	8x12	80	10x13	92
33				6.3x11	70	8x12	90	8x12	105	8x12	112	10x16	130
47		6.3x11	80	6.3x11	82	8x12	110	8x12	148	10x13	154	10x20	170
100		6.3x11	105	8x12	146	8x12	220	10x13	252	10x16	267	13x21	285
220		8x12	230	10x13	300	10x13	450	10x16	530	13x21	568	13x25	585
330		10x13	310	10x13	385	10x16	620	10x20	710	13x25	880	16x26	950
470		10x13	420	10x16	520	10x20	800	13x21	890	16x26	900		
1000		10x20	760	13x21	800	13x25	900	16x26	1100				

Cap (µF)	V	100		160		200		250		350		400		450	
	Item	D x L	R.C.	D x L	R.C.	D x L	R.C.	D x L	R.C.	D x L	R.C.	D x L	R.C.	D x L	R.C.
0.47		8x12	15												
1		8x12	22	8x12	28	8x12	28	8x12	40	8x12	40	8x12	42	8x12	45
2.2		8x12	30	8x12	35	8x12	35	10x13	48	10x13	48	10x13	48	10x16	52
3.3		8x12	35	10x13	40	10x16	45	10x16	50	10x16	50	10x16	53	10x20	58
4.7		10x13	42	10x13	50	10x16	60	10x20	65	10x20	53	10x20	62	10x25	65
10		10x16	68	10x16	80	10x20	78	10x20	78	10x25	85	10x25	86	13x21	90
22		10x20	95	10x20	115	10x25	126	13x21	128	13x25	139	13x30	142	16x26	154
33		13x21	150	10x25	154	13x21	157	13x25	171	16x26	189	16x26	189	16x32	203
47		13x25	180	13x25	200	13x25	204	16x26	292	16x32	243	16x32	243		
68		13x25	210	16x26	245	16x26	250	16x32	292						
100		16x26	290	16x32	360	16x36	329								

※ 13mm may be replaced by 12.5mm upon customer's request.

Aluminum Electrolytic Capacitors

RHI Series

- Miniature RHC series, long-life products.
- Load life: 10000~12000hours.
- Suitable for electronic ballast for lighting equipment,
- Long-life power input with smooth function.
- RoHS Compliant & Halogen Free

Specifications

Items	Characteristics						
Capacitance Tolerance	± 20% (120Hz, 20°C)						
Operating Temperature Range	-40 ~ +105°C			-25 ~ +105°C			
Rated Voltage Range	16 ~ 400VDC			450VDC			
Leakage Current	I ≤ 0.04CV+100uA which is greater.(After 1minutes application of DC rated voltage, at 20 °C)						
Dissipation Factor	Measurement Frequency: 120Hz. Temperature: 20°C						
	Rated Voltage (V)	160	200	250	350	400	450
	tan δ(Max)	0.20	0.20	0.20	0.24	0.24	0.24
Low Temperature Stability	When nominal capacitance over 1000μF, tanδ shall be added 0.02 to the listed value with increase of every 1000μF						
	Measurement Frequency: 120Hz.						
	Rated Voltage(V)	160	200	250	350	400	450
Impedance Ratio (Max)	Z(-25°C) / Z(20°C)	3	3	3	5	5	6
	Z(-40°C) / Z(20°C)	8	8	8	10	10	-
Load Life	12,000 hours, with application of rated voltage at 105°C.(L≤20mm,10,000hrs)						
	Capacitance Change	Within ± 20% of Initial Value					
	tan δ	200% or less of Initial Specified Value					
Shelf Life	Leakage Current	Initial Specified Value or less					
	The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours 105°C without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to them 4.1 of JIS C5101-4.						
	Capacitance Change	Within ± 20% of Initial Value					
Standards	tan δ	200% or less of Initial Specified Value					
	Leakage Current	Initial Specified Value or less					
Standards	JIS C-5101-4(IEC 60384)						

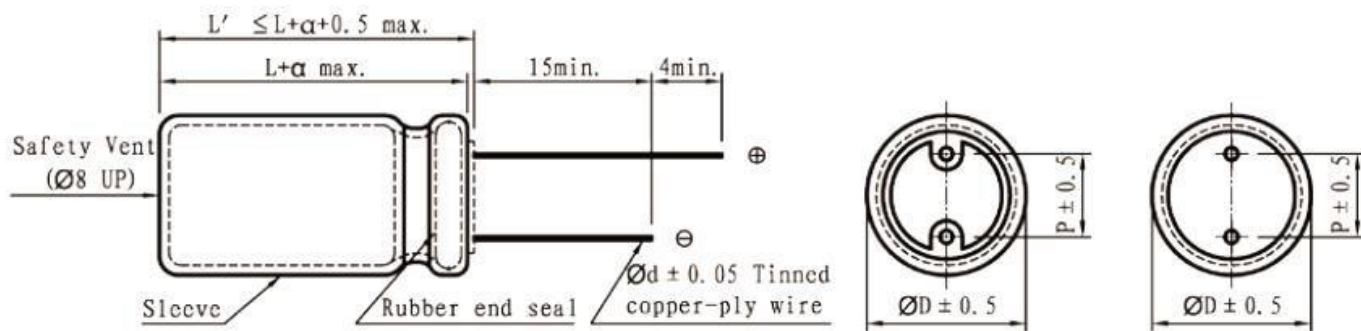
Frequency Coefficient of Permissible Ripple Current

Capacitance (μF)	Frequency (Hz)			
	120	1K	10K	100K
6.8~82	1.00	1.75	2.25	2.50
100~680	1.00	1.67	2.05	2.25

The endurance of capacitors is reduced with internal heating produced by ripple current at the rate of halving the lifetime with every 5°C rise. When long life performance is required in actual use, the rms ripple current has to be reduced.



Dimensions (mm)



$\varnothing D$	10	13	16	18
P	5.0	5.0	7.5	7.5
$\varnothing d$	0.6	0.6	0.8	0.8

α	(L < 16) 1.0
	(L > 16) 2.0

Standard Ratings

D×L(mm) ; R.C.(mA rms) at 105°C 120Hz.

Cap (μF)	V	160		200		250		350		400		450	
	Item	D x L	R.C.	D x L	R.C.	D x L	R.C.	D x L	R.C.	D x L	R.C.	D x L	R.C.
6.8										10x16	130	10x16	100
10										10x16	140	10x20	130
12								10x16	150	10x20	165	10x20	145
15								10x20	170	10x20	180	10x25	175
22				10x16	210	10x16	210	10x20	215	10x30	260	13x25	285
33		10x16	230	10x20	290	10x20	290	13x21	330	13x25	365	16x22	365
47		10x20	285	10x20	340	13x21	465	13x25	485	16x22	495	16x26	475
56		10x20	300	10x25	395	13x21	490	16x22	530	16x26	555	18x26	530
68		13x21	500	13x21	520	13x25	550	16x26	630	16x26	600	16x36	625
82		13x21	580	13x25	610	16x22	655	18x26	720	18x26	720	18x32	695
100		13x21	610	16x22	655	16x22	680	18x26	750	18x32	830	18x35	790
120		16x22	720	16x22	760	16x26	800	18x32	890	18x35	890	18x40	885
150		16x22	780	18x22	865	18x26	920	18x35	1020	18x40	980		
180		16x25	950	18x22	950	18x30	990	18x40	1140	18x45	1050		
220		18x25	1050	18x26	1125	18x32	1100	18x45	1235				
270		18x30	1170	18x32	1340	18x40	1380						
330		18x35	1370	18x32	1480	18x45	1450						
390		18x36	1500	18x35	1590								
470		18x40	1825	18x40	1760								
560		18x45	2025										
680		18x50	2185										

※ 13mm may be replaced by 12.5mm upon customer's request.

Aluminum Electrolytic Capacitors

RHD Series

- High temperature resistance, high reliability.
- 125°C, 2000 hours long life product.
- RoHS Compliant

Specifications

Items	Characteristics											
Capacitance Tolerance	± 20%(120Hz , 20℃)											
Operating Temperature Range	-40 ~ +125℃						-40 ~ +125℃			-25 ~ +125℃		
Rated Voltage Range	10 ~ 100VDC						160 ~ 250VDC			350 ~ 450VDC		
Leakage Current	I ≤ 0.01CV or 2 (μA) which is greater (After 2 minutes application of DC rated voltage, at 20℃)						I ≤ 0.03CV +20 (μA) (After 3 minutes application of DC rated voltage, at 20 °C)					
Dissipation Factor (tan δ)	Measurement Frequency: 120Hz. Temperature: 20℃											
	Rated Voltage(V)	10	16	25	35	50	63	100	160	200	250	350~450
	tan δ(Max)	0.20	0.16	0.14	0.12	0.10	0.10	0.10	0.15	0.20	0.20	0.24
	When nominal capacitance over 1000μF, tanδ shall be added 0.02 to the listed value with increase of every 1000μF.											
Low Temperature Stability Impedance Ratio (Max)	Measurement Frequency: 120Hz.											
	Rated Voltage(V)	10	16	25	35	50	63	100	160	200	250	350~450
	Z(-25℃) / Z(20℃)	3	2	2	2	2	2	3	3	3	3	6
	Z(-40℃) / Z(20℃)	8	6	4	4	4	4	4	6	6	6	-
Load Life	2000 hours, with application of rated voltage at 125℃											
	Capacitance Change		Within ± 25% of Initial Value									
	tan δ		200% or less of Initial Specified Value									
	Leakage Current		Initial Specified Value or less									
Shelf Life	The following specifications shall be satisfied when the capacitors are restored to 20℃ after exposing them for 1,000 hours 125℃ without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to them 4.1 of JIS C5101-4.											
	Capacitance Change		Within ± 25% of Initial Value									
	tan δ		200% or less of Initial Specified Value									
	Leakage Current		Initial Specified Value or less									
Standards	JIS C 5101-4 (IEC 60384)											

Frequency Coefficient of Permissible Ripple Current

Rated Voltage (V)	Capacitance (μF)	Frequency (Hz)			
		50	120	1K	$\geq 10K$
≤ 100	<100	0.75	1.00	1.57	2.00
	100 ~ 470	0.80	1.00	1.34	1.50
	>470	0.85	1.00	1.10	1.15
≥ 160	1 ~ 100	0.85	1.00	1.40	1.50

The endurance of capacitors is reduced with internal heating produced by ripple current at the rate of halving the lifetime with every 5°C rise. When long life performance is required in actual use, the rms ripple current has to be reduced.



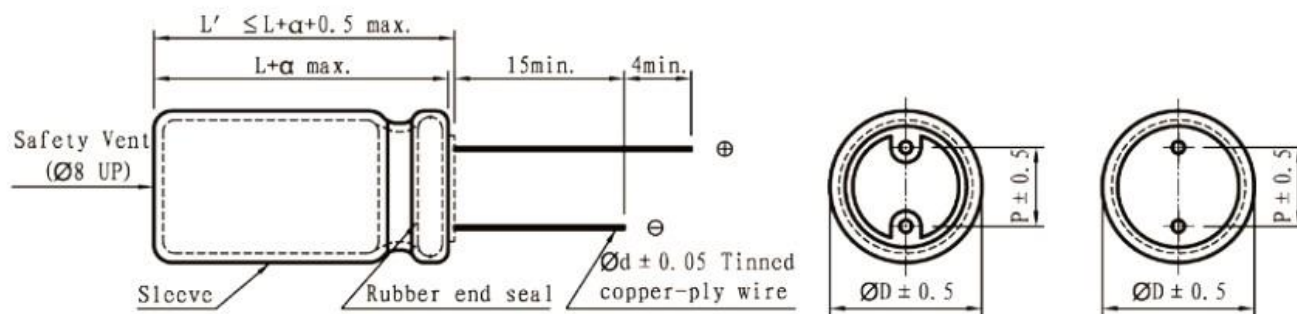
Aluminum Electrolytic Capacitors

RHD Series

Dimensions (mm)

Ø D	6.3	8	10	13	16
P	2.5	3.5	5.0	5.0	7.5
Ø d	0.5	0.5	0.6	0.6	0.8

α	(L < 16) 1.0
	(L ≥ 16) 2.0



Standard Ratings

D×L(mm) ; R.C.(mA rms) at 125°C 120Hz.

Cap(μF)	V	10		16		25		35		50		63			
	Item	D x L	R.C.	D x L	R.C.	D x L	R.C.	D x L	R.C.	D x L	R.C.	D x L	R.C.		
3.3												8x12	28		
4.7												8x12	35		
10								6.3x11	40	8x12	45	8x12	54		
22						6.3x11	70	8x12	78	8x12	80	10x13	92		
33				6.3x11	70	8x12	90	8x12	105	8x12	112	10x16	130		
47		6.3x11	80	6.3x11	82	8x12	110	8x12	148	10x13	154	10x20	170		
100		6.3x11	105	8x12	146	8x12	220	10x13	252	10x16	267	13x21	285		
220		8x12	230	10x13	300	10x13	450	10x16	530	13x21	568	13x25	585		
330		10x13	310	10x13	385	10x16	620	10x20	710	13x25	880	16x26	950		
470		10x13	420	10x16	520	10x20	800	13x21	890	16x26	900				
1000		10x20	760	13x21	800	13x25	900	16x26	1100						
Cap(μF)	V	100		160		200		250		350		400		450	
	Item	D x L	R.C.	D x L	R.C.	D x L	R.C.	D x L	R.C.	D x L	R.C.	D x L	R.C.	D x L	R.C.
0.47		8x12	15												
1		8x12	22	8x12	28	8x12	28	8x12	40	8x12	40	8x12	42	8x12	45
2.2		8x12	30	8x12	35	8x12	35	10x13	48	10x13	48	10x13	48	10x16	52
3.3		8x12	35	10x13	40	10x1	45	10x16	50	10x16	50	10x16	53	10x20	58
4.7		10x13	42	10x13	50	10x1	60	10x20	65	10x20	53	10x20	62	10x25	65
10		10x16	68	10x16	80	10x2	78	10x20	78	10x25	85	10x25	86	13x21	90
22		10x20	95	10x20	115	10x2	126	13x21	128	13x25	139	13x30	142	16x26	154
33		13x21	150	10x25	154	13x2	157	13x25	171	16x26	189	16x26	189	16x32	203
47		13x25	180	13x25	200	13x2	204	16x26	292	16x32	243	16x32	243		
68		13x25	210	16x26	245	16x2	250	16x32	292						
100		16x26	290	16x32	360	16x3	329								

※ 13mm may be replaced by 12.5mm upon customer's request.

Aluminum Electrolytic Capacitors

RHJ Series

- High temperature, high ripple current at high frequency.
- Specially designed for electronic ballast and energy saving lamp.
- Load Life: 2,000~3,000 hours.
- RoHS Compliance

Specifications

Items	Characteristics											
Capacitance Tolerance	± 20%(120Hz,20°C)											
Operating Temperature Range	- 40 ~ +130°C						- 40 ~ +130°C			- 25 ~ +130°C		
Rated Voltage Range	10 ~ 100VDC						160 ~ 250VDC			350 ~ 450VDC		
Leakage Current	I ≤ 0.01CV or 3 (μA) which is greater. (After 2 minutes application of DC rated voltage, at 20 °C)						I ≤ 0.03CV +20 (μA) (After 3 minutes application of DC rated voltage, at 20 °C)					
Leakage Current (tan δ)	Measurement Frequency:120Hz. Temperature: 20°C											
	Rated Voltage(V)	10	16	25	35	50	63	100	160	200	250	350 ~ 450
	Tan δ (Max)	0.20	0.16	0.14	0.12	0.10	0.10	0.10	0.15	0.20	0.20	0.24
	When nominal capacitance over 1000μF, tan δ shall be added 0.02 to the listed value with increase of every 1000μF.											
Low Temperature Stability Impedance Ratio (Max)	Measurement Frequency:120Hz											
	Rated Voltage(V)	10	16	25	35	50	63	100	160	200	250	350 ~ 450
	Z(-25°C) / Z(20°C)	3	2	2	2	2	2	3	3	3	3	6
	Z(-40°C) / Z(20°C)	8	6	4	4	4	4	4	6	6	6	—
Load Life	3,000 hours, with application of rated voltage at 130°C. (ØD≤8mm,2,000hrs)											
	Capacitance Change	within ±25% of initial Value										
	tan δ	200% or less of initial Specified Value										
	Leakage Current	Initial Specified Value or less										
Shelf Life	The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000hours 130°C without voltage applied. Before the measurement. The Capacitance shall be preconditioned by applying voltage according to them 4.1 of JIS C5101-4.											
	Capacitance Change	within ±25% of initial Value										
	tan δ	200% or less of initial Specified Value										
	Leakage Current	Initial Specified Value or less										
Standards	JIS C 5101-4 (IEC 60384)											

Frequency Coefficient of Permissible Ripple Current

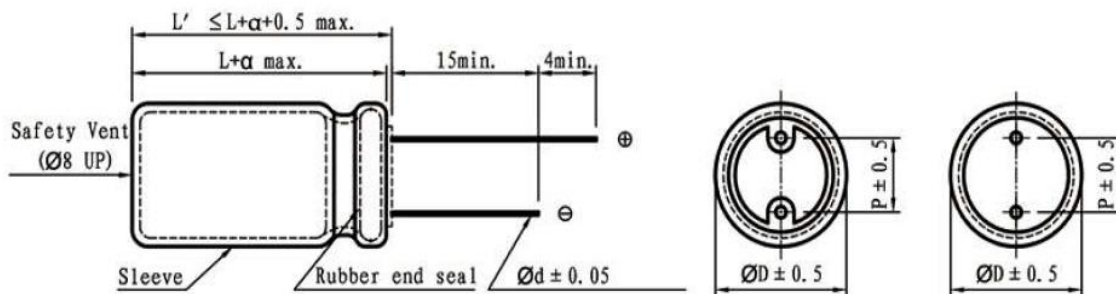
Rated Voltage (V)	Capacitance (μF)	Frequency (Hz)			
		50	120	1K	≥10K
≤100	< 100	0.50	0.70	0.85	1.00
	100 ~ 1500	0.65	0.75	0.90	1.00
	> 1500	0.75	0.80	0.95	1.00
≥160	1.8 ~ 5.6	0.20	0.40	0.80	1.00
	6.8 ~ 100	0.40	0.75	0.90	1.00

The endurance of capacitors is reduced with internal heating produced by ripple current at the rate of halving the lifetime with every 5°C rise. When long life performance is required in actual use, the rms ripple current has to be reduced.



RHJ Series

Dimensions (mm)



$\varnothing D$	8	10	13	16
P	3.5	5.0	5.0	7.5
$\varnothing d$	0.5	0.6	0.6	0.8

α	(L < 16) 1.0
	(L $\geq$ 16) 2.0

Standard Ratings

D×L(mm) ; R.C.(mA rms) at 130°C 100KHz.

Cap (μF)	V Item	10		16		25		35		50		63			
		DxL	R.C.	DxL	R.C.	DxL	R.C.	DxL	R.C.	DxL	R.C.	DxL	R.C.		
3.3										8x12	70				
4.7										8x12	100				
10										8x12	200	8x12	200		
22										8x12	260	8x12	250		
33										8x12	300	10x13	400		
47										8x12	300	10x16	450		
100		8x12	340	8x12	340	8x12	340	10x13	620	10x13	520	13x21	820		
220		8x12	340	10x13	620	10x13	620	10x16	800	10x20	890	13x25	1000		
330		10x13	580	10x13	620	10x16	800	10x20	960	13x21	1000	16x26	1500		
470		10x13	620	10x16	800	10x20	960	13x21	1430	13x25	1200	16x32	1850		
1000		10x20	960	13x21	1430	13x25	1430	16x26	1900	16x32	2180				
2200		13x25	1430	16x26	1900	16x32	2300	16x36	2550						
3300		16x26	1900	16x32	2300	16x36	2550								
4700		16x32	2300	16x36	2550										
Cap (μF)	V Item	100		160		200		250		350		400		450	
		DxL	R.C.	DxL	R.C.	DxL	R.C.	DxL	R.C.	DxL	R.C.	DxL	R.C.	DxL	R.C.
1.8										10x16	62	10x16	60	10x16	58
2.2										10x16	70	10x16	68	10x16	66
3.3										10x16	84	10x16	82	10x16	80
4.7		8x12	80	8x12	80	8x12	80	10x16	70	10x20	105	10x20	100	10x20	90
5.6		8x12	118	8x12	100	8x16	118	10x16	130	10x20	150	13x21	160	13x21	150
6.8		8x12	145	8x14	130	8x16	145	10x16	150	13x21	186	13x21	186	13x21	176
10		8x12	200	10x16	200	10x16	200	10x20	224	13x21	278	13x21	278	16x26	510
22		8x12	220	10x20	300	13x21	400	13x21	400	13x25	430	13x25	430	16x32	630
33		10x13	260	13x21	400	13x21	480	13x25	510	16x26	600	16x26	600		
47		10x16	330	13x25	528	13x25	528	16x26	620	16x32	650	16x32	650		
100		13x21	670	16x26	716										
220		16x26	1100												
330		16x32	1300												

※ 13mm may be replaced by 12.5mm upon customer's request.



Aluminum Electrolytic Capacitors

RHK Series

- On the basis of RHA series ripple promotion product.
- Suitable for LCD TV Power, SMPS.
- RoHS Compliant & Halogen Free

Specifications

Items	Characteristics				
Capacitance Tolerance	± 20% (120Hz, 20°C)				
Operating Temperature Range	-40 ~ +105°C			-25 ~ +105°C	
Rated Voltage Range	400VDC			450 ~ 500VDC	
Leakage Current	I ≤ 0.03CV +20 (μA) (After 3 minutes application of DC rated voltage, at 20 °C)				
Dissipation Factor	Measurement Frequency: 120Hz. Temperature: 20°C				
	Rated Voltage (V)	160~400	450	460	500
	tan δ(Max)	0.15	0.20	0.20	0.20
	When nominal capacitance over 1000μF, tanδ shall be added 0.02 to the listed value with increase of every 1000μF.				
Low Temperature Stability	Measurement Frequency: 120Hz.				
	Rated Voltage(V)	400	450	460	500
Impedance Ratio (Max)	Z(-25°C) / Z(20°C)	3	3	6	6
	Z(-40°C) / Z(20°C)	6	-	-	-
Load Life	5,000 hours, with application of rated voltage at 105°C.				
	Capacitance Change	Within ± 20% of Initial Value			
	tan δ	200% or less of Initial Specified Value			
	Leakage Current	Initial Specified Value or less			
Shelf Life	The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours 105°C without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to them 4.1 of JIS C5101-4.				
	Capacitance Change	Within ± 20% of Initial Value			
	tan δ	200% or less of Initial Specified Value			
	Leakage Current	Initial Specified Value or less			
Standards	JIS C 5101-4-1 (IEC 60384)				

Frequency Coefficient of Permissible Ripple Current

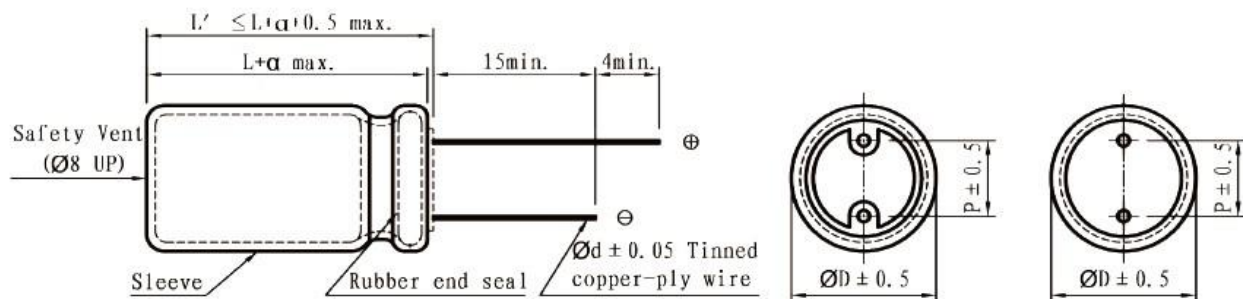
Capacitance (μ F)	Frequency (Hz)				
	120	1K	10K	50K	100K
10 ~ 82	1.00	1.75	2.25	2.35	2.50
100 ~ 150	1.00	1.67	2.05	2.15	2.25

The endurance of capacitors is reduced with internal heating produced by ripple current at the rate of halving the lifetime with every 5°C rise. When long life performance is required in actual use, the rms ripple current has to be reduced.

Aluminum Electrolytic Capacitors

RHK Series

Dimensions (mm)



Ø D	10	13	16	18	20	22
P	5.0	5.0	7.5	7.5	10	10
Ø d	0.6	0.6	0.8	0.8	0.8	0.8

Standard Ratings

D×L(mm); R.C. (mA rms) at 105°C 120Hz.

Cap (µF)	V	400			450			460			500		
	Item	D x L	R.C.		D x L	R.C.		D x L	R.C.		D x L	R.C.	
			120Hz	100KHz		120Hz	100KHz		120Hz	100KHz		120Hz	100KHz
10		10x16	150	375	10x20	105	263	10x20	80	200	13x21	75	187.5
15		10x20	170	425	13x21	130	325	13x21	110	275	13x21	90	225
22		13x21	250	625	13x25	210	525	13x25	180	450	13x25	170	425
33		13x25	350	875	16x22	270	675	16x25	330	825	16x25	260	650
47		13x25	480	1200	18x26	450	1125	18x26	400	1000	18x32	350	875
56		16x25	500	1250	18x26	550	1375	18x26	500	1250	18x35	520	1300
68		18x26	650	1625	18x32	600	1500	18x32	600	1500	18x35	550	1375
82		18x26	750	1875	18x32	650	1625	18x32	650	1625	18x40	650	1625
100		18x32	800	1800	18x35	750	1688	18x35	750	1688	18x45	700	1575
120		18x35	850	1913	18x40	800	1800	18x40	800	1800	22x45	800	1800
150		18x40	900	2025	20x45	900	2025	20x45	900	2025			

※ 13mm may be replaced by 12.5mm upon customer's request.

Aluminum Electrolytic Capacitors

RHL Series

- On the basic of HH series Life promotion product
- Suitable for LED Lighting Power Supply Circuit
- RoHS Compliance.

Specifications

Item	Characteristics					
Capacitance Tolerance	± 20% (120Hz, 20°C)					
Operating Temperature	-40~+150°C			-25~+150°C		
Rated Voltage Range	16~400VDC			450VDC		
Leakage Current	I ≤ 0.01CV +100 (μA) (After 1minutes application of DC rated voltage, at 20 °C)					
Dissipation Factor	Measurement Frequency: 120Hz. Temperature: 20°C					
	Rated Voltage	160~400		450		
	tan δ(Max)	0.24		0.24		
Low Temperature Stability Impedance Ratio (Max)	Measurement Frequency: 120Hz.					
	Rated Voltage (V)	160	200	250	400	450
	Z(-25°C)/Z(20°C)	3	3	3	6	6
	Z(-40°C)/Z(20°C)	8	8	8	10	-
Load Life	The following specifications shall be satisfied when the capacitors are restored at 20 °C after subjected to DC Voltage with the rated ripple current is applied for 2,000 hours (φD≤10:15,000 hours) at 105 °C					
	Capacitance Change	Within ± 30% of Initial Value				
	tan δ	300% or less of Initial Specified Value				
	Leakage Current	Initial Specified Value or less				
Shelf Life	The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours 105°C without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to them 4.1 of JIS C5101-4.					
	Capacitance Change	Within ± 30% of Initial Value				
	tan δ	300% or less of Initial Specified Value				
	Leakage Current	Initial Specified Value or less				
Standards	JIS C 5101-4-1 (IEC 60384)					

Frequency Coefficient of Permissible Ripple Current

Rated Voltage (V)	Capacitance (μF)	Frequency			
		120	1K	10K	100K
160~400	2.2~5.6	1.00	1.60	1.80	2.00
	6.8~18	1.00	1.50	1.70	1.90
	22~33	1.00	1.40	1.60	1.80
450	4.7~15	0.3 0	0.60	0.90	1.00
	22~120	0.4	0.70	0.90	1.00

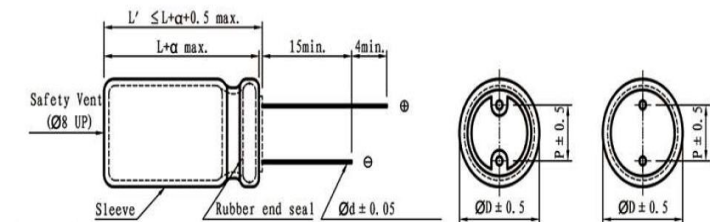
The endurance of capacitors is reduced with internal heating produced by ripple current at the rate of halving the lifetime with every 5°C rise.
 When long life performance is required in actual use, the rms ripple current has to be reduced.



Aluminum Electrolytic Capacitors

RHL Series

Dimensions (mm)



ØD	10	13	16	18	20	22
P	5.0	5.0	7.5	7.5	10	10
Ød	0.6	0.6	0.8	0.8	0.8	0.8

D x L(mm), R.C. (mA rms) at 105°C

Cap (µF)	V (Code) Item	160			200			250		
		D x L	R.C.		D x L	R.C.		D x L	R.C.	
			120HZ	100KHZ		120HZ	100KHZ		120HZ	100KHZ
5.6		6.3 x 11	52	104	8 x 10	56	112	8 x 12	62	124
6.8					8 x 10	62	117	8 x 12	68	129
8.2					8 x 10	88	125	10 x 10	76	144
10		8 x 10	70	133	8 x 12	80	152	10 x 13	90	171
12					10 x 10	88	167	10 x 13	97	184
15		8 x 12	92	174						
		10 x 10	95	180						
18					10 x 13	113	214	10 x 16	127	241
22		10 x 13	121	217	8 x 4	56	112			
27					10 x 16	149	268			
33		10 x 16	158	284						

Cap(µF)	V (Code) Item	400			450		
		D x L	R.C.		D x L	R.C.	
			120HZ	100KHZ		120HZ	100KHZ
2.2		8 x 12	40	80			
2.7		8 x 12	43	86			
3.3		8 x 12	47	94			
		10 x 10	48	96			
3.9		10 x 13	57	114			
4.7		10 x 13	61	122	10 x 16	54	180
					10 x 20	66	220
6.8		10 x 16	85	162	10 x 20	84	280
8.2		10 x 16	88	167	10 x 20	84	280
10		10 x 20	115	219	13 x 21	135	450
15		13 x 21	150	285	13 x 25	180	600
22		13 x 21	209	376	13 x 25	240	600
					16 x 20	292	730
33		16 x 22	297	535	16 x 25	392	980
					18 x 20	312	780
47					18 x 25	480	1200
68					18 x 32	520	1300
82					18 x 35	574	1435
100					18 x 40	650	1625
120					20 x 45	720	1800

Aluminum Electrolytic Capacitors

RHM Series

- On the basic of SEA series ripple promotion product
- Suitable for LCD TV Power, SMPS
- RoHS Compliance.

Specifications

Item	Characteristics				
Capacitance Tolerance	± 20% (120Hz, 20℃)				
Operating Temperature	-40~+150℃			-25~+150℃	
Rated Voltage Range	160VDC~400VDC			450VDC~460VDC	
Leakage Current	I ≤ 0.03CV +20 (μA) (After 3minutes application of DC rated voltage, at 20 ℃)				
Dissipation Factor	Measurement Frequency: 120Hz. Temperature: 20℃				
	Rated Voltage	160~250	350	400	450~460
	tan δ(Max)	0.15	0.15	0.20	0.20
Low Temperature Stability Impedance Ratio (Max)	When the nominal capacitance over 1000μF, tan shall be added 0.02 to the listed value with increase of every 1000μF				
	Measurement Frequency: 120Hz.				
	Rated Voltage (V)	160~250	350	400~450	460
	Z(-25℃)/Z(20℃)	3	5	6	6
	Z(-40℃)/Z(20℃)	6	-	-	-
Load Life	5000hours, with application of rated voltage at 105℃				
	Capacitance Change	Within ± 20% of Initial Value			
	tan δ	200% or less of Initial Specified Value			
	Leakage Current	Initial Specified Value or less			
Shelf Life	The following specifications shall be satisfied when the capacitors are restored to 20℃ after exposing them for 1,000 hours 105℃ without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to them 4.1 of JIS C5101-4.				
	Capacitance Change	Within ± 20% of Initial Value			
	tan δ	200% or less of Initial Specified Value			
	Leakage Current	Initial Specified Value or less			
Standards	JIS C 5101-4-1 (IEC 60384)				

Frequency Coefficient of Permissible Ripple Current

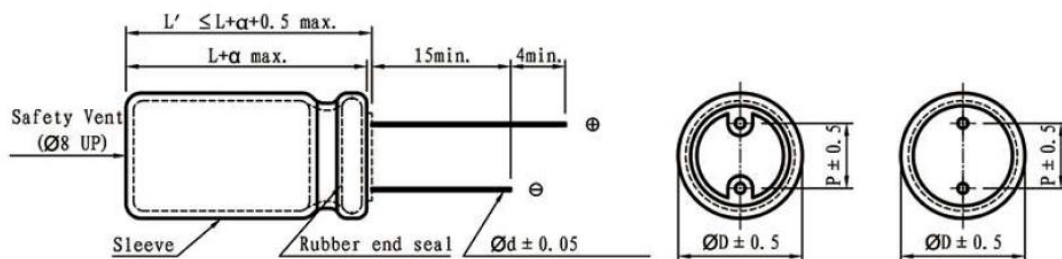
Capacitance (μF)	Frequency (Hz)				
	120	1K	10K	50K	100K
10~82	1.00	1.75	2.25	2.23	2.50
100~150	1.00	1.67	2.05	2.15	2.25

The endurance of capacitors is reduced with internal heating produced by ripple current at the rate of halving the lifetime with every 5°C rise. When long life performance is required in actual use, the rms ripple current has to be reduced.

Aluminum Electrolytic Capacitors

RHM Series

Dimensions (mm)



α	(L < 16) 1.0
	(L $\geq$ 16) 2.0

ϕD	10	13	16	18	20	22
P	5.0	5.0	7.5	7.5	10	10
ϕd	0.6	0.6	0.8	0.8	0.8	0.8

Standard Ratings

Cap (μF)	V	160		200		250		350	
	Item	D x L	R.C.	D x L	R.C.	D x L	R.C.	D x L	R.C.
10		8 x 12	140	8 x 14	180	10 x 13	180	8 x 20	180
22		8 x 16	220	8 x 16	220	10 x 16	200	8 x 30	250
27		10 x 14	220	10 x 13	220	10 x 20	240	10 x 25	280
33		8 x 20	280	10 x 16	250	10 x 20	260	13 x 21	350
47		10 x 20	320	10 x 20	280	10 x 25	320	13 x 25	380
56		10 x 25	360	10 x 25	320	10 x 25	330	16 x 22	450
68		13 x 21	445	10 x 25	330	13 x 21	445	16 x 25	550
82		13 x 21	445	10 x 30	390	13 x 25	520	16 x 25	650
100		10 x 30	445	10 x 35	485	13 x 30	580	16 x 25	650
		13 x 25	520	10 x 40	560	16 x 25	650	16 x 25	700

Cap (μF)	V	400		450		460	
	Item	D x L	R.C.	D x L	R.C.	D x L	R.C.
10		10 X 16	160	10 X 20	180	10 x 20	150
15		10 X 20	180	13 X 21	300	13 x 21	210
22		13 X 21	300	13 X 25	390	13 x 25	280
33		13 X 25	390	16 X 22	450	16 x 25	430
47		13 X 25	430	18 X 25	650	18 x 25	500
56		16 X 25	530	18 X 25	700	18 x 25	540
68		18 X 25	680	18 X 32	750	18 x 32	680
82		18 X 25	760	18 X 32	780	18 x 32	720
100		18 X 32	830	18 X 35	820	18 x 35	800
120		18 X 35	880	18 X 40	920	18 x 45	1000
150		18 X 40	950	20 X 45	1080	20 x 45	1050

13mm may be replaced by 12.5mm upon customer's request.

Aluminum Electrolytic Capacitors

RMI Series

- 105°C 10000 hours, miniaturized and long life.
- RoHS Compliant & Halogen Free

Specifications

Items	Characteristics								
Capacitance Tolerance	± 20% (120Hz, 20°C)								
Operating Temperature Range	-25 ~ +105°C								
Rated Voltage Range	10 ~ 100VDC								
Leakage Current	I ≤ 0.01CV or 3 (μA) which is greater. (After 2 minutes application of DC rated voltage, at 20 °C)								
Dissipation Factor	Measurement Frequency: 120Hz. Temperature: 20°C								
	Rated Voltage (V)	6.3	10	16	25	35	50	63	100
	tan δ(Max)	0.45	0.45	0.35	0.3	0.22	0.19	0.17	0.15
Low Temperature Stability	Measurement Frequency: 120Hz.								
Impedance Ratio (Max)	Rated Voltage(V)	10		16	25	35	50	63	100
	Z(-25°C) / Z(20°C)	8		6	4	4	3	3	3
Load Life	10,000 hours, with application of rated voltage at 105°C.								
	Capacitance Change	Within ± 25% of Initial Value							
	tan δ	300% or less of Initial Specified Value							
	Leakage Current	Initial Specified Value or less							
Shelf Life	The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours 105°C without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to them 4.1 of JIS C5101-4.								
	Capacitance Change	Within ± 25% of Initial Value							
	tan δ	300% or less of Initial Specified Value							
	Leakage Current	Initial Specified Value or less							
Standards	JIS C 5101-4-1 (IEC 60384)								

Frequency Coefficient of Permissible Ripple Current

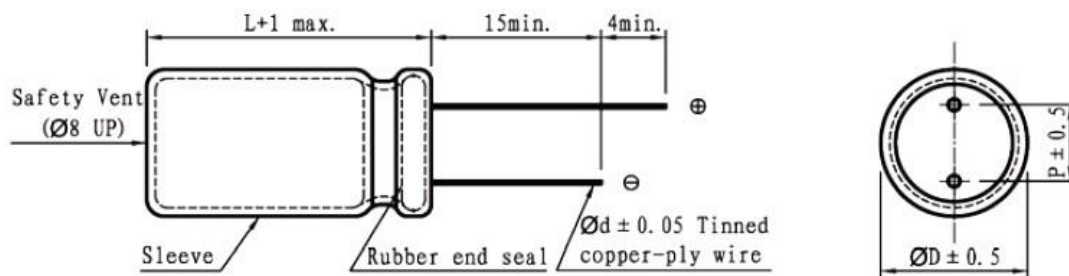
Rated Voltage (V)	Capacitance (μF)	Frequency (Hz)			
		120	1K	10K	100K
10 ~ 100	0.47~10	0.42	0.60	0.80	1.00
	22~33	0.55	0.75	0.90	1.00
	47~330	0.70	0.85	0.95	1.00

The endurance of capacitors is reduced with internal heating produced by ripple current at the rate of halving the lifetime with every 5°C rise. When long life performance is required in actual use, the rms ripple current has to be reduced.

Aluminum Electrolytic Capacitors

RMI Series

Dimensions (mm)



ØD	5	6.3	8
P	2.0	2.5	3.5
Ød	0.5	0.5	0.5

Standard Ratings

D×L(mm) ; R.C.(mA rms) at 105°C 100KHz.

Cap (µF)	V	10		16		25		35		50		63		100	
	Item	D x L	R.C.	D x L	R.C.	D x L	R.C.	D x L	R.C.	D x L	R.C.	D x L	R.C.	D x L	R.C.
0.47										5x12	12			5x12	20
1										5x12	25			5x12	40
2.2										5x12	35			5x12	50
3.3										5x12	70			5x12	60
4.7										5x12	80			5x12	70
10										5x12	90	5x12	80	6.3x12	150
22										5x12	120	6.3x12	170	8x12	230
33						5x12	124	5x12	130	6.3x12	190	6.3x12	170		
47				5x12	130	5x12	157	6.3x12	210	6.3x12	190	8x12	240		
100		5x12	130	6.3x12	210	6.3x12	210	8x12	330	8x12	270				
220		6.3x12	210	8x12	330										
330		8x12	330												

Aluminum Electrolytic Capacitors

RHE Series

- 105°C high-temperature resistance, standard product
- 3000 hours Load Life
- Suitable for LED and electronic rectifier
- RoHS Compliant & Halogen Free

Specifications

Items	Characteristics						
Capacitance Tolerance	± 20% (120Hz, 20℃)						
Operating Temperature Range	-40 ~ +105℃			-25 ~ +105℃			
Rated Voltage Range	160 ~ 400VDC			450VDC			
Leakage Current	I ≤ 0.02CV +10 (μA) which is greater. (After 2 minutes application of DC rated voltage, at 20 ℃)			I ≤ 0.03CV +10 (μA) (After 2 minutes application of DC rated voltage, at 20 ℃)			
Dissipation Factor	Measurement Frequency: 120Hz. Temperature: 20℃						
	Rated Voltage (V)	160~180	200	250	350	400	450
	tan δ(Max)	0.15	0.15	0.15	0.15	0.20	0.20
Low Temperature Stability	Measurement Frequency: 120Hz.						
	Rated Voltage(V)	160	200	250	350	400	450
	Z(-25℃) / Z(20℃)	3	3	3	5	5	6
Impedance Ratio (Max)	Z(-40℃) / Z(20℃)	6	6	6	6	6	-
	3000hours, with application of rated voltage at 105℃						
	Capacitance Change	Within ± 20% of Initial Value					
Load Life	tan δ	200% or less of Initial Specified Value					
	Leakage Current	Initial Specified Value or less					
Shelf Life	The following specifications shall be satisfied when the capacitors are restored to 20℃ after exposing them for 1,000 hours 105℃ without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to them 4.1 of JIS C5101-4.						
	Capacitance Change	Within ± 20% of Initial Value					
	tan δ	200% or less of Initial Specified Value					
	Leakage Current	500% or less of Initial Specified Value					
Standards	JIS C-5101-4(IEC 60384)						

Frequency Coefficient of Permissible Ripple Current

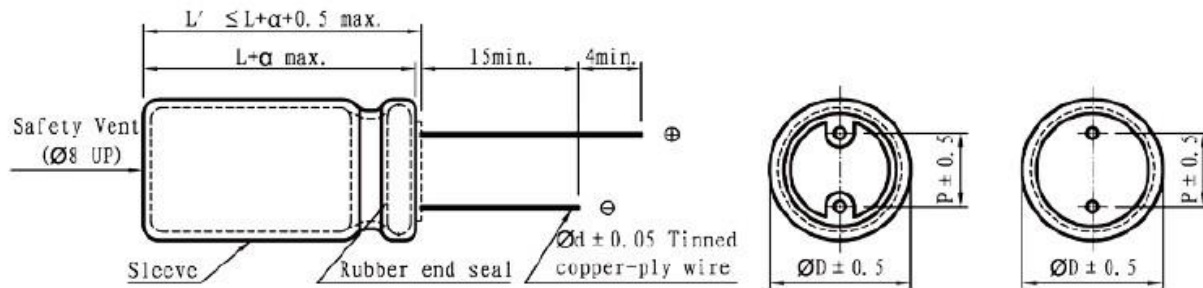
Rated Voltage (V)	Frequency (Hz)			
	120	1K	10K~20K	30K~100K
160~250	0.55	0.85	0.90	1.00
350~450	0.50	0.80	0.90	1.00

The endurance of capacitors is reduced with internal heating produced by ripple current at the rate of halving the lifetime with every 5°C rise. When long life performance is required in actual use, the rms ripple current has to be reduced.

Aluminum Electrolytic Capacitors

RHE Series

Dimensions (mm)



ØD	6.3	8	10	13	16	18
P	2.5	3.5	5.0	5.0	7.5	7.5
Ød	0.5	0.5	0.6	0.6	0.8	0.8

α

(L < 16) 1.0
(L ≥ 16) 2.0

Standard Ratings

D×L(mm) ; R.C.(mA rms) at 105°C 100KHz.

Cap (µF)	V	160		200		250	
	Item	D x L	R.C.	D x L	R.C.	D x L	R.C.
2.2		6.3x11	36	6.3x11	38	8x12	47
3.3		8x12	50	8x12	59	8x12	69
4.7		8x12	55	8x12	65	8x12	70
5.6		8x12	65	8x12	75	8x16	85
6.8		8x12	70	8x14	80	10x13	95
8.2		8x12	80	8x16	85	10x16	105
10		8x12	85	10x13	120	10x16	150
15		8x16	120	10x13	150	10x16	180
22		10x16	195	10x16	210	10x20	250
33		10x20	230	13x21	280	13x21	320
47		13x21	310	13x21	395	13x25	410
68		13x21	380	13x25	460	16x26	480
82		13x25	430	13x25	570	16x26	590
100		16x26	640	16x26	670	16x32	720
150		16x26	700	16x32	790	18x32	875
220		16x36	990	18x35	1040	18x40	1100



RHE Series

Standard Ratings

D×L(mm) ; R.C.(mA rms) at 105°C 100KHz.

Ca p (μF)	V	350		400		450	
	Item	D x L	R.C.	D x L	R.C.	D x L	R.C.
1		8x12	33	8x12	35	8x16	30
1.5		8x12	42	8x12	45	10x16	50
2.2		8x12	47	8x12	55	10x16	60
3.3		8x16	60	10x13	75	10x16	90
4.7		10x13	95	10x16	100	10x20	115
6.8		10x13	100	10x16	125	13x21	130
8.2		10x16	130	10x20	145	13x21	155
10		10x20	145	10x20	150	13x21	160
15		13x21	205	13x21	210	13x21	255
22		13x25	270	13x25	285	16x26	280
33		16x26	355	16x26	400	16x32	455
47		16x26	430	16x26	480	18x32	550
68		16x32	505	16x32	585	18x35	690
82		16x36	655	18x32	695	18x35	805
100		18x32	750	18x35	795	18x40	860

※ 13mm may be replaced by 12.5mm upon customer's request.

RHF Series

- 105°C high-temperature resistance, high ripple current and long life
- 5000hours load life
- Suitable for LED and electronic rectifier
- RoHS Compliant & Halogen Free

Specifications

Items	Characteristics						
Capacitance Tolerance	± 20% (120Hz, 20°C)						
Operating Temperature Range	-40 ~ +105°C				-25 ~ +105°C		
Rated Voltage Range	160 ~ 400VDC				450VDC		
Leakage Current	I≤0.02CV + 10 μA, which is greater. (After 2 minutes application of DC rated voltage at 20 °C)				I≤0.03CV + 10 (μA) (After 2 minutes application of DC rated voltage at 20 °C)		
	Measurement Frequency: 120Hz. Temperature: 20°C						
Dissipation Factor	Rated Voltage (V)	160	200	250	350	400	450~500
	tan δ(Max)	0.15	0.15	0.15	0.15	0.20	0.20
Low Temperature Stability	Measurement Frequency: 120Hz. Temperature: 20°C						
	Rated Voltage(V)	160	200	250	350	400	450
Impedance Ratio (Max)	Z(-25°C)／Z(20°C)	3	3	3	5	5	6
	Z(-40°C)／Z(20°C)	6	6	6	6	6	-
Load Life	5,000 hours, with application of working voltage at 105°C						
	Capacitance Change	Within ± 20% of Initial Value					
	tan δ	200% or less of Initial Specified Value					
	Leakage Current	Initial Specified Value or less					
Shelf Life	The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours 105°C without voltage applied. Before the measurement the capacitor shall be preconditioned by applying voltage according to them 4.1 of JIS C5101-4.						
	Capacitance Change	Within ± 20% of Initial Value					
	tan δ	200% or less of Initial Specified Value					
	Leakage Current	500% or less of Initial Specified Value					
Standards	JIS C-5101-4(IEC 60384)						

Frequency Coefficient of Permissible Ripple Current

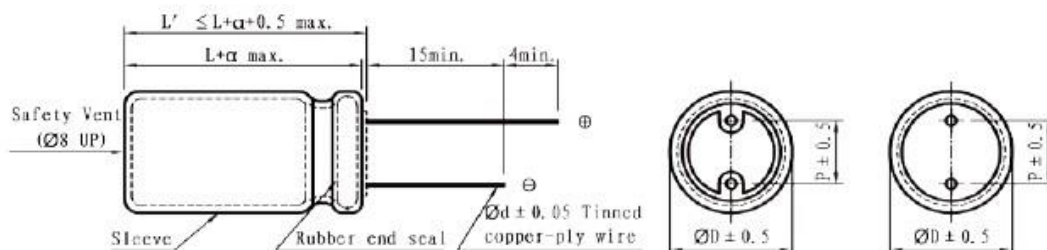
Rated Voltage (V)	Frequency (Hz)			
	120	1K	10K~20K	30K~100K
160~250	0.55	0.85	0.90	1.00
350~450	0.50	0.80	0.90	1.00

The endurance of capacitors is reduced with internal heating produced by ripple current at the rate of halving the lifetime with every 5°C rise. When long life performance is required in actual use, the RMS ripple current has to be reduced.



RHF Series

Dimensions (mm)



ØD	6.3	8	10	13	16	18
P	2.5	3.5	5.0	5.0	7.5	7.5
Ød	0.5	0.5	0.6	0.6	0.8	0.8

α	(L < 16) 1.0
	(L ≥ 16) 2.0

Standard Ratings

D×L(mm) ; R.C.(mA rms) at 105°C 100KHz.

Ca p (µF)	V	160		200		250	
	Item	D x L	R.C.	D x L	R.C.	D x L	R.C.
2.2		6.3x11	60	8x12	68	8x12	70
3.3		8x12	72	8x12	75	8x12	80
4.7		8x12	75	8x12	80	10x13	85
5.6		8x12	80	8x16	85	10x13	90
6.8		8x12	90	8x16	95	10x13	100
8.2		8x12	95	8x16	110	10x16	130
10		8x12	100	10x16	180	10x20	200
15		10x16	210	10x16	230	10x20	260
22		10x20	300	10x20	330	10x20	380
33		10x20	330	13x21	400	13x25	450
47		13x21	400	13x21	450	13x25	520
68		13x25	490	16x26	560	16x32	630
82		13x25	550	16x26	640	16x32	700
100		16x26	680	16x26	720	18x32	830
150		16x32	930	16x36	1030	18x35	1230
220		18x32	1050	18x35	1250	18x40	1340



RHF Series

Standard Ratings

D×L(mm) ; R.C.(mA RMS) at 105°C 100KHz..

Cap (μF)	V	350		400		450	
	Item	D × L	R.C.	D × L	R.C.	D × L	R.C.
1		8x12	43	8x16	50	8x16	60
1.5		8x12	45	10x13	53	10x16	63
2.2		8x12	53	10x13	63	10x16	70
3.3		10x13	80	10x16	90	10x16	95
4.7		10x16	90	10x16	100	10x20	105
5.6		10x16	100	10x16	108	10x20	110
6.8		10x20	130	10x20	155	13x21	160
8.2		13x21	160	13x21	190	13x21	220
10		13x21	190	13x21	230	13x21	250
15		13x25	230	13x25	250	13x25	300
22		16x26	300	16x26	380	16x32	430
33		16x26	350	16x32	430	16x36	560
47		16x36	480	18x26	580	18x32	630
68		18x26	560	18x32	650	18x35	780
82		18x32	730	18x35	800	18x40	950
100		18x35	840	18x40	930		

※ 13mm may be replaced by 12.5mm upon customer's request.

RHH Series

- 105°C high-temperature resistance, high ripple current and long life
- 10000hours load life
- Suitable for LED and electronic rectifier
- RoHS Compliant & Halogen Free

Specifications

Items	Characteristics							
Capacitance Tolerance	± 20% (120Hz, 20°C)							
Operating Temperature Range	-40 ~ +105°C				-25 ~ +105°C			
Rated Voltage Range	160 ~ 400VDC				450VDC			
Leakage Current	I ≦ 0.02CV +10 (μA) which is greater. (After 2 minutes application of DC rated voltage, at 20 °C)				I ≦ 0.03CV +10 (μA) (After 2 minutes application of DC rated voltage, at 20 °C)			
	Measurement Frequency: 120Hz. Temperature: 20°C							
Dissipation Factor	Rated Voltage (V)	160	200	250	350	400	450	420~500
	tan δ(Max)	0.15	0.15	0.15	0.15	0.20	0.20	0.20
Low Temperature Stability	Measurement Frequency: 120Hz.							
	Rated Voltage(V)	160	200	250	350	400	450	
Impedance Ratio (Max)	Z(-25°C)／Z(20°C)	3	3	3	5	5	6	
	Z(-40°C)／Z(20°C)	6	6	6	6	6	-	
Load Life	10000 hours, with application of rated voltage at 105°C (8ψ ~ 10ψ: 8000 hours)							
	Capacitance Change	Within ± 20% of Initial Value						
	tan δ	200% or less of Initial Specified Value						
	Leakage Current	Initial Specified Value or less						
Shelf Life	The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours 105°C without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to them 4.1 of JIS C5101-4.							
	Capacitance Change	Within ± 20% of Initial Value						
	tan δ	200% or less of Initial Specified Value						
	Leakage Current	500% or less of Initial Specified Value						
Standards	JIS C-5101-4(IEC 60384)							

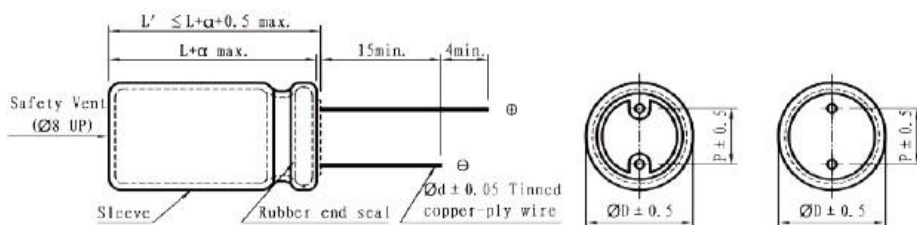
Frequency Coefficient of Permissible Ripple Current

Frequency (Hz)	50	120	1K	10K	100K
Coefficient	0.45	0.55	0.75	0.90	1.00

The endurance of capacitors is reduced with internal heating produced by ripple current at the rate of halving the lifetime with every 5°C rise. When long life performance is required in actual use, the rms ripple current has to be reduced.

RHH Series

Dimensions (mm)



ØD	8	10	13	16	18	22	α	(L < 16) 1.0
P	3.5	5.0	5.0	7.5	7.5	10		(L ≥ 16) 2.0
Ød	0.5	0.6	0.6	0.8	0.8	0.8		

Standard Ratings

D×L(mm) ; R.C.(mA rms) at 105°C 100KHz.

Cap (µF)	V	160		200		250	
	Item	D x L	R.C.	D x L	R.C.	D x L	R.C.
2.2		8x12	80	8x12	90	8x12	90
3.3		8x12	90	8x12	102	10x13	110
4.7		8x12	98	8x16	110	10x16	120
5.6		8x16	104	8x16	118	10x16	125
6.8		8x16	115	10x13	128	10x16	130
8.2		10x16	125	10x16	220	10x16	240
10		10x16	255	10x16	260	10x20	290
15		10x16	430	10x20	430	13x21	460
22		10x20	510	13x21	510	13x21	610
33		13x21	580	13x21	610	13x25	650
47		13x25	670	13x25	670	16x26	730
68		16x26	770	16x26	770	16x32	930
100		16x26	900	16x26	1030	18x32	1210
150		18x32	1270	18x35	1330	22x35	1530
220		18x35	1410	22x35	1710		

RHH Series

Standard Ratings

D×L(mm) ; R.C.(mA rms) at 105°C 100KHz.

Cap (μF)	V	350		400		450	
	Item	D x L	R.C.	D x L	R.C.	D x L	R.C.
1		8x12	74	8x16	85	10x13	90
1.5		10x13	80	10x13	95	10x16	100
2.2		10x16	98	10x16	105	10x16	110
3.3		10x16	110	10x16	115	10x16	120
4.7		10x20	145	10x20	148	10x20	150
5.6		13x21	165	13x21	180	13x21	200
6.8		13x21	200	13x21	230	13x21	260
8.2		13x21	250	13x21	270	13x21	290
10		13x21	290	13x21	300	13x21	330
15		13x25	350	13x25	390	13x25	430
22		16x26	450	16x26	500	16x32	600
33		16x32	510	16x32	650	16x36	710
47		16x36	670	18x26	850	18x32	900
68		18x32	860	18x32	960	18x35	1150
82		18x32	1150	18x35	1300	18x40	1400
100		18x35	1250	18x40	1400		

※ 13mm may be replaced by 12.5mm upon customer's request.

RLA Series

- High frequency and low impedance, high ripple current resistance.
- Suitable for return-circuit of switching power source.
- RoHS Compliant & Halogen Free

Specifications

Items	Characteristics												
Capacitance Tolerance	± 20% (120Hz, 20°C)												
Operating Temperature Range	-40 ~							-25 ~ +105°C					
Rated Voltage Range	6.3 ~ 400VDC							450VDC					
Leakage Current	V ≤ 100V I ≤ 0.01CV or 3 (μA) (After 2 minutes application of DC rated voltage, at 20°C) V > 100V I ≤ 0.03CV +20 (μA) (After 5 minutes application of DC rated voltage, at 20°C)												
Dissipation Factor	Measurement Frequency: 120Hz. Temperature: 20°C												
	Rated Voltage (V)	6.3	10	16	25	30	35	50	63~80	100	160~250	400~450	600
	tan δ(Max)	0.22	0.19	0.16	0.14	0.13	0.12	0.10	0.08	0.07	0.20	0.24	0.24
	When nominal capacitance over 1000μF, tan δ shall be added 0.02 to the listed value with increase of every 1000μF.												
Low Temperature Stability	Measurement Frequency: 120Hz.												
	Rated Voltage(V)	6.3	10	16	25	35	50	63	100	160~250	400	450	
	Z(-25°C) / Z(20°C)	4	3	2	2	2	2	2	2	3	5	6	
	Z(-40°C) / Z(20°C)	8	6	4	3	3	3	3	3	6	10	12	
Load Life	2,000 hours, with application of rated voltage at 105°C												
	Capacitance Change	Within ± 20% of Initial Value											
	tan δ	200% or less of Initial Specified Value											
	Leakage Current	Initial Specified Value or less											
Shelf Life	The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours 105°C without voltage applied. Before the measurement the capacitor shall be preconditioned by applying voltage according to them 4.1 of JIS C5101-4.												
	Capacitance Change	Within ± 20% of Initial Value											
	tan δ	200% or less of Initial Specified Value											
	Leakage Current	Initial Specified Value or less											
Standards	JIS C 5101-4 (IEC 60384)												

Frequency Coefficient of Permissible Ripple Current

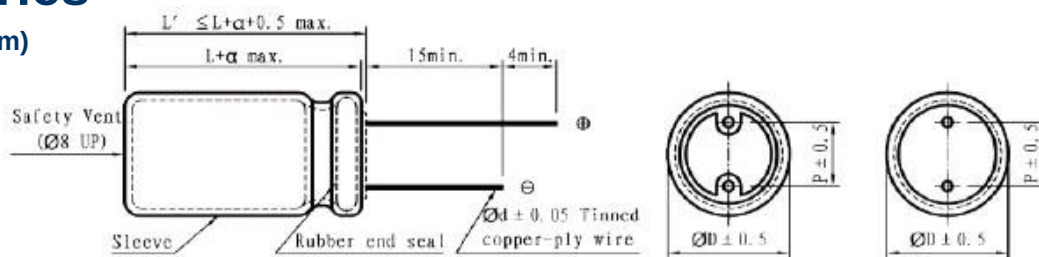
Rated Voltage (V)	Capacitance (μF)	Frequency (Hz)				
		50	120	1K	10K	100K
6.3 ~ 100	0.47 ~ 100	0.45	0.55	0.75	0.90	1.00
	220 ~ 1000	0.60	0.70	0.85	0.95	1.00
	1500 ~ 15000	0.70	0.80	0.95	0.98	1.00
160 ~ 450	2.2 ~ 330	0.55	0.65	0.80	0.90	1.00

The endurance of capacitors is reduced with internal heating produced by ripple current at the rate of halving the lifetime with every 5°C rise. When long life performance is required in actual use, the RMS ripple current has to be reduced.



RLA Series

Dimensions (mm)



Ø D	5	6.3	8	10	13	16	18
P	2.0	2.5	3.5	5.0	5.0	7.5	7.5
Ø d	0.5	0.5	0.5	0.6	0.6	0.8	0.8

α	(L < 16) 1.0
	(L ≥ 16) 2.0

Standard Ratings

D×L(mm) ; R.C.(mA rms) at 105°C 100KHz ; IMP (Ω max) at 20°C 100KHz.

Cap (µF)	V	6.3			10			16			25		
	Item	D x L	R.C.	IMP	D x L	R.C.	IMP	D x L	R.C.	IMP	D x L	R.C.	IMP
4.7											5x11	50	1.50
10											5x11	80	1.50
22											5x11	110	0.800
47					5x11	140	0.650	5x11	170	0.650	5x11	170	0.650
68					5x11	160	0.650	5x11	210	0.550	6.3x11	210	0.550
100					5x11	180	0.650	6.3x11	270	0.300	6.3x11	270	0.300
220		6.3x11	270	0.300	6.3x11	295	0.300	8x12	520	0.200	8x12	550	0.200
330		6.3x11	320	0.300	8x12	528	0.200	8x12	550	0.200	10x13	720	0.100
470		8x12	528	0.200	8x12	550	0.200	10x13	720	0.100	10x16	850	0.075
680		8x12	550	0.200	10x13	760	0.100	10x16	850	0.075	10x20	1200	0.058
1000		10x13	780	0.100	10x16	875	0.075	10x20	1200	0.058	13x21	1450	0.055
1500		10x16	950	0.075	10x20	1250	0.058	13x21	1450	0.055	13x25	1850	0.040
2200		10x25	1420	0.055	13x21	1450	0.055	13x25	1850	0.043	16x26	2250	0.030
3300		13x21	1550	0.055	13x25	1850	0.043	16x26	2250	0.030	16x32	2850	0.027
4700		13x25	1950	0.035	16x26	2250	0.030	16x32	2850	0.027	18x35	3120	0.025
6800		16x26	2460	0.030	16x32	2850	0.027	18x35	3120	0.025	18x40	3650	0.023
10000		16x32	2890	0.027	18x35	3120	0.025	18x40	3650	0.023			
15000		16x35	2950	0.025	18x40	3650	0.023						



Aluminum Electrolytic Capacitors

RLA Series

Standard Ratings

D×L(mm) ; R.C.(mA rms) at 105°C 100KHz ; IMP (Ω max) at 20°C 100KHz.

Cap (μF)	V	35			50			63			100		
	Item	D x L	R.C.	IMP	D x L	R.C.	IMP	D x L	R.C.	IMP	D x L	R.C.	IMP
0.47					5x11	25	7.500				5x11	20	15.000
1					5x11	40	5.300				5x11	30	15.000
2.2					5x11	55	4.500				5x11	44	9.800
3.3					5x11	65	3.900				5x11	58	6.600
4.7		5x11	85	2.000	5x11	90	2.300	5x11	65	4.494	5x11	74	4.600
10		5x11	100	1.200	5x11	110	1.400	5x11	110	2.252	6.3x11	130	1.805
22		5x11	120	1.000	5x11	140	1.200	6.3x11	200	1.000	8x12	280	1.360
33		5x11	210	0.430	6.3x11	240	0.480	6.3x11	250	0.900	10x13	450	0.460
47		6.3x11	270	0.300	6.3x11	240	0.480	8x12	420	0.800	10x16	650	0.390
68		8x12	525	0.300	8x12	525	0.300	10x13	525	0.760	10x20	750	0.288
100		8x12	550	0.200	8x12	550	0.250	10x13	550	0.580	13x21	950	0.208
220		10x13	720	0.100	10x16	720	0.170	10x20	850	0.170	16x26	1250	0.104
330		10x16	850	0.075	10x20	850	0.150	13x21	1250	0.142	16x32	1510	0.088
470		10x20	1200	0.058	13x21	1450	0.090	13x25	1500	0.070	16x36	1720	0.072
680		13x21	1450	0.055	13x25	1850	0.070	16x26	1780	0.055	18x35	1950	0.064
1000		13x25	1850	0.043	16x26	2250	0.048	16x32	2120	0.043	18x40	2320	0.047
1500		16x26	2250	0.030	16x32	2850	0.043	18x35	2310	0.033			
2200		16x32	2850	0.027	18x35	3120	0.040	18x40	2540	0.032			
3300		18x35	3120	0.025									
4700		18x40	3650	0.023									

※13mm may be replaced by 12.5mm upon customer's request.



Standard Ratings

D×L(mm); R.C.(mA rms) at 105°C 100KHz ; IMP (Ω max)at 20°C 100KHz.

Cap V (Code) Item	D x L	160 (2C) R.C.	IMP	D x L	200 (2D) R.C.	IMP	D x L	250(2E) R.C.	IMP
2.2							8x12	105	13.0
3.3	8x12	104	11.0	8x12	113	11.0	8x12	122	11.0
4.7	8x12	112	6.50	8x12	126	6.10	10x13	140	4.30
10	10x13	180	4.30	10x13	210	3.80	10x16	300	3.50
22	10x16	250	3.00	10x20	465	2.70	13x21	485	2.80
33	10x20	570	1.90	10x25	600	1.40	13x21	620	2.13
47	13x21	730	1.20	13x21	730	1.20	13x25	810	1.60
68	13x21	850	0.86	13x25	985	0.70	16x26	1010	1.07
100	16x26	1285	0.50	16x26	128	0.50	16x32	1405	0.62
220	16x36	1450	0.29	18x32	1510	0.36	18x40	1490	0.38
330	18x35	1850	0.26						
Cap V (Code) Item	400 (2G)			450 (2W)					
	D x L	R.C.	IMP	D x L	R.C.	IMP			
	6.3x12	50	27	8x12	60	28			
2.2	8x12	80	13	10x13	90	23			
	8x12	90	16.5	8x12	80	23			
3.3	10x13	110	8.2	10x16	126	20			
	8x12	90	9.5	8x14	95	12.5			
4.7	10x16	160	4.8	10x20	170	6.2			
	10x16	170	6.1	10x16	160	7.5			
10	10x20	195	3.0	13x21	280	3.7			
	13x21	290	4.0	13x21	280	7.0			
22	13x25	350	1.95	16x26	580	3.5			
	13x21	400	3.00	13x25	420	3.6			
33	13x25	480	1.50	16x26	610	1.6			
	13x25	530	1.25	16x26	650	1.9			
47	16x26	720	0.61	16x32	850	0.85			
	16x26	750	1.10	18x32			0.71		
68	16x32	820	0.55			940			
	18x26	850	1.00	18x35	1000	1.00			
100	18x35	950	0.48	18x40	1100	0.43			

※ 13mm may be replaced by 12.5mm upon customer's request.

RLB Series

- Low Impedance, high ripple current resistance, 2000~3000 hours load life.
- Suitable for output return circuit of switching power supply for IT products.
- RoHS Compliant & Halogen Free

Specifications

Items	Characteristics											
Capacitance Tolerance	± 20% (120Hz, 20°C)											
Operating Temperature Range	-40 ~ +105°C						-25 ~ +105°C					
Rated Voltage Range	6.3 ~ 400VDC						450VDC					
Leakage Current	V≤100V I≤0.01CV or 3 (μA) (After 2 minutes application of DC rated voltage, at 20°C) V>100V I≤0.03CV +20 (μA) (After 5 minutes application of DC rated voltage, at 20°C)											
Dissipation Factor	Measurement Frequency: 120Hz. Temperature: 20°C											
	Rated Voltage(V)	6.3	10	16	25	35	50	63	100	160~250	350	400~450
	tan δ(Max)	0.15	0.12	0.10	0.09	0.08	0.07	0.08	0.08	0.15	0.20	0.25
Low Temperature Stability	Measurement Frequency: 120Hz.											
Impedance Ratio (Max)	Rated Voltage(V)	6.3	10	16	25	35	50	63~100		160~350	400~450	
	Z(-25°C)/Z(20°C)	4	3	2	2	2	2	2		3	6	
	Z(-40°C)/Z(20°C)	8	6	4	3	3	3	3		6	12	
Load Life	The following specifications shall be satisfied when the capacitors are restored to 20°C after subjected to DC voltage with the rated ripple current is applied for 3,000 hours (ØD ≤ 8mm, 2,000 hrs) at 105°C											
	Capacitance Change			Within ± 20% of Initial Value								
	tan δ			200% or less of Initial Specified Value								
	Leakage Current			Initial Specified Value or less								
Shelf Life	The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours 105°C without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to them 4.1 of JIS C5101- 4.											
	Capacitance Change			Within ± 20% of Initial Value								
	tan δ			200% or less of Initial Specified Value								
	Leakage Current			Initial Specified Value or less								
Standards	JIS C 5101-4 (IEC 60384)											

Frequency Coefficient of Permissible Ripple Current

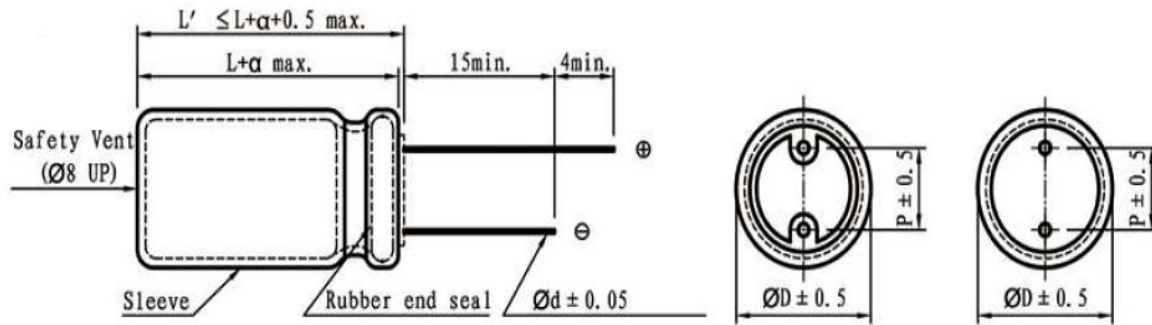
Rated Voltage (V)	Capacitance (μF)	Frequency (Hz)				
		50	120	1K	10K	100K
6.3 ~ 100	0.47 ~ 100	0.45	0.55	0.75	0.90	1.00
	220 ~ 1000	0.60	0.70	0.85	0.95	1.00
	1500 ~ 15000	0.70	0.80	0.95	0.98	1.00
160 ~ 450	2.2 ~ 330	0.55	0.65	0.80	0.90	1.00

The endurance of capacitors is reduced with internal heating produced by ripple current at the rate of halving the lifetime with every 5°C rise.

When long life performance is required in actual use , the rms ripple current has to be reduced.



Dimensions (mm)



Standard Ratings

D×L(mm) ; R.C.(mA rms) at 105°C 100KHz ; IMP (Ωmax)at 20°C 100KHz.

ØD	5	6.3	8	10	13	16	18
P	2.0	2.5	3.5	5.0	5.0	7.5	7.5
Ød	0.5	0.5	0.5	0.6	0.6	0.8	0.8

α	(L < 16) 1.0
	(L ≥ 16) 2.0

Ca p (µF)	V	6.3			10			16			25		
	Item	DxL	R.C.	IMP	DxL	R.C.	IMP	DxL	R.C.	IMP	DxL	R.C.	IMP
33											5x11	155	0.800
39											5x11	175	0.650
47								5x11	155	0.800	6.3x11	210	0.550
56								5x11	175	0.650	6.3x11	235	0.440
68					5x11	155	0.800	6.3x11	220	0.500	6.3x11	260	0.336
82					5x11	175	0.650	6.3x11	240	0.420	6.3x11	285	0.330
100	5x11	200	0.620	6.3x11	200	0.420	6.3x11	255	0.370	8x12	520	0.220	
220	6.3x11	275	0.320	8x12	360	0.220	8x12	550	0.140	8x14	600	0.100	
270	6.3x11	320	0.250	8x12	420	0.185	8x16	650	0.140	8x20	750	0.095	
330	8x12	530	0.180	8x12	550	0.140	10x13	750	0.100	10x16	800	0.069	
470	10x13	750	0.140	10x13	750	0.100	10x16	800	0.085	10x20	1050	0.064	
680	10x16	950	0.100	10x16	800	0.085	10x20	1050	0.064	13x21	1370	0.049	
1,000	10x16	980	0.069	10x20	1080	0.065	13x21	1360	0.039	13x25	1600	0.038	
2,200	10x25	1450	0.043	13x25	1650	0.038	13x30	2050	0.028	13x40	2300	0.024	
3,300	13x25	1750	0.035	13x35	2100	0.028	13x40	2360	0.024	16x36	2600	0.019	
3,900	13x30	1910	0.034	13x40	2360	0.024	16x32	2470	0.022	16x40	2950	0.019	
4,700	13x35	2050	0.028	16x32	2370	0.024	16x36	2600	0.019	18x40	3500	0.019	
6,800	16x32	2300	0.024	16x36	2600	0.019	18x35	2850	0.019				
8,200	16x36	2650	0.021	18x35	2900	0.019	18x40	3040	0.017				
10,000	18x32	2850	0.019	18x40	3500	0.018							
15,000	18x40	3500	0.019										

※ 13mm may be replaced by 12.5mm upon customer's request.



Standard Ratings

D×L(mm) ; R.C.(mA rms) at 105°C 100KHz ; IMP (Ωmax)at 20°C 100KHz.

Cap (μF)	V	35			50			63			100		
	Item	DxL	R.C.	IMP	DxL	R.C.	IMP	DxL	R.C.	IMP	DxL	R.C.	IMP
47					8x12	350	0.350	8x12	450	0.300	10x25	850	0.350
68		8x12	360	0.220	8x12	450	0.250	8x16	550	0.220	13x21	1100	0.240
100		8x12	450	0.140	10x16	850	0.200	10x20	700	0.170	13x25	1250	0.180
220		10x16	880	0.069	10x20	1100	0.100	13x21	1300	0.150	16x32	1850	0.071
330		10x20	1100	0.044	13x21	1300	0.095	13x25	1400	0.070	18x40	2350	0.049
470		13x21	1370	0.039	13x25	1450	0.070	13x35	1650	0.047			
680		13x25	1600	0.038	13x35	1800	0.040	16x32	2000	0.037			
1000		13x30	1930	0.029	16x32	2100	0.034	18x35	2200	0.034			
2200		16x36	2550	0.019	18x40	2600	0.025						
3300		18x40	3150	0.019									

Cap (μF)	V	160			200			250		
	Item	DxL	R.C.	IMP	DxL	R.C.	IMP	DxL	R.C.	IMP
2.2								8x12	85	13.0
3.3		8x12	85	11.0	8x12	90	11.0	8x12	97	11.0
4.7		8x12	90	6.50	8x12	100	6.10	10x13	112	4.30
10		10x13	144	4.30	10x13	168	3.80	10x16	240	3.50
22		10x16	200	3.00	10x20	372	2.70	13x21	388	2.80
33		10x20	450	2.50	10x25	480	2.30	13x21	495	2.20
47		13x21	580	2.00	13x21	584	2.00	13x25	650	1.80
68		13x21	680	1.05	13x25	788	0.98	16x26	810	0.90
100		16x26	1028	0.90	16x26	1030	0.90	16x32	1124	0.85
220		16x36	1160	0.80	18x32	1208	0.75	18x40	1200	0.70
330		18x35	1480	0.70						

Cap (μF)	V	400			450		
	Item	DxL	R.C.	IMP	DxL	R.C.	IMP
2.2		8x12	65	7.60	10x13	75	9.50
3.3		10x13	88	5.20	10x16	100	7.90
4.7		10x16	128	3.85	10x20	115	6.20
10		10x20	156	3.10	13x21	224	3.70
22		13x25	280	2.10	16x26	460	1.00
33		13x25	460	1.78	16x26	488	0.95
47		16x26	580	1.36	16x32	680	0.85
68		16x32	960	0.96	18x32	750	0.71
100		18x35	1000	0.78	18x40	880	0.43

※ 13mm may be replaced by 12.5mm upon customer's request.

RLC Series

- Low Impedance, high reliability, 2000~5000 hours load life.
- Suitable for switching regulator of computer, etc.
- RoHS Compliant & Halogen Free

Specifications

Items	Characteristics														
Capacitance Tolerance	± 20% (120Hz, 20°C)														
Operating Temperature Range	-40 ~ +105°C							-25 ~ +105°C							
Rated Voltage Range	6.3 ~ 400VDC							450VDC							
Leakage Current	V ≤ 100V I ≤ 0.01CV or 3 (μA) (After 2 minutes application of DC rated voltage, at 20°C) V > 100V I ≤ 0.03CV +20 (μA) (After 5 minutes application of DC rated voltage, at 20°C)														
Dissipation Factor	Measurement Frequency: 120Hz. Temperature: 20°C														
	Rated Voltage (V)	6.3	10	16	25	35	50	63	80	100	120~250	350	400~450	500	
	tan δ(Max)	0.20	0.17	0.16	0.14	0.12	0.10	0.08	0.08	0.08	0.15	0.20	0.25	0.25	
Low Temperature Stability	Measurement Frequency: 120Hz.														
	Rated Voltage(V)	6.3	10	16	25	35	50	63~100		160~250		350~400		450	
	Z(-25°C) / Z(20°C)	4	3	2	2	2	2	2		3		6		15	
Impedance Ratio (Max)	Z(-40°C) / Z(20°C)	8	6	4	3	3	3	3		4		10		-	
Load Life	The following specifications shall be satisfied when the capacitors are restored to 20°C after subjected to DC voltage with the rated ripple current is applied for 5,000 hours (ØD ≤ 6.3:2,000 hrs , ψD ≤ 8.:3,000 hrs)at 105°														
	Capacitance Change		Within ± 20% of Initial Value												
	tan δ		200% or less of Initial Specified Value												
	Leakage Current		Initial Specified Value or less												
Shelf Life	The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours 105°C without voltage applied. Before the measurement the capacitor shall be preconditioned by applying voltage according to them 4.1 of JIS C5101-4.														
	Capacitance Change		Within ± 20% of Initial Value												
	tan δ		150% or less of Initial Specified Value												
	Leakage Current		Initial Specified Value or less												
Standards	JIS C 5101-4 (IEC 60384)														

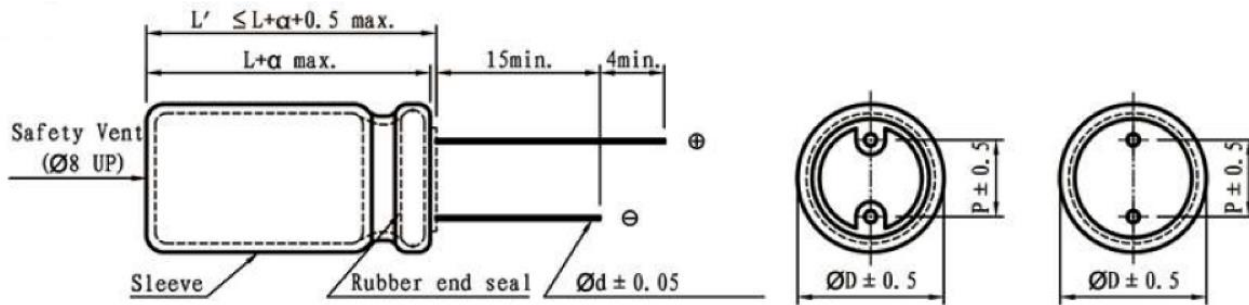
Frequency Coefficient of Permissible Ripple Current

Rated Voltage (V)	Capacitance (μF)	Frequency (Hz)				
		50	120	1K	10K	100K
6.3 ~ 100	10 ~ 150	0.60	0.70	0.85	0.95	1.00
	220 ~ 1800	0.65	0.75	0.90	0.98	1.00
	2200 ~ 15000	0.75	0.80	1.00	1.00	1.00
160 ~ 450	1 ~ 330	0.55	0.65	0.80	0.90	1.00

The endurance of capacitors is reduced with internal heating produced by ripple current at the rate of halving the lifetime with every 5°C rise. When long life performance is required in actual use, the RMS ripple current has to be reduced.

RLC Series

Dimensions (mm)



Ø D	5	6.3	8	10	13	16	18
P	2.0	2.5	3.5	5.0	5.0	7.5	7.5
Ø d	0.5	0.5	0.5	0.6	0.6	0.8	0.8

α	(L < 16) 1.0
	(L ≥ 16) 2.0

Standard Ratings

D×L(mm) ; R.C.(mA rms) at 105°C 100KHz ; IMP (Ω max) at 20°C 100KHz.

Cap (µF)	V	6.3			10			16			25		
	Item	D x L	R.C.	IMP	D x L	R.C.	IMP	D x L	R.C.	IMP	D x L	R.C.	IMP
33											5x11	145	0.920
47								5x11	180	0.650	6.3x11	210	0.600
100		5x11	140	0.920	5x11	180	0.650	5x11	230	0.550	6.3x11	370	0.350
220		6.3x11	275	0.300	6.3x11	340	0.300	8x12	580	0.280	8x12	640	0.230
330		6.3x11	320	0.300	8x12	580	0.280	8x12	640	0.230	10x13	865	0.080
470		8x12	580	0.280	8x12	640	0.230	8x16	840	0.150	10x16	1210	0.060
560		8x12	640	0.230	10x13	780	0.160	10x13	880	0.100	10x16	1320	0.055
680		8x12	720	0.140	10x13	820	0.110	10x16	1000	0.085	10x20	1380	0.052
820		8x16	840	0.087	8x16	865	0.080	10x16	1040	0.076	10x20	1400	0.046
1000		10x13	865	0.080	10x16	1040	0.076	10x20	1210	0.060	13x21	1900	0.035
1200		10x16	960	0.064	10x16	1210	0.060	10x25	1580	0.042	13x25	2058	0.032
1500		10x16	1210	0.060	10x20	1400	0.058	13x21	1870	0.035	13x25	2124	0.030
1800		10x20	1400	0.058	13x21	1580	0.042	13x21	1900	0.032	13x30	2340	0.028
2200		10x25	1450	0.046	13x21	1900	0.032	13x25	2124	0.030	13x35	2450	0.026
2700		13x21	1580	0.042	13x25	2124	0.030	13x30	2340	0.028	13x35	2743	0.024
3300		13x21	1870	0.035	13x30	2340	0.028	13x35	2450	0.026	16x32	3029	0.022
3900		13x21	1900	0.032	13x35	2450	0.026	16x26	2500	0.028	16x36	3124	0.020
4700		13x25	2124	0.030	16x26	2500	0.028	16x32	3029	0.022	18x35	3638	0.019
5600		13x30	2524	0.026	16x26	2552	0.026	16x36	3124	0.020	18x40	3781	0.016
6800		16x26	2760	0.028	16x32	3029	0.022	16x40	3586	0.019			
8200		16x32	3029	0.022	16x32	3600	0.020	18x35	3750	0.018			
10000		16x36	3124	0.020	18x35	3638	0.019						
12000		18x32	3600	0.020									
15000		18x35	3781	0.018									

※13mm may be replaced by 12.5mm upon customer's request.



RLC Series

Standard Ratings

D×L(mm); R.C. (mA rms) at 105°C 100KHz ; IMP (Ω max) at 20°C 100KHz.

Cap (μF)	V	35			50			63			100		
	Item	D x L	R.C.	IMP	D x L	R.C.	IMP	D x L	R.C.	IMP	D x L	R.C.	IMP
10					5x11	120	1.400	5x11	125	1.650	6.3x11	130	1.250
22		5x11	150	0.920	5x11	160	1.200	6.3x11	240	0.780	8x12	230	0.850
33		5x11	220	0.430	6.3x11	230	0.300	8x12	270	0.650	10x13	330	0.690
47		6.3x11	280	0.300	6.3x11	295	0.300	8x12	300	0.504	10x13	370	0.450
100		8x12	450	0.200	10x13	760	0.120	10x16	610	0.160	10x25	560	0.300
220		10x13	760	0.100	10x16	1150	0.078	10x20	1100	0.120	13x25	880	0.280
330		10x16	1210	0.060	13x21	1660	0.055	13x21	1280	0.100	16x26	1440	0.130
470		10x20	1400	0.058	13x25	1950	0.046	13x25	1710	0.082	18x32	1690	0.110
560		13x21	1660	0.055	13x25	2124	0.034	16x26	1820	0.058	18x35	2020	0.043
680		13x21	1900	0.035	13x30	2310	0.030	16x26	1850	0.055	18x35	2100	0.043
820		13x25	2124	0.030	13x35	2510	0.025	16x32	2250	0.043			
1000		13x25	2340	0.028	13x35	2920	0.022	16x36	2450	0.036			
1200		13x30	2524	0.026	16x32	3010	0.022	18x32	2580	0.031			
1500		16x26	2600	0.026	16x36	3150	0.020						
1800		16x26	2850	0.025	18x32	3635	0.020						
2200		16x32	3029	0.022	18x35	3680	0.017						
2700		18x32	3600	0.020									
3300		18x40	3781	0.015									

Cap (μF)	V	160		200		250	
	Item	D x L	R.C.	D x L	R.C.	D x L	R.C.
4.7						8x12	150
10		10x16	330	10x16	330	10x16	330
22		10x20	510	10x20	510	10x20	510
33		10x20	650	10x20	650	13x21	800
47		10x20	750	13x21	980	13x21	980
100		13x25	1420	16x25	1580	16x32	1750
150		16x25	1900	16x25	1900	18x32	2050
330		18x25	2100	18x32	2300		

Cap (μF)	V	350		400		450	
	Item	D x L	R.C.	D x L	R.C.	D x L	R.C.
2.2				10x13	150		
3.3				10x13	160		
4.7		10x13	140	10x16	230	10x20	210
10		10x20	350	10x20	350	13x21	450
22		13x21	640	13x21	640	16x22	750
33		16x22	850	16x22	850	16x25	950
47		16x25	1030	16x25	1030	18x25	1050
100		16x32	1180	18x32	1180	18x35	1230

※13mm may be replaced by 12.5mm upon customer's request.

RLD Series

- Ultra-Low impedance at High frequency range.
- High ripple current, 105°C 4000~8000 hours long life.
- RoHS Compliant & Halogen Free

Specifications

Items	Characteristics								
Capacitance Tolerance	± 20% (120Hz, 20°C)								
Operating Temperature Range	-40 ~ +105°C								
Rated Voltage Range	6.3 ~ 100VDC								
Leakage Current	I ≤ 0.01CV or 3 (μA) which is greater. (After 2 minutes application of DC rated voltage, at 20 °C)								
Dissipation Factor	Measurement Frequency: 120Hz. Temperature: 20°C								
	Rated Voltage (V)	6.3	10	16	25	35	50	63	100
	tan δ(Max)	0.22	0.19	0.16	0.14	0.12	0.10	0.09	0.08
	When nominal capacitance over 1000μF, tan δ shall be added 0.02 to the listed value with increase of every 1000μF.								
Low Temperature Stability	Measurement Frequency: 120Hz.								
	Rated Voltage(V)	6.3	10	16	25	35	50	63	100
	Z(-25°C) / Z(20°C)	4	3	2	2	2	2	2	2
	Z(-40°C) / Z(20°C)	8	6	4	3	3	3	3	3
Refer the	The following specifications shall be satisfied when the capacitors are restored to 20°C after subjected to DC voltage with the rated ripple current is applied for Varied hours according to varied ψ (Please refer to below sheet) at 105°								
	Time	ψ	5	6.3	8	10	12.5~13	14.5~16	18
		Hours	4000	4000	5000	6000	7000	8000	8000
	Capacitance Change		Within ± 20% of Initial Value						
	tan δ		200% or less of Initial Specified Value						
	Leakage Current		Initial Specified Value or less						
Shelf Life	The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours 105°C without voltage applied. Before the measurement the capacitor shall be preconditioned by applying voltage according to them 4.1 of JIS C5101-4.								
	Capacitance Change		Within ± 20% of Initial Value						
	tan δ		200% or less of Initial Specified Value						
	Leakage Current		Initial Specified Value or less						
Standards	JIS C 5101-4 (IEC 60384)								

Frequency Coefficient of Permissible Ripple Current

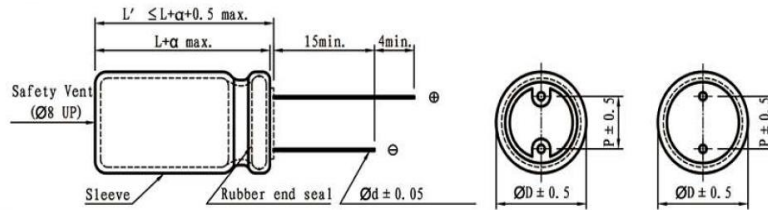
Capacitance (μF)	Frequency (Hz)			
	120	1K	10K	100K
5.6 ~ 180	0.40	0.75	0.90	1.00
220 ~ 560	0.50	0.85	0.94	1.00
680 ~ 1800	0.60	0.87	0.95	1.00
2200 ~ 3900	0.75	0.90	0.95	1.00
4700 ~ 18000	0.85	0.95	0.98	1.00

The endurance of capacitors is reduced with internal heating produced by ripple current at the rate of halving the lifetime with every 5°C rise. When long life performance is required in actual use, the RMS ripple current has to be reduced.



RLD Series

Dimensions (mm)



Ø D	5	6.3	8	10	13	16	18
P	2.0	2.5	3.5	5.0	5.0	7.5	7.5
Ø d	0.5	0.5	0.5	0.6	0.6	0.8	0.8

α	(L < 16) 1.0
	(L ≥ 16) 2.0

Standard Ratings

D×L(mm); R.C. (mA rms) at 105°C 100KHz ; IMP (Ω max) at 20°C, -10°C 100KHz.

Cap (μF)	V	6.3				10				16				25			
	Item	D x L	IMP		R.C.	D x L	IMP		R.C.	D x L	IMP		R.C.	D x L	IMP		R.C.
			20°C	-10°C			20°C	-10°C			20°C	-10°C			20°C	-10°C	
47										5x11	0.500	1.000	170	5x11	0.490	1.000	175
100					5x11	0.500	1.000	170		6.3x11	0.250	0.500	295	6.3x11	0.250	0.500	295
150		5x11	0.500	1.000	170									6.3x15	0.180	0.350	420
220					6.3x11	0.240	0.500	295		6.3x15	0.170	0.360	410	8x12	0.120	0.240	650
330		6.3x11	0.240	0.500	295	6.3x15	0.180	0.350	400	8x12	0.120	0.230	660	8x16	0.090	0.180	750
390														10x13	0.090	0.180	770
470														8x20	0.079	0.150	820
560		6.3x15	0.180	0.360	400	8x12	0.120	0.230	650	8x16	0.089	0.180	740	10x16	0.067	0.136	1060
680										10x13	0.090	0.180	770				
820		8x12	0.120	0.240	655	8x16	0.090	0.180	830	8x20	0.080	0.160	830				
1000		10x13	0.091	0.180	860	10x13	0.090	0.180	860	10x16	0.067	0.136	1070	10x20	0.052	0.104	1230
1200		8x16	0.091	0.190	830	8x20	0.080	0.150	1010					10x25	0.044	0.090	1450
1500						10x16	0.067	0.136	1250	10x20	0.052	0.103	1270	10x30	0.037	0.073	1720
1800		8x20	0.082	0.170	1060	10x20	0.052	0.103	1420	10x25	0.045	0.090	1450	13x21	0.037	0.076	1670
2200		10x16	0.067	0.136	1250												
2700		10x20	0.051	0.103	1420	10x25	0.044	0.090	1640	10x30	0.036	0.074	1700	13x25	0.030	0.060	1960
3300										13x21	0.038	0.076	1670				
3900					10x30	0.036	0.074	1930						13x30	0.024	0.050	2320
4700		10x25	0.044	0.090	1640	13x21	0.038	0.077	1650	13x25	0.030	0.060	1970	16x22	0.029	0.068	2220
5600														13x35	0.022	0.043	2520
6300		10x30	0.038	0.075	1930					13x40	0.024	0.050	2330	18x20	0.027	0.056	2500
7200										16x22	0.028	0.058	2220	13x40	0.016	0.034	2860
8200		13x21	0.037	0.075	1650	13x25	0.030	0.060	1960					16x26	0.027	0.043	2570
9200										13x35	0.022	0.043	2520	16x32	0.019	0.038	3020
10200														18x25	0.020	0.040	2750
11200		13x25	0.030	0.060	1960	13x30	0.024	0.050	2320	13x40	0.017	0.034	2880	16x36	0.017	0.033	3140
12200										16x26	0.022	0.043	2570				
13200						16x22	0.028	0.058	2230	18x20	0.028	0.055	2490	18x32	0.018	0.035	3340
14200		13x30	0.024	0.050	2320	13x35	0.022	0.043	2520	16x32	0.018	0.038	3020	16x40	0.015	0.030	3720
15200										18x25	0.020	0.040	2750	18x35	0.016	0.031	3690
16200		13x35	0.021	0.043	2520	13x40	0.017	0.034	2880	16x36	0.017	0.034	3160				
17200		16x22	0.028	0.057	2230	16x26	0.022	0.044	2570					18x40	0.015	0.030	3810
18200						18x20	0.027	0.056	2490	18x32	0.017	0.035	3350				
19200																	
20200										16x40	0.014	0.030	3720				
21200		13x40	0.017	0.034	2880	16x32	0.018	0.038	3020								
22200		16x26	0.022	0.043	2570												
23200		18x20	0.027	0.055	2490	18x25	0.020	0.040	2750								
24200		16x32	0.019	0.038	3020	16x36	0.017	0.034	3150	18x35	0.016	0.032	3670				
25200						18x32	0.017	0.036	3340								
26200		16x36	0.016	0.033	3150	16x40	0.015	0.030	3720	18x40	0.015	0.030	3810				
27200		18x25	0.020	0.040	2750	18x35	0.016	0.031	3670								
28200		16x40	0.015	0.030	3720	18x40	0.015	0.030	3810								
29200		18x32	0.017	0.035	3340												
30200		18x35	0.016	0.031	3670												
31200		18x40	0.015	0.030	3810												

※ 13mm may be replaced by 12.5mm upon customer's request.

RLD Series

Standard Ratings

D×L(mm); R.C.(mA rms) at 105°C 100KHz; IMP (Ω max)at 20°C,-10°C 100KHz.

Cap (μF)	V Item	35				50				63				100			
		D x L	IMP		R.C.	D x L	IMP		R.C.	D x L	IMP		R.C.	D x L	IMP		R.C.
			20°C	-10°C			20°C	-10°C			20°C	-10°C			20°C	-10°C	
5.6														5x11	2.000	5.200	90
12										5x11	1.800	4.000	145	6.3x11	1.200	3.100	120
18														6.3x15	0.620	1.800	200
22						5x11	0.900	1.800	165	6.3x11	1.000	2.000	250	8x12	0.540	1.600	250
27														10x13	0.480	1.400	350
33		5x11	0.490	1.000	185									8x16	0.74	2.000	320
39														10x16	0.62	1.650	460
47						6.3x11	0.440	0.900	270	6.3x15	0.600	1.400	340	8x20	0.280	0.750	450
56		6.3x11	0.250	0.500	300									10x20	0.270	0.710	580
68						6.3x15	0.310	0.620	370	8x12	0.340	0.740	410	10x25	0.200	0.530	760
100		6.3x15	0.170	0.360	410	8x12	0.210	0.430	490	8x16	0.260	0.650	540	10x30	0.160	0.430	910
120						8x16	0.160	0.320	640	10x13	0.254	0.510	550	13x21	0.160	0.430	840
150						10x13	0.150	0.320	630	10x16	0.190	0.380	620	13x25	0.120	0.320	1010
180		8x12	0.120	0.230	625					8x20	0.210	0.510	690	13x21	0.250	0.650	950
220						8x20	0.120	0.240	740	10x20	0.144	0.290	890	13x30	0.130	0.360	1220
270						10x16	0.130	0.250	860					16x22	0.120	0.320	1200
330		8x16	0.090	0.180	740	10x20	0.087	0.180	1060	10x25	0.130	0.260	1060	13x35	0.088	0.250	1420
390		10x13	0.090	0.170	770									16x26	0.082	0.230	1400
470		8x20	0.079	0.160	820									13x40	0.060	0.180	1600
560														18x20	0.085	0.240	1400
680		10x16	0.067	0.136	1060	10x25	0.073	0.150	1260	10x30	0.090	0.180	1310	16x32	0.059	0.180	1740
820										13x21	0.084	0.170	1290	18x25	0.070	0.200	1610
1000						10x30	0.054	0.110	1520	13x25	0.070	0.140	1730	16x36	0.053	0.150	1950
1200						13x21	0.058	0.120	1490					18x32	0.059	0.170	1820
1500		10x20	0.052	0.103	1230					13x30	0.054	0.110	2100	16x40	0.056	0.160	2100
1800										16x22	0.058	0.120	1780				
2200		10x25	0.044	0.090	1450	13x25	0.044	0.087	1850					18x35	0.053	0.150	2150
2700		10x30	0.037	0.073	1700	13x30	0.038	0.078	2230	13x35	0.046	0.093	2280				
3300		13x21	0.038	0.076	1670	16x22	0.047	0.095	1850	16x26	0.050	0.100	2170	18x40	0.042	0.120	2300
3900										18x20	0.054	0.110	2300				
						13x35	0.033	0.065	2300	13x40	0.042	0.084	2570				
						18x20	0.042	0.083	1990		0.042	0.085	2680				
										18x25	0.042	0.085	2690				
		13x25	0.030	0.060	1960	13x40	0.029	0.058	2510	16x36	0.035	0.071	2780				
						16x26	0.034	0.068	2250								
		13x30	0.024	0.050	2320	16x32	0.027	0.055	2710	16x36	0.030	0.060	2860				
		16x22	0.028	0.057	2220	18x25	0.028	0.057	2610	18x32	0.032	0.064	2960				
		13x35	0.022	0.043	2520	16x36	0.025	0.050	2810	18x35	0.030	0.060	3120				
		13x40	0.016	0.034	2880	16x40	0.020	0.042	3210								
		16x26	0.022	0.044	2570					18x40	0.025	0.050	3220				
		18x20	0.027	0.055	2510	18x32	0.025	0.050	3010								
		16x32	0.018	0.038	3020												
		18x25	0.020	0.040	2750	18x35	0.022	0.045	3110								
		16x36	0.017	0.033	3160												
		18x32	0.018	0.036	3340	18x40	0.020	0.040	3410								
		16x40	0.015	0.030	3720												
		18x35	0.016	0.031	3690												
		18x40	0.015	0.030	3810												

※ 13mm may be replaced by 12.5mm upon customer's request.

RLE Series

- High ripple current, ultra-low impedance at high frequency range.
- Long life.
- RoHS Compliant & Halogen Free

Specifications

Items	Characteristics						
Capacitance Tolerance	± 20% (120Hz, 20°C)						
Operating Temperature Range	-40 ~ +105°C						
Rated Voltage Range	6.3 ~ 50VDC						
Leakage Current	I ≤ 0.01CV or 3 (μA) which is greater. (After 2 minutes application of DC rated voltage, at 20 °C)						
Dissipation Factor	Measurement Frequency: 120Hz. Temperature: 20°C						
	Rated Voltage (V)	6.3	10	16	25	35	50
	tan δ(Max)	0.22	0.19	0.16	0.14	0.12	0.10
	When nominal capacitance over 1000μF, tan δ shall be added 0.02 to the listed value with increase of every 1000μF.						
Low Temperature Stability	Measurement Frequency: 120Hz.						
	Rated Voltage(V)	6.3	10	16	25	35	50
	Z(-25°C) / Z(20°C)	2	2	2	2	2	2
Impedance Ratio (Max)	Z(-40°C) / Z(20°C)	3	3	3	3	3	3
	5000hours, with application of rated voltage at 105°C (ψD ≤ 6.3mm, 2,000 hrs ; ψD = 8mm, 3,000 hrs ; ψD = 10mm, 4,000 hrs)						
Load Life	Capacitance Change	Within ± 20% of Initial Value					
	tan δ	200% or less of Initial Specified Value					
	Leakage Current	Initial Specified Value or less					
Shelf Life	The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours 105°C without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to them 4.1 of JIS C5101-4.						
	Capacitance Change	Within ± 20% of Initial Value					
	tan δ	200% or less of Initial Specified Value					
	Leakage Current	Initial Specified Value or less					
Standards	JIS C 5101-4 (IEC 60384)						

Frequency Coefficient of Permissible Ripple Current

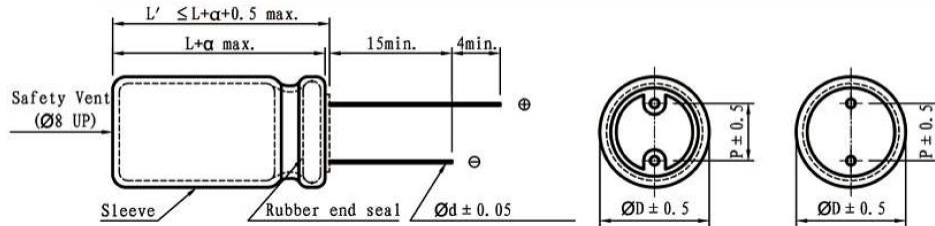
Capacitance (μF)	Frequency (Hz)				
	50	120	1K	10K	100K
≤ 33	0.34	0.40	0.75	0.90	1.00
47 ~ 330	0.45	0.50	0.85	0.95	1.00
470 ~ 1000	0.50	0.60	0.90	0.95	1.00
1200 ~ 6800	0.65	0.80	0.95	0.95	1.00

The endurance of capacitors is reduced with internal heating produced by ripple current at the rate of halving the lifetime with every 5°C rise. When long life performance is required in actual use, the RMS ripple current has to be reduced.



RLE Series

Dimensions (mm)



Ø D	5	6.3	8	10	13	16
P	2.0	2.5	3.5	5.0	5.0	7.5
Ø d	0.5	0.5	0.5	0.6	0.6	0.8

α	(L < 16) 1.0
	(L ≥ 16) 2.0

Standard Ratings

D×L(mm); R.C. (mA rms) at 105°C 100KHz ; IMP (Ω max) at 20°C 100KHz.

Ca p t i v i t y	V	6.3			10			16		
	Item	D x L	R.C.	IMP	D x L	R.C.	IMP	D x L	R.C.	IMP
56								5x11	250	0.300
100					5x11	250	0.300			
120								6.3x11	405	0.130
150		5x11	250	0.300						
220					6.3x11	405	0.130			
330		6.3x11	405	0.130	8x12	600	0.085	8x12	760	0.072
470					8x12	760	0.072	8x16	995	0.056
								10x13	1030	0.053
560		8x12	760	0.072						
680					8x16	995	0.056	8x20	1250	0.041
					10x13	1030	0.053	10x16	1430	0.038
820		8x16	995	0.056						
1000		10x13	1030	0.053	8x20	1250	0.041	10x20	1820	0.023
					10x16	1430	0.038			
1200		8x20	1250	0.041	10x20	1820	0.023	10x25	2150	0.022
		10x16	1430	0.038						
1500		10x20	1820	0.023	10x25	2150	0.022	13x21	2360	0.021
2200		10x25	2150	0.022	13x21	2360	0.021	13x25	2770	0.018
2700								13x30	3140	0.016
								16x22	3290	0.018
3300		13x21	2360	0.021	13x25	2770	0.018	13x35	3400	0.015
3900		13x25	2770	0.018	13x30	3290	0.016	16x26	3460	0.016
					16x22	3140	0.018			
4700		13x30	3290	0.016	13x35	3400	0.015			
5600		13x35	3350	0.015	16x26	3460	0.016			
		16x22	3400	0.018						
6800		16x26	3460	0.016						

※13mm may be replaced by 12.5mm upon customer's request.

Aluminum Electrolytic Capacitors

RLE Series

Standard Ratings

D×L(mm); R.C. (mA rms) at 105°C 100KHz; IMP (Ω max) at 20°C 100KHz.

Cap (μF)	V	25			35			50		
	Item	D x L	R.C.	IMP	D x L	R.C.	IMP	D x L	R.C.	IMP
22								5x11	238	0.340
33					5x11	250	0.300			
47		5x11	250	0.300						
56					6.3x11	405	0.130	6.3x11	385	0.140
68										
100		6.3x11	405	0.130				8x12	724	0.074
120								8x16	950	0.061
150					8x12	760	0.072	10x13	979	0.061
180								8x20	1190	0.046
220		8x12	760	0.072	8x16	995	0.056	10x16	1370	0.042
					10x13	1030	0.053			
270					8x20	1250	0.041	10x20	1580	0.030
330		8x16	995	0.056	10x16	1430	0.038	10x25	1870	0.028
		10x13	1030	0.053						
470		8x20	1250	0.041	10x20	1820	0.023	13x21	2050	0.027
		10x16	1430	0.038						
560					10x25	2150	0.022	13x25	2410	0.023
680		10x20	1820	0.023	13x21	2360	0.021	13x30	2860	0.021
820		10x25	2150	0.022	13x21	2450	0.020	13x35	2960	0.019
								16x22	2730	0.023
1000		13x21	2360	0.021	13x25	2770	0.018	16x26	3010	0.021
1200		13x21	2360	0.021	13x30	3140	0.016			
					16x22	3290	0.018			
1500		13x25	2770	0.018	13x35	3400	0.015			
1800		13x30	3140	0.016	16x26	3460	0.016			
		16x22	3290	0.018						
2200		13x35	3400	0.015						
2700		16x26	3460	0.016						

※13mm may be replaced by 12.5mm upon customer's request.

RLF Series

- Low impedance at high frequency range.
- Smaller case size and high ripple current.
- RoHS Compliant & Halogen Free

Specifications

Items	Characteristics						
Capacitance Tolerance	± 20% (120Hz, 20°C)						
Operating Temperature Range	-40 ~ +105°C						
Rated Voltage Range	6.3 ~ 35VDC						
Leakage Current	I ≤ 0.01CV or 3 (μA) which is greater. (After 2 minutes application of DC rated voltage, at 20 °C)						
Dissipation Factor	Measurement Frequency: 120Hz. Temperature: 20°C						
	Rated Voltage (V)	6.3	10	16	25	35	50~100
	tan δ(Max)	0.21	0.18	0.15	0.13	0.11	0.09
	When nominal capacitance over 1000μF, tan δ shall be added 0.02 to the listed value with increase of every 1000μF.						
Low Temperature Stability	Measurement Frequency: 120Hz.						
	Rated Voltage(V)	6.3	10	16	25		35
	Z(-25°C) / Z(20°C)	2	2	2	2		2
Impedance Ratio (Max)	Z(-40°C) / Z(20°C)	3	3	3	3		3
Load Life	6000hours, with application of rated voltage at 105°C (∅D≤6.3, 5000hrs)						
	Capacitance Change	Within ± 25% of Initial Value					
	tan δ	200% or less of Initial Specified Value					
	Leakage Current	Initial Specified Value or less					
Shelf Life	The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours 105°C without voltage applied. Before the measurement the capacitor shall be preconditioned by applying voltage according to them 4.1 of JIS C5101-4.						
	Capacitance Change	Within ± 20% of Initial Value					
	tan δ	200% or less of Initial Specified Value					
	Leakage Current	Initial Specified Value or less					
Standards	JIS C 5101-4 (IEC 60384)						

Frequency Coefficient of Permissible Ripple Current

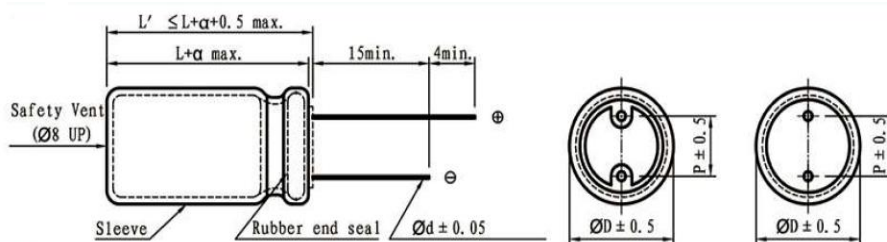
Capacitance (μF)	Frequency (Hz)			
	120	1K	10K	100K
47 ~ 150	0.40	0.75	0.90	1.00
220 ~ 560	0.50	0.85	0.94	1.00
680 ~ 1800	0.60	0.87	0.95	1.00
2200 ~ 3900	0.75	0.90	0.95	1.00
4700 ~ 8200	0.85	0.95	0.98	1.00

The endurance of capacitors is reduced with internal heating produced by ripple current at the rate of halving the lifetime with every 5°C rise. When long life performance is required in actual use, the RMS ripple current has to be reduced.



RLF Series

Dimensions (mm)



Ø D	5	6.3	8	10	13	16
P	2.0	2.5	3.5	5.0	5.0	7.5
Ø d	0.5	0.5	0.5	0.6	0.6	0.8

α	(L < 16) 1.0
	(L ≥ 16) 2.0

Standard Ratings

D×L(mm); R.C. (mA rms) at 105°C 100KHz; IMP (Ω max) at 20°C, -10°C 100KHz.

Cap (μF)	V	6.3				10				16			
	Item	D x L	IMP		R.C.	D x L	IMP		R.C.	D x L	IMP		R.C.
			20°C	-10°C			20°C	-10°C			20°C	-10°C	
100										5x11	0.230	0.760	360
150						5x11	0.230	0.760	360	6.3x11	0.100	0.330	450
220		5x11	0.230	0.760	360	6.3x11	0.100	0.330	450	6.3x11	0.100	0.330	550
330		6.3x11	0.100	0.330	460	6.3x11	0.100	0.330	550	8x12	0.059	0.181	830
470		6.3x11	0.100	0.330	550	8x12	0.059	0.181	820	8x12	0.059	0.181	990
680		8x12	0.059	0.181	900	8x12	0.059	0.181	990	8x16	0.046	0.143	1330
820		8x12	0.059	0.181	990	10x13	0.043	0.133	1250	10x13	0.043	0.133	1360
1000		10x13	0.043	0.133	1250	8x16	0.046	0.143	1330	10x16	0.030	0.095	1650
						10x13	0.043	0.133	1360	8x20	0.031	0.105	1550
1200		8x16	0.046	0.143	1300					10x16	0.030	0.095	1650
		10x13	0.043	0.133	1360	10x16	0.030	0.095	1650	10x20	0.019	0.057	1930
1500		8x20	0.031	0.105	1550	8x20	0.031	0.105	1550	10x20	0.019	0.057	2160
						10x16	0.030	0.095	1815				
1800		10x16	0.030	0.095	1815	10x20	0.019	0.057	2160	10x25	0.017	0.051	2475
2200		10x20	0.019	0.057	2160	10x25	0.017	0.051	2450	13x21	0.016	0.041	2725
2700		10x25	0.017	0.051	2475	13x21	0.016	0.041	2475	13x25	0.015	0.038	3190
3300		13x21	0.016	0.041	2500	13x21	0.016	0.041	2725	13x30	0.013	0.033	3795
										16x22	0.015	0.038	3575
3900		13x21	0.016	0.041	2725	13x25	0.014	0.036	3190	13x35	0.011	0.029	3925
4700		13x25	0.014	0.036	3190	13x30	0.012	0.031	3795				
						16x22	0.014	0.036	3575	16x26	0.012	0.033	3990
5600		13x30	0.012	0.031	3795	13x35	0.011	0.029	3925				
6800		13x35	0.011	0.029	3925								
		16x22	0.014	0.036	3575	16x26	0.012	0.033	3990				
8200		16x26	0.012	0.033	3990								

※13mm may be replaced by 12.5mm upon customer's request.

RLF Series

Standard Ratings

D×L(mm); R.C. (mA rms) at 105°C 100KHz; IMP (Ω max) at 20°C, -10°C 100KHz.

Cap (μF)	V	25				35			
	Item	D x L	IMP		R.C.	D x L	IMP		R.C.
			20°C	-10°C			20°C	-10°C	
47						5x11	0.230	0.760	360
68		5x11	0.230	0.760	360	6.3x11	0.100	0.330	450
100		6.3x11	0.100	0.330	450	6.3x11	0.100	0.330	550
150		8x12	0.085	0.260	620	8x12	0.059	0.181	820
220		8x12	0.059	0.181	810	8x12	0.059	0.181	990
270		8x12	0.059	0.181	900	8x16	0.046	0.143	1330
330		8x12	0.059	0.181	990	10x13	0.043	0.133	1360
390		8x16	0.046	0.143	1330	8x20	0.031	0.105	1550
470		10x13	0.043	0.133	1360	10x16	0.030	0.095	1815
560		8x20	0.032	0.110	1550	10x20	0.030	0.095	2160
680		10x16	0.031	0.100	1815	10x25	0.027	0.080	2475
820		10x20	0.020	0.062	2160	13x21	0.022	0.065	2725
1000		10x25	0.018	0.055	2475	13x21	0.019	0.053	2920
1200		13x21	0.017	0.049	2650	13x25	0.015	0.043	3190
1500		13x21	0.023	0.059	2725	13x30	0.013	0.040	3795
						16x22	0.014	0.036	3575
1800		13x25	0.020	0.051	3190	13x35	0.011	0.029	3925
2200		13x30	0.018	0.046	3795	16x26	0.012	0.033	3990
		16x22	0.014	0.036	3575				
2700		13x35	0.011	0.029	3925				
3300		16x26	0.012	0.033	3990				

※13mm may be replaced by 12.5mm upon customer's request.

RLG Series

- High ripple current, Low impedance at high frequency range.
- 105°C 10000 hours long life.
- RoHS Compliant & Halogen Free

Specifications

Items	Characteristics									
Capacitance Tolerance	± 20% (120Hz, 20°C)									
Operating Temperature Range	-40 ~ +105°C									
Rated Voltage Range	6.3 ~ 100VDC									
Leakage Current	I ≤ 0.01CV or 3 (μA) which is greater. (After 2 minutes application of DC rated voltage, at 20 °C)									
0.15	Measurement Frequency: 120Hz. Temperature: 20°C									
	Rated Voltage (V)	6.3	10	16	25	35	50	63~80	100	120
	tan δ(Max)	0.22	0.19	0.16	0.14	0.12	0.10	0.09	0.08	0.15
	When nominal capacitance over 1000μF, tan δ shall be added 0.02 to the listed value with increase of every 1000μF.									
Low Temperature Stability	Measurement Frequency: 120Hz.									
	Rated Voltage(V)	6.3	10	16	25	35	50	63~80	100	
	Z(-25°C) / Z(20°C)	4	3	2	2	2	2	2	2	
	Impedance Ratio (Max)	Z(-40°C) / Z(20°C)	8	6	4	3	3	3	3	3
Load Life	The following specifications shall be satisfied when the capacitors are restored to 20°C after subjected to DC voltage with the rated ripple current is applied for varied hours according to varied ψ and voltage (Please refer the below sheet)at 105°									
	Case Size			ψD ≤ 6.3		ψD = 8,10		ψD ≥ 13		
	Rated Voltage(V)	6.3~10 V		4,000hours		6,000hours		8,000hours		
		16~100 V		5,000hours		7,000hours		10,000hours		
	Capacitance Change	Within ± 25% of Initial Value								
	tan δ	200% or less of Initial Specified Value								
	Leakage Current	Initial Specified Value or less								
Shelf Life	The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours 105°C without voltage applied. Before the measurement the capacitor shall be preconditioned by applying voltage according to them 4.1 of JIS C5101-4.									
	Capacitance Change	Within ± 20% of Initial Value								
	tan δ	200% or less of Initial Specified Value								
	Leakage Current	Initial Specified Value or less								
Standards	JIS C 5101-4 (IEC 60384)									

Frequency Coefficient of Permissible Ripple Current

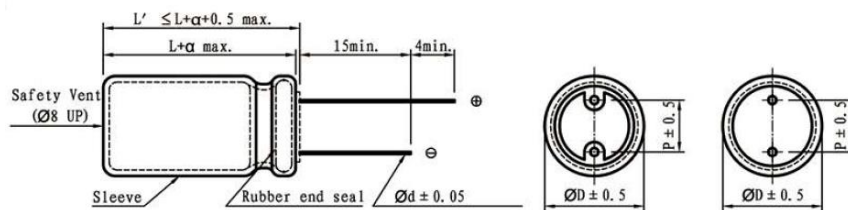
Capacitance (μF)	Frequency (Hz)				
	50	120	300	1K	100K
≤ 33	0.50	0.55	0.70	0.90	1.00
47 ~ 330	0.60	0.70	0.85	0.95	1.00
470 ~ 1000	0.65	0.75	0.90	0.98	1.00
1200 ~ 18000	0.70	0.80	0.95	1.00	1.00

The endurance of capacitors is reduced with internal heating produced by ripple current at the rate of halving the lifetime with every 5°C rise. When long life performance is required in actual use, the RMS ripple current has to be reduced.



RLG Series

Dimensions (mm)



Ø D	5	6.3	8	10	13	16	18
P	2.0	2.5	3.5	5.0	5.0	7.5	7.5
Ø d	0.5	0.5	0.5	0.6	0.6	0.8	0.8

α	(L < 16) 1.0
	(L ≥ 16) 2.0

Standard Ratings

D×L(mm); R.C. (mA rms) at 105°C 100KHz; IMP (Ω max) at 20°C, -10°C 100KHz.

Cap (μF)	V	6.3			10			
	Item	D x L		R.C.	D x L			R.C.
100					5x11	0.580	2.300	215
150		5x11	0.570	2.300	5x11	0.580	2.300	230
220		6.3x11	0.250	0.900	6.3x11	0.220	0.870	340
330		6.3x11	0.210	0.870	6.3x11	0.220	0.870	380
470		8x12	0.150	0.580	8x12	0.130	0.520	640
680		8x12	0.130	0.520	8x16	0.086	0.350	845
820					10x13	0.080	0.310	865
1000		10x13	0.080	0.320	10x16	0.070	0.280	1015
		8x16	0.085	0.350	8x20	0.068	0.270	1050
					10x16	0.060	0.240	1215
1200		8x20	0.071	0.260	10x20	0.045	0.180	1410
		10x16	0.062	0.240				
1500		10x20	0.045	0.180	10x25	0.041	0.170	1610
1800					13x16	0.049	0.160	1450
		13x16	0.048	0.160	13x21	0.039	0.150	1710
2200					10x30	0.030	0.120	1920
		10x25	0.042	0.170	13x21	0.035	0.120	1910
					16x15	0.042	0.120	1900
2700		10x30	0.030	0.120	18x15	0.042	0.110	2220
		16x15	0.041	0.120				
3300		13x21	0.034	0.120	13x25	0.026	0.089	2230
3900		13x25	0.026	0.088	13x30	0.023	0.078	2660
		18x15	0.042	0.110	16x22	0.026	0.078	2540
4700		13x30	0.023	0.078	13x35	0.020	0.065	2890
					13x40	0.016	0.055	3360
5600		13x35	0.020	0.065	16x26	0.020	0.060	2940
		16x22	0.026	0.077	18x20	0.025	0.066	2870
6800		13x40	0.016	0.055	16x32	0.016	0.050	3460
		16x26	0.020	0.060				
		18x20	0.025	0.066	18x25	0.018	0.049	3150
8200					16x36	0.015	0.044	3610
		16x32	0.016	0.050	18x32	0.015	0.040	4180
10000		16x36	0.014	0.044	16x40	0.013	0.038	4090
		18x25	0.018	0.049	18x35	0.012	0.038	4230
12000		16x40	0.012	0.038	18x40	0.011	0.032	4290
		18x32	0.014	0.040				
15000		18x35	0.013	0.038				
18000		18x40	0.012	0.032				

※13mm may be replaced by 12.5mm upon customer's request.



RLG Series

Standard Ratings

D×L(mm) ; R.C.(mA rms) at 105°C 100KHz; IMP (Ω max)at 20°C,-10°C 100KHz.

Cap (μF)	V	16				25			
	Item	D x L	IMP		R.C.	D x L	IMP		R.C.
			20°C	-10°C			20°C	-10°C	
47						5x11	0.570	2.300	200
56		5x11	0.570	2.300	220	5x11	0.570	2.300	240
100		6.3x11	0.210	0.820	310	6.3x11	0.210	0.870	340
120		6.3x11	0.210	0.870	340				
220		8x12	0.190	0.850	510	8x12	0.120	0.520	650
330		8x12	0.120	0.520	650	8x16	0.087	0.350	850
						10x13	0.081	0.320	870
470		8x16	0.086	0.350	840	8x20	0.070	0.270	1050
		10x13	0.080	0.320	865	10x16	0.060	0.240	1210
680		8x20	0.069	0.270	1060	10x20	0.045	0.180	1410
		10x16	0.060	0.240	1210	13x16	0.049	0.160	1460
820		10x20	0.052	0.220	1310	10x25	0.041	0.170	1660
1000		10x20	0.045	0.180	1410	10x30	0.030	0.120	1920
						13x21	0.034	0.120	1910
		13x16	0.050	0.160	1450	16x15	0.042	0.120	1940
1200		10x25	0.043	0.170	1650	18x15	0.043	0.110	2220
1500		10x30	0.030	0.120	1920	13x25	0.026	0.089	2240
		13x21	0.035	0.120	1910				
		16x15	0.042	0.120	1940				
1800		13x25	0.028	0.095	2140	13x30	0.024	0.078	2660
						16x22	0.026	0.078	2540
2200		13x25	0.026	0.089	2240	13x35	0.020	0.065	2890
		18x15	0.042	0.110	2220	18x20	0.025	0.066	2870
2700		13x30	0.023	0.077	2650	13x40	0.016	0.056	3360
		16x22	0.026	0.078	2540	16x26	0.021	0.060	2940
3300		13x35	0.020	0.066	2890	16x32	0.016	0.050	3460
						18x25	0.018	0.048	3150
3900		13x40	0.016	0.056	3350	16x36	0.014	0.043	3620
		16x26	0.021	0.060	2930				
		16x22	0.025	0.067	2860	18x32	0.015	0.040	4180
4700		16x32	0.016	0.050	3450	16x40	0.014	0.044	4080
		18x25	0.018	0.049	3150	18x35	0.013	0.040	4230
5600		16x36	0.015	0.044	3620	18x40	0.011	0.032	4290
		18x32	0.015	0.040	4180				
6800		16x40	0.012	0.038	4080				
8200		18x35	0.014	0.038	4230				
10000		18x40	0.011	0.032	4290				

※13mm may be replaced by 12.5mm upon customer's request.

RLG Series

Standard Ratings

D×L(mm) ; R.C.(mA rms) at 105°C 100KHz; IMP (Ω max)at 20°C,-10°C 100KHz.

Cap (μF)	V	35			50		
	Item	D x L	IMP		D x L	IMP	
				R.C.			R.C.
22					5x11	0.700	2.800
33		5x11	0.560	2.300			
47		6.3x11	0.350	1.400	6.3x11	0.380	1.500
56		6.3x11	0.210	0.860	6.3x11	0.300	1.200
100		8x12	0.150	0.560	8x12	0.160	0.670
120					8x16	0.120	0.480
150		8x12	0.130	0.520	10x13	0.120	0.480
180		8x16	0.086	0.350	8x20	0.090	0.360
220		8x16	0.086	0.350	10x16	0.083	0.340
		10x13	0.080	0.320			
270		8x20	0.070	0.260	10x20	0.060	0.240
330					13x16	0.062	0.200
		10x16	0.060	0.240	10x25	0.053	0.220
470		10x20	0.045	0.180	10x30	0.043	0.170
		13x16	0.048	0.150	13x21	0.044	0.150
					16x15	0.054	0.170
560		10x25	0.041	0.160	13x25	0.033	0.110
					18x15	0.053	0.150
680		10x30	0.030	0.120			
		13x21	0.033	0.132	13x30	0.030	0.100
		16x15	0.041	0.143			
820		13x25	0.028	0.088	13x35	0.023	0.081
					16x22	0.033	0.100
1000		13x25	0.028	0.088	13x40	0.020	0.069
					16x26	0.025	0.075
					18x20	0.036	0.097
1200		13x30	0.023	0.078	16x32	0.021	0.066
		16x22	0.026	0.078	18x25	0.025	0.070
1500		13x35	0.020	0.065	16x36	0.018	0.056
1800		13x40	0.016	0.056	16x40	0.016	0.048
		16x26	0.020	0.060			
		18x20	0.025	0.066	18x32	0.021	0.057
2200		16x32	0.016	0.050	18x35	0.017	0.046
		18x25	0.019	0.049			
2700		16x36	0.015	0.044	18x40	0.014	0.038
		18x32	0.014	0.040			
3300		16x40	0.013	0.038			
		18x35	0.014	0.040			

※13mm may be replaced by 12.5mm upon customer's request.

RLG Series

Standard Ratings

D×L(mm) ; R.C.(mA rms) at 105°C 100KHz ; IMP (Ω max)at 20°C,-10°C 100KHz.

Cap (μF)	V	63				100			
	Item	D x L	IMP		R.C.	D x L	IMP		R.C.
			20°C	-10°C			20°C	-10°C	
6.8						5x11	2.200	9.200	56
15		5x11	2.200	9.200	56	6.3x11	1.200	5.000	120
27						8x12	0.720	3.000	235
33		6.3x11	1.200	5.000	120				
39						8x16	0.62	2.540	280
47		8x12	0.680	3.100	190	10x13	0.430	1.800	290
56		8x12	0.620	2.800	235	8x20	0.320	1.600	340
68						10x16	0.300	1.500	358
82		8x16	0.450	2.100	310	10x20	0.210	0.940	470
		10x13	0.430	1.800	300	13x16	0.230	1.100	468
100		10x16	0.350	1.800	320	10x25	0.200	0.840	536
120		8x20	0.330	1.600	362	10x30	0.150	0.710	666
		10x16	0.300	1.500	357	13x21	0.160	0.640	690
150						16x15	0.140	0.660	795
180		10x20	0.200	0.940	470	13x25	0.120	0.450	790
		13x16	0.230	1.100	465	18x15	0.120	0.500	930
220		10x25	0.200	0.840	531	13x30	0.110	0.450	905
						16x22	0.090	0.370	1050
270		10x30	0.150	0.700	663	13x35	0.082	0.350	1060
		13x21	0.160	0.640	690				
		16x15	0.130	0.650	795	16x26	0.072	0.270	1250
330		13x25	0.120	0.450	790	13x40	0.070	0.300	1190
						18x20	0.080	0.300	1250
390		18x15	0.120	0.500	920	16x32	0.053	0.200	1570
						18x25	0.056	0.210	1490
470		13x30	0.100	0.420	910	16x36	0.045	0.170	1790
		16x22	0.090	0.380	1040	18x32	0.047	0.170	1640
560		13x35	0.082	0.350	1050	16x40	0.040	0.150	2030
		16x26	0.073	0.270	1250				
680		13x40	0.070	0.300	1190	18x35	0.040	0.150	1790
		18x20	0.080	0.300	1240				
820		16x32	0.053	0.200	1580	18x40	0.036	0.130	2340
		18x25	0.057	0.210	1490				
1000		16x36	0.045	0.170	1790				
		18x32	0.047	0.170	1640				
1200		16x40	0.039	0.150	2020				
		18x35	0.040	0.150	1790				
1500		18x40	0.035	0.130	2340				

※13mm may be replaced by 12.5mm upon customer's request.

RLJ Series

- 105°C High ripple and Low impedance, long life: 6,000~10,000 hours.
- Suited for LCD TV BLU Inverter, SMPS, IP-Board, Adaptor etc.
- RoHS Compliant & Halogen Free

Specifications

Items	Characteristics											
Capacitance Tolerance	± 20% (120Hz, 20°C)											
Operating Temperature Range	-40 ~ +105°C											
Rated Voltage Range	6.3 ~ 100VDC											
Leakage Current	I ≤ 0.01CV or 3 (μA) which is greater. (After 2 minutes application of DC rated voltage, at 20 °C)											
Dissipation Factor	Measurement Frequency: 120Hz. Temperature: 20°C											
	Rated Voltage (V)	6.3	10	16	25	35	50	63	80	100	120	
	tan δ(Max)	0.22	0.19	0.16	0.14	0.12	0.1	0.09	0.08	0.08	0.15	
	When nominal capacitance over 1000μF, tan δ shall be added 0.02 to the listed value with increase of every 1000μF.											
Low Temperature Stability	Measurement Frequency: 120Hz.											
	Rated Voltage(V)	6.3	10	16	25	35	50	63	80	100		
Impedance Ratio (Max)	Z(-25°C) / Z(20°C)	2	2	2	2	2	2	2	2	2		
	Z(-40°C) / Z(20°C)	3	3	3	3	3	3	3	3	3		
Load Life	The following specifications shall be satisfied when the capacitors are restored to 20°C after subjected to DC voltage with the rated ripple current is applied for varied hours according to varied ψ and voltage (Please refer the below sheet) at 105°											
	Case Size (ψD)					Life Time						
				6.3V		10 ~ 50V		63 ~ 100V				
	ψ5 ~ ψ6.3			6,000hours		7,000hours		6,000hours				
	ψ8 x12~8 x 14			8,000hours		9,000hours		8,000hours				
	ψ8x15L ~ 25L			9,000hours		10,000hours		9,000hours				
	ψ10x13L			9,000hours								
	ψ10x16L ~ 25L			10,000hours								
	> ψ10											
	Rated Voltage(V)		6.3~10 V					16~100 V				
	Capacitance Change		Within ± 30% of Initial Value					Within ± 25% of Initial Value				
	tan δ		200% or less of Initial Specified Value									
Leakage Current		Initial Specified Value or less										
Shelf Life	The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours 105°C without voltage applied. Before the measurement the capacitor shall be preconditioned by applying voltage according to them 4.1 of JIS C5101-4.											
	Capacitance Change		Within ± 20% of Initial Value									
	tan δ		200% or less of Initial Specified Value									
	Leakage Current		Initial Specified Value or less									
Standards	JIS C 5101-4-1 (IEC 60384)											

Frequency Coefficient of Permissible Ripple Current

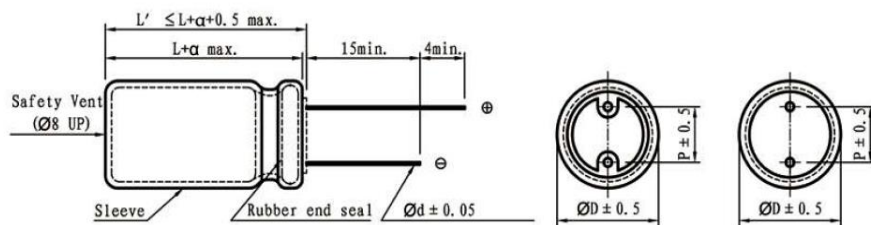
Capacitance (μF)	Frequency (Hz)			
	120	1K	10K	100K
5.6 ~ 180	0.40	0.70	0.90	1.00
220 ~ 560	0.50	0.85	0.94	1.00
680 ~ 1800	0.60	0.87	0.95	1.00
2200 ~ 3900	0.75	0.90	0.95	1.00
4700 ~ 18000	0.85	0.95	0.98	1.00

The endurance of capacitors is reduced with internal heating produced by ripple current at the rate of halving the lifetime with every 5°C rise. When long life performance is required in actual use, the RMS ripple current has to be reduced.



RLJ Series

Dimensions (mm)



Ø D	5	6.3	8	10	13	16	18
P	2.0	2.5	3.5	5	5	7.5	7.5
Ø d	0.5	0.5	0.5	0.6	0.6	0.8	0.8

α	(L < 16) 1.0
	(L ≥ 16) 2.0

Standard Ratings

D×L(mm); R.C. (mA rms) at 105°C 100KHz ; IMP (Ω max) at 20°C 100KHz.

Cap (μF)	V	6.3			10			16			25		
	Item	D x L	R.C.	IMP	D x L	R.C.	IMP	D x L	R.C.	IMP	D x L	R.C.	IMP
68											5x12	460	0.390
120								5x12	460	0.390			
150					5x12	460	0.390				6.3x12	690	0.160
220		5x12	350	0.390									
270								6.3x12	690	0.160			
330					6.3x12	690	0.160				8x12	1210	0.074
390											8x16	1610	0.058
470		6.3x12	530	0.180				8x12	1210	0.074	10x13	1690	0.052
560					8x12	1210	0.074	8x16	1610	0.058	8x20	1970	0.040
680					8x16	1610	0.058	10x13	1690	0.052	10x16	1990	0.037
820		8x12	940	0.074	10x13	1690	0.052	8x20	1970	0.040			
1000		8x16	1245	0.060	8x20	1970	0.040	10x16	1990	0.037	10x20	2520	0.027
1200		10x13	1510	0.052	10x16	1990	0.037				10x25	2910	0.023
1500		8x20	1510	0.042				10x20	2520	0.027	13x21	2610	0.024
1800		10x16	1765	0.037	10x20	2520	0.027	10x25	2910	0.023	13x25	3060	0.018
2200					10x25	2910	0.023	13x21	2610	0.024	13x30	3490	0.017
2700											16x22	3250	0.021
3300		10x20	1965	0.027	13x21	2610	0.024	13x25	3060	0.018	13x35	3650	0.016
3900		10x25	2260	0.023	13x25	3060	0.018	13x30	3490	0.017	16x25	3650	0.017
4700								16x22	3250	0.021			
5600		13x21	2485	0.024				13x35	3650	0.016			
6800		13x25	2910	0.019	13x30	3490	0.017						
8200					16x22	3250	0.021	16x25	3650	0.017			
		13x30	3455	0.017	13x35	3620	0.016						
					16x25	3650	0.017						
		13x35	3565	0.015									
		16x22	3245	0.021									
		16x26	3640	0.017									

※ 13mm may be replaced by 12.5mm upon customer's request.



RLJ Series

Standard Ratings

D×L(mm) ; R.C.(mA rms) at 105°C 100KHz; IMP (Ω max)at 20°C 100KHz.

Cap (μF)	V	35			50			63		
	Item	D x L	R.C.	IMP	D x L	R.C.	IMP	D x L	R.C.	IMP
18								5x12	250	0.700
27					5x12	300	0.48			
33										
47		5x12	460	0.39				6.3x12	430	0.500
56					6.3x12	490	0.23	8x12	500	0.350
68										
82								8x12	720	0.350
100		6.3x12	690	0.16	8x12	940	0.13	8x16	990	0.300
120					8x16	1240	0.081	10x13	990	0.280
150					8x20	1600	0.057	8x20	1200	0.200
					10x13	1270	0.072			
180		8x12	1210	0.074				10x16	1200	0.100
220		8x16	1610	0.058	10x16	1645	0.052			
270		10x13	1690	0.052				10x20	1580	0.080
330		8x20	1970	0.04	10x20	2065	0.037	10x25	1990	0.075
390		10x16	1990	0.037	10x25	2250	0.031	13x21	1990	0.065
470					13x21	2210	0.032	13x25	2450	0.055
560		10x20	2520	0.027				13x30	2750	0.05
								16x22	2150	0.052
680		10x25	2910	0.023	13x25	2510	0.026	13x35	3050	0.045
820		13x21	2610	0.024	13x30	3100	0.023	16x26	2560	0.048
					16x22	2750	0.026			
1000					13x35	3250	0.021			
					16x25	3000	0.022			
1200		13x25	3060	0.017						
1500		13x30	3490	0.017						
		16x22	3250	0.021						
1800		13x35	3620	0.016						
		16x25	3650	0.017						

※ 13mm may be replaced by 12.5mm upon customer's request.

RLJ Series

Standard Ratings

D×L(mm) ; R.C.(mA rms) at 105°C 100KHz; IMP (Ω max)at 20°C 100KHz.

Cap (μF)	V	80			100		
	Item	D x L	R.C.	IMP	D x L	R.C.	IMP
8.2					5x12	230	1.200
12		5x12	230	0.800			
18					6.3x12	360	0.580
27		6.3x12	380	0.550	8x12	450	0.430
33					8x12	630	0.430
47		8x12	630	0.400	8x16	780	0.400
56		8x16	780	0.380	10x13	780	0.330
68		10x13	780	0.300	8x20	1050	0.250
					10x16	1050	0.130
82		8x20	1050	0.230			
100		10x16	1050	0.110	10x20	1400	0.091
					13x16	1400	0.130
120					10x25	1650	0.085
150		10x20	1400	0.089	13x21	1750	0.065
		13x16	1400	0.110			
180		10x25	1650	0.080			
220		13x21	1750	0.063	13x25	2200	0.063
270		13x25	2200	0.060	13x30	2400	0.055
					16x22	1950	0.058
330		13x30	2400	0.053	13x35	2600	0.050
		16x22	1950	0.055			
390		13x35	2600	0.048	13x40	2860	0.045
					16x25	2450	0.043
470		13x40	2860	0.038	16x32	2650	0.038
		16x25	2450	0.040	18x22	2270	0.048
					18x25	2500	0.042
560		16x32	2650	0.035	16x36	2860	0.036
					18x32	2860	0.036
680		16x36	2860	0.033	16x40	3500	0.033
		18x25	2500	0.039	18x36	3500	0.033
820		16x40	3500	0.030			
		18x32	2860	0.033	18x40	3860	0.030
1000		18x35	3500	0.030			

※ 13mm may be replaced by 12.5mm upon customer's request.

RLO Series

- On the basis of RLA Series ripple promotion product
- Suitable for LCD TV Power, SMPS
- RoHS Compliance

Specifications

Items	Characteristics			
Capacitance Tolerance	± 20% (120Hz, 20°C)			
Operating Temperature Range	-40 ~ +105°C			
Rated Voltage Range	400VDC		450VDC~500VDC	
Leakage Current	I ≤ 0.03CV +20(μA) (After 5 minutes application of DC rated voltage, at 20 °C)			
Dissipation Factor	Measurement Frequency: 120Hz. Temperature: 20°C			
	Rated Voltage (V)	400V	450V	500V
	tan δ(Max)	0.15	0.18	0.20
	When nominal capacitance over 1000μF, tan δ shall be added 0.02 to the listed value with increase of every 1000μF.			
Low Temperature Stability	Measurement Frequency: 120Hz.			
	Rated Voltage(V)	400	450	500
Impedance Ratio (Max)	Z(-25°C) / Z(20°C)	5	6	6
	Z(-40°C) / Z(20°C)	10	12	12
Load Life	The following specifications shall be satisfied when the capacitors are restored to 20°C after subjected to DC voltage with the rated ripple current is applied for 3,000 hours at 105°			
	Capacitance Change	Within ± 20% of Initial Value		
	tan δ	200% or less of Initial Specified Value		
	Leakage Current	Initial Specified Value or less		
Shelf Life	The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours 105°C without voltage applied. Before the measurement the capacitor shall be preconditioned by applying voltage according to them 4.1 of JIS C5101-4.			
	Capacitance Change	Within ± 20% of Initial Value		
	tan δ	200% or less of Initial Specified Value		
	Leakage Current	Initial Specified Value or less		
Standards	JIS C 5101-4-1 (IEC 60384)			

Frequency Coefficient of Permissible Ripple Current

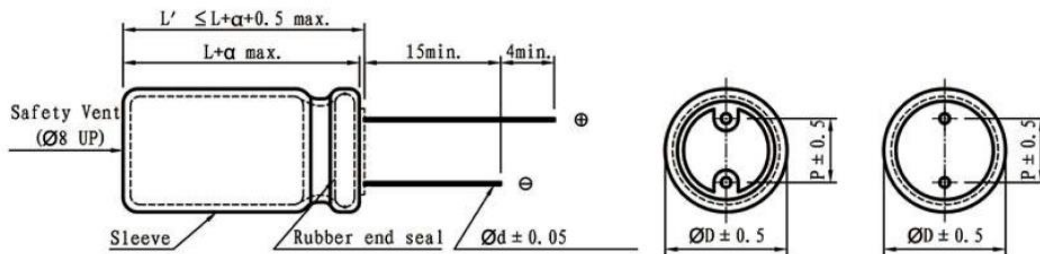
Frequency (Hz)	50	120	1K	10K	100K
Coefficient	0.55	0.65	0.80	0.90	1.00

The endurance of capacitors is reduced with internal heating produced by ripple current at the rate of halving the lifetime with every 5°C rise. When long life performance is required in actual use, the RMS ripple current has to be reduced.



RLO Series

Dimensions (mm)



ØD	6.3	8	10	13	16	18
P	2.5	3.5	5.0	5.0	7.5	7.5
Ød	0.5	0.5	0.6	0.6	0.8	0.8

α	(L < 16) 1.0 (L ≥ 16) 2.0
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Standard Ratings

D x L (mm), R.C. (mA rms) 125°C 100KHz. IMP: (Ω max) at 20°C, 100KHz

Cap (µF)	V	400			450			500		
	Item	D x l	IMP	R.C.	D x l	IMP	R.C.	D x l	IMP	R.C.
4.7		6.3x12	9.5	120	6.3x16	15.6	115	6.3x16	17.4	82
					8x10	15.6	115	8x10	15.2	82
6.8		6.3x13	8.3	130	10x10	12.7	130	10x10	15.2	90
8.2		6.3x15	7.5	175	8x12	9.2	165	10x11	11.1	115
10					8x15	8.1	195	10x13	9.8	150
		8x10	5.3	195	10x11	8.1	195			
12		8x13	4.1	235	10x13	6.3	230	10x14	7.5	210
15		8x15	3.9	265	10x13.5	6.0	255	10x15	7.2	225
18		8x17	3.1	300	10x15	5.7	300	10x17	6.5	245
22		10x14	3.0	315	10x17	5.4	315	13x17	5.6	315
		8x18	3.0	315						
27		10x15	3.0	375	10x20	4.5	375	10x23	5.3	350
33		10x18	2.5	445	10x35	3.1	445	13x21	4.1	405
47		13x19	1.9	620	10x45	2.6	620	16x20	3.1	565
68		16x20	1.4	1010	10x50	1.6	1010	18x20	2.2	815
82		18x20	1.0	1200	16x25	1.3	1200	18x25	1.9	980
100		18x25	0.9	1350	18x25	1.0	1250			

RLN Series

- 125°C 5000hours long life product. (4000 hours: 63V to 100V)
- Best - suited to smoothing circuits and control for industrial equipments
Power supplies of which long life and high reliability are required.
- NC terminal added items are lineup for vibration resistance.
(30G guaranteed: 20mm L or less)
- RoHS Compliance.

Specifications

Items	Characteristics								
Capacitance Tolerance	± 20% (120Hz, 20°C)								
Operating Temperature Range	-40 ~ +125°C								
Rated Voltage Range	10 ~ 100VDC								
Leakage Current	I ≤ 0.01CV or 3(μA) (After 2 minutes application of DC rated voltage, at 20 °C)								
Dissipation Factor	Measurement Frequency: 120Hz. Temperature: 20°C								
	Rated Voltage (V)	10	16	25	35	50	63	80	100
	tan δ(Max)	0.20	0.16	0.14	0.12	0.10	0.10	0.08	0.08
	When nominal capacitance over 1000μF, tan δ shall be added 0.02 to the listed value with increase of every 1000μF.								
Low Temperature Stability	Measurement Frequency: 120Hz.								
	Rated Voltage(V)	10	16	25	35	50	63	80	100
Impedance Ratio (Max)	Z(-40°C) / Z(20°C)	4	3	3	3	3	3	3	3
Load Life	5000 hours, (63~100V, 4000hours) at 125°C								
	Capacitance Change	Within ±30% of Initial Value							
	tan δ	300% or less of Initial Specified Value							
	Leakage Current	Initial Specified Value or less							
Shelf Life	The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours 105°C without voltage applied. Before the measurement the capacitor shall be preconditioned by applying voltage according to them 4.1 of JIS C5101-4.								
	Capacitance Change	Within ± 30% of Initial Value							
	tan δ	300% or less of Initial Specified Value							
	Leakage Current	Initial Specified Value or less							
Standards	JIS C 5101-4-1 (IEC 60384)								

Frequency Coefficient of Permissible Ripple Current

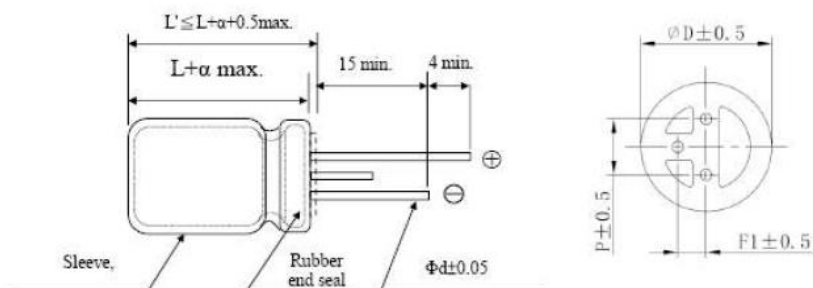
Capacitance (μF)	Frequency (Hz)			
	50~60	120	1K	10K~100K
220~330	0.55	0.65	0.85	1.00
390~1000	0.70	0.75	0.90	1.00
1200~8200	0.80	0.85	0.95	1.00

The endurance of capacitors is reduced with internal heating produced by ripple current at the rate of halving the lifetime with every 5°C rise. When long life performance is required in actual use, the RMS ripple current has to be reduced.



RLN Series

Dimensions (mm)



ØD	12.5	16	18	20
P	5.0	7.5	7.5	10
F1	2.5	3.75	3.75	5
A	2.0	2.0	2.0	2.0
Ød	0.8	0.8	0.8	1.0

Standard Ratings

D x L (mm), R.C. (mA rms) 125°C 100KHz. IMP: (Ω max) at 20°C, 100KHz

Cap (μF)	10				16			25			35		
	Item	D x L	R.C.	IMP	D x L	R.C.	IMP	D x L	R.C.	IMP	D x L	R.C.	IMP
470	-	-	-	-	-	-	-	-	-	-	12.5 x 20	1830	0.055
1000							0.052	12.5 x 20	1830	0.052	12.5 x 25	2410	0.042
							0.057	12.5 x 25	2410	0.042	12.5 x 25	3100	0.031
1200							-	16 x 16	1940	0.057	16 x 16	2490	0.038
								12.5 x 20	1830	0.052	12.5 x 30	2570	0.038
1500	-	-	-	-	-	-	-	-	-	-	16 x 20	2290	0.042
											12.5 x 35	2980	0.030
1800											16 x 31.54	3160	0.026
											18 x 25	3200	0.029
2200	12.5 x 25	2410	0.042	12.5 x 25	2410	0.042		12.5 x 25	2410	0.042	12.5 x 40	3600	0.026
								16 x 20			16 x 25	3100	0.031
2700	-						-	16 x 20	2290	0.042	16 x 25	3100	0.031
								18 x 16			18 x 20	2490	0.038
3300	12.5 x 30	2570	0.038	16 x 31.5	3160	0.038	16 x 35.5	12.5 x 35	2980	0.030	16 x 35.5	3590	0.025
								16 x 25	3100	0.031	18 x 31.5	3410	0.023
3900	-						-	18 x 20	2490	0.038	20 x 25	3500	0.029
								12.5 x 40	3600	0.026	16 x 40	4300	0.022
4700	16 x 25	3100	0.031		0.026	0.026		16 x 31.5	3160	0.026	18 x 35.5	4000	0.022
								18 x 20	2490	0.038	20 x 30	4000	0.025
5600	-	-	-	-	-	-	-	16 x 35.5	3590	0.025	-	-	-
								18 x 25	3200	0.029	-	-	-
6800	16 x 31.5	3160	0.026	16 x 35.5	3590	0.025		18 x 35.5	4200	0.022	18 x 40	4600	0.021
								20 x 25	3500	0.029	20 x 35.5	4700	0.021
8200	18 x 25	3200	0.029	18 x 31.5	3410	0.023		16 x 40	4300	0.022	20 x 40	5100	0.020
								18 x 13.5	4200	0.022	-	-	-
	-	-	-	-	-	-	-	20 x 30	4000	0.025	-	-	-
								18 x 40	4600	0.021	-	-	-
	-	-	-	-	-	-	-	20 x 35.5	4700	0.021	-	-	-
								-	-	-	-	-	-



Cap (μ F)	V Item	50			63			80			100		
		D x L	R.C.	IMP	D x L	R.C.	IMP	D x L	R.C.	IMP	D x L	R.C.	IMP
220		-	-	-	-	-	-	-	-	-	16 x 20	1110	0.286
330		-	-	-	-	-	-	-	-	-	16 x 25	1460	0.165
470		12.5 x 20	1500	0.091	-	-	-	16 x 25	1500	0.151	16x 35.5	2000	0.100
560		-	-	-	-	-	-	18 x 25	1600	0.13	16 x 40	2200	0.090
820		12.5 x 30	2150	0.049	16 x 31.5	1910	0.104	18 x 35.5	2180	0.081	18 x 40	2330	0.077
1000		16 x 25	2620	0.04	16 x 35.5	2110	0.086	18 x 40	2470	0.066	-	-	-
1800		18 x 31.5	3140	0.033	-	-	-	-	-	-	-	-	-
2200		18 x 35.5	3510	0.029	-	-	-	-	-	-	-	-	-

※ 13mm may be replaced by 12.5mm upon customer's request.

RLK Series

- On the basis of RLA series ripple promotion product
- Suited for LCD TV Power, SMPS.
- RoHS Compliant & Halogen Free

Specifications

Items	Characteristics					
Capacitance Tolerance	± 20% (120Hz, 20°C)					
Operating Temperature Range	-40 ~ +105°C			-25 ~ +105°C		
Rated Voltage Range	400VDC			450 ~ 500VDC		
Leakage Current	I ≤ 0.03CV +20 (μA) (After 1 minutes application of DC rated voltage, at 20 °C)					
Dissipation Factor	Measurement Frequency: 120Hz. Temperature: 20°C					
	Rated Voltage (V)	400	450	460	500	550
	tan δ(Max)	0.15	0.20	0.20	0.20	0.20
	When nominal capacitance over 1000μF, tan δ shall be added 0.02 to the listed value with increase of every 1000μF.					
Low Temperature Stability	Measurement Frequency: 120Hz.					
	Rated Voltage(V)	400	450	460		500
Impedance Ratio (Max)	Z(-25°C) / Z(20°C)	3	3	6		6
	Z(-40°C) / Z(20°C)	6	-	-		-
Load Life	2000 hours, with application of rated voltage at 105°C					
	Capacitance Change	Within ± 20% of Initial Value				
	tan δ	200% or less of Initial Specified Value				
	Leakage Current	Initial Specified Value or less				
Shelf Life	The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours 105°C without voltage applied. Before the measurement the capacitor shall be preconditioned by applying voltage according to them 4.1 of JIS C5101-4.					
	Capacitance Change	Within ± 20% of Initial Value				
	tan δ	200% or less of Initial Specified Value				
	Leakage Current	Initial Specified Value or less				
Standards	JIS C 5101-4-1 (IEC 60384)					

Frequency Coefficient of Permissible Ripple Current

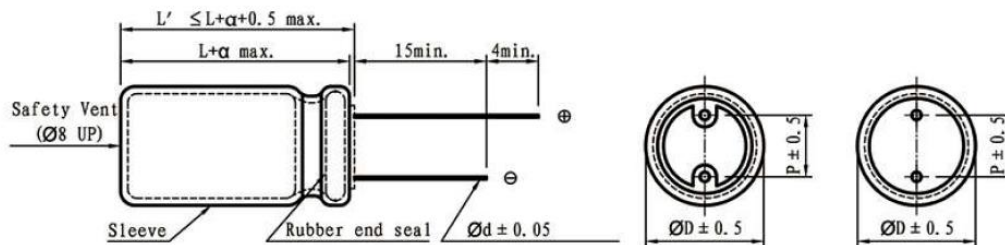
Capacitance (μ F)	Frequency (Hz)				
	120	10K	30K	50K	100K
10 ~ 150	1.00	1.50	1.60	1.75	2.00

The endurance of capacitors is reduced with internal heating produced by ripple current at the rate of halving the lifetime with every 5°C rise. When long life performance is required in actual use, the RMS ripple current has to be reduced.



RLK Series

Dimensions (mm)



$\varnothing D$	10	13	16	18	20	22
P	5.0	5.0	7.5	7.5	10	10
$\varnothing d$	0.6	0.6	0.8	0.8	0.8	0.8

α	(L < 16) 1.0 (L $\geq$ 16) 2.0
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Standard Ratings

D x L (mm) ; R.C. (mA rms) at 105°C 120Hz.

Cap (μ F)	V	400			450			460			500		
		D x L	R.C.		D x L	R.C.		D x L	R.C.		D x L	R.C.	
			120Hz	100KHz		120Hz	100KHz		120Hz	100KHz		120Hz	100KHz
10		10x16	120	240	10x20	170	340	10x20	150	300	13x21	83	166
15		10x20	230	460	13x21	230	460	13x21	200	400	13x21	110	220
22		13x21	300	600	13x21	350	700	13x25	350	700	13x25	200	400
33		13x21	380	760	13x25	400	800	16x25	480	960	16x25	300	600
47		13x25	400	800	16x25	530	1060	18x26	530	1060	18x26	330	660
56		16x25	550	1100	18x26	630	1260	18x26	600	1200	18x32	350	700
68		16x25	700	1400	18x32	690	1380	18x32	690	1380	18x35	480	960
82		18x26	780	1560	18x32	750	1500	18x32	750	1500	18x40	590	1180
100		18x32	830	1660	18x35	800	1600	18x35	800	1600	18x45	680	1360
120		18x35	900	1800	18x40	950	1900	18x40	950	1900	20x45	730	1460
150		18x40	1000	2000	18x45	1050	2100	20x45	1300	2600	22x45	780	1560

※ 13mm may be replaced by 12.5mm upon customer's request.

RLM Series

- 105°C High ripple and Low impedance, long life: 4,000~5,000 hours.
- Suited for LCD TV BLU Inverter, SMPS, IP-Board, Adaptor, etc.
- RoHS Compliant & Halogen Free

Specifications

Items	Characteristics					
Capacitance Tolerance	± 20% (120Hz, 20°C)					
Operating Temperature Range	-40 ~ +105°C					
Rated Voltage Range	10 ~ 50VDC					
Leakage Current	I ≤ 0.01CV or 3 (μA) which is greater. (After 2 minutes application of DC rated voltage, at 20 °C)					
Dissipation Factor	Measurement Frequency: 120Hz. Temperature: 20°C					
	Rated Voltage (V)	10	16	25	35	50
	tan δ(Max)	0.19	0.16	0.14	0.12	0.10
	When nominal capacitance over 1000μF, tan δ shall be added 0.02 to the listed value with increase of every 1000μF.					
Low Temperature Stability	Measurement Frequency: 120Hz.					
	Rated Voltage(V)	10	16	25	35	50
Impedance Ratio (Max)	Z(-25°C) / Z(20°C)	2	2	2	2	2
	Z(-40°C) / Z(20°C)	3	3	3	3	3
Load Life	5000hours, with application of working voltage at 105°C (ψD ≤ 8mm & Size: 10x13;load life: 4,000 hours)					
	Capacitance Change	Within ± 30% of Initial Value				
	tan δ	200% or less of Initial Specified Value				
	Leakage Current	Initial Specified Value or less				
Shelf Life	The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours 105°C without voltage applied. Before the measurement the capacitor shall be preconditioned by applying voltage according to them 4.1 of JIS C5101-4.					
	Capacitance Change	Within ± 25% of Initial Value				
	tan δ	200% or less of Initial Specified Value				
	Leakage Current	Initial Specified Value or less				
Standards	JIS C 5101-4-1 (IEC 60384)					

Frequency Coefficient of Permissible Ripple Current

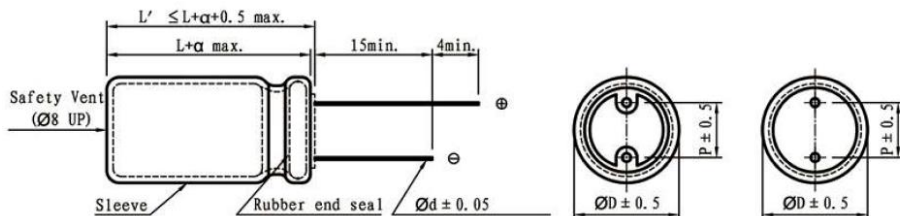
Capacitance (μF)	Frequency (Hz)			
	120	1K	10K	100K
100 ~ 270	0.40	0.75	0.90	1.00
330 ~ 680	0.50	0.85	0.94	1.00
820 ~ 1800	0.60	0.87	0.95	1.00
2200 ~ 2700	0.75	0.90	0.95	1.00

The endurance of capacitors is reduced with internal heating produced by ripple current at the rate of halving the lifetime with every 5°C rise. When long life performance is required in actual use, the RMS ripple current has to be reduced.



RLM Series

Dimensions (mm)



Ø D	8	10
P	3.5	5.0
Ø d	0.5	0.6

α	(L < 16) 1.0
	(L ≥ 16) 2.0

Standard

DxL(mm) ; R.C.(mA rms) at 105°C 100KHz ; IMP (Ω max)at 20°C 100KHz.

Cap (μF)	V Item	10			16			25		
		D x L	R.C.	IMP	D x L	R.C.	IMP	D x L	R.C.	IMP
330								8x12	1420	0.072
390								8x16	2045	0.056
470					8x12	1420	0.072	10x13	2180	0.052
560								8x20	2385	0.040
680		8x12	1420	0.072	8x12	2045	0.056	10x16	2540	0.037
					10x13	2180	0.052			
820								10x20	2870	0.027
1000		8x16	2045	0.056	8x20	2385	0.040	10x25	3165	0.023
		10x13	2180	0.052	10x16	2540	0.037			
1200								10x35	3580	0.020
1500		8x20	2385	0.040	10x20	2870	0.027			
		10x16	2540	0.037						
1800		10x20	2870	0.027	10x25	3165	0.023			
2200		10x25	3165	0.023	10x35	3580	0.020			
2700		10x35	3580	0.020						

Cap (μF)	V Item	35			50		
		D x L	R.C.	IMP	D x L	R.C.	IMP
100					8x12	1090	0.095
120					8x16	1560	0.078
150					10x13	1620	0.087
180					8x20	1900	0.064
220		8x12	1420	0.072	10x16	1990	0.056
270		8x16	2045	0.056	10x20	2330	0.041
330		10x13	2180	0.052	10x25	2630	0.036
390		8x20	2385	0.040			
470		10x16	2540	0.037	10x35	2960	0.032
560		10x20	2870	0.027			
680		10x25	3165	0.023			
820							
1000		10x35	3580	0.020			

※ 13mm may be replaced by 12.5mm upon customer's request.

RMB Series

- Subminiature product, 105°C
- Applicable to small electronic devices
- Height: 5mm
- RoHS Compliant & Halogen Free

Specifications

Items	Characteristics							
Capacitance Tolerance	± 20% (120Hz, 20°C)							
Operating Temperature Range	-40 ~ +105°C							
Rated Voltage Range	4 ~ 50VDC							
Leakage Current	I ≤ 0.01CV or 3 (μA) which is greater. (After 2 minutes application of DC rated voltage, at 20 °C)							
Dissipation Factor	Measurement Frequency: 120Hz. Temperature: 20°C							
	Rated Voltage (V)	4	6.3	10	16	25	35	50
	tan δ(Max)	0.35	0.24	0.20	0.16	0.15	0.14	0.13
Low Temperature Stability	Measurement Frequency: 120Hz.							
	Rated Voltage(V)	4	6.3	10	16	25	35	50
Impedance Ratio (Max)	Z(-25°C) / Z(20°C)	6	3	3	2	2	2	2
	Z(-40°C) / Z(20°C)	12	8	5	4	3	3	3
Load Life	1000hours, with application of rated voltage at 105°C							
	Capacitance Change	Within ± 20% of Initial Value						
	tan δ	200% or less of Initial Specified Value						
	Leakage Current	Initial Specified Value or less						
Shelf Life	The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours 105°C without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to them 4.1 of JIS C5101-4.							
	Capacitance Change	Within ± 20% of Initial Value						
	tan δ	200% or less of Initial Specified Value						
	Leakage Current	Initial Specified Value or less						
Standards	JIS C 5101-4 (IEC 60384)							

Frequency Coefficient of Permissible Ripple Current

Capacitance (μF)	Frequency (Hz)			
	50	120	1K	$\geq 10K$
< 100	0.80	1.00	1.30	1.50
≥ 100	0.80	1.00	1.15	1.20

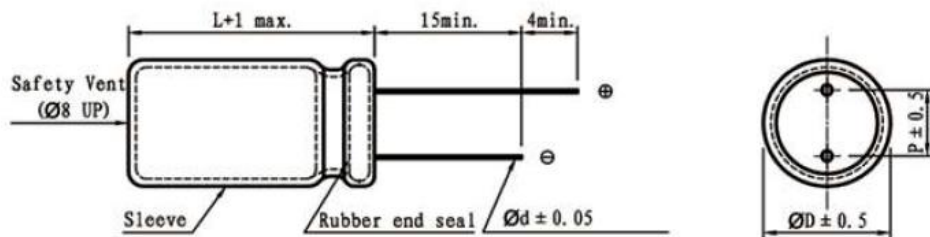
The endurance of capacitors is reduced with internal heating produced by ripple current at the rate of having the lifetime with every 5°C rise.

When long life performance is required in actual use, the rms ripple current has to be reduced.



RMB Series

Dimensions (mm)



ØD	4	5	6.3	8
P	1.5	2.0	2.5	2.5
Ød	0.45	0.45	0.45	0.45

Standard Ratings

D×L(mm) ; R.C.(mA rms) at 105°C 120Hz.

Cap (µF)	V	4		6.3		10		16	
	Item	D x L	R.C.	D x L	R.C.	D x L	R.C.	D x L	R.C.
10						4x5	16	4x5	18
22		4x5	20	4x5	21	4x5	25	4x5	33
33		5x5	28	5x5	29	5x5	34	5x5	44
47		5x5	33	5x5	34	6.3x5	46	6.3x5	52
100		6.3x5	60	6.3x5	66	6.3x5	77	8x5	93
150		6.3x5	67	6.3x5	75	8x5	100	8x5	115
220		8x5	95	8x5	115	8x5	125		

Cap (µF)	V	25		35		50	
	Item	D x L	R.C.	D x L	R.C.	D x L	R.C.
0.1						4x5	1.0
0.22						4x5	2.0
0.33						4x5	3.0
0.47						4x5	3.7
1						4x5	6.2
2.2						4x5	10
3.3				4x5	11	4x5	14
4.7		4x5	13	4x5	16	5x5	18
10		4x5	22	5x5	25	6.3x5	28
22		6.3x5	38	6.3x5	46	6.3x5	59
33		6.3x5	48	6.3x5	50	8x5	65
47		6.3x5	58	8x5	69	8x5	78

RMC Series

- Subminiature product, Low impedance, 105°C
- Applicable to small electronic devices
- Height: 5mm
- RoHS Compliant & Halogen Free

Specifications

Items	Characteristics						
Capacitance Tolerance	± 20% (120Hz, 20°C)						
Operating Temperature Range	-40 ~ +105°C						
Rated Voltage Range	6.3 ~ 35VDC						
Leakage Current	I ≤ 0.01CV or 3 (μA) which is greater. (After 2 minutes application of DC rated voltage, at 20 °C)						
Dissipation Factor	Measurement Frequency: 120Hz. Temperature: 20°C						
	Rated Voltage (V)	6.3	10	16	25	35	50
	tan δ(Max)	0.22	0.20	0.18	0.14	0.12	0.10
Low Temperature Stability	Measurement Frequency: 120Hz.						
	Rated Voltage(V)	6.3	10	16	25	35~50	
Impedance Ratio (Max)	Z(-25°C) / Z(20°C)	2	2	2	2	2	
	Z(-40°C) / Z(20°C)	4	4	3	3	3	
Load Life	1000 hours, with application of rated voltage at 105°C						
	Capacitance Change	Within ± 20% of Initial Value					
	tan δ	200% or less of Initial Specified Value					
	Leakage Current	Initial Specified Value or less					
Shelf Life	The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours 105°C without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to them 4.1 of JIS C5101-4.						
	Capacitance Change	Within ± 20% of Initial Value					
	tan δ	200% or less of Initial Specified Value					
	Leakage Current	Initial Specified Value or less					
Standards	JIS C 5101-4 (IEC 60384)						

Frequency Coefficient of Permissible Ripple Current

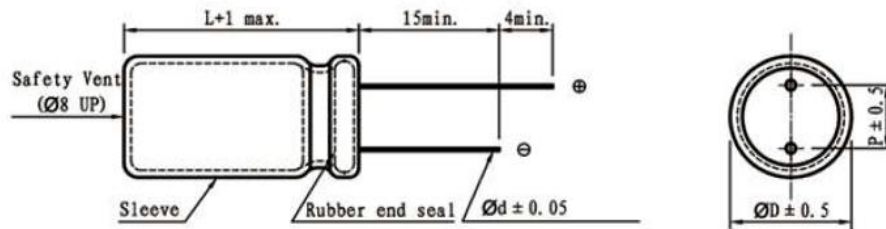
Frequency (Hz)	50	120	300	1K	10K ~ 100K
Coefficient	0.50	0.65	0.70	0.90	1.00

The endurance of capacitors is reduced with internal heating produced by ripple current at the rate of halving the lifetime with every 5°C rise. When long life performance is required in actual use, the rms ripple current has to be reduced.

Aluminum Electrolytic Capacitors

RMC Series

Dimensions (mm)



ØD	4	5	6.3
P	1.5	2.0	2.5
Ød	0.45	0.45	0.45

Standard Ratings

D×L(mm); R.C.(mA rms) at 105°C 100KHz, IMP (Ω max) at 20°C 100KHz.

Cap (µF)	V	6.3			10			16		
	Item	D x L	R.C.	IMP	D x L	R.C.	IMP	D x L	R.C.	IMP
10								4x5	55	5.0
15								5x5	80	2.6
22		4x5	52	5.0	5x5	80	2.6	5x5	82	2.5
33		5x5	82	2.5	5x5	82	2.5	6.3x5	113	1.3
47		5x5	85	2.5	6.3x5	115	1.2	6.3x5	115	1.2
68		6.3x5	118	1.3						
100		6.3x5	120	1.2						

Cap (µF)	V	25			35		
	Item	D x L	R.C.	IMP	D x L	R.C.	IMP
1					4x5	48	5.0
1.5					4x5	49	4.9
2.2					4x5	50	4.9
3.3					4x5	52	4.8
4.7		4x5	49	5.0	4x5	55	4.8
6.8		4x5	52	4.8	5x5	80	2.6
10		5x5	82	2.5	5x5	85	2.5
15		6.3x5	116	1.3	6.3x5	116	1.3
22		6.3x5	118	1.2	6.3x5	118	1.2
33		6.3x5	120	1.1			

RME Series

- Miniature product, 105°C
- Applicable to small electronic devices
- Height: 7 mm
- RoHS Compliant & Halogen Free

Specifications

Items	Characteristics									
Capacitance Tolerance	± 20% (120Hz, 20°C)									
Operating Temperature Range	-40 ~ +105°C									
Rated Voltage Range	6.3 ~ 50VDC									
Leakage Current	I ≤ 0.01CV or 3 (μA) which is greater. (After 2 minutes application of DC rated voltage, at 20 °C)									
Dissipation Factor	Measurement Frequency: 120Hz. Temperature: 20°C									
	Rated Voltage (V)	2.7	6.3	10	16	25	35	50	63	100
	tan δ(Max)	0.25	0.24	0.20	0.16	0.15	0.12	0.10	0.09	0.07
Low Temperature Stability	Measurement Frequency: 120Hz.									
	Rated Voltage(V)	6.3	10	16	25	35	50			
Impedance Ratio (Max)	Z(-25°C) / Z(20°C)	3	2	2	2	2	2	2		
	Z(-40°C) / Z(20°C)	6	5	4	3	3	3	3		
Load Life	1000hours, with application of rated voltage at 105°C									
	Capacitance Change	Within ± 20% of Initial Value								
	tan δ	200% or less of Initial Specified Value								
	Leakage Current	Initial Specified Value or less								
Shelf Life	The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours 105°C without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to them 4.1 of JIS C5101-4.									
	Capacitance Change	Within ± 20% of Initial Value								
	tan δ	200% or less of Initial Specified Value								
	Leakage Current	Initial Specified Value or less								
Standards	JIS C 5101-4 (IEC 60384)									

Frequency Coefficient of Permissible Ripple Current

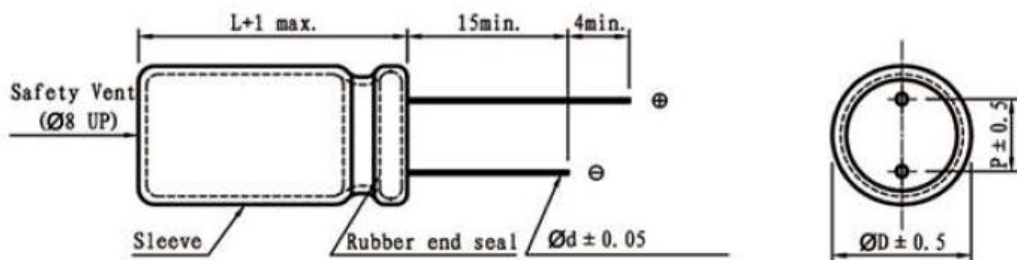
Capacitance (μF)	Frequency (Hz)			
	50	120	1K	≥ 10K
< 100	0.80	1.00	1.30	1.50
≥ 100	0.80	1.00	1.15	1.20

The endurance of capacitors is reduced with internal heating produced by ripple current at the rate of halving the lifetime with every 5°C rise. When long life performance is required in actual use, the rms ripple current has to be reduced.



RME Series

Dimensions (mm)



ØD	4	5	6.3	8
P	1.5	2.0	2.5	3.5
Ød	0.45	0.5	0.5	0.5

Standard Ratings

D×L(mm) ; R.C.(mA rms) at 105°C 120Hz.

Cap (µF)	V	6.3		10		16	
	Item	D x L	R.C.	D x L	R.C.	D x L	R.C.
10						4x7	28
22		4x7	34	4x7	37	4x7	44
33		4x7	42	4x7	45	5x7	52
47		4x7	50	5x7	60	5x7	69
100		5x7	75	6.3x7	86	6.3x7	95
220		6.3x7	95	8x7	145	8x7	150
330		8x7	160				

Cap (µF)	V	25		35		50	
	Item	D x L	R.C.	D x L	R.C.	D x L	R.C.
0.1						4x7	1.0
0.22						4x7	2.3
0.33						4x7	3.5
0.47						4x7	5.0
1						4x7	10
2.2						4x7	18
3.3				4x7	18	4x7	24
4.7		4x7	22	4x7	22	4x7	28
10		4x7	29	5x7	33	5x7	42
22		5x7	35	6.3x7	55	6.3x7	60
33		6.3x7	62	6.3x7	65	8x7	68
47		8x7	75	8x7	80	8x7	95
100		8x7	95				
150		8x7	105				
180		8x7	120				

RMG Series

- Miniature, Low impedance, 105°C product
- Applicable to small electronic devices
- Height: 7 mm
- RoHS Compliant & Halogen Free

Specifications

Items	Characteristics								
Capacitance Tolerance	± 20% (120Hz, 20°C)								
Operating Temperature Range	-40 ~ +105°C								
Rated Voltage Range	6.3 ~ 35VDC								
Leakage Current	I ≤ 0.01CV or 3 (μA) which is greater. (After 2 minutes application of DC rated voltage, at 20 °C)								
Dissipation Factor	Measurement Frequency: 120Hz. Temperature: 20°C								
	Rated Voltage (V)	6.3	10	16	25	35	40~50	63	100
	tan δ(Max)	0.18	0.16	0.14	0.12	0.12	0.10	0.09	0.07
Low Temperature Stability	Measurement Frequency: 120Hz.								
	Rated Voltage(V)	6.3	10	16	25	35	40~50	63	100
Impedance Ratio (Max)	Z(-25°C) / Z(20°C)	2	2	2	2	2	2	2	2
	Z(-40°C) / Z(20°C)	3	3	3	3	3	3	3	3
Load Life	1,000 hours, with application of working voltage at 105°C.								
	Capacitance Change	Within ± 20% of Initial Value							
	tan δ	200% or less of Initial Specified Value							
	Leakage Current	Initial Specified Value or less							
Shelf Life	The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours 105°C without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to them 4.1 of JIS C5101-4.								
	Capacitance Change	Within ± 20% of Initial Value							
	tan δ	200% or less of Initial Specified Value							
	Leakage Current	Initial Specified Value or less							
Standards	JIS C 5101-4 (IEC 60384)								

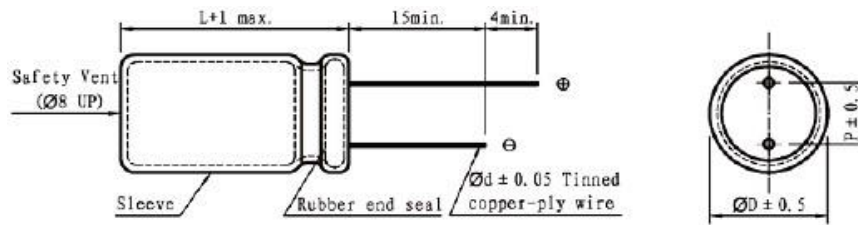
Frequency Coefficient of Permissible Ripple Current

Frequency (Hz)	50	120	300	1K	10K ~ 100K
Coefficient	0.35	0.50	0.64	0.83	1.00

The endurance of capacitors is reduced with internal heating produced by ripple current at the rate of halving the lifetime with every 5°C rise. When long life performance is required in actual use, the rms ripple current has to be reduced.

RMG Series

Dimensions (mm)



ØD	4	5	6.3	8
P	1.5	2.0	2.5	3.5
Ød	0.45	0.5	0.5	0.5

Standard Ratings

D×L(mm) ; R.C.(mA rms) at 105°C 100KHz, IMP (Ω max) at 20°C 100KHz.

Cap (µF)	V	6.3			10			16		
	Item	D x L	R.C.	IMP	D x L	R.C.	IMP	D x L	R.C.	IMP
15								4x7	70	3.3
22					4x7	70	3.3	5x7	110	1.7
33		5x7	110	1.7	5x7	115	1.7	6.3x7	160	0.8
47		5x7	110	1.7	5x7	143	1.3	6.3x7	165	0.8
68		6.3x7	160	0.8	6.3x7	165	0.8	8x7	200	0.5
100		6.3x7	160	0.8	8x7	200	0.5	8x7	210	0.5
150		8x7	200	0.5	8x7	205	0.5			
220		8x7	200	0.5						

Ca p (µF)	V	25			35		
	Item	D x L	R.C.	IMP	D x L	R.C.	IMP
6.8					4x7	70	3.3
10		4x7	70	3.3	5x7	110	1.7
15		5x7	110	1.7	6.3x7	132	1.7
22		5x7	110	1.7	6.3x7	160	0.8
33		6.3x7	160	0.8	8x7	200	0.5
47		8x7	200	0.5	8x7	230	0.5
68		8x7	200	0.5			
100		8x7	300	0.4			

RMH Series

- Miniature, long life 5000 hours, 105°C product
- Applicable to small electronic devices
- Height: 7 mm
- RoHS Compliant & Halogen Free

Specifications

Items	Characteristics						
Capacitance Tolerance	± 20% (120Hz, 20°C)						
Operating Temperature Range	-40 ~ +105°C						
Rated Voltage Range	6.3 ~ 50VDC						
Leakage Current	I ≤ 0.01CV or 3 (μA) which is greater. (After 2 minutes application of DC rated voltage, at 20 °C)						
Dissipation Factor	Measurement Frequency: 120Hz. Temperature: 20°C						
	Rated Voltage (V)	6.3	10	16	25	35	50
	tan δ(Max)	0.24	0.20	0.17	0.15	0.13	0.12
Low Temperature Stability	Measurement Frequency: 120Hz.						
	Rated Voltage(V)	6.3	10	16	25	35	50
Impedance Ratio (Max)	Z(-25°C) / Z(20°C)	4	3	2	2	2	2
	Z(-40°C) / Z(20°C)	8	6	4	3	3	3
Load Life	5,000 hours, with application of rated voltage at 105°C.						
	Capacitance Change	Within ± 30% of Initial Value					
	tan δ	300% or less of Initial Specified Value					
	Leakage Current	Initial Specified Value or less					
Shelf Life	The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours 105°C without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to them 4.1 of JIS C5101-4.						
	Capacitance Change	Within ± 30% of Initial Value					
	tan δ	300% or less of Initial Specified Value					
	Leakage Current	Initial Specified Value or less					
Standards	JIS C 5101-4 (IEC 60384)						

Frequency Coefficient of Permissible Ripple Current

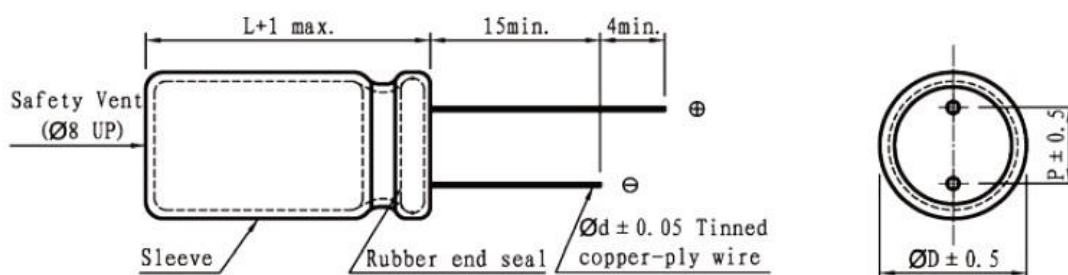
Frequency (Hz)	50	120	1K	≥10K
Coefficient	0.65	1.00	1.37	1.50

The endurance of capacitors is reduced with internal heating produced by ripple current at the rate of halving the lifetime with every 5°C rise. When long life performance is required in actual use, the rms ripple current has to be reduced.



RMH Series

Dimensions (mm)



ØD	4	5	6.3	8
P	1.5	2.0	2.5	3.5
Ød	0.45	0.5	0.5	0.5

Standard Ratings

D×L(mm); R.C.(mA rms) at 105°C 120Hz.

Cap (µF)	V	6.3		10		16	
	Item	D x L	R.C.	D x L	R.C.	D x L	R.C.
10						4x7	29
22		4x7	35	5x7	42	5x7	46
33		5x7	43	5x7	50	6.3x7	58
47		5x7	50	6.3x7	60	6.3x7	70
100		6.3x7	76	8x7	96	8x7	110
220		8x7	131				

Cap (µF)	V	25		35		50	
	Item	D x L	R.C.	D x L	R.C.	D x L	R.C.
0.1						4x7	1.5
0.22						4x7	2.5
0.33						4x7	3.5
0.47						4x7	5
1						4x7	12
2.2						4x7	21
3.3						4x7	26
4.7				4x7	26	5x7	31
10		5x7	36	5x7	36	6.3x7	46
22		6.3x7	52	6.3x7	60	8x7	67
33		6.3x7	65	8x7	75		
47		8x7	80				

RNC Series

- Non-polarity standard product, 85°C 2000 hours.
- Suitable for DC two-way return circuit.
- RoHS Compliant & Halogen Free

Specifications

Items	Characteristics								
Capacitance Tolerance	± 20% (120Hz, 20°C)								
Operating Temperature Range	-40 ~ +85°C								
Rated Voltage Range	6.3 ~ 100VDC								
Leakage Current	I ≤ 0.03CV or 3 (μA) which is greater. (After 5 minutes application of DC rated voltage, at 20°C)								
Dissipation Factor	Measurement Frequency: 120Hz. Temperature: 20°C								
	Rated Voltage (V)	6.3	10	16	25	35	50	63	100
	tan δ(Max)	0.26	0.24	0.22	0.20	0.16	0.14	0.12	0.10
	When nominal capacitance over 1000μF, tan δ shall be added 0.02 to the listed value with increase of every 1000μF.								
Low Temperature Stability Impedance Ratio (Max)	Measurement Frequency: 120Hz.								
	Rated Voltage (V)	6.3	10	16	25	35	50	63	100
	Z(-25°C) / Z(20°C)	4	3	2	2	2	2	2	2
	Z(-40°C) / Z(20°C)	10	8	6	5	4	4	3	3
Load Life	2,000 hours, with the polarity inverted every 250 hours at 85°C								
	Capacitance Change	Within ±20% of Initial Value							
	tan δ	200% or less of Initial Specified Value							
	Leakage Current	Initial Specified Value or less							
Shelf Life	The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours 85°C without voltage applied. Before the measurement the capacitor shall be preconditioned by applying voltage according to them 4.1 of JIS C5101-4.								
	Capacitance Change	Within ±20% of Initial Value							
	tan δ	200% or less of Initial Specified Value							
	Leakage Current	Initial Specified Value or less							
Standards	JIS C 5101-4 (IEC 60384)								

Frequency Coefficient of Permissible Ripple Current

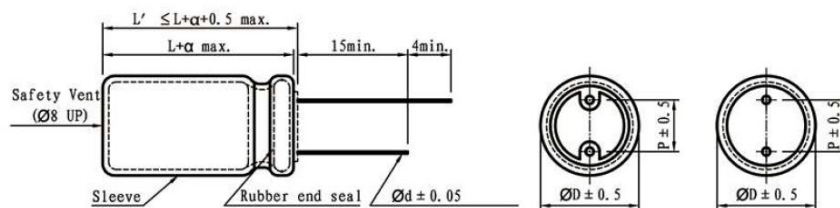
Capacitance (μF)	Frequency (Hz)			
	50	120	1K	≥ 10K
< 100	0.80	1.00	1.30	1.50
≥ 100	0.80	1.00	1.15	1.20

The endurance of capacitors is reduced with internal heating produced by ripple current at the rate of halving the lifetime with every 5°C rise. When long life performance is required in actual use, the RMS ripple current has to be reduced.



RNC Series

Dimensions (mm)



$\varnothing D$	4	5	6.3	8	10	13	16	18
P	1.5	2.0	2.5	3.5	5.0	5.0	7.5	7.5
$\varnothing d$	0.45	0.5	0.5	0.5	0.6	0.6	0.8	0.8

α	(L < 16) 1.0
α	(L $\geq$ 16) 2.0

Standard Ratings

D×L(mm); R.C. (mA rms) at 85°C 120Hz.

Cap (μF)	V	6.3		10		16		25	
	Item	D x L	R.C.	D x L	R.C.	D x L	R.C.	D x L	R.C.
4.7						4x7	19	5x7	22
10						5x7	30	5x11	45
22				4x7	24	5x11	42	6.3x7	35
33				5x7	41	5x11	59	6.3x7	53
47				5x11	57	6.3x7	51	6.3x11	66
100		5x7	43	5x11	67	6.3x7	64	6.3x11	88
220		5x11	63	6.3x7	56	6.3x11	80	8x7	74
330		6.3x7	58	6.3x7	67	6.3x7	75	8x7	87
470		5x11	76	6.3x11	83	6.3x11	95	8x12	100
1000		6.3x11	125	6.3x11	128	8x7	125	8x14	160
2200		8x7	96	8x7	110	8x12	160		
3300		8x7	140	8x14	215	10x16	300	10x16	385
4700		8x12	210						
6800		8x14	270	10x16	350	10x16	375	13x21	460
		10x16	370	10x20	410	10x20	480	13x21	540
		10x20	650	13x21	720	13x25	855	16x26	950
		13x25	1160	16x26	1280	16x32	1510	18x35	1620
		16x26	1570	16x32	1690	18x35	1980		
		16x32	2020	18x35	2160				
		18x35	2600						

RNC Series

Standard Ratings

D×L(mm) ; R.C.(mA rms) at 85°C 120Hz.

Cap (μF)	V Item	35		50		63		100	
		D × L	R.C.	D × L	R.C.	D × L	R.C.	D × L	R.C.
0.10				4x7	4				
0.22				4x7	6				
0.33				4x7	7.3				
0.47				4x7	8.9				
0.1 ~ 0.47				5x11	11	5x11	11	5x11	14
1.0				4x7	12	5x11	17	5x11	21
				5x11	17				
2.2				4x7	19	5x11	25	6.3x11	33
				5x11	25				
3.3				5x7	25	5x11	37	6.3x11	39
		4x7	20	5x11	28				
4.7		5x7	30	5x11	34	6.3x11	47	8x12	57
		5x11	34	6.3x7	38				
10		5x11	45	6.3x11	52	8x12	68	8x14	80
		6.3x7	48	8x7	54				
22		6.3x11	74	8x7	66	8x14	95	10x16	135
		8x7	62	8x12	88				
33		8x7	76	8x14	105	10x16	135	13x21	220
		8x12	105						
47		8x14	125	10x16	150	10x20	180	13x21	240
100		10x16	230	10x20	265	13x21	320	16x26	430
220		13x21	420	13x25	480	16x26	570	18x35	720
330		13x21	510	16x26	650	16x32	660		
470		13x25	660	16x32	840	18x35	965		
1000		16x32	1140						

※ 13mm may be replaced by 12.5mm upon customer's request.

RND Series

- Non-polarity standard product, 105°C 2000 hours.
- Suitable for DC two-way return circuit.
- RoHS Compliant & Halogen Free

Specifications

Items	Characteristics									
Capacitance Tolerance	± 20% (120Hz, 20°C)									
Operating Temperature Range	-40 ~ +105°C									
Rated Voltage Range	6.3 ~ 160VDC									
Leakage Current	I ≤ 0.03CV or 3 (μA) which is greater. (After 5 minutes application of DC rated voltage, at 20°C)									
Dissipation Factor	Measurement Frequency: 120Hz. Temperature: 20°C									
	Rated Voltage (V)	6.3	10	16	25	35	50	63	100	160
	tan δ(Max)	0.26	0.24	0.22	0.20	0.16	0.14	0.12	0.10	0.15
	When nominal capacitance over 1000μF, tan δ shall be added 0.02 to the listed value with increase of every 1000μF.									
Low Temperature Stability Impedance Ratio (Max)	Measurement Frequency: 120Hz.									
	Rated Voltage(V)	6.3	10	16	25	35	50	63	100	160
	Z(-25°C) / Z(20°C)	4	3	2	2	2	2	2	2	3
	Z(-40°C) / Z(20°C)	10	8	6	5	4	4	3	3	4
Load Life	2,000 hours, with the polarity inverted every 250 hours at 105°C									
	Capacitance Change	Within ±20% of Initial Value								
	tan δ	200% or less of Initial Specified Value								
	Leakage Current	Initial Specified Value or less								
Shelf Life	The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours 105°C without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to them 4.1 of JIS C5101-4.									
	Capacitance Change	Within ±20% of Initial Value								
	tan δ	200% or less of Initial Specified Value								
	Leakage Current	Initial Specified Value or less								
Standards	JIS C 5101-4 (IEC 60384)									

Frequency Coefficient of Permissible Ripple Current

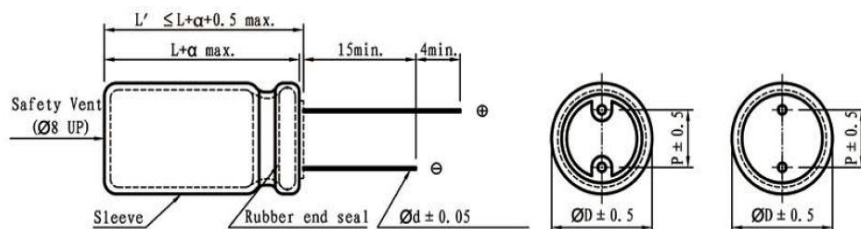
Capacitance (μF)	Frequency (Hz)			
	50	120	1K	≥ 10K
< 100	0.80	1.00	1.30	1.50
≥ 100	0.80	1.00	1.15	1.20

The endurance of capacitors is reduced with internal heating produced by ripple current at the rate of halving the lifetime with every 5°C rise. When long life performance is required in actual use, the RMS ripple current has to be reduced.



RND Series

Dimensions (mm)



ϕD	4	5	6.3	8	10	13	16
P	1.5	2.0	2.5	3.5	5.0	5.0	7.5
ϕd	0.45	0.5	0.5	0.5	0.6	0.6	0.8

α	(L < 16) 1.0
	(L $\geq$ 16) 2.0

Standard Ratings

D×L(mm) ; R.C.(mA rms) at 105°C 120Hz.

Cap (μF)	V	6.3		10		16		25	
	Item	D x L	R.C.	D x L	R.C.	D x L	R.C.	D x L	R.C.
3.3								4x7	15
4.7						4x7	18	5x7	18
10				4x7	23	5x7	27	5x11	36
						5x11	30	6.3x7	28
22		5x7	33	5x7	36	6.3x7	41	6.3x11	55
				5x11	42	6.3x11	52	8x7	42
33		5x7	40	6.3x7	45	6.3x11	66	8x12	75
		5x11	48	6.3x11	58	8x7	52		
47		6.3x7	49	6.3x11	70	8x12	90	10x13	96
		6.3x11	65	8x7	55				
100		8x12	105	10x13	125	10x13	140	10x16	158
220		10x13	168	10x16	205	10x20	285	13x21	306
330		10x16	230	10x20	278	13x21	346	13x25	415
470		10x20	330	13x21	370	13x25	460	16x26	545
1000		13x25	550	16x26	665	16x26	750	16x32	870



RND Series

Standard Ratings

D×L(mm) ; R.C.(mA rms) at 105°C 120Hz.

Cap (μF)	V	35		50		63		100		160	
	Item	D × L	R.C.	D × L	R.C.	D × L	R.C.	D × L	R.C.	D × L	R.C.
0.1				4x7	2.1	4x7	2.6				
0.22				4x7	4.5	4x7	5				
0.33				4x7	5.6	4x7	6.1				
0.47				4x7	6.6	4x7	7.3				
0.1 ~ 0.47				5x11	8	5x11	5	5x11	10	6.3x11	10
1				4x7	9.7	4x7	10	5x11	15	8x12	17
				5x11	12	5x11	15				
2.2	4x7	13		5x7	14	5x7	16	6.3x11	24	8x12	20
				5x11	18	5x11	22				
3.3	5x7	16		5x7	18	6.3x7	20	8x12	32	8x12	25
				5x11	22	6.3x11	26				
4.7	5x7	20		6.3x7	22	6.3x11	32	8x12	40	8x12	30
	5x11	25		6.3x11	30	8x7	24				
5.6	5x11	28		6.3x11	35	6.3x11	40	8x12	48	8x14	35
6.8	5x11	33		6.3x11	40	8x12	45	8x14	52	8x16	41
10	6.3x11	40		8x12	50	8x12	55	10x13	65	10x16	55
	8x7	30									
22	8x12	68		10x13	82	10x16	90	10x20	120	13x21	106
33	10x13	90		10x16	100	10x20	128	13x21	168	13x21	130
47	10x13	110		10x20	146	10x20	156	13x21	200	13x25	167
56	10x16	140		13x21	195	13x21	218	13x21	250	16x26	206
100	10x20	196		13x25	260	13x25	275	13x25	295	16x32	300
220	13x25	365		16x26	445	16x32	486				
330	16x26	492		16x32	595						
470	16x32	595									

※ 13mm may be replaced by 12.5mm upon customer's request.

RNE Series

- Non-polarity, low E.S.R, ripple current high frequency and high-temperature resistance.
- Suitable for propositive amplifier of high-grade audio and horizontal compensatory return circuit of TV set.
- RoHS Compliant & Halogen Free

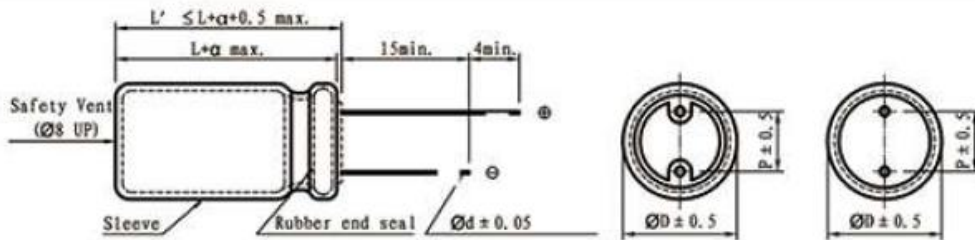
Specifications

Items	Characteristics				
Capacitance Tolerance	± 20% (120Hz, 20°C)				
Operating Temperature Range	-40 ~ +105°C				
Rated Voltage Range	25V, 35V, 50V, 100VDC				
Leakage Current	After 5 minutes application of DC rated voltage, leakage current is 100μA or less.				
Dissipation Factor	0.05 Max. measured at 120Hz. 20°C				
Low Temperature Stability Impedance Ratio (Max)	Measurement Frequency: 120Hz.				
	Rated Voltage(V)	25	35	50	100
	Z(-25°C) / Z(20°C)	3	3	3	3
	Z(-40°C) / Z(20°C)	4	4	4	4
Load Life	1,000 hours, with application of rated voltage at 105°C				
	Capacitance Change	Within ± 15% of Initial Value			
	tan δ	200% or less of Initial Specified Value			
	Leakage Current	Initial Specified Value or less			
Shelf Life	The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours 105°C without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to them 4.1 of JIS C5101-4.				
	Capacitance Change	Within ± 15% of Initial Value			
	tan δ	200% or less of Initial Specified Value			
	Leakage Current	Initial Specified Value or less			
Standards	JIS C 5101-4 (IEC 60384)				



RNE Series

Dimensions (mm)



$\varnothing D$	10	13	16
P	5.0	5.0	7.5
$\varnothing d$	0.6	0.6	0.8

Standard Ratings

D×L (mm), R.C. A(p-p) 15.75KHz at 105°C, E.S.R. (Ω) at 20°C 120Hz.

Cap (μF)	V	25			35	50	100
	Item	D × L	R.C.	E.S.R	D × L	R.C.	E.S.R
2.2		10x20	2.8	30.20	13x25	3.0	30.20
2.7		13x21	3.5	24.23	13x25	4.5	24.23
3.3		13x21	4.0	20.12	16x26	5.0	20.12
4.7		13x21	5.0	14.30	16x26	6.5	14.30
5.6		13x25	6.0	9.80	16x32	6.5	9.80
6.8		16x26	7.0	8.10	16x36	7.5	8.10
8.2		16x26	7.5	7.05	16x36	8.0	7.05
10		16x32	9.0	5.60			

※13mm may be replaced by 12.5mm upon customer's request.

RPB Series

- Low leakage current product.
- Suitable for prepositive amplifier of high-grade audio and oscillating return of TV set.
- RoHS Compliant & Halogen Free

Specifications

Items	Characteristics								
Capacitance Tolerance	± 20% (120Hz, 20°C)								
Operating Temperature Range	-40 ~ +85°C								
Rated Voltage Range	6.3 ~ 100VDC								
Leakage Current	I ≤ 0.002CV or 0.4 (μA), which is greater. (After 2 minutes application of DC rated voltage, at 20°C)								
Dissipation Factor	Measurement Frequency: 120Hz. Temperature: 20°C								
	Rated Voltage (V)	6.3	10	16	25	35	50	63	100
	tan δ(Max)	0.24	0.20	0.16	0.15	0.12	0.10	0.09	0.08
	When nominal capacitance over 1000μF, tan δ shall be added 0.02 to the listed value with increase of every 1000μF.								
Low Temperature Stability Impedance Ratio (Max)	Measurement Frequency: 120Hz.								
	Rated Voltage(V)	6.3	10	16	25	35	50	63	100
	Z(-25°C) / Z(20°C)	4	3	2	2	2	2	2	2
	Z(-40°C) / Z(20°C)	8	6	6	4	4	3	3	3
Load Life	The following specifications shall be satisfied when the capacitors are restored to 20°C after subjected to DC voltage with the rated ripple current is applied for 1000 hours, at 105°C)								
	Capacitance Change	Within ± 25% of Initial Value							
	tan δ	200% or less of Initial Specified Value							
	Leakage Current	Initial Specified Value or less							
Shelf Life	The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours 85°C without voltage applied. Before the measurement the capacitor shall be preconditioned by applying voltage according to them 4.1 of JIS C5101-4.								
	Capacitance Change	Within ± 25% of Initial Value							
	tan δ	200% or less of Initial Specified Value							
	Leakage Current	Initial Specified Value or less							
Standards	JIS C 5101-4(IEC 60384)								

Frequency Coefficient of Permissible Ripple Current

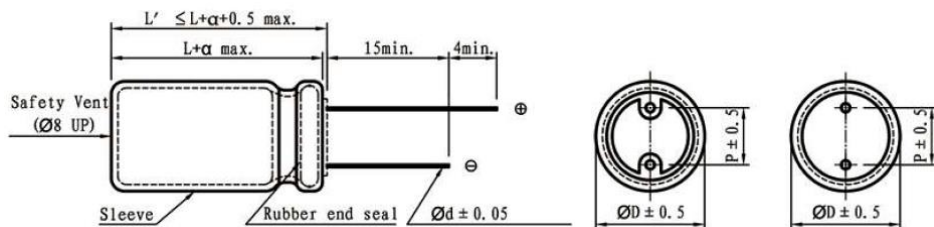
Capacitance (μF)	Frequency (Hz)			
	50	120	1K	10K
< 100	0.80	1.00	1.30	1.50
100 ~ 1000	0.80	1.00	1.15	1.20
> 1000	0.80	1.00	1.10	1.15

The endurance of capacitors is reduced with internal heating produced by ripple current at the rate of halving the lifetime with every 5°C rise. When long life performance is required in actual use, the RMS ripple current has to be reduced.



RPB Series

Dimensions (mm)



ØD	5	6.3	8	10	13	16	18
P	2.0	2.5	3.5	5.0	5.0	7.5	7.5
Ød	0.5	0.5	0.5	0.6	0.6	0.8	0.8

α	(L < 16) 1.0
	(L ≥ 16) 2.0

Standard Ratings

D×L(mm) ; R.C.(mA rms) at 85°C 120Hz.

Cap (µF)	V	6.3		10		16		25	
	Item	D x L	R.C.	D x L	R.C.	D x L	R.C.	D x L	R.C.
4.7								5x11	45
6.8								5x11	55
10						5x11	55	5x11	70
15						5x11	70	5x11	85
22						5x11	85	5x11	100
33						5x11	100	6.3x11	140
47				5x11	100	6.3x11	140	6.3x11	170
68				6.3x11	150	6.3x11	160	8x12	230
100				6.3x11	180	8x12	230	8x12	280
150				8x12	250	8x12	280	10x13	370
220				8x12	310	10x13	370	10x16	400
330				10x13	400	10x16	420	10x20	490
470		10x13	385	10x16	530	10x16	550	10x20	650
680		10x13	480	10x16	600	10x20	720	13x21	800
1000		10x16	640	10x20	780	13x21	900	13x25	1000
1500		10x20	900	13x25	1020	16x26	1150	16x32	1270
2200		13x21	1050	13x25	1200	16x26	1300	16x36	1440
3300		16x26	1300	16x32	1420	16x36	1550	18x40	1720
4700		16x32	1500	16x36	1650	18x35	1820		

※ 13mm may be replaced by 12.5mm upon customer's request.



RPB Series

Standard Ratings

D×L(mm) ; R.C.(mA rms) at 85°C 120Hz.

Cap (μF)	V	35		50		63		100	
	Item	D x L	R.C.	D x L	R.C.	D x L	R.C.	D x L	R.C.
0.1				5x11	1.1			5x11	2.1
0.15				5x11	1.6			5x11	3.2
0.22				5x11	2.3			5x11	4.7
0.33				5x11	3.5			5x11	7.0
0.47				5x11	5.0			5x11	10.1
0.68				5x11	7.3			5x11	14.5
1				5x11	10.7			5x11	19
1.5				5x11	16			5x11	23
2.2				5x11	23			5x11	28
3.3				5x11	40			5x11	45
4.7		5x11	45	5x11	45			5x11	50
6.8		5x11	55	5x11	55	5x11	59	6.3x11	65
10		5x11	70	5x11	70	6.3x11	75	8x12	90
15		5x11	85	6.3x11	95	6.3x11	100	8x12	110
22		6.3x11	110	6.3x11	110	8x12	115	10x13	136
33		6.3x11	140	8x12	165	8x12	170	10x16	180
47		8x12	190	8x12	190	10x13	200	10x20	220
68		8x12	230	10x13	250	10x16	270	10x20	290
100		10x13	300	10x16	320	10x20	330	13x21	370
150		10x16	400	10x20	420	13x21	450	13x25	470
220		10x20	440	13x21	490	13x21	550	16x26	580
330		13x21	550	13x21	600	13x25	710	16x32	730
470		13x25	680	13x25	750	16x26	850	18x35	910
680		13x25	800	16x26	910	16x32	1050		
1000		16x26	1110	16x32	1140	18x35	1330		
1500		16x32	1390	18x40	1480				
2200		18x35	1580						

※ 13mm may be replaced by 12.5mm upon customer's request.

RPC Series

- Low leakage current product.
- Suitable for prepositive amplifier of high-grade audio and oscillating return of TV set.
- RoHS Compliant & Halogen Free

Specifications

Items	Characteristics								
Capacitance Tolerance	± 20% (120Hz, 20°C)								
Operating Temperature Range	-40 ~ +105°C								
Rated Voltage Range	6.3 ~ 100VDC								
Leakage Current	I ≤ 0.002CV or 0.4 (μA), which is greater. (After 2 minutes application of DC rated voltage, at 20°C)								
Dissipation Factor	Measurement Frequency: 120Hz. Temperature: 20°C								
	Rated Voltage (V)	6.3	10	16	25	35	50	63	100
	tan δ(Max)	0.24	0.20	0.16	0.15	0.12	0.10	0.09	0.08
	When nominal capacitance over 1000μF, tan δ shall be added 0.02 to the listed value with increase of every 1000μF.								
Low Temperature Stability Impedance Ratio (Max)	Measurement Frequency: 120Hz.								
	Rated Voltage(V)	6.3	10	16	25	35	50	63	100
	Z(-25°C) / Z(20°C)	4	3	2	2	2	2	2	2
	Z(-40°C) / Z(20°C)	8	6	6	4	4	3	3	3
Load Life	The following specifications shall be satisfied when the capacitors are restored to 20°C after subjected to DC voltage with the rated ripple current is applied for 1000 hours, at 105°C								
	Capacitance Change	Within ± 25% of Initial Value							
	tan δ	200% or less of Initial Specified Value							
	Leakage Current	Initial Specified Value or less							
Shelf Life	The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours 105°C without voltage applied. Before the measurement the capacitor shall be preconditioned by applying voltage according to them 4.1 of JIS C5101-4.								
	Capacitance Change	Within ± 25% of Initial Value							
	tan δ	200% or less of Initial Specified Value							
	Leakage Current	Initial Specified Value or less							
Standards	JIS C 5101-4 (IEC 60384)								

Frequency Coefficient of Permissible Ripple Current

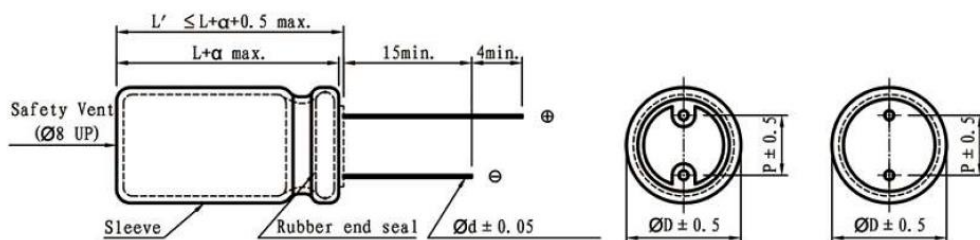
Capacitance (μF)	Frequency (Hz)			
	50	120	1K	10K
< 100	0.80	1.00	1.30	1.50
100 ~ 1000	0.80	1.00	1.15	1.20
> 1000	0.80	1.00	1.10	1.15

The endurance of capacitors is reduced with internal heating produced by ripple current at the rate of halving the lifetime with every 5°C rise. When long life performance is required in actual use, the RMS ripple current has to be reduced.



RPC Series

Dimensions (mm)



ØD	5	6.3	8	10	13	16	18
P	2.0	2.5	3.5	5.0	5.0	7.5	7.5
Ød	0.5	0.5	0.5	0.6	0.6	0.8	0.8

α	(L < 16) 1.0
	(L ≥ 16) 2.0

Standard Ratings

D×L(mm) ; R.C.(mA rms) at 105°C 120Hz.

Cap (µF)	V	6.3		10		16		25	
	Item	D x L	R.C.	D x L	R.C.	D x L	R.C.	D x L	R.C.
4.7								5x11	45
6.8								5x11	55
10						5x11	55	5x11	70
15						5x11	70	5x11	85
22						5x11	85	5x11	100
33						5x11	100	6.3x11	140
47				5x11	100	6.3x11	140	6.3x11	170
68				6.3x11	150	6.3x11	160	8x12	230
100				6.3x11	180	8x12	230	8x12	280
150				8x12	250	8x12	280	10x13	370
220				8x12	310	10x13	370	10x16	400
330				10x13	400	10x16	420	10x20	490
470		10x13	385	10x16	530	10x16	550	10x20	650
680		10x13	480	10x16	600	10x20	720	13x21	800
1000		10x16	640	10x20	780	13x21	900	13x25	1000
1500		10x20	900	13x25	1020	16x26	1150	16x32	1270
2200		13x21	1050	13x25	1200	16x26	1300	16x36	1440
3300		16x26	1300	16x32	1420	16x36	1550	18x40	1720
4700		16x32	1500	16x36	1650	18x35	1820		

※ 13mm may be replaced by 12.5mm upon customer's request.

RPC Series

Standard Ratings

D×L(mm) ; R.C.(mA rms) at 105°C 120Hz.

Cap (μF)	V	35		50		63		100	
	Item	D x L	R.C.	D x L	R.C.	D x L	R.C.	D x L	R.C.
0.1				5x11	1.1			5x11	2.1
0.15				5x11	1.6			5x11	3.2
0.22				5x11	2.3			5x11	4.7
0.33				5x11	3.5			5x11	7.0
0.47				5x11	5.0			5x11	10.1
0.68				5x11	7.3			5x11	14.5
1				5x11	10.7			5x11	19
1.5				5x11	16			5x11	23
2.2				5x11	23			5x11	28
3.3				5x11	40			5x11	45
4.7				5x11	45			5x11	50
6.8		5x11	45	5x11	55	5x11	59	6.3x11	65
10		5x11	70	5x11	70	6.3x11	75	8x12	90
15		5x11	85	6.3x11	95	6.3x11	100	8x12	110
22		6.3x11	110	6.3x11	110	8x12	115	10x13	136
33		6.3x11	140	8x12	165	8x12	170	10x16	180
47		8x12	190	8x12	190	10x13	200	10x20	220
68		8x12	230	10x13	250	10x16	270	10x20	290
100		10x13	300	10x16	320	10x20	330	13x21	370
150		10x16	400	10x20	420	13x21	450	13x25	470
220		10x20	440	13x21	490	13x21	550	16x26	580
330		13x21	550	13x21	600	13x25	710	16x32	730
470		13x25	680	13x25	750	16x26	850	18x35	910
680		13x25	800	16x26	910	16x32	1050		
1000		16x26	1110	16x32	1140	18x35	1330		
1500		16x32	1390	18x40	1480				
2200		18x35	1580						

※ 13mm may be replaced by 12.5mm upon customer's request.

RPD Series

- Protective countermeasure against DC over-voltage, 105°C 2000hours.
- RoHS Compliant & Halogen Free

Specifications

Items	Characteristics		
Capacitance Tolerance	± 20% (120Hz, 20°C)		
Operating Temperature Range	-25 ~ +105°C		
Rated Voltage Range	200VDC, 400VDC		
Leakage Current	I ≤ 0.04CV +100 (μA) (After 1 minute application of DC rated voltage, at 20 °C)		
Dissipation Factor	Measurement Frequency: 120Hz. Temperature: 20°C		
	Rated Voltage (V)	200	400
	tan δ(Max)	0.15	0.15
Low Temperature Stability Impedance Ratio (Max)	Measurement Frequency: 120Hz.		
	Rated Voltage(V)	200	400
	Z(-25°C) / Z(20°C)	4	6
Load Life	2000 hours, with application of rated voltage at 105°C		
	Capacitance Change	Within ± 20% of Initial Value	
	tan δ	200% or less of the Initial Specified Value	
	Leakage Current	Initial Specified Value or less	
Shelf Life	The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours 105°C without voltage applied. Before the measurement the capacitor shall be preconditioned by applying voltage according to them 4.1 of JIS C5101-4.		
	Capacitance Change	Within ±20% of Initial Value	
	tan δ	200% or less of Initial Specified Value	
	Leakage Current	Initial Specified Value or less	
Standards	JIS C 5101-4 (IEC 60384)		

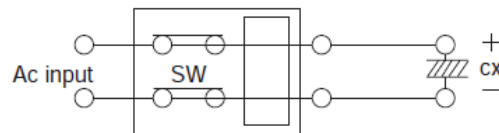
DC over voltage test conditions

The vent will be Operated, and the capacitor shall become an open circuit without burning materials when the following excess DC voltage is applied.

TEST DC VOLTAGE

Rated Voltage	Current Limit	Test DC voltage
200 Vdc	4A	300 Vdc / 375 Vdc
400 Vdc	2A	500 Vdc / 600 Vdc

TEST CIRCUIT



Frequency Coefficient of Permissible Ripple Current

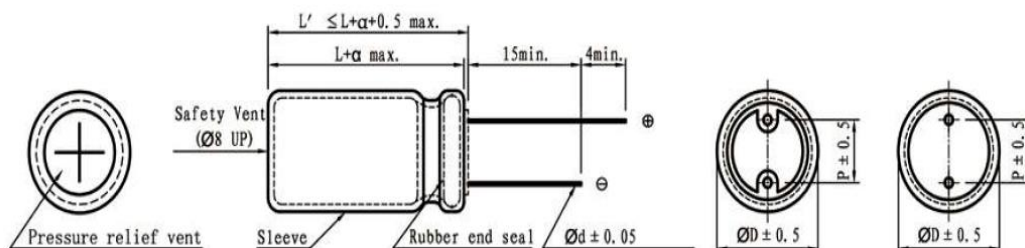
Rated Voltage (V)	Capacitance (μF)	Frequency (Hz)				
		60 (50)	120	150	1K	≥ 10K
200	22 ~ 470	0.85	1.00	1.30	1.50	1.85
	4.7 ~ 68	0.85	1.00	1.20	1.30	1.50
400	82 ~ 220	0.85	1.00	1.10	1.15	1.20

The endurance of capacitors is reduced with internal heating produced by ripple current at the rate of halving the lifetime with every 5°C rise. When long life performance is required in actual use, the RMS ripple current has to be reduced.



RPD Series

Dimensions (mm)



Ø D	10	13	16	18	20	22
P	5.0	5.0	7.5	7.5	10	10
Ø d	0.6	0.6	0.8	0.8	0.8	0.8

Standard Ratings

D×L(mm) ; R.C.(mA RMS) at 105°C 120Hz.

V	Cap (µF)	D x L	R.C.
200	22	10x20	120
	33	10x25	160
		13x21	160
	47	10x30	195
		13x21	195
	56	13x25	210
	68	13x25	250
		16x22	250
	82	13x32	285
		16x22	285
		16x26	305
		13x35	335
	100	16x26	335
		16x36	350
		18x21	335
		16x26	450
	120	16x32	500
		18x25	500
		16x32	560
		16x36	585
	150	18x21	560
		18x25	585
		16x36	600
		16x40	645
	180	18x32	645
		18x32	680
	220	18x35	700
		18x40	735
		18x35	775
	330	18x40	810
		18x45	920
		18x40	850
	390	22x40	920
		18x45	1120
	470	22x40	1270



RPD Series

Standard Ratings

D×L(mm) ; R.C. (mA RMS) at 105°C 120Hz.

V	Cap (μF)	D × L	R.C.
400	4.7	10x10	60
		10x13	63
	10	10x16	87
	15	10x20	105
	18	10x25	115
	22	13x25	135
		13x30	145
		16x22	145
		16x26	180
	33	13x25	175
		16x26	195
		18x21	225
		18x25	255
	47	13x32	370
		16x26	268
		16x32	275
		16x36	290
		18x21	275
		18x25	290
	56	18x32	310
		16x32	326
		16x36	338
		16x40	350
	68	18x32	320
		16x36	320
		16x40	360
		18x25	350
		18x32	360
	82	18x35	380
		16x32	395
		18x25	395
		18x32	400
	100	18x40	420
		18x28	450
		18x32	470
		18x35	490
	120	18x40	510
		18x32	515
		18x35	530
	150	18x40	550
		18x35	770
	180	18x40	790
		22x35	800
	220	22x40	1000

RPE Series

- Ideally Suited for first class audio equipment where qualitative Quantitative comfortableness is required.
- RoHS Compliance.

Specifications

Items	Characteristics										
Capacitance Tolerance	± 20% (120Hz, 20°C)										
Operating Temperature Range	-40~+105°C										
Rated Voltage Range	6.3~160VDC										
Leakage Current	I ≤ 0.01CV or 3 (μA) which is greater. (After 2 minutes application of DC rated voltage, at 20 °C)										
Dissipation Factor	Measurement Frequency: 120Hz. Temperature: 20°C										
	Rated Voltage (V)	6.3	10	16	25	35	50	63	80	100	200
	tan δ(Max)	0.24	0.20	0.16	0.15	0.12	0.10	0.09	0.09	0.08	0.15
	When nominal capacitance over 1000μF, tanδ shall be added 0.02 to the listed value with increase of every 1000μF.										
Low Temperature Stability	Measurement Frequency: 120Hz.										
	Rated Voltage(V)	6.3	10	16	25	35	50	63	80	100	
Impedance Ratio (Max)	Z(-25°C)/Z(20°C)	5	4	3	2	2	2	3	2	2	
	Z(-40°C)/Z(20°C)	12	10	8	6	4	3	4	3	3	
Load Life	2000hours, with application of rated voltage at 105°C										
	Capacitance Change	Within ± 20% of Initial Value									
	tan δ	200% or less of Initial Specified Value									
	Leakage Current	Initial Specified Value or less									
Shelf Life	The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours 85°C without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to them 4.1 of JIS C5101-4.										
	Capacitance Change	Within ± 20% of Initial Value									
	tan δ	200% or less of Initial Specified Value									
	Leakage Current	Initial Specified Value or less									
Standards	JIS C 5101-4 (IEC 60384)										

Frequency Coefficient of Permissible Ripple Current

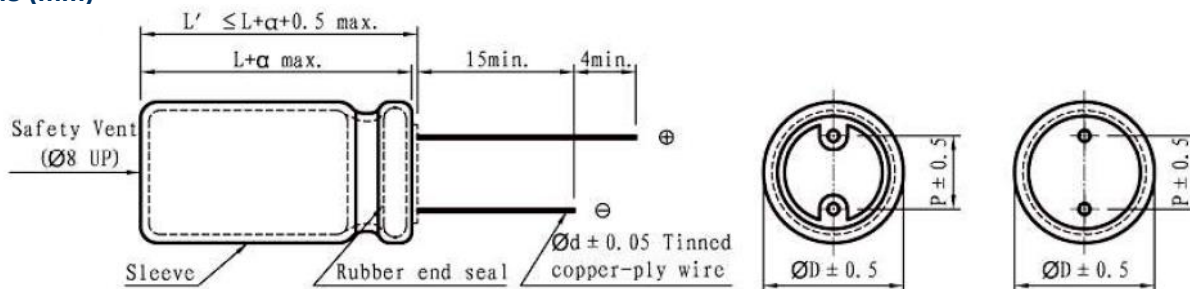
Rated Voltage (V)	Frequency (Hz)				
	50	120	300	1K	10K
1~47	0.75	0.75	1.00	1.40	1.50
100~470	0.80	0.75	1.00	1.20	1.30
1000~10000	0.85	0.85	1.00	1.10	1.15

The endurance of capacitors is reduced with internal heating produced by ripple current at the rate of halving the lifetime with every 5°C rise. When long life performance is required in actual use, the RMS ripple current has to be reduced.



RPE Series

Dimensions (mm)



Ø D	5	6.3	8	10	12.5	16	18
P	2.0	2.5	3.5	5.0	5.0	7.5	7.5
Ø d	0.5	0.5	0.5	0.61	0.6	0.8	0.8

Standard Ratings

D×L(mm) ; R.C.(mA rms) at 105°C 120Hz.

Cap (µF)	V	6.3		10		16		25		35		50	
	Item	D × L		R.C.		D × L		R.C.		D × L		R.C.	
1												5 x 11	9
2.2												5 x 11	18
3.3												5 x 11	22
4.7												5 x 11	27
10												5 x 11	39
22								5 x 11	50	6.3 x 11	60	6.3 x 11	65
33						5 x 11	57	6.3 x 11	70	6.3 x 11	75	8 x 12	93
47				5 x 11	60	6.3 x 11	74	6.3 x 11	85	8 x 12	101	8 x 12	111
100				6.3 x 11	99	8 x 12	128	8 x 12	140	10 x 13	176	10 x 16	215
220				8 x 12	170	10 x 13	226	10 x 16	260	10 x 20	320	12.5 x 20	390
330				10 x 13	247	10 x 16	309	10 x 20	352	12.5 x 20	446	12.5 x 20	488
470	10 x 13	270	10 x 13	330	12.5 x 20	406	12.5 x 20	476	12.5 x 25	590	16 x 25	650	
1000	10 x 20	485	12.5 x 20	601	16 x 25	723	16 x 25	854	16 x 25	1060	16 x 32	1143	
2200	12.5 x 25	867	16 x 25	1047	16 x 32	1290	16 x 35	1570	18 x 35	1840			
3300	16 x 25	1135	16 x 32	1520	16 x 35	1720	18 x 40	1794					
4700	16 x 32	1431	16 x 35	1840	18 x 40	2140							
6800	18 x 35	1810	18 x 40	2049									
10000	18 x 40	2100											
Cap (µF)	V	63				80				100			
	Item	D × L		R.C.		D × L		R.C.		D × L		R.C.	
1										5 x 11		15	
2.2										5 x 11		22	
3.3										5 x 11		27	
4.7										5 x 11		36	
10		6.3 x 11		50		6.3 x 11		55		8 x 12		65	
22		8 x 12		85		8 x 12		100		10 x 13		110	
33		8 x 12		105		10 x 13		130		10 x 16		150	
47		10 x 13		140		10 x 16		170		10 x 16		190	
100		10 x 20		255		12.5 x 20		270		12.5 x 20		300	
220		12.5 x 20		420		12.5 x 25		490		16 x 25		549	
330		12.5 x 25		541		16 x 32		650		16 x 32		734	
470		16 x 25		840		16 x 35		920		18 x 35		980	
1000		18 x 35		1400									

※13mm may be replaced by 12.5mm upon customer's request.

RSA Series

- 85°C 2000 hours, standard product.
- RoHS Compliant & Halogen Free

Specifications

Items	Characteristics											
Capacitance Tolerance	± 20% (120Hz, 20°C)											
Operating Temperature Range	-40 ~ +85°C				-40 ~ +85°C				-25 ~ +85°C			
Rated Voltage Range	6.3 ~ 100VDC				160 ~ 250VDC				350 ~ 500VDC			
Leakage Current	I ≤ 0.01CV or 3 (μA) which is greater. (After 2 minutes application of DC rated voltage, at 20 °C)				I ≤ 0.03CV +20 (μA) (After 3 minutes application of DC rated voltage, at 20 °C)							
Dissipation Factor	Measurement Frequency: 120Hz. Temperature: 20°C											
	Rated Voltage (V)	6.3	10	16	25	35	50	63	100	160~250	330	350~500
	tan δ(Max)	0.24	0.20	0.16	0.15	0.12	0.10	0.09	0.08	0.20	0.25	0.25
	When nominal capacitance over 1000μF, tanδ shall be added 0.02 to the listed value with increase of every 1000μF.											
Low Temperature Stability	Measurement Frequency: 120Hz.											
	Rated Voltage(V)	6.3	10	16	25	35	50~100	160~250	350~400	450~500		
Impedance Ratio (Max)	Z(-25°C)/Z(20°C)	5	4	3	2	2	2	3	6	8		
	Z(-40°C)/Z(20°C)	12	10	8	6	4	3	4	-	-		
Load Life	2000hours, with application of rated voltage at 85°C											
	Capacitance Change	Within ± 20% of Initial Value										
	tan δ	200% or less of Initial Specified Value										
	Leakage Current	Initial Specified Value or less										
Shelf Life	The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours 85°C without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to them 4.1 of JIS C5101-4.											
	Capacitance Change	Within ± 20% of Initial Value										
	tan δ	200% or less of Initial Specified Value										
	Leakage Current	Initial Specified Value or less										
Standards	JIS C 5101-4 (IEC 60384)											

Frequency Coefficient of Permissible Ripple Current

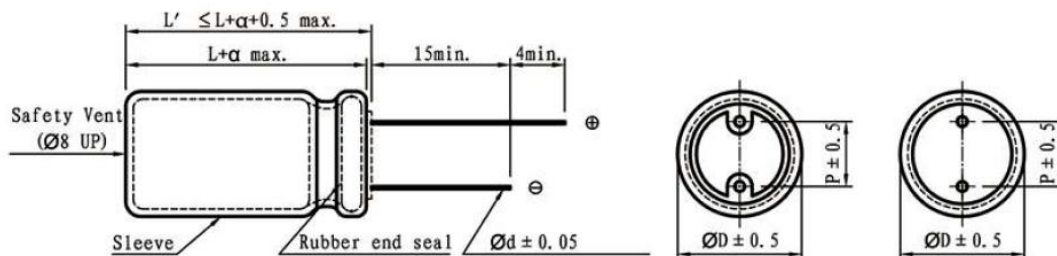
Rated Voltage (V)	Capacitance (μF)	Frequency (Hz)			
		50	120	1K	≤ 20K
≤ 100	< 100	0.75	1.00	1.57	2.00
	100~470	0.80	1.00	1.34	1.50
	> 470	0.85	1.00	1.10	1.15
≥ 160	0.1 ~ 220	0.80	1.00	1.40	1.60
	330 ~ 1000	0.90	1.00	1.13	1.15

The endurance of capacitors is reduced with internal heating produced by ripple current at the rate of halving the lifetime with every 5°C rise. When long life performance is required in actual use, the rms ripple current has to be reduced.



RSA Series

Dimensions (mm)



ØD	5	6.3	8	10	13	16	18	22	25
P	2.0	2.5	3.5	5.0	5.0	7.5	7.5	10	12.5
Ød	0.5	0.5	0.5	0.6	0.6	0.8	0.8	0.8	1.0

α	(L < 16) 1.0 (L ≥ 16) 2.0
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Standard Ratings

D×L(mm) ; R.C.(mA rms) at 85°C 120Hz.

Cap (µF)	V	6.3		10		16		25		35		50		63		100	
	Item	D x L	R.C.	D x L	R.C.	D x L	R.C.	D x L	R.C.	D x L	R.C.	D x L	R.C.	D x L	R.C.	D x L	R.C.
22																8x12	151
33																8x9	180
																10x13	204
47														8x9	193	10x16	266
														8x12	218		
68										8x12	206	8x12	249	8x12	278	10x20	315
100										8x12	278	8x9	275	8x14	363	10x20	459
												8x12	303				
220								8x12	387	8x9	362	10x16	532	10x16	593	13x25	726
										10x13	448						
330						8x12	436	8x9	442	10x16	593	10x20	702	10x20	823	16x26	907
								8x14	508								
470		8x12	460	8x12	484	8x9	508	10x16	653	10x16	774	13x13	808	13x21	1065	16x32	1113
						8x12	569					13x21	920				
1000		8x9	617														
		10x13	702	10x13	762	10x16	956	10x20	1150	13x21	1331	13x25	1634	16x26	1755	18x40	1573
1500		10x16	788	10x20	823	10x20	1101	13x21	1367	13x25	1597	16x32	1925	18x32	2310	22x40	2145
2200		10x16	1150	10x20	1331	13x21	1634	13x25	1876	16x26	2178	16x36	2541	18x35	2783	25x50	2432
3300		10x20	1513			13x25	2057	16x26	2118	16x32	2686	18x35	3037	22x40	3267		
		13x13	1392	13x21	1694												
4700		13x21	1815	13x25	2178	16x26	2420	16x32	2614	18x35	3110	22x40	3630	22x50	4114		
6800		13x25	2299	16x26	2481	16x32	2783	18x35	3207	22x40	3884	22x50	4235	25x50	4719		
10000		16x26	2481	16x36	3025	18x35	3485	22x40	4380	22x50	4719	25x50	4840				
15000		16x36	3243	18x35	3775	22x40	4659	22x50	5082	25x50	5203						
22000		18x40	3896	22x40	4489	22x50	5336	25x50	5445								
33000		22x50	4719	22x50	5445	25x50	5808										

※13mm may be replaced by 12.5mm upon customer's request.



RSA Series

Standard Ratings

D×L(mm) ; R.C.(mA rms) at 85°C 120Hz.

Cap (μF)	V	160		200		250		350	
	Item	D x L	R.C.	D x L	R.C.	D x L	R.C.	D x L	R.C.
1.0								8x12	28
2.2						8x12	36	8x12	37
3.3		8x12	42	8x12	50	8x12	55	10x13	56
4.7		8x12	56	8x12	62	10x13	67	10x16	70
10		10x13	97	10x16	105	10x16	110	10x20	120
22		10x16	157	10x20	165	13x13	169	13x13	169
						13x21	195	13x21	210
33		10x20	230	13x13 13x21	212 238	13x21	245	16x26	280
47		13x13	254	13x21	310	13x21	320	16x36	380
		13x21	290						
100		16x26	520	16x26	550	16x32	570	18x40	600
220		16x36	860	22x30	980	22x30	1070	22x50	1210
330		18x40	1210	22x35	1280	22x35	1320		
470		22x40	1320	22x50	1360	25x50	1500		
1000		22x50	1720						

Cap (μF)	V	400		450		500	
	Item	D x L	R.C.	D x L	R.C.	D x L	R.C.
1.0		8x12	23	8x12	25		
2.2		10x13	35	10x13	36	10x13	32
3.3		10x13	45	10x16	50	10x16	45
4.7		10x16	55	10x20	62	10x20	55
10		13x21	85	13x21	93	13x21	65
22		16x26	160	16x26	172	16x26	135
33		16x32	195	16x36	210	16x36	155
47		16x36	275	18x40	285	18x40	235
100		22x35	500	22x40	520	22x40	450
220		25x50	970				

※13mm may be replaced by 12.5mm upon customer's request.

RSB Series

- 105°C 2000hours, standard product
- RoHS Compliant & Halogen Free

SPECIFICATIONS

Items	Characteristics													
Capacitance Tolerance	± 20% (120Hz, 20℃)													
Operating Temperature Range	-40 ~ +105℃				-40 ~ +105℃				-25 ~ +105℃					
Rated Voltage Range	6.3 ~ 100VDC				160 ~ 250VDC				350 ~ 500VDC					
Leakage Current	I ≤ 0.01CV or 3 (μA) which is greater. (After 2 minutes application of DC rated voltage, at 20 °C)							I ≤ 0.03CV +20 (μA) (After 3 minutes application of DC rated voltage, at 20 °C)						
Dissipation Factor	Measurement Frequency: 120Hz. Temperature: 20℃													
	Rated Voltage(V)	6.3	10	16	25	35	50	63	80	100	130	160~250	350~500	600
	tan δ(Max)	0.24	0.20	0.16	0.15	0.12	0.10	0.09	0.08	0.08	0.08	0.20	0.25	0.25
	When nominal capacitance over 1000μF, tanδ shall be added 0.02 to the listed value with increase of every 1000μF .													
Low Temperature Stability	Measurement Frequency: 120Hz.													
Impedance Ratio(Max)	Rated Voltage(V)	6.3	10	16	25	35	50~100	160~250	350~400	450~500				
	Z(-25℃) / Z(20℃)	5	4	3	2	2	2	3	6	15				
	Z(-40℃) / Z(20℃)	10	8	6	4	3	3	4	-	-				
Load Life	2000hours, with application of rated voltage at 105℃													
	Capacitance Change	Within ± 20% of Initial Value												
	tan δ	200% or less of Initial Specified Value												
	Leakage Current	Initial Specified Value or less												
Shelf Life	The following specifications shall be satisfied when the capacitors are restored to 20℃ after exposing them for 1,000 hours 105℃ without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to them 4.1 of JIS C5101-4.													
	Capacitance Change	Within ± 20% of Initial Value												
	tan δ	200% or less of Initial Specified Value												
	Leakage Current	Initial Specified Value or less												
Standards	JIS C 5101-4 (IEC 60384)													

Frequency Coefficient of Permissible Ripple Current

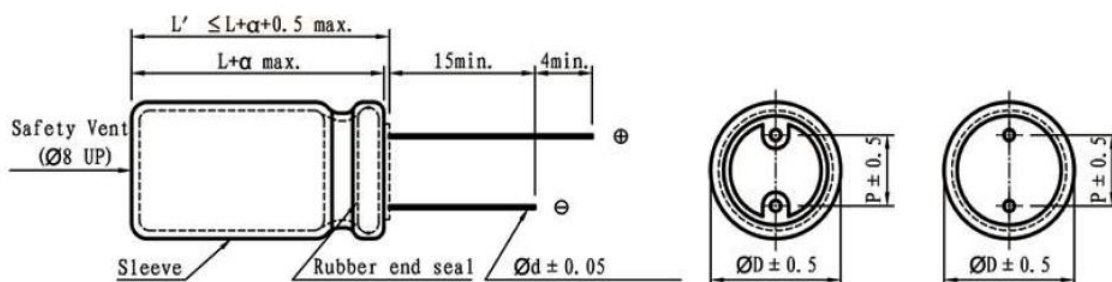
Rated Voltage (V)	Capacitance (μF)	Frequency (Hz)			
		50	120	1K	≥20K
≤ 100	<100	0.75	1.00	1.40	1.50
	100 ~ 470	0.75	1.00	1.20	1.30
	>470	0.85	1.00	1.10	1.15
≥ 160	0.47 ~ 470	0.75	1.00	1.10	1.20

The endurance of capacitors is reduced with internal heating produced by ripple current at the rate of halving the lifetime with every 5°C rise. When long life performance is required in actual use, the rms ripple current has to be reduced.



RSB Series

DIMENSIONS (mm)



ØD	5	6.3	8	10	13	14.5	16	18	22	25
P	2.0	2.5	3.5	5.0	5.0	7.5	7.5	7.5	10	12.5
Ød	0.5	0.5	0.5	0.6	0.6	0.8	0.8	0.8	0.8	1.0

α	(L < 16) 1.0 (L ≥ 16) 2.0
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STANDARD RATINGS

DxL (mm); R.C. (mA rms) at 105°C 120 Hz.

Cap (µF)	V	6.3		10		16		25		35		50		63		100	
	Item	D x L	R.C.	D x L	R.C.	D x L	R.C.	D x L	R.C.	D x L	R.C.	D x L	R.C.	D x L	R.C.	D x L	R.C.
0.1~0.47												5x11	11	5x11	12	5x11	17
1												5x11	15	5x11	17	5x11	20
2.2												5x11	24	5x11	25	5x11	30
3.3												5x11	30	5x11	31	5x11	36
4.7								5x11	30	5x11	31	5x11	36	5x11	37	5x11	44
6.8								5x11	35	5x11	37	5x11	46	5x11	51	5x11	45
10						5x11	42	5x11	43	5x11	47	5x11	54	5x11	58	6.3x11	75
22		5x11	54	5x11	59	5x11	63	5x11	65	5x11	75	5x11	83	6.3x11	109	8x12	112
33		5x11	66	5x11	77	5x11	79	5x11	83	5x11	91	6.3x11	107	8x12	121	8x12	133
47		5x11	78	5x11	87	5x11	94	5x11	97	6.3x11	116	6.3x11	145	8x12	163	10x13	170
56		5x11	90	5x11	100	5x11	105	5x11	109	6.3x11	127	6.3x11	151	8x12	172	10x16	187
68		5x11	102	5x11	119	5x11	145	5x11	151	6.3x11	169	6.3x11	196	8x12	206	10x16	238
100		5x11	111	5x11	139	6.3x11	151	6.3x11	163	8x12	194	8x14	242	10x13	254	10x20	315
220		5x11	175	6.3x11	212	8x12	237	8x12	290	10x13	332	10x16	363	10x20	436	13x25	581
330		6.3x11	233	6.3x11	272	8x12	321	10x13	369	10x16	484	10x20	514	13x21	666	16x26	714
470		6.3x11	266	8x12	299	8x14	381	8x16 10x16	436 460	10x20	581	13x21	762	13x25	847	16x32	968
560		8x12	272	8x12	306	8x14	387	10x16	448	10x20	629	13x21	774	13x25	871	16x36	1012
680		8x12	278	8x12	319	8x16	424	10x20	581	13x21	702	13x25	799	16x26	1004	18x32	1210
1000		8x14	484	10x13	586	10x16	617	10x20	750	13x21	908	13x25	1089	16x32	1210	18x35	1573
1500		8x20	545	10x20	592	10x20	641	13x21	787	13x25	1041	16x32	1452	18x32	1718		
2200		10x20	774	10x20	918	13x21	1004	13x25	1132	16x26	1343	16x36	1609	18x35	1997		
3300		10x20	908	13x21	1091	13x25	1222	16x26	1428	16x36	1730	18x35	1997	22x40	2347		
4700		13x21	1162	13x25	1306	16x26	1464	16x32	1718	18x35	2057	22x40	2541	22x50	2965		
6800		13x25	1385	16x26	1770	16x36	1863	18x35	2202	22x40	2602	22x50	3025				
10000		16x26	1730	16x36	2236	18x35	2335	22x40	2589	22x50	3207						
15000		16x36	2214	18x35	2808	22x40	2928	22x50	3328								
22000		18x40	2771	22x40	3514	22x50	3630										

RSB Series

STANDARD RATINGS

DxL (mm); R.C. (mA rms) at 105° 120 Hz.

Cap (μF)	V	160		200		250		350		400		450		500	
	Item	D x L	R.C.	D x L	R.C.	D x L	R.C.	D x L	R.C.	D x L	R.C.	D x L	R.C.	D x L	R.C.
2.2		6.3x11	35	6.3x11	35	8x12	72	8x12	56	10x13	54	10x16	75		
3.3		8x12	72	8x12	72	8x12	78	10x13	85	10x13	69	10x16	102	10x20	42
4.7		8x12	75	8x12	75	10x13	110	10x13	90	10x16	120	10x20	130	10x20	56
6.8		8x12	78	8x12	78	10x13	120	10x13	95	10x16	125	13x21	155	13x21	105
10		10x13	92	10x16	145	10x16	145	10x20	150	10x20	145	13x21	165	13x21	110
22		10x16	145	10x20	210	13x21	245	13x25	225	13x25	252	16x26	360	16x26	250
33		10x20	210	13x21	245	13x21	255	13x25	245	16x26	380	16x26	380	16x32	280
47		13x21	245	13x25	330	13x25	350	16x26	405	16x26	395	16x32	450	18x35	320
68		13x21	255	13x25	340	16x26	540	16x32	450	16x32	475	18x32	585	18x45	360
82		13x25	350	13x25	350	16x26	550	16x32	480	18x26	480	18x35	650		
100		16x26	530	16x26	540	16x32	630	18x32	580	18x32	580	18x40	720		
120		16x26	540	16x26	550	16x32	650	18x35	650	18x35	650	18x40	750		
150		16x26	550	16x32	650	18x32	730	18x40	750	18x40	720	22x45	785		
220		16x36	720	18x32	750	22x35	950								
330		18x35	810	22x35	860										
470		18x40	1050	22x40	1100										

※ 13mm may be replaced by 12.5mm upon customer's request.

RSB Series

SLIM TYPE

- 105°C high-temperature and high voltage 400~500V, life 2000hrs.
- Specially Size, 8~16mm diameter.
- For LCD-TV and LCD-Monitor power.
- RoHS Compliant.

STANDARD RATINGS

DxL (mm); R.C. (mA rms) at 105°C 120Hz.

Cap p (μ F)	V	400		450		500	
	Item	D x L	R.C.	D x L	R.C.	D x L	R.C.
22		8x50	158	8x50	168	13x40	158
		10x30	150	10x35	153		
33		8x61	210	8x61	218	13x45	162
		10x40	192	10x45	198		
39		8x61	258	8x61	287	14.5x45	160
		10x45	235	10x50	250		
		13x35	250	13x40	265		
47		10x50	285	10x50	335	14.5x45	163
		13x40	282	13x45	305	16x50	175
		14.5x30	278	14.5x30	290		
53		10x50	305	10x50	400	16x50	178
68		13x45	340	14.5x40	460		
		14.5x30	330	16x35	490		
82		13x50	365	14.5x50	460		
		14.5x40	385	16x40	490		
100		14.5x45	468	14.5x50	620		
				16x50	640		
120		14.5x50	550	16x50	650		

※ 13mm may be replaced by 12.5mm upon customer's request.

RSC Series

- 105°C high temperature resistance
- High ripple current
- RoHS Compliant & Halogen Free

Specifications

Items	Characteristics		
Capacitance Tolerance	± 20% (120Hz, 20°C)		
Operating Temperature Range	-40 ~ +105°C		-25 ~ +105°C
Rated Voltage Range	160 ~ 400VDC		450VDC
Leakage Current	I ≤ 0.03CV +20 (μA) (After 3 minutes application of DC rated voltage)		
Dissipation Factor	Measurement Frequency: 120Hz. Temperature: 20°C		
	Rated Voltage (V)	160~250	400~450
	tan δ(Max)	0.15	0.20
Low Temperature Stability	Measurement Frequency: 120Hz.		
	Rated Voltage(V)	160~250	400450
Impedance Ratio (Max)	Z(-25°C) / Z(20°C)	3	56
	Z(-40°C) / Z(20°C)	6	6-
Load Life	The following specifications shall be satisfied when the capacitors are restored to 20°C after subjected to DC voltage with the rated ripple current is applied for 2,000 hours at 105°C		
	Capacitance Change	Within ± 20% of Initial Value	
	tan δ	200% or less of Initial Specified Value	
	Leakage Current	Initial Specified Value or less	
Shelf Life	The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours 105°C without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to them 4.1 of JIS C5101-4.		
	Capacitance Change	Within ± 20% of Initial Value	
	tan δ	200% or less of Initial Specified Value	
	Leakage Current	Initial Specified Value or less	
Standards	JIS C 5101-4 (IEC 60384)		

Frequency Coefficient of Permissible Ripple Current

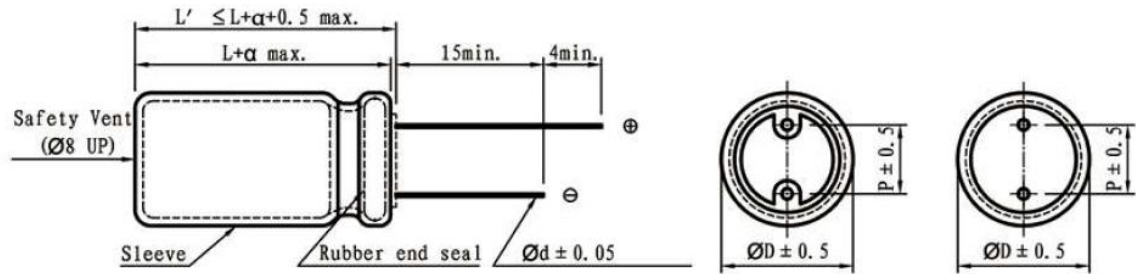
Capacitance (μF)	Frequency (Hz)			
	120	1K	10K	100K
22~82	1.00	1.25	1.50	1.75
100~470	1.00	1.15	1.30	1.40

The endurance of capacitors is reduced with internal heating produced by ripple current at the rate of halving the lifetime with every 5°C rise. When long life performance is required in actual use, the rms ripple current has to be reduced.

Aluminum Electrolytic Capacitors

RSC Series

Dimensions (mm)



ØD	10	13	14.5	16	18	20
P	5.0	5.0	7.5	7.5	7.5	10
Ød	0.6	0.6	0.8	0.8	0.8	0.8

Standard Ratings

D×L(mm) ; R.C.(mA rms) at 105°C 120Hz.

Ca p (µF)	V	160		200		250		400		450	
	Item	D x L	R.C.	D x L	R.C.	D x L	R.C.	D x L	R.C.	D x L	R.C.
22								10x30	260	10x35	280
33								10x40	360	13x30	375
39								10x45	405	13x35	415
47								13x35	443	13x40	465
56								13x40	510	14.5x30	465
68		10x25	375	10x30	485	13x25	530	13x45	580	14.5x35	520
82		10x30	485	10x35	528	13x30	595	14.5x30	580	16x30	520
100		10x35	528	10x40	615	16x25	650	14.5x40	635	14.5x40	600
120		10x40	615	10x45	710	16x32	715	16x35	600	16x40	650
150		10x45	710	13x35	780	16x35	860	18x32	690	18x32	650
220		13x40	880	13x45	995	18x36	1120	14.5x45	690	18x36	700
270		13x45	995	14.5x35	995	18x40	1200	18x32	690	18x40	820
330		16x35	1150	16x35	1150			16x40	810	18x45	990
470		18x40	1270	18x32	1320			18x40	940	20x40	1000
				18x45	1660						

※ 13mm may be replaced by 12.5mm upon customer's request.

Aluminum Electrolytic Capacitors

RSD Series

- High-temperature resistance, high ripple current.
- 105°C for general purposes, 3000 hours standard product.
- RoHS Compliance

Specifications

Items	Characteristics													
Capacitance Tolerance	± 20% (120Hz, 20°C)													
Operating Temperature Range	-40 ~ +105°C							-40~+105°C			-25 ~ +105°C			
Rated Voltage Range	6.3 ~ 100VDC							160 ~ 250VDC			350~450VDC			
Leakage Current	I ≤ 0.01CV or 3 (μA) which is greater. (After 2 minutes application of DC rated voltage, at 20°C)							I ≤ 0.03CV + 20(μA) (After 3 minutes application of DC rated voltage, at 20°C)						
Dissipation Factor (tan δ)	Measurement Frequency: 120Hz. Temperature: 20°C													
	Rated Voltage (V)	6.3	10	16	25	35	50	63	80	100	120	160~250	350~450	500
	tan δ(Max)	0.24	0.20	0.16	0.15	0.12	0.10	0.09	0.08	0.08	0.08	0.20	0.25	0.25
	When nominal capacitance over 1000μF, tanδ shall be added 0.02 to the listed value with increase of every 1000μF													
Low Temperature Stability	Measurement Frequency: 120Hz.													
	Rated Voltage(V)	6.3	10	16	25	35	50~100	160~250	350~400	450				
Impedance Ratio (Max)	Z(-25°C) / Z(20°C)	5	4	3	2	2	2	3	6	15				
	Z(-40°C) / Z(20°C)	10	8	6	4	3	3	4	-	-				
Load Life	3,000 hours, with application of rated voltage at 105°C													
	Capacitance Change	Within ± 20% of Initial Value												
	tan δ	200% or less of Initial Specified Value												
	Leakage Current	Initial Specified Value or less												
Shelf Life	The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours 105°C without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to them 4.1 of JIS C5101-4.													
	Capacitance Change	Within ± 20% of Initial Value												
	tan δ	200% or less of Initial Specified Value												
	Leakage Current	Initial Specified Value or less												
Standards	JIS C-5101-4(IEC 60384)													

Frequency Coefficient of Permissible Ripple Current

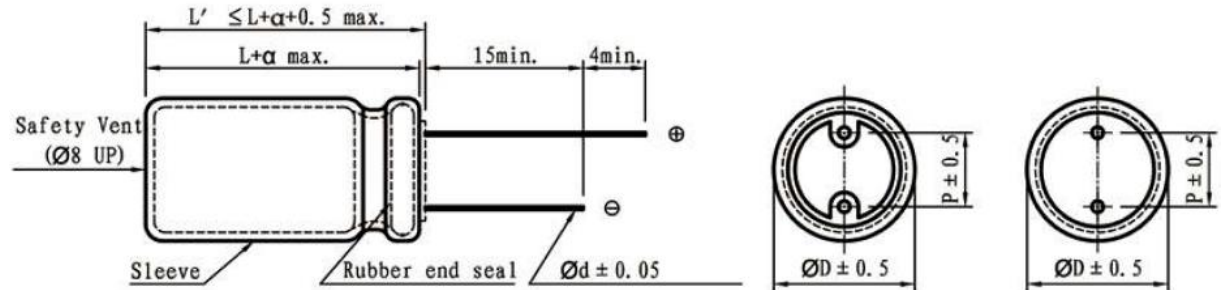
Rated Voltage (V)	Capacitance (μF)	Frequency (Hz)			
		50	120	1K	≥20K
≤ 100	<100	0.75	1.00	1.57	2.00
	100 ~ 470	0.80	1.00	1.34	1.50
	> 470	0.85	1.00	1.10	1.15
≥160	0.47 ~ 1000	0.85	1.00	1.40	1.50

The endurance of capacitors is reduced with internal heating produced by ripple current at the rate of having the lifetime with every 5°C rise. When long life performance is required in actual use, the rms ripple current has to be reduced.

Aluminum Electrolytic Capacitors

RSD Series

Dimensions (mm)



ØD	5	6.3	8	10	13	16	18	20	22
P	2.0	2.5	3.5	5.0	5.0	7.5	7.5	10	10
Ød	0.5	0.5	0.5	0.6	0.6	0.8	0.8	0.8	0.8

α	(L < 16) 1.0 (L ≥ 16) 2.0
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Standard Ratings

DxL(mm); R.C.(mA rms) at 105°C 120Hz.

Cap(µF)	V	6.3		10		16		25		35		50		63	
	Item	D x L	R.C.	D x L	R.C.	D x L	R.C.	D x L	R.C.	D x L	R.C.	D x L	R.C.	D x L	R.C.
0.1~0.47												5x11	12		
1												5x11	16		
2.2												5x11	25		
3.3												5x11	35		
4.7								5x11	32	5x11	33	5x11	38		
6.8								5x11	37	5x11	39	5x11	50	5x11	52
10						5x11	44	5x11	45	5x11	49	5x11	56	5x11	68
22	5x11	56	5x11	61	5x11	65	5x11	67	5x11	76	5x11	89	6.3x11	112	
33	5x11	68	5x11	79	5x11	81	5x11	85	5x11	93	6.3x11	130	8x12	145	
47	5x11	80	5x11	89	5x11	97	5x11	100	6.3x11	133	6.3x11	152	8x12	174	
56	5x11	92	5x11	103	5x11	107	5x11	121	6.3x11	136	6.3x11	171	8x12	187	
68	5x11	105	5x11	121	5x11	150	5x11	158	6.3x11	173	6.3x11	208	8x12	234	
100	5x11	113	5x11	145	6.3x11	157	6.3x11	179	8x12	197	8x14	270	10x13	292	
220	5x11	176	6.3x11	223	8x12	248	8x12	318	10x13	347	10x16	583	10x20	693	
330	6.3x11	240	6.3x11	275	8x12	361	10x13	391	10x16	490	10x20	737	13x21	770	
470	6.3x11	292	8x12	339	8x14	427	8x16	523	10x20	627	13x21	902	13x25	1012	
							10x16	545							
560	8x12	350	8x12	443	8x14	475	10x16	594	10x20	644	13x21	963	13x25	1177	
680	8x12	413	8x12	538	8x16	548	10x20	704	13x21	770	13x25	1040	16x26	1337	
1000	8x14	502	10x13	645	10x16	768	10x20	919	13x21	1194	13x25	1485	16x32	1848	
1500	10x16	669	10x20	798	10x20	993	13x21	1155	13x25	1370	16x32	1810	18x32	1975	
2200	10x20	912	10x20	988	13x21	1231	13x25	1447	16x26	1678	16x36	2200	18x35	2288	
3300	10x20	1154	13x21	1395	13x25	1560	16x26	1847	16x36	2145	18x35	2541	22x40	2695	
4700	13x21	1447	13x25	1671	16x26	1958	16x32	2310	18x35	2640	22x40	2915	22x50	3069	
6800	13x25	1795	16x26	2056	16x36	2374	18x35	2767	22x40	2761	22x50	3080			
10000	16x26	2112	16x36	2265	18x35	2903	22x40	2860	22x50	3210					
15000	16x36	2629	18x35	2820	22x40	2991	22x50	3350							
22000	18x40	2805	22x40	3620	22x50	3650									



Cap (μF)	V	100		160		200		250		350		400		450	
	Item	D x L	R.C.	D x L	R.C.	D x L	R.C.	D x L	R.C.	D x L	R.C.	D x L	R.C.	D x L	R.C.
0.1		5x11	1.7												
0.22		5x11	3.7												
0.33		5x11	5.5												
0.47		5x11	12	6.3x11	22	6.3x11	22	6.3x11	26	6.3x11	24	8x12	26	8x12	25
1		5x11	18	6.3x11	30	6.3x11	25	6.3x11	28	8x12	45	8x12	46	10x16	75
2.2		5x11	28	6.3x11	35	6.3x11	30	8x12	62	8x12	62	8x12	70	10x16	80
3.3		5x11	40	8x12	65	8x12	70	8x12	75	10x13	90	10x13	105	10x20	125
4.7		5x11	46	8x12	70	8x12	75	10x13	120	10x13	95	10x16	130	10x20	135
6.8		5x11	54	8x12	75	8x12	85	10x13	125	10x13	105	10x16	150	13x21	165
10		6.3x11	69	10x13	90	10x16	140	10x16	150	10x20	145	10x20	175	13x21	175
22		8x12	127	10x16	145	10x20	200	13x21	250	13x25	245	13x25	280	16x26	410
33		8x12	167	10x20	200	13x21	250	13x21	260	16x26	420	16x26	420	16x32	470
47		10x16	231	13x21	240	13x25	340	13x25	350	16x26	450	16x26	470	18x32	540
68		10x16	271	13x21	303	13x25	360	16x26	540	16x32	490	16x32	510	18x35	570
82		10x16	299	13x25	365	13x25	385	16x26	550	16x32	510	18x32	580	18x35	590
100		10x20	402	16x26	520	16x26	550	16x32	630	18x32	620	18x35	650	18x40	750
120		10x25	457	16x26	550	16x26	570	16x32	650	18x35	650	18x40	780	18x45	820
150		13x21	579	16x26	580	16x32	650	18x32	720	18x40	850	22x40	920		
220		13x25	762	16x26	660	18x35	800	18x40	850						
330		16x26	952	18x35	800	22x35	1100								
470		16x32	1238	18x40	1100	22x40	1238								
1000		18x35	2321	22x50	1760										

※ 13mm may be replaced by 12.5mm upon customer's request.

RSE Series

- Long life of RSA series.
- Suitable for LCD TV Power, SMPS.
- RoHS Compliant & Halogen Free

Specifications

Items	Characteristics				
Capacitance Tolerance	± 20% (120Hz, 20°C)				
Operating Temperature Range	-40 ~ +85°C			-25 ~ +85°C	
Rated Voltage Range	400 ~ 420VDC			450 ~ 500VDC	
Leakage Current	I ≤ 0.03CV +20 (μA) (After 3 minutes application of DC rated voltage, at 20 °C)				
Dissipation Factor	Measurement Frequency: 120Hz. Temperature: 20°C				
	Rated Voltage (V)	400 ~ 420	450	460	500
	tan δ(Max)	0.15	0.20	0.20	0.20
	When nominal capacitance over 1000μF, tan δ shall be added 0.02 to the listed value with increase of every 1000μF.				
Low Temperature Stability	Measurement Frequency: 120Hz.				
	Rated Voltage(V)	400~420	450	460	500
Impedance Ratio (Max)	Z(-25°C) / Z(20°C)	3	3	6	6
	Z(-40°C) / Z(20°C)	6	-	-	-
Load Life	8000hours, with application of rated voltage at 85°C				
	Capacitance Change	Within ± 20% of Initial Value			
	tan δ	200% or less of Initial Specified Value			
	Leakage Current	Initial Specified Value or less			
Shelf Life	The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours 85°C without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to them 4.1 of JIS C5101-4.				
	Capacitance Change	Within ± 20% of Initial Value			
	tan δ	200% or less of Initial Specified Value			
	Leakage Current	Initial Specified Value or less			
Standards	JIS C 5101-4-1 (IEC 60384)				

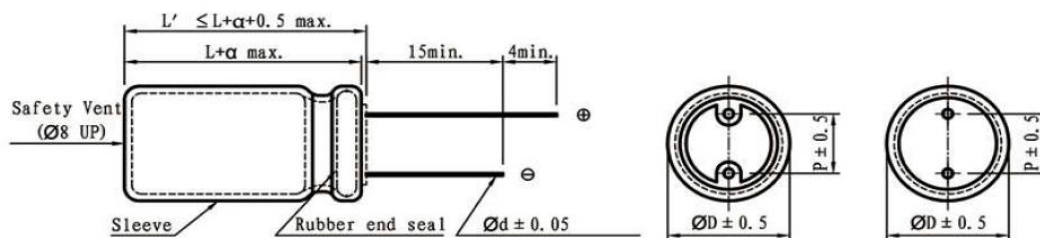
Frequency Coefficient of Permissible Ripple Current

Capacitance (μF)	Frequency (Hz)				
	120	10K	30K	50K	100K
10 ~ 150	1.00	1.50	1.60	1.75	2.00

The endurance of capacitors is reduced with internal heating produced by ripple current at the rate of halving the lifetime with every 5°C rise. When long life performance is required in actual use, the rms ripple current has to be reduced.

RSE Series

Dimensions (mm)



ØD	10	13	16	18	20
P	5.0	5.0	7.5	7.5	10
Ød	0.6	0.6	0.8	0.8	0.8

α	(L < 16) 1.0
	(L ≥ 16) 2.0

Standard Ratings

D×L(mm) ; R.C.(mA rms) at 85°C 120Hz.

Cap (µF)	V	400			420			450		
	Item	D x L	R.C.		D x L	R.C.		D x L	R.C.	
			120Hz	100KHz		120Hz	100KHz		120Hz	100KHz
10		10x16	150	300	10x20	180	360	10x20	150	300
22		13x21	300	600	13x25	330	660	13x25	330	660
47		13x25	350	700	16x22	400	800	16x26	380	760
56		16x25	480	960	16x25	500	1000	16x32	450	900
68		16x32	563	1126	16x32	550	1100	16x36	530	1060
82		16x35	650	1300	16x36	630	1260	16x40	600	1200
100		16x40	780	1560	16x40	750	1500	16x45	720	1440
120		16x45	889	1778	16x45	840	1680	16x50	840	1680
150		16x50	980	1960	16x50	920	1840			

Cap (µF)	V	460			500		
	Item	D x L	R.C.		D x L	R.C.	
			120Hz	100KHz		120Hz	100KHz
10		13x16	120	240	13x16	115	230
22		16x25	250	500	16x25	230	460
47		16x36	450	900	16x36	435	870
56		16x40	500	1000	16x40	491	982
68		16x45	580	1160	16x45	563	1126
82		16x50	650	1300	16x50	630	1260
100		18x45	730	1460	18x45	700	1400
120		20x45	800	1600			

※ 13mm may be replaced by 12.5mm upon customer's request.

RSF Series

- On the basis of RSB series ripple promotion product.
- Suitable for LCD TV Power, SMPS.
- RoHS Compliant & Halogen Free

Specifications

Items	Characteristics				
Capacitance Tolerance	± 20% (120Hz, 20°C)				
Operating Temperature Range	-40 ~ +105°C			-25 ~ +105°C	
Rated Voltage Range	400VDC			450 ~ 500VDC	
Leakage Current	I ≤ 0.03CV +20 (μA) (After 3 minutes application of DC rated voltage, at 20 °C)				
Dissipation Factor	Measurement Frequency: 120Hz. Temperature: 20°C				
	Rated Voltage (V)	400	450	460	500
	tan δ(Max)	0.15	0.20	0.20	0.20
	When nominal capacitance over 1000μF, tan δ shall be added 0.02 to the listed value with increase of every 1000μF.				
Low Temperature Stability	Measurement Frequency: 120Hz.				
	Rated Voltage(V)	400	450	460	500
Impedance Ratio (Max)	Z(-25°C) / Z(20°C)	3	3	6	6
	Z(-40°C) / Z(20°C)	6	-	-	-
Load Life	2000hours, with application of rated voltage at 105°C				
	Capacitance Change	Within ± 20% of Initial Value			
	tan δ	200% or less of Initial Specified Value			
	Leakage Current	Initial Specified Value or less			
Shelf Life	The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours 105°C without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to them 4.1 of JIS C5101-4.				
	Capacitance Change	Within ± 20% of Initial Value			
	tan δ	200% or less of Initial Specified Value			
	Leakage Current	Initial Specified Value or less			
Standards	JIS C 5101-4-1 (IEC 60384)				

Frequency Coefficient of Permissible Ripple Current

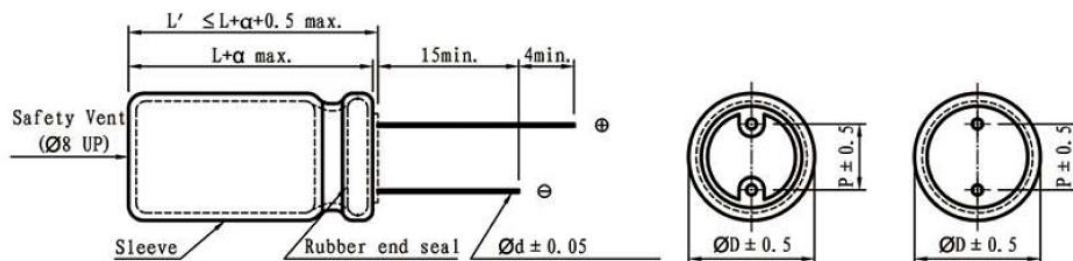
Capacitance (μF)	Frequency (Hz)				
	120	10K	30K	50K	100K
10 ~ 150	1.00	1.50	1.60	1.75	2.00

The endurance of capacitors is reduced with internal heating produced by ripple current at the rate of halving the lifetime with every 5°C rise. When long life performance is required in actual use, the rms ripple current has to be reduced.



RSF Series

Dimensions (mm)



ØD	10	13	16	18	20	22
P	5.0	5.0	7.5	7.5	10	10
Ød	0.6	0.6	0.8	0.8	0.8	0.8

α	(L < 16) 1.0 (L ≥ 16) 2.0
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Standard Ratings

D×L(mm) ; R.C.(mA rms) at 105°C 120Hz.

Cap (µF)	V	400			450			460			500		
	Item	D x L	R.C.		D x L	R.C.		D x L	R.C.		D x L	R.C.	
			120Hz	100KHz		120Hz	100KHz		120Hz	100KHz		120Hz	100KHz
10		10x16	100	200	10x20	130	260	10x20	120	240	13x21	78	156
15		10x20	200	400	13x21	200	400	13x21	150	300	13x21	100	200
22		13x21	280	560	13x21	300	600	13x25	300	600	13x25	190	380
33		13x21	330	660	13x25	400	800	16x25	400	800	16x25	270	540
47		13x25	380	760	16x25	500	1000	18x26	500	1000	18x26	300	600
56		16x25	500	1000	18x26	600	1200	18x26	550	1100	18x32	330	660
68		16x25	650	1300	18x32	690	1380	18x32	600	1200	18x35	450	900
82		18x26	750	1500	18x32	750	1500	18x32	650	1300	18x40	560	1120
100		18x32	800	1600	18x35	780	1560	18x35	750	1500	18x45	650	1300
120		18x35	850	1700	18x40	850	1700	18x40	800	1600	20x45	700	1400
150		18x40	900	1800	18x45	900	1800	20x45	827	1654	22x45	750	1500

※ 13mm may be replaced by 12.5mm upon customer's request.

RSG Series

- -55°C low temperature resistant products.
- Suitable for LED, Intelligent electronic meter and outdoor power supply
- RoHS Compliance.

Specifications

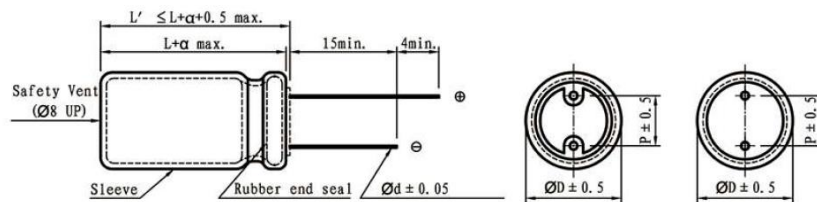
Items	Characteristics		
Capacitance Tolerance	±20 % (120Hz, 20°C)		
Operating Temperature Range	-55°C ~ +105°C		
Rated Voltage Range	400 ~ 450VDC		
Leakage Current	I ≤ 0.03CV + 20 (μA) (After 3 minutes application of DC rated voltage, at 20°C)		
Dissipation Factor(tan δ)	Measurement Frequency:120Hz. Temperature: 20°C		
	Rated Voltage(V)	400	450
	tan δ (Max)	0.20	0.20
	When nominal capacitance over 1000μF, tan δ shall be added 0.02 to the listed value with increase of every 1000 μF.		
Low Temperature Stability	Measurement Frequency: 120Hz.		
Impedance Ratio (Max)	Rated Voltage(V)	400	450
	Z(-25°C)/ Z(20°C)	2	2
	Z(-40°C)/ Z(20°C)	3	3
Load Life	The following specifications shall be satisfied when the capacitors are restored to 20°C after subjected to DC voltage with the rated ripple current is applied for 2,000 hours at 105°C.		
	Capacitance Change	within ±20 % of Initial Value	
	Tan δ	200% or less of Initial Specified Value	
	Leakage Current	Initial Specified Value or less	
Shelf Life	The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1000hours 105°C without voltage applied. Before the measurement. The Capacitance shall be preconditioned by applying voltage according to them 4.1 of JIS C5101-4.		
	Capacitance Change	within ±20 % of Initial Value	
	Tan δ	200% or less of Initial Specified Value	
	Leakage Current	Initial Specified Value or less	
Standards	JIS C 5101-4-1 (IEC 60384)		

Frequency Coefficient of permissible Ripple Current

Capacitance (μF)	Frequency (Hz)				
	120	10K	30K	50K	100K
10 ~ 82	1.00	1.75	2.25	2.23	2.50
100 ~ 150	1.00	1.67	2.05	2.15	2.25

The endurance of capacitors is reduced with internal heating produced by ripple current at the rate of halving the lifetime with every 5°C rise. When long life performance is required in actual use. The rms ripple current has to be reduced.

DIMENSIONS (mm)



$\varnothing D$	10	13	16	18
P	5.0	5.0	7.5	7.5
$\varnothing d$	0.6	0.6	0.8	0.8

α	(L < 16) 1.0 (L > 16) 2.0
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STANDARD RATINGS

D x L (mm) ; R.C. (mA rms) at 105°C 120Hz

Cap (μF)	V	400			450		
	Item	D x L	R.C.		D x L	R.C.	
			100Hz	120KHz		100Hz	120KHz
10		10x16	150	375	10x20	105	263
15		10x20	170	425	13x21	130	325
22		13x21	250	625	13x25	210	525
33		13x25	350	875	16x22	270	675
47		16x22	480	1200	18x26	450	1125
56		16x25	500	1250	18x26	550	1375
68		18x26	550	1375	18x32	600	1500
82		18x26	600	1500	18x32	650	1625
100		18x32	680	1530	18x35	750	1688
120		18x35	750	1688	18x40	800	1800
150		18x40	800	1800	18x45	900	2025

※13mm may be replaced by 12.5mm upon customer's request.

Aluminum Electrolytic Capacitor – Package Specification

Taping Specification for Automatic insertion

APPLICATIONS

- These specifications include taped single-ended electrolytic capacitors with the body diameters from 4.0 to 16mm.
- Suitable to be used in automatic lead preparation and insertion machines.

DIAGRAM OF TAPING DIMENSIONS

Fig. 1 (Ø4 - Ø8)

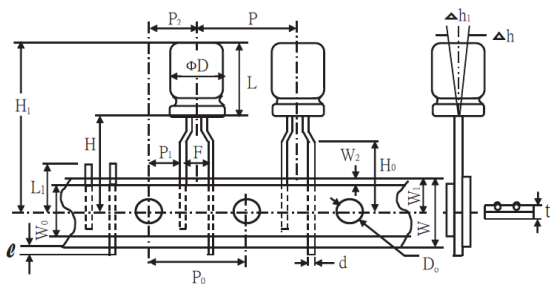


Fig. 3 (Ø5 - Ø8)

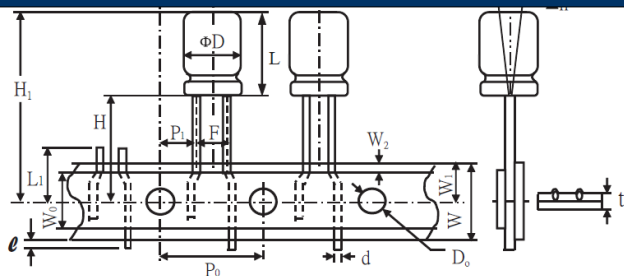


Fig. 5 (Ø12 - Ø13)

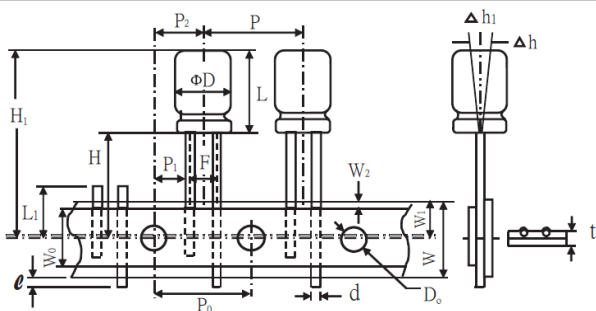


Fig. 2 (Ø4 - Ø5)

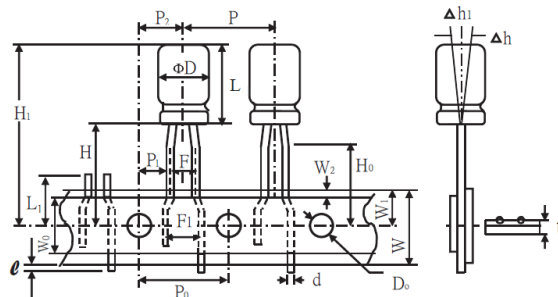


Fig. 4 (Ø10)

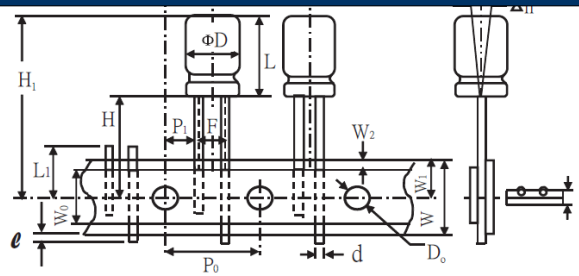
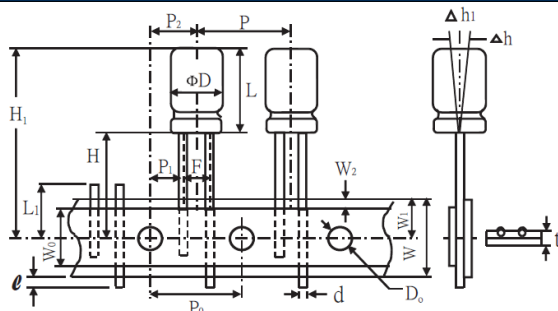


Fig. 6 (Ø16)



DESCRIPTION

- Body tape requirements are shown from Fig.1 to Fig.6
- Polarity of capacitors shall be oriented in one direction.
- Leader tapes shall not be provided before the first and after the last capacitor on tape.
- Up to 3 capacitors consecutively missing on tape is permitted but a designed quantity of capacitors shall be packed in each case.
- Removal faulty capacitors from the tape shall be by pulling out or by cutting off leads. Cut off leads remaining on tape shall not protrude more than 2.0 mm from tape edge.

(Unit = mm)

For Automatic Insertion Taping Capacitors

TAPING DIMENSIONS (mm)

Items	Symbol	Case Size										Tolerance	Remark
		4x5	5x5	4x7	5x7	5x11	6.3x11	8x12	10x13	10x16	10x20		
			6.3x5		6.3x7								
			8x5		8x7								
Lead Wire Diameter	d	0.45	0.45	0.45	0.50	0.50			0.60			± 0.05	
Body Height	L	6		8		12		13	14	18	22	max	
Intervals of Bodies	P	12.70										± 1.0	
Intervals of Punched Holes	P ₀	12.70										± 0.2	
Distance between Holes and Lead Wire	P ₁	3.85										± 0.7	Fig.1 Fig.4
		5.35	5.10	5.10	5.10	5.10	5.10	5.10	5.10		Fig.2		
			5.35		5.35	5.10					Fig.3		
Distance between Holes and Body Center	P ₂	6.35										± 1.0	
Distance between Lead and Lead	F	5.00										+ 0.8	Fig.1 Fig.4
		2.50	2.50	2.50	2.50	2.50							Fig.2
		1.5	2.0		2.50	2.00	2.50	3.50				- 0.2	Fig.3
			2.5		3.50								
Distance between Lead and Lead	F1	5.00											Fig.2 Fig.3
Base Tape Width	W	18.00										± 0.5	
Adhesive Tape Width	W ₀	11.00	11.00 12.00	11.00	11.00 12.00	11.00		12.00				min	
Deviation between Holes and Base Tape	W ₁	9.00										± 0.5	
Deviation between Adhesive and Base Tape	W ₂	1.50										max	
Deviation between Body Bottom and Tape Center	H	17.50				18.50						± 0.75	Fig.1 Fig.4
		17.50	18.50	17.50	18.50	18.50							Fig.2 Fig.3
Lead Wire Clinched Height	H ₀	15.00				16.00						± 0.50	
		15.00	16.00	15.00	16.00								
Distance between Body Top and Tape Center	H ₁	27.50			32.50				33.00	36.00	41.00	max	
Punched Hole Diameter	D ₀	4.00										± 0.3	
Lead Wire Protrusion	l	1.00										max	
Length of not Good Lead Slit	L ₁	11.00										max	
Base and Adhesive Tape Thickness	t	0.70										± 0.2	
Deviation of Body Alignment	Δh	0										± 2.0	
Deviation of Body Alignment	Δh ₁	0										± 2.0	

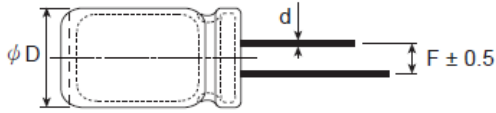
TAPING DIMENSIONS (mm)

Items	Symbol	Case Size							Tolerance	Remark
		12.5x21	13x21	13x25	13x30	16x26	16x32	16x36		
Lead Wire Diameter	d	0.60				0.80			± 0.05	
Body Height	L	23.00	23.00	27.00	32.00	28.00	34.00	38.00	max	
Intervals of Bodies	P	15.00				30.00			± 1.0	
Intervals of Punched Holes	P ₀	15.00							± 0.2	
Distance between Holes and Lead Wire	P ₁	5.00				3.75			± 0.7	
Distance between Holes and Bodies	P ₂	7.50							± 1.0	
Distance between Lead and Lead	F	5.00				7.50			+ 0.8 -0.2	Fig.5 Fig.6
Base Tape Width	W	18.00							± 0.5	
Adhesive Tape Width	W ₀	12.00				15.00			min	
Deviation between Holes and Base Tape	W ₁	9.00							± 0.5	
Deviation between Adhesive and Base Tape	W ₂	1.50							max	
Deviation between Body Bottom and Tape Center	H	18.50							± 0.75	Fig.5 Fig.6
Distance between Body Top and Tape Center	H ₁	40.50	40.50	45.50	50.50	46.50	53.50	56.50	max	
Punched Hole Diameter	D ₀	4.00							± 0.3	
Lead Wire Protrusion	l	1.00							max	
Length of not Good Lead Slit	L ₁	11.00							max	
Base and Adhesive Tape Thickness	t	0.70							± 0.2	
Deviation of Body Alignment	Δh	0							± 2.0	
Deviation of Body Alignment	Δh ₁	0							± 2.0	

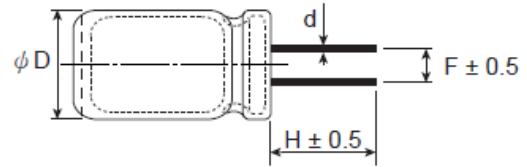


With Terminals or Forms as below, it is easier to insert the units into P.C. Boards and this contributes to a Higher Mounting Efficiency.

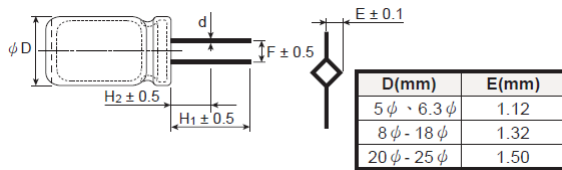
SHAPE (S)



SHAPE (C)

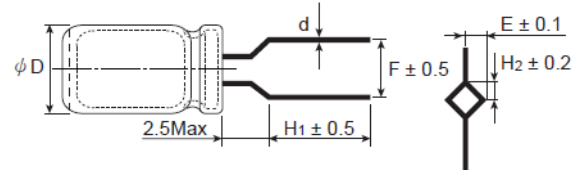


SHAPE (D)

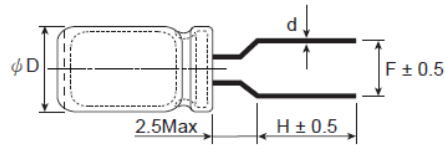


D(mm)	E(mm)
5 ϕ - 6.3 ϕ	1.12
8 ϕ - 18 ϕ	1.32
20 ϕ - 25 ϕ	1.50

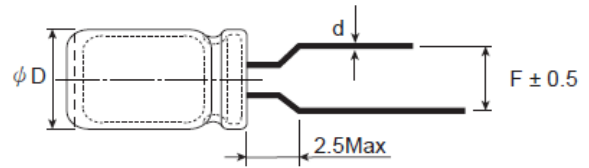
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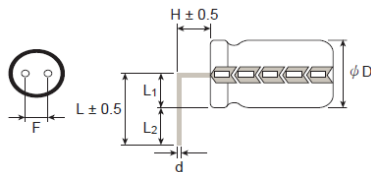
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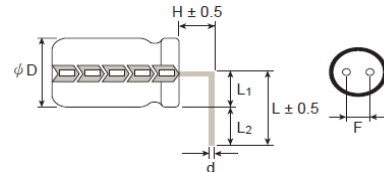
SHAPE (B)



SHAPE (Z)



SHAPE (L)



SPECIFICATION INFORMATION

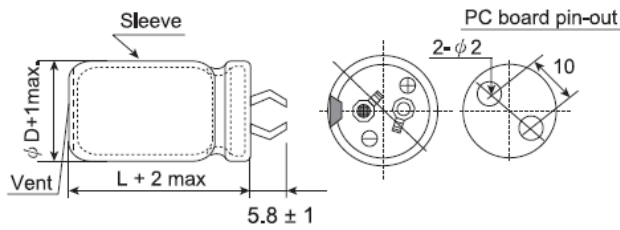
Shape No.	Cutting & Forming Methods	ϕD	$\phi 4$	$\phi 5$	$\phi 6.3$	$\phi 8$	$\phi 10$	$\phi 12.5$	$\phi 13$	$\phi 16$	$\phi 18$	$\phi 22$
S	Long Lead	F	1.5	2	2.5	3.5	5	5	5	7.5	7.5	10
		d	0.45	0.5	0.5	0.5	0.6	0.6	0.6	0.8	0.8	0.8
C	Lead Cut Only	F	1.5	2	2.5	3.5	5	5	5	7.5	7.5	10
		H	5	5	5	5	5	5	5	5	5	5
D	Lead Cut and Crimp	d	0.45	0.5	0.5	0.5	0.6	0.6	0.6	0.8	0.8	0.8
		F	—	—	—	—	5	5	5	7.5	7.5	10
		H ₁	—	—	—	—	5	5	5	5	5	5
		H ₂	—	—	—	—	1.8	1.8	1.8	1.8	1.8	1.8
F	Lead Cut and Form	d	—	—	—	—	0.6	0.6	0.6	0.8	0.8	0.8
		F	5	5	5	5	—	—	—	—	—	—
		H	4	5	5	5	—	—	—	—	—	—
H	Lead Cut, Crimp and Form	d	0.45	0.5	0.5	0.5	—	—	—	—	—	—
		F	5	5	5	5	—	—	—	—	—	—
		H ₁	4	5	5	5	—	—	—	—	—	—
		H ₂	1.8	1.8	1.8	1.8	—	—	—	—	—	—
B	Forming Only	d	0.45	0.5	0.5	0.5	—	—	—	—	—	—
		F	5	5	5	5	—	—	—	—	—	—
		H	4	5	5	5	—	—	—	—	—	—
L / Z	Lead Cutting and Bending	d	0.45	0.5	0.5	0.5	0.6	0.6	0.6	0.8	0.8	0.8
		F	1.5	2	2.5	3.5	5	5	5	7.5	7.5	10
		H	2	2	2	—	—	—	—	—	—	—
		L ₁	2.2	2.7	3.6	4.5	5.3	6.6	6.8	8.4	9.4	11.4
		L ₂	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5



(mm)

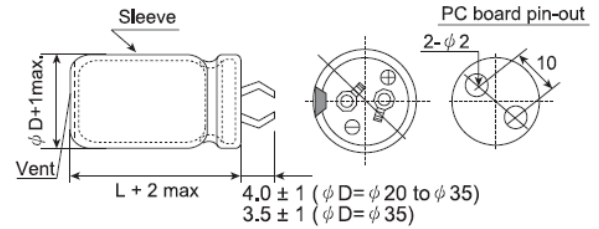
D= Ø22 to Ø35 mm

YL



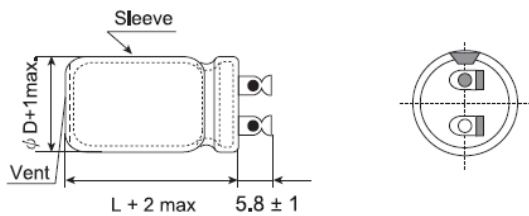
D= Ø22 to Ø35 mm

YS



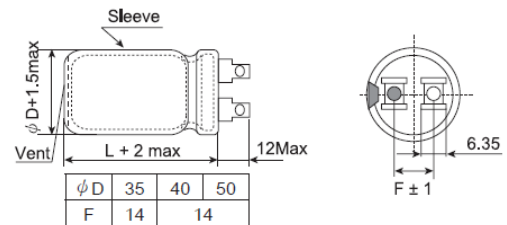
D= Ø25 to Ø51 mm

G



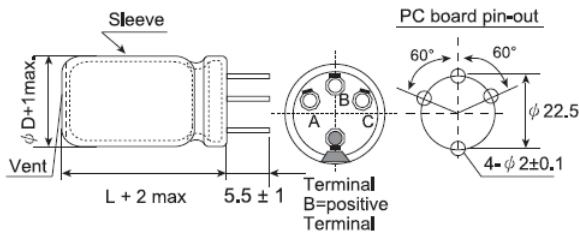
D= Ø35 to Ø51 mm

ST



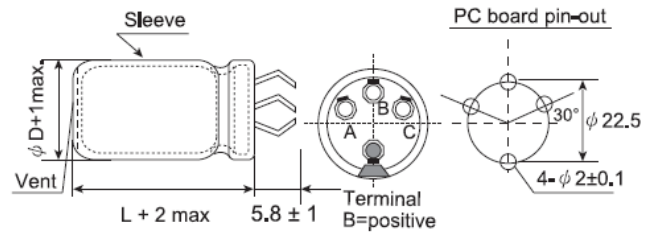
D= Ø35 to Ø40 mm

PCS



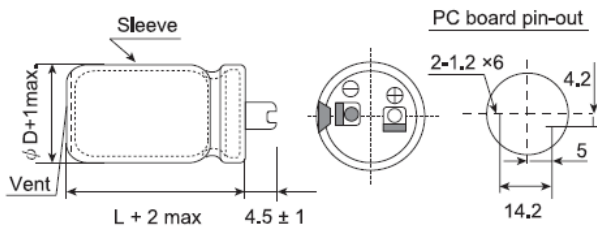
D= Ø35 to Ø40 mm

PCY



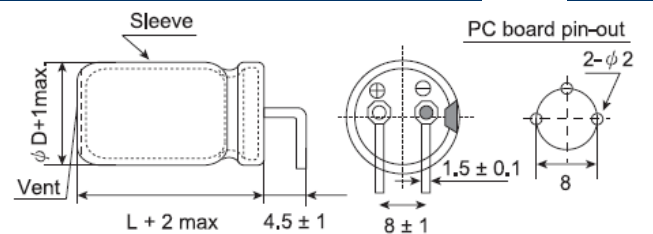
D= Ø35 to Ø40 mm

PCU



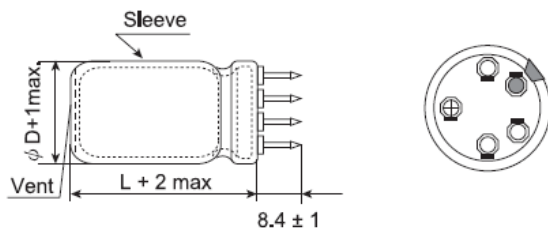
D= Ø22 to Ø30 mm

PCB



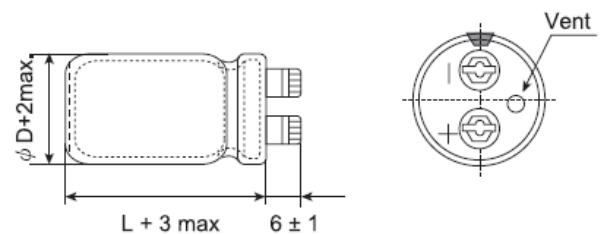
D= Ø40 to Ø50 mm

U



D= Ø35 to Ø100 mm

W

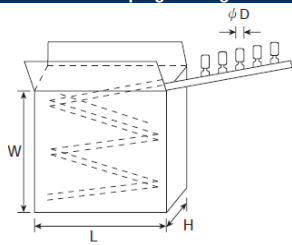


CAUTION:

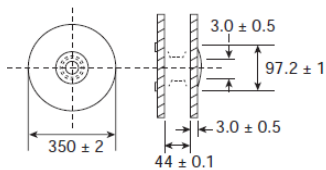
- Use the blank terminals for mechanical support only.
- The blank terminals must not be connected to any copper on PC boards.
- Be sure to electrically isolate from negative the positive terminals.



Taping Package

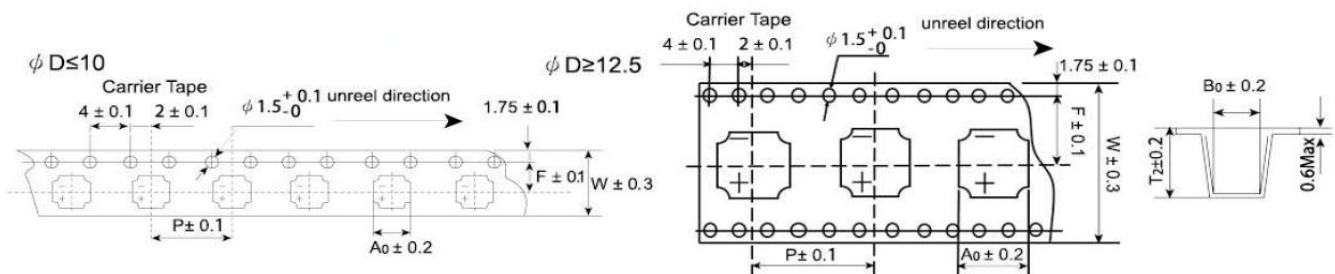


Taping and Reel



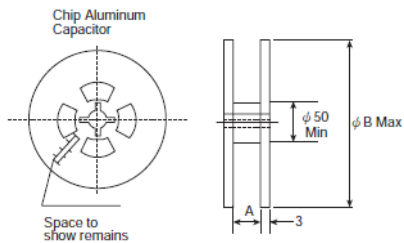
Item	Taping Packing						Tape and Reel	
	ØD (mm)	W±5 (mm)	L±5 (mm)	H±5 (mm)	Qty (pcs)	G.W. Kg/box	Box/ Carton	Qty. (pcs)
4		235	327	54	2,500	0.89	10	1,800
5		235	327	54	2,000	0.99	10	1,200
6.3		235	327	54	1,500	1.12	10	1,000
8		265	327	51	1,000	1.48	10	800
10 (L≤16)		235	330	57	600	1.29	10	600
10 (L≤20)		235	330	57	600	1.48	10	600
12.5 (L≤21)		280	315	65	400	1.73	6	400
13 (L≤21)		280	315	65	400	1.95	6	400
13 (L≤25)		280	315	65	400	2.35	6	
13 (L≤30)		290	310	72	400	2.65	6	
16 (L≤26)		290	310	72	250	1.85	6	
16 (L≤32)		290	310	72	250	2.25	6	
16 (L≤36)		290	310	72	250	2.45	6	

Chip Packing



Size	Item					
	W	P	F	A0	B0	T2
Ø4 x 5.5~5.6 L	12.0	8.0	5.5	5.0	5.0	5.8
Ø4 x 5.7~6.3 L	12.0	8.0	5.5	5.0	5.0	6.3
Ø5 x 5.3~5.6 L	12.0	12.0	5.5	5.0	5.0	5.9
Ø5 x 5.7~6.3 L	12.0	12.0	5.5	5.0	5.0	6.3
Ø5 x 6.4~7.0 L	12.0	12.0	5.5	5.0	5.0	7.6
Ø6.3 x 4.5 L	16.0	12.0	7.5	7.0	7.0	4.8
Ø6.3 x 5.3~5.6 L	16.0	12.0	7.5	7.0	7.0	5.9
Ø6.3 x 5.7~6.3 L	16.0	12.0	7.5	7.0	7.0	6.5
Ø6.3 x 7~8 L	16.0	12.0	7.5	7.0	7.0	8.3
Ø6.3 x 8.1~9 L	16.0	12.0	7.5	7.0	7.0	9.3
Ø8 x 6~7 L	16.0	12.0	7.5	8.7	8.7	6.9
Ø8 x 10~11 L	24.0	16.0	11.5	8.7/9.4(G)	8.7/9.4(G)	11/11.4(G)
Ø10 x 7.7 L	24.0	16.0	11.5	10.7	10.7	8.7
Ø10 x 10~11 L	24.0	16.0	11.5	10.7/11.4(G)	10.7/11.4(G)	11/11.4(G)
Ø10 x 12~13 L	24.0	16.0	11.5	10.7	10.7	13.1
Ø10 x 16~17 L	24.0	16.0	11.5	10.7	10.7	17.5
Ø12.5 x 13~14 L	32.0	24.0	14.2	13.4/13.7(G)	13.4/13.7(G)	15
Ø12.5 x 16~17 L	32.0	24.0	14.2	13.4/13.7(G)	13.4/13.7(G)	17.5
Ø16 x 16~17 L	44.0	28.0	20.2	17.5	17.5	17.5
Ø16 x 21~22 L	44.0	28.0	20.2	17.5	17.5	23.0
Ø18 x 16~17 L	44.0	32.0	20.2	19.5	19.5	17.5
Ø18 x 21~22 L	44.0	32.0	20.2	19.5	19.5	23.0

Chip and Reel



Size	Ø4 x 5	Ø6.3	Ø8	Ø10	Ø12.5	Ø16 x 18
A	14	18	26	26	34	46
B	382	382	382	382	382	382

Package Quantity

Size	Q'ty / Reel	Inner Box / measurement (mm)		Outer Carton /measurement (mm)	
04	2000	10000	385x106x385	20000	403x255x412
05	1000	5000	385x106x385	10000	403x255x412
Ø6.3 x 4 ~ 8 L	1000	5000	385x125x385	10000	403x293x412
Ø6.3 x 8.4 L	800	4000	385x125x385	8000	403x293x412
Ø0 6.3 x 7.7L	1000	5000	385x125x385	10000	403x293x412
Ø8 x 6 ~ 7 L	1000	5000	385x125x385	10000	403x293x412
Ø08 x 10 ~ 11 L	500	1500	385x106x385	3000	403x255x412
Ø10 x 7 ~ 11 L	500	1500	385x106x385	3000	403x255x412
Ø10 x 12 ~ 13 L	400	1200	385x106x385	2400	403x255x412
Ø10 x 16 ~ 17 L	300	900	385x106x385	1800	403x255x412
Ø12.5 x 13 ~ 14L	250	750	385x125x385	1500	403x293x412
Ø12.5 x 16 ~ 17L	200	600	385x125x385	1200	403x293x412
Ø16\18 x 16 ~ 17L	200	400	385x106x385	800	403x255x412
Ø16\18 x 21 ~ 22L	100	200	385x106x385	400	403x255x412



Unit: (mm)

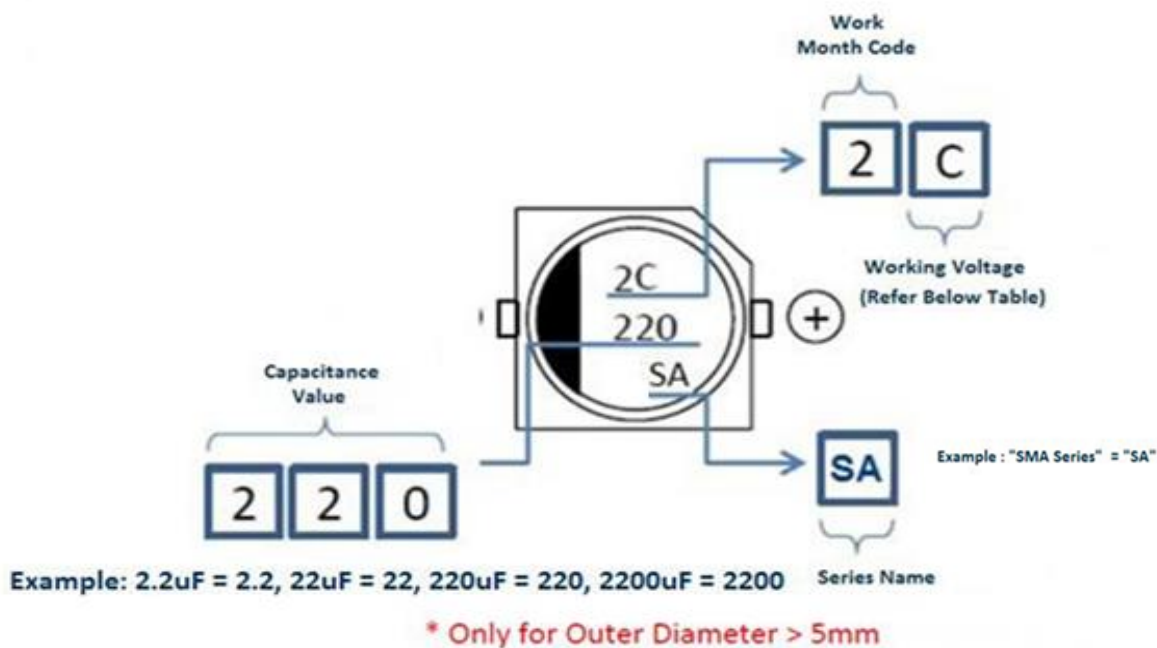
Type of Product	Dim (DxL)	Bags / Inner Box	Layer Quantity	Quantity (pcs/bag)	Total Quantity (pcs/carton)	Wt (kg/bag)	Size of Inner Box	Size of Out Box (mm)
Radial (Standard Bulk)	4x5	20	2	1000	40000	0.19	272 X 260 X 135	546 X 279 X 160
	4x7	20	2	1000	40000	0.23		
	5x5	15	2	1000	30000	0.25		
	5x7	10	2	1000	20000	0.32		
	5x11	10	2	1000	20000	0.43		
	6.3x5	10	2	1000	20000	0.37		
	6.3x7	10	2	1000	20000	0.45		
	6.3x11	8	2	1000	16000	0.60		
	8x5	10	2	500	10000	0.23		
	8x9	10	2	500	10000	0.42		
	8x12	10	2	500	10000	0.49		
	8x14	8	2	500	8000	0.63		
	8x16	6	2	500	6000	0.69		
	8x20	6	2	500	6000	0.71		
	10x13	11	2	200	4400	0.38		
Radial (Special Bulk)	10x16	9	2	200	3600	0.45	365 X 245 X 230	365 X 245 X 230
	4x5	15	2	1000	30000	0.13		
	4x7	15	2	1000	30000	0.18		
	5x5	10	2	1000	20000	0.19		
	5x7	10	2	1000	20000	0.27		
	5x11	10	2	1000	20000	0.40		
	6.3x5	10	2	1000	20000	0.31		
	6.3x7	10	2	1000	20000	0.40		
	6.3x11	10	2	1000	20000	0.55		
	8x5	20	2	250	10000	0.11		
	8x7	20	2	250	10000	0.15		
	8x9	20	2	250	10000	0.20		
	8x12	20	2	250	10000	0.23		
	8x14	20	2	250	10000	0.28		
	8x16	20	2	250	10000	0.33		
	8x20	18	2	250	9000	0.39		
	8x25	14	2	250	7000	0.48		
Cutting	4x5	30	2	1000	60000	0.13	267 X 260 X 135	546 X 279 X 160
	4x7	30	2	1000	60000	0.18		
	5x5	20	2	1000	40000	0.19		
	5x7	20	2	1000	40000	0.27		
	5x11	15	2	1000	30000	0.40		
	6.3x5	15	2	1000	30000	0.31		
	6.3x7	15	2	1000	30000	0.40		



Type of Product	Dim (DxL)	Quantity (pcs/Inner Box)	Layer Qty	Total Qty (pcs/Carton)	Unit Wt. (kg/pcs)	Gross (kg/Inner Box)	Size of Inner Box (mm)	Size of Out Box (mm)
Screw Terminal	35x120	25	4	100	0.161	16.24	204x204x146	428x214x312
	51x100	40	1	40	0.278	11.83		
	51x120	40	1	40	0.326	13.75	515x337x210	515x337x210
	51x170	36	1	36	0.412	15.76	515x337x260	515x337x260
	64x120	24	1	24	0.485	12.35	515x337x210	515x337x210
	64x140	20	1	20	0.558	12.09	515x337x260	515x337x260
	64x170	20	1	20	0.775	16.43		
	64x195	16	1	16	0.51	9.31	515x337x310	515x337x310
	76x140	12	1	12	0.714	9.5		
	76x150	12	1	12	0.603	8.17	515x337x260	515x337x260
	76x170	12	1	12	1.012	13.07		
	76x190	9	1	9	1.209	12.03	515x337x310	515x337x310
	76x220	9	1	9	1.472	14.39		
	90x170	12	1	12	1.237	15.77	515x337x260	515x337x260
	90x190	7	1	7	1.635	12.59	515x337x310	515x337x310
Snap-In, LUG	20x50	200	4	800	0.022	4.61	272 x 272 x 146	564 x 282 x312
	22x25	300	4	1200	0.013	4.11		
	22x30	300	4	1200	0.016	5.01		
	22x35	200	4	800	0.02	4.21		
	22x40	200	4	800	0.022	4.61		
	22x45	200	4	800	0.023	4.81		
	22x50	200	4	800	0.03	6.21	302 x 302 x 146	624 x 312 x 312
	25x25	300	4	1200	0.016	5.05		
	25x30	300	4	1200	0.017	5.35		
	25x35	300	4	1200	0.022	6.85		
	25x40	200	4	800	0.028	5.85		
	25x45	200	4	800	0.032	6.65		
	25x50	200	4	800	0.035	7.25	179 x 179 x 146	378 x 189 x 312
	30x25	75	4	300	0.024	1.92		
	30x30	75	4	300	0.027	2.15		
	30x35	75	4	300	0.036	2.82		
	30x40	50	4	200	0.04	2.12		
	30x45	50	4	200	0.045	2.37		
	30x50	50	4	200	0.05	2.62	204 x 204 x 146	428 x 214 x 312
	30x55	50	4	200	0.055	2.87		
	35x30	75	4	300	0.036	2.87		
	35x35	75	4	300	0.039	3.06		
	35x40	50	4	200	0.046	2.44		
	35x50	50	4	200	0.061	3.19		

Marking Specifications

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Code	1	2	3	4	5	6	7	8	9	O	N	D



Working Voltage	2.5	4	6.3	10	16	20	25	35	50	63	80
Code	Z	A	B	C	D	Q	E	F	G	H	J
Working Voltage	100	125	160	200	250	350	400	450	500		
Code	I	O	K	M	N	P	L	R	S		

Aluminum Electrolytic Capacitor

Coreworks Series	SMA	SMB	SMC	SMD	SME	SMF	SMG
Series Code	SA	SB	SC	SD	SE	SF	SG

Conductive Polymer Aluminum Solid Capacitors

Coreworks Series	PSA	PSB	PSC	PSD	PSE	PRA	PRB	PRC	PRD	PRE	PRF
Series Code	PA	PB	PC	PD	PE	P1	P2	P3	P4	P5	P6

Conductive Polymer Hybrid Aluminum Electrolytic Capacitors

Coreworks Series	HSA	HSB	HRA	HRB
Series Code	HA	HB	H1	H2



Dip Type



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