ALUMINUM ELECTROLYTIC CAPACITORS

Application Guidelines

1-1-1. 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) Operating temperature and applied ripple current shall be within the specification.
The capacitor shall not be used in an ambient temperature which exceeds the operating temperature specified in the specification.
Do not apply excessive current which exceeds the allowable ripple current.

(3) Appropriate capacitors which comply with the life requirement of the products should be selected when designing the circuit.

(4) Aluminum electrolytic capacitors are polarized. Make sure that no reverse voltage of AC voltage is applied to the capacitors. Please use bi-polar capacitors for a circuit that can possibly see reversed polarity.
Note: Even bi-polar capacitors can not be used for AC voltage application.

(5) For a circuit that repeats rapid charging/discharging of electricity, an appropriate capacitor that is capable of enduring such a condition must be sued. Welding machines and photoflash are a few examples of products that contain such a circuit . In addition, rapid charging/discharging may be repeated in control circuits for servomotors , In which the circuit voltage fluctuates substantially.
For appropriate choice of capacitors for circuit that repeat rapid charging/discharging. Please consult us.

(6) For conductive polymer solid capacitors, the leakage current may become greater even if the soldering conditions adhere to the specification requirements. Therefore , do not use such capacitors in the following circuits because trouble or failure may occur.
a) High impedance circuits
b) Coupling circuits
c) Time constant circuits
d) Do not use the capacitors in circuits except those above if changes in the leakage current affects circuit operations.

(7) It is said that to restrain output ripple current, the output smoothing capacitor of the switching power supply is suitable to use the smaller ESR capacitor . However when the low ESR capacitor is used ,the phenomenon sometimes occurs that is called the abnormal oscillation of output voltage. 30 degrees to 40 degrees or more of phase margin is thought as a necessity to inhibit the oscillation of output voltage with a general negative feed-back circuit. The phase margin is numerical value how much the minimum value of the phase is distant from-180 degrees. The smaller the phase margin gets. the higher the possibility to oscillate by the characteristic dispersion and temperature change of the component will be.
By doing phase compensation with the feed-back circuit of the error amplifier the oscillation of output voltage con be inhibited.

(8) Make sure that no excess voltage (that is , higher than the rated voltage) is applied to the capacitor.
Please pay attention so that the peak voltage. Which is DC voltage overlapped by ripple current . will not exceed the rated voltage.
In the case where more that 2 aluminum electrolytic capacitors are used in series. Please make sure that applied voltage will be lower that rated voltage and the voltage be will applied to each capacitor equally using a balancing resistor in parallel with the capacitors.

(9) Outer sleeve of the capacitor is not guaranteed as an electrical insulator . Do not use a standard sleeve on a capacitor in applications that require the electrical insulation. When the application requires special insulation. Please contact us for details.

(10) Capacitors may fail if they are used under the following conditions:

① Environmental (climatic)conditions

(a) Being exposed to water, high temperature & high humidity atmosphere , or condensation of moisture.

(b) Being exposed to oil or an atmosphere that is filled with particles of oil.

(C) Being exposed to salty water or an atmosphere that is filled with particles of salt.

(d) In an atmosphere filled with toxic gasses (such as hydrogen sulfide, sulfurous acid , nitrous acid, chlorine , bromine , methyl bromide , ammonia, etc.)

(e) Being exposed to direct sunlight . ozone , ultraviolet ray , or radiation

(f) Being exposed to acidic or alkaline solutions

② Under severe conditions where vibration and /or mechanical shock exceed the applicable ranges of the specifications.

(11) When designing a P.C. board , please pay attention to the following:

① Have the hole spacing on the P.C. board match the lead spacing of the capacitor.

② There should not be any circuit pattern or circuit wire above the capacitor pressure relief vent.

③ Unless otherwise specified, following clearance should be made above the pressure relief vent.

Case Diameter	Clearance Required
Φ6.3~16mm	2mm or more
Φ18~35mm	3mm or more
Φ40mm or more	5mm or more

④ In case the vent side is placed toward P.C board (such as end seal vented parts), make a corresponding hole on the P.C. board to release the gas when vent is operated . The hole should be made to match the capacitor vent position.

⑤ Screw terminal capacitors must be installed with their end seal side facing up. When you install a screw terminal capacitor in a horizontal position. the positive terminal must be in the upper position.

(12) The main chemical solution of the electrolyte and the separator paper used in the capacitors are combustible. The electrolyte is conductive When if comes in contact with the P.C. board. there is a possibility of pattern corrosion or short circuit between the circuit pattern which could result in smoking or catching fire. Do not locate any circuit pattern beneath the capacitor end seal.

(13) 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).

(14) Electrical characteristics may vary depending on changes in temperature and frequency . please consider this variation when you design circuits.

(15) When you mount capacitors on the double-sided P.C.boards do not place capacitors on circuit patterns or over on unused holes.

(16) The torque for terminal screw or brackets screws shall be within the specified value in specifications.

(17) When you install more than 2 capacitors in parallel, consider the balance of current flowing through the capacitors . Especially, When a solid conductive polymer aluminum electrolytic capacitor and a standard aluminum electrolytic capacitor are connected in parallel , special consideration must be given.

(18) if more than 2 aluminum electrolytic capacitors are used in 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.

1-1-2. Mounting

(1) Once a capacitor has been assembled in the set and power applied . Even if a capacitor is discharged . an electric potential (recovery 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 l k resistor.

(3) Leakage current of the parts that have been stored for more than 1 year may increase. If leakage current has increased, please perform a voltage treatment using 1 k resistor.

(4) Please confirm ratings before installing capacitors on the P.C. board.

(5) Please confirm polarity before installing capacitors on the P.C. board.

(6) Do not drop capacitors on the floor , nor use a capacitor that was dropped.

(7) Do not damage the capacitor while installing.

(8) Please confirm that the lead spacing of the capacitor matches the hole spacing of the P.C. board prior to installation.

(9) Snap-in type capacitor should be installed tightly to the P.C. board (allow no gap between the P.C. board and bottom of the capacitor).

(10) Please pay attention that the clinch force is not too strong when capacitors are placed and fixed by an automatic insertion machine.

(11) Please pay attention to that the mechanical shock to the capacitor by suction nozzle of the automatic insertion machine or automatic mounted. or by product checker, or by centering mechanism.

(12) Hand soldering.

① Soldering condition shall be confirmed to be within the specification.

② If it is necessary that the leads must be formed due to a mismatch of the lead space to hole space on the board . bend the lead prior to soldering without applying too much stress to the capacitor.

③ If you need to remove parts which were soldered . please melt the solder enough so that stress is not applied to lead.

④ Please pay attention so that solder iron does not touch any portion of capacitor body.

(13) Flow soldering (wave solder)

① Aluminum capacitor body must not be submerged into the solder bath . Aluminum capacitors must be mounted on the "top side" of the P.C. board and only allow the bottom side of the P.C. board to come in contact with the solder.

② Soldering condition must be confirmed to be within specification. Solder temperature:260±5℃,Immersing lead time:10±1 second. Thickness of P.C. board :1.6mm.

③ Please avoid having flux adhere to any portion except the terminal.

④ Please avoid contact between other components and the aluminum capacitor.

(14) Reflow soldering (SMD only)

① Soldering condition must be confirmed to be within specification.

Pre - heating :Less than 150℃, 90 seconds max . Max. temperature at capacitor top during reflow:230℃

The duration for over 200℃ temperature at capacitor top:20 seconds max.

The duration from the pre-heat temperature to peak temperature of reflow varies due to changes of the peak temperature.

② When an infrared heater is used . please pay attention to the extent of heating since the absorption rate of infrared . will vary due to difference in the color of the capacitor body. material of the sleeve and capacitor size.

③ The number of reflow time for SMT aluminum electrolytic capacitors shall be one time . if this type of capacitor has to be inevitably subjected to the reflow twice , enough cooling time between the first and second reflow (at least more that 30 minutes) shall be taken to avoid consecutive reflow , please contact us if you have questions.

(15) Soldering flux

There are non-halogen types of flux that do not contain ionic halides, but contain many non-ionic halides. When these non-ionic halides infiltrate the capacitor , they cause a chemical reaction that is just as harmful as the use of cleaning agents. Use soldering flux that does not contain non-ionic halides.

(16) Do not tilt lay down or twist the capacitor body after the capacitors are soldered to the P.C. board.

(17) Do not carry the P.C. board by grasping the soldered capacitor.

(18) Please do not allow anything to touch the capacitor after soldering . if P.C. board are stored in a stack , please make sure P.C. board or the other components do not touch the capacitor.

The capacitors shall not be effected by any radiated heat from the soldered P.C. board or other components after soldering .

1-1-3 In the equipment

(1) Do not directly touch terminal by hand.

(2) Do not short between terminals with conductor , not spill conductible liquid such as alkaline or acidic solution on or near the capacitor .

(3) Please make sure that the ambient conditions where the set is installed will be free from spilling water or oil. direct sunlight. ultraviolet rays . radiation, poisonous gases, vibration or mechanical shock.

1-1-4. Maintenance inspection

Please periodically inspect the aluminum capacitors that are installed in industrial equipment . The following items should be checked:

①Appearance: Remarkable abnormality such as vent operation . leaking electrolyte etc.

②Electrical characteristic: Capacitance, dielectric loss tangent . leakage current . and items specified in the specification.

1-1-5. In an Emergency

(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. The gasses emitted from that are over 100℃.

If the gas gets into your eyes . please flush your eyes immediately in pure water.

If you breathe the gas . immediately wash out your mouth and throat with water.

Do not ingest electrolyte. if your skin is exposed to electrolyte. Please wash if away using soap and water.

1-1-6. Storage

(1) If is recommended to keep capacitors between the ambient temperatures of 5℃ to 35℃ and a relative humidity of 75% or below.

(2) Confirm that the environment does not have any of the following conditions:

① where capacitors are exposed to water, high temperature & high humidity atmosphere , or condensation of moisture.

② Where capacitors are exposed to oil or an atmosphere that if filled with particles of oil.

③ Where capacitors are exposed to salty water. high temperature & high humidity atmosphere , or condensation of moisture.

④ The atmosphere is filled with toxic acid gasses (e.g. hydrogen sulfide . sulfurous acid , nitrous acid. chlorine. bromine , methyl bromide . etc.)

⑤ The atmosphere is filled with toxic alkaline gasses (e.g. ammonia)

Where capacitors are exposed to acidic or alkaline solutions.

1-1-7. Disposal

Take either of the following methods in disposing of capacitors.

Make a hole in the capacitor body or crush capacitors and incinerate them.

If incineration is not applicable , hand them over to a waste disposal agent and have them buried in a landfill.

STANDARDIZATION

1. The below series have been updated , At the same time, the approval items can make delivery continually.

Type	Discontinued Series	Before	After
RB	Radial Lead Type	ΦD12.5×L≥35 the diameter of CP designates to 0.8mm	ΦD12.5×L≥35 the diameter of CP designates to 0.6mm
	SM	Voltage Range:6.3 to 450 Vdc	Voltage Range:6.3 to 550 Vdc
	PW	Voltage Range:200 to 500 Vdc Capacitance Rang:10 to 470uF	Voltage Range:160 to 550 Vdc Capacitance Rang:10 to 560uF
	PV	Voltage Range:200 to 450 Vdc Capacitance Rang:6.8 to 470uF	Voltage Range:160 to 500 Vdc Capacitance Rang:33 to 560uF
	LL	Voltage Range:200 to 450 Vdc Capacitance Rang:1 to 68uF	Voltage Range:160 to 450 Vdc Capacitance Rang:33 to 560uF
	PJ	Capacitance Rang:6.8 to 330uF	Capacitance Rang:10 to 560uF
	KJ	Capacitance Rang:6.8 to 560uF	Capacitance Rang:10 to 560uF
	MW	Voltage Range:200 to 450 Vdc Capacitance Rang:68 to 470uF	Voltage Range:160 to 450 Vdc Capacitance Rang:33 to 560uF
	MV	Voltage Range:200 to 450 Vdc Capacitance Rang:6.8 to 470uF	Voltage Range:160 to 450 Vdc Capacitance Rang:33 to 560uF
	MJ	Voltage Range:200 to 450 Vdc Capacitance Rang:6.8 to 330uF	Voltage Range:160 to 450 Vdc Capacitance Rang:10 to 560uF
	PA	Capacitance Rang:33 to 120uF	Capacitance Rang:27 to 120uF
	PQ	Voltage Range:200 to 450 Vdc Capacitance Rang:33 to 220uF	Voltage Range:160 to 450 Vdc Capacitance Rang:27 to 390uF
	MA	Capacitance Rang:33 to 120uF	Capacitance Rang:27 to 120uF
	MQ	Voltage Range:200 to 450 Vdc Capacitance Rang:33 to 220uF	Voltage Range:160 to 450 Vdc Capacitance Rang:27 to 390uF
Snap-in	Snap-in Type	ΦD25 indicates the diameter is 25mm	ΦD25 indicates the diameter is 25.4mm
	GM	Voltage Range:16 to 500 Vdc Capacitance Rang:56 to 68,000uF	Voltage Range:16 to 550 Vdc Capacitance Rang:47 to 68,000uF
	PL	Voltage Range:16 to 500 Vdc	Voltage Range:16 to 550 Vdc
	PK	Voltage Range:200 to 450 Vdc Capacitance Rang:56 to 1,800uF	Voltage Range:200 to 500 Vdc Capacitance Rang:47 to 2,200uF
	PG	Capacitance Rang:47 to 1,800uF	Capacitance Rang:56 to 1,800uF

2. The below old series have been updated , we would like to recommend new series as below table.

At the same time, the approval items of old series can make delivery continually

Type	Discontinued Series	Characteristics	Replacements Series	Page
RB	PC	Downsize, Ideal for low profile power,supply applications	PW	120
Snap-in	GM	Downsize，85℃ 2,000	GM	165
	GR	General , Downsize	GM	165
	PM	General , High temperature	PL	175

Capacitor Series Table

♦ **RADIAL LEAD TYPE**

Series		Pags	Features	Voltage Range (Vdc)	Capacitance Range (μF)	Sleeve Color	Temperature Endurance (Hours)
Mini Size	SS	52	7mm height	6.3 to 63	0.1 to 330	Dark Blue	85℃ 1,000
	SS-H	52	7mm height, High temperature	6.3 to 63	0.1 to 330	Black	105℃ 1,000
	SB	55	5mm height	4 to 50	0.1 to 470	Dark Blue	85℃ 1,000
	SB-H	55	5mm height, High temperature	4 to 50	0.1 to 470	Black	105℃ 1,000
	SF	58	7mm height	6.3 to 63	0.1 to 220	Black	105℃ 2,000
	LK	60	Downsize, High ripple current ,12 mm height	160 to 200	22 to 39	Black	105℃ 4,000
	EM	62	Low Impedance, High ripple current, Miniature Size	6.3 to 35	33 to 470	Brown	105℃ 1,000 to 2,000
	ER	64	Low Impedance, miniature size with 7 to 9 mm height	6.3 to 35	33 to 470	Brown	105℃ 3,000
	EH	66	Low Impedance ,High ripple current, 9 mm height	10 to 35	150 to 820	Brown	105℃ 3,000 to 4,000
	EP	68	Miniaturized, Low Impedance, 12 mm height	10 to 100	68 to 1,800	Brown	105℃ 4,000
	EC	70	Miniaturized, Low ESR and low impedance.	10 to 100	68 to 1,800	Brown	105℃ 5,000
Standard	ND	72	Non-Polar Standard	6.3 to 250	0.47 to 2,200	Dark Blue	85℃ 2,000
	ND-H	72	Non-Polar High temperature	6.3 to 250	0.47 to 2,200	Black	105℃ 1,000
	LB	75	Low Leakage Current	6.3 to 100	0.47 to 4,700	Dark Blue	85℃ 2,000
	LB-H	75	Low Leakage Current, High temperature	6.3 to 100	0.47 to 4,700	Black	105℃ 1,000
	SM	78	General, Downsize	6.3 to 550	0.1 to 22,000	Dark Blue	85℃ 2,000
	PF	81	Standard	6.3 to 450	0.47 to 22,000	Black	105℃ 2,000
High Frequency, Low Impedance	EL	84	Extremely Low Impedance, Downsize	6.3 to 50	56 to 6,800	Brown	105℃ 2,000
	EB	86	Extremely Low Impedance, High ripple current	6.3 to 16	82 to 3,300	Brown	105℃ 1,000 to 2,000
	ED	88	Low Impedance, High ripple current	6.3 to 100	10 to 10,000	Brown	105℃ 2,000 to 5,000
	EK	91	Miniaturized, Low Impedance, High ripple current	6.3 to 50	0.1 to 6,800	Brown	105℃ 2,000 to 5,000
	EV	94	Low Impedance, High ripple current	6.3 to 35	10 to 8,200	Brown	105℃ 3,000 to 6,000
	EJ	97	Low Impedance, Long life	6.3 to 63	10 to 10,000	Brown	105℃ 3,000 to 5,000
	EG	100	Low Impedance, High ripple current, Long Life	6.3 to 63	10 to 10,000	Brown	105℃ 3,000 to 6,000
	EY	103	Miniaturized, Low impedance, High ripple current	6.3 to 100	6.8 to 18,000	Brown	105℃ 4,000 to 10,000
	RF	107	Low impedance, Downsize,, Long life	6.3 to 100	6.8 to 18,000	Brown	105℃ 6,000 to 12,000
High reliability	PY	111	High-temperature 125℃, high reliability.	10 to 450	4.7 to 1,000	Black	125℃ 2,000
	TL	113	High-temperature 125℃, long life	10 to 50	22 to 1,000	Black	125℃ 3,000 to 5,000
	TD	115	High-temperature 130℃, high reliability.	10 to 450	4.7 to 4700	Black	130℃ 1,000 to 4,000
	TX	118	High-temperature 135℃, high reliability.	10 to 50	22 to 1,000	Black	135℃ 1,000 to 2,000

ALUMINUM ELECTROLYTIC CAPACITORS

Series		Pags	Features	Voltage Range (Vdc)	Capacitance Range (μF)	Sleeve Color	Temperature Endurance (Hours)
Power supply with the product	**PW**	120	High ripple current, Downsize	160 to 550	10 to 560	Black	105°C 2,000
	PV	122	Downsize with high ripple current	160 to 500	33 to 560	Black	105℃ 2,000 to 5,000
	LF	124	Energy-saving lamps, Standard Downsize	200 to 450	1 to 68	Black	105℃ 2,000
	LL	126	Energy-saving lamps, High ripple current , Long life	160 to 450	33 to 560	Black	105℃ 2,000 to 5,000
	PJ	128	long life 8,000 to 10,000 hours	160 to 500	10 to 560	Black	105℃ 8,000 to 10,000
	KJ	130	Downsize, High ripple current , Long life	160 to 450	10 to 560	Black	105℃ 10,000 to 12,000
	KY	132	Downsize, High ripple current, Long life	160 to 450	6.8 to 470	Black	105℃ 12,000 to 15,000
	MW	134	Low ESR, High ripple current	160 to 450	33 to 560	Black	105℃ 2,000
	MV	136	Low ESR, High ripple current , long life	160 to 450	33 to 560	Black	105℃ 5,000
	MJ	138	Low ESR, Downsize , High ripple current , long life	160 to 450	10 to 560	Black	105℃ 8,000 to 10,000
	PZ	140	Ideal for low profile power supply applications	200 to 450	18 to 270	Black	105℃ 2,000
	PA	142	105℃ Long life 5,000 hours, Ultra miniature size	400 to 450	27 to 120	Black	105℃ 5,000
	PQ	144	105℃ Long life 10,000 hours, miniature size	160 to 450	27 to 390	Black	105℃ 10,000
	MZ	146	Low ESR, High ripple current , Ultra miniature size	200 to 450	18 to 270	Black	105℃ 2,000
	MA	148	Low ESR , Long life, Ultra miniature size	400 to 450	27 to 120	Black	105℃ 5,000
	MQ	150	Low ESR, High ripple current,, Long life, Ultra miniature size	160 to 450	27 to 390	Black	105℃ 10,000
Counter-plan product for safety	**SW**	152	High ripple current, Miniaturized	160 to 450	22 to 680	Black	105℃ 2,000
	SQ	154	High ripple current, Long life 5,000 hours	160 to 450	22 to 680	Black	105℃ 5,000
	SP	156	High ripple current, Long life 10,000 hours	160 to 450	22 to 680	Black	105℃ 10,000
Capacitor For Over Voltage Application	**VW**	158	High ripple current, Miniaturized	160 to 450	22 to 680	Black	105℃ 2,000
	VQ	160	High ripple current, Long life 5,000 hours	160 to 450	22 to 680	Black	105℃ 5,000
	VJ	162	High ripple current, Long life 10,000 hours	160 to 450	22 to 680	Black	105℃ 10,000

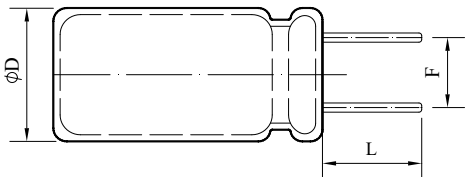
♦ SNAP-IN TYPE

Series		Pags	Features	Voltage Range (Vdc)	Capacitance Range (μF)	Sleeve Color	Temperature Endurance (Hours)
General Purpose	GM	165	General , Standard	16 to 550	47 to 68,000	Dark Blue	85℃ 2,000
	GSF	169	General , Long life	200 to 450	68 to 2,200	Dark Blue	85℃ 3,000
	GVF	172	High ripple current , Load life	200 to 500	56 to 2,200	Dark Blue	85℃ 5,000
	PL	175	General, High temperature, Long life	16 to 550	39 to 47,000	Black	105℃ 2,000
	PK	179	High temperature , Long life	200 to 500	56 to 2,200	Black	105℃ 3,000
	PT	182	General, High temperature , Long life	200 to 400	68 to 1,000	Black	105℃ 4,000
	PG	184	Smaller size with higher ripple current	200 to 500	56 to 1,800	Black	105℃ 5,000
Server product	PO	187	Snap-in terminal, more downsized	400 to 450	68 to 680	Black	105℃ 2,000
	PI	189	Snap-in terminal, downsized	400 to 450	56 to 680	Black	105℃ 3,000
High reliability	TG	191	The double waist products, Long life	10 to 100	680 to 47,000	Black	125℃ 5,000
Horizontal	GD	194	General , Standard , Horizontal mounting	160 to 450	82 to 1,200	Dark Blue	85℃ 2,000
	PX	196	High temperature, Horizontal mounting	160 to 450	68 to 1,500	Black	105℃ 2,000

♦ SPECIAL TYPE

Series		Pags	Features	Terminal Type	Voltage Range (Vdc)	Capacitance Range (μF)	Sleeve Color	Temperature Endurance (Hours)
Frequency conversion	AQ	200	For Power Supply and Air-Conditioner	HU	400 to 450	330 to 820	Dark Blue	85℃ 3,000
	AN	202	For Power Supply and Air-Conditioner	AC	400 to 450	800 to 3,300	Black	85℃ 3,000
Screw General Purpose	SC	204	Standard	Screw	200 to 600	820 to 33,000	Black	85℃ 2,000
	SA	207	Long life	Screw	160 to 450	1,000 to 68,000	Black	85℃ 5,000
	SL	210	High ripple current , Long life	Screw	200 to 400	1,000 to 39,000	Black	85℃ 20,000
	SK	213	High temperature , Long life	Screw	200 to 400	1,000 to 39,000	Black	105℃ 2,000
	SX	216	High temperature , Long life	Screw	200 to 400	1,000 to 39,000	Black	105℃ 5,000

♦ LEAD FORMING TYPE

Type	Part Number	Dimensions (Unit: mm)																										
		ΦD	F	ι	L (Part number for lead length and pitch for taping)																							
					Z	2	B	E	G	M	Q	S	T	F	H	3	C	D	4	5	6	7	I	8	J	9	K	A	L
					2.0	2.5	2.8	3.1	3.3	3.5	3.6	1.0	3.8	14.8	12	3.5	3.8	4.0	4.5	5.0	6.3	7.0	7.5	8.0	8.5	9.0	9.5	10	10.5
					+0.3 / -0.2							±0.3				±0.5													
Cut	C	4	1.5	----																									Fig 1
		5	2.0	----																									
		6.3	2.5	----																									
		8	3.5	----																									
		10	5.0	----																									
		12.5	5.0	----																									
		16	7.5	----																									
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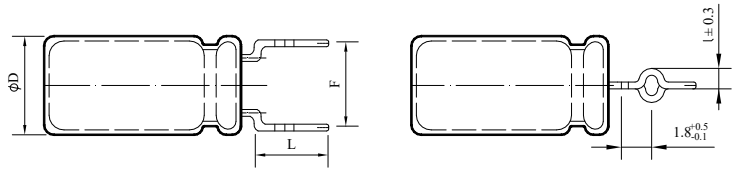
Kink & Cut	B	4	5.0	1.1																									Fig 2
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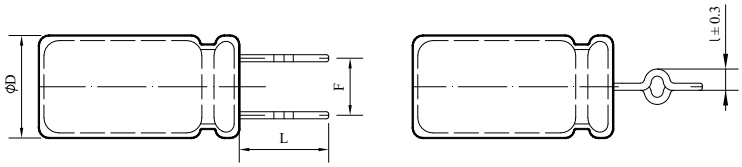
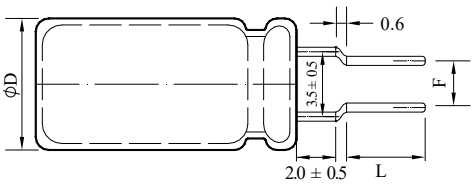
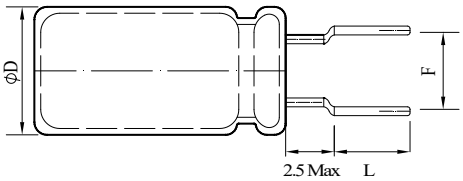
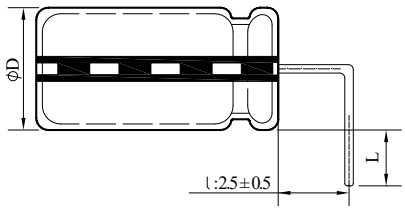
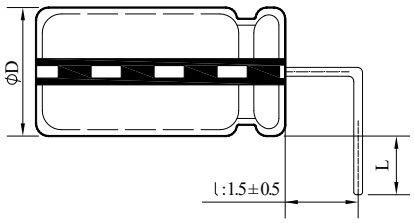
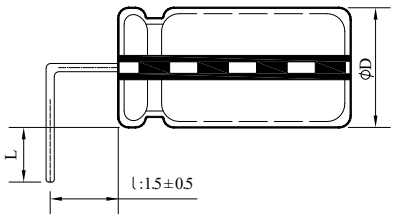
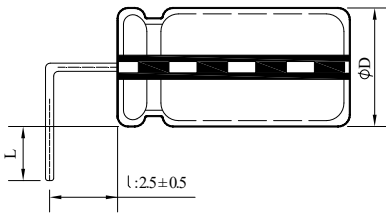
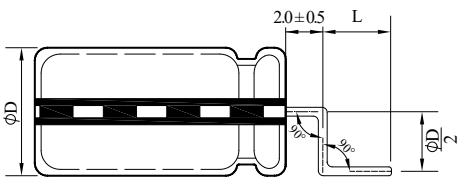
		8	5.0	1.3																									
		10	5.0	1.3																										
		12.5	5.0	1.3																									
		16	7.5	1.3																									
		18	7.5	1.3																									
Form & Cut	D	8	2.5	----																									Fig 3
	F	4	5.0	----																									Fig 4
		5	5.0	----																									
		6.3	5.0	----																									
		8	5.0	----																									

♦ LEAD FORMING TYPE

Type	Part Number	Dimensions (Unit: mm)																										
		ΦD	F	ι	L (Part number for lead length and pitch for taping)																							
					Z	2	B	E	G	M	Q	S	T	F	H	3	C	D	4	5	6	7	I	8	J	9	K	A	L
					2.0	2.5	2.8	3.1	3.3	3.5	3.6	1.0	3.8	14.8	12	3.5	3.8	4.0	4.5	5.0	6.3	7.0	7.5	8.0	8.5	9.0	9.5	10	10.5
					+0.3 / -0.2							±0.3				±0.5													
Form & Cut	L	5	2.0	2.5																									Fig 5
		6.3	2.5	2.5																								
		8	3.5	2.5																								
		10	5.0	2.5																								
		12.5	5.0	2.5																								
		16	7.5	2.5																								
		18	7.5	2.5																								
	T	5	2.0	1.5																									Fig 6
		6.3	2.5	1.5																								
		8	3.5	1.5																								
		10	5.0	1.5																								
		12.5	5.0	1.5																								
		16	7.5	1.5																								
		18	7.5	1.5																								
	R	5	2.0	1.5																									Fig 7
		6.3	2.5	1.5																								
		8	3.5	1.5																								
		10	5.0	1.5																								
		12.5	5.0	1.5																								
		16	7.5	1.5																								
		18	7.5	1.5																								
	S	5	2.0	2.5																									Fig 8
		6.3	2.5	2.5																								
		8	3.5	2.5																								
		10	5.0	2.5																								
		12.5	5.0	2.5																								
		16	7.5	2.5																								
		18	7.5	2.5																								
	E	5	2.0	----																									Fig 9
		6.3	2.5	----																								
		8	3.5	----																								
		10	5.0	----																								
		12.5	5.0	----																								
		16	7.5	----																								
		18	7.5	----																								

♦ TAPING

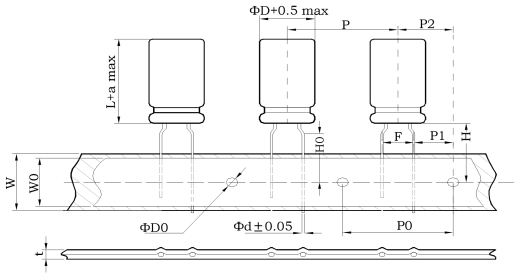


FIG 10-I

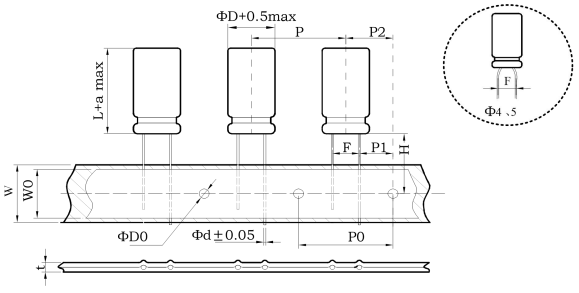


FIG 10-II

Item	Symbol	Tolerance	Formed Lead Type (10-I)						
			Φ 4×5 Φ 4×7	Φ 5×5 Φ 5×7	Φ 6.3×5	Φ 6.3×7	Φ 5×11 Φ 6.3×11	Φ 8×5 Φ 8×7 Φ 8×9	Φ 8×11.5 Φ 8×15 Φ 8×20
Lead wire diameter	Φd	±0.05	0.45	0.45	0.45	0.45	0.5	0.45/0.5	0.6
Pitch of component	P	±1.0	12.7	12.7	12.7	12.7	12.7	12.7	12.7
Feed hole pitch	P0	±0.2	12.7	12.7	12.7	12.7	12.7	12.7	12.7
Hole center to lead	P1	±0.5	3.85	3.85	3.85	3.85	3.85	3.85	3.85
Feed hole center to component center	P2	±1.0	6.35	6.35	6.35	6.35	6.35	6.35	6.35
Lead-to-lead distance	F	+ 0.8/-0.2	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Height of component from tape center	H	±0.5	18.5	18.5	18.5	18.5	18.5	18.5	18.5
Lead wire clinch height	H0	±0.5	16.0	16.0	16.0	16.0	16.0	16.0	16.0
Tape width	W	±0.5	18.0	18.0	18.0	18.0	18.0	18.0	18.0
Hole down tape width	W0	Min	12.5	12.5	12.5	12.5	12.5	12.5	12.5
Feed hole diameter	ΦD0	±0.2	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total tape thickness	t	±0.2	0.7	0.7	0.7	0.7	0.7	0.7	0.7

Item	Symbol	Tolerance	Straight Lead Type (10-II)						
			Φ 4	Φ 5	Φ 6.3	Φ 8	Φ 10	Φ 12.5	Φ 16
Lead wire diameter	Φd	±0.05	0.45	0.5	0.5	0.6	0.6	0.6	0.8
Pitch of component	P	±1.0	12.7	12.7	12.7	12.7	12.7	15.0	30.0
Feed hole pitch	P0	±0.2	12.7	12.7	12.7	12.7	12.7	15.0	15.0
Hole center to lead	P1	±0.5	5.6	5.35	5.1	4.6	3.85	5.0	3.75
Feed hole center to component center	P2	±1.0	6.35	6.35	6.35	6.35	6.35	7.5	7.5
Lead-to-lead distance	F	+ 0.8/-0.2	2.5	2.5	2.5	3.5	5.0	5.0	7.5
Height of component from tape center	H	±0.5	18.5	18.5	18.5	18.5	18.5	18.5	18.5
Tape width	W	±0.5	18.0	18.0	18.0	18.0	18.0	18.0	18.0
Hole down tape width	W0	Min	12.5	12.5	12.5	12.5	12.5	12.5	12.5
Feed hole diameter	ΦD0	±0.2	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total tape thickness	t	±0.2	0.7	0.7	0.7	0.7	0.7	0.7	0.7

PART NUMBER SYSTEM (I)

♦ RADIAL LEAD TYPE

Series	Rated Voltage	Capacitance	Tolerance	Lead Forming Type	Lead Length	Case Dimension	Special Request
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
□□	□□	□□□	□	□	□	□□□□	□□□□□□

(1) Series

Series	SS	SS-H	SB	SB-H	SF	LK	EM	ER	EH	EP	EC	ND
	ND-H	LB	LB-H	SM	PF	PW	EL	EB	ED	EK	EV	EJ
	EG	EY	RF	PY	TL	TD	TX	PC	LF	LL	PV	PJ
	KJ	KY	MW	MV	MJ	PZ	PA	PQ	MZ	MA	MQ	SW
	SQ	SP	VW	VQ	VJ							

(2) Rated Voltage

Code	0J	1A	1C	1E	1F	1V	1H	1J	1K	2A	2C	2Z	2D	2P	2E	2V	2G	2S	2W	2H
WV	6.3	10	16	25	30	35	50	63	80	100	160	180	200	220	250	350	400	420	450	500

(3) Capacitance

Code	R10	R47	010	4R7	100	470	101	471	102	472	473
µF	0.1	0.47	1.0	4.7	10	47	100	470	1000	4700	47000

(4) Capacitance Tolerance

Code	J	Q	R	K	V	M	H
%	± 5	+30 / -10	+20 / -0	± 10	+20 / -10	± 20	+20 / -5

(5) Lead Type

Code	N	C	B	D	F	L	T	R	S	E	P
Description	Long Lead	Cutting	Kink & Cutting	Forming & Cutting							Taping
Drawing	---	Fig 1	Fig 2	Fig 3	Fig 4	Fig 5	Fig 6	Fig 7	Fig 8	Fig 9	Fig 10

(6) Lead Length (Cut / Formed lead)

Code	Z	2	B	E	G	M	3	T	C	D	4	5	6
Length	2.0	2.5	2.8	3.1	3.3	3.5	3.5	3.8	3.8	4.0	4.5	5.0	6.3
Tolerance	+0.3/-0.2						±0.5	±0.3	±0.5				
Code	7	I	8	J	9	K	A	L	F	S	H	Q	N
Length	7.0	7.5	8.0	8.5	9.0	9.5	10	10.5	14.8	1.0	12	3.6	⊕19mm min
Tolerance	±0.5								±0.3		±1.0	+0.3/-0.2	⊖15mm min

Taping Code

Code	Z	2	3	5	I
Lead Pitch:+0.8/-0.2	2.0	2.5	3.5	5.0	7.5

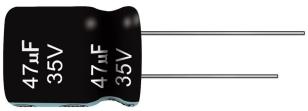
(7) Case Dimension

Code	0407	0511	6311	08B5	10C5	1016	1225	16N3	16P1	18N3	18P1	1840
Size	04x07	05x11	6.3x11	08x11.5	10x12.5	10x16	12.5x25	16x31.5	16x35.5	18x31.5	18x35.5	18x40

(8) Special Request

Code	R	F	L	D
Description	High Rated ripple current	Endurance	Low Leakage Current	Low Dissipation Factor
Code	H	E	P	---
Description	High Temperature	Low Impedance & ESR	PET Sleeve	---

SS & SS-H Series

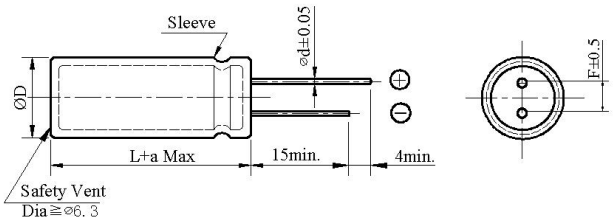


- **Standard miniature series with 7mm height at 85 ℃ &105℃**

◆ SPECIFICATIONS

Item	Performance Characteristics							
Series	SS					SS-H		
Category Temperature Range	-40 ~ +85℃					-40 ~ +105℃		
Working Voltage Range	6.3 ~ 63 Vdc							
Capacitance Range	0.1 ~ 330 μF							
Capacitance Tolerance	±20% (at 25℃ and 120Hz)							
Dissipation Factor (tanδ) (at 25℃, 120Hz)	Rated Voltage (V) / tanδ(Max): 6.3 / 0.24; 10 / 0.20; 16 / 0.16; 25 / 0.14; 35 / 0.12; 50 / 0.10; 63 / 0.10 The above values should be increased by 0.02 for every additional 1000μF							
Leakage Current	I=0.01CV or 3μA whichever is greater I : Leakage current (μA) C : Rated capacitance (μF) V : Rated voltage (V) Impress the rated voltage for 2 minutes							
Low Temperature Characteristics Impedance Ratio(MAX)	Rated voltage (V) / Z(-40℃)/Z(+20℃): 6.3 / 10; 10 / 8; 16 / 6; 25 / 4; 35 / 4; 50 / 3; 63 / 3 (at 120Hz)							
Endurance	The following requirements shall be satisfied when the capacitor are restored to 25℃ after the rated voltage applied for 1,000 hours at 85℃(SS), or 1,000 hours at 105℃(SS-H). Capacitance change: ≦ ±25% of the initial value Dissipation factor(tanδ): ≦ 200% of the specified value Leakage current: ≦ specified value							
Shelf Life	The following requirements shall be satisfied when the capacitor are restored to 25℃ after the rated voltage applied for 500 hours at 85℃(SS), or 500 hours at 105℃(SS-H) without voltage applied. Capacitance change: ≦ ±25% of the initial value Dissipation factor(tanδ): ≦ 200% of the specified value Leakage current: ≦ 200% of the specified value							
Others	Conforms to JIS-C-5101-4 (1998), characteristic W							

◆ DIMENSIONS (mm)



ΦD	4	5	6.3	8×7
ΦD	ΦD + 0.5 Max			
Φd	0.45	0.45	0.45	0.45
F	1.5	2.0	2.5	3.5
a	L + 1.0 Max			

◆ PART NUMBER SYSTEM(Example : 35V 22μF)

S	S	1	V	2	2	0	M	N	N	0	5	0	7						

- Special Request
- Size code(0507 : 5×7)
- Lead length code
- Lead forming Type code
- Capacitance tolerance code(M:±20%)
- Capacitance code (22μF)
- Voltage code (35V)
- Series code (SS)

SS Series

◆ **Case size & Permissible rated ripple current: (mA rms) at 85℃ / 120Hz**

uF \ Vdc	6.3		10		16		25	
	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC
0.1								
0.22								
0.33								
0.47								
1.0								
2.2								
3.3								
4.7							4×7	24
10					4×7	28	4×7	30
22	4×7	34	4×7	38	4×7	39	4×7	46
33	4×7	40	4×7	41	4×7	45	5×7	57
47	4×7	44	4×7	47	5×7	61	6.3×7	66
100	5×7	69	5×7	73	6.3×7	92	8×7	95
220	6.3×7	120	6.3×7	125	8×7	138		
330	8×7	150	8×7	155				

uF \ Vdc	35		50		63	
	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC
0.1			4×7	2	4×7	4
0.22			4×7	2	4×7	4
0.33			4×7	3.5	4×7	4
0.47			4×7	5	4×7	6
1.0			4×7	10	4×7	13
2.2			4×7	19	4×7	21
3.3			4×7	24	4×7	26
4.7	4×7	24	4×7	26	5×7	33
10	5×7	32	5×7	40	6.3×7	45
22	5×7	51	6.3×7	60	8×7	68
33	6.3×7	60	8×7	62		
47	6.3×7	72	8×7	75		
100	8×7	98				

◆ **RIPPLE CURRENT MULTIPLIERS**

Frequency Multipliers

Vdc	Frequency (Hz)				
	60	120	1K	10K	100K
6.3 ~ 25	0.75	1.00	1.10	1.13	1.20
35 ~ 63	0.80	1.00	1.15	1.20	1.25

SS-H Series

◆ **Case size & Permissible rated ripple current: (mA rms) at 105℃ / 120Hz**

Vdc / uF	6.3		10		16		25	
	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC
0.1								
0.22								
0.33								
0.47								
1.0								
2.2								
3.3								
4.7							4×7	15
10					4×7	28	4×7	29
22	4×7	34	4×7	35	4×7	37	4×7	45
33	4×7	39	4×7	40	4×7	42	5×7	47
47	4×7	40	4×7	41	5×7	60	6.3×7	61
100	5×7	65	5×7	70	6.3×7	90	8×7	92
220	6.3×7	100	6.3×7	102	8×7	105		
330	8×7	130	8×7	135				

Vdc / uF	35		50		63	
	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC
0.1			4×7	1	4×7	1
0.22			4×7	2	4×7	2
0.33			4×7	3	4×7	4
0.47			4×7	5	4×7	6
1.0			4×7	10	4×7	13
2.2			4×7	19	4×7	21
3.3			4×7	24	4×7	26
4.7	4×7	20	4×7	29	5×7	33
10	5×7	30	5×7	32	6.3×7	35
22	5×7	47	6.3×7	50	8×7	52
33	6.3×7	52	8×7	62		
47	6.3×7	62	8×7	70		
100	8×7	93				

◆ **RIPPLE CURRENT MULTIPLIERS**

Frequency Multipliers

Vdc	Frequency (Hz)				
	60	120	1K	10K	100K
6.3 ~ 25	0.75	1.00	1.10	1.13	1.20
35 ~ 63	0.80	1.00	1.15	1.20	1.25

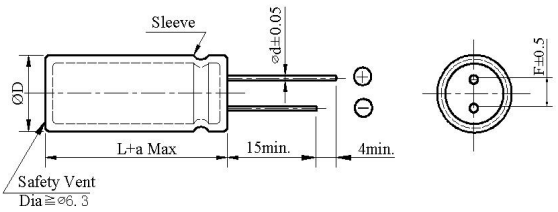
SB & SB-H Series

- **Standard miniature series with 5mm height at 85 ℃ &105℃**

◆ SPECIFICATIONS

Item	Performance Characteristics							
Series	SB						SB-H	
Category Temperature Range	-40 ~ +85℃						-40 ~ +105℃	
Working Voltage Range	4 ~ 50 Vdc							
Capacitance Range	0.1 ~ 470 μF							
Capacitance Tolerance	±20% (at 25℃ and 120Hz)							
Dissipation Factor (tanδ) (at 25℃, 120Hz)	Rated Voltage (V)	4	6.3	10	16	25	35	50
	tanδ(Max)	0.37	0.28	0.22	0.18	0.16	0.14	0.12
Leakage Current	I=0.01CV or 3μA whichever is greater I : Leakage current (μA) C : Rated capacitance (μF) V : Rated voltage (V) Impress the rated voltage for 2 minutes							
Low Temperature Characteristics Impedance Ratio(MAX)	Rated voltage (V)	4	6.3	10	16	25	35	50
	Z(-40℃)/Z(+20℃)	15	8	8	6	4	4	3
	(at 120Hz)							
Endurance	The following requirements shall be satisfied when the capacitor are restored to 25℃ after the rated voltage applied for 1,000 hours at 85℃(SB), or 1,000 hours at 105℃(SB-H). Capacitance change: ≦ ±25% of the initial value (4V:≦ ±30%) Dissipation factor(tanδ): ≦ 200% of the specified value Leakage current: ≦ specified value							
Shelf Life	The following requirements shall be satisfied when the capacitor are restored to 25℃ after the rated voltage applied for 500 hours at 85℃(SB), or 500 hours at 105℃(SB-H) without voltage applied. Capacitance change: ≦ ±25% of the initial value Dissipation factor(tanδ): ≦ 200% of the specified value Leakage current: ≦ 200% of the specified value							
Others	Conforms to JIS-C-5101-4 (1998), characteristic W							

◆ DIMENSIONS (mm)



ΦD	4	5	6.3	8×5
ΦD	ΦD + 0.5 Max			
Φd	0.45	0.45	0.45	0.45
F	1.5	2.0	2.5	3.5
a	L + 1.0 Max			

◆ PART NUMBER SYSTEM(Example : 50V 0.47μF)

S	B	1	H	R	4	7	M	N	N	0	4	0	5						

Special Request
Size code(0405 : 4×5)
Lead length code
Lead forming Type code
Capacitance tolerance code(M:±20%)
Capacitance code (0.47μF)
Voltage code (50V)
Series code (SB)

SB Series

◆ **Case size & Permissible rated ripple current (mA rms) at 85℃/120Hz**

Vdc / uF	4		6.3		10		16	
	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC
0.1								
0.22								
0.33								
0.47								
1.0								
2.2								
3.3								
4.7								
10								
22							4×5	32
33					5×5	38	5×5	42
47	5×5	35	5×5	41	5×5	45	6.3×5	58
100	6.3×5	63	6.3×5	70	6.3×5	73	6.3×5	80
220	6.3×5	70	6.3×5	95	8×5	120	8×5	125
330	8×5	80	8×5	150				
470	8×5	150						

Vdc / uF	25		35		50	
	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC
0.1					4×5	1
0.22					4×5	2
0.33					4×5	2.8
0.47					4×5	4
1.0					4×5	8.4
2.2					4×5	13
3.3					4×5	17
4.7			4×5	18	5×5	20
10	4×5	24	5×5	29	6.3×5	33
22	5×5	37	6.3×5	46	8×5	55
33	6.3×5	45	6.3×5	50	8×5	65
47	6.3×5	60	8×5	68		
100	8×5	90				

◆ **RIPPLE CURRENT MULTIPLIERS**

Frequency Multipliers

Vdc	Frequency (Hz)				
	60	120	1K	10K	100K
4 ~ 25	0.75	1.00	1.10	1.13	1.20
35 ~ 50	0.80	1.00	1.15	1.20	1.25

SB-H Series

◆ **Case size & Permissible rated ripple current: (mA rms) at 105℃ / 120Hz**

Vdc / uF	4		6.3		10		16	
	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC
0.1								
0.22								
0.33								
0.47								
1.0								
2.2								
3.3								
4.7								
10								
22							4×5	22
33					5×5	33	5×5	37
47	5×5	30	5×5	32	5×5	35	6.3×5	50
100	6.3×5	60	6.3×5	60	6.3×5	62	6.3×5	65
220	6.3×5	65	6.3×5	72	8×5	92	8×5	96
330	8×5	70	8×5	105				
470	8×5	105						

Vdc / uF	25		35		50	
	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC
0.1					4×5	0.8
0.22					4×5	1.6
0.33					4×5	2.2
0.47					4×5	3.5
1.0					4×5	6.0
2.2					4×5	11
3.3					4×5	14
4.7			4×5	15	5×5	18
10	4×5	18	5×5	22	6.3×5	28
22	5×5	25	6.3×5	38	8×5	42
33	6.3×5	40	6.3×5	45		
47	6.3×5	54	8×5	60		
100	8×5	70				

◆ **RIPPLE CURRENT MULTIPLIERS**

Frequency Multipliers

Vdc	Frequency (Hz)				
	60	120	1K	10K	100K
4 ~ 25	0.75	1.00	1.10	1.13	1.20
35 ~ 50	0.80	1.00	1.15	1.20	1.25

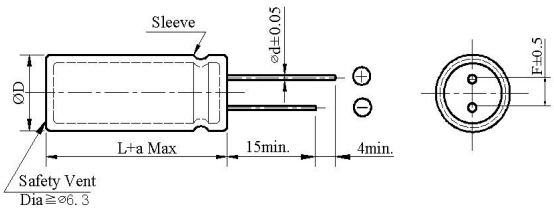
SF Series

- **Load life: 105℃ 2,000 hours, 7mm height**
- **Design for space-saving and high density insertion**
- **Applications: VTR, car radio, car stereos, charger, et**

◆ SPECIFICATIONS

Item	Performance Characteristics
Category Temperature Range	-40 ~ +105℃
Working Voltage Range	6.3 ~ 63Vdc
Capacitance Range	0.1 ~ 220 μF
Capacitance Tolerance	±20% (at 25℃ and 120Hz)
Dissipation Factor (tanδ) (at 25℃, 120Hz)	Rated Voltage (V): 6.3 / 10 / 16 / 25 / 35 / 50 / 63 tanδ(Max): 0.24 / 0.20 / 0.16 / 0.14 / 0.12 / 0.10 / 0.09
Leakage Current	I≦0.01CV or 3 μA I : Leakage current (μA) C : Rated capacitance (μF) V : Rated voltage (V) Impress the rated voltage for 1 minute
Low Temperature Characteristics Impedance Ratio(MAX)	Rated voltage (V): 6.3 / 10 / 16 / 25 / 35 / 50 / 63 Z(-40℃)/Z(+20℃): 10 / 6 / 5 / 4 / 4 / 3 / 3 (at 120Hz)
Endurance	The following requirements shall be satisfied when the capacitor are restored to 25℃ after the rated voltage applied for 2,000 hours at 105℃. Capacitance change: ≦ ±20% of the initial value Dissipation factor(tanδ): ≦ 200% of the specified value Leakage current: ≦ specified value
Shelf Life	The following requirements shall be satisfied when the capacitor are restored to 25℃ after the rated voltage applied for 1,000 hours at 105℃ without voltage applied. Capacitance change: ≦ ±20% of the initial value Dissipation factor(tanδ): ≦ 200% of the specified value Leakage current: ≦ 200% of the specified value
Others	Conforms to JIS-C-5101-4 (1998), characteristic W

◆ DIMENSIONS (mm)



ΦD	4	5	6.3	8×7
ΦD	ΦD + 0.5 Max			
Φd	0.45			
F	1.5	2.0	2.5	3.5
a	L + 1.0 Max			

◆ PART NUMBER SYSTEM(Example : 6.3V 100μF)

S	F	0	J	1	0	1	M	N	N	6	3	0	7						

- Special Request
- Size code (6307 : 6.3×7)
- Lead length code
- Lead forming Type code
- Capacitance tolerance code(M:±20%)
- Capacitance code (100μF)
- Voltage code (6.3V)
- Series code (SF)

SF Series

◆ **Case size & Permissible rated ripple current: (mA rms) at 105℃ / 120Hz**

Vdc / uF	6.3		10		16		25	
	ΦD × L	RC	ΦD × L	RC	ΦD × L	RC	ΦD × L	RC
4.7							4×7	17
6.8					4×7	16	4×7	19
10					4×7	28	4×7	28
							5×7	33
15			4×7	26	4×7	30	5×7	35
22	4×7	28	4×7	32	4×7	35	5×7	43
					5×7	42	6.3×7	45
33	4×7	32	5×7	48	5×7	50	6.3×7	62
	5×7	35						
47	5×7	47	5×7	51	6.3×7	67	8×7	75
68	5×7	50	6.3×7	68	6.3×7	70	8×7	80
					8×7	78		
100	6.3×7	75	6.3×7	80	8×7	110	8×7	115
			8×7	95				
220	8×7	92	8×7	130				

Vdc / uF	35		50		63	
	ΦD × L	RC	ΦD × L	RC	ΦD × L	RC
0.1			4×7	1.5	4×7	1.5
0.15			4×7	1.8	4×7	1.8
0.22			4×7	2.5	4×7	2.5
0.33			4×7	3.5	4×7	3.5
0.47			4×7	5	4×7	6
0.68			4×7	7	4×7	7
1			4×7	10	4×7	12
1.5			4×7	13	4×7	14
2.2			4×7	20	4×7	20
3.3			4×7	26	5×7	28
4.7	4×7	22	4×7	27	5×7	29
			5×7	29	6.3×7	33
6.8	4×7	24	5×7	32	6.3×7	35
	5×7	28	6.3×7	33		
10	5×7	35	6.3×7	38	6.3×7	40
15	5×7	38	6.3×7	52	8×7	55
	6.3×7	45				
22	6.3×7	60	8×7	63	8×7	65
33	6.3×7	50	8×7	78		
	8×7	68				
47	8×7	80				
68	8×7	85				

◆ **RIPPLE CURRENT MULTIPLIERS**

Frequency Multipliers

Vdc	Cap(uF)	Frequency (Hz)					
		50/60	120	400	1K	10K	50K-100K
6.3 ~ 63	CAP ≦ 10	0.80	1.00	1.30	1.45	1.65	1.70
	100< CAP ≦220	0.80	1.00	1.23	1.36	1.36	1.53

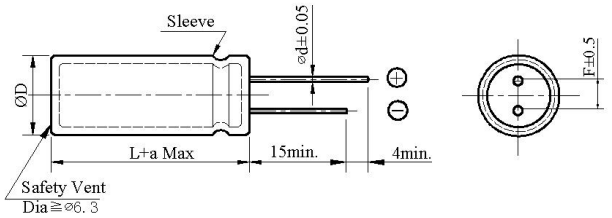
LK Series

- **Downsize and high ripple current**
- **Load life: 4,000 hours at 105℃**

◆ SPECIFICATIONS

Item	Performance Characteristics
Category Temperature Range	-25 ~ +105℃
Working Voltage Range	160 ~ 200Vdc
Capacitance Range	22 ~ 39 μF
Capacitance Tolerance	±20% (at 25℃ and 120Hz)
Dissipation Factor (tanδ) (at 25℃, 120Hz)	Rated Voltage (V): 160 / 200; tanδ(Max): 0.15 / 0.15 The above values should be increased by 0.02 for every additional 1000μF
Leakage Current	I=0.03CV+10uA I : Leakage current (μA) C : Rated capacitance (μF) V : Rated voltage (V) Impress the rated voltage for 2 minutes
Low Temperature Characteristics Impedance Ratio(MAX)	Rated voltage (V): 160 / 200; Z(-25℃)/Z(+20℃): 3 / 3 (at 120Hz)
Endurance	The following requirements shall be satisfied when the capacitor are restored to 25℃ after the rated voltage applied for 4,000 hours at 105℃. Capacitance change: ≦ ±20% of the initial value Dissipation factor(tanδ): ≦ 200% of the specified value Leakage current: ≦ specified value
Shelf Life	The following requirements shall be satisfied when the capacitor are restored to 25℃ after exposing them for 1,000 hours at 105℃ without voltage applied. Capacitance change: ≦ ±20% of the initial value Dissipation factor(tanδ): ≦ 200% of the specified value Leakage current: ≦ 200% of the specified value
Others	Conforms to JIS-C-5101-4 (1998), characteristic W

◆ DIMENSIONS (mm)



ΦD	12.5 × 12
ΦD	ΦD + 0.5 Max
Φd	0.6
F	5.0
a	L + 1.0 Max

◆ PART NUMBER SYSTEM(Example : 160V 33μF)

L	K	2	C	3	3	0	M	N	N	1	2	1	2						

Special Request
Size code(1212 : 12.5×12)
Lead length code
Lead forming Type code
Capacitance tolerance code(M:±20%)
Capacitance code (33μF)
Voltage code (160V)
Series code (LK)

LK Series

◆ **Case size & Permissible rated ripple current: (mA rms) at 105℃ / 120Hz**

Nominal capacitance (uF)	160V		200V	
	ΦD×L	RC	ΦD×L	RC
22			12.5×12	250
27			12.5×12	270
33	12.5×12	180		
39	12.5×12	200		

◆ **RIPPLE CURRENT MULTIPLIERS**

Frequency Multipliers

Vdc	Cap(uF)	Frequency (Hz)				
		50/60	120	1K	10K	100K
160 ~ 200	22 ~ 39	0.80	1.00	1.40	1.40	1.40

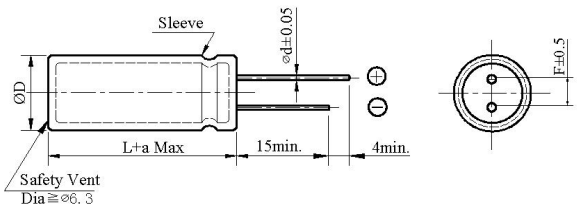
EM Series

- **Low impedance, high ripple current and miniature size with 7 to 9 mm height**

◆ SPECIFICATIONS

Item	Performance Characteristics
Category Temperature Range	-40 ~ +105℃
Working Voltage Range	6.3 ~ 35Vdc
Capacitance Range	33 ~ 470 μF
Capacitance Tolerance	±20% (at 25℃ and 120Hz)
Dissipation Factor (tanδ) (at 25℃, 120Hz)	Rated Voltage (V): 6.3 / 10 / 16 / 25 / 30 / 35 tanδ(Max): 0.24 / 0.20 / 0.16 / 0.14 / 0.14 / 0.14
Leakage Current	I=0.01CV or 3 μA, whichever is greater I : Leakage current (μA) C : Rated capacitance (μF) V : Rated voltage (V) Impress the rated voltage for 2 minutes
Low Temperature Characteristics Impedance Ratio(MAX)	Rated voltage (V): 6.3 / 10 / 16 / 25 / 30 / 35 Z(-40℃)/Z(+20℃): 8 / 6 / 6 / 5 / 4 / 4 (at 120Hz)
Endurance	The following requirements shall be satisfied when the capacitor are restored to 25℃ after the rated voltage applied for 1,000~2,000 hours at 105℃. Capacitance change: ≦ ±25% of the initial value (6.3V、10V:≦±30%) Dissipation factor(tanδ): ≦ 200% of the specified value Leakage current: ≦ specified value Size ≦6.3Φ: Life time 1,000 hours Size ≧ 8 Φ: Life time 2,000 hours
Shelf Life	The following requirements shall be satisfied when the capacitor are restored to 25℃ after the rated voltage applied for 500 hours at 105℃ without voltage applied. Capacitance change: ≦ ±25% of the initial value (6.3V、10V:≦±30%) Dissipation factor(tanδ): ≦ 200% of the specified value Leakage current: ≦ 200% of the specified value
Others	Conforms to JIS-C-5101-4 (1998), characteristic W

◆ DIMENSIONS (mm)



ΦD	8 × 7	8 × 9
ΦD	ΦD + 0.5 Max	
Φd	0.45	0.50
F	3.5	
a	L + 1.0 Max	

◆ PART NUMBER SYSTEM(Example : 25V 220μF)

E	M	1	E	2	2	1	M	N	N	0	8	0	9						

- Special Request
- Size code(0809 : 8×9)
- Lead length code
- Lead forming Type code
- Capacitance tolerance code(M:±20%)
- Capacitance code (220μF)
- Voltage code (25V)
- Series code (EM)

EM Series

◆ **Case size & Permissible rated ripple current**

Nominal Capacitance (uF)	6.3V			10V			16V		
	Case size ΦD×L (mm)	Impedance @20℃ (Ωmax/100kHz)	Max. Rated ripple current @105℃ 100kHz (mA rms)	Case size ΦD×L (mm)	Impedance @20℃ (Ωmax/100kHz)	Max. Rated ripple current @105℃ 100kHz (mA rms)	Case size ΦD×L (mm)	Impedance @20℃ (Ωmax/100kHz)	Max. Rated ripple current @105℃ 100kHz (mA rms)
100							8×7	0.240	330
150	8×7	0.230	305	8×7	0.210	315	8×7	0.150	385
220	8×7	0.150	380	8×7	0.140	390	8×7	0.130	405
330	8×7	0.140	405	8×9	0.130	465	8×9	0.120	505
470	8×9	0.130	465	8×9	0.120	480	8×9	0.110	535

Nominal Capacitance (uF)	25V			30V			35V		
	Case size ΦD×L (mm)	Impedance @20℃ (Ωmax/100kHz)	Max. Rated ripple current @105℃ 100kHz (mA rms)	Case size ΦD×L (mm)	Impedance @20℃ (Ωmax/100kHz)	Max. Rated ripple current @105℃ 100kHz (mA rms)	Case size ΦD×L (mm)	Impedance @20℃ (Ωmax/100kHz)	Max. Rated ripple current @105℃ 100kHz (mA rms)
33	8×7	0.360	215				8×7	0.300	250
47	8×7	0.280	250				8×7	0.230	310
56	8×7	0.230	310				8×7	0.160	380
68	8×7	0.190	330				8×7	0.150	400
100	8×7	0.150	380				8×7	0.140	420
150	8×7	0.140	465	8×7	0.130	680	8×9	0.120	700
180	8×9	0.120	760	8×9	0.110	765			
220	8×9	0.100	800						

◆ **RIPPLE CURRENT MULTIPLIERS**

Frequency Multipliers

Vdc	Cap(uF)	Frequency (Hz)			
		120	1K	10K	100K ≤ 200K
6.3 ~ 35	33 ~ 82	0.50	0.80	0.98	1.00
	100 ~ 470	0.55	0.85	0.95	1.00

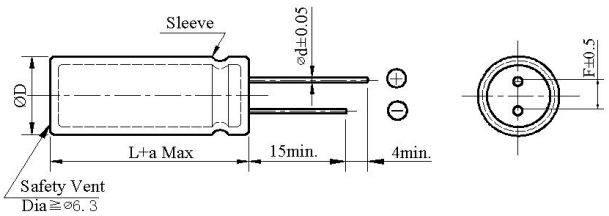
ER Series

- **Low impedance, high ripple current and miniature size with 7 to 9 mm height**

◆ SPECIFICATIONS

Item	Performance Characteristics
Category Temperature Range	-40 ~ +105℃
Working Voltage Range	6.3 ~ 35Vdc
Capacitance Range	33 ~ 470 μF
Capacitance Tolerance	±20% (at 25℃ and 120Hz)
Dissipation Factor (tanδ) (at 25℃, 120Hz)	Rated Voltage (V): 6.3 / 10 / 16 / 25 / 35 tanδ(Max): 0.24 / 0.20 / 0.16 / 0.14 / 0.14
Leakage Current	I=0.01CV or 3 μA, whichever is greater I : Leakage current (μA) C : Rated capacitance (μF) V : Rated voltage (V) Impress the rated voltage for 2 minutes
Low Temperature Characteristics Impedance Ratio(MAX)	Rated voltage (V): 6.3 / 10 / 16 / 25 / 35 Z(-40℃)/Z(+20℃): 8 / 6 / 6 / 5 / 4 (at 120Hz)
Endurance	The following requirements shall be satisfied when the capacitor are restored to 25℃ after the rated voltage applied for 3,000 hours at 105℃. Capacitance change: ≦ ±25% of the initial value(6.3V、10V:≦±30%) Dissipation factor(tanδ): ≦ 200% of the specified value Leakage current: ≦ specified value
Shelf Life	The following requirements shall be satisfied when the capacitor are restored to 25℃ after the rated voltage applied for 500 hours at 105℃ without voltage applied. Capacitance change: ≦ ±25% of the initial value(6.3V、10V:≦±30%) Dissipation factor(tanδ): ≦ 200% of the specified value Leakage current: ≦ 200% of the specified value
Others	Conforms to JIS-C-5101-4 (1998), characteristic W

◆ DIMENSIONS (mm)



ΦD	8×7	8×9
ΦD	ΦD + 0.5 Max	
dΦ	0.45	0.50
F	3.5	
a	L+ 1.0 Max	

◆ PART NUMBER SYSTEM(Example : 25V 220μF)

E	R	1	E	2	2	1	M	N	N	0	8	0	9						

- Special Request
- Size code(0809 : 8×9)
- Lead length code
- Lead forming Type code
- Capacitance tolerance code(M:±20%)
- Capacitance code (220μF)
- Voltage code (25V)
- Series code (ER)

ER Series

◆ **Case size & Permissible rated ripple current**

Nominal Capacitance (uF)	6.3V			10V			16V		
	Case size ΦD×L (mm)	Impedance @20℃ (Ωmax/100kHz)	Max. Rated ripple current @105℃ 100kHz (mA rms)	Case size ΦD×L (mm)	Impedance @20℃ (Ωmax/100kHz)	Max. Rated ripple current @105℃ 100kHz (mA rms)	Case size ΦD×L (mm)	Impedance @20℃ (Ωmax/100kHz)	Max. Rated ripple current @105℃ 100kHz (mA rms)
100							8×7	0.240	330
150	8×7	0.230	305	8×7	0.210	315	8×7	0.150	385
220	8×7	0.150	380	8×7	0.140	390	8×7	0.130	405
330	8×7	0.140	405	8×9	0.130	465	8×9	0.120	505
470	8×9	0.130	465	8×9	0.120	480	8×9	0.110	535

Nominal Capacitance (uF)	25V			30V			35V		
	Case size ΦD×L (mm)	Impedance @20℃ (Ωmax/100kHz)	Max. Rated ripple current @105℃ 100kHz (mA rms)	Case size ΦD×L (mm)	Impedance @20℃ (Ωmax/100kHz)	Max. Rated ripple current @105℃ 100kHz (mA rms)	Case size ΦD×L (mm)	Impedance @20℃ (Ωmax/100kHz)	Max. Rated ripple current @105℃ 100kHz (mA rms)
33	8×7	0.360	215				8×7	0.300	250
47	8×7	0.280	250				8×7	0.230	310
56	8×7	0.230	310				8×7	0.160	380
68	8×7	0.190	330				8×7	0.150	400
100	8×7	0.150	380				8×7	0.140	420
150	8×7	0.140	465	8×7	0.130	680	8×9	0.120	700
180	8×9	0.120	760	8×9	0.110	765			
220	8×9	0.100	800						

◆ **RIPPLE CURRENT MULTIPLIERS**

Frequency Multipliers

Vdc	Cap(uF)	Frequency (Hz)			
		120	1K	10K	100K ≤ 200K
6.3 ~ 35	33 ~ 82	0.50	0.80	0.98	1.00
	100 ~ 470	0.55	0.85	0.95	1.00

ALUMINUM ELECTROLYTIC CAPACITORS

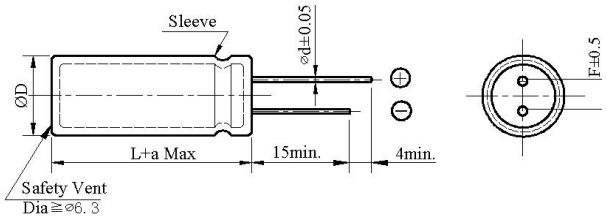
EH Series

- **Low impedance and High ripple current.**
- **Load life 3,000~4,000 hours at 105℃**

◆ SPECIFICATIONS

Item	Performance Characteristics
Category Temperature Range	-55~ +105℃
Working Voltage Range	10 ~ 35Vdc
Capacitance Range	150 ~820 μF
Capacitance Tolerance	±20% (at 25℃ and 120Hz)
Dissipation Factor (tanδ) (at 25℃, 120Hz)	Rated Voltage (V): 10 / 16 / 25 / 35 tanδ(Max): 0.19 / 0.16 / 0.14 / 0.12 The above values should be increased by 0.02 for every additional 1000μF
Leakage Current	I=0.01CV or 3μA whichever is greater I : Leakage current (μA) C : Rated capacitance (μF) V : Rated voltage (V) Impress the rated voltage for 2 minutes
Low Temperature Characteristics Impedance Ratio(MAX)	Rated voltage (V): 10 / 16 / 25 / 35 Z(-55℃)/Z(+20℃): 3 / 3 / 3 / 3 (at 120Hz)
Endurance	The following requirements shall be satisfied when the capacitor are restored to 25℃ after the rated voltage applied for 3,000 to 4,000 hours at 105℃. Capacitance change: ≦ ±25% of the initial value Dissipation factor(tanδ): ≦ 200% of the specified value Leakage current: ≦ specified value Size / Life time (hours): 10Φ / 3,000; 12.5Φ / 4,000
Shelf Life	The following requirements shall be satisfied when the capacitor are restored to 25℃ after exposing them for 1,000 hours at 105℃ without voltage applied. Capacitance change: ≦ ±25% of the initial value Dissipation factor(tanδ): ≦ 200% of the specified value Leakage current: ≦ 200% of the specified value
Others	Conforms to JIS-C-5101-4 (1998), characteristic W

◆ DIMENSIONS (mm)



ΦD	10×9	12.5×9
ΦD	ΦD + 0.5 Max	
Φd	0.6	0.6
F	5.0	5.0
a	L + 1.0 Max	

◆ PART NUMBER SYSTEM(Example : 10V 820μF)

E	H	1	A	8	2	1	M	N	N	1	2	0	9						

Special Request
Size code(1209 : 12.5×09)
Lead length code
Lead forming Type code
Capacitance tolerance code(M:±20%)
Capacitance code (820μF)
Voltage code (10V)
Series code (EH)

EH Series

◆ **Case size & Permissible rated ripple current**

Nominal capacitance (uF)	10V		16V		25V		35V	
	Case size ΦD×L (mm)	Max. Rated ripple current @105℃ 100kHz (mA rms)	Case size ΦD×L (mm)	Max. Rated ripple current @105℃ 100kHz (mA rms)	Case size ΦD×L (mm)	Max. Rated ripple current @105℃ 100kHz (mA rms)	Case size ΦD×L (mm)	Max. Rated ripple current @105℃ 100kHz (mA rms)
150							10×9	630
220							12.5×9	750
270					10×9	630		
390			10×9	640	12.5×9	700		
560	10×9	600	12.5×9	720				
820	12.5×9	750						

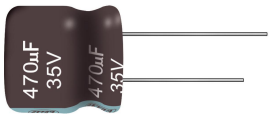
◆ **RIPPLE CURRENT MULTIPLIERS**

Frequency Multipliers

Vdc	Cap(uF)	Frequency (Hz)				
		50/60	120	1K	10K	100K
10 ~ 35	150 ~ 270	0.30	0.50	0.80	0.95	1.00
	390 ~ 820	0.57	0.71	0.90	0.98	1.00

EP Series

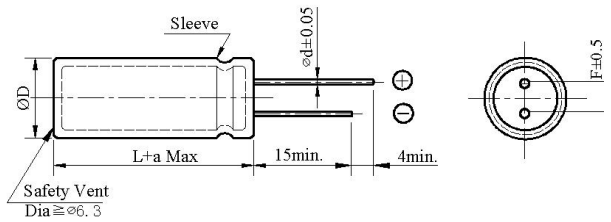
- **Miniaturized, Low ESR and Low impedance**
- **Suitable for use in high ripple current capability**
- **Load life 4,000 hours at 105℃**



◆ SPECIFICATIONS

Item	Performance Characteristics
Category Temperature Range	-40 ~ +105℃
Working Voltage Range	10 ~ 100Vdc
Capacitance Range	68 ~1,800 μF
Capacitance Tolerance	±20% (at 25℃ and 120Hz)
Dissipation Factor (tanδ) (at 25℃, 120Hz)	Rated Voltage (V): 10 / 16 / 25 / 35 / 100 tanδ(Max): 0.19 / 0.16 / 0.14 / 0.12 / 0.08 The above values should be increased by 0.02 for every additional 1000μF
Leakage Current	I=0.01CV or 3μA whichever is greater I : Leakage current (μA) C : Rated capacitance (μF) V : Rated voltage (V) Impress the rated voltage for2 minutes
Low Temperature Characteristics Impedance Ratio(MAX)	Rated voltage (V): 10 / 16 / 25 / 35 / 100 Z(-40℃)/Z(+20℃): 6 / 6 / 5 / 4 / 3 (at 120Hz)
Endurance	The following requirements shall be satisfied when the capacitor are restored to 25℃ after the rated voltage applied for 4,000 hours at 105℃. Capacitance change: ≦ ±25% of the initial value Dissipation factor(tanδ): ≦ 200% of the specified value Leakage current: ≦ specified value
Shelf Life	The following requirements shall be satisfied when the capacitor are restored to 25℃ after exposing them for 500 hours at 105℃ without voltage applied. Capacitance change: ≦ ±25% of the initial value Dissipation factor(tanδ): ≦ 200% of the specified value Leakage current: ≦ 200% of the specified value
Others	Conforms to JIS-C-5101-4 (1998), characteristic W

◆ DIMENSIONS (mm)



ΦD	12.5×12
ΦD	ΦD + 0.5 Max
Φd	0.6
F	5.0
a	L + 1.0 Max

◆ PART NUMBER SYSTEM(Example : 35V 470μF)

E	P	1	V	4	7	1	M	N	N	1	2	1	2						

- Special Request
- Size code(1212 : 12.5×12)
- Lead length code
- Lead forming Type code
- Capacitance tolerance code(M:±20%)
- Capacitance code (470μF)
- Voltage code (35V)
- Series code (EP)

EP Series

◆ **Case size & Permissible rated ripple current**

Nominal Capacitance (uF)	10V		16V		25 V	
	Case Size ΦD×L (mm)	Max. Rated ripple current @105℃ 100kHz (mA rms)	Case Size ΦD×L (mm)	Max. Rated ripple current @105℃ 100kHz (mA rms)	Case Size ΦD×L (mm)	Max. Rated ripple current @105℃ 100kHz (mA rms)
560					12.5×12	1150
680					12.5×12	1200
1000			12.5×12	1300		
1200			12.5×12	1400		
1500	12.5×12	1260				
1800	12.5×12	1300				

Nominal Capacitance (uF)	35V		100 V	
	Case Size ΦD×L (mm)	Max. Rated ripple current @105℃ 100kHz (mA rms)	Case Size ΦD×L (mm)	Max. Rated ripple current @105℃ 100kHz (mA rms)
68			12.5×12	350
82			12.5×12	420
390	12.5×12	1050		
470	12.5×12	1100		

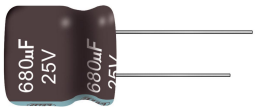
◆ **RIPPLE CURRENT MULTIPLIERS**

Frequency Multipliers

Vdc	Cap(uF)	Frequency (Hz)			
		120	1K	10K	100K
10 ~100	≥68	0.30	0.65	0.85	1.00
	82 ~ 220	0.50	0.70	0.90	1.00
	330 ~ 820	0.60	0.75	0.95	1.00
	1000 ~ 1800	0.70	0.80	0.98	1.00

EC Series

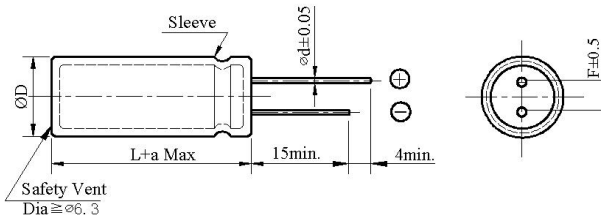
- **Miniaturized, Low ESR and Low impedance**
- **Suitable for use in high ripple current capability**
- **Load life 5,000 hours at 105℃**



◆ SPECIFICATIONS

Item	Performance Characteristics
Category Temperature Range	-40 ~ +105℃
Working Voltage Range	10 ~ 100Vdc
Capacitance Range	68 ~1,800 μF
Capacitance Tolerance	±20% (at 25℃ and 120Hz)
Dissipation Factor (tanδ) (at 25℃, 120Hz)	Rated Voltage (V): 10 / 16 / 25 / 35 / 100 tanδ(Max): 0.19 / 0.16 / 0.14 / 0.12 / 0.08
Leakage Current	I=0.01CV or 3μA whichever is greater I : Leakage current (μA) C : Rated capacitance (μF) V : Rated voltage (V) Impress the rated voltage for 2 minutes
Low Temperature Characteristics Impedance Ratio(MAX)	Rated voltage (V): 10 / 16 / 25 / 35 / 100 Z(-40℃)/Z(+20℃): 6 / 6 / 5 / 4 / 3 (at 120Hz)
Endurance	The following requirements shall be satisfied when the capacitor are restored to 25℃ after the rated voltage applied for 5,000 hours at 105℃. Capacitance change: ≦ ±25% of the initial value Dissipation factor(tanδ): ≦ 200% of the specified value Leakage current: ≦ specified value
Shelf Life	The following requirements shall be satisfied when the capacitor are restored to 25℃ after exposing them for 500 hours at 105℃ without voltage applied. Capacitance change: ≦ ±25% of the initial value Dissipation factor(tanδ): ≦ 200% of the specified value Leakage current: ≦ 200% of the specified value
Others	Conforms to JIS-C-5101-4 (1998), characteristic W

◆ DIMENSIONS (mm)



ΦD	12.5×12
ΦD	ΦD + 0.5 Max
Φd	0.6
F	5.0
a	L + 1.0 Max

◆ PART NUMBER SYSTEM(Example : 35V 470μF)

E	C	1	V	4	7	1	M	N	N	1	2	1	2						

- Special Request
- Size code(1212 : 12.5×12)
- Lead length code
- Lead forming Type code
- Capacitance tolerance code(M:±20%)
- Capacitance code (470μF)
- Voltage code (35V)
- Series code (EC)

EC Series

◆ **Case size & Permissible rated ripple current**

Nominal Capacitance (uF)	10V		16V		25 V	
	Case Size ΦD×L (mm)	Max. Rated ripple current @105℃ 100kHz (mA rms)	Case Size ΦD×L (mm)	Max. Rated ripple current @105℃ 100kHz (mA rms)	Case Size ΦD×L (mm)	Max. Rated ripple current @105℃ 100kHz (mA rms)
560					12.5×12	1150
680					12.5×12	1200
1000			12.5×12	1300		
1200			12.5×12	1400		
1500	12.5×12	1260				
1800	12.5×12	1300				

Nominal Capacitance (uF)	35V		100 V	
	Case Size ΦD×L (mm)	Max. Rated ripple current @105℃ 100kHz (mA rms)	Case Size ΦD×L (mm)	Max. Rated ripple current @105℃ 100kHz (mA rms)
68			12.5×12	350
82			12.5×12	420
390	12.5×12	1050		
470	12.5×12	1100		

◆ **RIPPLE CURRENT MULTIPLIERS**

Frequency Multipliers

Vdc	Cap(uF)	Frequency (Hz)			
		120	1K	10K	100K
10 ~100	≥68	0.30	0.65	0.85	1.00
	82 ~ 220	0.50	0.70	0.90	1.00
	330 ~ 820	0.60	0.75	0.95	1.00
	1000 ~ 1800	0.70	0.80	0.98	1.00

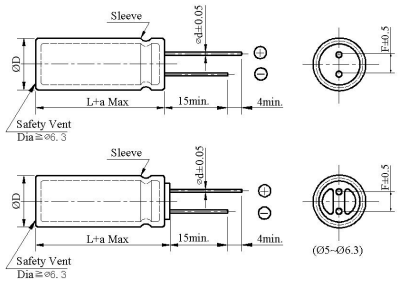
ND&ND-H Series

- **Standard non-polarized type**
- **Suitable for conditions where polarity reverses or where polarity is not constant**
- **ND series 85℃ 2,000Hrs, ND-H series 105℃ 1,000Hrs**

◆ SPECIFICATIONS

Item	Performance Characteristics			
Series	ND		ND-H	
Category Temperature Range	-40 ~ +85℃	-25 ~ +85℃	-40 ~ +105℃	-25 ~ +105℃
Working Voltage Range	6.3 ~ 100 Vdc	160 ~ 250 Vdc	6.3 ~ 100 Vdc	160 ~ 250 Vdc
Capacitance Range	0.47 ~ 2,200 μF	0.47 ~ 100 μF	0.47 ~ 2,200 μF	0.47 ~ 100 μF
Capacitance Tolerance	±20% (at 25℃ and 120Hz)			
Dissipation Factor (tanδ) (at 25℃, 120Hz)	Rated Voltage (V): 6.3 / 10 / 16 / 25 / 35 / 50 / 63 / 100 / 160 ~ 250 tanδ(Max): 0.26 / 0.24 / 0.22 / 0.20 / 0.16 / 0.14 / 0.12 / 0.10 / 0.20 The above values should be increased by 0.02 for every additional 1000μF			
Leakage Current	I=0.03CV or 3μA whichever is greater I : Leakage current (μA) C : Rated capacitance (μF) V : Rated voltage (V) Impress the rated voltage for 2 minutes			
Low Temperature Characteristics Impedance Ratio(MAX)	Rated voltage (V): 6.3 / 10 / 16 / 25 / 35 / 50 / 63 / 100 / 160 ~250 Z(-40℃)/Z(+20℃): 10 / 8 / 6 / 4 / 3 / 3 / 3 / 3 / — Z(-25℃)/Z(+20℃): — / — / — / — / — / — / — / — / 3 (at 120Hz)			
Endurance	The following requirements shall be satisfied when the capacitor are restored to 25℃ after the rated voltage applied for 2,000 hours at 85℃(ND), or 1,000 hours at 105℃(ND-H). During this test rated DC voltage shall be reversed on the capacitor for every 250 hours. Capacitance change: ≦ ±20% of the initial value Dissipation factor(tanδ): ≦ 200% of the specified value Leakage current: ≦ specified value			
Shelf Life	The following requirements shall be satisfied when the capacitor are restored to 25℃ after the rated voltage applied for 1,000 hours at 85℃(ND), or 500 hours at 105℃(ND-H) without voltage applied. Capacitance change: ≦ ±25% of the initial value Dissipation factor(tanδ): ≦ 200% of the specified value Leakage current: ≦ 200% of the specified value			
Others	Conforms to JIS-C-5101-4 (1998), characteristic W			

◆ DIMENSIONS (mm)



ΦD	5	6.3	8	10	12.5	16	18
ΦD	ΦD + 0.5 Max						
Φd	0.5	0.5	0.6	0.6	0.6	0.8	0.8Max
F	2.0	2.5	3.5	5.0	5.0	7.5	7.5
a	L + 1.5 Max				≦ 35 L+1.5Max ≧ 40 L+2.0 Max	L +1.5 Max	

◆ PART NUMBER SYSTEM(Example : 250V 2.2μF)

N	D	2	E	2	R	2	M	N	N	1	0	C	5						

- Special Request
- Size code(10C5 : 10×12.5)
- Lead length code
- Lead forming Type code
- Capacitance tolerance code(M:±20%)
- Capacitance code (2.2μF)
- Voltage code (250V)
- Series code (ND)

ND Series

◆ **Case size & Permissible rated ripple current: (mA rms) at 85℃ / 120Hz**

Vdc / uF	6.3		10		16		25	
	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC
0.47								
1.0								
2.2								
3.3								
4.7								
10					5×11	40	5×11	40
22			5×11	46	5×11	46	5×11	50
33	5×11	64	5×11	64	5×11	70	5×11	77
47	5×11	76	5×11	76	5×11	80	6.3×11	95
100	6.3×11	125	6.3×11	125	6.3×11	130	8×11.5	160
220	6.3×11	160	8×11.5	215	8×11.5	220	10×12.5	295
330	8×11.5	240	8×11.5	240	10×12.5	325	10×16	380
470	8×11.5	250	10×12.5	345	10×16	415	10×20	510
1000	10×16	425	10×20	550	12.5×20	695	12.5×25	710
2200	12.5×20	580	12.5×20	645	16×25	730	16×31.5	845

Vdc / uF	35		50		63		100	
	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC
0.47			5×11	7			5×11	14
1.0			5×11	17			5×11	21
2.2			5×11	25			6.3×11	34
3.3			5×11	27	5×11	28	6.3×11	39
4.7	5×11	34	5×11	34	6.3×11	34	6.3×11	47
10	5×11	40	5×11	40	6.3×11	57	8×11.5	71
22	6.3×11	65	6.3×11	72	8×11.5	82	10×12.5	96
33	6.3×11	90	8×11.5	98	8×11.5	100	10×16	125
47	8×11.5	120	8×11.5	130	10×16	180	12.5×20	240
100	10×12.5	220	10×16	235	10×20	250	12.5×25	285
220	10×20	390	12.5×20	460	12.5×25	490	16×31.5	505
330	12.5×20	505	12.5×25	590	16×25	600		
470	12.5×25	655	16×25	668	16×35.5	720		
1000	16×25	880	16×35.5	975				

Vdc / uF	160		200		250	
	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC
0.47	5×11	7	6.3×11	8	6.3×11	9
1.0	5×11	10	6.3×11	11	6.3×11	13
2.2	6.3×11	16	8×11.5	20	10×12.5	23
3.3	8×11.5	23	10×12.5	29	10×12.5	29
4.7	10×12.5	35	10×16	38	10×16	40
10	10×16	55	12.5×20	70	12.5×20	70
22	12.5×20	105	12.5×25	120	16×25	135
33	12.5×25	110	16×25	165	16×31.5	180
47	16×25	200	16×31.5	220	16×35.5	230
100	18×31.5	275				

◆ **RIPPLE CURRENT MULTIPLIERS**

Frequency Multipliers

Cap(uF)	Frequency (Hz)				
	50/60	120	1K	10K	100K
0.47 ~ 47	0.75	1.00	1.57	1.75	2.00
100 ~ 470	0.80	1.00	1.34	1.40	1.50
1000 ~ 2200	0.85	1.00	1.13	1.13	1.13

ND-H Series

◆ **Case size & Permissible rated ripple current: (mA rms) at 105℃ / 120Hz**

Vdc / uF	6.3		10		16		25	
	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC
0.47								
1.0								
2.2								
3.3								
4.7								
10					5×11	30	5×11	30
22			5×11	35	5×11	35	5×11	38
33	5×11	46	5×11	46	5×11	50	5×11	50
47	5×11	50	5×11	50	5×11	54	6.3×11	68
100	6.3×11	65	6.3×11	68	6.3×11	84	8×11.5	115
220	6.3×11	70	8×11.5	135	8×11.5	140	10×12.5	182
330	8×11.5	135	8×11.5	150	10×12.5	202	10×16	247
470	8×11.5	161	10×12.5	215	10×16	265	10×20	333
1000	10×16	360	10×20	380	12.5×20	475	12.5×25	510
2200	12.5×20	480	12.5×25	500	16×25	625	16×31.5	660

Vdc / uF	35		50		63		100	
	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC
0.47			5×11	5			5×11	10
1.0			5×11	12			5×11	15
2.2			5×11	18			6.3×11	24
3.3			5×11	19	5×11	20	6.3×11	28
4.7	5×11	24	5×11	24	6.3×11	24	6.3×11	34
10	5×11	30	5×11	30	6.3×11	41	8×11.5	51
22	6.3×11	44	6.3×11	45	8×11.5	68	10×12.5	70
33	6.3×11	56	8×11.5	65	10×12.5	69	10×16	95
47	8×11.5	86	8×11.5	80	10×16	130	12.5×20	173
100	10×12.5	142	10×16	150	10×20	165	12.5×25	205
220	10×20	256	12.5×20	280	12.5×25	310	16×31.5	365
330	12.5×20	364	12.5×25	365	16×25	410		
470	12.5×25	472	16×25	450	16×35.5	455		
1000	16×25	560	16×35.5	615				

Vdc / uF	160		200		250	
	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC
0.47	5×11	6	6.3×11	6	6.3×11	6
1.0	5×11	8	6.3×11	8	6.3×11	9
2.2	6.3×11	12	8×11.5	14	10×12.5	17
3.3	8×11.5	17	10×12.5	21	10×12.5	21
4.7	10×12.5	25	10×16	27	10×16	29
10	10×16	40	12.5×20	50	12.5×20	50
22	12.5×20	76	12.5×25	86	16×25	97
33	12.5×25	95	16×25	119	16×31.5	130
47	16×25	144	16×31.5	158	16×35.5	166
100	18×31.5	210				

◆ **RIPPLE CURRENT MULTIPLIERS**

Frequency Multipliers

Cap(uF)	Frequency (Hz)				
	50/60	120	1K	10K	100K
0.47 ~ 47	0.75	1.00	1.57	1.75	2.00
100 ~ 470	0.80	1.00	1.34	1.40	1.50
1000 ~ 2200	0.85	1.00	1.13	1.13	1.13

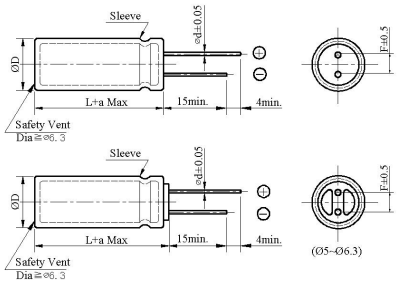
LB & LB-H Series

- **Low leakage current at 85 ℃ &105℃**

◆ SPECIFICATIONS

Item	Performance Characteristics									
Series	LB						LB-H			
Category Temperature Range	-40 ~ +85℃						-40 ~ +105℃			
Working Voltage Range	6.3 ~ 100 Vdc									
Capacitance Range	0.47 ~ 4,700 μF									
Capacitance Tolerance	±20% (at 25℃ and 120Hz)									
Dissipation Factor (tanδ) (at 25℃, 120Hz)	Rated Voltage (V) | 6.3 | 10 | 16 | 25 | 35 | 50 | 63 | 80 | 100 tanδ(Max) | 0.22 | 0.19 | 0.16 | 0.14 | 0.12 | 0.10 | 0.10 | 0.10 | 0.10 The above values should be increased by 0.02 for every additional 1000μF									
Leakage Current	I=0.002CV or 0.4μA whichever is greater I : Leakage current (μA) C : Rated capacitance (μF) V : Rated voltage (V) Impress the rated voltage for 2 minutes									
Low Temperature Characteristics Impedance Ratio(MAX)	Rated voltage (V) | 6.3 | 10 | 16 | 25 | 35 | 50 | 63 | 80 | 100 Z(-40℃)/Z(+20℃) | 12 | 10 | 8 | 5 | 4 | 3 | 3 | 3 | 3 (at 120Hz)									
Endurance	The following requirements shall be satisfied when the capacitor are restored to 25℃ after the rated voltage applied for 2,000 hours at 85℃(LB) or 1,000 hours at 105℃(LB-H). Capacitance change ≦ ±20% of the initial value Dissipation factor(tanδ) ≦ 200% of the specified value Leakage current ≦ specified value									
Shelf Life	The following requirements shall be satisfied when the capacitor are restored to 25℃ after the rated voltage applied for 1,000 hours at 85℃(LB) or 500 hours at 105℃(LB-H) without voltage applied. Capacitance change ≦ ±20% of the initial value Dissipation factor(tanδ) ≦ 200% of the specified value Leakage current ≦ 200% of the specified value									
Others	Conforms to JIS-C-5101-4 (1998), characteristic W									

◆ DIMENSIONS (mm)



ΦD	5	6.3	8	10	12.5	16	18
ΦD	ΦD + 0.5 Max						
Φd	0.5	0.5	0.6	0.6	0.6	0.8	0.8
F	2.0	2.5	3.5	5.0	5.0	7.5	7.5
a	L + 1.5 Max				≦ 35 L+1.5Max ≧ 40 L+2.0 Max	L + 1.5 Max	

◆ PART NUMBER SYSTEM(Example : 80V 10μF)

L	B	1	K	1	0	0	M	N	N	6	3	1	1						

Special Request
Size code(6311 : 6.3×11)
Lead length code
Lead forming Type code
Capacitance tolerance code(M:±20%)
Capacitance code (10μF)
Voltage code (80V)
Series code (LB)

LB Series

◆ **Case size & Permissible rated ripple current: (mA rms) at 85°C / 120Hz**

uF \ Vdc	6.3		10		16		25		35	
	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC
15									5×11	48
22							5×11	60	6.3×11	72
33					5×11	66	6.3×11	82	6.3×11	88
47			5×11	72	6.3×11	90	6.3×11	96	8×11.5	120
68	5×11	86	6.3×11	104	6.3×11	122	8×11.5	132	8×11.5	162
100	5×11	114	6.3×11	120	8×11.5	156	8×11.5	162	10×12.5	204
150	6.3×11	146	8×11.5	160	8×11.5	210	10×12.5	238	10×16	285
220	6.3×11	180	8×11.5	204	10×12.5	270	10×16	312	10×20	366
330	8×11.5	270	10×12.5	294	10×16	360	10×20	414	12.5×20	498
470	10×12.5	318	10×16	396	10×16	468	12.5×20	552	12.5×25	642
680	10×16	384	10×20	504	12.5×20	636	12.5×20	780	12.5×25	864
1000	10×20	554	10×20	684	12.5×20	810	12.5×25	900	16×25	1044
1500	12.5×20	720	12.5×20	904	12.5×25	1032	16×31.5	1218	16×35.5	1338
2200	12.5×20	948	12.5×25	1152	16×25	1260	16×31.5	1482	18×35.5	1632
3300	16×25	1240	16×25	1434	16×31.5	1902	18×40	1956	18×40	2160
4700	16×31.5	1530	16×31.5	1700	18×35.5	2268	18×40	2568		

uF \ Vdc	50		63		80		100	
	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC
0.47							5×11	12
1.0							5×11	18
2.2	5×11	15	5×11	15	5×11	15	5×11	26
3.3	5×11	22	5×11	24	5×11	25	5×11	32
4.7	5×11	26	5×11	29	5×11	30	6.3×11	43
6.8	5×11	32	5×11	36	5×11	38	6.3×11	54
10	5×11	36	5×11	44	6.3×11	50	8×11.5	73
15	5×11	48	6.3×11	60	8×11.5	66	10×12.5	98
22	5×11	60	8×11.5	78	8×11.5	90	10×12.5	127
33	6.3×11	78	8×11.5	102	10×12.5	114	10×16	170
47	6.3×11	112	8×11.5	126	10×12.5	160	10×20	220
68	8×11.5	134	10×12.5	174	10×16	186	12.5×20	288
100	8×11.5	192	10×16	240	10×20	264	12.5×20	360
150	10×12.5	248	10×20	302	12.5×20	336	12.5×25	497
220	10×16	348	12.5×20	396	12.5×20	437	16×25	640
330	10×20	444	12.5×20	497	12.5×25	540	16×31.5	842
470	12.5×20	546	12.5×25	660	16×31.5	780	18×35.5	1068
680	16×25	782	16×25	870	16×35.5	966		
1000	16×25	1032	16×31.5	1200	18×35.5	1296		
1500	16×31.5	1224	18×35.5	1464				
2200	18×40	1584						
3300	18×40	1896						

◆ **RIPPLE CURRENT MULTIPLIERS**

Frequency Multipliers

Cap(uF)	Frequency (Hz)				
	50/60	120	1K	10K	100K
0.47 ~ 68	0.75	1.00	1.57	1.75	2.00
100 ~ 680	0.80	1.00	1.34	1.40	1.50
1000 ~ 4700	0.85	1.00	1.13	1.13	1.13

LB-H Series

◆ **Case size & Permissible rated ripple current: (mA rms) at 105℃ / 120Hz**

uF \ Vdc	6.3		10		16		25		35	
	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC
15									5×11	40
22							5×11	50	6.3×11	60
33					5×11	55	6.3×11	68	6.3×11	73
47			5×11	60	6.3×11	75	6.3×11	80	8×11.5	100
68	5×11	72	6.3×11	87	6.3×11	102	8×11.5	110	8×11.5	135
100	5×11	95	6.3×11	100	8×11.5	130	8×11.5	135	10×12.5	170
150	6.3×11	122	8×11.5	134	8×11.5	175	10×12.5	198	10×16	238
220	6.3×11	150	8×11.5	170	10×12.5	225	10×16	260	10×20	305
330	8×11.5	225	10×12.5	245	10×16	300	10×20	345	12.5×20	415
470	10×12.5	265	10×16	325	10×16	390	12.5×20	460	12.5×25	535
680	10×16	320	10×20	420	12.5×20	530	12.5×20	650	12.5×25	720
1000	10×20	462	10×20	570	12.5×20	675	12.5×25	725	16×25	870
1500	12.5×20	600	12.5×20	753	12.5×25	860	16×31.5	1015	16×35.5	1115
2200	12.5×20	790	12.5×25	960	16×25	1050	16×31.5	1235	18×35.5	1360
3300	16×25	1033	16×25	1195	16×31.5	1585	18×40	1630	18×40	1800
4700	16×31.5	1275	16×31.5	1420	18×35.5	1890	18×40	2140		

uF \ Vdc	50		63		80		100	
	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC
0.47							5×11	10
1.0	5×11	12	5×11	12	5×11	12	5×11	15
2.2	5×11	18	5×11	20	5×11	21	5×11	22
3.3	5×11	22	5×11	24	5×11	25	5×11	27
4.7	5×11	27	5×11	30	5×11	32	6.3×11	36
6.8	5×11	30	5×11	37	6.3×11	42	6.3×11	45
10	5×11	40	6.3×11	50	8×11.5	55	8×11.5	61
15	5×11	50	8×11.5	65	8×11.5	75	10×12.5	82
22	6.3×11	65	8×11.5	85	10×12.5	95	10×12.5	106
33	6.3×11	93	8×11.5	105	10×12.5	133	10×16	142
47	8×11.5	112	10×12.5	145	10×16	155	10×20	184
68	8×11.5	160	10×16	200	10×20	220	12.5×20	240
100	10×12.5	207	10×20	252	12.5×20	280	12.5×20	300
150	10×16	290	12.5×20	330	12.5×20	364	12.5×25	414
220	10×20	370	12.5×20	414	12.5×25	450	16×25	533
330	12.5×20	455	12.5×25	550	16×31.5	650	16×31.5	702
470	16×25	652	16×25	725	16×35.5	805	18×35.5	890
680	16×25	860	16×31.5	1000	18×35.5	1080		
1000	16×31.5	1020	18×35.5	1220				
1500	18×40	1320						
2200	18×40	1580						

◆ **RIPPLE CURRENT MULTIPLIERS**

Frequency Multipliers

Cap(uF)	Frequency (Hz)				
	50/60	120	1K	10K	100K
0.47 ~ 68	0.75	1.00	1.57	1.75	2.00
100 ~ 680	0.80	1.00	1.34	1.40	1.50
1000 ~ 4700	0.85	1.00	1.13	1.13	1.13

SM Series

- **Standard size downsized**
- **2,000 hours assured at 85℃**

◆ SPECIFICATIONS

Item	Performance Characteristics
Category Temperature Range	-40 ~ +85℃ / -25 ~ +85℃
Working Voltage Range	6.3 ~ 100Vdc / 160 ~ 450Vdc
Capacitance Range	0.1 ~ 22,000μF / 0.47 ~ 470 μF
Capacitance Tolerance	±20% (at 25℃ and 120Hz)
Dissipation Factor (tanδ) (at 25℃, 120Hz)	See table below
Leakage Current	See text below
Low Temperature Characteristics Impedance Ratio(MAX)	See table below
Endurance	See text below
Shelf Life	See text below
Others	Conforms to JIS-C-5101-4 (1998), characteristic W

Rated Voltage (V)	6.3	10	16	25	35	50	63	100	160 ~ 250	350 ~ 500	550
tanδ(Max)	0.26	0.22	0.16	0.14	0.12	0.10	0.09	0.08	0.15	0.20	0.25

The above values should be increased by 0.02 for every additional 1000μF

I=0.01CV or 3μA whichever is greater (6.3 ~ 100V)
I=0.03CV + 10μA (160 ~ 550V)
I : Leakage current (μA) C : Rated capacitance (μF) V : Rated voltage (V)
Impress the rated voltage for 2 minutes

Rated voltage (V)	6.3	10	16	25	35	50	63	100	160 ~ 250	350	400 ~ 500	550
Z(-40℃)/Z(+20℃)	12	10	8	5	4	3	3	3	—	—	—	—
Z(-25℃)/Z(+20℃)	—	—	—	—	—	—	—	—	3	6	6	8

(at 120Hz)

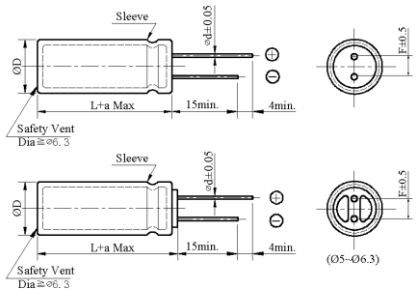
The following requirements shall be satisfied when the capacitor are restored to 25℃ after the rated voltage applied for 2,000 hours at 85℃.

Capacitance change	≦ ±20% of the initial value
Dissipation factor(tanδ)	≦ 200% of the specified value
Leakage current	≦ specified value

The following requirements shall be satisfied when the capacitor are restored to 25℃ after the rated voltage applied for 1,000 hours at 85℃ without voltage applied.

Capacitance change	≦ ±20% of the initial value
Dissipation factor(tanδ)	≦ 200% of the specified value
Leakage current	≦ 200% of the specified value

◆ DIMENSIONS (mm)



ΦD	5	6.3	8	10	12.5	16	18	20	22
ΦD	ΦD +0.5 Max							ΦD +1.0 Max	
Φd	0.5	0.5	0.6	0.6	0.6	0.8	0.8	1.0	1.0
F	2.0	2.5	3.5	5.0	5.0	7.5	7.5	10	10
a	L+1.5 Max				≦ 35 L+1.5Max ≧ 40 L+2.0 Max	L+1.5 Max		L+2.0 Max	

◆ PART NUMBER SYSTEM (Example : 35V 150μF)

S	M	1	V	1	5	1	M	N	N	0	8	B	5						

- Special Request
- Size code(08B5 : 8×11.5)
- Lead length code
- Lead forming Type code
- Capacitance tolerance code(M:±20%)
- Capacitance code(150μF)
- Voltage code(35V)
- Series code(SM)

SM Series

◆ **Case size & Permissible rated ripple current: (mA rms) at 85℃ / 120Hz**

uF \ Vdc	6.3		10		16		25	
	ΦD × L	RC	ΦD × L	RC	ΦD × L	RC	ΦD × L	RC
4.7							5×11	30
10					5×11	40	5×11	55
22	5×11	65	5×11	65	5×11	75	5×11	80
33	5×11	80	5×11	85	5×11	90	5×11	95
47	5×11	95	5×11	100	5×11	115	5×11	120
68	5×11	100	5×11	110	5×11	120	6.3×11	145
100	5×11	134	5×11	150	5×11	175	6.3×11	190
150	5×11	150	5×11	160	6.3×11	210	6.3×11	210
220	5×11	220	5×11	220	6.3×11	280	8×11.5	370
330	6.3×11	280	6.3×11	300	8×11.5	370	8×11.5	440
470	6.3×11	360	6.3×11	360	8×11.5	460	10×12.5	550
680	8×11.5	503	8×11.5	580	10×12.5	690	10×16	605
1000	8×11.5	590	10×12.5	650	10×12.5	720	10×20	930
2200	10×16	930	10×16	1090	12.5×20	1555	12.5×25	1550
3300	10×20	1230	12.5×20	1450	12.5×25	1990	16×25	1980
4700	12.5×20	1520	12.5×25	1790	16×25	2100	16×31.5	2140
6800	12.5×25	1920	16×25	2250	16×31.5	2280	16×35.5	2600
10000	16×25	2370	16×31.5	2550	18×35.5	2750		
15000	16×35.5	2590	18×35.5	2880				
22000	18×35.5	3220	18×40	3400				

uF \ Vdc	35		50		63		100	
	ΦD × L	RC	ΦD × L	RC	ΦD × L	RC	ΦD × L	RC
0.1			5×11	2			5×11	3
0.22			5×11	3			5×11	5
0.33			5×11	5			5×11	7
0.47			5×11	14			5×11	16
1			5×11	20			5×11	23
2.2			5×11	30			5×11	34
3.3			5×11	37			5×11	42
4.7	5×11	35	5×11	41	5×11	45	5×11	50
10	5×11	60	5×11	65	5×11	70	6.3×11	80
22	5×11	90	5×11	95	5×11	100	6.3×11	130
33	5×11	110	5×11	125	6.3×11	140	8×11.5	180
47	5×11	135	6.3×11	160	6.3×11	170	10×12.5	220
68	6.3×11	160	6.3×11	210	8×11.5	220	10×12.5	270
100	6.3×11	215	8×11.5	270	8×11.5	280	10×16	340
150	8×11.5	290	10×12.5	345	10×12.5	345	12.5×20	490
220	8×11.5	385	10×12.5	430	10×16	490	12.5×20	550
330	10×12.5	490	10×16	590	10×20	710	12.5×25	760
470	10×16	650	10×20	760	12.5×20	900	16×25	1000
680	10×20	820	12.5×20	875	12.5×25	1000	16×35.5	1100
1000	12.5×20	1200	12.5×25	1360	16×25	1310	18×35.5	1350
2200	16×25	1880	16×35.5	2060	18×35.5	2300		
3300	16×31.5	2100	18×35.5	2500				
4700	16×35.5	2500						

SM Series

◆ **Case size & Permissible rated ripple current: (mA rms) at 85°C / 120Hz**

Vdc / uF	160		200		250		350	
	ΦD × L	RC	ΦD × L	RC	ΦD × L	RC	ΦD × L	RC
0.47	5×11	12	5×11	12	5×11	12	5×11	14
1	5×11	17	5×11	17	6.3×11	17	6.3×11	18
2.2	6.3×11	26	6.3×11	26	6.3×11	30	8×11.5	28
3.3	6.3×11	35	6.3×11	35	8×11.5	35	8×11.5	35
4.7	6.3×11	40	8×11.5	45	8×11.5	45	10×12.5	41
10	8×11.5	65	8×11.5	70	10×12.5	70	10×16	70
22	10×16	110	10×20	110	10×20	130	12.5×20	110
33	10×20	150	10×20	160	12.5×20	160	12.5×25	140
47	12.5×20	180	12.5×20	180	12.5×20	210	16×25	220
68	12.5×25	230	12.5×25	230	16×25	250	16×31.5	260
82	12.5×25	250	12.5×25	260	16×25	265	18×31.5	270
100	12.5×25	300	16×25	330	16×31.5	310	18×31.5	305
120	12.5×25	325	16×25	350	16×31.5	345	18×31.5	340
150	16×25	360	16×31.5	400	16×35.5	530	18×35.5	380
180	16×31.5	415	16×35.5	430	18×35.5	540	18×40	410
220	16×31.5	510	16×35.5	520	18×35.5	600		
330	18×35.5	600	18×35.5	635	18×40	650		
470	18×40	700	18×40	705				

Vdc / uF	400		450		500		550	
	ΦD × L	RC	ΦD × L	RC	ΦD × L	RC	ΦD × L	RC
0.47	6.3×11	14	6.3×11	14	6.3×11	14	6.3×11	15
1	6.3×11	18	8×11.5	19	6.3×11	19	6.3×11	20
2.2	8×11.5	28	8×11.5	25	8×11.5	28	8×15	30
3.3	8×11.5	32	10×12.5	32	10×12.5	35	10×16	40
4.7	10×16	41	10×16	50	10×16	55	10×20	60
10	10×20	70	12.5×16	75	12.5×20	78	12.5×25	85
22	12.5×25	110	12.5×25	110	12.5×30	135	12.5×35	150
33	16×25	140	16×25	150	16×25	160	16×31.5	180
47	16×25	160	16×31.5	220	16×31.5	240	16×35.5	280
68	16×35.5	280	18×31.5	310	18×31.5	350	18×35.5	400
82	18×31.5	290	18×35.5	330	18×35.5	380	18×40	430
100	18×31.5	300	18×40	360	18×40	430	18×45	480
120	18×35.5	330	18×45	400	18×45	480	18×50	550
150	18×40	360						
180	18×45	400						

◆ **RIPPLE CURRENT MULTIPLIERS**

Frequency Multipliers

Vdc	Cap(uF)	Frequency (Hz)				
		50/60	120	1K	10K	100K
6.3 ~ 100	0.1 ~ 68	0.75	1.00	1.57	2.00	2.00
	100 ~ 680	0.80	1.00	1.34	1.40	1.50
	1000 ~ 22000	0.85	1.00	1.13	1.13	1.13
160 ~ 550	0.47 ~ 220	0.80	1.00	1.40	1.40	1.40
	330 ~ 470	0.90	1.00	1.13	1.13	1.13

PF Series

- **General standard size**
- **Load life 2,000 hours at 105℃**

◆ SPECIFICATIONS

Item	Performance Characteristics
Category Temperature Range	-40 ~ +105℃ / -25 ~ +105℃
Working Voltage Range	6.3 ~ 100Vdc / 160 ~ 450Vdc
Capacitance Range	0.47 ~ 22,000μF / 0.47 ~ 560 μF
Capacitance Tolerance	±20% (at 25℃ and 120Hz)
Dissipation Factor (tanδ) (at 25℃, 120Hz)	See table below
Leakage Current	I=0.01CV or 3μA whichever is greater(6.3 ~ 100V) I=0.03CV + 10μA(160 ~ 450V) I : Leakage current (μA) C : Rated capacitance (μF) V : Rated voltage (V) Impress the rated voltage for 2 minutes
Low Temperature Characteristics Impedance Ratio(MAX)	See table below
Endurance	The following requirements shall be satisfied when the capacitor are restored to 25℃ after the rated voltage applied for 2,000 hours at 105℃.
Shelf Life	The following requirements shall be satisfied when the capacitor are restored to 25℃ after the rated voltage applied for 1,000 hours at 105℃ without voltage applied.
Others	Conforms to JIS-C-5101-4 (1998), characteristic W

Dissipation Factor (tanδ) (at 25℃, 120Hz)

Rated Voltage (V)	6.3	10	16	25	35	50	63	100	160 ~ 250	400 ~ 450
tanδ(Max)	0.26	0.22	0.18	0.16	0.14	0.12	0.10	0.10	0.15	0.20

The above values should be increased by 0.02 for every additional 1000μF

Low Temperature Characteristics Impedance Ratio(MAX)

Rated voltage (V)	6.3	10	16	25	35	50	63	100	160 ~ 250	350	400 ~ 450
Z(-40℃)/Z(+20℃)	12	10	8	5	4	3	3	3	—	—	—
Z(-25℃)/Z(+20℃)	—	—	—	—	—	—	—	—	3	6	6

(at 120Hz)

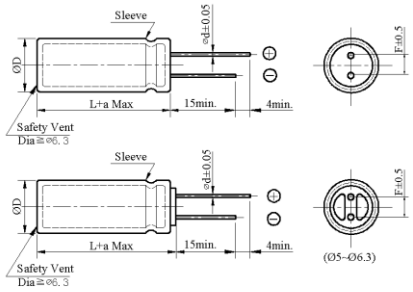
Endurance

Capacitance change	≦ ±20% of the initial value
Dissipation factor(tanδ)	≦ 200% of the specified value
Leakage current	≦ specified value

Shelf Life

Capacitance change	≦ ±20% of the initial value
Dissipation factor(tanδ)	≦ 200% of the specified value
Leakage current	≦ 200% of the specified value

◆ DIMENSIONS (mm)



ΦD	5	6.3	8	10	12.5	16	18	20	22
ΦD	ΦD +0.5 Max							ΦD +1.0 Max	
Φd	0.5	0.5	0.6	0.6	0.6	0.8	0.8	1.0	1.0
F	2.0	2.5	3.5	5.0	5.0	7.5	7.5	10	10
a	L+1.5 Max				≦ 35 L+1.5Max ≧ 40 L+2.0 Max	L+1.5 Max		L+2.0 Max	

◆ PART NUMBER SYSTEM (Example : 200V 330μF)

P	F	2	D	3	3	1	M	N	N	1	8	P	1						

- Special Request
- Size code(18P1 : 18×35.5)
- Lead length code
- Lead forming Type code
- Capacitance tolerance code(M:±20%)
- Capacitance code(330μF)
- Voltage code(200V)
- Series code(PF)

PF Series

◆ **Case size & Permissible rated ripple current: (mA rms) at 105℃ / 120Hz**

uF \ Vdc	6.3		10		16		25	
	ΦD × L	RC	ΦD × L	RC	ΦD × L	RC	ΦD × L	RC
10					5×11	40	5×11	43
15					5×11	45	5×11	47
22	5×11	45	5×11	51	5×11	55	5×11	60
33	5×11	55	5×11	60	5×11	70	5×11	75
47	5×11	65	5×11	75	5×11	85	5×11	90
68	5×11	70	5×11	80	5×11	100	6.3×11	125
100	5×11	100	5×11	110	5×11	115	6.3×11	145
150	6.3×11	120	6.3×11	130	8×11.5	180	8×11.5	200
220	6.3×11	180	6.3×11	190	8×11.5	240	8×11.5	250
330	6.3×11	195	6.3×11	210	8×11.5	285	10×12.5	350
470	8×11.5	300	8×11.5	330	10×12.5	380	10×16	460
680	10×12.5	320	10×12.5	420	10×16	530	10×20	650
1000	10×12.5	480	10×12.5	460	10×20	680	12.5×20	830
1500	10×16	600	10×20	750	12.5×20	860	12.5×25	1020
2200	10×20	830	12.5×20	980	12.5×25	1130	16×25	1210
3300	10×20	840	12.5×25	1250	16×25	1270	16×31.5	1540
4700	12.5×20	1090	16×25	1350	16×31.5	1570	16×35.5	1650
6800	12.5×25	1350	16×31.5	1670	18×35.5	1930	18×35.5	1950
10000	16×25	1650	18×35.5	2010	18×40	2060	18×40	2100
15000	16×31.5	1820	18×40	2360				
22000	18×35.5	2280						

uF \ Vdc	35		50		63		100	
	ΦD × L	RC	ΦD × L	RC	ΦD × L	RC	ΦD × L	RC
0.47			5×11	11	5×11	8	5×11	12
1			5×11	16	5×11	12	5×11	18
2.2			5×11	23	5×11	20	5×11	27
3.3			5×11	29	5×11	24	5×11	33
4.7			5×11	34	5×11	34	5×11	39
6.8			5×11	35	5×11	37	5×11	46
10	5×11	47	5×11	50	5×11	50	6.3×11	65
15	5×11	50	5×11	52	5×11	65	6.3×11	66
22	5×11	65	5×11	75	6.3×11	85	6.3×11	85
33	5×11	88	6.3×11	100	6.3×11	110	8×11.5	130
47	6.3×11	100	6.3×11	125	8×11.5	150	10×12.5	165
68	6.3×11	110	8×11.5	159	10×12.5	198	10×16	200
100	6.3×11	150	8×11.5	210	10×12.5	250	10×20	265
150	10×12.5	240	10×12.5	290	10×16	330	12.5×20	335
220	10×12.5	320	10×16	370	10×20	410	12.5×25	440
330	10×16	420	10×20	550	12.5×20	550	16×25	660
470	10×20	570	12.5×20	660	12.5×25	720	16×31.5	880
680	12.5×20	730	12.5×25	860	16×25	1000	16×35.5	1202
1000	12.5×25	1000	16×25	1020	16×31.5	1130	18×35.5	1300
1500	16×25	1110	16×31.5	1350	16×35.5	1450		
2200	16×31.5	1450	18×35.5	1690	18×40	1780		
3300	18×31.5	1600	18×40	2060				
4700	18×35.5	1910						

PF Series

◆ **Case size & Permissible rated ripple current: (mA rms) at 105℃ / 120Hz**

uF \ Vdc	160		200		250		400	
	ΦD × L	RC	ΦD × L	RC	ΦD × L	RC	ΦD × L	RC
22					10×16	100		
33			10×16	180	10×20	190		
47	10×16	210	10×20	230	10×25	250		
56	10×20	260	10×25	280	10×30	310	12.5×30	250
68	10×25	300	10×30	320	12.5×20	360	16×25	300
82	10×30	360	12.5×20	380	12.5×25	410	16×31.5	350
100	12.5×20	430	12.5×25	450	16×20	480	16×35.5	400
120	12.5×25	480	12.5×30	500	16×25	530	18×31.5	430
150	16×20	550	16×25	570	16×31.5	620	18×35.5	550
180	16×25	610	16×31.5	650	18×25	700	18×40	600
220	16×31.5	680	18×25	700	18×31.5	750		
330	16×35.5	800	18×31.5	830	18×35.5	860		
390	18×31.5	890	18×35.5	890	18×40			
470	18×35.5	980	18×40	980	18×45			
560	18×40	1050	18×45	1050				

uF \ Vdc	420		450	
	ΦD × L	RC	ΦD × L	RC
47	16×20	250	16×25	250
56	16×25	300	16×31.5	300
68	16×31.5	350	16×35.5	350
82	16×35.5	380	18×31.5	400
100	18×31.5	420	18×35.5	450
120	18×35.5	480	18×40	520
150	18×40	580	18×45	600
180	18×45	630	16×25	250

◆ **RIPPLE CURRENT MULTIPLIERS**

Frequency Multipliers

Vdc	Cap(uF)	Frequency (Hz)				
		50/60	120	1K	10K	100K
6.3 ~ 250	0.47 ~ 68	0.75	1.00	1.57	2.00	2.00
	100 ~ 680	0.80	1.00	1.34	1.40	1.50
	1000 ~ 22000	0.85	1.00	1.13	1.13	1.13
400 ~ 450	0.47 ~ 220	0.80	1.00	1.40	1.40	1.40
	330 ~ 560	0.90	1.00	1.13	1.13	1.13

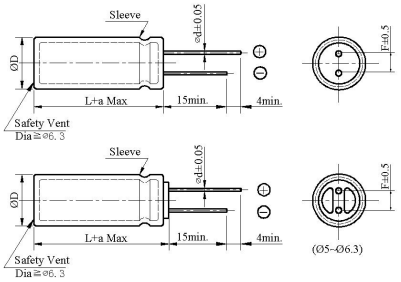
EL Series

- **Suitable for main board**
- **Extremely low impedance, downsize and high ripple current**

◆ SPECIFICATIONS

Item	Performance Characteristics
Category Temperature Range	-40 ~ +105°C
Working Voltage Range	6.3 ~ 50Vdc
Capacitance Range	56 ~ 6,800 µF
Capacitance Tolerance	±20% (at 25°C and 120Hz)
Dissipation Factor (tanδ) (at 25°C, 120Hz)	Rated Voltage (V): 6.3 / 10 / 16 / 25 / 35 / 50 tanδ(Max): 0.22 / 0.19 / 0.16 / 0.14 / 0.12 / 0.10 The above values should be increased by 0.02 for every additional 1000µF
Leakage Current	I=0.01CV or 3µA whichever is greater I : Leakage current (µA) C : Rated capacitance (µF) V : Rated voltage (V) The rated voltage is impressed for 2 minutes.
Low Temperature Characteristics Impedance Ratio(MAX)	Rated voltage (V): 6.3 / 10 / 16 / 25 / 35 / 50 Z(-40℃)/Z(+20℃): 8 / 6 / 6 / 5 / 4 / 3 (at 120Hz)
Endurance	The following specifications shall be satisfied when the capacitors are restored to 25°C after subjected to DC voltage with the rated ripple current is applied for 2,000 hours at 105°C Capacitance change: ≦ ±25% of the initial value Dissipation factor(tanδ): ≦ 200% of the specified value Leakage current: ≦ specified value
Shelf Life	The following requirements shall be satisfied when the capacitor are restored to 25℃ after exposing them for 500 hours at 105℃ without voltage applied. Capacitance change: ≦ ±25% of the initial value Dissipation factor(tanδ): ≦ 200% of the specified value Leakage current: ≦ 200% of the specified value
Others	Conforms to JIS-C-5101-4 (1998), characteristic W

◆ DIMENSIONS (mm)



ΦD	5	6.3	8	10	12.5	16	18
ΦD	ΦD + 0.5 Max						
Φd	0.5	0.5	0.6	0.6	0.6	0.8	0.8
F	2.0	2.5	3.5	5.0	5.0	7.5	7.5
a	L + 1.5 Max				≦ 35 L+1.5Max ≧ 40 L+2.0 Max	L + 1.5 Max	

◆ PART NUMBER SYSTEM(Example : 10V 5600µF)

E	L	1	A	5	6	2	M	N	N	1	2	3	5						

- Special Request
- Size code(1235 : 12.5×35)
- Lead length code
- Lead forming Type code
- Capacitance tolerance code(M:±20%)
- Capacitance code (5600µF)
- Voltage code (10V)
- Series code (EL)

EL Series

◆ **Case size & Permissible rated ripple current**

Nominal Capacitance (uF)	6.3V				10V				16V			
	Case Size ΦD×L (mm)	Impedance (Ωmax/100kHz) 20℃	Impedance (Ωmax/100kHz) -10℃	Max. Rated ripple current @105℃ 100kHz (mA rms)	Case Size ΦD×L (mm)	Impedance (Ωmax/100kHz) 20℃	Impedance (Ωmax/100kHz) -10℃	Max. Rated ripple current @105℃ 100kHz (mA rms)	Case Size ΦD×L (mm)	Impedance (Ωmax/100kHz) 20℃	Impedance (Ωmax/100kHz) -10℃	Max. Rated ripple current @105℃ 100kHz (mA rms)
100	5×11	1.780	2.690	175	5×11	1.480	2.480	250	6.3×11	1.280	2.160	290
220	6.3×11	0.880	1.760	280	6.3×11	0.580	1.660	405	8×11.5	0.460	1.560	410
330	6.3×11	0.450	1.320	405	8×11.5	0.380	1.280	500	8×11.5	0.280	1.080	760
470	8×11.5	0.110	0.380	560	8×11.5	0.072	0.220	760	8×15	0.056	0.170	995
560	8×11.5	0.072	0.220	760	8×15	0.069	0.200	805	8×20	0.052	0.160	1050
680	8×11.5	0.068	0.210	800	8×15	0.056	0.170	995	10×16	0.038	0.120	1430
820	8×15	0.056	0.170	995	8×20	0.052	0.160	1050	10×20	0.035	0.110	1520
1000	8×15	0.053	0.160	1030	8×20	0.041	0.130	1250	10×20	0.023	0.069	1820
1200	8×20	0.041	0.130	1250	10×20	0.023	0.069	1820	10×25	0.022	0.066	2150
1500	10×20	0.023	0.069	1820	10×25	0.022	0.066	2150	12.5×20	0.021	0.053	2360
2200	10×25	0.022	0.066	2150	12.5×20	0.021	0.053	2360	12.5×25	0.018	0.045	2770
2700	10×30	0.022	0.066	2200	12.5×20	0.021	0.053	2395	12.5×30	0.016	0.041	3290
3300	12.5×20	0.021	0.053	2360	12.5×25	0.018	0.045	2770	12.5×35	0.015	0.039	3400
3900	12.5×25	0.018	0.045	2770	12.5×30	0.016	0.041	3290	16×25	0.016	0.043	3460
4700	12.5×30	0.016	0.041	3290	12.5×35	0.015	0.039	3400	16×31.5	0.016	0.043	3500
5600	12.5×35	0.015	0.039	3400	12.5×40	0.016	0.043	3460	16×35.5	0.015	0.042	3540
6800	12.5×40	0.016	0.043	3460	16×31.5	0.017	0.040	3500	16×40	0.015	0.040	3585

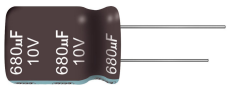
Nominal Capacitance (uF)	25V				35V				50V			
	Case Size ΦD×L (mm)	Impedance (Ωmax/100kHz) 20℃	Impedance (Ωmax/100kHz) -10℃	Max. Rated ripple current @105℃ 100kHz (mA rms)	Case Size ΦD×L (mm)	Impedance (Ωmax/100kHz) 20℃	Impedance (Ωmax/100kHz) -10℃	Max. Rated ripple current @105℃ 100kHz (mA rms)	Case Size ΦD×L (mm)	Impedance (Ωmax/100kHz) 20℃	Impedance (Ωmax/100kHz) -10℃	Max. Rated ripple current @105℃ 100kHz (mA rms)
56	6.3×11	0.880	0.900	270	6.3×11	0.760	1.240	405	8×11.5	0.640	1.400	385
68	6.3×11	0.660	0.850	290	8×11.5	0.560	0.760	430	8×11.5	0.480	0.900	405
100	6.3×11	0.430	0.500	405	8×11.5	0.380	0.560	450	8×11.5	0.220	0.630	724
150	8×11.5	0.120	0.400	415	8×11.5	0.072	0.220	760	8×15	0.061	0.180	979
220	8×11.5	0.072	0.220	760	8×15	0.056	0.170	995	10×16	0.042	0.120	1370
330	8×15	0.056	0.170	995	10×16	0.038	0.120	1430	10×25	0.028	0.085	1870
470	10×16	0.038	0.120	1430	10×20	0.023	0.069	1820	12.5×20	0.027	0.068	2050
560	10×20	0.035	0.110	1505	10×25	0.022	0.066	2150	12.5×25	0.023	0.059	2410
680	10×20	0.023	0.069	1820	12.5×20	0.021	0.053	2360	12.5×30	0.021	0.052	2860
820	10×25	0.022	0.066	2150	12.5×20	0.020	0.052	2410	12.5×35	0.019	0.051	2960
1000	12.5×20	0.021	0.053	2360	12.5×25	0.018	0.045	2770	16×25	0.021	0.056	3010
1200	12.5×25	0.021	0.053	2400	12.5×30	0.016	0.041	3290				
1500	12.5×25	0.018	0.045	2770	12.5×35	0.015	0.039	3400				
2200	12.5×35	0.015	0.039	3400	16×31.5	0.015	0.039	3500				
2700	16×25	0.016	0.043	3460								

◆ **RIPPLE CURRENT MULTIPLIERS**

Frequency Multipliers

Vdc	Frequency (Hz)				
	50/60	120	1K	10K	100K
6.3 ~ 16	0.60	0.75	0.90	0.98	1.00
25 ~ 50	0.50	0.62	0.85	0.95	1.00

EB Series

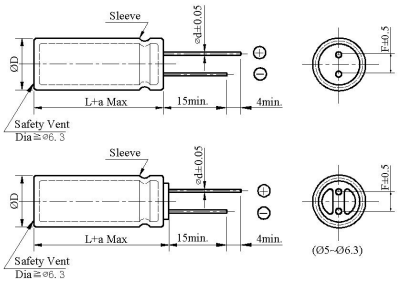


- **Extremely low impedance, Downsize and high ripple current**
- **Suitable for main board**

◆ SPECIFICATIONS

Item	Performance Characteristics
Category Temperature Range	-40 ~ +105℃
Working Voltage Range	6.3 ~ 16Vdc
Capacitance Range	82 ~ 3,300 μF
Capacitance Tolerance	±20% (at 25℃ and 120Hz)
Dissipation Factor (tanδ) (at 25℃, 120Hz)	Rated Voltage (V): 6.3 / 10 / 16 tanδ(Max): 0.15 / 0.14 / 0.12 The above values should be increased by 0.02 for every additional 1000μF
Leakage Current	I=0.03CV or 3μA whichever is greater I : Leakage current (μA) C : Rated capacitance (μF) V : Rated voltage (V) Impress the rated voltage for 2 minutes
Low Temperature Characteristics Impedance Ratio(MAX)	Rated voltage (V): 6.3 / 10 / 16 Z(-40℃)/Z(+20℃): 8 / 6 / 6 (at 120Hz)
Endurance	The following specifications shall be satisfied when the capacitors are restored to 25℃ after subjected to DC voltage with the rated ripple current is applied for 1,000~2,000 hours at 105℃ Capacitance change: ≦ ±25% of the initial value Dissipation factor(tanδ): ≦ 200% of the specified value Leakage current: ≦ specified value Size ≦6.3Φ: 1,000 hours; Size ≧ 8 Φ: 2,000 hours
Shelf Life	The following requirements shall be satisfied when the capacitor are restored to 25℃ after exposing them for 500 hours at 105℃ without voltage applied. Capacitance change: ≦ ±25% of the initial value Dissipation factor(tanδ): ≦ 200% of the specified value Leakage current: ≦ 200% of the specified value
Others	Conforms to JIS-C-5101-4 (1998), characteristic W

◆ DIMENSIONS (mm)



ΦD	5	6.3	8	10	12.5
ΦD	ΦD + 0.5 Max				
Φd	0.5	0.5	0.6	0.6	0.6
F	2.0	2.5	3.5	5.0	5.0
a	L + 1.5 Max				

◆ PART NUMBER SYSTEM(Example : 6.3V 3300μF)

E	B	0	J	3	3	2	M	N	N	1	0	2	5						

- Special Request
- Size code(1025 : 10×25)
- Lead length code
- Lead forming Type code
- Capacitance tolerance code(M:±20%)
- Capacitance code (3300μF)
- Voltage code (6.3V)
- Series code (EB)

EB Series

◆ **Case size & Permissible rated ripple current**

Nominal Capacitance (uF)	6.3V			10V			16V		
	Case Size ΦD×L (mm)	Impedance @20℃ (Ωmax/100kHz)	Max. Rated ripple current @105℃ 100kHz (mA rms)	Case Size ΦD×L (mm)	Impedance @20℃ (Ωmax/100kHz)	Max. Rated ripple current @105℃ 100kHz (mA rms)	Case Size ΦD×L (mm)	Impedance @20℃ (Ωmax/100kHz)	Max. Rated ripple current @105℃ 100kHz (mA rms)
82	5×11	1.850	165	5×11	1.350	200	6.3×11	1.200	250
100	5×11	1.650	180	5×11	1.180	260	6.3×11	0.980	300
150	6.3×11	1.320	215	6.3×11	0.960	340	6.3×11	0.880	350
220	6.3×11	0.680	295	6.3×11	0.480	425	8×11.5	0.420	430
330	6.3×11	0.320	425	8×11.5	0.250	525	8×11.5	0.180	795
470	8×11.5	0.078	605	8×11.5	0.052	805	8×11.5	0.036	1140
680	8×11.5	0.052	805	8×11.5	0.036	1140	8×15	0.028	1490
							10×12.5	0.026	1540
820	8×15	0.036	1140	8×15	0.033	1200	10×16	0.024	1605
1000	8×15	0.032	1210	8×15	0.028	1490	8×20	0.019	1870
				10×12.5	0.026	1540	10×16	0.019	2000
1200	8×15	0.028	1490	10×16	0.024	1605	10×20	0.017	2110
1500	8×20	0.016	1870	8×20	0.019	1870	10×20	0.013	2550
	10×12.5	0.026	1540	10×16	0.019	2000			
1800	8×20	0.021	1870	10×20	0.013	2550	10×25	0.012	2800
	10×16	0.019	2000						
2200	10×20	0.013	2550	10×25	0.012	2800	10×25	0.012	2950
3300	10×25	0.012	2800	10×25	0.012	2950	12.5×25	0.012	3050

◆ **RIPPLE CURRENT MULTIPLIERS**

Frequency Multipliers

Vdc	Frequency (Hz)				
	50/60	120	1K	10K	100K
6.3 ~16	0.60	0.75	0.90	0.98	1.00

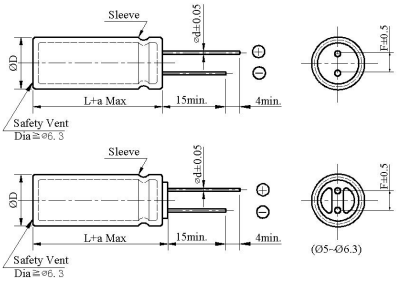
ED Series

- **Suitable for use in high ripple current capability**
- **Miniaturized, Low E.S.R and low impedance**

◆ SPECIFICATIONS

Item	Performance Characteristics
Category Temperature Range	-40 ~ +105℃
Working Voltage Range	6.3 ~ 100Vdc
Capacitance Range	10 ~10,000 μF
Capacitance Tolerance	±20%　(at 25℃ and 120Hz)
Dissipation Factor (tanδ) (at 25℃, 120Hz)	Rated Voltage (V): 6.3 / 10 / 16 / 25 / 35 / 50 / 63 / 100 tanδ(Max): 0.22 / 0.19 / 0.16 / 0.14 / 0.12 / 0.10 / 0.09 / 0.08 The above values should be increased by 0.02 for every additional 1000μF
Leakage Current	I=0.01CV or 3μA whichever is greater I : Leakage current (μA)　C : Rated capacitance (μF)　V : Rated voltage (V) Impress the rated voltage for2 minutes
Low Temperature Characteristics Impedance Ratio(MAX)	Rated voltage (V): 6.3 / 10 / 16 / 25 / 35 / 50 / 63 / 100 Z(-40℃)/Z(+20℃): 8 / 6 / 6 / 5 / 4 / 3 / 3 / 3 (at 120Hz)
Endurance	The following specifications shall be satisfied when the capacitors are restored to 25°C after subjected to DC voltage with the rated ripple current is applied for 2,000~5,000 hours at 105°C Capacitance change: ≦ ±25% of the initial value Dissipation factor(tanδ): ≦ 200% of the specified value Leakage current: ≦ specified value Size / Life time (hours): D×L ~ 8×12 / 2,000; 8×16 ~ 10Φ / 3,000; 12.5Φ ~ 18Φ / 5,000
Shelf Life	The following requirements shall be satisfied when the capacitor are restored to 25℃ after exposing them for 500 hours at 105℃ without voltage applied. Capacitance change: ≦ ±25% of the initial value Dissipation factor(tanδ): ≦ 200% of the specified value Leakage current: ≦ 200% of the specified value
Others	Conforms to JIS-C-5101-4 (1998), characteristic W

◆ DIMENSIONS (mm)



ΦD	5	6.3	8	10	12.5	16	18
ΦD	ΦD + 0.5 Max						
Φd	0.5	0.5	0.6	0.6	0.6	0.8	0.8
F	2.0	2.5	3.5	5.0	5.0	7.5	7.5
a	L + 1.5 Max				≦ 35 L+1.5Max ≧ 40 L+2.0 Max	L + 1.5 Max	

◆ PART NUMBER SYSTEM(Example : 25V 4700μF)

E	D	1	E	4	7	2	M	N	N	1	6	4	0						

Special Request
Size code(1640 : 16×40)
Lead length code
Lead forming Type code
Capacitance tolerance code(M:±20%)
Capacitance code (4700μF)
Voltage code (25V)
Series code (ED)

ED Series

◆ **Case size & Permissible rated ripple current**

Nominal capacitance (uF)	6.3V				10V			
	Case Size ΦD×L (mm)	Impedance (Ωmax/100kHz)		Max. Rated ripple current @105℃ 100kHz (mA rms)	Case Size ΦD×L (mm)	Impedance (Ωmax/100kHz)		Max. Rated ripple current @105℃ 100kHz (mA rms)
		20℃	-10℃			20℃	-10℃	
100	5×11	0.650	3.600	155	5×11	0.580	2.300	210
220	6.3×11	0.400	1.600	255	6.3×11	0.220	0.870	340
330	6.3×11	0.220	0.870	340	8×11.5	0.210	0.850	410
470	8×11.5	0.180	0.800	400	8×11.5	0.130	0.520	640
560	8×11.5	0.170	0.750	460	8×15	0.120	0.480	675
680	8×11.5	0.130	0.520	640	8×15	0.087	0.350	840
820	8×15	0.095	0.480	730	8×20	0.085	0.330	875
1000	8×15	0.087	0.350	840	10×16	0.060	0.240	1210
1200	8×20	0.069	0.270	1050	10×20	0.046	0.180	1400
1500	10×20	0.046	0.180	1400	10×20	0.045	0.180	1440
2200	10×20	0.045	0.180	1440	12.5×20	0.035	0.120	1750
2700	10×25	0.042	0.170	1700	12.5×20	0.034	0.110	1945
3300	12.5×20	0.035	0.120	1900	12.5×25	0.027	0.089	2230
3900	12.5×25	0.027	0.089	2230	12.5×30	0.024	0.078	2650
4700	12.5×30	0.024	0.078	2650	12.5×35	0.020	0.065	2880
5600	12.5×35	0.020	0.065	2880	12.5×35	0.019	0.060	2930
6800	12.5×35	0.019	0.060	2930	16×31.5	0.017	0.050	3450
8200	16×31.5	0.017	0.050	3450	16×35.5	0.015	0.044	3610
10000	16×35.5	0.015	0.044	3610	16×40	0.013	0.038	4080

Nominal capacitance (uF)	16V				25V			
	Case Size ΦD×L (mm)	Impedance (Ωmax/100kHz)		Max. Rated ripple current @105℃ 100kHz (mA rms)	Case Size ΦD×L (mm)	Impedance (Ωmax/100kHz)		Max. Rated ripple current @105℃ 100kHz (mA rms)
		20℃	-10℃			20℃	-10℃	
47	5×11	0.800	2.800	120	5×11	0.580	2.300	210
68	6.3×11	0.560	2.200	220	6.3×11	0.360	1.800	230
100	6.3×11	0.520	1.500	255	6.3×11	0.220	0.870	340
150	8×11.5	0.210	0.860	350	8×11.5	0.200	0.690	405
220	8×11.5	0.200	0.790	405	8×11.5	0.130	0.520	640
330	8×11.5	0.130	0.520	640	8×15	0.087	0.350	840
470	8×15	0.087	0.350	840	10×16	0.060	0.240	1210
560	8×20	0.085	0.340	865	10×20	0.058	0.230	1220
680	8×20	0.069	0.270	1050	10×20	0.046	0.180	1400
820	10×20	0.058	0.230	1220	10×20	0.042	0.170	1450
1000	10×20	0.046	0.180	1400	12.5×20	0.035	0.120	1730
1200	10×25	0.042	0.170	1650	12.5×25	0.034	0.110	1936
1500	12.5×20	0.035	0.120	1900	12.5×25	0.027	0.089	2230
2200	12.5×25	0.027	0.089	2230	12.5×35	0.020	0.065	2880
2700	12.5×30	0.024	0.078	2650	12.5×35	0.019	0.060	2930
3300	12.5×35	0.020	0.065	2880	16×31.5	0.017	0.050	3450
3900	12.5×40	0.017	0.056	3350	16×35.5	0.015	0.044	3610
4700	16×31.5	0.017	0.050	3450	16×40	0.013	0.038	4080
5600	16×35.5	0.015	0.044	3610				
6800	16×40	0.013	0.038	4080				

ED Series

◆ **Case size & Permissible rated ripple current:**

Nominal capacitance (uF)	35V				50V			
	Case Size ΦD×L (mm)	Impedance (Ωmax/100kHz)		Max. Rated ripple current @105℃ 100kHz (mA rms)	Case Size ΦD×L (mm)	Impedance (Ωmax/100kHz)		Max. Rated ripple current @105℃ 100kHz (mA rms)
		20℃	-10℃			20℃	-10℃	
10	5×11	1.500	3.800	100	5×11	1.450	3.500	105
22	5×11	0.750	3.200	160	5×11	0.700	2.800	180
33	5×11	0.580	2.300	210	6.3×11	0.480	1.700	215
47	6.3×11	0.490	1.800	250	6.3×11	0.400	1.600	220
68	8×11.5	0.210	0.870	350	8×11.5	0.280	1.100	355
100	8×11.5	0.200	0.850	405	8×11.5	0.170	0.680	555
150	8×11.5	0.130	0.520	640	8×15	0.120	0.480	730
220	8×15	0.087	0.350	840	10×16	0.084	0.340	1050
330	10×16	0.060	0.240	1210	10×25	0.055	0.220	1440
470	10×20	0.046	0.180	1400	12.5×20	0.045	0.150	1660
560	10×25	0.042	0.170	1650	12.5×25	0.034	0.110	1950
680	10×30	0.031	0.120	1910	12.5×30	0.030	0.100	2310
820	12.5×25	0.030	0.110	1938	12.5×35	0.025	0.083	2510
1000	12.5×25	0.027	0.089	2230	16×25	0.025	0.075	2555
1200	12.5×30	0.024	0.078	2650	16×31.5	0.022	0.066	3010
1500	12.5×35	0.020	0.065	2880	16×35.5	0.019	0.057	3150
2200	16×31.5	0.017	0.050	3450	18×35.5	0.017	0.046	3680
2700	16×35.5	0.015	0.044	3610	18×40	0.014	0.038	3800
3300	16×40	0.013	0.038	4080				
3900	18×40	0.012	0.032	4280				

Nominal capacitance (uF)	63V				100V			
	Case Size ΦD×L (mm)	Impedance (Ωmax/100kHz)		Max. Rated ripple current @105℃ 100kHz (mA rms)	Case Size ΦD×L (mm)	Impedance (Ωmax/100kHz)		Max. Rated ripple current @105℃ 100kHz (mA rms)
		20℃	-10℃			20℃	-10℃	
10	5×11	2.850	9.300	30	6.3×11	2.200	9.300	60
22	6.3×11	1.850	7.200	60	8×11.5	1.100	5.000	120
33	6.3×11	1.200	5.000	115	8×15	0.620	2.800	242
47	8×11.5	1.000	4.500	170	10×12.5	0.430	1.800	288
68	8×11.5	0.610	2.500	245	10×16	0.310	1.500	357
100	8×15	0.430	1.900	305	10×25	0.200	0.840	531
220	10×20	0.210	0.920	470	12.5×30	0.100	0.420	905
330	12.5×25	0.120	0.450	784	12.5×40	0.071	0.300	1180
470	12.5×30	0.100	0.420	905	16×35.5	0.045	0.170	1790
560	12.5×35	0.083	0.350	1050	16×40	0.040	0.150	2020
680	12.5×40	0.071	0.300	1180	18×35.5	0.040	0.150	2180
820	16×31.5	0.054	0.200	1570	18×40	0.036	0.130	2330
1000	16×35.5	0.045	0.170	1790				
1200	16×40	0.040	0.150	2020				
1500	18×40	0.036	0.130	2330				

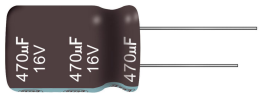
◆ **RIPPLE CURRENT MULTIPLIERS**

Frequency Multipliers

Vdc	Cap(uF)	Frequency (Hz)			
		120	1K	10K	100K
6.3 ~100	10 ~ 68	0.30	0.65	0.85	1.00
	82 ~ 220	0.50	0.70	0.90	1.00
	330 ~ 820	0.60	0.75	0.95	1.00
	1000 ~ 10000	0.70	0.80	0.98	1.00

ALUMINUM ELECTROLYTIC CAPACITORS

EK Series

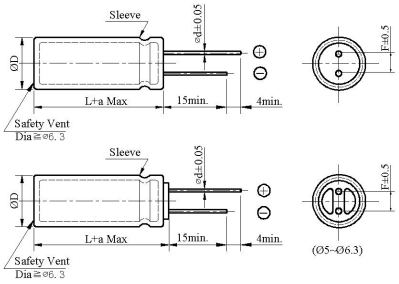


- **Miniaturized, Low ESR and Low impedance**
- **Suitable for use in high ripple current capability**

◆ SPECIFICATIONS

Item	Performance Characteristics
Category Temperature Range	-40 ~ +105°C
Working Voltage Range	6.3 ~ 50Vdc
Capacitance Range	0.10 ~ 6,800 μF
Capacitance Tolerance	±20% (at 25°C and 120Hz)
Dissipation Factor (tanδ) (at 25°C, 120Hz)	Rated Voltage (V): 6.3 / 10 / 16 / 25 / 35 / 50 tanδ(Max): 0.22 / 0.19 / 0.16 / 0.14 / 0.12 / 0.10 The above values should be increased by 0.02 for every additional 1000μF
Leakage Current	I=0.03CV or 3μA whichever is greater I : Leakage current (μA) C : Rated capacitance (μF) V : Rated voltage (V) Impress the rated voltage for2 minutes
Low Temperature Characteristics Impedance Ratio(MAX)	Rated voltage (V): 6.3 / 10 / 16 / 25 / 35 / 50 Z(-40℃)/Z(+20℃): 8 / 6 / 6 / 5 / 4 / 3 (at 120Hz)
Endurance	The following specifications shall be satisfied when the capacitors are restored to 25°C after subjected to DC voltage with the rated ripple current is applied for 2,000~5,000 hours at 105°C Capacitance change: ≦ ±25% of the initial value Dissipation factor(tanδ): ≦ 200% of the specified value Leakage current: ≦ specified value Size / Life time (hours): ≦6.3Φ: 2,000; = 8 Φ: 3,000; = 10Φ: 4,000; ≧12.5Φ: 5,000
Shelf Life	The following requirements shall be satisfied when the capacitor are restored to 25℃ after exposing them for 500 hours at 105℃ without voltage applied. Capacitance change: ≦ ±25% of the initial value Dissipation factor(tanδ): ≦ 200% of the specified value Leakage current: ≦ 200% of the specified value
Others	Conforms to JIS-C-5101-4 (1998), characteristic W

◆ DIMENSIONS (mm)



ΦD	5	6.3	8	10	12.5	16
ΦD	ΦD + 0.5 Max					
Φd	0.5	0.5	0.6	0.6	0.6	0.8
F	2.0	2.5	3.5	5.0	5.0	7.5
a	L + 1.5 Max				≦ 35 L+1.5Max ≧ 40 L+2.0 Max	L + 1.5 Max

◆ PART NUMBER SYSTEM(Example : 16V 2700μF)

E	K	1	C	2	7	2	M	N	N	1	2	3	0						

- Special Request
- Size code(1230 : 12.5×30)
- Lead length code
- Lead forming Type code
- Capacitance tolerance code(M:±20%)
- Capacitance code (2700μF)
- Voltage code (16V)
- Series code (EK)

EK Series

◆ **Case size & Permissible rated ripple current**

Nominal Capacitance (uF)	6.3V			10V			16V		
	Case Size ΦD×L (mm)	Impedance @20℃ (Ωmax/100kHz)	Max. Rated ripple current @105℃ 100kHz (mA rms)	Case Size ΦD×L (mm)	Impedance @20℃ (Ωmax/100kHz)	Max. Rated ripple current @105℃ 100kHz (mA rms)	Case Size ΦD×L (mm)	Impedance @20℃ (Ωmax/100kHz)	Max. Rated ripple current @105℃ 100kHz (mA rms)
2.2							5×11	4.500	40
4.7							5×11	4.000	80
10							5×11	1.300	90
22	6.3×11	0.150	150	5×11	0.500	80	5×11	0.800	150
47							5×11	0.350	100
56							5×11	0.300	250
100				5×11	0.300	250	5×11	0.240	320
							6.3×11	0.150	350
120							6.3×11	0.130	405
150	5×11	0.300	250	5×11	0.380	300			
220	5×11	0.300	350	6.3×11	0.130	405	6.3×11	0.110	680
				8×11.5	0.072	520	8×11.5	0.090	720
330	6.3×11	0.130	405				8×11.5	0.072	760
470				8×11.5	0.072	760	8×11.5	0.056	995
							8×15	0.056	995
				10×12.5	0.053	1030	10×12.5	0.053	1030
							10×16	0.050	1080
560	8×11.5	0.072	760						
680				8×15	0.056	995	8×15	0.045	1200
							8×20	0.041	1250
				10×12.5	0.053	1030	10×16	0.038	1430
820	8×15	0.056	995						
1000				8×20	0.041	1250			
	10×12.5	0.053	1030	10×12.5	0.038	1410			
				10×16	0.038	1430	10×20	0.023	1820
1200	8×20	0.041	1250	10×20	0.023	1820	10×25	0.022	2150
	10×16	0.038	1430						
1500	10×20	0.023	1820	10×25	0.022	2150			
				12.5×20	0.021	2150	12.5×20	0.021	2360
2200	10×25	0.022	2150	10×30	0.021	2500	12.5×25	0.018	2770
2700	12.5×20	0.022	2200				12.5×30	0.016	3290
							16×20	0.018	3140
3300	12.5×20	0.021	2360	12.5×25	0.018	2770	12.5×35	0.015	3400
3900	12.5×25	0.018	2770	12.5×30	0.016	3290			
				16×20	0.018	3140	16×25	0.016	3460
4700	12.5×30	0.016	3290	12.5×35	0.015	3400			
5600	12.5×35	0.015	3400	16×25	0.016	3460			
	16×20	0.018	3140						
6800	16×25	0.016	3460						

EK Series

◆ **Case size & Permissible rated ripple current:**

Nominal Capacitance (uF)	25V			35V			50V		
	Case Size ΦD×L (mm)	Impedance @20℃ (Ωmax/100kHz)	Max. Rated ripple current @105℃ 100kHz (mA rms)	Case Size ΦD×L (mm)	Impedance @20℃ (Ωmax/100kHz)	Max. Rated ripple current @105℃ 100kHz (mA rms)	Case Size ΦD×L (mm)	Impedance @20℃ (Ωmax/100kHz)	Max. Rated ripple current @105℃ 100kHz (mA rms)
0.1							5×11	20.000	38
0.22							5×11	15.000	40
0.33							5×11	12.000	45
0.47							5×11	4.000	50
1							5×11	3.600	100
2.2							5×11	3.600	140
4.7	5×11	1.200	100				5×11	3.600	140
10	5×11	1.200	100	5×11	0.800	170	5×11	0.900	180
22	5×11	1.000	120				5×11	0.750	238
33				5×11	0.300	250			
47	5×11	0.300	250				6.3×11	0.340	285
56				6.3×11	0.130	405	6.3×11	0.140	385
68									
100	6.3×11	0.130	405				8×11.5	0.074	724
120							8×15	0.061	950
150				8×11.5	0.072	760	10×12.5	0.061	979
180							8×20	0.046	1190
220	8×11.5	0.072	840	8×15	0.056	995	10×16	0.042	1370
				10×12.5	0.053	1030			
270				8×20	0.041	1250	10×20	0.030	1580
330	8×15	0.056	995						
	10×12.5	0.053	1030	10×16	0.038	1430	10×25	0.028	1870
470	8×20	0.041	1250						
	10×12.5	0.038	1300	10×16	0.030	1620			
	10×16	0.038	1430	10×20	0.023	1820			
	12.5×16	0.035	1480	12.5×16	0.033	1750	12.5×20	0.027	2050
560				10×25	0.022	2150	12.5×25	0.023	2410
680	10×16	0.028	1750				12.5×20	0.028	2700
	10×20	0.023	1820	12.5×20	0.021	2360	12.5×30	0.021	2860
820	10×25	0.022	2150				12.5×35	0.019	2960
							16×20	0.023	2730
1000	12.5×16	0.028	2250	12.5×20	0.050	2610			
	12.5×20	0.021	2360	12.5×25	0.018	2770	16×25	0.021	3010
1200				12.5×30	0.016	3290			
				16×20	0.018	3140			
1500	12.5×25	0.018	2770	12.5×35	0.015	3400			
1800	12.5×30	0.016	3290						
	16×20	0.018	3140	16×25	0.016	3460			
2200	12.5×35	0.015	3400						
2700	16×25	0.016	3460						

◆ **RIPPLE CURRENT MULTIPLIERS**

Frequency Multipliers

Vdc	Cap(uF)	Frequency (Hz)			
		120	1K	10K	100K
6.3 ~50	0.10 ~ 68	0.30	0.55	0.80	1.00
	82 ~ 220	0.40	0.60	0.85	1.00
	330 ~ 820	0.50	0.65	0.90	1.00
	1000 ~ 6800	0.60	0.70	0.95	1.00

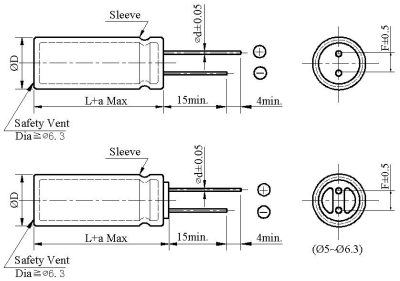
EV Series

- **Low impedance and High ripple current**
- **Load life 3,000~6,000 hours at 105℃**

◆ SPECIFICATIONS

Item	Performance Characteristics
Category Temperature Range	-40~ +105℃
Working Voltage Range	6.3 ~ 35Vdc
Capacitance Range	10 ~8,200μF
Capacitance Tolerance	±20% (at 25℃ and 120Hz)
Dissipation Factor (tanδ) (at 25℃, 120Hz)	Rated Voltage (V): 6.3 / 10 / 16 / 25 / 35 tanδ(Max): 0.22 / 0.19 / 0.16 / 0.14 / 0.12 The above values should be increased by 0.02 for every additional 1000μF
Leakage Current	I=0.01CV or 3μA whichever is greater I : Leakage current (μA) C : Rated capacitance (μF) V : Rated voltage (V) Impress the rated voltage for 2 minutes
Low Temperature Characteristics Impedance Ratio(MAX)	Rated voltage (V): 6.3 / 10 / 16 / 25 / 35 Z(-40℃)/Z(+20℃): 8 / 6 / 6 / 5 / 4 (at 120Hz)
Endurance	The following specifications shall be satisfied when the capacitors are restored to 25℃ after subjected to DC voltage with the rated ripple current is applied for 3,000~6,000 hours at 105℃ Capacitance change: ≦ ±25% of the initial value Dissipation factor(tanδ): ≦ 200% of the specified value Leakage current: ≦ specified value Size / Life time (hours): ≦6.3Φ: 3,000; = 8 Φ: 4,000; = 10Φ: 5,000; ≧12.5Φ: 6,000
Shelf Life	The following requirements shall be satisfied when the capacitor are restored to 25℃ after exposing them for 1,000 hours at 105℃ without voltage applied. Capacitance change: ≦ ±25% of the initial value Dissipation factor(tanδ): ≦ 200% of the specified value Leakage current: ≦ 200% of the specified value
Others	Conforms to JIS-C-5101-4 (1998), characteristic W

◆ DIMENSIONS (mm)



ΦD	5	6.3	8	10	12.5	16	18
ΦD	ΦD + 0.5 Max						
Φd	0.5	0.5	0.6	0.6	0.6	0.8	0.8
F	2.0	2.5	3.5	5.0	5.0	7.5	7.5
a	L + 1.5 Max				≦ 35 L+1.5Max ≧ 40 L+2.0 Max	L +1.5 Max	

◆ PART NUMBER SYSTEM(Example : 16V 3300μF)

E	V	1	C	3	3	2	M	N	N	1	6	2	0						

Special Request
Size code(1620 : 16×20)
Lead length code
Lead forming Type code
Capacitance tolerance code(M:±20%)
Capacitance code (3300μF)
Voltage code (16V)
Series code (EV)

EV Series

◆ **Case size & Permissible rated ripple current**

Nominal Capacitance (uF)	6.3V				10V				16 V			
	Case Size ΦD×L (mm)	Impedance (Ωmax/100kHz)		Max. Rated ripple current @105℃ 100kHz (mA rms)	Case Size ΦD×L (mm)	Impedance (Ωmax/100kHz)		Max. Rated ripple current @105℃ 100kHz (mA rms)	Case Size ΦD×L (mm)	Impedance (Ωmax/100kHz)		Max. Rated ripple current @105℃ 100kHz (mA rms)
		20℃	-10℃			20℃	-10℃			20℃	-10℃	
100									5×11	0.230	0.760	360
150					5×11	0.230	0.760	360	6.3×11	0.100	0.330	450
220	5×11	0.230	0.760	360	6.3×11	0.100	0.330	450	6.3×11	0.100	0.330	550
330	6.3×11	0.100	0.330	460	6.3×11	0.100	0.330	550	8×11.5	0.059	0.181	830
470	6.3×11	0.100	0.330	550	8×11.5	0.059	0.181	820	8×11.5	0.059	0.181	990
680	8×11.5	0.059	0.181	860	8×11.5	0.059	0.181	990	8×15	0.046	0.143	1330
									10×12.5	0.043	0.133	1360
820	8×11.5	0.059	0.181	990	10×12.5	0.043	0.133	1250	10×16	0.030	0.095	1650
1000	10×12.5	0.043	0.133	1250	10×16	0.039	0.128	1450	8×20	0.031	0.105	1550
									10×16	0.030	0.095	1815
1200	10×12.5	0.043	0.133	1360	10×16	0.030	0.095	1650	10×20	0.019	0.057	1930
	8×15	0.046	0.143	1330								
1500	8×20	0.031	0.105	1550	10×16	0.030	0.095	1815	10×20	0.019	0.057	2160
					8×20	0.031	0.105	1550				
1800	10×16	0.030	0.095	1815	10×20	0.019	0.057	2160	10×25	0.017	0.051	2475
2200	10×20	0.019	0.057	2160	10×25	0.017	0.051	2475	12.5×20	0.016	0.041	2725
2700	10×25	0.017	0.051	2475	12.5×20	0.016	0.041	2600	12.5×25	0.014	0.036	3190
3300	12.5×20	0.016	0.041	2500	12.5×20	0.016	0.041	2725	12.5×30	0.012	0.031	3795
									16×20	0.014	0.036	3575
3900	12.5×20	0.016	0.041	2725	12.5×25	0.014	0.036	3190	12.5×35	0.011	0.029	3925
4700	12.5×25	0.014	0.036	3190	12.5×30	0.012	0.031	3795	16×25	0.012	0.033	3990
					16×20	0.014	0.036	3575				
5600	12.5×35	0.012	0.031	3795	12.5×35	0.011	0.029	3925				
6800	12.5×36	0.011	0.029	3925	16×25	0.012	0.033	3990				
	16×20	0.014	0.036	3575								
8200	16×25	0.012	0.033	3990								

EV Series

◆ **Case size & Permissible rated ripple current**

Nominal Capacitance (uF)	25 V				35 V			
	Case Size ΦD×L (mm)	Impedance (Ωmax/100kHz)		Max. Rated ripple current @105℃ 100kHz (mA rms)	Case Size ΦD×L (mm)	Impedance (Ωmax/100kHz)		Max. Rated ripple current @105℃ 100kHz (mA rms)
		20℃	-10℃			20℃	-10℃	
10	5×11	0.650	1.320	300	5×11	0.840	2.420	360
47					5×11	0.230	0.760	390
68	5×11	0.230	0.760	360	6.3×11	0.100	0.330	450
100	6.3×11	0.100	0.330	450	6.3×11	0.100	0.330	550
150	8×11.5	0.100	0.330	550	8×11.5	0.059	0.181	820
220	8×15	0.059	0.181	810	8×11.5	0.059	0.181	990
					8×15	0.048	0.150	1200
270	8×11.5	0.059	0.181	900	8×15	0.046	0.143	1330
330	8×11.5	0.059	0.181	990	10×12.5	0.043	0.133	1360
390	8×15	0.046	0.143	1330	8×20	0.031	0.105	1550
470	10×12.5	0.043	0.133	1360	10×16	0.030	0.095	1815
560	8×20	0.031	0.105	1550	10×20	0.019	0.057	2160
680	10×16	0.030	0.095	1815	10×25	0.017	0.051	2475
820	10×20	0.019	0.057	2160	12.5×20	0.016	0.041	2725
1000	10×25	0.017	0.051	2475	12.5×20	0.016	0.041	2920
1200	12.5×20	0.016	0.041	2570	12.5×25	0.014	0.041	3190
1500	12.5×20	0.016	0.041	2725	12.5×30	0.012	0.031	3795
					16×20	0.014	0.036	3575
1800	12.5×35	0.014	0.036	3190	12.5×35	0.011	0.029	3925
2200	12.5×30	0.012	0.031	3795	16×25	0.012	0.033	3990
	16×20	0.014	0.036	3575				
2700	12.5×35	0.011	0.029	3925				
3300	16×25	0.012	0.033	3990				

◆ **RIPPLE CURRENT MULTIPLIERS**

Frequency Multipliers

Vdc	Cap(uF)	Frequency (Hz)			
		120	1K	10K	100K
6.3 ~ 35	10 ~ 68	0.30	0.55	0.80	1.00
	82 ~ 220	0.40	0.60	0.85	1.00
	330 ~ 820	0.50	0.65	0.90	1.00
	1000 ~ 8200	0.60	0.70	0.95	1.00

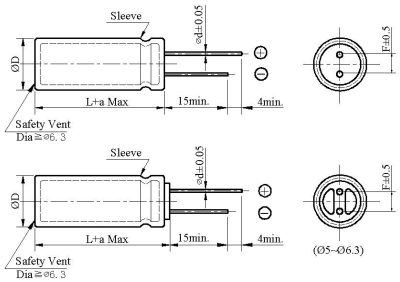
EJ Series

- **Low impedance and High ripple current**
- **Load life 3,000 to 5,000 hours at 105°C**

◆ SPECIFICATIONS

Item	Performance Characteristics
Category Temperature Range	-55~ +105°C
Working Voltage Range	6.3 ~ 63Vdc
Capacitance Range	10 ~10,000μF
Capacitance Tolerance	±20% (at 25°C and 120Hz)
Dissipation Factor (tanδ) (at 25°C, 120Hz)	Rated Voltage (V): 6.3 / 10 / 16 / 25 / 35 / 50 / 63 tanδ(Max): 0.22 / 0.19 / 0.16 / 0.14 / 0.12 / 0.10 / 0.09 The above values should be increased by 0.02 for every additional 1000μF
Leakage Current	I=0.01CV or 3μA whichever is greater I : Leakage current (μA) C : Rated capacitance (μF) V : Rated voltage (V) Impress the rated voltage for 2 minutes
Low Temperature Characteristics Impedance Ratio(MAX)	Rated voltage (V): 6.3 / 10 / 16 / 25 / 35 / 50 / 63 Z(-55°C)/Z(+20°C): 4 / 3 / 3 / 3 / 3 / 3 / 3 (at 120Hz)
Endurance	The following specifications shall be satisfied when the capacitors are restored to 25°C after subjected to DC voltage with the rated ripple current is applied for 3,000~5,000 hours at 105°C Capacitance change: ≦ ±25% of the initial value Dissipation factor(tanδ): ≦ 200% of the specified value Leakage current: ≦ specified value Size / Life time (hours): ≦6.3Φ: 3,000; = 8 Φ: 4,000; ≧10 Φ: 5,000
Shelf Life	The following requirements shall be satisfied when the capacitor are restored to 25℃ after exposing them for 1,000 hours at 105℃ without voltage applied. Capacitance change: ≦ ±25% of the initial value Dissipation factor(tanδ): ≦ 200% of the specified value Leakage current: ≦ 200% of the specified value
Others	Conforms to JIS-C-5101-4 (1998), characteristic W

◆ DIMENSIONS (mm)



ΦD	5	6.3	8	10	12.5	16	18
ΦD	ΦD + 0.5 Max						
Φd	0.5	0.5	0.6	0.6	0.6	0.8	0.8
F	2.0	2.5	3.5	5.0	5.0	7.5	7.5
a	L + 1.5 Max				≦ 35 L+1.5Max ≧ 40 L+2.0 Max	L + 1.5 Max	

◆ PART NUMBER SYSTEM(Example : 6.3V 10000μF)

E	J	0	J	1	0	3	M	N	N	1	6	P	1						

- Special Request
- Size code(16P1 : 16×35.5)
- Lead length code
- Lead forming Type code
- Capacitance tolerance code(M:±20%)
- Capacitance code (10000μF)
- Voltage code (6.3V)
- Series code (EJ)

EJ Series

◆ **Case size & Permissible rated ripple current**

Nominal capacitance (uF)	6.3V				10V			
	Case size ΦD×L (mm)	Impedance (Ωmax/100kHz)		Max.Rated ripple current @105℃ 100kHz (mA rms)	Case size ΦD×L (mm)	Impedance (Ωmax/100kHz)		Max.Rated ripple current @105℃ 100kHz (mA rms)
		20℃	-10℃			20℃	-10℃	
100	5×11	0.650	3.600	155	5×11	0.580	2.300	210
220	6.3×11	0.400	1.600	255	6.3×11	0.220	0.870	340
330	6.3×11	0.220	0.870	340	8×11.5	0.210	0.850	410
470	8×11.5	0.180	0.800	400	8×11.5	0.130	0.520	640
560	8×11.5	0.170	0.750	460	8×15	0.120	0.480	675
680	8×11.5	0.130	0.520	640	8×15	0.087	0.350	840
820	8×15	0.095	0.480	730	8×20	0.085	0.330	875
1000	8×15	0.087	0.350	840	10×16	0.060	0.240	1210
1200	8×20	0.069	0.270	1050	10×20	0.046	0.180	1400
1500	10×20	0.046	0.180	1400	10×20	0.045	0.180	1440
2200	10×20	0.045	0.180	1440	12.5×20	0.035	0.120	1900
2700	10×30	0.035	0.120	1910	12.5×25	0.034	0.110	1945
3300	12.5×20	0.030	0.120	1950	12.5×25	0.027	0.089	2230
3900	12.5×25	0.027	0.089	2230	12.5×30	0.024	0.078	2650
4700	12.5×30	0.024	0.078	2650	12.5×35	0.020	0.065	2880
5600	12.5×35	0.020	0.065	2880	12.5×40	0.017	0.056	3350
6800	12.5×40	0.017	0.056	3350	16×31.5	0.017	0.050	3450
8200	16×31.5	0.017	0.050	3450	16×35.5	0.015	0.044	3610
10000	16×35.5	0.015	0.044	3610	16×40	0.013	0.038	4080

Nominal capacitance (uF)	16V				25V			
	Case size ΦD×L (mm)	Impedance (Ωmax/100kHz)		Max.Rated ripple current @105℃ 100kHz (mA rms)	Case size ΦD×L (mm)	Impedance (Ωmax/100kHz)		Max.Rated ripple current @105℃ 100kHz (mA rms)
		20℃	-10℃			20℃	-10℃	
47	5×11	0.800	2.800	120	5×11	0.580	2.300	210
68	6.3×11	0.560	2.200	220	6.3×11	0.360	1.800	230
100	6.3×11	0.520	1.500	255	6.3×11	0.220	0.870	340
150	8×11.5	0.210	0.860	350	8×11.5	0.200	0.690	405
220	8×11.5	0.200	0.790	405	8×11.5	0.130	0.520	640
330	8×11.5	0.130	0.520	640	8×15	0.087	0.350	840
470	8×15	0.087	0.350	840	10×16	0.060	0.240	1210
560	8×20	0.085	0.340	865	10×20	0.058	0.230	1220
680	8×20	0.069	0.270	1050	10×20	0.046	0.180	1400
820	10×20	0.058	0.230	1220	10×25	0.042	0.170	1650
1000	10×20	0.046	0.180	1400	12.5×20	0.035	0.120	1900
1200	10×25	0.042	0.170	1650	12.5×25	0.034	0.110	1936
1500	12.5×20	0.035	0.120	1900	12.5×25	0.027	0.089	2230
2200	12.5×25	0.027	0.089	2230	12.5×35	0.020	0.065	2880
2700	12.5×30	0.024	0.078	2650	12.5×40	0.017	0.056	3350
3300	12.5×35	0.020	0.065	2880	16×31.5	0.017	0.050	3450
3900	12.5×40	0.017	0.056	3350	16×35.5	0.015	0.044	3610
4700	16×31.5	0.017	0.050	3450	16×40	0.013	0.038	4080
5600	16×35.5	0.015	0.044	3610				
6800	16×40	0.013	0.038	4080				

EJ Series

◆ **Case size & Permissible rated ripple current:**

Nominal capacitance (uF)	35V				50V			
	Case size ΦD×L (mm)	Impedance (Ωmax/100kHz) 20℃	Impedance (Ωmax/100kHz) -10℃	Max.Rated ripple current @105℃ 100kHz (mA rms)	Case size ΦD×L (mm)	Impedance (Ωmax/100kHz) 20℃	Impedance (Ωmax/100kHz) -10℃	Max.Rated ripple current @105℃ 100kHz (mA rms)
10	5×11	1.500	3.800	100	5×11	1.450	3.500	105
22	5×11	0.750	3.200	160	5×11	0.700	2.800	180
33	5×11	0.580	2.300	210	6.3×11	0.480	1.700	215
47	6.3×11	0.490	1.800	215	6.3×11	0.400	1.600	220
68	8×11.5	0.210	0.870	350	8×11.5	0.280	1.100	355
100	8×11.5	0.200	0.850	405	8×11.5	0.170	0.680	555
150	8×11.5	0.130	0.520	640	8×15	0.120	0.480	730
220	8×15	0.087	0.350	840	10×16	0.084	0.340	1050
330	10×16	0.060	0.240	1210	10×25	0.055	0.220	1440
470	10×20	0.046	0.180	1400	12.5×20	0.045	0.150	1660
560	10×25	0.042	0.170	1650	12.5×25	0.034	0.110	1950
680	10×30	0.031	0.120	1910	12.5×30	0.030	0.100	2310
820	12.5×25	0.030	0.110	1938	12.5×35	0.025	0.083	2510
1000	12.5×25	0.027	0.089	2230	16×25	0.025	0.075	2555
1200	12.5×30	0.024	0.078	2650	16×31.5	0.022	0.066	3010
1500	12.5×35	0.020	0.065	2880	16×35.5	0.019	0.057	3150
2200	16×31.5	0.017	0.050	3450	18×35.5	0.017	0.046	3680
2700	16×35.5	0.015	0.044	3610	18×40	0.014	0.038	3800
3300	16×40	0.013	0.038	4080				
3900	18×40	0.012	0.032	4280				

Nominal capacitance (uF)	63V			
	Case size ΦD×L (mm)	Impedance (Ωmax/100kHz) 20℃	Impedance (Ωmax/100kHz) -10℃	Max.Rated ripple current @105℃ 100kHz (mA rms)
10	5×11	2.850	9.300	30
22	6.3×11	1.850	7.200	60
33	6.3×11	1.200	5.000	115
47	8×11.5	1.000	4.500	170
68	8×11.5	0.610	2.500	245
100	8×15	0.430	1.900	305
100	10×12.5	0.430	1.900	305
220	10×20	0.210	0.920	470
220	10×25	0.200	0.840	531
330	12.5×25	0.120	0.450	784
470	12.5×30	0.100	0.420	905
560	12.5×35	0.083	0.350	1050
680	12.5×40	0.071	0.300	1180
820	16×31.5	0.054	0.200	1570
1000	16×35.5	0.045	0.170	1790
1200	16×40	0.040	0.150	2020
1500	18×40	0.036	0.130	2330

◆ **RIPPLE CURRENT MULTIPLIERS**

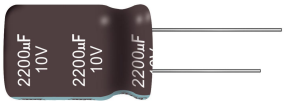
Frequency Multipliers

Vdc	Cap(uF)	Frequency (Hz) 50/60	120	1K	10K	100K
6.3 ~ 63	10 ~220	0.30	0.50	0.80	0.90	1.00
	330 ~ 820	0.57	0.71	0.90	0.98	1.00
	1000 ~ 10000	0.75	0.87	0.98	1.00	1.00

ALUMINUM ELECTROLYTIC CAPACITORS

EG Series

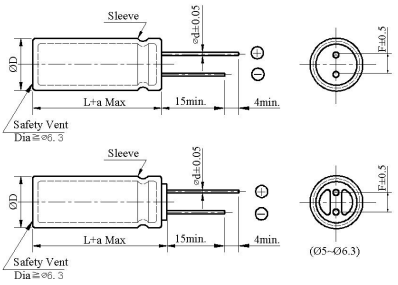
- **Low impedance and High ripple current**
- **Load life 3,000 to 6,000 hours at 105℃**



◆ SPECIFICATIONS

Item	Performance Characteristics
Category Temperature Range	-55~ +105°C
Working Voltage Range	6.3 ~ 63Vdc
Capacitance Range	10 ~10,000μF
Capacitance Tolerance	±20% (at 25°C and 120Hz)
Dissipation Factor (tanδ) (at 25°C, 120Hz)	Rated Voltage (V): 6.3 / 10 / 16 / 25 / 35 / 50 / 63 tanδ(Max): 0.22 / 0.19 / 0.16 / 0.14 / 0.12 / 0.10 / 0.09 The above values should be increased by 0.02 for every additional 1000μF
Leakage Current	I=0.01CV or 3μA whichever is greater I : Leakage current (μA) C : Rated capacitance (μF) V : Rated voltage (V) Impress the rated voltage for 2 minutes
Low Temperature Characteristics Impedance Ratio(MAX)	Rated voltage (V): 6.3 / 10 / 16 / 25 / 35 / 50 / 63 Z(-55°C)/Z(+20°C): 4 / 3 / 3 / 3 / 3 / 3 / 3 (at 120Hz)
Endurance	The following specifications shall be satisfied when the capacitors are restored to 25°C after subjected to DC voltage with the rated ripple current is applied for 3,000~6,000 hours at 105°C Capacitance change: ≦ ±25% of the initial value Dissipation factor(tanδ): ≦ 200% of the specified value Leakage current: ≦ specified value Size / Life time (hours): ≦6.3Φ: 3,000; = 8 Φ: 4,000; = 10Φ: 5,000; ≧12.5Φ: 6,000
Shelf Life	The following requirements shall be satisfied when the capacitor are restored to 25℃ after exposing them for 1,000 hours at 105℃ without voltage applied. Capacitance change: ≦ ±25% of the initial value Dissipation factor(tanδ): ≦ 200% of the specified value Leakage current: ≦ 200% of the specified value
Others	Conforms to JIS-C-5101-4 (1998), characteristic W

◆ DIMENSIONS (mm)



ΦD	5	6.3	8	10	12.5	16	18
ΦD	ΦD + 0.5 Max						
Φd	0.5	0.5	0.6	0.6	0.6	0.8	0.8
F	2.0	2.5	3.5	5.0	5.0	7.5	7.5
a	L + 1.5 Max				≦ 35 L+1.5Max ≧ 40 L+2.0 Max	L +1.5 Max	

◆ PART NUMBER SYSTEM(Example : 35V 3900μF)

E	G	1	V	3	9	2	M	N	N	1	8	4	0						

- Special Request
- Size code(1840 : 18×40)
- Lead length code
- Lead forming Type code
- Capacitance tolerance code(M:±20%)
- Capacitance code (3900μF)
- Voltage code (35V)
- Series code (EG)

EG Series

◆ **Case size & Permissible rated ripple current**

Nominal capacitance (uF)	6.3V				10V			
	Case size ΦD×L (mm)	Impedance (Ωmax/100kHz)		Max.Rated ripple current @105℃ 100kHz (mA rms)	Case size ΦD×L (mm)	Impedance (Ωmax/100kHz)		Max.Rated ripple current @105℃ 100kHz (mA rms)
		20℃	-10℃			20℃	-10℃	
100	5×11	0.650	3.600	155	5×11	0.580	2.300	210
220	6.3×11	0.400	1.600	255	6.3×11	0.220	0.870	340
330	6.3×11	0.220	0.870	340	8×11.5	0.210	0.850	410
470	8×11.5	0.180	0.800	400	8×11.5	0.130	0.520	640
560	8×11.5	0.170	0.750	460	8×15	0.120	0.480	675
680	8×11.5	0.130	0.520	640	8×15	0.087	0.350	840
820	8×15	0.095	0.480	730	8×20	0.085	0.330	875
1000	8×15	0.087	0.350	840	10×16	0.060	0.240	1210
1200	8×20	0.069	0.270	1050	10×20	0.046	0.180	1400
1500	10×20	0.046	0.180	1400	10×20	0.045	0.180	1440
2200	10×20	0.045	0.180	1440	12.5×20	0.035	0.120	1900
2700	10×30	0.035	0.120	1910	12.5×25	0.034	0.110	1945
3300	12.5×20	0.030	0.120	1950	12.5×25	0.027	0.089	2230
3900	12.5×25	0.027	0.089	2230	12.5×30	0.024	0.078	2650
4700	12.5×30	0.024	0.078	2650	12.5×35	0.020	0.065	2880
5600	12.5×35	0.020	0.065	2880	12.5×40	0.017	0.056	3350
6800	12.5×40	0.017	0.056	3350	16×31.5	0.017	0.050	3450
8200	16×31.5	0.017	0.050	3450	16×35.5	0.015	0.044	3610
10000	16×35.5	0.015	0.044	3610	16×40	0.013	0.038	4080

Nominal capacitance (uF)	16V				25V			
	Case size ΦD×L (mm)	Impedance (Ωmax/100kHz)		Max.Rated ripple current @105℃ 100kHz (mA rms)	Case size ΦD×L (mm)	Impedance (Ωmax/100kHz)		Max.Rated ripple current @105℃ 100kHz (mA rms)
		20℃	-10℃			20℃	-10℃	
47	5×11	0.800	2.800	120	5×11	0.580	2.300	210
68	6.3×11	0.560	2.200	220	6.3×11	0.360	1.800	230
100	6.3×11	0.520	1.500	255	6.3×11	0.220	0.870	340
150	8×11.5	0.210	0.860	350	8×11.5	0.200	0.690	405
220	8×11.5	0.200	0.790	405	8×11.5	0.130	0.520	640
330	8×11.5	0.130	0.520	640	8×15	0.087	0.350	840
470	8×15	0.087	0.350	840	10×16	0.060	0.240	1210
560	8×20	0.085	0.340	865	10×20	0.058	0.230	1220
680	8×20	0.069	0.270	1050	10×20	0.046	0.180	1400
820	10×20	0.058	0.230	1220	10×25	0.042	0.170	1650
1000	10×20	0.046	0.180	1400	12.5×20	0.035	0.120	1900
1200	10×25	0.042	0.170	1650	12.5×25	0.034	0.110	1936
1500	12.5×20	0.035	0.120	1900	12.5×25	0.027	0.089	2230
2200	12.5×25	0.027	0.089	2230	12.5×35	0.020	0.065	2880
2700	12.5×30	0.024	0.078	2650	12.5×40	0.017	0.056	3350
3300	12.5×35	0.020	0.065	2880	16×31.5	0.017	0.050	3450
3900	12.5×40	0.017	0.056	3350	16×35.5	0.015	0.044	3610
4700	16×31.5	0.017	0.050	3450	16×40	0.013	0.038	4080
5600	16×35.5	0.015	0.044	3610				
6800	16×40	0.013	0.038	4080				

EG Series

◆ **Case size & Permissible rated ripple current**

Nominal capacitance (uF)	35V				50V			
	Case size ΦD×L (mm)	Impedance (Ωmax/100kHz)		Max.Rated ripple current @105℃ 100kHz (mA rms)	Case size ΦD×L (mm)	Impedance (Ωmax/100kHz)		Max.Rated ripple current @105℃ 100kHz (mA rms)
		20℃	-10℃			20℃	-10℃	
10	5×11	1.500	3.800	100	5×11	1.450	3.500	105
22	5×11	0.750	3.200	160	5×11	0.700	2.800	180
33	5×11	0.580	2.300	210	6.3×11	0.480	1.700	215
47	6.3×11	0.490	1.800	215	6.3×11	0.400	1.600	220
68	8×11.5	0.210	0.870	350	8×11.5	0.280	1.100	355
100	8×11.5	0.200	0.850	405	8×11.5	0.170	0.680	555
150	8×11.5	0.130	0.520	640	8×15	0.120	0.480	730
220	8×15	0.087	0.350	840	10×16	0.084	0.340	1050
330	10×16	0.060	0.240	1210	10×25	0.055	0.220	1440
470	10×20	0.046	0.180	1400	12.5×20	0.045	0.150	1660
560	10×25	0.042	0.170	1650	12.5×25	0.034	0.110	1950
680	10×30	0.031	0.120	1910	12.5×30	0.030	0.100	2310
820	12.5×25	0.030	0.110	1938	12.5×35	0.025	0.083	2510
1000	12.5×25	0.027	0.089	2230	16×25	0.025	0.075	2555
1200	12.5×30	0.024	0.078	2650	16×31.5	0.022	0.066	3010
1500	12.5×35	0.020	0.065	2880	16×35.5	0.019	0.057	3150
2200	16×31.5	0.017	0.050	3450	18×35.5	0.017	0.046	3680
2700	16×35.5	0.015	0.044	3610	18×40	0.014	0.038	3800
3300	16×40	0.013	0.038	4080				
3900	18×40	0.012	0.032	4280				

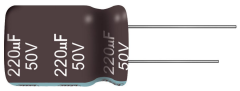
Nominal capacitance (uF)	63V			
	Case size ΦD×L (mm)	Impedance (Ωmax/100kHz)		Max.Rated ripple current @105℃ 100kHz (mA rms)
		20℃	-10℃	
10	5×11	2.850	9.300	30
22	6.3×11	1.850	7.200	60
33	6.3×11	1.200	5.000	115
47	8×11.5	1.000	4.500	170
68	8×11.5	0.610	2.500	245
100	8×15	0.430	1.900	305
100	10×12.5	0.430	1.900	305
220	10×20	0.210	0.920	470
220	10×25	0.200	0.840	531
330	12.5×25	0.120	0.450	784
470	12.5×30	0.100	0.420	905
560	12.5×35	0.083	0.350	1050
680	12.5×40	0.071	0.300	1180
820	16×31.5	0.054	0.200	1570
1000	16×35.5	0.045	0.170	1790
1200	16×40	0.040	0.150	2020
1500	18×40	0.036	0.130	2330

◆ **RIPPLE CURRENT MULTIPLIERS**

Frequency Multipliers

Vdc	Cap(uF)	Frequency (Hz)				
		60	120	1K	10K	100K
6.3 ~ 63	10 ~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 ~ 10000	0.75	0.80	0.95	1.00	1.00

EY Series

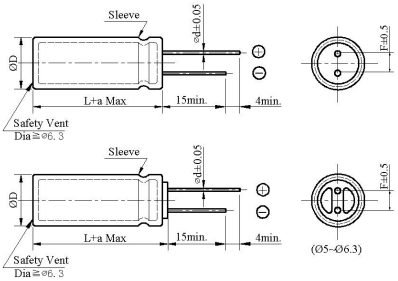


- **Miniaturized, Low E.S.R and Low impedance**
- **Suitable for use in high ripple current capability**
- **Load life 4,000~10,000 hours at 105℃**

◆ SPECIFICATIONS

Item	Performance Characteristics
Category Temperature Range	-55~ +105℃
Working Voltage Range	6.3 ~ 100Vdc
Capacitance Range	6.8 ~18,000μF
Capacitance Tolerance	±20% (at 25℃ and 120Hz)
Dissipation Factor (tanδ) (at 25℃, 120Hz)	Rated Voltage (V): 6.3 / 10 / 16 / 25 / 35 / 50 / 63 / 100 tanδ(Max): 0.22 / 0.19 / 0.16 / 0.14 / 0.12 / 0.10 / 0.09 / 0.08 The above values should be increased by 0.02 for every additional 1000μF
Leakage Current	I=0.01CV or 3μA whichever is greater I : Leakage current (μA) C : Rated capacitance (μF) V : Rated voltage (V) Impress the rated voltage for 2 minutes
Low Temperature Characteristics Impedance Ratio(MAX)	Rated voltage (V): 6.3 / 10 / 16 / 25 / 35 / 50 / 63 / 100 Z(-55℃)/Z(+20℃): 4 / 3 / 3 / 3 / 3 / 3 / 3 / 3 (at 120Hz)
Endurance	The following specifications shall be satisfied when the capacitors are restored to 25℃ after subjected to DC voltage with the rated ripple current is applied for 4,000~10,000 hours at 105℃ Capacitance change: ≦ ±25% of the initial value Dissipation factor(tanδ): ≦200% of the specified value Leakage current: ≦ specified value Size / Life time (hours): (6.3~10WV) / (16~100WV) ≦ 6.3 Φ: 4,000 / 5,000 8 ~ 10 Φ: 6,000 / 7,000 ≧12.5Φ: 8,000 / 10,000
Shelf Life	The following requirements shall be satisfied when the capacitor are restored to 25℃ after exposing them for 1,000 hours at 105℃ without voltage applied. Capacitance change: ≦ ±25% of the initial value Dissipation factor(tanδ): ≦ 200% of the specified value Leakage current: ≦ 200% of the specified value
Others	Conforms to JIS-C-5101-4 (1998), characteristic W

◆ DIMENSIONS (mm)



ΦD	5	6.3	8	10	12.5	16	18
ΦD	ΦD + 0.5 Max						
Φd	0.5	0.5	0.6	0.6	0.6	0.8	0.8
F	2.0	2.5	3.5	5.0	5.0	7.5	7.5
a	L + 1.5 Max				≦ 35 L+1.5Max ≧ 40 L+2.0 Max	L + 1.5 Max	

◆ PART NUMBER SYSTEM(Example : 10V 5600μF)

E	Y	1	A	5	6	2	M	N	N	1	8	2	0						

- Special Request
- Size code(1820 : 18×20)
- Lead length code
- Lead forming Type code
- Capacitance tolerance code(M:±20%)
- Capacitance code (5600μF)
- Voltage code (10V)
- Series code (EY)

EY Series

◆ **Case size & Permissible rated ripple current**

Nominal capacitance (uF)	6.3V				10V			
	Case size ΦD×L (mm)	Impedance (Ωmax/100kHz)		Max. Rated ripple current @105℃ 100kHz (mA rms)	Case size ΦD×L (mm)	Impedance (Ωmax/100kHz)		Max. Rated ripple current @105℃ 100kHz (mA rms)
		20℃	-10℃			20℃	-10℃	
100					5×11	0.580	2.300	215
150	5×11	0.570	2.300	210	5×11	0.580	2.300	230
220	6.3×11	0.250	0.900	320	6.3×11	0.220	0.870	340
330	6.3×11	0.210	0.870	350	6.3×11	0.220	0.870	380
470	8×11.5	0.150	0.580	410	8×11.5	0.130	0.520	640
680	8×11.5	0.130	0.520	645	8×15	0.086	0.350	845
					10×12.5	0.080	0.310	865
820	10×12.5	0.080	0.320	865	10×16	0.070	0.280	1015
1000	8×15	0.085	0.350	870	8×20	0.068	0.270	1050
					10×16	0.060	0.240	1215
1200	8×20	0.069	0.260	1050	10×20	0.045	0.180	1410
	10×16	0.062	0.240	1215				
1500	10×20	0.045	0.180	1410	10×25	0.041	0.170	1610
					12.5×16	0.049	0.160	1450
1800	12.5×16	0.048	0.160	1460	12.5×20	0.039	0.150	1710
2200	10×20	0.042	0.170	1650	10×30	0.030	0.120	1920
					12.5×20	0.035	0.120	1910
					16×16	0.042	0.120	1900
2700	10×30	0.030	0.120	1910	18×15	0.042	0.110	2220
	16×15	0.041	0.120	1945				
3300	12.5×20	0.034	0.120	1950	12.5×25	0.026	0.089	2250
3900	12.5×25	0.026	0.088	2240	12.5×30	0.023	0.078	2660
	18×15	0.042	0.110	2210	16×20	0.026	0.078	2540
4700	12.5×30	0.023	0.078	2670	12.5×35	0.020	0.065	2890
5600	12.5×35	0.020	0.065	2890	12.5×40	0.016	0.055	3360
	16×20	0.026	0.077	2540	16×25	0.020	0.060	2940
					18×20	0.025	0.066	2870
6800	12.5×40	0.016	0.055	3350	16×31.5	0.016	0.050	3460
	16×25	0.020	0.060	2940	18×25	0.018	0.049	3150
	18×20	0.025	0.066	2870				
8200	16×31.5	0.016	0.050	3460	16×35.5	0.015	0.044	3610
					18×31.5	0.015	0.040	4180
10000	16×35.5	0.014	0.044	3620	16×40	0.013	0.038	4090
	18×25	0.018	0.049	3150	18×35.5	0.012	0.038	4150
12000	16×40	0.012	0.038	4090	18×40	0.011	0.032	4290
	18×31.5	0.014	0.040	4180				
15000	18×35.5	0.013	0.038	4230				
18000	18×40	0.012	0.032	4290				

EY Series

◆ **Case size & Permissible rated ripple current**

Nominal capacitance (uF)	16V				25V			
	Case size ΦD×L (mm)	Impedance (Ωmax/100kHz)		Max. Rated ripple current @105℃ 100kHz (mA rms)	Case size ΦD×L (mm)	Impedance (Ωmax/100kHz)		Max. Rated ripple current @105℃ 100kHz (mA rms)
		20℃	-10℃			20℃	-10℃	
10	5×11	1.100	3.020	96	5×11	1.100	3.020	100
22	5×11	0.750	2.800	120	5×11	0.700	2.800	140
47	5×11	0.600	2.600	180	5×11	0.570	2.300	205
56	5×11	0.570	2.300	220	5×11	0.570	2.300	240
100	5×11	0.350	0.760	260	6.3×11	0.210	0.870	360
	6.3×11	0.210	0.820	310				
120	6.3×11	0.210	0.870	340				
220	6.3×11	0.150	0.650	450	8×11.5	0.120	0.520	650
	8×11.5	0.190	0.850	650				
330	8×11.5	0.120	0.520	760	8×15	0.087	0.350	850
					10×12.5	0.081	0.320	870
470	8×15	0.086	0.350	850	8×20	0.070	0.270	1050
	10×12.5	0.080	0.320	865	10×16	0.060	0.240	1210
680	8×20	0.069	0.270	1060	10×20	0.045	0.180	1410
	10×16	0.060	0.240	1210	12.5×16	0.049	0.160	1460
820	10×20	0.052	0.220	1310	10×25	0.041	0.170	1660
1000	10×20	0.045	0.180	1410	10×30	0.030	0.120	1920
	12.5×16	0.050	0.160	1450	12.5×20	0.034	0.120	1910
					16×16	0.042	0.120	1940
1200	10×25	0.043	0.170	1650	18×15	0.043	0.110	2220
1500	10×30	0.030	0.120	1920	12.5×25	0.026	0.089	2240
	12.5×20	0.035	0.120	1910				
	16×16	0.042	0.120	1940				
1800	12.5×25	0.028	0.095	2140	12.5×30	0.024	0.078	2660
					16×20	0.026	0.078	2540
2200	12.5×25	0.026	0.089	2240	12.5×35	0.020	0.065	2890
	18×15	0.042	0.110	2220	18×20	0.025	0.066	2870
2700	12.5×30	0.023	0.077	2650	12.5×40	0.016	0.056	3360
	16×20	0.026	0.078	2540	16×25	0.021	0.060	2940
3300	12.5×35	0.020	0.066	2890	16×30	0.016	0.050	3460
					18×25	0.018	0.048	3150
3900	12.5×40	0.016	0.056	3350	16×35.5	0.014	0.043	3620
	16×25	0.021	0.060	2930	18×31.5	0.015	0.040	4180
	16×20	0.025	0.067	2860				
4700	16×31.5	0.016	0.050	3450	16×40	0.012	0.038	4090
	18×25	0.018	0.049	3150	18×35.5	0.013	0.038	4230
5600	16×35.5	0.015	0.044	3620	18×40	0.011	0.032	4290
	18×31.5	0.015	0.040	4180				
6800	16×40	0.012	0.038	4080				
8200	18×35.5	0.014	0.038	4230				
18000	18×40	0.011	0.032	4290				

EY Series

◆ **Case size & Permissible rated ripple current**

Nominal capacitance (uF)	35V				50V			
	Case size ΦD×L (mm)	Impedance (Ωmax/100kHz)		Max. Rated ripple current @105℃ 100kHz (mA rms)	Case size ΦD×L (mm)	Impedance (Ωmax/100kHz)		Max. Rated ripple current @105℃ 100kHz (mA rms)
		20℃	-10℃			20℃	-10℃	
10					5×11	1.300	2.800	135
22					5×11	0.700	2.500	190
33	5×11	0.560	2.300	220	6.3×11	0.600	1.900	225
47	6.3×11	0.350	1.400	280	6.3×11	0.380	1.500	230
56	6.3×11	0.210	0.860	340	8×11.5	0.300	1.200	300
100	8×11.5	0.150	0.560	510	8×11.5	0.160	0.670	560
150	8×11.5	0.130	0.520	650	8×15	0.120	0.480	740
220	8×15	0.086	0.350	850	10×16	0.083	0.340	1060
330	10×16	0.060	0.240	1210	10×25	0.053	0.220	1460
470	10×20	0.045	0.180	1410	12.5×20	0.044	0.150	1670
560	10×25	0.041	0.160	1670	12.5×25	0.033	0.110	1960
680	10×30	0.030	0.120	1920	12.5×30	0.030	0.100	2320
820	12.5×25	0.029	0.095	2050	12.5×35	0.023	0.081	2530
1000	12.5×25	0.028	0.088	2250	16×25	0.025	0.075	2565
1200	12.5×30	0.023	0.078	2660	16×31.5	0.021	0.066	3020
1500	12.5×35	0.020	0.065	2890	16×35.5	0.018	0.056	3160
2200	16×31.5	0.016	0.056	3470	18×35.5	0.017	0.046	3690
2700	18×35.5	0.015	0.044	3620	18×40	0.014	0.038	3810
3300	16×40	0.013	0.038	4090				
3900	18×40	0.012	0.033	4290				

Nominal capacitance (uF)	63V				100V			
	Case size ΦD×L (mm)	Impedance (Ωmax/100kHz)		Max. Rated ripple current @105°C 100kHz (mA rms)	Case size ΦD×L (mm)	Impedance (Ωmax/100kHz)		Max. Rated ripple current @105°C 100kHz (mA rms)
		20℃	-10℃			20℃	-10℃	
6.8					5×11	2.200	9.200	56
15	5×11	2.200	9.200	56	6.3×11	1.200	5.000	120
33	6.3×11	1.200	5.000	120	8×15	0.580	3.200	160
47	8×11.5	0.680	3.100	190	10×12.5	0.430	1.800	290
68	8×11.5	0.600	2.900	255	10×16	0.300	1.500	350
100	10×16	0.350	1.800	320	10×25	0.200	0.840	535
120	10×16	0.300	1.500	355	10×30	0.150	0.710	665
180	10×20	0.200	0.940	470	12.5×25	0.120	0.450	790
220	10×25	0.200	0.840	535	12.5×30	0.100	0.420	905
330	12.5×25	0.120	0.450	790	12.5×40	0.070	0.300	1190
470	12.5×30	0.100	0.420	910	16×35.5	0.045	0.170	1790
560	12.5×35	0.082	0.350	1050	16×40	0.040	0.150	2030
680	12.5×40	0.070	0.300	1190	18×35.5	0.040	0.150	2100
820	16×31.5	0.053	0.200	1580	18×40	0.036	0.130	2340
1000	18×35.5	0.045	0.170	1790				
1200	16×40	0.040	0.150	2020				
1500	18×40	0.035	0.130	2340				

◆ **RIPPLE CURRENT MULTIPLIERS**

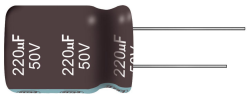
Frequency Multipliers

Vdc	Cap(uF)	Frequency (Hz)			
		120	1K	10K	100K
6.3 ~ 100	6.8 ~ 68	0.30	0.55	0.80	1.00
	82 ~ 220	0.40	0.60	0.85	1.00
	330 ~ 820	0.50	0.65	0.90	1.00
	1000 ~ 18000	0.60	0.70	0.95	1.00

ALUMINUM ELECTROLYTIC CAPACITORS

RF Series

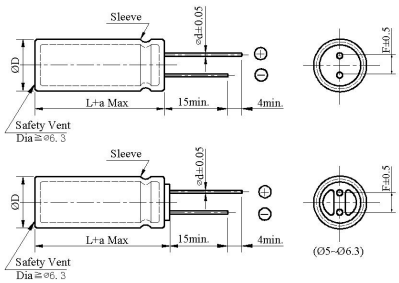
- **Miniaturized, Low E.S.R and Low impedance**
- **Suitable for use in high ripple current capability**
- **Load life 6,000~12,000 hours at 105℃**



◆ SPECIFICATIONS

Item	Performance Characteristics
Category Temperature Range	-55~ +105℃
Working Voltage Range	6.3 ~ 100Vdc
Capacitance Range	6.8 ~18,000μF
Capacitance Tolerance	±20% (at 25℃ and 120Hz)
Dissipation Factor (tanδ) (at 25℃, 120Hz)	Rated Voltage (V): 6.3 / 10 / 16 / 25 / 35 / 50 / 63 / 100 tanδ(Max): 0.22 / 0.19 / 0.16 / 0.14 / 0.12 / 0.10 / 0.09 / 0.08 The above values should be increased by 0.02 for every additional 1000μF
Leakage Current	I=0.01CV or 3μA whichever is greater I : Leakage current (μA) C : Rated capacitance (μF) V : Rated voltage (V) Impress the rated voltage for 2 minutes
Low Temperature Characteristics Impedance Ratio(MAX)	Rated voltage (V): 6.3 / 10 / 16 / 25 / 35 / 50 / 63 / 100 Z(-55℃)/Z(+20℃): 4 / 3 / 3 / 3 / 3 / 3 / 3 / 3 (at 120Hz)
Endurance	The following specifications shall be satisfied when the capacitors are restored to 25℃ after subjected to DC voltage with the rated ripple current is applied for 6,000~12,000 hours at 105℃ Capacitance change: ≦ ±25% of the initial value Dissipation factor(tanδ): ≦200% of the specified value Leakage current: ≦ specified value Size / Life time (hours): ≦6.3Φ 6,000; 8 Φ 8,000; 10 Φ 10,000; ≧12.5Φ 12,000
Shelf Life	The following requirements shall be satisfied when the capacitor are restored to 25℃ after exposing them for 1,000 hours at 105℃ without voltage applied. Capacitance change: ≦ ±25% of the initial value Dissipation factor(tanδ): ≦ 200% of the specified value Leakage current: ≦ 200% of the specified value
Others	Conforms to JIS-C-5101-4 (1998), characteristic W

◆ DIMENSIONS (mm)



ΦD	5	6.3	8	10	12.5	16	18
ΦD	ΦD + 0.5 Max						
Φd	0.5	0.5	0.6	0.6	0.6	0.8	0.8
F	2.0	2.5	3.5	5.0	5.0	7.5	7.5
a	L + 1.5 Max				≦ 35 L+1.5Max ≧ 40 L+2.0 Max	L + 1.5Max	

◆ PART NUMBER SYSTEM(Example : 50V 2700μF)

R	F	1	H	2	7	2	M	N	N	1	8	4	0						

Special Request
Size code(1840 : 18×40)
Lead length code
Lead forming Type code
Capacitance tolerance code(M:±20%)
Capacitance code (2700μF)
Voltage code (50V)
Series code (RF)

RF Series

◆ **Case size & Permissible rated ripple current**

Nominal capacitance (uF)	6.3V				10V			
	Case size ΦD×L (mm)	Impedance (Ωmax/100kHz)		Max. Rated ripple current @105℃ 100kHz (mA rms)	Case size ΦD×L (mm)	Impedance (Ωmax/100kHz)		Max. Rated ripple current @105℃ 100kHz (mA rms)
		20℃	-10℃			20℃	-10℃	
100					5×11	0.580	2.300	215
150	5×11	0.570	2.300	210	5×11	0.580	2.300	230
220	6.3×11	0.250	0.900	320	6.3×11	0.220	0.870	340
330	6.3×11	0.210	0.870	350	6.3×11	0.220	0.870	380
470	8×11.5	0.150	0.580	410	8×11.5	0.130	0.520	640
680	8×11.5	0.130	0.520	645	8×15	0.086	0.350	845
					10×12.5	0.080	0.310	865
820	10×12.5	0.080	0.320	865	10×16	0.070	0.280	1015
1000	8×15	0.085	0.350	870	8×20	0.068	0.270	1050
					10×16	0.060	0.240	1215
1200	8×20	0.069	0.260	1050	10×20	0.045	0.180	1410
	10×16	0.062	0.240	1215				
1500	10×20	0.045	0.180	1410	10×20	0.041	0.170	1610
					12.5×16	0.049	0.160	1450
1800	12.5×16	0.048	0.160	1460	12.5×20	0.039	0.150	1710
2200	10×20	0.042	0.170	1650	10×30	0.030	0.120	1920
					12.5×20	0.035	0.120	1910
					16×16	0.042	0.120	1900
2700	10×30	0.030	0.120	1910	18×15	0.042	0.110	2220
	16×15	0.041	0.120	1945				
3300	12.5×20	0.034	0.120	1950	12.5×25	0.026	0.089	2250
3900	12.5×25	0.026	0.088	2240	12.5×30	0.023	0.078	2660
	18×15	0.042	0.110	2210	16×20	0.026	0.078	2540
4700	12.5×30	0.023	0.078	2670	12.5×35	0.020	0.065	2890
5600	12.5×35	0.020	0.065	2890	12.5×40	0.016	0.055	3360
	16×20	0.026	0.077	2540	16×25	0.020	0.060	2940
					18×20	0.025	0.066	2870
6800	12.5×40	0.016	0.055	3350	16×31.5	0.016	0.050	3460
	16×25	0.020	0.060	2940	18×25	0.018	0.049	3150
	18×20	0.025	0.066	2870				
8200	16×31.5	0.016	0.050	3460	16×35.5	0.015	0.044	3610
					18×31.5	0.015	0.040	4180
10000	16×35.5	0.014	0.044	3620	16×40	0.013	0.038	4090
	18×25	0.018	0.049	3150	18×35.5	0.012	0.038	4150
12000	16×40	0.012	0.038	4090	18×40	0.011	0.032	4290
	18×31.5	0.014	0.040	4180				
15000	18×35.5	0.013	0.038	4230				
18000	18×40	0.012	0.032	4290				

RF Series

◆ **Case size & Permissible rated ripple current**

Nominal capacitance (uF)	16V				25V			
	Case size ΦD×L (mm)	Impedance (Ωmax/100kHz)		Max. Rated ripple current @105℃ 100kHz (mA rms)	Case size ΦD×L (mm)	Impedance (Ωmax/100kHz)		Max. Rated ripple current @105℃ 100kHz (mA rms)
		20℃	-10℃			20℃	-10℃	
10	5×11	1.100	3.020	96	5×11	1.100	3.020	100
22	5×11	0.750	2.800	120	5×11	0.700	2.800	140
47	5×11	0.600	2.600	100	5×11	0.570	2.300	205
56	5×11	0.570	2.300	220	5×11	0.570	2.300	240
100	5×11	0.350	0.760	260	6.3×11	0.210	0.870	360
	6.3×11	0.210	0.820	310				
120	6.3×11	0.210	0.870	340	6.3×11	0.210	0.870	370
220	6.3×11	0.150	0.650	450	8×11.5	0.120	0.520	650
	8×11.5	0.190	0.850	650				
330	8×11.5	0.120	0.520	760	8×15	0.087	0.350	850
					10×12.5	0.081	0.320	870
470	8×15	0.086	0.350	850	8×20	0.070	0.270	1050
	10×12.5	0.080	0.320	865	10×16	0.060	0.240	1210
680	8×20	0.069	0.270	1060	10×20	0.045	0.180	1410
	10×16	0.060	0.240	1210	12.5×16	0.049	0.160	1460
820	10×20	0.052	0.220	1310	10×25	0.041	0.170	1660
1000	10×20	0.045	0.180	1410	10×30	0.030	0.120	1920
	12.5×16	0.050	0.160	1450	12.5×20	0.034	0.120	1910
					16×16	0.042	0.120	1940
1200	10×25	0.043	0.170	1650	18×15	0.043	0.110	2220
1500	10×30	0.030	0.120	1920	12.5×25	0.026	0.089	2240
	12.5×20	0.035	0.120	1910				
	16×16	0.042	0.120	1940				
1800	12.5×25	0.028	0.095	2140	12.5×30	0.024	0.078	2660
					16×20	0.026	0.078	2540
2200	12.5×25	0.026	0.089	2240	12.5×35	0.020	0.065	2890
	18×15	0.042	0.110	2220	18×20	0.025	0.066	2870
2700	12.5×30	0.023	0.077	2650	12.5×40	0.016	0.056	3360
	16×20	0.026	0.078	2540	16×25	0.021	0.060	2940
3300	12.5×35	0.020	0.066	2890	16×30	0.016	0.050	3460
					18×25	0.018	0.048	3150
3900	12.5×40	0.016	0.056	3350	16×35.5	0.014	0.043	3620
	16×25	0.021	0.060	2930	18×31.5	0.015	0.040	4180
	16×20	0.025	0.067	2860				
4700	16×31.5	0.016	0.050	3450	16×40	0.012	0.038	4090
	18×25	0.018	0.049	3150	18×35.5	0.013	0.038	4230
5600	16×35.5	0.015	0.044	3620	18×40	0.011	0.032	4290
	18×31.5	0.015	0.040	4180				
6800	16×40	0.012	0.038	4080				
8200	18×35.5	0.014	0.038	4230				
18000	18×40	0.011	0.032	4290				

RF Series

◆ **Case size & Permissible rated ripple current**

Nominal capacitance (uF)	35V				50V			
	Case size ΦD×L (mm)	Impedance (Ωmax/100kHz)		Max. Rated ripple current @105℃ 100kHz (mA rms)	Case size ΦD×L (mm)	Impedance (Ωmax/100kHz)		Max. Rated ripple current @105℃ 100kHz (mA rms)
		20℃	-10℃			20℃	-10℃	
10	5×11	0.700	2.500	120	5×11	1.300	2.800	135
22	5×11	0.600	1.900	165	5×11	0.700	2.500	190
33	5×11	0.560	2.300	220	6.3×11	0.600	1.900	225
47	6.3×11	0.350	1.400	280	6.3×11	0.380	1.500	230
56	6.3×11	0.210	0.860	340	8×11.5	0.300	1.200	300
100	8×11.5	0.150	0.560	510	8×11.5	0.160	0.670	560
150	8×11.5	0.130	0.520	650	8×15	0.120	0.480	740
220	8×15	0.086	0.350	850	10×16	0.083	0.340	1060
330	10×16	0.060	0.240	1210	10×25	0.053	0.220	1460
470	10×20	0.045	0.180	1410	12.5×20	0.044	0.150	1670
560	10×25	0.041	0.160	1670	12.5×25	0.033	0.110	1960
680	10×30	0.030	0.120	1920	12.5×30	0.030	0.100	2320
820	12.5×25	0.029	0.095	2050	12.5×35	0.023	0.081	2530
1000	12.5×25	0.028	0.088	2250	16×25	0.025	0.075	2565
1200	12.5×30	0.023	0.078	2660	16×31.5	0.021	0.066	3020
1500	12.5×35	0.020	0.065	2890	16×35.5	0.018	0.056	3160
2200	16×31.5	0.016	0.056	3370	18×35.5	0.017	0.046	3690
2700	16×35.5	0.015	0.044	3620	18×40	0.014	0.038	3810
3300	16×40	0.013	0.038	4090				
3900	18×40	0.012	0.033	4290				

Nominal capacitance (uF)	63V				100V			
	Case size ΦD×L (mm)	Impedance (Ωmax/100kHz)		Max. Rated ripple current @105℃ 100kHz (mA rms)	Case size ΦD×L (mm)	Impedance (Ωmax/100kHz)		Max. Rated ripple current @105℃ 100kHz (mA rms)
		20℃	-10℃			20℃	-10℃	
6.8					5×11	2.200	9.200	56
15	5×11	2.200	9.200	56	6.3×11	1.200	5.000	120
33	6.3×11	1.200	5.000	120	8×15	0.580	3.200	160
47	8×11.5	0.680	3.100	190	10×12.5	0.430	1.800	290
68	8×11.5	0.600	2.900	255	10×16	0.300	1.500	350
100	10×16	0.350	1.800	320	10×25	0.200	0.840	535
120	10×16	0.300	1.500	355	10×30	0.150	0.710	665
180	10×20	0.200	0.940	470	12.5×25	0.120	0.450	790
220	10×25	0.200	0.840	535	12.5×30	0.100	0.420	905
330	12.5×25	0.120	0.450	790	12.5×40	0.070	0.300	1190
470	12.5×30	0.100	0.420	910	16×35.5	0.045	0.170	1790
560	12.5×35	0.082	0.350	1050	16×40	0.040	0.150	2030
680	12.5×40	0.070	0.300	1190	18×35.5	0.040	0.150	1790
820	16×31.5	0.053	0.200	1580	18×40	0.036	0.130	2340
1000	16×35.5	0.045	0.170	1790				
1200	16×40	0.040	0.150	2020				
1500	18×40	0.035	0.130	2340				

◆ **RIPPLE CURRENT MULTIPLIERS**

Frequency Multipliers

Vdc	Cap(uF)	Frequency (Hz)			
		120	1K	10K	100K
6.3 ~ 100	6.8 ~ 68	0.30	0.55	0.80	1.00
	82 ~ 220	0.40	0.60	0.85	1.00
	330 ~ 820	0.50	0.65	0.90	1.00
	1000 ~ 18000	0.60	0.70	0.95	1.00

PY Series

- **High-temperature 125℃, High reliability**
- **Load life 2,000 hours at 125℃**

◆ SPECIFICATIONS

Item	Performance Characteristics	
Category Temperature Range	-40 ~ +125℃	-25 ~ +125℃
Working Voltage Range	10 ~ 100Vdc	160 ~ 450Vdc
Capacitance Range	4.7 ~ 1000 μF	4.7~ 150 μF
Capacitance Tolerance	±20% (at 25℃ and 120Hz)	

Dissipation Factor (tanδ) (at 25℃, 120Hz)

Rated Voltage (V)	10	16	25	35	50	63	100	160 ~ 250	350 ~ 450
tanδ(Max)	0.20	0.16	0.14	0.12	0.10	0.10	0.09	0.20	0.24

The above values should be increased by 0.02 for every additional 1000μF

Leakage Current

I≦0.01CV or 2μA whichever is greater（10 ~ 100V）
I≦0.03CV +10μA（160 ~ 450V）
I : Leakage current (μA) C : Rated capacitance (μF) V : Rated voltage (V)
Impress the rated voltage for 2 minutes

Low Temperature Characteristics Impedance Ratio(MAX)

Rated voltage (V)	10	16	25	35	50	63	100	160 ~ 250	350	400 ~ 450
Z(-40°C)/Z(+20°C)	6	4	4	4	4	4	4	—	—	—
Z(-25°C)/Z(+20°C)	—	—	—	—	—	—	—	3	6	6

(at 120Hz)

Endurance

The following specifications shall be satisfied when the capacitors are restored to 25°C after subjected to DC voltage with the rated ripple current is applied for 2,000 hours at 125°C

Capacitance change	≦ ±25% of the initial value
Dissipation factor(tanδ)	≦ 200% of the specified value
Leakage current	≦ specified value

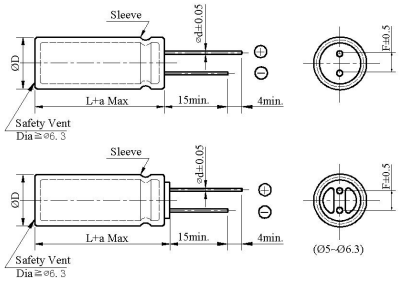
Shelf Life

The following requirements shall be satisfied when the capacitor are restored to 25℃ after the rated voltage applied for 1,000 hours at 125℃ without voltage applied.
After test : UR to be applied for 30 minutes, 24 to 48 hours before measurement.

Capacitance change	≦ ±25% of the initial value
Dissipation factor(tanδ)	≦ 200% of the specified value
Leakage current	≦ 200% of the specified value

Others	Conforms to JIS-C-5101-4 (1998), characteristic W

◆ DIMENSIONS (mm)



ΦD	6.3	8	10	12.5	16
ΦD	ΦD + 0.5 Max				
Φd	0.5	0.6	0.6	0.6	0.8
F	2.5	3.5	5.0	5.0	7.5
a	L + 1.5 Max			≦ 35 L+1.5Max ≧ 40 L+2.0 Max	L + 1.5 Max

◆ PART NUMBER SYSTEM(Example : 10V 1000μF)

P	Y	1	A	1	0	2	M	N	N	1	0	2	0						

Special Request
Size code(1020 : 10×20)
Lead length code
Lead forming Type code
Capacitance tolerance code(M:±20%)
Capacitance code (1000μF)
Voltage code (10V)
Series code (PY)

PY Series

◆ **Case size & Permissible rated ripple current: (mA rms) at 125℃ / 120Hz**

Vdc / uF	10		16		25	
	ΦD × L	RC	ΦD × L	RC	ΦD × L	RC
22					6.3×11	70
33			6.3×11	70	8×11.5	90
47	6.3×11	80	6.3×11	82	8×11.5	110
100	6.3×11	105	8×11.5	146	8×11.5	220
220	8×11.5	230	10×12.5	300	10×12.5	450
330	10×12.5	310	10×12.5	385	10×16	620
470	10×12.5	420	10×16	520	10×20	800
1000	10×20	760	12.5×20	800	12.5×25	900

Vdc / uF	35		50		100	
	ΦD × L	RC	ΦD × L	RC	ΦD × L	RC
4.7					8×11.5	72
10					8×11.5	120
22	8×11.5	78	8×11.5	150	10×12.5	200
33	8×11.5	105	8×11.5	182	10×12.5	225
47	8×11.5	148	8×15	205	10×16	330
100	10×12.5	252	10×16	442	12.5×20	550
220	10×16	530	10×20	690	16×25	763
330	10×20	710	10×25	885	16×30	950
470	12.5×20	890	12.5×25	1120		
1000	16×25	1100	16×30	1405		

Vdc / uF	160		200		250	
	ΦD × L	RC	ΦD × L	RC	ΦD × L	RC
10			10×20	86	10×20	90
22	10×20	120	10×25	138	12.5×20	140
33	10×25	160	12.5×20	172	12.5×25	188
47	12.5×20	195	12.5×25	224	16×25	250
68	12.5×25	255	16×20	275	16×30	320
100	16×25	345	16×25	360		
150	16×30	450				

Vdc / uF	350		400		450	
	ΦD × L	RC	ΦD × L	RC	ΦD × L	RC
4.7	10×20	58	10×20	60	10×25	70
10	10×25	94	10×25	100	12.5×20	103
22	12.5×25	152	12.5×30	163	16×25	185
33	16×25	208	16×25	217	16×30	245
47	16×30	265	16×30	280		

◆ **RIPPLE CURRENT MULTIPLIERS**

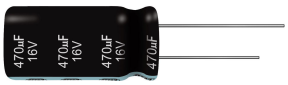
（10 to 100Vdc）Frequency Multipliers

Vdc	Cap(uF)	Frequency (Hz)			
		50/60	120	1K	≥10K
10 ~ 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 to 450Vdc）Frequency Multipliers

Vdc	Cap(uF)	Frequency (Hz)				
		50	120	1 K	10 K	100 K
160 ~ 450	4.7~33	0.75	1.00	1.50	1.75	1.80
	47~150	0.80	1.00	1.30	1.40	1.50

TL Series

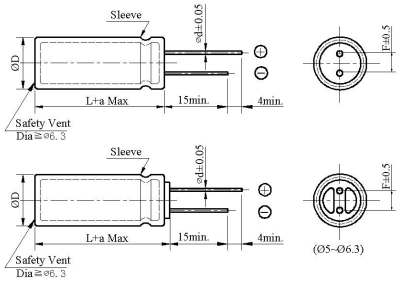


- **High-temperature 125℃, high reliability**
- **Load life 3,000~ 5,000 hours at 125℃**

◆ SPECIFICATIONS

Item	Performance Characteristics
Category Temperature Range	-55 ~ +125℃
Working Voltage Range	10 ~ 50Vdc
Capacitance Range	22 ~ 1000 μF
Capacitance Tolerance	±20% (at 25℃ and 120Hz)
Dissipation Factor (tanδ) (at 25℃, 120Hz)	Rated Voltage (V): 10 / 16 / 25 / 35 / 50 tanδ(Max): 0.20 / 0.16 / 0.14 / 0.12 / 0.10 The above values should be increased by 0.02 for every additional 1000μF
Leakage Current	I≦0.01CV or 2μA whichever is greater I : Leakage current (μA) C : Rated capacitance (μF) V : Rated voltage (V) Impress the rated voltage for 2 minutes
Low Temperature Characteristics Impedance Ratio(MAX)	Rated voltage (V): 10 / 16 / 25 / 35 / 50 Z(-55℃)/Z(+20℃): 6 / 4 / 4 / 4 / 4 (at 120Hz)
Endurance	The following specifications shall be satisfied when the capacitors are restored to 25℃ after subjected to DC voltage with the rated ripple current is applied for 3,000~5,000 hours at 125℃ Capacitance change: ≦ ±25% of the initial value Dissipation factor(tanδ): ≦ 200% of the specified value Leakage current: ≦ specified value Size / Life time (hours): ≦6.3Φ: 3,000; 8 Φ: 4,000; ≧10 Φ: 5,000
Shelf Life	The following requirements shall be satisfied when the capacitor are restored to 25℃ after the rated voltage applied for 1,000 hours at 125℃ without voltage applied. After test : UR to be applied for 30 minutes, 24 to 48 hours before measurement. Capacitance change: ≦ ±25% of the initial value Dissipation factor(tanδ): ≦ 200% of the specified value Leakage current: ≦ 200% of the specified value
Others	Conforms to JIS-C-5101-4 (1998), characteristic W

◆ DIMENSIONS (mm)



ΦD	6.3	8	10	12.5	16
ΦD	ΦD + 0.5 Max				
Φd	0.5	0.6	0.6	0.6	0.8
F	2.5	3.5	5.0	5.0	7.5
a	L + 1.5 Max			≦ 35 L+1.5Max ≧ 40 L+2.0 Max	L + 1.5 Max

◆ PART NUMBER SYSTEM(Example : 16V 470μF)

T	L	1	C	4	7	1	M	N	N	1	0	2	0						

Special Request
Size code(1020: 10×20)
Lead length code
Lead forming Type code
Capacitance tolerance code(M:±20%)
Capacitance code (470μF)
Voltage code (16V)
Series code (TL)

TL Series

◆ **Case size & Permissible rated ripple current: (mA rms) at 125℃ / 120Hz**

uF \ Vdc	10		16		25	
	ΦD × L	RC	ΦD × L	RC	ΦD × L	RC
22					6.3×11	100
33			6.3×11	90	8×11.5	115
47	6.3×11	90	6.3×11	100	8×11.5	130
100	6.3×11	130	8×11.5	155	8×11.5	250
220	8×11.5	242	10×12.5	348	10×12.5	472
330	10×12.5	335	10×16	405	10×16	690
470	10×16	440	10×20	550	10×20	875
1000	10×20	800	12.5×20	900	12.5×25	1050

uF \ Vdc	35		50	
	ΦD × L	RC	ΦD × L	RC
22	8×11.5	130	8×11.5	185
33	8×11.5	155	8×11.5	210
47	8×11.5	170	8×15	245
100	10×12.5	272	10×16	480
220	10×16	565	10×20	810
330	10×20	733	10×25	1085
470	12.5×20	895	12.5×25	1210
1000	16×25	1137	16×30	1470

◆ **RIPPLE CURRENT MULTIPLIERS**

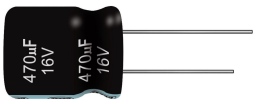
Frequency Multipliers

Vdc	Cap(uF)	Frequency (Hz)			
		50/60	120	1K	≥10K
10 ~ 50	＜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

ALUMINUM ELECTROLYTIC CAPACITORS

TD Series

- **High-temperature 130℃, high reliability**
- **Load life 1,000~ 4,000 hours at 130℃**
- **For automotive electronics and lighting equipment and other high temperature applications**



◆ SPECIFICATIONS

Item	Performance Characteristics	
Category Temperature Range	-40 ~ +130℃	-25 ~ +130℃
Working Voltage Range	10 ~ 100Vdc	200 ~ 450Vdc
Capacitance Range	4.7 ~ 4,700 μF	3.3~ 100 μF
Capacitance Tolerance	±20% (at 25℃ and 120Hz)	

Dissipation Factor (tanδ) (at 25℃, 120Hz)

Rated Voltage (V)	10	16	25	35	50	63	100	200	250	400	420	450
tanδ(Max)	0.20	0.16	0.14	0.12	0.10	0.10	0.09	0.20	0.20	0.24	0.24	0.24

The above values should be increased by 0.02 for every additional 1000μF

Leakage Current

I≦0.01CV or 2μA whichever is greater（10 ~ 100V）
I≦0.03CV +10μA（200 ~ 450V）
I : Leakage current (μA) C : Rated capacitance (μF) V : Rated voltage (V)
Impress the rated voltage for 2 minutes

Low Temperature Characteristics Impedance Ratio(MAX)

Rated voltage (V)	10	16	25	35	50	63	100	200 ~ 250	350	400 ~ 450
Z(-40℃)/Z(+20℃)	6	4	4	4	4	4	4	—	—	—
Z(-25℃)/Z(+20℃)	—	—	—	—	—	—	—	3	6	6

(at 120Hz)

Endurance

The following specifications shall be satisfied when the capacitors are restored to 25°C after subjected to DC voltage with the rated ripple current is applied for 1,000~4,000 hours at 130°C

	10~100 Vdc	200~450Vdc
Capacitance change	≦±30% of the initial value	≦±20% of the initial value
Dissipation factor(tanδ)	≦±300% of the specified value	≦±200% of the specified value
Leakage curren	≦Specified value	

Case Size	Life time (hours)	
	10~100V	200~450
ΦD=6.3	—	1,000
ΦD=8,10	2,000	2,000
ΦD≧12.5	4,000	3,000

Shelf Life

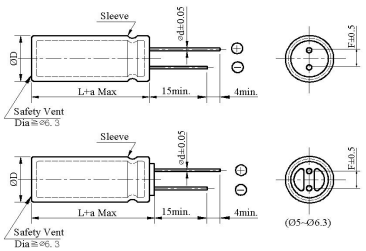
The following requirements shall be satisfied when the capacitor are restored to 25℃ after the rated voltage applied for 1,000 hours at 130℃ without voltage applied.
After test : UR to be applied for 30 minutes, 24 to 48 hours before measurement.

	10~100 Vdc	200~450Vdc
Capacitance change	≦ ±30% of the initial value	≦ ±20% of the initial value
Dissipation factor(tanδ)	≦ ±300% of the specified value	≦ ±200% of the specified value
Leakage curren	≦Specified value	

Others

Conforms to JIS-C-5101-4 (1998), characteristic W

◆ DIMENSIONS (mm)



ΦD	6.3	8	10	12.5	16	18
ΦD	ΦD + 0.5 Max					
Φd	0.5	0.6	0.6	0.6	0.8	0.8
F	2.5	3.5	5.0	5.0	7.5	7.5
a	L + 1.5 Max			≦ 35 L+1.5Max ≧ 40 L+2.0 Max	L + 1.5Max	

◆ PART NUMBER SYSTEM(Example : 10V 1000μF)

T	D	1	A	1	0	2	M	N	N	1	0	2	0						

Special Request
Size code(1020 : 10×20)
Lead length code
Lead forming Type code
Capacitance tolerance code(M:±20%)
Capacitance code (1000μF)
Voltage code (10V)
Series code (TD)

TD Series

◆ **Case size & Permissible rated ripple current: (mA rms) at 130℃ / 100KHz**

Vdc / uF	10		16		25	
	ΦD × L	RC	ΦD × L	RC	ΦD × L	RC
220					8×11.5	360
330	8×11.5	360	8×11.5	360	10×12.5	620
470	10×12.5	620	10×12.5	620	10×16	800
1000	10×20	960	10×20	960	12.5×20	1100
2200	12.5×25	1430	12.5×25	1430	16×31.5	2300
3300	16×25	1900	16×31.5	2300	16×35.5	2550
4700	16×31.5	2300	16×35.5	2550		

Vdc / uF	35		50		63	
	ΦD × L	RC	ΦD × L	RC	ΦD × L	RC
4.7			8×11.5	100		
10			8×11.5	200		
22			8×11.5	260		
33			8×11.5	300	8×11.5	250
47			8×11.5	300	10×12.5	400
100	8×11.5	360	10×12.5	520	10×16	450
220	10×12.5	620	10×20	890	12.5×25	820
330	10×16	800	12.5×20	1000	12.5×30	1000
470	10×25	960	12.5×25	1200	16×25	1500
1000	12.5×30	1430	16×31.5	2180	18×35.5	1850
1500	16×31.5	1800	18×35.5	2450	18×45	2350
2200	16×35.5	2550	18×40	2800		
3300	18×35.5	2800				

Vdc / uF	100		200		250	
	ΦD × L	RC	ΦD × L	RC	ΦD × L	RC
4.7			6.3×11	100	8×11.5	115
5.6			8×11.5	130	8×11.5	140
6.8			8×11.5	130	8×11.5	140
10	8×16	200	8×16	200	8×16	220
15	8×16	210	8×16	220	8×20	245
22	8×16	220	8×20	300	10×16	320
33	10×12.5	260	10×20	320	10×25	350
47	10×16	330	10×25	345	12.5×20	375
56	10×20	350	10×30	370	12.5×25	400
68	10×25	400	12.5×25	450	16×20	480
82	10×30	435	12.5×30	485	16×25	505
100	12.5×25	670	16×25	600		
220	16×25	1100				
330	16×31.5	1300				
470	16×40	1650				

TD Series

◆ **Case size & Permissible rated ripple current: (mA rms) at 130℃ / 100KHz**

Vdc / uF	400		420		450	
	ΦD × L	RC	ΦD × L	RC	ΦD × L	RC
3.3	8×16	110	8×16	120	8×20	135
4.7	8×20	120	8×20	130	10×12.5	150
5.6	10×16	130	10×16	140	10×16	160
6.8	10×20	150	10×20	155	10×20	170
10	10×25	220	10×25	240	12.5×20	260
15	10×30	240	10×30	255	12.5×25	300
22	12.5×20	270	12.5×25	300	16×20	345
33	12.5×25	305	12.5×30	340		
47	16×25	400	16×31.5	445		
56	16×31.5	435				
68	16×35.5	480				

◆ **RIPPLE CURRENT MULTIPLIERS**

Frequency Multipliers:(10 to 100Vdc）

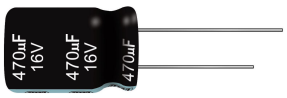
Vdc	Cap(uF)	Frequency (Hz)			
		120K	1K	10K	≥100K
10 ~ 100	＜100	0.40	0.75	0.90	1.00
	100 ~ 470	0.50	0.85	0.94	1.00
	＞470	0.60	0.87	0.95	1.00

（200 to 450Vdc）

Vdc	Cap(uF)	Frequency (Hz)			
		120	1K	10K	100K
200 ~ 450	3.3~15	0.30	0.60	0.90	1.00
	22~100	0.50	0.80	0.90	1.00

ALUMINUM ELECTROLYTIC CAPACITORS

TX Series

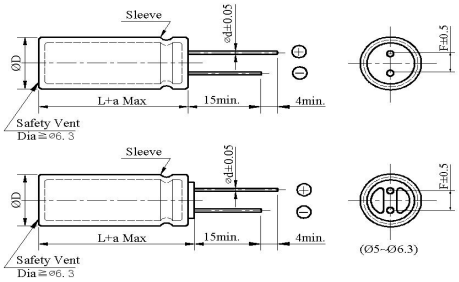


- **High-temperature 135℃, high reliability**
- **Load life 1,000~ 2,000 hours at 135℃**
- **For automotive electronics and lighting equipment and other high temperature applications**

◆ SPECIFICATIONS

Item	Performance Characteristics
Category Temperature Range	-55 ~ +135℃
Working Voltage Range	10 ~ 50Vdc
Capacitance Range	22 ~ 1000 μF
Capacitance Tolerance	±20% (at 25℃ and 120Hz)
Dissipation Factor (tanδ) (at 25℃, 120Hz)	Rated Voltage (V): 10 / 16 / 25 / 35 / 50 tanδ(Max): 0.20 / 0.16 / 0.14 / 0.12 / 0.10 The above values should be increased by 0.02 for every additional 1000μF
Leakage Current	I≦0.03CV I : Leakage current (μA) C : Rated capacitance (μF) V : Rated voltage (V) Impress the rated voltage for 2 minutes
Low Temperature Characteristics Impedance Ratio(MAX)	Rated voltage (V): 10 / 16 / 25 / 35 / 50 Z(-55℃)/Z(+20℃): 6 / 4 / 4 / 4 / 4 (at 120Hz)
Endurance	The following specifications shall be satisfied when the capacitors are restored to 25°C after subjected to DC voltage with the rated ripple current is applied for 1,000~2,000 hours at 135°C Capacitance change: ≦ ±25% of the initial value Dissipation factor(tanδ): ≦ 200% of the specified value Leakage current: ≦ specified value Size / Life time (hours): ≦10Φ: 1,000; ≧12.5Φ: 2,000
Shelf Life	The following requirements shall be satisfied when the capacitor are restored to 25℃ after the rated voltage applied for 1,000 hours at 135℃ without voltage applied. After test : UR to be applied for 30 minutes, 24 to 48 hours before measurement. Capacitance change: ≦ ±25% of the initial value Dissipation factor(tanδ): ≦ 200% of the specified value Leakage current: ≦ 200% of the specified value
Others	Conforms to JIS-C-5101-4 (1998), characteristic W

◆ DIMENSIONS (mm)



ΦD	6.3	8	10	12.5	16
ΦD	ΦD + 0.5 Max				
Φd	0.5	0.6	0.6	0.6	0.8
F	2.5	3.5	5.0	5.0	7.5
a	L + 1.5 Max			≦ 35 L+1.5Max ≧ 40 L+2.0 Max	L + 1.5Max

◆ PART NUMBER SYSTEM(Example : 16V 470μF)

T	X	1	C	4	7	1	M	N	N	1	0	1	6						

- Special Request
- Size code(1016 : 10×16)
- Lead length code
- Lead forming Type code
- Capacitance tolerance code(M:±20%)
- Capacitance code (470μF)
- Voltage code (16V)
- Series code (TX)

TX Series

◆ **Case size & Permissible rated ripple current: (mA rms) at 135℃ / 100KHz**

Vdc / uF	10		16		25	
	ΦD × L	RC	ΦD × L	RC	ΦD × L	RC
22					6.3×11	135
33			6.3×11	155	8×11.5	175
47	6.3×11	180	6.3×11	190	8×11.5	225
100	6.3×11	420	8×11.5	455	8×11.5	480
220	8×11.5	500	10×12.5	590	10×12.5	600
330	10×12.5	580	10×12.5	600	10×16	745
470	10×12.5	620	10×16	755	10×20	900
1000	10×20	900	12.5×20	1010	12.5×25	1290

Vdc / uF	35		50	
	ΦD × L	RC	ΦD × L	RC
22	8×11.5	170	8×11.5	185
33	8×11.5	185	8×11.5	210
47	8×11.5	240	8×15	280
100	10×12.5	490	10×12.5	490
220	10×16	770	10×20	820
330	10×20	880	12.5×20	900
470	12.5×20	1020	12.5×25	1095
1000	16×25	1450	16×31.5	1510

◆ **RIPPLE CURRENT MULTIPLIERS**

Frequency Multipliers

Vdc	Cap(uF)	Frequency (Hz)			
		120K	1K	10K	100K
10 ~ 50	＜100	0.40	0.75	0.90	1.00
	100 ~ 470	0.50	0.85	0.94	1.00
	＞470	0.60	0.87	0.95	1.00

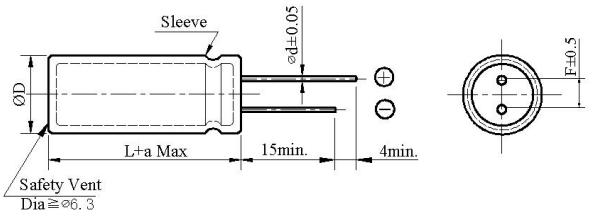
PW Series

- **Downsize and high ripple version of PF series**
- **Load life 2,000 hours at 105℃**

◆ SPECIFICATIONS

Item	Performance Characteristics
Category Temperature Range	-25 ~ +105℃
Working Voltage Range	160 ~ 550Vdc
Capacitance Range	10 ~ 470 μF
Capacitance Tolerance	±20% (at 25℃ and 120Hz)
Dissipation Factor (tanδ) (at 25℃, 120Hz)	Rated Voltage (V): 160 ~ 250 / 400 ~ 550 tanδ(Max): 0.15 / 0.20 The above values should be increased by 0.02 for every additional 1000μF
Leakage Current	I=0.03CV + 10μA I : Leakage current (μA) C : Rated capacitance (μF) V : Rated voltage (V) Impress the rated voltage for 2 minutes
Low Temperature Characteristics Impedance Ratio(MAX)	Rated voltage (V): 160 ~ 250 / 400 / 420 / 450 / 475 / 500 / 550 Z(-25℃)/Z(+20℃): 3 / 5 / 6 / 6 / 6 / 6 / 6 (at 120Hz)
Endurance	The following specifications shall be satisfied when the capacitors are restored to 25°C after subjected to DC voltage with the rated ripple current is applied for 2,000 hours at 105°C Capacitance change: ≦ ±20% of the initial value Dissipation factor(tanδ): ≦ 200% of the specified value Leakage current: ≦ specified value
Shelf Life	The following requirements shall be satisfied when the capacitor are restored to 25℃ after the rated voltage applied for 1,000 hours at 105℃ without voltage applied. Capacitance change: ≦ ±20% of the initial value Dissipation factor(tanδ): ≦ 200% of the specified value Leakage current: ≦ 200% of the specified value
Others	Conforms to JIS-C-5101-4 (1998), characteristic W

◆ DIMENSIONS (mm)



ΦD	12.5	16	18
ΦD	ΦD + 0.5 Max		
Φd	0.6	0.8	0.8
F	5.0	7.5	7.5
a	≦ 35 L+1.5Max ≧ 40 L+2.0 Max	L +1.5 Max	

◆ PART NUMBER SYSTEM(Example : 500V 22μF)

P	W	2	H	2	2	0	M	N	N	1	2	3	0						

- Special Request
- Size code(1230 : 12.5×30)
- Lead length code
- Lead forming Type code
- Capacitance tolerance code(M:±20%)
- Capacitance code (22μF)
- Voltage code(500V)
- Series code(PW)

PW Series

◆ **Case size & Permissible rated ripple current: (mA rms) at 105℃ / 120Hz**

uF \ Vdc	160		200		250		400	
	ΦD × L	RC	ΦD × L	RC	ΦD × L	RC	ΦD × L	RC
33			10×16	260	10×20	280		
47	10×16	310	10×20	330	10×25	350		
56	10×20	360	10×25	380	10×30	400	12.5×30	350
68	10×25	420	10×30	430	12.5×20	450	16×25	380
82	10×30	460	12.5×20	480	12.5×25	500	16×31.5	420
100	12.5×20	590	12.5×25	610	16×20	630	16×35.5	450
120	12.5×25	660	12.5×30	680	16×25	700	18×31.5	520
150	16×20	780	16×25	800	16×31.5	820	18×35.5	700
180	16×25	850	16×31.5	870	18×25	900	18×40	850
220	16×31.5	940	18×25	960	18×31.5	1000		
330	16×35.5	1000	18×31.5	1050	18×35.5	1100		
390	18×31.5	1050	18×35.5	1120	18×40	1190		
470	18×35.5	1120	18×40	1190	18×45	1250		
560	18×40	1190	18×45	1250				

uF \ Vdc	420		450		475		500	
	ΦD × L	RC	ΦD × L	RC	ΦD × L	RC	ΦD × L	RC
33							16×25	320
39					16×25	300	16×31.5	360
47	16×20	250	16×25	300	16×31.5	330	18×25	420
56	16×25	300	16×31.5	360	18×25	400	18×31.5	470
68	16×31.5	350	16×35.5	420	18×31.5	450	18×35.5	555
82	16×35.5	380	18×31.5	480	18×35.5	520	18×40	610
100	18×31.5	420	18×35.5	530	18×40	580	18×45	690
120	18×35.5	480	18×40	620	18×45	670	18×50	860
150	18×40	580	18×45	780	18×50	830		
180	18×45	630	16×25	300				

uF \ Vdc	550	
	ΦD × L	RC
10	12.5×20	125
15	12.5×25	160
22	12.5×35	200
33	16×30	290
47	18×31.5	380
56	16×40	490
68	18×35.5	596
82	18×45	625
100	18×50	705

◆ **RIPPLE CURRENT MULTIPLIERS**

Frequency Multipliers

Vdc	Frequency (Hz)				
	50	120	1K	10K	100K
160 ~ 550	0.80	1.00	1.30	1.40	1.50

ALUMINUM ELECTROLYTIC CAPACITORS

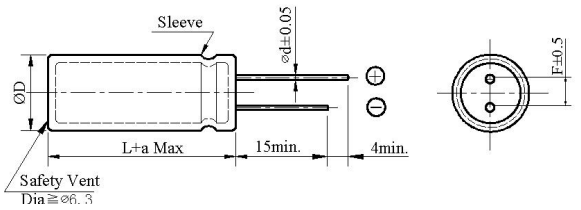
PV Series

- **Downsize and high ripple current**
- **Load life 2,000 ~ 5,000 hours at 105℃**

◆ SPECIFICATIONS

Item	Performance Characteristics
Category Temperature Range	-25 ~ +105℃
Working Voltage Range	160 ~ 500Vdc
Capacitance Range	33 ~ 560 μF
Capacitance Tolerance	±20% (at 25℃ and 120Hz)
Dissipation Factor (tanδ) (at 25℃, 120Hz)	Rated Voltage (V): 160 / 200 / 250 / 400 / 420 / 450 / 500 tanδ(Max): 0.20 / 0.20 / 0.20 / 0.20 / 0.20 / 0.20 / 0.24 The above values should be increased by 0.02 for every additional 1000μF
Leakage Current	I=0.02CV or 3000μA whichever is smaller I : Leakage current (μA) C : Rated capacitance (μF) V : Rated voltage (V) Impress the rated voltage for 2 minutes
Low Temperature Characteristics Impedance Ratio(MAX)	Rated voltage (V): 160~250 / 400 / 420 ~ 450 / 500 Z(-25℃)/Z(+20℃): 3 / 5 / 6 / 6 (at 120Hz)
Endurance	The following specifications shall be satisfied when the capacitors are restored to 25°C after subjected to DC voltage with the rated ripple current is applied for 2,000 ~5,000 hours at 105°C Capacitance change: ≦ ±20% of the initial value Dissipation factor(tanδ): ≦ 200% of the specified value Leakage current: ≦ specified value Size / Life time (hours): ΦD≦12.5Φ / 2,000; ΦD≧16 Φ / 5,000
Shelf Life	The following requirements shall be satisfied when the capacitor are restored to 25℃ after exposing them for 1,000 hours at 105℃ without voltage applied. Capacitance change: ≦ ±20% of the initial value Dissipation factor(tanδ): ≦ 200% of the specified value Leakage current: ≦ 200% of the specified value
Others	Conforms to JIS-C-5101-4 (1998), characteristic W

◆ DIMENSIONS (mm)



ΦD	10	12.5	16	18
ΦD	ΦD +0.5 Max			
Φd	0.6	0.6	0.8	0.8
F	5.0	5.0	7.5	7.5
a	L + 1.5 Max	≦ 35 L+1.5Max ≧ 40 L+2.0 Max	L + 1.5 Max	

◆ PART NUMBER SYSTEM(Example : 420V 68μF)

P	V	2	S	6	8	0	M	N	N	1	6	4	0						

- Special Request
- Size code(1640 : 16×40)
- Lead length code
- Lead forming Type code
- Capacitance tolerance code(M:±20%)
- Capacitance code (68μF)
- Voltage code (420V)
- Series code (PV)

PV Series

◆ **Case size & Permissible rated ripple current: (mA rms) at 105℃ / 120Hz**

uF \ Vdc	160		200		250		400	
	ΦD × L	RC	ΦD × L	RC	ΦD × L	RC	ΦD × L	RC
33	10×16	260	10x20	280	10×25	300		
47	10×20	330	10x25	350	12.5×16	360	16×20	280
56	10×25	380	10x30	400	12.5×20	420	16×25	380
68	10×30	430	12.5x20	450	12.5×25	470	16×31.5	400
82	12.5×20	480	12.5x25	500	16×20	520	16×35.5	450
100	12.5×25	610	16x20	630	16×25	650	18×31.5	490
120	12.5×30	680	16x25	700	18×20	720	18×35.5	560
150	16×25	800	16x31.5	820	18×25	840	18×40	750
180	16×31.5	870	18x25	900	18×31.5	930	18×45	880
220	18×25	960	18x31.5	1000	18×35.5	1050		
330	18×31.5	1050	18x35.5	1100	18×40	1190		
390	18×35.5	1120	18x40	1190	18×45	1250		
470	18×40	1190	18x45	1250				
560	18×45	1250	18x50	1320				

uF \ Vdc	420		450		500	
	ΦD × L	RC	ΦD × L	RC	ΦD × L	RC
33					16×31.5	335
39	12.5×30	280	16×25	300	16×35.5	380
47	16×25	350	16×31.5	320	18×31.5	440
56	16×31.5	380	16×35.5	400	18×35.5	490
68	18×25	420	18×31.5	450	18×40	580
82	18×31.5	480	18×35.5	510	18×45	635
100	18×35.5	530	18×40	570	18×50	715
120	18×40	620	18×45	660		
150	18×45	800	18×50	880		
180	18×50	920				

◆ **RIPPLE CURRENT MULTIPLIERS**

Frequency Multipliers

Vdc	Frequency (Hz)				
	50	120	1K	10K	100K
160 ~ 500	0.80	1.00	1.30	1.40	1.50

ALUMINUM ELECTROLYTIC CAPACITORS

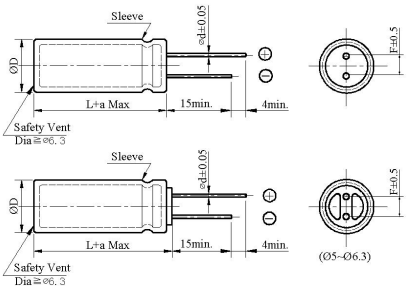
LF Series

- **Standard size downsized**
- **2,000 hours assured at 105℃**

◆ SPECIFICATIONS

Item	Performance Characteristics
Category Temperature Range	-25 ~ +105℃
Working Voltage Range	200 ~ 450Vdc
Capacitance Range	1 ~ 68 μF
Capacitance Tolerance	±20% (at 25℃ and 120Hz)
Dissipation Factor (tanδ) (at 25℃, 120Hz)	Rated Voltage (V): 200 ~ 250 / 350 / 400 ~ 450 tanδ(Max): 0.15 / 0.20 / 0.20 The above values should be increased by 0.02 for every additional 1000μF
Leakage Current	I≦0.03CV + 10 μA I : Leakage current (μA) C : Rated capacitance (μF) V : Rated voltage (V) Impress the rated voltage for 2 minutes
Low Temperature Characteristics Impedance Ratio(MAX)	Rated voltage (V): 200 ~ 250 / 350 / 400 / 420 ~ 450 Z(-25℃)/Z(+20℃): 3 / 5 / 5 / 6 (at 120Hz)
Endurance	The following specifications shall be satisfied when the capacitors are restored to 25°C after subjected to DC voltage with the rated ripple current is applied for 2,000 hours at 105°C Capacitance change: ≦ ±20% of the original value Dissipation factor(tanδ): ≦ 200% of the specified value Leakage current: ≦ specified value
Shelf Life	The following requirements shall be satisfied when the capacitor are restored to 25℃ after the rated voltage applied for 500 hours at 105℃ without voltage applied. Capacitance change: ≦ ±20% of the original value Dissipation factor(tanδ): ≦ 200% of the specified value Leakage current: ≦ 200% of the specified value
Others	Conforms to JIS-C-5101-4 (1998), characteristic W

◆ DIMENSIONS (mm)



ΦD	5	6.3	8	10	12.5	16	18
ΦD	ΦD + 0.5 Max						
Φd	0.5	0.5	0.6	0.6	0.6	0.8	0.8
F	2.0	2.5	3.5	5.0	5.0	7.5	7.5
a	L + 1.5 Max				≦ 35 L+1.5Max ≧ 40 L+2.0 Max	L + 1.5 Max	

◆ PART NUMBER SYSTEM(Example : 400V 47μF)

L	F	2	G	4	7	0	M	N	N	1	6	N	3						

- Special Request
- Size code(16N3 : 16×31.5)
- Lead length code
- Lead forming Type code
- Capacitance tolerance code(M:±20%)
- Capacitance code (47μF)
- Voltage code (400V)
- Series code (LF)

LF Series

◆ **Case size & Permissible rated ripple current: (mA rms) at 105°C / 120Hz**

Vdc / uF	200		250		350		400		450	
	ΦD × L	RC	ΦD × L	RC	ΦD × L	RC	ΦD × L	RC	ΦD × L	RC
1	5×11	18	5×11	16	6.3×11	16	6.3×11	18	6.3×11	15
2.2	6.3×11	27	6.3×11	26	6.3×11	28	8×11.5	33	10×12.5	28
2.7	6.3×11	30	6.3×11	30	8×11.5	35	8×11.5	38	10×12.5	35
3.3	6.3×11	33	8×11.5	35	10×12.5	41	10×12.5	41	10×16	38
4.7	8×11.5	43	8×11.5	41	10×16	49	10×16	55	10×20	41
5.6	8×11.5	46	8×11.5	49	10×16	55	10×16	60	10×20	48
6.8	8×11.5	61	8×11.5	66	10×16	60	10×20	62	12.5×20	51
8.2	8×11.5	66	10×12.5	71	10×16	71	12.5×20	82	12.5×20	62
10	10×12.5	82	10×16	81	10×20	88	12.5×20	100	12.5×25	78
15	10×16	88	10×20	104	12.5×20	110	12.5×20	145	12.5×25	104
22	10×20	132	12.5×20	143	12.5×20	126	12.5×25	180	16×25	130
33	12.5×20	175	12.5×20	171	16×20	215	16×25	235	16×31.5	185
47	12.5×25	215	12.5×25	230	16×25	290	16×31.5	290	16×35.5	215
68	16×25	230	16×25	275	16×31.5	300	18×35.5	340	18×35.5	245

◆ **RIPPLE CURRENT MULTIPLIERS**

Frequency Multipliers

Vdc	Cap(uF)	Frequency (Hz)				
		50/60	120	1K	10K	100K
200 ~ 450	1 ~ 68	0.80	1.00	1.40	1.60	1.60

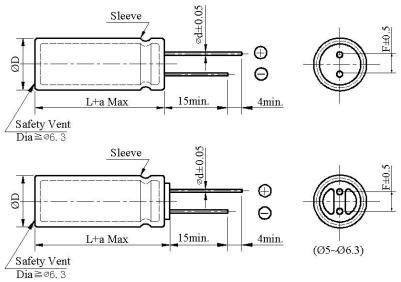
LL Series

- **High ripple current capability**
- **High stability**

◆ SPECIFICATIONS

Item	Performance Characteristics
Category Temperature Range	-25 ~ +105℃
Working Voltage Range	160 ~ 450Vdc
Capacitance Range	33~560 μF
Capacitance Tolerance	±20% (at 25℃ and 120Hz)
Dissipation Factor (tanδ) (at 25℃, 120Hz)	Rated Voltage (V): 160 ~ 250 / 400 ~ 450; tanδ(Max): 0.15 / 0.20 The above values should be increased by 0.02 for every additional 1000μF
Leakage Current	I≦0.03CV + 10 μA I : Leakage current (μA) C : Rated capacitance (μF) V : Rated voltage (V) Impress the rated voltage for 2 minutes
Low Temperature Characteristics Impedance Ratio(MAX)	Rated voltage (V): 160 ~ 250 / 400 / 420 ~ 450; Z(-25℃)/Z(+20℃): 3 / 5 / 6 (at 120Hz)
Endurance	The following specifications shall be satisfied when the capacitors are restored to 25°C after subjected to DC voltage with the rated ripple current is applied for 2,000 ~ 5,000 hours at 105°C Capacitance change: ≦ ±20% of the initial value Dissipation factor(tanδ): ≦ 200% of the specified value Leakage current: ≦ specified value Size / Life time (hours): ≦6.3Φ: 2,000; = 8 Φ: 3,000; ≧ 10Φ: 5,000
Shelf Life	The following requirements shall be satisfied when the capacitor are restored to 25℃ after the rated voltage applied for 500 hours at 105℃ without voltage applied. Capacitance change: ≦ ±20% of the initial value Dissipation factor(tanδ): ≦ 200% of the specified value Leakage current: ≦ 200% of the specified value
Others	Conforms to JIS-C-5101-4 (1998), characteristic W

◆ DIMENSIONS (mm)



ΦD	10	12.5	16	18
ΦD	ΦD + 0.5 Max			
Φd	0.6	0.6	0.8	0.8
F	5.0	5.0	7.5	7.5
a	L + 1.5 Max	≦ 35 L+1.5Max ≧ 40 L+2.0 Max	L + 1.5 Max	

◆ PART NUMBER SYSTEM(Example : 350V 15μF)

L	L	2	V	1	5	0	M	N	N	1	2	2	0						

Special Request
Size code(1220 : 12.5×20)
Lead length code
Lead forming Type code
Capacitance tolerance code(M:±20%)
Capacitance code (15μF)
Voltage code (350V)
Series code (LL)

LL Series

◆ **Case size & Permissible rated ripple current: (mA rms) at 105°C / 120Hz**

Vdc / uF	160		200		250	
	ΦD × L	RC	ΦD × L	RC	ΦD × L	RC
33	10x16	260	10x20	280	10x25	300
47	10x20	330	10x25	350	12.5x16	360
56	10x25	380	10x30	400	12.5x20	420
68	10x30	430	12.5x20	450	12.5x25	470
82	12.5x20	480	12.5x25	500	16x20	520
100	12.5x25	610	16x20	630	16x25	650
120	12.5x30	680	16x25	700	18x20	720
150	16x25	800	16x31.5	820	18x25	840
180	16x31.5	870	18x25	900	18x31.5	930
220	18x25	960	18x31.5	1000	18x35.5	1050
330	18x31.5	1050	18x35.5	1100	18x40	1190
390	18x35.5	1120	18x40	1190	18x45	1250
470	18x40	1190	18x45	1250		
560	18x45	1250	18x50	1320		

Vdc / uF	400		420		450	
	ΦD × L	RC	ΦD × L	RC	ΦD × L	RC
39			12.5x30	280	16x25	300
47	16x20	280	16x25	350	16x31.5	320
56	16x25	380	16x31.5	380	16x35.5	400
68	16x31.5	400	18x25	420	18x31.5	450
82	16x35.5	450	18x31.5	480	18x35.5	510
100	18x31.5	490	18x35.5	530	18x40	570
120	18x35.5	560	18x40	620	18x45	660
150	18x40	750	18x45	800	18x50	880
180	18x45	880	18x50	920		

◆ **RIPPLE CURRENT MULTIPLIERS**

Frequency Multipliers

Vdc	Cap(uF)	Frequency (Hz)				
		50/60	120	1K	10K	100K
160 ~ 450	1 ~ 68	0.80	1.00	1.40	1.60	1.60

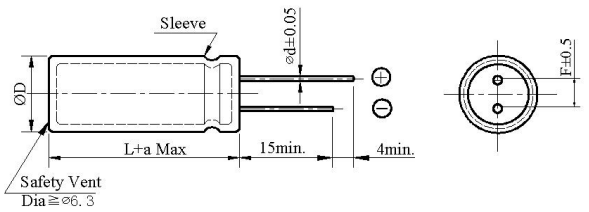
PJ Series

- **For electronic ballast circuits and long life**
- **required applications**
- **High ripple current**
- **Load life: 8,000 to 10,000 hours at 105℃**

◆ SPECIFICATIONS

Item	Performance Characteristics
Category Temperature Range	-25~ +105℃
Working Voltage Range	160 ~ 500Vdc
Capacitance Range	10~560 μF
Capacitance Tolerance	±20% (at 25℃ and 120Hz)
Dissipation Factor (tanδ) (at 25℃, 120Hz)	Rated Voltage (V): 160 / 200 / 250 / 400 / 450 / 500 tanδ(Max): 0.20 / 0.20 / 0.24 / 0.24 / 0.24 / 0.24
Leakage Current	I=0.03CV + 10μA I : Leakage current (μA) C : Rated capacitance (μF) V : Rated voltage (V) Impress the rated voltage for 2 minutes
Low Temperature Characteristics Impedance Ratio(MAX)	Rated voltage (V): 160 ~250 / 400 / 420 ~ 450 / 500 Z(-25℃)/Z(+20℃): 3 / 5 / 6 / 6 (at 120Hz)
Endurance	The following specifications shall be satisfied when the capacitors are restored to 25°C after subjected to DC voltage with the rated ripple current is applied for 10,000 (8,000 hours for Φ 10) hours at 105°C Capacitance change: ≦ ±20% of the initial value Dissipation factor(tanδ): ≦ 200% of the specified value Leakage current: ≦ specified value
Shelf Life	The following requirements shall be satisfied when the capacitor are restored to 25℃ after the rated voltage applied for 1,000 hours at 105℃ without voltage applied. Capacitance change: ≦ ±20% of the initial value Dissipation factor(tanδ): ≦ 200% of the specified value Leakage current: ≦ 500% of the specified value
Others	Conforms to JIS-C-5101-4 (1998), characteristic W

◆ DIMENSIONS (mm)



ΦD	10	12.5	16	18
ΦD	ΦD + 0.5 Max			
Φd	0.6	0.6	0.8	0.8
F	5.0	5.0	7.5	7.5
a	L + 1.5 Max	≦ 35 L+1.5Max ≧ 40 L+2.0 Max	L + 1.5 Max	

◆ PART NUMBER SYSTEM(Example : 350V 150μF)

P	J	2	V	1	5	1	M	N	N	1	8	4	0						

- Special Request
- Size code(1840 : 18×40)
- Lead length code
- Lead forming Type code
- Capacitance tolerance code(M:±20%)
- Capacitance code (150μF)
- Voltage code (350V)
- Series code (PJ)

PJ Series

◆ **Case size & Permissible rated ripple current: (mA rms) at 105℃ / 120Hz**

Vdc / uF	160		200		250	
	ΦD × L	RC	ΦD × L	RC	ΦD × L	RC
10					10×12.5	130
15					10×16	170
22					10×20	200
33	10×20	280			12.5×16	320
47	10×25	350	12.5×16	360	12.5×20	390
56	12.5×16	400	12.5×20	420	12.5×25	460
68	12.5×20	450	12.5×25	470	16×20	520
82	12.5×25	500	16×20	520	16×25	560
100	16×20	630	16×25	650	18×20	680
120	16×25	700	18×20	720	18×25	750
150	18×20	820	18×25	840	18×31.5	860
180	18×25	900	18×31.5	930	18×35.5	950
220	18×31.5	1000	18×35.5	1050	18×40	1130
330	18×35.5	1120	18×40	1190	18×45	1250
390	18×40	1190	18×45	1250	18×50	1320
470	18×45	1250	18×50	1320		
560	18×50	1320				

Vdc / uF	400		420		450	
	ΦD × L	RC	ΦD × L	RC	ΦD × L	RC
39	12.5×30	280	16×25	300	18×20	320
47	16×25	320	18×20	380	18×25	350
56	16×31.5	400	18×25	420	18×31.5	450
68	18×25	430	18×31.5	460	18×35.5	500
82	18×31.5	480	18×35.5	510	18×40	540
100	18×35.5	550	18×40	580	18×45	620
120	18×40	600	18×45	650	18×50	700
150	18×45	820	18×50	850		
180	18×50	950				

Vdc / uF	500	
	ΦD × L	RC
33	18×25	350
39	18×31.5	400
47	18×35.5	460
56	18×40	510
68	18×45	600
82	18×50	660

◆ **RIPPLE CURRENT MULTIPLIERS**

Frequency Multipliers

Vdc	Frequency (Hz)				
	50	120	1K	10K	100K
160 ~ 500	0.80	1.00	1.30	1.40	1.50

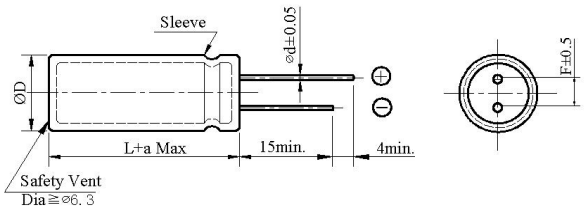
KJ Series

- **Downsize and high ripple current**
- **Load life: 10,000 to 12,000 hours at 105℃**
- **For electronic ballast circuits and other long life applications**

◆ SPECIFICATIONS

Item	Performance Characteristics
Category Temperature Range	-25~ +105℃
Working Voltage Range	160 ~ 450Vdc
Capacitance Range	6.8 ~ 560 µF
Capacitance Tolerance	±20% (at 25℃ and 120Hz)
Dissipation Factor (tanδ) (at 25℃, 120Hz)	Rated Voltage (V): 160 ~ 250 / 350 ~ 450; tanδ(Max): 0.20 / 0.24
Leakage Current	I=0.03CV + 10uA I : Leakage current (µA) C : Rated capacitance (µF) V : Rated voltage (V) Impress the rated voltage for 2 minutes
Low Temperature Characteristics Impedance Ratio(MAX)	Rated voltage (V): 160~250 / 350 / 400 / 450; Z(-25℃)/Z(+20℃): 4 / 4 / 4 / 6 (at 120Hz)
Endurance	The following specifications shall be satisfied when the capacitors are restored to 25°C after subjected to DC voltage with the rated ripple current is applied for 12,000 (10,000 hours for Φ 10) hours at 105°C. Capacitance change: ≦ ±20% of the initial value Dissipation factor(tanδ): ≦ 200% of the specified value Leakage current: ≦ specified value
Shelf Life	The following requirements shall be satisfied when the capacitor are restored to 25℃ after the rated voltage applied for 1,000 hours at 105℃ without voltage applied. Capacitance change: ≦ ±20% of the initial value Dissipation factor(tanδ): ≦ 200% of the specified value Leakage current: ≦ 500% of the specified value
Others	Conforms to JIS-C-5101-4 (1998), characteristic W

◆ DIMENSIONS (mm)



ΦD	10	12.5	16	18
ΦD	ΦD + 0.5 Max			
Φd	0.6	0.6	0.8	0.8
F	5.0	5.0	7.5	7.5
a	L + 1.5 Max	≦ 35 L+1.5Max ≧ 40 L+2.0 Max	L + 1.5 Max	

◆ PART NUMBER SYSTEM(Example : 200V 82µF)

K	J	2	D	8	2	0	M	N	N	1	2	3	0						

Special Request
Size code(1230 : 12.5×30)
Lead length code
Lead forming Type code
Capacitance tolerance code(M:±20%)
Capacitance code (82µF)
Voltage code (200V)
Series code (KJ)

KJ Series

◆ **Case size & Permissible rated ripple current: (mA rms) at 105℃ / 120Hz**

Vdc / uF	160		200		250	
	ΦD × L	RC	ΦD × L	RC	ΦD × L	RC
10	10×16	150	10×16	150	10×20	160
22	10×20	210	10×20	210	10×20	215
33	10×20	265	10×20	270	10×25	330
47	10×25	330	12.5×20	405	12.5×25	405
68	12.5×20	485	12.5×25	475	16×20	530
82	12.5×25	520	12.5×30	560	16×25	565
100	12.5×30	625	16×20	640	16×30	690
	16×20	640				
150	16×25	785	16×25	855	18×30	875
220	16×30	1040	18×30	1055	18×35.5	1150
330	18×31.5	1400	18×35.5	1440	18×45	1455
470	18×40	1495	18×45	1530		
560	18×45	1535	18×50	1575		

Vdc / uF	350		400		450	
	ΦD × L	RC	ΦD × L	RC	ΦD × L	RC
6.8	10×16	125	10×16	125	10×20	125
10	10×20	150	10×20	150	12.5×20	190
15	10×20	205	12.5×20	235	12.5×25	255
22	12.5×20	270	12.5×25	275	12.5×30	308
33	16×20	370	16×20	370	16×25	400
					18×20	390
47	16×25	450	16×25	485	18×25	495
			18×20	460		
68	16×30	575	18×25	600	18×31.5	640
82	18×25	630	18×30	630	18×35.5	730
100	18×30	708	18×31.5	770	18×40	835
120	18×31.5	845	18×35.5	875	18×50	920
150	18×40	975	18×45	990		

◆ **RIPPLE CURRENT MULTIPLIERS**

Frequency Multipliers

Cap(uF)	Frequency (Hz)			
	120	1K	10K	100K
＜100	1.00	1.75	2.25	2.50
≥100	1.00	1.67	2.05	2.25

ALUMINUM ELECTROLYTIC CAPACITORS

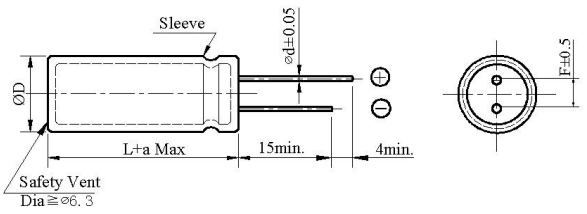
KY Series

- **Downsize and high ripple current**
- **Load life: 12,000 to 15,000 hours at 105℃**
- **For electronic ballast circuits and other long life applications**

◆ SPECIFICATIONS

Item	Performance Characteristics
Category Temperature Range	-25~ +105℃
Working Voltage Range	160 ~ 450Vdc
Capacitance Range	6.8 ~ 470 μF
Capacitance Tolerance	±20% (at 25℃ and 120Hz)
Dissipation Factor (tanδ) (at 25℃, 120Hz)	Rated Voltage (V): 160 ~ 250 / 400 ~ 450; tanδ(Max): 0.20 / 0.24
Leakage Current	I=0.03CV + 10uA I : Leakage current (μA) C : Rated capacitance (μF) V : Rated voltage (V) Impress the rated voltage for 2 minutes
Low Temperature Characteristics Impedance Ratio(MAX)	Rated voltage (V): 160~250 / 400 / 420 ~ 450; Z(-25℃)/Z(+20℃): 4 / 4 / 6 (at 120Hz)
Endurance	The following specifications shall be satisfied when the capacitors are restored to 25°C after subjected to DC voltage with the rated ripple current is applied for 15,000 (12,000 hours for Φ 10) hours at 105°C. Capacitance change: ≦ ±20% of the initial value Dissipation factor(tanδ): ≦ 200% of the specified value Leakage current: ≦ specified value
Shelf Life	The following requirements shall be satisfied when the capacitor are restored to 25℃ after the rated voltage applied for 1,000 hours at 105℃ without voltage applied. Capacitance change: ≦ ±20% of the initial value Dissipation factor(tanδ): ≦ 200% of the specified value Leakage current: ≦ 500% of the specified value
Others	Conforms to JIS-C-5101-4 (1998), characteristic W

◆ DIMENSIONS (mm)



ΦD	10	12.5	16	18
ΦD	ΦD + 0.5 Max			
Φd	0.6	0.6	0.8	0.8
F	5.0	5.0	7.5	7.5
a	L + 1.5 Max	≦ 35 L+1.5Max ≧ 40 L+2.0 Max	L + 1.5 Max	

◆ PART NUMBER SYSTEM(Example : 450V 47μF)

K	Y	2	W	4	7	0	M	N	N	1	8	N	3						

- Special Request
- Size code(18N3 : 18×31.5)
- Lead length code
- Lead forming Type code
- Capacitance tolerance code(M:±20%)
- Capacitance code (47μF)
- Voltage code (450V)
- Series code (KY)

KY Series

◆ **Case size & Permissible rated ripple current: (mA rms) at 105℃ / 120Hz**

Vdc / uF	160		200		250	
	ΦD × L	RC	ΦD × L	RC	ΦD × L	RC
10	10×16	160	10×16	160	10×20	170
22	10×20	225	10×20	225	10×20	230
33	10×20	280	12.5×20	340	10×25	330
47	10×25	350	12.5×25	425	12.5×25	425
68	12.5×20	500	12.5×30	510	16×25	550
82	12.5×25	540	16×20	550	16×31.5	580
100	12.5×30	650	16×25	680	18×31.5	740
150	16×25	800	16×31.5	880	18×35.5	905
220	16×31.5	1075	18×35.5	1100	18×40	1195
330	18×35.5	1450	18×45	1500		
470	18×45	1540	18×50	1580		

Vdc / uF	400		420		450	
	ΦD × L	RC	ΦD × L	RC	ΦD × L	RC
6.8	10×16	150	10×16	150	10×20	150
10	10×20	175	10×20	190	12.5×20	215
15	12.5×20	255	12.5×20	265	12.5×25	275
22	12.5×25	300	12.5×25	310	16×20	320
33	16×20	395	16×20	420	16×25	460
47	18×20	490	18×25	510	18×31.5	550
56	18×25	560	18×25	590	18×31.5	630
68	18×31.5	650	18×31.5	685	18×35.5	725
82	18×31.5	680	18×35.5	730	18×40	810
100	18×35.5	805	18×40	835	18×50	900
120	18×40	900	18×45	940		
150	18×45	1000				

◆ **RIPPLE CURRENT MULTIPLIERS**

Frequency Multipliers

Cap(uF)	Frequency (Hz)			
	120	1K	10K	100K
＜100	1.00	1.75	2.25	2.50
≥100	1.00	1.67	2.05	2.25

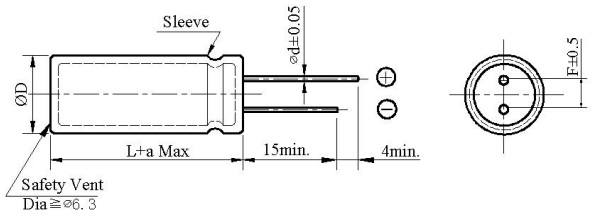
MW Series

- Low ESR
- Load life 2,000 hours at 105℃

◆ SPECIFICATIONS

Item	Performance Characteristics
Category Temperature Range	-25 ~ +105℃
Working Voltage Range	160 ~ 450Vdc
Capacitance Range	33 ~ 560 μF
Capacitance Tolerance	±20% (at 25℃ and 120Hz)
Dissipation Factor (tanδ) (at 25℃, 120Hz)	Rated Voltage (V): 160 ~ 450; tanδ(Max): 0.15
Leakage Current	I=0.03CV + 10μA I : Leakage current (μA) C : Rated capacitance (μF) V : Rated voltage (V) Impress the rated voltage for 2 minutes
Low Temperature Characteristics Impedance Ratio(MAX)	Rated voltage (V): 160~250 / 400 / 420 ~450; Z(-25℃)/Z(+20℃): 3 / 5 / 6 (at 120Hz)
Endurance	The following specifications shall be satisfied when the capacitors are restored to 25°C after subjected to DC voltage with the rated ripple current is applied for 2,000 hours at 105°C. Capacitance change: ≦ ±20% of the initial value Dissipation factor(tanδ): ≦ 200% of the specified value Leakage current: ≦ specified value
Shelf Life	The following requirements shall be satisfied when the capacitor are restored to 25℃ after the rated voltage applied for 1,000 hours at 105℃ without voltage applied. Capacitance change: ≦ ±20% of the initial value Dissipation factor(tanδ): ≦ 200% of the specified value Leakage current: ≦ 200% of the specified value
Others	Conforms to JIS-C-5101-4 (1998), characteristic W

◆ DIMENSIONS (mm)



ΦD	16	18
ΦD	ΦD + 0.5 Max	
Φd	0.8	0.8
F	7.5	7.5
a	L + 1.5 Max	

◆ PART NUMBER SYSTEM(Example : 450V 150μF)

M	W	2	W	1	5	1	M	N	N	1	8	5	0						

- Special Request
- Size code(1850 : 18×50)
- Lead length code
- Lead forming Type code
- Capacitance tolerance code(M:±20%)
- Capacitance code (150μF)
- Voltage code(450V)
- Series code(MW)

MW Series

◆ **Case size & Permissible rated ripple current: (mA rms) at 105°C / 120Hz**

uF \ Vdc	160		200		250	
	ΦD × L	RC	ΦD × L	RC	ΦD × L	RC
33			10×16	350	10×20	360
47	10×16	380	10×20	420	10×25	440
56	10×20	500	10×25	520	10×30	540
68	10×25	560	10×30	580	12.5×20	620
82	10×30	600	12.5×20	630	12.5×25	660
100	12.5×20	720	12.5×25	745	16×20	780
120	12.5×25	770	12.5×30	800	16×25	850
150	16×20	870	16×25	930	16×31.5	950
180	16×25	1050	16×31.5	1090	18×25	1120
220	16×31.5	1095	18×25	1120	18×31.5	1190
330	16×35.5	1150	18×31.5	1190	18×35.5	1220
390	18×31.5	1320	18×35.5	1350	18×40	1385
470	18×35.5	1375	18×40	1400	18×45	1460
560	18×40	1440	18×45	1460		

uF \ Vdc	400		420		450	
	ΦD × L	RC	ΦD × L	RC	ΦD × L	RC
47			16×20	380	16×25	400
56	12.5×30	410	16×25	450	16×31.5	480
68	16×25	450	16×31.5	510	16×35.5	550
82	16×31.5	560	16×35.5	595	18×31.5	620
100	16×35.5	650	18×31.5	660	18×35.5	680
120	18×31.5	780	18×35.5	820	18×40	840
150	18×35.5	960	18×40	970	18×45	1000
180	18×40	1000	18×45	1050		

◆ **RIPPLE CURRENT MULTIPLIERS**

Frequency Multipliers

Vdc	Cap(uF)	Frequency (Hz)				
		50/60	120	1K	10K	100K
160 ~ 450	68 ~ 220	0.80	1.00	1.40	1.40	1.40
	330 ~ 470	0.90	1.00	1.13	1.13	1.13

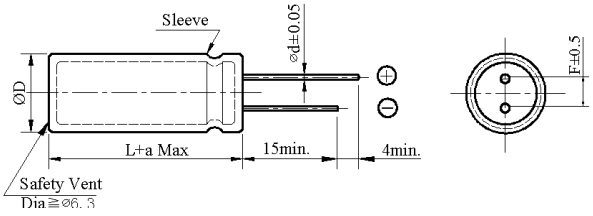
MV Series

- **High ripple current**
- **Low ESR**
- **Load life 5,000 hours at 105℃**

◆ SPECIFICATIONS

Item	Performance Characteristics
Category Temperature Range	-25~ +105℃
Working Voltage Range	160 ~ 450Vdc
Capacitance Range	6.8 ~ 470 μF
Capacitance Tolerance	±20% (at 25℃ and 120Hz)
Dissipation Factor (tanδ) (at 25℃, 120Hz)	Rated Voltage (V): 160~ 450; tanδ(Max): 0.15
Leakage Current	I=0.03CV + 10μA I : Leakage current (μA) C : Rated capacitance (μF) V : Rated voltage (V) Impress the rated voltage for 2 minutes.
Low Temperature Characteristics Impedance Ratio(MAX)	Rated voltage (V): 160~250 / 400 / 420 ~ 450 Z(-25℃)/Z(+20℃): 3 / 5 / 6 (at 120Hz)
Endurance	The following specifications shall be satisfied when the capacitors are restored to 25℃ after subjected to DC voltage with the rated ripple current is applied for 5,000 hours at 105℃. Capacitance change: ≦ ±20% of the initial value Dissipation factor(tanδ): ≦ 200% of the specified value Leakage current: ≦ specified value
Shelf Life	The following requirements shall be satisfied when the capacitor are restored to 25℃ after exposing them for 1,000 hours at 105℃ without voltage applied. Capacitance change: ≦ ±20% of the initial value Dissipation factor(tanδ): ≦ 200% of the specified value Leakage current: ≦ 200% of the specified value
Others	Conforms to JIS-C-5101-4 (1998), characteristic W

◆ DIMENSIONS (mm)



ΦD	10	12.5 L < 35	16	18
ΦD	ΦD +0.5 Max			
Φd	0.6	0.6	0.8	0.8
F	5.0	5.0	7.5	7.5
a	L + 1.5 Max	≤ 35 L+1.5Max ≥ 40 L+2.0 Max	L + 1.5 Max	

◆ PART NUMBER SYSTEM (Example : 350V 100μF)

M	V	2	V	1	0	1	M	N	N	1	8	4	5						

- Special Request
- Size code(1845 : 18×45)
- Lead length code
- Lead forming Type code
- Capacitance tolerance code(M:±20%)
- Capacitance code (100μF)
- Voltage code(350V)
- Series code(MV)

MV Series

◆ **Case size & Permissible rated ripple current: (mA rms) at 105℃ / 120Hz**

uF \ Vdc	160		200		250	
	ΦD × L	RC	ΦD × L	RC	ΦD × L	RC
33	10×16	350	10×20	360	10×25	380
47	10×20	400	10×25	440	12.5×16	460
56	10×25	520	10×30	540	12.5×20	560
68	10×30	580	12.5×20	600	12.5×25	630
82	12.5×20	630	12.5×25	650	16×20	680
100	12.5×25	745	16×20	760	16×25	800
120	12.5×30	800	16×25	820	18×20	880
150	16×25	960	16×31.5	950	18×25	980
180	16×31.5	1090	18×25	1120	18×31.5	1160
220	18×25	1120	18×31.5	1190	18×35.5	1220
330	18×31.5	1190	18×35.5	1220	18×40	1350
390	18×35.5	1350	18×40	1385	18×45	1420
470	18×40	1400	18×45	1430		
560	18×45	1460	18×50	1495		

uF \ Vdc	400		420		450	
	ΦD × L	RC	ΦD × L	RC	ΦD × L	RC
39			12.5×30	360	16×25	390
47	16×20	360	16×25	400	16×31.5	420
56	16×25	450	16×31.5	480	16×35.5	510
68	16×31.5	500	18×25	550	18×31.5	595
82	16×35.5	595	18×31.5	620	18×35.5	650
100	18×31.5	660	18×35.5	680	18×40	700
120	18×35.5	800	18×40	835	18×45	865
150	18×40	970	18×45	990	18×50	1050
180	18×45	1050	18×50	1100		

◆ **RIPPLE CURRENT MULTIPLIERS**

Frequency Multipliers

Vdc	Frequency (Hz)				
	50/60	120	1K	10K	100K
160 ~ 350	0.80	1.00	1.20	1.30	1.40
400 ~ 450	0.80	1.00	1.15	1.25	1.35

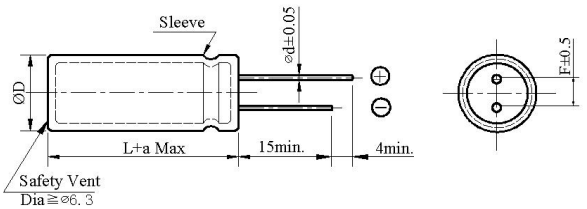
MJ Series

- **For electronic ballast circuits and long life**
- **Low ESR**
- **High ripple current**
- **Load life: 8,000 to 10,000 hours at 105℃**

◆ SPECIFICATIONS

Item	Performance Characteristics
Category Temperature Range	-25~ +105℃
Working Voltage Range	160 ~ 450Vdc
Capacitance Range	10 ~ 560 μF
Capacitance Tolerance	±20% (at 25℃ and 120Hz)
Dissipation Factor (tanδ) (at 25℃, 120Hz)	Rated Voltage (V): 160 ~ 450; tanδ(Max): 0.15
Leakage Current	I=0.03CV + 10μA I : Leakage current (μA) C : Rated capacitance (μF) V : Rated voltage (V) Impress the rated voltage for 2 minutes
Low Temperature Characteristics Impedance Ratio(MAX)	Rated voltage (V): 160~250 / 400 / 420 ~ 450; Z(-25°C)/Z(+20°C): 3 / 5 / 6 (at 120Hz)
Endurance	The following specifications shall be satisfied when the capacitors are restored to 25°C after subjected to DC voltage with the rated ripple current is applied for 10,000 (8,000 hours for Φ 10) hours at 105°C. Capacitance change: ≦ ±20% of the initial value Dissipation factor(tanδ): ≦ 200% of the specified value Leakage current: ≦ specified value
Shelf Life	The following requirements shall be satisfied when the capacitor are restored to 25℃ after the rated voltage applied for 1,000 hours at 105℃ without voltage applied. Capacitance change: ≦ ±20% of the initial value Dissipation factor(tanδ): ≦ 200% of the specified value Leakage current: ≦ 200% of the specified value
Others	Conforms to JIS-C-5101-4 (1998), characteristic W

◆ DIMENSIONS (mm)



ΦD	10	12.5	16	18
ΦD	ΦD + 0.5 Max			
Φd	0.6	0.6	0.8	0.8
F	5.0	5.0	7.5	7.5
a	L + 1.5 Max	≦35 L+1.5Max ≧40 L+2.0 Max	L + 1.5 Max	

◆ PART NUMBER SYSTEM(Example : 250V 220μF)

M	J	2	E	2	2	1	M	N	N	1	8	N	3						

- Special Request
- Size code(18N3 : 18×31.5)
- Lead length code
- Lead forming Type code
- Capacitance tolerance code(M:±20%)
- Capacitance code (220μF)
- Voltage code(250V)
- Series code(MJ)

MJ Series

◆ **Case size & Permissible rated ripple current: (mA rms) at 105℃ / 120Hz**

uF \ Vdc	160		200		250	
	ΦD × L	RC	ΦD × L	RC	ΦD × L	RC
10					10×12.5	185
15					10×16	230
22					10×20	300
33	10×20	360			12.5×16	400
47	10×25	420	12.5×16	460	12.5×20	480
56	12.5×16	540	12.5×20	560	12.5×25	580
68	12.5×20	600	12.5×25	620	16×20	650
82	12.5×25	650	16×20	660	16×25	700
100	16×20	760	16×25	780	18×20	830
120	16×25	830	18×20	850	18×25	900
150	18×20	960	18×25	980	18×31.5	1000
180	18×25	1120	18×31.5	1160	18×35.5	1190
220	18×31.5	1190	18×35.5	1220	18×40	1280
330	18×35.5	1220	18×40	1350	18×45	1385
390	18×40	1385	18×45	1420	18×50	1460
470	18×45	1430	18×50	1460		
560	18×50	1495				

uF \ Vdc	400		420		450	
	ΦD × L	RC	ΦD × L	RC	ΦD × L	RC
39	12.5×30	360	16×25	390	18×20	420
47	16×25	380	18×20	420	18×25	450
56	16×31.5	480	18×25	510	18×31.5	550
68	18×25	550	18×31.5	600	18×35.5	630
82	18×31.5	620	18×35.5	650	18×40	680
100	18×35.5	680	18×40	700	18×45	720
120	18×40	820	18×45	850	18×50	880
150	18×45	980	18×50	1000		
180	18×50	1100				

◆ **RIPPLE CURRENT MULTIPLIERS**

Frequency Multipliers

Cap(uF)	Frequency (Hz)			
	120	1K	10K	100K
6.8 ~ 82	1.00	1.75	2.25	2.50
100 ~ 330	1.00	1.67	1.75	2.25

ALUMINUM ELECTROLYTIC CAPACITORS

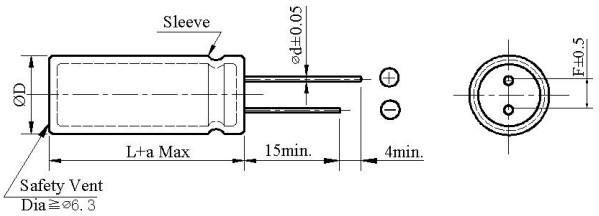
PZ Series

- **Rated voltage range: 200 to 450Vdc, Capacitance: 18 to 270μF**
- **Load life 2,000 hours at 105°C**
- **Ideal for low profile power supply applications**

◆ SPECIFICATIONS

Item	Performance Characteristics				
Category Temperature Range	-40 ~ +105℃			-25 ~ +105℃	
Working Voltage Range	200 ~ 400Vdc			420 ~ 450Vdc	
Capacitance Range	27 ~ 270 μF			18 ~ 100 μF	
Capacitance Tolerance	±20% (at 25℃ and 120Hz)				
Dissipation Factor (tanδ) (at 25℃, 120Hz)	Rated Voltage (V)	200	400	420	450
	tanδ(Max)	0.12	0.15	0.20	0.20
Leakage Current	I=0.03CV + 10μA I : Leakage current (μA) C : Rated capacitance (μF) V : Rated voltage (V) Impress the rated voltage for 2 minutes				
Low Temperature Characteristics Impedance Ratio(MAX)	Rated voltage (V)	200	400	420 ~ 450	
	Z(-40℃)/Z(+20℃)	6	6	—	
	Z(-25℃)/Z(+20℃)	3	5	6	(at 120Hz)
Endurance	The following specifications shall be satisfied when the capacitors are restored to 25°C after subjected to DC voltage with the rated ripple current is applied for 2,000 hours at 105°C. Capacitance change: ≦ ±20% of the initial value Dissipation factor(tanδ): ≦ 200% of the specified value Leakage current: ≦ specified value				
Shelf Life	The following requirements shall be satisfied when the capacitor are restored to 25℃ after the rated voltage applied for 1,000 hours at 105℃ without voltage applied. Capacitance change: ≦ ±20% of the initial value Dissipation factor(tanδ): ≦ 200% of the specified value Leakage current: ≦ 200% of the specified value				
Others	Conforms to JIS-C-5101-4 (1998), characteristic W				

◆ DIMENSIONS (mm)



ΦD	10	12.5	14.5
ΦD	ΦD + 0.5 Max		
Φd	0.6	0.6	0.8
F	5.0	5.0	7.5
a	L+ 1.5 Max	≦ 35 L+1.5Max ≧ 40 L+2.0 Max	L+ 2.0 Max

◆ PART NUMBER SYSTEM(Example : 450V 56μF)

P	Z	2	W	5	6	0	M	N	N	1	4	3	5						

- Special Request
- Size code(1435 : 14.5×35)
- Lead length code
- Lead forming Type code
- Capacitance tolerance code(M:±20%)
- Capacitance code (56 μ F)
- Voltage code(450V)
- Series code(PZ)

PZ Series

◆ **Case size & Permissible rated ripple current: (mA rms) at 105℃ / 120Hz**

uF \ Vdc	200		400		420		450	
	ΦD × L	RC	ΦD × L	RC	ΦD × L	RC	ΦD × L	RC
18							8×35	170
22					8×40	195	8×45	210
					10×30	205	10×30	210
27			8×35	215	8×45	225	10×35	255
					10×35	245		
33			8×45	210	10×40	280	12.5×30	310
			10×30	230				
39			8×50	275	12.5×30	295	10×40	320
			10×35	285				
47			10×40	310	10×45	325	10×45	335
					12.5×35	350	14.5×30	360
56			10×45	390	10×50	395	12.5×40	400
			12.5×30	400	12.5×35	410	14.5×35	415
68			12.5×35	410	12.5×40	430	12.5×45	440
			14.5×30	420	14.5×35	460	14.5×40	465
82	10×30	380	12.5×40	485	12.5×45	505	12.5×50	515
			14.5×35	500	14.5×40	515	14.5×45	540
100	10×35	435	12.5×45	565	12.5×50	605	14.5×50	650
			14.5×40	610	14.5×45	635		
120	10×40	460	14.5×45	645	14.5×50	650		
150	12.5×30	580						
180	12.5×35	655						
220	12.5×40	740						
	14.5×35	750						
270	14.5×40	865						

◆ **RIPPLE CURRENT MULTIPLIERS**

Frequency Multipliers

Vdc	Cap(uF)	Frequency (Hz)			
		120	1K	10K	100K
200 ~ 450	18 ~ 82	1.00	1.50	1.75	1.80
	100~ 270	1.00	1.30	1.40	1.50

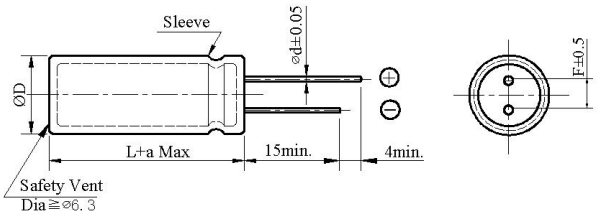
PA Series

- **105℃ Long Life (5,000 hours), Ultra Miniature size**
  Body diameter of Φ10mm to Φ14.5mm with high ripple current capability

◆ SPECIFICATIONS

Item	Performance Characteristics
Category Temperature Range	-25 ~ +105℃
Working Voltage Range	400 ~ 450Vdc
Capacitance Range	27 ~ 120 μF
Capacitance Tolerance	±20% (at 25℃ and 120Hz)
Dissipation Factor (tanδ) (at 25℃, 120Hz)	Rated Voltage (V): 400 / 420 / 450 — tanδ(Max): 0.20 / 0.20 / 0.20
Leakage Current	I=0.03CV + 10μA I : Leakage current (μA) C : Rated capacitance (μF) V : Rated voltage (V) Impress the rated voltage for 2 minutes
Low Temperature Characteristics Impedance Ratio(MAX)	Rated voltage (V): 400 / 420 ~ 450 — Z(-25°C)/Z(+20°C): 5 / 6 (at 120Hz)
Endurance	The following specifications shall be satisfied when the capacitors are restored to 25°C after subjected to DC voltage with the rated ripple current is applied for 5,000 hours at 105°C. Capacitance change: ≦ ±20% of the initial value Dissipation factor(tanδ): ≦ 200% of the specified value Leakage current: ≦ specified value
Shelf Life	The following requirements shall be satisfied when the capacitor are restored to 25℃ after the rated voltage applied for 1,000 hours at 105℃ without voltage applied. Capacitance change: ≦ ±20% of the initial value Dissipation factor(tanδ): ≦ 200% of the specified value Leakage current: ≦ 200% of the specified value
Others	Conforms to JIS-C-5101-4 (1998), characteristic W

◆ DIMENSIONS (mm)



ΦD	10	12.5	14.5
ΦD	ΦD + 0.5 Max		
Φd	0.6	0.6	0.8
F	5.0	5.0	7.5
a	L + 1.5 Max	≦ 35 L+1.5Max ≧ 40 L+2.0 Max	L + 2.0 Max

◆ PART NUMBER SYSTEM(Example : 450V 39μF)

P	A	2	W	3	9	0	M	N	N	1	0	5	5						

- Special Request
- Size code(1055 : 10×55)
- Lead length code
- Lead forming Type code
- Capacitance tolerance code(M:±20%)
- Capacitance code (39μF)
- Voltage code (450V)
- Series code (PA)

PA Series

◆ **Case size & Permissible rated ripple current: (mA rms) at 105℃ / 120Hz**

uF \ Vdc	400		420		450	
	ΦD × L	RC	ΦD × L	RC	ΦD × L	RC
27					10×30	240
33	10×30	240	10×35	250	10×40	260
39	10×35	295	10×40	325	10×45	330
	10×40	315				
47	10×45	375	10×45	385	10×50	370
					12.5×35	385
56	10×50	415	10×50	440	12.5×40	485
	12.5×35	425	12.5×40	475		
68	12.5 ×40	540	12.5×40	540	12.5×45	550
			14.5×35	550	14.5×40	555
82	12.5×45	560	12.5×45	585	12.5×50	600
	14.5×35	555	14.5×40	605	14.5×45	630
100	12.5×50	625	14.5×45	650	14.5×50	680
	14.5×40	630				
120	14.5×50	655	14.5×50	670		

◆ **RIPPLE CURRENT MULTIPLIERS**

Frequency Multipliers

Vdc	Frequency (Hz)				
	60(50)	120	500	1K	≥10K
400 ~ 450	0.80	1.00	1.25	1.40	1.50

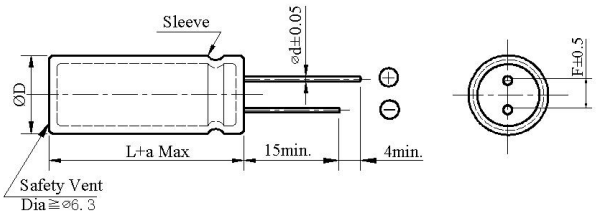
PQ Series

- **105℃ Long Life (10,000 hours), Miniature size**
  Body diameter of Φ10mm to Φ12.5mm with high ripple current capability

◆ SPECIFICATIONS

Item	Performance Characteristics
Category Temperature Range	-25 ~ +105℃
Working Voltage Range	160 ~ 450Vdc
Capacitance Range	27 ~ 390 μF
Capacitance Tolerance	±20% (at 25℃ and 120Hz)
Dissipation Factor (tanδ) (at 25℃, 120Hz)	Rated Voltage (V): 160 / 200 / 220 / 250 / 350 / 400 / 420 / 450 tanδ(Max): 0.20 / 0.20 / 0.20 / 0.20 / 0.20 / 0.20 / 0.25 / 0.25
Leakage Current	I=0.03CV + 10μA I : Leakage current (μA) C : Rated capacitance (μF) V : Rated voltage (V) Impress the rated voltage for 2 minutes
Low Temperature Characteristics Impedance Ratio(MAX)	Rated voltage (V): 160~250 / 350 / 400 / 420 ~ 450 Z(-25℃)/Z(+20℃): 3 / 5 / 5 / 6 (at 120Hz)
Endurance	The following specifications shall be satisfied when the capacitors are restored to 25°C after subjected to DC voltage with the rated ripple current is applied for 10,000 hours at 105°C. Capacitance change: ≦ ±20% of the initial value Dissipation factor(tanδ): ≦ 200% of the specified value Leakage current: ≦ specified value
Shelf Life	The following requirements shall be satisfied when the capacitor are restored to 25℃ after the rated voltage applied for 1,000 hours at 105℃ without voltage applied. Capacitance change: ≦ ±20% of the initial value Dissipation factor(tanδ): ≦ 200% of the specified value Leakage current: ≦ 200% of the specified value
Others	Conforms to JIS-C-5101-4 (1998), characteristic W

◆ DIMENSIONS (mm)



ΦD	10	12.5
ΦD	ΦD + 0.5 Max	
Φd	0.6	0.6
F	5.0	5.0
a	L + 1.5 Max	≤ 35 L+1.5Max ≥ 40 L+2.0 Max

◆ PART NUMBER SYSTEM(Example : 200V 220μF)

P	Q	2	D	2	2	1	M	N	N	1	2	5	0						

- Special Request
- Size code(1250 : 12.5×50)
- Lead length code
- Lead forming Type code
- Capacitance tolerance code(M:±20%)
- Capacitance code (220μF)
- Voltage code (200V)
- Series code (PQ)

PQ Series

◆ **Case size & Permissible rated ripple current: (mA rms) at 105℃ / 120Hz**

Vdc / uF	160		200		220		250	
	ΦD × L	RC	ΦD × L	RC	ΦD × L	RC	ΦD × L	RC
68							10×35	415
82					10×35	450	10×40	485
100			10×35	500	10×40	525	10×50	580
					10×45	545		
120	10×35	560	10×40	575	10×50	570	12.5×35	785
			10×45	600	12.5×35	740		
150	10×40	650	10×50	670	12.5×40	860	12.5×40	875
	10×45	675	12.5×35	800			14.5×35	825
180	10×50	765	12.5×40	920	12.5×45	990	12.5×50	995
							14.5×40	995
220	10×55	860	12.5×45	955	12.5×50	1130	14.5×45	1145
	12.5×35	875	14.5×35	945			14.5×50	1145
270	12.5×45	985	12.5×50	1030	14.5×50	1300		
			14.5×40	1130				
330	12.5×50	1130	14.5×50	1185				
	14.5×40	1125						
390	14.5×45	1187						

Vdc / uF	350		400		420		450	
	ΦD × L	RC	ΦD × L	RC	ΦD × L	RC	ΦD × L	RC
27					10×35	270	10×40	275
33			10×35	280	10×40	315	10×45	305
							12.5×30	370
39	10×35	290	10×40	325	10×45	380	10×50	410
					12.5×30	390	12.5×35	420
47	10×40	330	10×45	400	10×50	430	12.5×40	480
					12.5×35	450	14.5×30	475
56	10×45	400	12.5×35	455	12.5×40	520	12.5×45	530
							14.5×35	530
68	12.5×35	505	12.5×40	535	12.5×45	562	12.5×50	585
					14.5×40	555	14.5×40	595
82	12.5×40	570	12.5×45	585	12.5×50	635	14.5×50	660
			14.5×35	600	14.5×45	625		
100	12.5×45	620	14.5×40	680	14.5×50	715		
120	14.5×40	730	14.5×50	785				
150	14.5×50	770						

◆ **RIPPLE CURRENT MULTIPLIERS**

Frequency Multipliers

Vdc	Frequency (Hz)				
	60(50)	120	500	1K	≥10K
160 ~ 250	0.80	1.00	1.20	1.30	1.40
350 ~ 450	0.80	1.00	1.25	1.40	1.50

ALUMINUM ELECTROLYTIC CAPACITORS

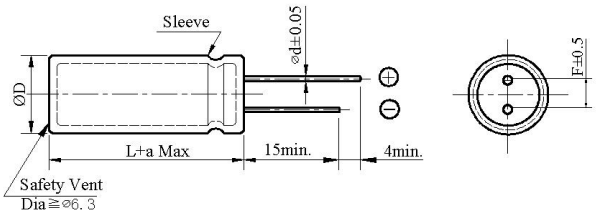
MZ Series

- **Low ESR**
- **Load life 2,000 hours at 105°C**
- **Ideal for low profile power supply applications**

◆ SPECIFICATIONS

Item	Performance Characteristics	
Category Temperature Range	-40 ~ +105℃	-25 ~ +105℃
Working Voltage Range	200 ~ 400Vdc	420 ~ 450Vdc
Capacitance Range	27 ~ 270 μF	18 ~ 270 μF
Capacitance Tolerance	±20% (at 25°C and 120Hz)	
Dissipation Factor (tanδ) (at 25°C, 120Hz)	Rated Voltage (V): 200 ~ 450; tanδ(Max): 0.15	
Leakage Current	I=0.03CV + 10μA I : Leakage current (μA) C : Rated capacitance (μF) V : Rated voltage (V) Impress the rated voltage for 2 minutes	
Low Temperature Characteristics Impedance Ratio(MAX)	Rated voltage (V): 200 / 400 / 420 ~ 450 Z(-40℃)/Z(+20℃): 6 / 6 / — Z(-25℃)/Z(+20℃): 3 / 5 / 6 (at 120Hz)	
Endurance	The following specifications shall be satisfied when the capacitors are restored to 25°C after subjected to DC voltage with the rated ripple current is applied for 2,000 hours at 105°C. Capacitance change: ≦ ±20% of the initial value Dissipation factor(tanδ): ≦ 200% of the specified value Leakage current: ≦ specified value	
Shelf Life	The following requirements shall be satisfied when the capacitor are restored to 25℃ after the rated voltage applied for 1,000 hours at 105℃ without voltage applied. Capacitance change: ≦ ±20% of the initial value Dissipation factor(tanδ): ≦ 200% of the specified value Leakage current: ≦ 200% of the specified value	
Others	Conforms to JIS-C-5101-4 (1998), characteristic W	

◆ DIMENSIONS (mm)



ΦD	8	10	12.5	14.5
ΦD	ΦD + 0.5 Max			
Φd	0.6	0.6	0.6	0.8
F	3.5	5.0	5.0	7.5
a	L+ 1.5 Max	L+ 1.5 Max	≦ 35 L+1.5Max ≧ 40 L+2.0 Max	L+ 2.0 Max

◆ PART NUMBER SYSTEM(Example : 400V 100μF)

M	Z	2	G	1	0	1	M	N	N	1	4	4	5						

- Special Request
- Size code(1445 : 14.5×45)
- Lead length code
- Lead forming Type code
- Capacitance tolerance code(M:±20%)
- Capacitance code (100μF)
- Voltage code (400V)
- Series code (MZ)

MZ Series

◆ **Case size & Permissible rated ripple current: (mA rms) at 105℃ / 120Hz**

uF \ Vdc	200		400		420		450	
	ΦD × L	RC	ΦD × L	RC	ΦD × L	RC	ΦD × L	RC
18							8×35	190
22					8×40	210	8×45	230
					10×30	215	10×30	230
27			8×35	235	8×45	245	10×35	270
					10×35	260		
33			8×45	230	10×40	295	12.5×30	330
			10×30	245				
39			8×50	290	12.5×30	330	10×40	340
			10×35	300				
47			10×40	330	10×45	340	10×45	350
					12.5×35	360	14.5×30	380
56			10×45	400	10×50	410	12.5×40	415
			12.5×30	410	12.5×35	420	14.5×35	435
68			12.5×35	420	12.5×40	450	12.5×45	460
			14.5×30	435	14.5×35	465	14.5×40	470
82	10×30	400	12.5×40	500	12.5×45	530	12.5×50	535
			14.5×35	515	14.5×40	540	14.5×45	550
100	10×35	460	12.5×45	580	12.5×50	630	14.5×50	670
			14.5×40	630	14.5×45	660		
120	10×40	480	14.5×45	665	14.5×50	675		
150	12.5×30	600						
180	12.5×35	680						
220	12.5×40	770						
	14.5×35	785						
270	14.5×40	890						

◆ **RIPPLE CURRENT MULTIPLIERS**

Frequency Multipliers

Vdc	Cap(uF)	Frequency (Hz)			
		120	1K	10K	100K
200 ~ 450	18 ~ 82	1.00	1.50	1.75	1.80
	100~ 270	1.00	1.30	1.40	1.50

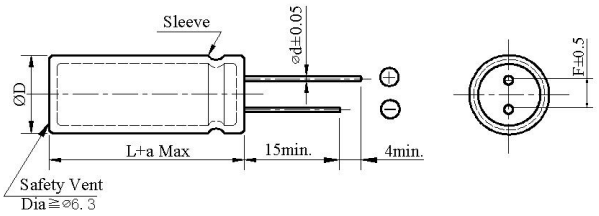
MA Series

- **Low ESR**
- **105℃ Long life (5,000 hours),Ultra Miniature size**
  Body diameter of Φ10mm to Φ14.5mm with high ripple current capability

◆ SPECIFICATIONS

Item	Performance Characteristics
Category Temperature Range	-25 ~ +105℃
Working Voltage Range	400 ~ 450Vdc
Capacitance Range	27 ~ 120 μF
Capacitance Tolerance	±20% (at 25℃ and 120Hz)
Dissipation Factor (tanδ) (at 25℃, 120Hz)	Rated Voltage (V): 400 ~ 450; tanδ(Max): 0.15
Leakage Current	I=0.03CV + 10μA I : Leakage current (μA) C : Rated capacitance (μF) V : Rated voltage (V) Impress the rated voltage for 2 minutes.
Low Temperature Characteristics Impedance Ratio(MAX)	Rated voltage (V): 400 / 420 ~ 450; Z(-25°C)/Z(+20°C): 5 / 6 (at 120Hz)
Endurance	The following specifications shall be satisfied when the capacitors are restored to 25°C after subjected to DC voltage with the rated ripple current is applied for 5,000 hours at 105°C. Capacitance change: ≦ ±20% of the initial value Dissipation factor(tanδ): ≦ 200% of the specified value Leakage current: ≦specified value
Shelf Life	The following requirements shall be satisfied when the capacitor are restored to 25℃ after the rated voltage applied for 1,000 hours at 105℃ without voltage applied. Capacitance change: ≦ ±20% of the initial value Dissipation factor(tanδ): ≦ 200% of the specified value Leakage current: ≦ 200% of the specified value
Others	Conforms to JIS-C-5101-4 (1998), characteristic W

◆ DIMENSIONS (mm)



ΦD	10	12.5	14.5
ΦD	ΦD + 0.5 Max		
Φd	0.6	0.6	0.8
F	5.0	5.0	7.5
a	L + 1.5 Max	≦ 35 L+1.5Max ≧ 40 L+2.0 Max	L + 2.0 Max

◆ PART NUMBER SYSTEM(Example : 400V 68μF)

M	A	2	G	6	8	0	M	N	N	1	2	4	0						

- Special Request
- Size code(1240 : 12.5×40)
- Lead length code
- Lead forming Type code
- Capacitance tolerance code(M:±20%)
- Capacitance code (68μF)
- Voltage code (400V)
- Series code (MA)

MA Series

◆ **Case size & Permissible rated ripple current: (mA rms) at 105℃ / 120Hz**

uF \ Vdc	400		420		450	
	ΦD × L	RC	ΦD × L	RC	ΦD × L	RC
27					10×30	260
33	10×30	260	10×35	270	10×40	280
39	10×35	315	10×40	340	10×45	350
	10×40	330				
47	10×45	393	10×45	405	10×50	390
					12.5×35	405
56	10×50	435	10×50	465	12.5×40	505
	12.5×35	440	12.5×40	497		
68	12.5 ×40	555	12.5×40	555	12.5×45	560
			14.5×35	560	14.5×40	565
82	12.5×45	580	12.5×45	610	12.5×50	625
	14.5×35	575	14.5×40	620	14.5×45	650
100	12.5×50	645	14.5×45	670	14.5×50	708
	14.5×40	655				
120	14.5×50	675	14.5×50	690		

◆ **RIPPLE CURRENT MULTIPLIERS**

Frequency Multipliers

Vdc	Frequency (Hz)				
	60(50)	120	500	1K	≥10K
400 ~ 450	0.80	1.00	1.25	1.40	1.50

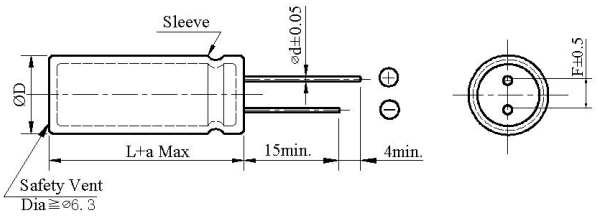
MQ Series

- **Low ESR**
- **105℃ Long Life (10,000 hours), Miniature size**
  Body diameter of Φ10mm to Φ12.5mm with high ripple current capability

◆ SPECIFICATIONS

Item	Performance Characteristics
Category Temperature Range	-25 ~ +105℃
Working Voltage Range	160 ~ 450Vdc
Capacitance Range	27 ~ 390 μF
Capacitance Tolerance	±20% (at 25℃ and 120Hz)
Dissipation Factor (tanδ) (at 25℃, 120Hz)	Rated Voltage (V): 160 ~ 250 / 350 ~ 450; tanδ(Max): 0.15 / 0.15
Leakage Current	I=0.03CV + 10μA I : Leakage current (μA) C : Rated capacitance (μF) V : Rated voltage (V) Impress the rated voltage for 2 minutes
Low Temperature Characteristics Impedance Ratio(MAX)	Rated voltage (V): 160~250 / 350 / 400 / 420 ~ 450; Z(-25℃)/Z(+20℃): 3 / 5 / 5 / 6 (at 120Hz)
Endurance	The following specifications shall be satisfied when the capacitors are restored to 25℃ after subjected to DC voltage with the rated ripple current is applied for 10,000 hours at 105℃. Capacitance change: ≦ ±20% of the initial value Dissipation factor(tanδ): ≦ 200% of the specified value Leakage current: ≦ specified value
Shelf Life	The following requirements shall be satisfied when the capacitor are restored to 25℃ after the rated voltage applied for 1,000 hours at 105℃ without voltage applied. Capacitance change: ≦ ±20% of the initial value VDissipation factor(tanδ): ≦ 200% of the specified value Leakage current: ≦ 200% of the specified value
Others	Conforms to JIS-C-5101-4 (1998), characteristic W

◆ DIMENSIONS (mm)



ΦD	10	12.5	14.5
ΦD	ΦD + 0.5 Max		
Φd	0.6	0.6	0.8
F	5.0	5.0	7.5
a	L + 1.5 Max	≦ 35 L+1.5Max ≧ 40 L+2.0 Max	L+2.0 Max

◆ PART NUMBER SYSTEM(Example : 450V 33μF)

M	Q	2	W	3	3	0	M	N	N	1	0	5	0						

- Special Request
- Size code(1050 : 10×50)
- Lead length code
- Lead forming Type code
- Capacitance tolerance code(M:±20%)
- Capacitance code (33μF)
- Voltage code (450V)
- Series code (MQ)

MQ Series

◆ **Case size & Permissible rated ripple current: (mA rms) at 105℃ / 120Hz**

uF \ Vdc	160		200		220		250	
	ΦD × L	RC	ΦD × L	RC	ΦD × L	RC	ΦD × L	RC
68							10×35	430
82					10×35	470	10×40	495
100			10×35	520	10×40	545	10×50	585
					10×45	565		
120	10×35	570	10×40	595	10×50	590	12.5×35	795
			10×45	620	12.5×35	780		
150	10×40	665	10×50	690	12.5×40	873	12.5×40	890
	10×45	695	12.5×35	813			14.5×35	830
180	10×50	785	12.5×40	935	12.5×45	1002	12.5×50	1015
							14.5×40	1015
220	10×55	880	12.5×45	970	12.5×50	1145	14.5×45	1150
	12.5×35	890	14.5×35	960			14.5×50	1150
270	12.5×45	1000	12.5×50	1050	14.5×50	1315		
			14.5×40	1150				
330	12.5×50	1150	14.5×50	1210				
	14.5×40	1145						
390	14.5×45	1210						

uF \ Vdc	350		400		420		450	
	ΦD × L	RC	ΦD × L	RC	ΦD × L	RC	ΦD × L	RC
27					10×35	275	10×40	280
33			10×35	300	10×40	325	10×45	310
							12.5×30	373
39	10×35	300	10×40	340	10×45	390	10×50	415
					12.5×30	395	12.5×35	425
47	10×40	335	10×45	420	10×50	440	12.5×40	490
					12.5×35	455	14.5×30	480
56	10×45	405	12.5×35	470	12.5×40	524	12.5×45	538
							14.5×35	545
68	12.5×35	520	12.5×40	555	12.5×45	570	12.5×50	600
					14.5×40	560	14.5×40	580
82	12.5×40	580	12.5×45	600	12.5×50	645	14.5×50	670
			14.5×35	620	14.5×45	630		
100	12.5×45	625	14.5×40	700	14.5×50	725		
120	14.5×40	745	14.5×50	800				
150	14.5×50	780						

◆ **RIPPLE CURRENT MULTIPLIERS**

Frequency Multipliers

Vdc	Frequency (Hz)				
	60(50)	120	500	1K	⩾10K
160 ~ 250	0.80	1.00	1.20	1.30	1.40
350 ~ 450	0.80	1.00	1.25	1.40	1.50

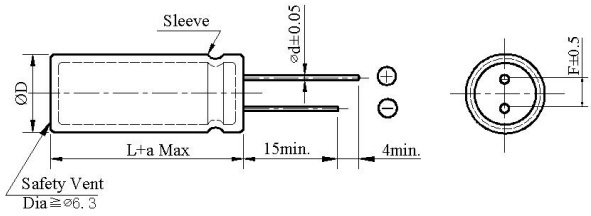
SW Series

- **Counter-plan product for safety**
- **Load life 2,000 hours at 105℃**

◆ SPECIFICATIONS

Item	Performance Characteristics
Category Temperature Range	-25 ~ +105℃
Working Voltage Range	160 ~ 450Vdc
Capacitance Range	22 ~ 680 μF
Capacitance Tolerance	±20% (at 25℃ and 120Hz)
Dissipation Factor (tanδ) (at 25℃, 120Hz)	Rated Voltage (V): 160 ~ 250 / 400 ~ 450 tanδ(Max): 0.12 / 0.15
Leakage Current	I=0.02CV or 3000 μA whichever is smaller I : Leakage current (μA) C : Rated capacitance (μF) V : Rated voltage (V) Impress the rated voltage for 2 minutes
Low Temperature Characteristics Impedance Ratio(MAX)	Rated voltage (V): 160~250 / 400 / 420 ~ 450 Z(-25℃)/Z(+20℃): 3 / 5 / 6 (at 120Hz)
Endurance	The following specifications shall be satisfied when the capacitors are restored to 25°C after subjected to DC voltage with the rated ripple current is applied for 2,000 hours at 105°C. Capacitance change: ≦ ±20% of the initial value Dissipation factor(tanδ): ≦ 200% of the specified value Leakage current: ≦ specified value
Shelf Life	The following requirements shall be satisfied when the capacitor are restored to 25℃ after the rated voltage applied for 1,000 hours at 105℃ without voltage applied. Capacitance change: ≦ ±20% of the initial value Dissipation factor(tanδ): ≦ 200% of the specified value Leakage current: ≦ 200% of the specified value
Others	Conforms to JIS-C-5101-4 (1998), characteristic W

◆ DIMENSIONS (mm)



ΦD	10	12.5	16	18
ΦD	ΦD + 0.5 Max			
Φd	0.6	0.6	0.8	0.8
F	5.0	5.0	7.5	7.5
a	L + 1.5 Max	≦ 35 L+1.5Max ≧ 40 L+2.0 Max	L +1.5 Max	

◆ PART NUMBER SYSTEM(Example : 450V 150μF)

S	W	2	W	1	5	1	M	N	N	1	8	4	5						

Special Request
Size code(1845 : 18×45)
Lead length code
Lead forming Type code
Capacitance tolerance code(M:±20%)
Capacitance code (150μF)
Voltage code (450V)
Series code (SW)

SW Series

◆ **Case size & Permissible rated ripple current: (mA rms) at 105°C / 120Hz**

uF \ Vdc	160		200		220		250	
	ΦD × L	RC	ΦD × L	RC	ΦD × L	RC	ΦD × L	RC
68					10×35	380	10×40	395
82			10×35	435	10×40	450	10×45	480
100	10×30	410	10×40	470	10×45	505	10×50	550
							12.5×35	530
120	10×35	500	10×45	535	10×50	580	12.5×40	565
					12.5×35	540		
150	10×40	575	12.5×35	610	12.5×40	620	12.5×45	635
180	10×50	640	12.5×40	700	12.5×45	715	12.5×50	740
	12.5×30	620					16×31.5	730
220	12.5×35	740	12.5×50	860	16×35.5	870	16×40	950
	16×25	725	16×31.5	825			18×30	920
270	12.5×45	860	16×35.5	860	16×40	930	16×45	1100
	16×30	830	18×30	855	18×30	910	18×35.5	1030
330	12.5×50	930	16×40	1150	16×45	1200	18×40	1300
	16×31.5	910	18×35.5	1200	18×35.5	1245		
	18×25	895						
470	18×31.5	1210	18×45	1380	18×45	1400	18×50	1460
560	18×35.5	1350	18×50	1500				
680	18×40	1460						

uF \ Vdc	400		420		450	
	ΦD × L	RC	ΦD × L	RC	ΦD × L	RC
22			10×30	210	10×30	225
27	10×30	250	10×35	260	10×35	280
33	10×35	275	10×40	290	10×40	305
39	10×40	305	10×45	315	10×50	330
47	10×45	330	10×50	350	12.5×40	390
	12.5×30	320	12.5×35	340		
56	12.5×35	375	12.5×40	395	12.5×45	450
68	12.5×40	455	12.5×45	480	12.5×50	570
			16×31.5	470	16×35.5	560
82	12.5×50	535	16×35.5	560	16×40	630
	16×31.5	530			18×31.5	605
100	16×35.5	615	16×40	670	16×45	740
			18×31.5	655	18×35.5	720
120	16×40	730	18×35.5	750	18×40	805
	18×31.5	700				
150	18×40	845	18×45	900	18×45	950
180	18×45	950	18×50	1040		
220	18×50	1100				

◆ **RIPPLE CURRENT MULTIPLIERS**

Frequency Multipliers

Vdc	Frequency (Hz)				
	50/60	120	1K	10K	100K
160 ~ 450	0.80	1.00	1.30	1.40	1.50

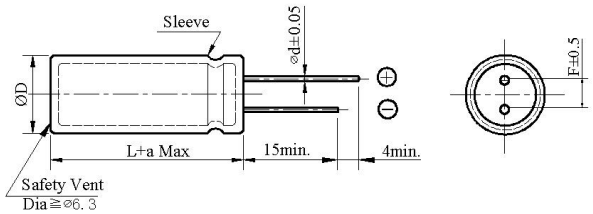
SQ Series

- **Counter-plan product for safety**
- **Load life 5,000 hours at 105℃**

◆ SPECIFICATIONS

Item	Performance Characteristics
Category Temperature Range	-25 ~ +105℃
Working Voltage Range	160 ~ 450Vdc
Capacitance Range	22 ~ 680 μF
Capacitance Tolerance	±20% (at 25℃ and 120Hz)
Dissipation Factor (tanδ) (at 25℃, 120Hz)	Rated Voltage (V): 160 ~ 250 / 400 ~ 450 tanδ(Max): 0.12 / 0.15
Leakage Current	I=0.02CV or 3000 μA whichever is smaller I : Leakage current (μA) C : Rated capacitance (μF) V : Rated voltage (V) . Impress the rated voltage for 2 minutes
Low Temperature Characteristics Impedance Ratio(MAX)	Rated voltage (V): 160~250 / 400 / 420 ~ 450 Z(-25℃)/Z(+20℃): 3 / 5 / 6 (at 120Hz)
Endurance	The following specifications shall be satisfied when the capacitors are restored to 25°C after subjected to DC voltage with the rated ripple current is applied for 5,000 hours at 105°C. Capacitance change: ≦ ±20% of the initial value Dissipation factor(tanδ): ≦ 200% of the specified value Leakage current: ≦ specified value
Shelf Life	The following requirements shall be satisfied when the capacitor are restored to 25℃ after the rated voltage applied for 1,000 hours at 105℃ without voltage applied. Capacitance change: ≦ ±20% of the initial value Dissipation factor(tanδ): ≦ 200% of the specified value Leakage current: ≦ 200% of the specified value
Others	Conforms to JIS-C-5101-4 (1998), characteristic W

◆ DIMENSIONS (mm)



ΦD	10	12.5	16	18
ΦD	ΦD + 0.5 Max			
Φd	0.6	0.6	0.8	0.8
F	5.0	5.0	7.5	7.5
a	L + 1.5 Max	≦ 35 L+1.5Max ≧ 40 L+2.0 Max	L + 1.5 Max	

◆ PART NUMBER SYSTEM(Example : 450V 47μF)

S	Q	2	W	4	7	0	M	N	N	1	2	4	5						

- Special Request
- Size code(1245 : 12.5x45)
- Lead length code
- Lead forming Type code
- Capacitance tolerance code(M:±20%)
- Capacitance code (47μF)
- Voltage code (450V)
- Series code (SQ)

SQ Series

◆ **Case size & Permissible rated ripple current: (mA rms) at 105°C / 120Hz**

uF \ Vdc	160		200		220		250	
	ΦD × L	RC	ΦD × L	RC	ΦD × L	RC	ΦD × L	RC
68					10×35	410	10×40	425
82			10×35	450	10×40	465	10×45	485
100	10×30	425	10×40	485	10×45	520	12.5×35	550
120	10×35	510	10×45	545	10×50	590	12.5×40	575
					12.5×35	560		
150	10×40	590	12.5×35	630	12.5×40	645	12.5×50	655
	12.5×30	570						
180	10×50	655	12.5×45	725	12.5×50	740	16×35.5	770
	12.5×35	640						
220	12.5×40	770	12.5×50	880	16×35.5	900	16×40	965
	16×25	735	16×31.5	865			18×31.5	950
270	12.5×45	880	16×40	890	16×40	960	16×50	1120
	16×30	860	18×30	875	18×31.5	935	18×40	1070
330	12.5×50	945	16×45	1180	16×50	1240	18×45	1350
	16×35.5	930	18×35.5	1250	18×40	1280		
	18×30	920						
470	18×35.5	1240	18×45	1410	18×50	1440		
560	18×40	1375	18×50	1520				
680	18×45	1480						

uF \ Vdc	400		420		450	
	ΦD × L	RC	ΦD × L	RC	ΦD × L	RC
22			10×30	220	10×35	235
27	10×30	265	10×35	270	10×40	290
33	10×35	280	10×40	305	10×45	315
39	10×40	315	10×45	325	10×50	350
					12.5×40	335
47	10×45	350	10×50	370	12.5×45	405
	12.5×35	340	12.5×40	360		
56	12.5×40	385	12.5×45	405	12.5×50	470
68	12.5×45	465	12.5×50	490	16×40	590
			16×35.5	485		
82	12.5×50	555	16×40	590	16×45	650
	16×35.5	545			18×35.5	630
100	16×40	630	16×45	695	16×50	770
			18×35.5	680	18×40	750
120	16×45	760	18×40	775	18×45	835
	18×35.5	735				
150	18×40	870	18×45	930	18×50	980
180	18×45	980	18×50	1070		

◆ **RIPPLE CURRENT MULTIPLIERS**

Frequency Multipliers

Vdc	Frequency (Hz)				
	50/60	120	1K	10K	100K
160 ~ 250	0.80	1.00	1.20	1.30	1.40
400 ~ 450	0.80	1.00	1.15	1.25	1.35

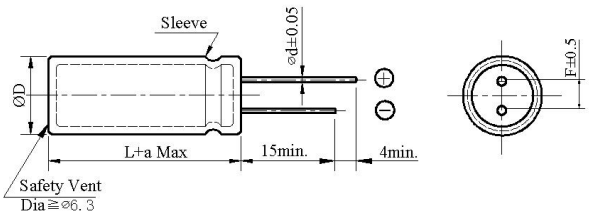
SP Series

- **Counter-plan product for safety**
- **Load life 10,000 hours at 105℃**

◆ SPECIFICATIONS

Item	Performance Characteristics
Category Temperature Range	-25 ~ +105℃
Working Voltage Range	160 ~ 450Vdc
Capacitance Range	22 ~ 680 μF
Capacitance Tolerance	±20% (at 25℃ and 120Hz)
Dissipation Factor (tanδ) (at 25℃, 120Hz)	Rated Voltage (V): 160 ~ 250 / 400 ~ 450; tanδ(Max): 0.12 / 0.15
Leakage Current	I=0.02CV or 3000 μA whichever is smaller I : Leakage current (μA) C : Rated capacitance (μF) V : Rated voltage (V) Impress the rated voltage for 2 minutes
Low Temperature Characteristics Impedance Ratio(MAX)	Rated voltage (V): 160~250 / 400 / 420 ~ 450; Z(-25℃)/Z(+20℃): 3 / 5 / 6 (at 120Hz)
Endurance	The following specifications shall be satisfied when the capacitors are restored to 25°C after subjected to DC voltage with the rated ripple current is applied for 10,000 hours at 105°C. Capacitance change: ≦ ±20% of the initial value Dissipation factor(tanδ): ≦ 200% of the specified value Leakage current: ≦ specified value
Shelf Life	The following requirements shall be satisfied when the capacitor are restored to 25℃ after the rated voltage applied for 1,000 hours at 105℃ without voltage applied. Capacitance change: ≦ ±20% of the initial value Dissipation factor(tanδ): ≦ 200% of the specified value Leakage current: ≦ 200% of the specified value
Others	Conforms to JIS-C-5101-4 (1998), characteristic W

◆ DIMENSIONS (mm)



ΦD	10	12.5	16	18
ΦD	ΦD + 0.5 Max			
Φd	0.6	0.6	0.8	0.8
F	5.0	5.0	7.5	7.5
a	L + 1.5 Max	≦ 35 L+1.5Max ≧ 40 L+2.0 Max	L + 1.5 Max	

◆ PART NUMBER SYSTEM(Example : 160V 560μF)

S	P	2	C	5	6	1	M	N	N	1	8	4	5						

- Special Request
- Size code(1845 : 18x45)
- Lead length code
- Lead forming Type code
- Capacitance tolerance code(M:±20%)
- Capacitance code (560μF)
- Voltage code (160V)
- Series code (SP)

SP Series

◆ **Case size & Permissible rated ripple current: (mA rms) at 105℃ / 120Hz**

uF \ Vdc	160		200		220		250	
	ΦD × L	RC	ΦD × L	RC	ΦD × L	RC	ΦD × L	RC
68					10×40	425	10×45	440
82			10×40	460	10×45	480	10×50	505
100	10×35	445	10×45	490	10×50	545	12.5×40	570
120	10×40	525	10×50	555	12.5×40	580	12.5×50	610
							16×30	590
150	10×50	610	12.5×40	650	12.5×45	670	16×35.5	735
	12.5×35	595						
180	12.5×40	670	12.5×45	745	12.5×50	765	16×40	820
220	12.5×45	785	12.5×50	900	16×40	930	16×50	1050
	16×30	760	16×35.5	885			18×40	1010
270	12.5×50	905	16×40	910	16×45	990	18×45	1120
	16×35.5	880	18×31.5	890	18×35.5	975		
	18×30	870						
330	16×40	960	16×45	1210	16×50	1270	18×50	1380
	18×31.5	945	18×35.5	1285	18×40	1300		
470	18×40	1270	18×45	1450	18×50	1475		
560	18×45	1400	18×50	1550				
680	18×50	1520						

uF \ Vdc	400		420		450	
	ΦD × L	RC	ΦD × L	RC	ΦD × L	RC
22			10×35	240	10×40	260
27	10×35	280	10×40	285	10×45	310
33	10×40	295	10×45	320	10×50	340
					12.5×35	330
39	10×45	325	10×50	345	12.5×40	365
47	10×50	370	12.5×40	385	12.5×45	440
	12.5×35	360				
56	12.5×40	400	12.5×45	420	12.5×50	510
68	12.5×45	475	12.5×50	520	16×40	630
			16×35.5	515		
82	12.5×50	580	16×40	620	16×45	690
	16×35.5	575			18×35.5	670
100	16×40	655	16×45	730	18×40	800
	18×31.5	635	18×35.5	715		
120	16×45	780	18×45	800	18×50	880
	18×40	765				
150	18×45	890	18×50	955		
180	18×50	1000				

◆ **RIPPLE CURRENT MULTIPLIERS**

Frequency Multipliers

Vdc	Frequency (Hz)				
	50/60	120	1K	10K	100K
160 ~ 450	0.80	1.00	1.30	1.40	1.50

ALUMINUM ELECTROLYTIC CAPACITORS

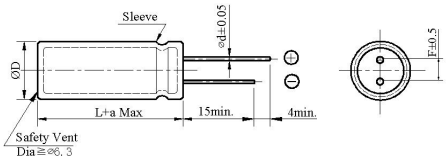
VW Series

- **Capacitor For Over Voltage Application**
- **Load life 2,000 hours at 105℃**

◆ SPECIFICATIONS

Item	Performance Characteristics
Category Temperature Range	-25 ~ +105℃
Working Voltage Range	160 ~ 450Vdc
Capacitance Range	22 ~ 680 μF
Capacitance Tolerance	±20% (at 25℃ and 120Hz)
Dissipation Factor (tanδ) (at 25℃, 120Hz)	Rated Voltage (V): 160 ~ 250 / 400 ~ 450; tanδ(Max): 0.12 / 0.15
Leakage Current	I=0.02CV or 3000 μA whichever is smaller I : Leakage current (μA) C : Rated capacitance (μF) V : Rated voltage (V) Impress the rated voltage for 2 minutes
Low Temperature Characteristics Impedance Ratio(MAX)	Rated voltage (V): 160~250 / 400 / 420 ~ 450; Z(-25℃)/Z(+20℃): 3 / 5 / 6 (at 120Hz)
Charge and Discharge	The following specifications shall be satisfied when the capacitors are restored to 25°C after subjected to charge and discharge test with the voltage waveform shown below at room temperature(15 to 35°C) Frequency: 5Hz; Number of cycles: 200million times; Voltage waveform: Rated voltage, ≦150V, 1 cycle, 0V Capacitance change: ≦ ±20% of the initial value Dissipation factor(tanδ): ≦ 200% of the specified value Leakage current: ≦ specified value
Endurance	The following specifications shall be satisfied when the capacitors are restored to 25°C after subjected to DC voltage with the rated ripple current is applied for 2,000 hours at 105°C. Capacitance change: ≦ ±20% of the initial value Dissipation factor(tanδ): ≦ 200% of the specified value Leakage current: ≦ specified value
Shelf Life	The following requirements shall be satisfied when the capacitor are restored to 25℃ after the rated voltage applied for 1,000 hours at 105℃ without voltage applied. Capacitance change: ≦ ±20% of the initial value Dissipation factor(tanδ): ≦ 200% of the specified value Leakage current: ≦ 200% of the specified value
Others	Conforms to JIS-C-5101-4 (1998), characteristic W

◆ DIMENSIONS (mm)



ΦD	10	12.5	16	18
ΦD	ΦD + 0.5 Max			
Φd	0.6	0.6	0.8	0.8
F	5.0	5.0	7.5	7.5
a	L + 1.5 Max	≦ 35 L+1.5Max ≧ 40 L+2.0 Max	L + 1.5 Max	

◆ PART NUMBER SYSTEM(Example : 450V 150μF)

V	W	2	W	1	5	1	M	N	N	1	8	4	5						

- Special Request
- Size code(1845 : 18×45)
- Lead length code
- Lead forming Type code
- Capacitance tolerance code(M:±20%)
- Capacitance code (150μF)
- Voltage code (450V)
- Series code (VW)

VW Series

◆ **Case size & Permissible rated ripple current: (mA rms) at 105°C / 120Hz**

uF \ Vdc	160		200		220		250	
	ΦD × L	RC	ΦD × L	RC	ΦD × L	RC	ΦD × L	RC
68					10×35	365	10×40	380
82			10×35	420	10×40	435	10×45	460
100	10×30	395	10×40	450	10×45	480	10×50	530
							12.5×35	510
120	10×35	480	10×45	515	10×50	555	12.5×40	545
					12.5×35	520		
150	10×40	555	12.5×35	585	12.5×40	595	12.5×45	610
180	10×50	615	12.5×40	670	12.5×45	685	12.5×50	710
	12.5×30	595					16×31.5	700
220	12.5×35	710	12.5×50	830	16×35.5	840	16×40	915
	16×25	695	16×31.5	795			18×30	880
270	12.5×45	825	16×35.5	825	16×40	900	16×45	1060
	16×30	800	18×30	820	18×30	875	18×35.5	990
330	12.5×50	890	16×40	1105	16×45	1150	18×40	1250
	16×31.5	875	18×35.5	1150	18×35.5	1195		
	18×25	860						
470	18×31.5	1160	18×45	1325	18×45	1350	18×50	1400
560	18×35.5	1295	18×50	1440				
680	18×40	1400						

uF \ Vdc	400		420		450	
	ΦD × L	RC	ΦD × L	RC	ΦD × L	RC
22			10×30	202	10×30	215
27	10×30	240	10×35	250	10×35	270
33	10×35	265	10×40	280	10×40	295
39	10×40	290	10×45	305	10×50	320
47	10×45	320	10×50	335	12.5×40	375
	12.5×30	310	12.5×35	325		
56	12.5×35	360	12.5×40	380	12.5×45	430
68	12.5×40	435	12.5×45	460	12.5×50	545
			16×31.5	450	16×35.5	535
82	12.5×50	515	16×35.5	540	16×40	605
	16×31.5	510			18×31.5	580
100	16×35.5	590	16×40	645	16×45	710
			18×31.5	630	18×35.5	690
120	16×40	700	18×35.5	720	18×40	775
	18×31.5	675				
150	18×40	810	18×45	865	18×45	920
180	18×45	915	18×50	1000		
220	18×50	1055				

◆ **RIPPLE CURRENT MULTIPLIERS**

Frequency Multipliers

Vdc	Frequency (Hz)				
	50/60	120	1K	10K	100K
160 ~ 450	0.80	1.00	1.30	1.40	1.50

ALUMINUM ELECTROLYTIC CAPACITORS

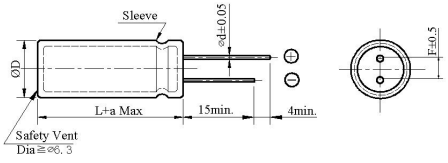
VQ Series

- **Capacitor For Over Voltage Application**
- **Load life 5,000 hours at 105℃**

◆ SPECIFICATIONS

Item	Performance Characteristics
Category Temperature Range	-25 ~ +105℃
Working Voltage Range	160 ~ 450Vdc
Capacitance Range	22 ~ 680 μF
Capacitance Tolerance	±20% (at 25℃ and 120Hz)
Dissipation Factor (tanδ) (at 25℃, 120Hz)	Rated Voltage (V): 160 ~ 250 / 400 ~ 450 tanδ(Max): 0.12 / 0.15
Leakage Current	I=0.02CV or 3000 μA whichever is smaller I : Leakage current (μA) C : Rated capacitance (μF) V : Rated voltage (V) Impress the rated voltage for 2 minutes
Low Temperature Characteristics Impedance Ratio(MAX)	Rated voltage (V): 160~250 / 400 / 420 ~ 450 Z(-25℃)/Z(+20℃): 3 / 5 / 6 (at 120Hz)
Charge and Discharge	The following specifications shall be satisfied when the capacitors are restored to 25℃ after subjected to charge and discharge test with the voltage waveform shown below at room temperature(15 to 35℃) Frequency: 5Hz; Number of cycles: 200million times; Voltage waveform: Rated voltage, ≦150V, 1 cycle, 0V Capacitance change: ≦ ±20% of the initial value Dissipation factor(tanδ): ≦ 200% of the specified value Leakage current: ≦ specified value
Endurance	The following specifications shall be satisfied when the capacitors are restored to 25°C after subjected to DC voltage with the rated ripple current is applied for 5,000 hours at 105°C. Capacitance change: ≦ ±20% of the initial value Dissipation factor(tanδ): ≦ 200% of the specified value Leakage current: ≦ specified value
Shelf Life	The following requirements shall be satisfied when the capacitor are restored to 25℃ after the rated voltage applied for 1,000 hours at 105℃ without voltage applied. Capacitance change: ≦ ±20% of the initial value Dissipation factor(tanδ): ≦ 200% of the specified value Leakage current: ≦ 200% of the specified value
Others	Conforms to JIS-C-5101-4 (1998), characteristic W

◆ DIMENSIONS (mm)



ΦD	10	12.5	16	18
ΦD	ΦD + 0.5 Max			
Φd	0.6	0.6	0.8	0.8
F	5.0	5.0	7.5	7.5
a	L + 1.5 Max	≤35 L+1.5Max ≥40 L+2.0 Max	L +1.5 Max	

◆ PART NUMBER SYSTEM(Example : 450V 47μF)

V	Q	2	W	4	7	0	M	N	N	1	2	4	5						

- Special Request
- Size code(1245 : 12.5×45)
- Lead length code
- Lead forming Type code
- Capacitance tolerance code(M:±20%)
- Capacitance code (47μF)
- Voltage code (450V)
- Series code (VQ)

VQ Series

◆ **Case size & Permissible rated ripple current: (mA rms) at 105℃ / 120Hz**

uF \ Vdc	160		200		220		250	
	ΦD × L	RC	ΦD × L	RC	ΦD × L	RC	ΦD × L	RC
68					10×35	395	10×40	410
82			10×35	430	10×40	445	10×45	465
100	10×30	410	10×40	465	10×45	500	12.5×35	530
120	10×35	490	10×45	520	10×50	565	12.5×40	555
					12.5×35	540		
150	10×40	565	12.5×35	605	12.5×40	620	12.5×50	630
	12.5×30	545						
180	10×50	630	12.5×45	700	12.5×50	710	16×35.5	740
	12.5×35	615						
220	12.5×40	740	12.5×50	845	16×35.5	865	16×40	925
	16×25	705	16×31.5	830			18×31.5	910
270	12.5×45	845	16×40	855	16×40	920	16×50	1080
	16×30	825	18×30	840	18×31.5	900	18×40	1025
330	12.5×50	910	16×45	1135	16×50	1190	18×45	1300
	16×35.5	900	18×35.5	1200	18×40	1230		
	18×30	890						
470	18×35.5	1190	18×45	1355	18×50	1385		
560	18×40	1320	18×50	1460				
680	18×45	1425						

uF \ Vdc	400		420		450	
	ΦD × L	RC	ΦD × L	RC	ΦD × L	RC
22			10×30	210	10×35	225
27	10×30	255	10×35	260	10×40	280
33	10×35	270	10×40	295	10×45	300
39	10×40	300	10×45	310	10×50	335
					12.5×40	320
47	10×45	335	10×50	355	12.5×45	390
	12.5×35	325	12.5×40	345		
56	12.5×40	370	12.5×45	390	12.5×50	450
68	12.5×45	445	12.5×50	470	16×40	565
			16×35.5	465		
82	12.5×50	535	16×40	565	16×45	630
	16×35.5	520			18×35.5	610
100	16×40	605	16×45	670	16×50	740
			18×35.5	655	18×40	720
120	16×45	730	18×40	750	18×45	805
	18×35.5	705				
150	18×40	835	18×45	900	18×50	950
180	18×45	940	18×50	1030		

◆ **RIPPLE CURRENT MULTIPLIERS**

Frequency Multipliers

Vdc	Frequency (Hz)				
	50/60	120	1K	10K	100K
160 ~ 250	0.80	1.00	1.20	1.30	1.40
400 ~ 450	0.80	1.00	1.15	1.25	1.35

ALUMINUM ELECTROLYTIC CAPACITORS

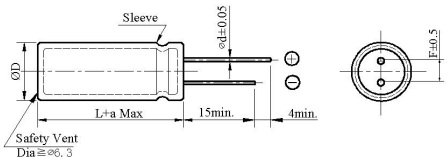
VJ Series

- **Capacitor For Over Voltage Application**
- **Load life 10,000 hours at 105℃**

◆ SPECIFICATIONS

Item	Performance Characteristics
Category Temperature Range	-25 ~ +105℃
Working Voltage Range	160 ~ 450Vdc
Capacitance Range	22 ~ 680 μF
Capacitance Tolerance	±20% (at 25℃ and 120Hz)
Dissipation Factor (tanδ) (at 25℃, 120Hz)	Rated Voltage (V): 160 ~ 250 / 400 ~ 450 tanδ(Max): 0.12 / 0.15
Leakage Current	I=0.02CV or 3000 μA whichever is smaller I : Leakage current (μA) C : Rated capacitance (μF) V : Rated voltage (V) Impress the rated voltage for 2 minutes
Low Temperature Characteristics Impedance Ratio(MAX)	Rated voltage (V): 160~250 / 400 / 420 ~ 450 Z(-25℃)/Z(+20℃): 3 / 5 / 6 (at 120Hz)
Charge and Discharge	The following specifications shall be satisfied when the capacitors are restored to 25°C after subjected to charge and discharge test with the voltage waveform shown below at room temperature(15 to 35°C) Frequency: 5Hz; Number of cycles: 200million times; Voltage waveform: Rated voltage, ≦150V, 1 cycle, 0V Capacitance change: ≦ ±20% of the initial value Dissipation factor(tanδ): ≦ 200% of the specified value Leakage current: ≦ specified value
Endurance	The following specifications shall be satisfied when the capacitors are restored to 25°C after subjected to DC voltage with the rated ripple current is applied for 10,000 hours at 105°C. Capacitance change: ≦ ±20% of the initial value Dissipation factor(tanδ): ≦ 200% of the specified value Leakage current: ≦specified value
Shelf Life	The following requirements shall be satisfied when the capacitor are restored to 25℃ after the rated voltage applied for 1,000 hours at 105℃ without voltage applied. Capacitance change: ≦ ±20% of the initial value Dissipation factor(tanδ): ≦ 200% of the specified value Leakage current: ≦ 200% of the specified value
Others	Conforms to JIS-C-5101-4 (1998), characteristic W

◆ DIMENSIONS (mm)



ΦD	10	12.5	16	18
ΦD	ΦD + 0.5 Max			
Φd	0.6	0.6	0.8	0.8
F	5.0	5.0	7.5	7.5
a	L + 1.5 Max	≤35 L+1.5Max ≥40 L+2.0 Max	L + 1.5 Max	

◆ PART NUMBER SYSTEM(Example : 160V 560μF)

V	J	2	C	5	6	1	M	N	N	1	8	4	5						

- Special Request
- Size code(1845 : 18×45)
- Lead length code
- Lead forming Type code
- Capacitance tolerance code(M:±20%)
- Capacitance code (560μF)
- Voltage code (160V)
- Series code (VJ)

VJ Series

◆ **Case size & Permissible rated ripple current: (mA rms) at 105℃ / 120Hz**

uF \ Vdc	160		200		220		250	
	ΦD × L	RC	ΦD × L	RC	ΦD × L	RC	ΦD × L	RC
68					10×40	410	10×45	425
82			10×40	440	10×45	460	10×50	480
100	10×35	430	10×45	470	10×50	525	12.5×40	550
120	10×40	505	10×50	535	12.5×40	560	12.5×50	590
							16×30	570
150	10×50	585	12.5×40	630	12.5×45	645	16×35.5	710
	12.5×35	570						
180	12.5×40	650	12.5×45	715	12.5×50	740	16×40	790
220	12.5×45	755	12.5×50	865	16×40	895	16×50	1005
	16×30	730	16×35.5	850			18×40	970
270	12.5×50	870	16×40	875	16×45	950	18×45	1080
	16×35.5	845	18×31.5	860	18×35.5	940		
	18×30	835						
330	16×40	920	16×45	1165	16×50	1220	18×50	1330
	18×31.5	905	18×35.5	1240	18×40	1250		
470	18×40	1220	18×45	1400	18×50	1420		
560	18×45	1345	18×50	1490				
680	18×50	1460						

uF \ Vdc	400		420		450	
	ΦD × L	RC	ΦD × L	RC	ΦD × L	RC
22			10×35	230	10×40	250
27	10×35	270	10×40	275	10×45	300
33	10×40	285	10×45	310	10×50	325
					12.5×35	315
39	10×45	310	10×50	330	12.5×40	350
47	10×50	355	12.5×40	370	12.5×45	420
	12.5×35	345				
56	12.5×40	380	12.5×45	400	12.5×50	490
68	12.5×45	460	12.5×50	500	16×40	605
			16×35.5	490		
82	12.5×50	560	16×40	595	16×45	660
	16×35.5	550			18×35.5	640
100	16×40	630	16×45	700	18×40	770
	18×31.5	610	18×35.5	685		
120	16×45	750	18×45	770	18×50	845
	18×40	735				
150	18×45	855	18×50	920		
180	18×50	960				

◆ **RIPPLE CURRENT MULTIPLIERS**

Frequency Multipliers

Vdc	Frequency (Hz)				
	50/60	120	1K	10K	100K
160 ~ 450	0.80	1.00	1.30	1.40	1.50

PART NUMBER SYSTEM (II)

♦ SNAP-IN TYPE

Series	Rated Voltage	Capacitance	Tolerance	Lead Forming Type	Lead Length	Case Dimension	Special Request
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
□ □ (□)	□ □	□ □ □	□	□	□	□ □ □ □	□ □ □ □ □ □

(1) Series

Series	GM	GR	GSF	GVF	PM	PL	PK	PT	PG	PO	PI
	TG	GD	PX								

(2) Rated Voltage

Code	1C	1E	1F	1V	1H	1J	1K	2A	2C	2Z	2D	2P	2E	2V	2G	2S	2W	2H
WV	16	25	30	35	50	63	80	100	160	180	200	220	250	350	400	420	450	500

(3) Capacitance

Code	470	101	471	102	472	473	683
µF	47	100	470	1000	4700	47000	68000

(4) Capacitance Tolerance

Code	J	Q	R	K	V	M	H
%	± 5	+30 / -10	+20 / -0	± 10	+20 / -10	± 20	+20 / -5

(5) Lead Forming Type

Code	K	N	R
Description	Four Terminals	Snap-in Terminal	Forming & Cutting

(6) Terminal Length

Code	D	4	N	6
Length	4.0	4.5	5.5	6.3
Tolerance	±0.5	±0.5	±0.5	±1.0

(7) Case Dimension

Code	2225	2530	2545	2550	3035	3540	3550
Size	22 x 25	25 x 30	25 x 45	25 x 50	30 x 35	35 x 40	35 x 50

(8) Special Request

Code	R	F	L	D
Description	High Rated ripple current	Endurance	Low Leakage Current	Low Dissipation Factor
Code	H	E	P	---
Description	High Temperature	Low Impedance & ESR	PET Sleeve	---

GM Series

- **Large size for PCB board mounting hole type.**

◆ SPECIFICATIONS

Item	Performance Characteristics	
Category Temperature Range	-40 ~ +85℃	-25 ~ +85℃
Working Voltage Range	16 ~ 100Vdc	160 ~ 550Vdc
Capacitance Range	820 ~ 68,000μF	47 ~ 3,300 μF
Capacitance Tolerance	±20% (at 25℃ and 120Hz)	
Dissipation Factor (tanδ) (at 25℃, 120Hz)		

Rated Voltage (V)	16	25	35	50	63	80 ~ 100	160 ~ 250	350 ~ 450	500~550
tanδ(Max)	0.35	0.35	0.25	0.25	0.25	0.20	0.15	0.15	0.20

The above values should be increased by 0.02 for every additional 1000μF

Leakage Current	I=0.02CV or 3000μA,whichever is smaller I : Leakage current (μA) C : Rated capacitance (μF) V : Rated voltage (V) Impress the rated voltage for 5 minutes

Low Temperature Characteristics Impedance Ratio(MAX)

Rated voltage (V)	16	25	35	50	63	80	100	160 ~ 250	350	400	420 ~ 550
Z(-40℃)/Z(+20℃)	15	10	8	6	6	5	5	—	—	—	—
Z(-25℃)/Z(+20℃)	—	—	—	—	—	—	—	4	4	4	8

(at 120Hz)

Endurance

The following specifications shall be satisfied when the capacitors are restored to 25°C after subjected to DC voltage with the rated ripple current is applied for 2,000 hours at 85°C.

Capacitance change	≦ ±20% of the initial value
Dissipation factor(tanδ)	≦ 200% of the specified value
Leakage current	≦ specified value

Shelf Life

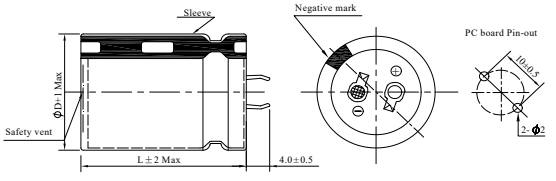
The following requirements shall be satisfied when the capacitor are restored to 25℃ after exposing them for 1,000 hours at 85℃ without voltage applied.

Capacitance change	≦ ±20% of the initial value
Dissipation factor(tanδ)	≦ 200% of the specified value
Leakage current	≦ 200% of the specified value

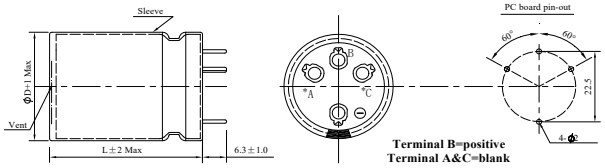
Others	Conforms to JIS-C-5101-4 (1998), characteristic W

◆ DIMENSIONS (mm)

Terminal Code : ND : Standard



Terminal Code :K6 (ø35)



◆ PART NUMBER SYSTEM(Example : 400V 470μF)

G	M	2	G	4	7	1	M	N	D	3	0	5	0						

Special Request
Size code(3050 : 30×50)
Terminal length code
Lead forming Type code
Capacitance tolerance code(M:±20%)
Capacitance code(470μF)
Voltage code(400V)
Series code (GM)

GM Series

◆ **Case size & Permissible rated ripple current (mA rms) at 85°C / 120Hz**

Vdc / ΦD / uF	16							
	Φ 22		Φ 25.4		Φ30		Φ35	
	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC
8200	22×25	2510						
10000	22×25	2770						
12000	22×30	2890	25.4×25	2890				
15000	22×35	3390	25.4×30	3390	30×25	3660		
18000	22×40	3900	25.4×35	3900	30×25	4000		
22000	22×50	4370	25.4×40	4260	30×30	4210	35×25	4170
27000			25.4×45	4625	30×35	4820	35×30	4650
33000			25.4×50	5250	30×40	5360	35×30	5250
39000					30×45	6010	35×35	5950
47000					30×50	6790	35×40	6760
56000							35×45	7620
68000							35×50	8630

Vdc / ΦD / uF	25							
	Φ 22		Φ 25.4		Φ30		Φ35	
	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC
4700								
5600	22×25	2210						
6800	22×30	2500	25.4×25	2540				
8200	22×35	2740	25.4×25	2760				
10000	22×40	3090	25.4×30	3100	30×25	3210		
12000	22×45	3480	25.4×35	3410	30×30	3860	35×25	3540
15000	22×50	4000	25.4×40	3920	30×30	4000	35×25	3950
18000			25.4×45	4450	30×35	4460	35×30	4630
22000			25.4×50	5050	30×45	5210	35×35	5160
27000					30×50	5940	35×40	2920
33000							35×45	6750
39000							35×50	7560

Vdc / ΦD / uF	35							
	Φ 22		Φ 25.4		Φ30		Φ35	
	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC
3900	22×25	2220						
4700	22×30	2410	25.4×25	2400				
5600	22×35	2750	25.4×25	2695				
6800	22×40	2800	25.4×30	2740	30×25	2970		
8200	22×45	3470	25.4×35	3100	30×30	3130	35×25	3065
10000	22×50	3570	25.4×40	3500	30×30	3495	35×25	3495
12000			25.4×45	3950	30×35	4010	35×30	4420
15000			25.4×50	4500	30×40	4520	35×35	5010
18000					30×45	5425	35×40	5540
22000					30×50	5915	35×45	6040
27000							35×50	6890

Vdc / ΦD / uF	50							
	Φ 22		Φ 25.4		Φ30		Φ35	
	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC
2200	22×25	1910						
3300	22×30	2370	25.4×25	2350				
3900	22×35	2650	25.4×30	2650	30×25	2595		
4700	22×40	2990	25.4×35	2950	30×25	2810		
5600	22×45	3360	25.4×35	3300	30×30	3370	35×25	3420
6800	22×50	3810	25.4×40	3750	30×35	3850	35×30	3850
8200			25.4×50	4370	30×40	4360	35×30	4410
10000					30×45	4970	35×35	4920
12000					30×50	5600	35×40	5580
15000							35×45	6440
18000							35×50	6710

Vdc / ΦD / uF	63							
	Φ 22		Φ 25.4		Φ30		Φ35	
	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC
1500								
1800	22×25	1820						
2200	22×30	2310	25.4×25	2280				
2700	22×35	2400	25.4×25	2350				
3300	22×35	2620	25.4×30	2600	30×25	2780		
3900	22×40	2940	25.4×35	2950	30×30	3000	35×25	3000
4700	22×50	3390	25.4×40	3300	30×30	3320	35×25	3360
5600			25.4×45	3720	30×35	3750	35×30	3760
6800			25.4×50	4220	30×40	4270	35×30	4180
8200					30×45	4830	35×35	4790
10000					30×50	5490	35×40	5470
12000							35×45	6190

Vdc / ΦD / uF	80							
	Φ 22		Φ 25.4		Φ30		Φ35	
	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC
1200	22×25	1690						
1500	22×25	1880						
1800	22×30	2140	25.4×25	2210				
2200	22×35	2440	25.4×30	2450	30×25	2490		
2700	22×40	2780	25.4×35	2800	30×25	2750		
3300	22×45	3160	25.4×40	3180	30×30	3170	35×25	3210
3900	22×50	3520	25.4×45	3550	30×35	3570	35×25	3500
4700			25.4×50	4000	30×40	4050	35×30	4090
5600					30×45	4550	35×35	4510
6800					30×50	5160	35×40	5140
8200							35×45	5830
10000							35×50	6630

GM Series

◆ **Case size & Permissible rated ripple current (mA rms) at 85°C / 120Hz**

Vdc / ΦD / uF	100							
	Φ 22		Φ 25.4		Φ30		Φ35	
	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC
820	22×25	1860						
1200	22×30	2090	25.4×25	2195				
1500	22×35	2410	25.4×30	2420	30×25	2460		
1800	22×40	2710	25.4×35	2730	30×25	2720		
2200	22×45	3080	25.4×40	3100	30×30	3090	35×25	3140
2700	22×50	3530	25.4×45	3560	30×35	3550	35×30	3710
3300			25.4×50	4050	30×40	4050	35×30	4050
3900					30×45	4540	35×35	4490
4700					30×50	5130	35×40	5110
5600							35×45	5750
6800							35×50	6500
8200								

Vdc / ΦD / uF	160							
	Φ 22		Φ 25.4		Φ30		Φ35	
	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC
390	22×25	1630						
470	22×30	1860						
560	22×35	2250	25.4×25	2150				
680	22×40	2350	25.4×30	2330				
820	22×45	2680	25.4×35	2650	30×25	2640		
1000	22×50	3020	25.4×40	3000	30×30	2960		
1200			25.4×45	3430	30×35	3410	35×25	3400
1500			25.4×50	3960	30×40	3960	35×30	3940
1800					30×45	43200	35×35	4280
2200					30×50	4960	35×40	4960
2700							35×45	5200
3300							35×50	5400

Vdc / ΦD / uF	200							
	Φ 22		Φ 25.4		Φ30		Φ35	
	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC
390	22×25	1510						
470	22×30	1970						
560	22×35	2180	25.4×25	2150				
680	22×40	2480	25.4×30	2480				
820	22×45	2700	25.4×35	2790	30×25	2780		
1000	22×50	3280	25.4×40	3280	30×30	3000	35×25	3250
1200			25.4×45	3610	30×35	3610	35×30	3570
1500			25.4×50	4130	30×40	4130	35×35	4060
1800					30×45	4600	35×40	4590
2200					30×50	5250	35×45	5250
2700							35×50	5320

Vdc / ΦD / uF	220							
	Φ 22		Φ 25.4		Φ30		Φ35	
	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC
330	22×25	1410						
390	22×30	1580	25.4×25	1580				
470	22×35	1800	25.4×30	1800				
560	22×40	2030	25.4×35	2030	30×25	2030		
680	22×45	2330	25.4×40	2330	30×30	2330		
820	22×50	2560	25.4×45	2560	30×35	2560	35×25	2560
1000			25.4×50	2850	30×40	2850	35×30	2850
1200					30×45	3130	35×35	3130
1500					30×50	3750	35×40	3750
1800							35×45	3900
2200							35×50	4050

Vdc / ΦD / uF	250							
	Φ 22		Φ 25.4		Φ30		Φ35	
	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC
270	22×25	1310						
330	22×30	1750	25.4×25	1610				
390	22×35	1910	25.4×30	1880				
470	22×40	2110	25.4×35	2110	30×25	2040		
560	22×45	2250	25.4×40	2090	30×30	2250		
680	22×50	2500	25.4×45	2500	30×35	2500	35×25	2750
820			25.4×50	2800	30×40	2850	35×30	2900
1000					30×45	3290	35×35	3320
1200					30×50	3580	35×40	3530
1500							35×45	4040
1800							35×50	4150

Vdc / ΦD / uF	400							
	Φ 22		Φ 25.4		Φ30		Φ35	
	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC
100	22×25	900						
120	22×30	1020	25.4×25	1130				
150	22×35	1160	25.4×30	1270				
180	22×40	1440	25.4×35	1440				
220	22×45	1500	25.4×40	1500	30×25	1520		
270	22×50	1670	25.4×45	1650	30×30	1700	35×25	1650
330			25.4×50	1900	30×35	1950	35×30	1900
390					30×40	2130	35×35	2130
470					30×45	2390	35×40	2420
560					30×50	2700	35×45	2710
680							35×50	2970

GM Series

◆ **Case size & Permissible rated ripple current (mA rms) at 85°C / 120Hz**

Vdc / ΦD / uF	420								Vdc / ΦD / uF	450							
	Φ 22		Φ 25.4		Φ30		Φ35			Φ 22		Φ25.4		Φ30		Φ35	
	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC		ΦD×L	RC	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC
									82	22×25	830						
100	22×25	970							100	22×30	930						
120	22×30	1070							120	22×35	1040	25.4×25	1070				
150	22×35	1300	25.4×25	1290					150	22×40	1190	25.4×30	1190				
180	22×40	1480	25.4×30	1480	30×25	1480			180	22×45	1350	25.4×35	1350	30×25	1380		
220	22×45	1500	25.4×35	1500	30×30	1500			220	22×50	1550	25.4×40	1500	30×30	1550		
270	22×50	1940	25.4×40	1940	30×35	1940	35×25	1940	270			25.4×45	1780	30×35	1780	35×25	1780
330			25.4×45	2170	30×40	2170	35×30	2170	330			25.4×50	2010	30×40	2010	35×30	2010
390			25.4×50	2270	30×45	2220	35×35	2270	390					30×45	2240	35×35	2240
470					30×50	2500	35×40	2610	470					30×50	2530	35×40	2530
560							35×45	2820	560							35×45	2620
680							35×50	2900	680							35×50	2700

Vdc / ΦD / uF	500								Vdc / ΦD / uF	550							
	Φ 22		Φ 25.4		Φ30		Φ35			Φ 22		Φ 25.4		Φ30		Φ35	
	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC		ΦD×L	RC	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC
56									47	22×25	385						
68									56	22×30	420	25.4×25	420				
82	22×25	785							68	22×35	465	25.4×25	465				
100	22×30	840	25.4×25	800					82	22×40	600	25.4×30	600	30×25	600		
120	22×35	920	25.4×30	890					100	22×45	785	25.4×35	785	30×25	785	35×25	785
150	22×40	1070	25.4×35	1070	30×25	1100			120	22×50	840	25.4×40	840	30×30	840	35×25	840
180	22×45	1380	25.4×40	1380	30×30	1380	35×25	1380	150			25.4×45	920	30×35	920	35×25	920
220	22×50	1610	25.4×45	1600	30×35	1610	35×30	1610	180			25.4×50	1245	30×40	1245	35×30	1245
270			25.4×50	1750	30×40	1810	35×35	1810	220					30×45	1380	35×35	1380
330					30×45	1985	35×40	1985	270					30×50	1610	35×40	1610
390					30×50	2100	35×45	2120	330							35×45	1810
470							35×50	2480	390							35×50	1985

◆ **RIPPLE CURRENT MULTIPLIERS**

Frequency Multipliers

Vdc	Frequency (Hz)				
	50	120	1K	10K	≥50K
16 ~ 100	0.80	1.00	1.15	1.15	1.15
160 ~ 250	0.81	1.00	1.32	1.45	1.50
350 ~ 550	0.77	1.00	1.30	1.41	1.43

GSF Series

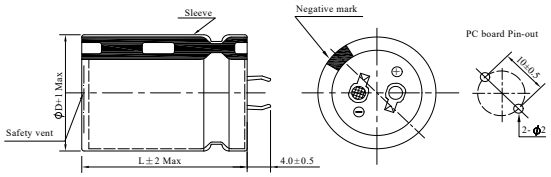
- **Standard, Long life down size and high ripple current**

◆ SPECIFICATIONS

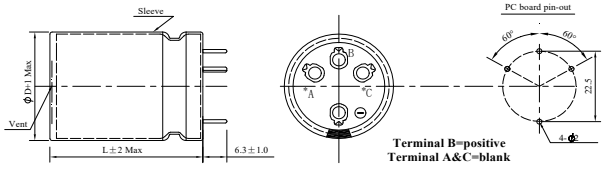
Item	Performance Characteristics
Category Temperature Range	-25 ~ +85℃
Working Voltage Range	200 ~ 500Vdc
Capacitance Range	68 ~ 2,200 μF
Capacitance Tolerance	±20% (at 25℃ and 120Hz)
Dissipation Factor (tanδ) (at 25℃, 120Hz)	Rated Voltage (V): 200 / 220 / 250 / 400 / 420 / 450 / 500 tanδ(Max): 0.20 / 0.20 / 0.20 / 0.20 / 0.20 / 0.20 / 0.20 The above value should be increased by 0.02 for every additional 1000μF
Leakage Current	I=0.02CV or 3000μA,whichever is smaller I : Leakage current (μA) C : Rated capacitance (μF) V : Rated voltage (V) Impress the rated voltage for 5 minutes
Low Temperature Characteristics Impedance Ratio(MAX)	Rated voltage (V): 200 ~250 / 400 / 420 ~ 450 / 500 Z(-25℃)/Z(+20℃): 4 / 4 / 8 / 8 (at 120Hz)
Endurance	The following specifications shall be satisfied when the capacitors are restored to 25°C after subjected to DC voltage with the rated ripple current is applied for 3,000 hours at 85°C. Capacitance change: ≦ ±20% of the initial value Dissipation factor(tanδ): ≦ 200% of the specified value Leakage current: ≦ specified value
Shelf Life	The following requirements shall be satisfied when the capacitor are restored to 25℃ after exposing them for 1,000 hours at 85℃ without voltage applied. Capacitance change: ≦ ±20% of the initial value Dissipation factor(tanδ): ≦ 200% of the specified value Leakage current: ≦ 200% of the specified value
Others	Conforms to JIS-C-5101-4 (1998), characteristic W

◆ DIMENSIONS (mm)

Terminal Code : ND : Standard



Terminal Code :K6 (ø35)



◆ PART NUMBER SYSTEM(Example : 250V 560μF)

G	S	F	2	E	5	6	1	M	N	D	2	2	5	0						

- Special Request
- Size code(2250 : 22×50)
- Terminal length code
- Lead forming Type code
- Capacitance tolerance code(M:±20%)
- Capacitance code(560μF)
- Voltage code(250V)
- Series code (GSF)

GSF Series

◆ **Case size & Permissible rated ripple current (mA rms) at 85°C / 120Hz**

Vdc / ΦD / uF	200								Vdc / ΦD / uF	220							
	Φ 22		Φ 25.4		Φ30		Φ35			Φ 22		Φ 25.4		Φ30		Φ35	
	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC		ΦD×L	RC	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC
330	22×25	1510							330	22×25	1700						
390	22×30	1730							390	22×30	1890	25.4×25	1840				
470	22×35	1970	25.4×25	1950					470	22×35	2080	25.4×30	2080				
560	22×40	2180	25.4×30	2150					560	22×40	2330	25.4×35	2380	30×25	2310		
680	22×45	2480	25.4×35	2260	30×25	2480			680	22×45	2630	25.4×40	2680	30×30	2620	35×25	2580
820	22×50	2810	25.4×40	2790	30×30	2800	35×25	2830	820	22×50	3010	25.4×45	3010	30×35	2990	35×30	2790
1000			25.4×45	3280	30×35	3150	35×30	3260	1000			25.4×50	3400	30×40	3420	35×35	3290
1200			25.4×50	3610	30×40	3610	35×35	3570	1200					30×45	3680	35×40	3680
1500					30×45	4130	35×40	4060	1500					30×50	3720	35×45	3730
1800					30×50	4600	35×45	4590	1800							35×50	4120
2200							35×50	5250	2200								

Vdc / ΦD / uF	250								Vdc / ΦD / uF	400							
	Φ 22		Φ 25.4		Φ30		Φ35			Φ 22		Φ 25.4		Φ30		Φ35	
	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC		ΦD×L	RC	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC
220	22×25	1240							100	22×25	990						
270	22×30	1370							120	22×30	1090	25.4×25	1130				
330	22×35	1520	25.4×25	1470					150	22×35	1240	25.4×30	1270				
390	22×40	1720	25.4×30	1720					180	22×40	1410	25.4×35	1440	30×25	1520		
470	22×45	2150	25.4×35	2150	30×25	2050			220	22×45	1580	25.4×40	1640	30×30	1660		
560	22×50	2480	25.4×40	2350	30×30	2350	35×25	2350	270	22×50	1650	25.4×45	1650	30×35	1650	35×25	1630
680			25.4×45	2670	30×35	2710	35×30	2580	330			25.4×50	2000	30×40	2000	35×30	2050
820			25.4×50	2980	30×40	2980	35×35	2960	390					30×45	2260	35×35	2280
1000					30×45	3560	35×40	3480	470					30×50	2510	35×40	2540
1200					30×50	3840	35×45	3840	560							35×45	2850
1500							35×50	4100	680							35×50	3100

Vdc / ΦD / uF	420								Vdc / ΦD / uF	450							
	Φ 22		Φ 25.4		Φ30		Φ35			Φ 22		Φ 25.4		Φ30		Φ35	
	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC		ΦD×L	RC	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC
100	22×25	970							68	22×25	710						
120	22×30	1070	25.4×25	1080					82	22×30	860						
150	22×35	1210	25.4×30	1260					100	22×35	950	25.4×25	970				
180	22×40	1330	25.4×35	1420	30×25	1480			120	22×40	1070	25.4×30	1090				
220	22×45	1550	25.4×40	1580	30×30	1650			150	22×45	1180	25.4×35	1250	30×25	1290		
270	22×50	1940	25.4×45	1900	30×35	1900	35×25	1940	180	22×50	1410	25.4×40	1400	30×30	1450	35×25	1400
330			25.4×50	2200	30×40	1980	35×30	2170	220			25.4×45	1590	30×35	1640	35×30	1660
390					30×45	2220	35×35	2270	270			25.4×50	1730	30×40	1890	35×35	1900
470					30×50	2500	35×40	2610	330					30×45	2120	35×40	2150
560							35×45	2950	390					30×50	2350	35×45	2380
680							35×50	3080	470							35×50	2680

GSF Series

◆ **Case size & Permissible rated ripple current (mA rms) at 85℃ / 120Hz**

Vdc / ΦD / uF	500							
	Φ 22		Φ 25.4		Φ30		Φ35	
	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC
68	22×25	620						
82	22×30	800	25.4×25	800				
100	22×35	830	25.4×30	820				
120	22×40	930	25.4×35	930	30×25	920		
150	22×45	1040	25.4×40	1040	30×30	1040		
180	22×50	1250	25.4×45	1260	30×35	1250	35×25	1250
220			25.4×50	1330	30×40	1330	35×30	1340
270					30×45	1420	35×35	1420
330					30×50	1500	35×40	1500
390							35×45	1780
470							35×50	1800

◆ **RIPPLE CURRENT MULTIPLIERS**

Frequency Multipliers

Vdc	Frequency (Hz)				
	50/60	120	300	1K	≥10K
200 ~ 250	0.80	1.00	1.15	1.17	1.20
400 ~ 500	0.77	1.00	1.10	1.12	1.15

GVF Series

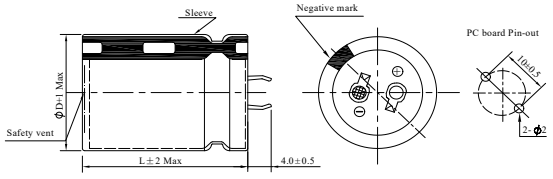
- **High ripple current**
- **Load life 5,000 hours at 85℃**

◆ SPECIFICATIONS

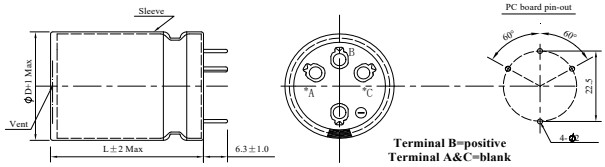
Item	Performance Characteristics
Category Temperature Range	-25 ~ +85℃
Working Voltage Range	200 ~ 500Vdc
Capacitance Range	56 ~ 2200 μF
Capacitance Tolerance	±20% (at 25℃ and 120Hz)
Dissipation Factor (tanδ) (at 25℃, 120Hz)	Rated Voltage (V): 200 ~ 450 / 500; tanδ(Max): 0.15 / 0.20 The above values should be increased by 0.02 for every additional 1000μF
Leakage Current	I=0.02CV or 3000μA,whichever is smaller I : Leakage current (μA) C : Rated capacitance (μF) V : Rated voltage (V) Impress the rated voltage for 5 minutes
Low Temperature Characteristics Impedance Ratio(MAX)	Rated voltage (V): 200 ~250 / 400 / 420 ~ 450 / 500; Z(-25℃)/Z(+20℃): 4 / 4 / 8 / 8 (at 120Hz)
Endurance	The following specifications shall be satisfied when the capacitors are restored to 25°C after subjected to DC voltage with the rated ripple current is applied for 5,000 hours at 85°C Capacitance change: ≦ ±20% of the initial value Dissipation factor(tanδ): ≦ 200% of the specified value Leakage current: ≦ specified value
Shelf Life	The following requirements shall be satisfied when the capacitor are restored to 25℃ after exposing them for 1,000 hours at 85℃ without voltage applied. Capacitance change: ≦ ±20% of the initial value Dissipation factor(tanδ): ≦ 200% of the specified value Leakage current: ≦ 200% of the specified value
Others	Conforms to JIS-C-5101-4 (1998), characteristic W

◆ DIMENSIONS (mm)

Terminal Code : ND : Standard



Terminal Code :K6 (ø35)



◆ PART NUMBER SYSTEM(Example : 420V 560μF)

G	V	F	2	S	5	6	1	M	N	D	3	5	5	0						

- Special Request
- Size code(3550 : 35×50)
- Terminal length code
- Lead forming Type code
- Capacitance tolerance code(M:±20%)
- Capacitance code(560μF)
- Voltage code(420V)
- Series code (GVF)

GVF Series

◆ **Case size & Permissible rated ripple current (mA rms) at 85℃ / 120Hz**

Vdc / ΦD / uF	200							
	Φ 22		Φ 25.4		Φ30		Φ35	
	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC
270								
330	22×25	1450						
390	22×30	1500	25.4×25	1500				
470	22×35	1760	25.4×30	1760				
560	22×40	2050	25.4×35	2050	30×25	2050		
680	22×45	2500	25.4×40	2500	30×30	2500		
820	22×50	2740	25.4×45	2740	30×35	2740	35×25	2740
1000			25.4×50	2985	30×40	2985	35×30	2985
1200					30×45	3300	35×35	3300
1500					30×50	3770	35×40	3770
1800							35×45	3870
2200							35×50	4150

Vdc / ΦD / uF	220							
	Φ 22		Φ 25.4		Φ30		Φ35	
	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC
220								
270	22×25	1390						
330	22×30	1530	25.4×25	1530				
390	22×35	1800	25.4×30	1800				
470	22×40	1910	25.4×35	1910	30×25	1910		
560	22×45	2200	25.4×40	2200	30×30	2200		
680	22×50	2530	25.4×45	2530	30×35	2530	35×25	2530
820			25.4×50	2810	30×40	2810	35×30	2810
1000					30×45	3050	35×35	3050
1200					30×50	3375	35×40	3375
1500							35×45	3830
1800							35×50	3920

Vdc / ΦD / uF	250							
	Φ 22		Φ 25.4		Φ30		Φ35	
	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC
180								
220	22×25	1300						
270	22×30	1450	25.4×25	1450				
330	22×35	1610	25.4×30	1610				
390	22×40	1890	25.4×35	1890	30×25	1890		
470	22×45	2050	25.4×35	2050	30×30	2050		
560	22×50	2270	25.4×40	2270	30×35	2270	35×25	2270
680			25.4×50	2545	30×40	2545	35×30	2545
820					30×45	2950	35×35	2950
1000					30×50	3200	35×40	3200
1200							35×45	3450
1500							35×50	4000

Vdc / ΦD / uF	400							
	Φ 22		Φ 25.4		Φ30		Φ35	
	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC
82	22×25	770						
100	22×30	920						
120	22×35	1090	25.4×25	1090				
150	22×40	1210	25.4×30	1210				
180	22×45	1430	25.4×35	1430	30×25	1430		
220	22×50	1650	25.4×40	1650	30×30	1650		
270			25.4×45	1745	30×35	1745	35×25	1745
330			25.4×50	1940	30×40	1940	35×30	1940
390					30×45	2180	35×35	2180
470					30×50	2460	35×40	2460
560							35×45	2630
680							35×50	3060

Vdc / ΦD / uF	420							
	Φ 22		Φ 25.4		Φ30		Φ35	
	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC
82	22×25	775						
100	22×30	965						
120	22×35	1095	25.4×25	1095				
150	22×40	1260	25.4×30	1260	30×25	1260		
180	22×45	1430	25.4×35	1430	30×30	1430		
220	22×50	1680	25.4×40	1680	30×35	1680	35×25	1680
270			25.4×45	1810	30×40	1810	35×30	1810
330			25.4×50	1950	30×45	1950	35×35	1950
390					30×50	2250	35×40	2250
470							35×45	2520
560							35×50	2700

Vdc / ΦD / uF	450							
	Φ 22		Φ 25.4		Φ30		Φ35	
	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC
56	22×25	495						
68	22×30	770						
82	22×35	810	25.4×25	810				
100	22×40	980	25.4×30	980				
120	22×45	1120	25.4×35	1120	30×25	1120		
150	22×50	1330	25.4×40	1330	30×30	1330	35×25	1330
180			25.4×45	1500	30×35	1500	35×30	1500
220			25.4×50	1740	30×40	1740	35×35	1740
270					30×45	1905	35×40	1905
330					30×50	1995	35×45	1995
390							35×50	2310

GVF Series

◆ **Case size & Permissible rated ripple current (mA rms) at 85℃ / 120Hz**

Vdc / ΦD / uF	500							
	Φ 22		Φ 25.4		Φ30		Φ35	
	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC
56	22×25	595						
68	22×30	630						
82	22×35	805	25.4×25	805				
100	22×40	900	25.4×30	900				
120	22×45	985	25.4×35	985	30×25	985		
150	22×50	1350	25.4×40	1350	30×30	1350	35×25	1350
180			25.4×45	1400	30×35	1400	35×30	1400
220			25.4×50	1720	30×40	1720	35×35	1720
270					30×45	1865	35×40	1865
330					30×50	2030	35×45	2030
390							35×50	2225

◆ **RIPPLE CURRENT MULTIPLIERS**

Frequency Multipliers

Vdc	Frequency (Hz)				
	50/60	120	1K	10K	100K
200 ~ 250	0.80	1.00	1.15	1.17	1.20
400 ~ 500	0.90	1.00	1.10	1.12	1.15

PL Series

- **Load life 2,000 hours at 105℃**
- **Large size for PCB board mounting hole type**

◆ SPECIFICATIONS

Item	Performance Characteristics	
Category Temperature Range	-40 ~ +105℃	-25 ~ +105℃
Working Voltage Range	16 ~ 100Vdc	160 ~ 550Vdc
Capacitance Range	560 ~ 47,000μF	39 ~ 2,700μF
Capacitance Tolerance	±20% (at 25℃ and 120Hz)	

Dissipation Factor (tanδ) (at 25℃, 120Hz)

Rated Voltage (V)	16	25	35	50	63	80	100 ~ 250	350 ~ 450	475~550
tanδ(Max)	0.35	0.35	0.25	0.25	0.25	0.20	0.15	0.15	0.20

The above values should be increased by 0.02 for every additional 1000μF

Leakage Current

I=0.02CV or 3000μA,whichever is smaller
I : Leakage current (μA) C : Rated capacitance (μF) V : Rated voltage (V)
Impress the rated voltage for 5 minutes

Low Temperature Characteristics Impedance Ratio(MAX)

Rated voltage (V)	16	25	35	50	63	80	100	160 ~ 250	400	420 ~ 550
Z(-40℃)/Z(+20℃)	15	10	8	6	6	5	5	—	—	—
Z(-25℃)/Z(+20℃)	—	—	—	—	—	—	—	4	4	8

(at 120Hz)

Endurance

The following specifications shall be satisfied when the capacitors are restored to 25°C after subjected to DC voltage with the rated ripple current is applied for 2,000 hours at 105°C.

Capacitance change	≦ ±20% of the initial value
Dissipation factor(tanδ)	≦ 200% of the specified value
Leakage current	≦ specified value

Shelf Life

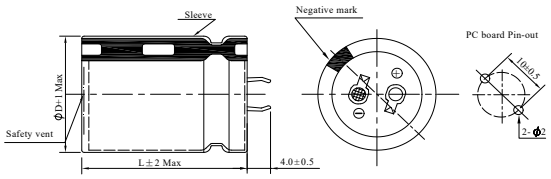
The following requirements shall be satisfied when the capacitor are restored to 25℃ after exposing them for 500 hours at 105℃ without voltage applied.

Capacitance change	≦ ±20% of the initial value
Dissipation factor(tanδ)	≦ 200% of the specified value
Leakage current	≦ 200% of the specified value

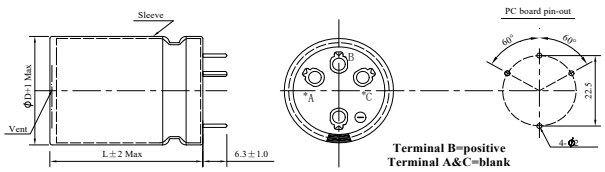
Others	Conforms to JIS-C-5101-4 (1998), characteristic W

◆ DIMENSIONS (mm)

Terminal Code : ND : Standard



Terminal Code :K6 (ø35)



◆ PART NUMBER SYSTEM(Example : 500V 100μF)

P	L	2	H	1	0	1	M	N	D	2	5	4	5						

Special Request
Size code(2545 : 25×45)
Terminal length code
Lead forming Type code
Capacitance tolerance code(M:±20%)
Capacitance code (100μF)
Voltage code (500V)
Series code (PL)

PL Series

◆ **Case size & Permissible rated ripple current (mA rms) at 105℃ / 120Hz**

Vdc / ΦD / uF	16								Vdc / ΦD / uF	25							
	Φ 22		Φ 25.4		Φ30		Φ35			Φ 22		Φ 25.4		Φ30		Φ35	
	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC		ΦD×L	RC	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC
6800	22×25	1570							4700	22×25	1500						
10000	22×30	1970	25.4×25	1970					5600	22×25	1630						
12000	22×35	2220	25.4×30	2240	30×25	2450			6800	22×30	1860	25.4×25	1870				
15000	22×40	2550	25.4×35	2580	30×25	2520			8200	22×35	2110	25.4×30	2120	30×25	2150		
18000	22×45	2870	25.4×40	2920	30×30	2880	35×25	2920	10000	22×40	2390	25.4×35	2420	30×25	2370		
22000			25.4×45	3320	30×35	3290	35×25	3230	12000	22×45	2690	25.4×40	2740	30×30	2700	35×25	2740
27000			25.4×50	3780	30×40	3770	35×30	3580	15000			25.4×45	3150	30×35	3130	35×30	3270
33000					30×45	4300	35×35	4260	18000			25.4×50	3540	30×40	3540	35×30	3580
39000					30×50	4810	35×40	4790	22000					30×45	4040	35×35	3800
47000							35×45	5430	27000							35×45	4730

Vdc / ΦD / uF	35								Vdc / ΦD / uF	50							
	Φ 22		Φ 25.4		Φ30		Φ35			Φ 22		Φ 25.4		Φ30		Φ35	
	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC		ΦD×L	RC	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC
3300	22×25	1400							1800	22×25	1330						
3900	22×30	1570							2200	22×30	1700	25.4×25	1700				
4700	22×30	1720	25.4×25	1800					3300	22×35	1930	25.4×30	1850				
5600	22×35	1950	25.4×30	1960	30×25	1990			3900	22×40	2160	25.4×35	2180	30×25	2070		
6800	22×40	2200	25.4×35	2230	30×25	2190			4700	22×45	2460	25.4×35	2390	30×30	2355	35×25	2480
8200	22×45	2610	25.4×40	2610	30×30	2750	35×25	2750	5600	22×50	2750	25.4×40	2700	30×35	2760	35×25	2700
10000			25.4×45	2850	30×35	2900	35×30	2910	6800			25.4×50	3300	30×40	3300	35×30	3250
12000			25.4×50	3240	30×40	3230	35×30	3075	8200					30×45	3600	35×35	3550
15000					30×45	3720	35×35	3670	10000					30×50	4040	35×40	4030
18000							35×40	4370	12000							35×45	4550
22000							35×50	4920	15000								

Vdc / ΦD / uF	63								Vdc / ΦD / uF	80							
	Φ 22		Φ 25.4		Φ30		Φ35			Φ 22		Φ 25.4		Φ30		Φ35	
	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC		ΦD×L	RC	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC
1200	22×25	1190							820	22×25	1110						
1500	22×25	1330							1000	22×25	1220						
1800	22×30	1510	25.4×25	1520					1200	22×30	1380	25.4×25	1390				
2200	22×35	1730	25.4×30	1740					1500	22×35	1590	25.4×30	1610				
2700	22×40	1970	25.4×35	1990	30×25	1890			1800	22×40	1800	25.4×30	1760	30×25	1710		
3300	22×50	2290	25.4×40	2290	30×30	2240	35×25	2155	2200	22×45	2040	25.4×35	2010	30×30	2050	35×25	2070
3900			25.4×45	2540	30×35	2550	35×25	2420	2700			25.4×45	2360	30×35	2350	35×25	2290
4700			25.4×50	2860	30×40	2860	35×30	2790	3300			25.4×50	2680	30×40	2680	35×30	2980
5600					30×45	3220	35×35	3190	3900					30×45	3000	35×35	2980
6800					30×50	3650	35×40	3640	4700					30×50	3390	35×40	3380
8200							35×45	3900	5600							35×45	3800
10000							35×50	4400	6800							35×50	3900

PL Series

◆ **Case size & Permissible rated ripple current (mA rms) at 105℃ / 120Hz**

Vdc / ΦD / uF	100								160							
	Φ 22		Φ 25.4		Φ30		Φ35		Φ 22		Φ 25.4		Φ30		Φ35	
	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC
560	22×25	1050							330							
820	22×30	1320	25.4×25	1330					390	22×25	1215					
1000	22×35	1500	25.4×30	1510					470	22×30	1330					
1200	22×40	1690	25.4×35	1710	30×25	1680			560	22×35	1460	25.4×25	1460			
1500	22×45	1940	25.4×40	1980	30×30	1950	35×25	1980	680	22×40	1750	25.4×30	1730			
1800			25.4×45	2230	30×35	2200	35×25	2170	820	22×45	2000	25.4×35	2000	30×25	2000	
2200			25.4×50	2565	30×40	2650	35×30	2565	1000	22×50	2110	25.4×40	2150	30×30	2110	35×25	2130
2700					30×45	2880	35×35	2860	1200			25.4×45	2315	30×35	2490	35×30	2315
3300					30×50	3280	35×40	3270	1500			25.4×50	2675	30×40	2675	35×35	2675
3900							35×45	3670	1800					30×45	3140	35×40	3140
4700							35×50	3800	2200					30×50	3580	35×45	3580
5600									2700							35×50	3600

Vdc / ΦD / uF	200								220							
	Φ 22		Φ 25.4		Φ30		Φ35		Φ 22		Φ 25.4		Φ30		Φ35	
	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC
270	22×25	1100							220							
330	22×30	1250							270	22×25	990					
390	22×35	1310	25.4×25	1310					330	22×30	1160					
470	22×40	1335	25.4×30	1400					390	22×35	1340	25.4×25	1350			
560	22×45	1600	25.4×35	1560	30×25	1600			470	22×40	1400	25.4×30	1400			
680	22×50	1650	25.4×40	1700	30×30	1720			560	22×45	1550	25.4×35	1550	30×25	1550	
820			25.4×45	1935	30×35	1935	35×25	1935	680	22×50	1750	25.4×40	1750	30×30	1700	
1000			25.4×50	2040	30×40	2185	35×30	2185	820			25.4×45	1930	30×35	1900	35×25	1930
1200					30×45	2515	35×35	2515	1000			25.4×50	2280	30×40	2280	35×30	2300
1500					30×50	2925	35×40	2925	1200					30×45	2380	35×35	2380
1800							35×45	3000	1500					30×50	2500	35×40	2500
2200							35×50	3150	1800							35×45	2600

Vdc / ΦD / uF	250								400							
	Φ 22		Φ 25.4		Φ30		Φ35		Φ 22		Φ 25.4		Φ30		Φ35	
	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC
270	22×25								100	22×25	700					
330	22×30	1200	25.4×25	1260					120	22×30	730					
390	22×35	1415	25.4×30	1420					150	22×35	800	25.4×25	795			
470	22×40	1490	25.4×35	1490	30×25	1500			180	22×40	890	25.4×30	890			
560	22×45	1700	25.4×40	1700	30×30	1700	35×25	1700	220	22×45	1070	25.4×35	1070	30×25	1070	
680	22×50	1870	25.4×45	1870	30×35	1900	35×30	1910	270	22×50	1100	25.4×40	1110	30×30	1100	35×25	1100
820			25.4×50	2000	30×40	2020	35×35	2000	330			25.4×45	1150	30×35	1150	35×30	1280
1000					30×45	2030	35×40	2185	390			25.4×50	1550	30×40	1500	35×35	1530
1200					30×50	2300	35×45	2300	470				1600	30×45	1600	35×40	1620
1500							35×50	2400	560					30×50	1900	35×45	1900
1800									680							35×50	2000

PL Series

◆ **Case size & Permissible rated ripple current (mA rms) at 105℃ / 120Hz**

Vdc / ΦD / uF	420							
	Φ 22		Φ 25.4		Φ30		Φ35	
	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC
100	22×25	700						
120	22×30	780	25.4×25	770				
150	22×35	840	25.4×30	820				
180	22×40	950	25.4×35	910	30×25	950		
220	22×45	1050	25.4×40	1050	30×30	1070		
270	22×50	1150	25.4×45	1160	30×35	1160	35×25	1160
330			25.4×50	1300	30×40	1350	35×30	1360
390					30×45	1600	35×35	1590
470					30×50	1850	35×40	1870
560							35×45	2100
680							35×50	2210

Vdc / ΦD / uF	450							
	Φ 22		Φ 25.4		Φ30		Φ35	
	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC
100	22×25	680						
120	22×30	720	25.4×25	750				
150	22×35	840	25.4×30	840				
180	22×40	1000	25.4×35	980	30×25	980		
220	22×45	1120	25.4×40	1120	30×30	1100		
270	22×50	1200	25.4×45	1210	30×35	1210	35×25	1220
330			25.4×50	1390	30×40	1390	35×30	1390
390					30×45	1450	35×35	1480
470					30×50	1650	35×40	1650
560							35×45	1700
							35×50	1820

Vdc / ΦD / uF	475							
	Φ 22		Φ 25.4		Φ30		Φ35	
	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC
47								
56								
68	22×25	600						
82	22×30	700	25.4×25	690				
100	22×35	800	25.4×25	790				
120	22×40	880	25.4×30	900	30×25	890		
150	25×45	1050	25.4×35	1030	30×25	1040		
180	22×50	1160	25.4×40	1120	30×30	1160	35×25	1150
220			25.4×45	1380	30×35	1340	35×30	1130
270					30×40	1480	35×35	1500

Vdc / ΦD / uF	500							
	Φ 22		Φ 25.4		Φ30		Φ35	
	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC
47	22×25	410						
56	22×25	500						
68	22×30	580						
82	22×30	700	25.4×25	730				
100	22×35	800	25.4×30	810				
120	22×40	900	25.4×35	890	30×25	900		
150	22×50	1150	25.4×40	1100	30×30	1070	35×25	1090
180			25.4×45	1220	30×35	1200	35×30	1190
220			25.4×50	1330	30×40	1300	35×35	1290
270					30×45	1400	35×40	1380

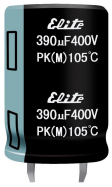
Vdc / ΦD / uF	550							
	Φ 22		Φ 25.4		Φ30		Φ35	
	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC
39	22×25	330						
47	22×30	400	25.4×25	400				
56	22×35	450	25.4×30	450				
68	22×40	520	25.4×35	520				
82	22×45	600	25.4×40	600	30×25	600		
100	22×50	720	25.4×45	720	30×30	720		
120			25.4×50	830	30×35	830	35×25	830
150					30×40	960	35×30	960
180					30×45	1050	35×35	1050
220					30×50	1170	35×40	1170
270							35×45	1300
330							35×50	1420

◆ **RIPPLE CURRENT MULTIPLIERS**

Frequency Multipliers

Vdc	Frequency (Hz)				
	50	120	1K	10K	⩾50K
16 ~ 100	0.95	1.00	1.05	1.08	1.08
160 ~ 250	0.81	1.00	1.32	1.45	1.50
350 ~ 550	0.77	1.00	1.30	1.41	1.43

PK Series



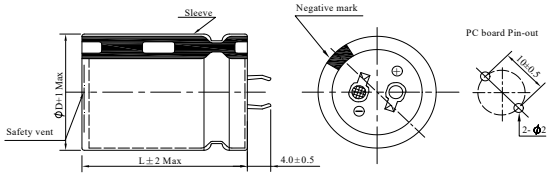
- **Long life and high temperature, down size and high ripple current**
- **Load life 3,000 hours at 105℃**

◆ SPECIFICATIONS

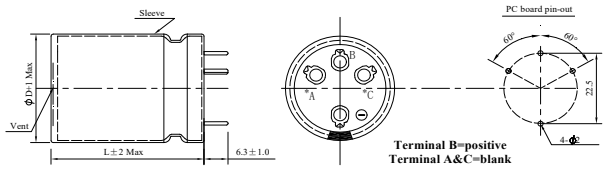
Item	Performance Characteristics
Category Temperature Range	-25 ~ +105℃
Working Voltage Range	200 ~ 500Vdc
Capacitance Range	56 ~ 2,200μF
Capacitance Tolerance	±20% (at 25℃ and 120Hz)
Dissipation Factor (tanδ) (at 25℃, 120Hz)	Rated Voltage (V): 200 / 220 / 250 / 350 / 400 / 420 / 450 / 500 tanδ(Max): 0.15 / 0.15 / 0.15 / 0.15 / 0.15 / 0.15 / 0.15 / 0.20 The above values should be increased by 0.02 for every additional 1000μF
Leakage Current	I=0.02CV or 3000μA,whichever is smaller I : Leakage current (μA) C : Rated capacitance (μF) V : Rated voltage (V) Impress the rated voltage for 5 minutes
Low Temperature Characteristics Impedance Ratio(MAX)	Rated voltage (V): 200~250 / 350 / 400 / 420 ~ 450 / 500 Z(-25℃)/Z(+20℃): 4 / 4 / 4 / 8 / 8 (at 120Hz)
Endurance	The following specifications shall be satisfied when the capacitors are restored to 25°C after subjected to DC voltage with the rated ripple current is applied for 3,000 hours at 105°C Capacitance change: ≦ ±20% of the initial value Dissipation factor(tanδ): ≦ 200% of the specified value Leakage current: ≦ specified value
Shelf Life	The following requirements shall be satisfied when the capacitor are restored to 25℃ after exposing them for 1,000 hours at 105℃ without voltage applied. Capacitance change: ≦ ±20% of the initial value Dissipation factor(tanδ): ≦ 200% of the specified value Leakage current: ≦ 200% of the specified value
Others	Conforms to JIS-C-5101-4 (1998), characteristic W

◆ DIMENSIONS (mm)

Terminal Code : ND : Standard



Terminal Code :K6 (ø35)



◆ PART NUMBER SYSTEM(Example : 420V 470μF)

P	K	2	S	4	7	1	M	N	D	3	5	4	5						

- Special Request
- Size code(3545 : 35×45)
- Terminal length code
- Lead forming Type code
- Capacitance tolerance code(M:±20%)
- Capacitance code (470μF)
- Voltage code (420V)
- Series code (PK)

PK Series

◆ **Case size & Permissible rated ripple current (mA rms) 120Hz / 105℃**

Vdc / ΦD / uF	200							
	Φ 22		Φ 25.4		Φ30		Φ35	
	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC
270	22×25	1100						
330	22×30	1250						
390	22×35	1340	25.4×25	1350				
470	22×40	1540	25.4×30	1500				
560	22×45	1670	25.4×35	1670	30×25	1670		
680	22×50	1780	25.4×40	1780	30×30	1750		
820			25.4×45	2040	30×35	2040	35×25	2040
1000			25.4×50	2450	30×40	2300	35×30	2300
1200					30×45	2650	35×35	2650
1500					30×50	2800	35×40	3080
1800							35×45	3480
2200							35×50	3520

Vdc / ΦD / uF	220							
	Φ 22		Φ 25.4		Φ30		Φ35	
	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC
220	22×25	1000						
270	22×30	1150						
330	22×35	1250	25.4×25	1250				
390	22×40	1400	25.4×30	1400				
470	22×45	1520	25.4×35	1450	30×25	1450		
560	22×50	1700	25.4×40	1700	30×30	1700		
680			25.4×45	1780	30×35	1780	35×25	1780
820			25.4×50	2100	30×40	2100	35×30	2100
1000					30×45	2400	35×35	2400
1200					30×50	2600	35×40	2600
1500							35×45	3000
1800							35×50	3130

Vdc / ΦD / uF	250							
	Φ 22		Φ 25.4		Φ30		Φ35	
	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC
150								
180								
220	22×25	1000						
270	22×30	1110	25.4×25	1180				
330	22×35	1250	25.4×30	1300				
390	22×40	1420	25.4×35	1400	30×25	1450		
470	22×45	1610	25.4×40	1650	30×30	1650	35×25	1610
560	22×50	1790	25.4×45	1790	30×35	1800	35×30	1800
680			25.4×50	2000	30×40	2000	35×35	2000
820					30×45	2140	35×40	2160
1000					30×50	2470	35×45	2470
1200							35×50	2760

Vdc / ΦD / uF	400							
	Φ 22		Φ 25.4		Φ30		Φ35	
	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC
82	22×25	580						
100	22×30	700						
120	22×35	770	25.4×25	770				
150	22×40	900	25.4×30	880				
180	22×45	1020	25.4×35	1020	30×25	1020		
220	22×50	1150	25.4×40	1100	30×30	1100		
270			25.4×45	1220	30×35	1290	35×25	1220
330			25.4×50	1470	30×40	1470	35×30	1440
390					30×45	1660	35×35	1600
470					30×50	1900	35×40	1900
560							35×45	2070
680							35×50	2270

Vdc / ΦD / uF	420							
	Φ 22		Φ 25.4		Φ30		Φ35	
	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC
82	22×25	640						
100	22×30	700						
120	22×35	810	25.4×25	810				
150	22×40	930	25.4×30	950				
180	22×45	1040	25.4×35	1020	30×25	1060		
220	22×50	1200	25.4×40	1180	30×30	1180	35×25	1180
270			25.4×45	1360	30×35	1360	35×30	1300
330			25.4×50	1500	30×40	1480	35×35	1550
390					30×45	1700	35×40	1710
470					30×50	1900	35×45	1950
560							35×50	2170
680							35×55	2200

Vdc / ΦD / uF	450							
	Φ 22		Φ 25.4		Φ30		Φ35	
	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC
68								
82	22×25	640						
100	22×30	690	25.4×25	690				
120	22×35	810	25.4×30	810				
150	22×40	940	25.4×35	930	30×25	930		
180	22×45	1060	25.4×40	1060	30×30	1060		
220	22×50	1200	25.4×45	1200	30×35	1180	35×25	1240
270			25.4×50	1320	30×40	1340	35×30	1400
330					30×45	1520	35×35	1500
390					30×50	1730	35×40	1710
470							35×45	1950
560							35×50	2010

PK Series

◆ **Case size & Permissible rated ripple current (mA rms) 120Hz / 105℃**

Vdc / ΦD / uF	500							
	Φ 22		Φ 25.4		Φ30		Φ35	
	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC
56	22×25	510						
68	22×30	580						
82	22×35	720	25.4×25	740				
100	22×40	830	25.4×30	820				
120	22×45	930	25.4×35	930	30×25	910		
150	22×50	1020	25.4×40	1020	30×30	1040		
180			25.4×45	1200	30×35	1170	35×25	1100
220			25.4×50	1300	30×40	1310	35×30	1320
270					30×45	1410	35×35	1420
330					30×50	1510	35×40	1560
390							35×45	1700
470							35×50	1900

◆ **RIPPLE CURRENT MULTIPLIERS**

Frequency Multipliers

Vdc	Frequency (Hz)				
	50	120	1K	10K	≥50K
200 ~ 250	0.81	1.00	1.32	1.45	1.50
350 ~ 500	0.77	1.00	1.30	1.41	1.43

PT Series

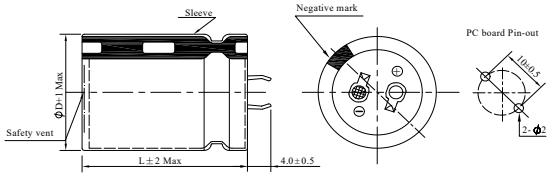
- **Large size for PCB board mounting hole type**
- **Load life 4,000 hours at 105℃**

◆ SPECIFICATIONS

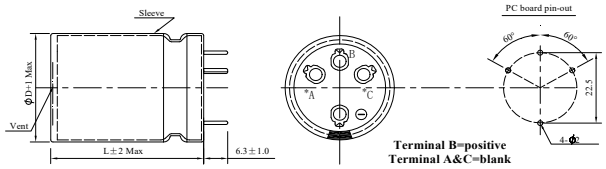
Item	Performance Characteristics
Category Temperature Range	-25 ~ +105℃
Working Voltage Range	200 ~ 400Vdc
Capacitance Range	68 ~ 1,000μF
Capacitance Tolerance	±20% (at 25℃ and 120Hz)
Dissipation Factor (tanδ) (at 25℃, 120Hz)	Rated Voltage (V): 200 / 250 / 400 tanδ(Max): 0.15 / 0.15 / 0.20
Leakage Current	I=0.02CV or 3000μA,whichever is smaller I : Leakage current (μA) C : Rated capacitance (μF) V : Rated voltage (V) Impress the rated voltage for 5 minutes
Low Temperature Characteristics Impedance Ratio(MAX)	Rated voltage (V): 200~250 / 400 Z(-25℃)/Z(+20℃): 4 / 4 (at 120Hz)
Endurance	The following specifications shall be satisfied when the capacitors are restored to 25°C after subjected to DC voltage with the rated ripple current is applied for 4,000 hours at 105°C. Capacitance change: ≦ ±20% of the initial value Dissipation factor(tanδ): ≦ 200% of the specified value Leakage current: ≦ specified value
Shelf Life	The following requirements shall be satisfied when the capacitor are restored to 25℃ after exposing them for 1,000 hours at 105℃ without voltage applied. Capacitance change: ≦ ±20% of the initial value Dissipation factor(tanδ): ≦ 200% of the specified value Leakage current: ≦ 200% of the specified value
Others	Conforms to JIS-C-5101-4 (1998), characteristic W

◆ DIMENSIONS (mm)

Terminal Code : ND : Standard



Terminal Code :K6 (ø35)



◆ PART NUMBER SYSTEM(Example : 250V 330μF)

P	T	2	E	3	3	1	M	N	D	2	2	4	5						

- Special Request
- Size code(2245 : 22×45)
- Terminal length code
- Lead forming Type code
- Capacitance tolerance code(M:±20%)
- Capacitance code (330μF)
- Voltage code (250V)
- Series code (PT)

PT Series

◆ **Case size & Permissible rated ripple current (mA rms) at 105℃/120Hz**

Vdc / ΦD / uF	200						Vdc / ΦD / uF	250							
	Φ 22		Φ 25.4		Φ30			Φ 22		Φ 25.4		Φ30		Φ35	
	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC		ΦD×L	RC	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC
68							68								
100							100	22×25	400						
120	22×25	430					120	22×30	440						
150	22×25	480					150	22×30	550						
220	22×30	670					220	22×35	750						
330	22×35	960					330	22×45	1020						
470	22×45	1100					470			25.4×5	1200				
680			25.4×5	1350			680					30×50	1450		
820					30×45	1600	820							35×45	1700
1000					30×50	1750	1000							35×50	1850

Vdc / ΦD / uF	400							
	Φ 22		Φ 25.4		Φ30		Φ35	
	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC
68	22×25	280						
100	22×35	470						
120			25.4×35	520				
150			25.4×40	600				
220			25.4×50	820				
330					30×50	1010		
470							35×50	1300

◆ **RIPPLE CURRENT MULTIPLIERS**

Frequency Multipliers

Vdc	Frequency (Hz)				
	50/60	120	1K	10K	100K
200 ~ 250	0.88	1.00	1.15	1.17	1.20
400	0.90	1.00	1.10	1.13	1.15

PG Series

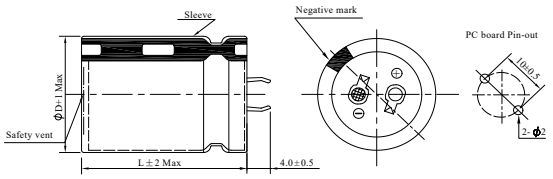
- **Smaller size with higher ripple current**
- **Load life 5,000 hours at 105℃**

◆ SPECIFICATIONS

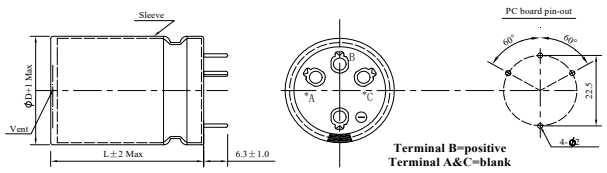
Item	Performance Characteristics
Category Temperature Range	-25 ~ +105℃
Working Voltage Range	200 ~ 500Vdc
Capacitance Range	56 ~ 1,800μF
Capacitance Tolerance	±20% (at 25℃ and 120Hz)
Dissipation Factor (tanδ) (at 25℃, 120Hz)	Rated Voltage (V): 200 / 220 / 250 / 400 / 420 / 450 / 500 tanδ(Max): 0.20 / 0.20 / 0.20 / 0.25 / 0.25 / 0.25 / 0.25
Leakage Current	I=0.02CV or 3000μA,whichever is smaller I : Leakage current (μA) C : Rated capacitance (μF) V : Rated voltage (V) Impress the rated voltage for 5 minutes
Low Temperature Characteristics Impedance Ratio(MAX)	Rated voltage (V): 200 ~250 / 400 / 420~ 450 / 500 Z(-25℃)/Z(+20℃): 4 / 4 / 8 / 8 (at 120Hz)
Endurance	The following specifications shall be satisfied when the capacitors are restored to 25°C after subjected to DC voltage with the rated ripple current is applied for 5,000 hours at 105°C. Capacitance change: ≦ ±20% of the initial value Dissipation factor(tanδ): ≦ 200% of the specified value Leakage current: ≦ specified value
Shelf Life	The following requirements shall be satisfied when the capacitor are restored to 25℃ after exposing them for 1,000 hours at 105℃ without voltage applied. Capacitance change: ≦ ±20% of the initial value Dissipation factor(tanδ): ≦ 200% of the specified value Leakage current: ≦ 200% of the specified value
Others	Conforms to JIS-C-5101-4 (1998), characteristic W

◆ DIMENSIONS (mm)

Terminal Code : ND : Standard



Terminal Code :K6 (ø35)



◆ PART NUMBER SYSTEM(Example : 450V 470μF)

P	G	2	W	4	7	1	M	N	D	3	5	5	0						

- Special Request
- Size code(3550 : 35×50)
- Terminal length code
- Lead forming Type code
- Capacitance tolerance code(M:±20%)
- Capacitance code (470μF)
- Voltage code (450V)
- Series code (PG)

PG Series

◆ **Case size & Permissible rated ripple current (mA rms) 120Hz / 105℃**

Vdc / ΦD / uF	200								220							
	Φ 22		Φ 25.4		Φ30		Φ35		Φ 22		Φ 25.4		Φ30		Φ35	
	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC
220	22×25	900							180	22×25	920						
270	22×30	1100							220	22×30	990						
330	22×35	1150	25.4×25	1150					270	22×35	1040	25.4×25	1040				
390	22×40	1310	25.4×30	1310					330	22×40	1300	25.4×30	1260				
470	22×45	1450	25.4×35	1450	30×25	1450			390	22×45	1420	25.4×35	1450	30×25	1420		
560	22×50	1550	25.4×40	1580	30×30	1600			470	22×50	1580	25.4×40	1540	30×30	1540		
680			25.4×45	1780	30×35	1780	35×25	1780	560			25.4×45	1660	30×35	1650	35×25	1650
820			25.4×50	1950	30×40	1950	35×30	1950	680			25.4×50	1850	30×40	1820	35×30	1780
1000					30×45	2300	35×35	2300	820					30×45	2000	35×35	1930
1200					30×50	2530	35×40	2650	1000					30×50	2350	35×40	2330
1500							35×45	3080	1200							35×45	2650
1800							35×50	3120	1500							35×50	2960

Vdc / ΦD / uF	250								400							
	Φ 22		Φ 25.4		Φ30		Φ35		Φ 22		Φ 25.4		Φ30		Φ35	
	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC
150									68	22×25	520						
180	22×25	950							82	22×30	640						
220	22×30	1000							100	22×35	660	25.4×25	660				
270	22×35	1150	25.4×25	1150					120	22×40	750	25.4×30	750				
330	22×40	1200	25.4×30	1200	30×25	1200			150	22×45	860	25.4×30	860	30×25	820		
390	22×45	1440	25.4×35	1430	30×30	1430			180	22×50	900	25.4×35	890	30×30	870		
470	22×50	1600	25.4×40	1600	30×35	1650	35×25	1600	220			25.4×40	1120	30×35	1100	35×25	1100
560			25.4×45	1780	30×40	1800	35×30	1800	270			25.4×45	1260	30×40	1220	35×30	1220
680			25.4×50	1850	30×45	1870	35×35	2000	330			25.4×50	1300	30×45	1430	35×35	1430
820					30×50	2060	35×40	2150	390					30×50	1600	35×40	1600
1000							35×45	2380	470							35×45	1810
1200							35×50	3000	560							35×50	2070

Vdc / ΦD / uF	420								450							
	Φ 22		Φ 25.4		Φ30		Φ35		Φ 22		Φ 25.4		Φ30		Φ35	
	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC
68	22×25	460							68	22×25	490						
82	22×30	650							82	22×30	580	25.4×25	580				
100	22×35	680	25.4×25	680					100	22×35	690	25.4×30	700				
120	22×40	730	25.4×30	760					120	22×40	770	25.4×35	830	30×25	810		
150	22×45	860	25.4×35	860	30×25	860			150	22×45	880	25.4×40	880	30×30	880		
180	22×50	960	25.4×40	950	30×30	970	35×25	950	180	22×50	900	25.4×45	920	30×35	1030	35×25	1050
220			25.4×45	1080	30×35	1140	35×30	1070	220			25.4×50	1200	30×40	1170	35×30	1200
270			25.4×50	1330	30×40	1310	35×35	1380	270					30×45	1340	35×35	1330
330					30×45	1480	35×40	1480	330					30×50	1510	35×40	1390
390					30×50	1500	35×45	1630	390							35×45	1710
470							35×50	1950	470							35×50	1830
560							35×55	2170	560								

PG Series

◆ **Case size & Permissible rated ripple current (mA rms) 120Hz / 105°C**

Vdc / ΦD / uF	500							
	Φ 22		Φ 25.4		Φ30		Φ35	
	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC
56	22×25	560						
68	22×30	610	25.4×25	650				
82	22×35	720	25.4×30	740	30×25	740		
100	22×40	770	25.4×35	780	30×25	820		
120	22×45	930	25.4×40	930	30×30	910	35×25	880
150	22×50	1080	25.4×45	1080	30×35	1040	35×25	1080
180			25.4×50	1100	30×40	1170	35×30	1100
220					30×45	1330	35×35	1230
270					30×50	1500	35×40	1420
330							35×45	1600
390							35×50	1780

◆ **RIPPLE CURRENT MULTIPLIERS**

Frequency Multipliers

Vdc	Frequency (Hz)				
	50/60	120	1K	10K	100K
200 ~ 250	0.80	1.00	1.20	1.30	1.40
400 ~ 500	0.80	1.00	1.10	1.12	1.15

PO Series

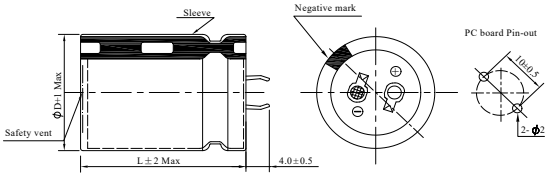
- **Endurance with ripple current: 2,000 hours at 105℃**

◆ SPECIFICATIONS

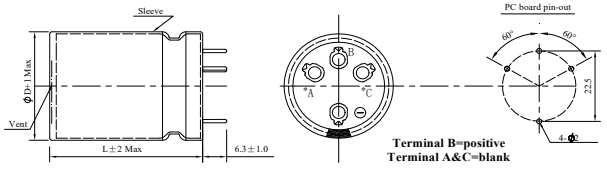
Item	Performance Characteristics
Category Temperature Range	-25 ~ +105℃
Working Voltage Range	400 ~ 450Vdc
Capacitance Range	68 ~ 680μF
Capacitance Tolerance	±20% (at 25℃ and 120Hz)
Dissipation Factor (tanδ) (at 25℃, 120Hz)	Rated Voltage (V): 400 / 420 / 450 tanδ(Max): 0.15 / 0.20 / 0.20
Leakage Current	$I \leq 3\sqrt{CV}$ I : Leakage current (μA) C : Rated capacitance (μF) V : Rated voltage (V) Impress the rated voltage for 5 minutes
Low Temperature Characteristics Impedance Ratio(MAX)	Rated voltage (V): 400 / 420 ~ 450 Z(-25℃)/Z(+20℃): 4 / 8 (at 120Hz)
Endurance	The following specifications shall be satisfied when the capacitors are restored to 25°C after subjected to DC voltage with the rated ripple current is applied for 2,000 hours at 105°C. Capacitance change: ≦ ±20% of the initial value Dissipation factor(tanδ): ≦ 200% of the specified value Leakage current: ≦ The initial specified value
Shelf Life	The following requirements shall be satisfied when the capacitor are restored to 25℃ after exposing them for 1,000 hours at 105℃ without voltage applied. Capacitance change: ≦ ±15% of the initial value Dissipation factor(tanδ): ≦ 150% of the specified value Leakage current: ≦ The initial specified value
Others	Conforms to JIS-C-5101-4 (1998), characteristic W

◆ DIMENSIONS (mm)

Terminal Code : ND : Standard



Terminal Code :K6 (ø35)



◆ PART NUMBER SYSTEM(Example : 420V 680μF)

P	O	2	S	6	8	1	M	N	D	3	5	5	5						

- Special Request
- Size code(3555 : 35×55)
- Terminal length code
- Lead forming Type code
- Capacitance tolerance code(M:±20%)
- Capacitance code (680μF)
- Voltage code (420V)
- Series code (PO)

PO Series

◆ **Case size & Permissible rated ripple current (A rms) 120Hz / 105℃**

Vdc / ΦD / uF	400								420							
	Φ 22		Φ 25.4		Φ30		Φ35		Φ 22		Φ 25.4		Φ30		Φ35	
	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC
82									22×25	0.60						
100	22×25	0.66							22×30	0.63	25.4×25	0.63				
120	22×30	0.67							22×35	0.77	25.4×25	0.77				
150	22×35	0.84	25.4×30	0.84					22×40	0.80	25.4×30	0.80	30×25	0.80		
180	22×40	0.90	25.4×30	0.90					22×45	0.86	25.4×35	0.86	30×30	0.86		
220	22×45	1.05	25.4×35	1.05	30×30	1.05			22×50	0.99	25.4×40	0.99	30×30	0.99	35×25	0.99
270	22×50	1.16	25.4×40	1.16	30×30	1.16	35×30	1.16			25.4×45	1.18	30×40	1.18	35×30	1.18
330			25.4×50	1.36	30×35	1.36	35×30	1.36			25.4×55	1.35	30×40	1.35	35×35	1.35
390			25.4×55	1.47	30×40	1.47	35×35	1.47					30×45	1.53	35×40	1.53
470					30×45	1.50	35×40	1.50					30×50	1.76	35×40	1.76
560					30×55	1.80	35×40	1.80							35×50	1.99
680							35×50	2.01							35×55	2.09

Vdc / ΦD / uF	450							
	Φ 22		Φ 25.4		Φ30		Φ35	
	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC
68	22×25	0.48						
82	22×30	0.53						
100	22×30	0.60	25.4×25	0.60				
120	22×35	0.68	25.4×30	0.68				
150	22×40	0.75	25.4×35	0.75	30×25	0.75		
180	22×50	0.82	25.4×40	0.82	30×30	0.82		
220			25.4×45	0.95	30×35	0.95	35×30	0.95
270			25.4×50	1.13	30×40	1.13	35×30	1.13
330					30×45	1.38	35×35	1.38
390					30×50	1.47	35×40	1.47
470							35×45	1.65
560							35×50	1.80

◆ **RIPPLE CURRENT MULTIPLIERS**

Frequency Multipliers

Vdc	Frequency (Hz)					
	50	120	300	1K	10K	50K
400 ~ 450	0.77	1.00	1.16	1.30	1.41	1.43

PI Series

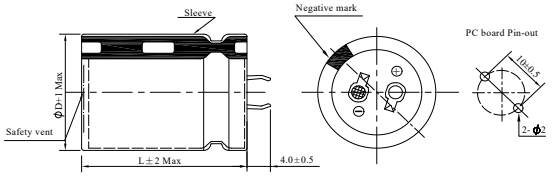
- **Endurance with ripple current: 3,000 hours at 105℃**

◆ SPECIFICATIONS

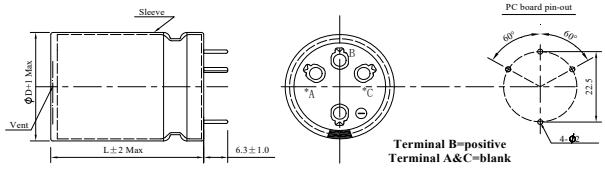
Item	Performance Characteristics
Category Temperature Range	-25 ~ +105℃
Working Voltage Range	400 ~ 450Vdc
Capacitance Range	56 ~ 680μF
Capacitance Tolerance	±20% (at 25℃ and 120Hz)
Dissipation Factor (tanδ) (at 25℃, 120Hz)	Rated Voltage (V): 400 / 420 / 450 tanδ(Max): 0.15 / 0.20 / 0.20
Leakage Current	$I \leq 3\sqrt{CV}$ I : Leakage current (μA) C : Rated capacitance (μF) V : Rated voltage (V) Impress the rated voltage for 5 minutes
Low Temperature Characteristics Impedance Ratio(MAX)	Rated voltage (V): 400 / 420~ 450 Z(-25℃)/Z(+20℃): 4 / 8 (at 120Hz)
Endurance	The following specifications shall be satisfied when the capacitors are restored to 25°C after subjected to DC voltage with the rated ripple current is applied for 3,000 hours at 105°C. Capacitance change: ≦ ±20% of the initial value Dissipation factor(tanδ): ≦ 200% of the specified value Leakage current: ≦The initial specified value
Shelf Life	The following requirements shall be satisfied when the capacitor are restored to 25℃ after exposing them for 1,000 hours at 105℃ without voltage applied. Capacitance change: ≦ ±15% of the initial value Dissipation factor(tanδ): ≦ 150% of the specified value Leakage current: ≦The initial specified value
Others	Conforms to JIS-C-5101-4 (1998), characteristic W

◆ DIMENSIONS (mm)

Terminal Code : ND : Standard



Terminal Code :K6 (ø35)



◆ PART NUMBER SYSTEM(Example : 450V 270μF)

P	I	2	W	2	7	1	M	N	D	3	0	4	0						

- Special Request
- Size code(3040 : 30×40)
- Terminal length code
- Lead forming Type code
- Capacitance tolerance code(M:±20%)
- Capacitance code (270μF)
- Voltage code (450V)
- Series code (PI)

PI Series

◆ **Case size & Permissible rated ripple current (A rms) at 105℃ / 120Hz**

Vdc / ΦD / uF	400								420							
	Φ 22		Φ 25.4		Φ30		Φ35		Φ 22		Φ 25.4		Φ30		Φ35	
	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC
82	22×25	0.61							22×25	0.61	25.4×25	0.62				
100	22×30	0.66	25.4×25	0.67					22×30	0.66	25.4×25	0.66				
120	22×35	0.71	25.4×25	0.71	30×25	0.73			22×35	0.71	25.4×30	0.71	30×25	0.71		
150	22×40	0.83	25.4×30	0.84	30×25	0.84	35×25	0.84	22×40	0.84	25.4×35	0.84	30×25	0.84		
180	22×45	0.93	25.4×35	0.93	30×30	0.93	35×25	0.93	22×45	0.91	25.4×35	0.91	30×30	0.91	35×25	0.91
220	22×50	1.05	25.4×40	1.05	30×30	1.05	35×25	1.05	22×50	1.05	25.4×45	1.05	30×35	1.05	35×25	1.05
270			25.4×45	1.16	30×35	1.16	35×30	1.16			25.4×50	1.16	30×40	1.16	35×30	1.16
330			25.4×50	1.37	30×40	1.37	35×30	1.37					30×45	1.40	35×35	1.40
390			25.4×60	1.44	30×45	1.44	35×35	1.44					30×50	1.50	35×40	1.50
470					30×50	1.81	35×40	1.81							35×45	1.81
560					30×60	2.00	35×45	2.00							35×50	2.05
680							35×50	2.15							35×60	2.15

Vdc / ΦD / uF	450							
	Φ 22		Φ 25.4		Φ30		Φ35	
	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC
56	22×25	0.40						
68	22×30	0.51	25.4×25	0.51				
82	22×30	0.61	25.4×25	0.61				
100	22×35	0.66	25.4×30	0.66	30×25	0.66		
120	22×40	0.76	25.4×35	0.76	30×25	0.76	35×25	0.76
150	22×45	0.84	25.4×35	0.84	30×30	0.84	35×25	0.84
180	22×50	0.96	25.4×40	0.96	30×30	0.96	35×30	0.96
220			25.4×45	1.07	30×35	1.07	35×30	1.07
270			25.4×60	1.12	30×40	1.12	35×35	1.12
330					30×50	1.38	35×40	1.38
390					30×60	1.44	35×40	1.44
470							35×50	1.76
560							35×60	1.82

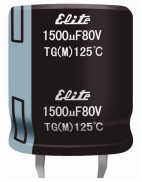
◆ **RIPPLE CURRENT MULTIPLIERS**

Frequency Multipliers

Vdc	Frequency (Hz)					
	50	120	300	1K	10K	50K
400 ~ 450	0.77	1.00	1.16	1.30	1.41	1.43

TG Series

- **Load life 5,000 hours at 125°C**
- **High ripple current, High reliability**

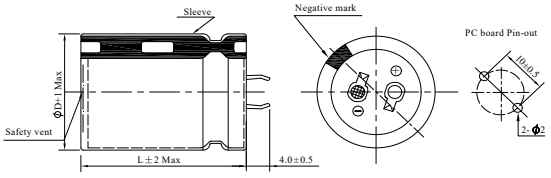


◆ SPECIFICATIONS

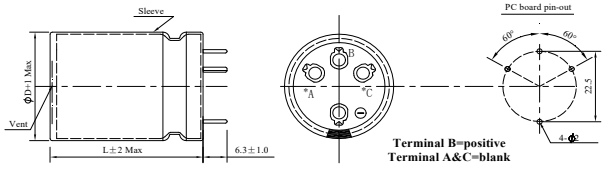
Item	Performance Characteristics
Category Temperature Range	-40 ~ +125℃
Working Voltage Range	10 ~ 100Vdc
Capacitance Range	680 ~ 47,000μF
Capacitance Tolerance	±20% (at 25℃ and 120Hz)
Dissipation Factor (tanδ) (at 25℃, 120Hz)	Rated Voltage (V): 10 / 16 / 25 / 35 / 50 / 63 / 80 / 100 tanδ(Max): 0.35 / 0.35 / 0.35 / 0.25 / 0.25 / 0.25 / 0.20 / 0.15 The above values should be increased by 0.02 for every additional 1000μF
Leakage Current	I=0.02CV or 3000μA,whichever is smaller I : Leakage current (μA) C : Rated capacitance (μF) V : Rated voltage (V) Impress the rated voltage for 5 minutes
Low Temperature Characteristics Impedance Ratio(MAX)	Rated voltage (V): 10 / 16 / 25 / 35 / 50 / 63 / 80 / 100 Z(-40℃)/Z(+20℃): 15 / 15 / 10 / 8 / 6 / 6 / 5 / 5 (at 120Hz)
Endurance	The following specifications shall be satisfied when the capacitors are restored to 25°C after subjected to DC voltage with the rated ripple current is applied for 5,000 hours at 125°C. Capacitance change: ≦ ±20% of the initial value Dissipation factor(tanδ): ≦ 200% of the specified value Leakage current: ≦ specified value
Shelf Life	The following requirements shall be satisfied when the capacitor are restored to 25℃ after exposing them for 1,000 hours at 125℃ without voltage applied. Capacitance change: ≦ ±20% of the initial value Dissipation factor(tanδ): ≦ 200% of the specified value Leakage current: ≦ 200% of the specified value
Others	Conforms to JIS-C-5101-4 (1998), characteristic W

◆ DIMENSIONS (mm)

Terminal Code : ND : Standard



Terminal Code :K6 (ø35)



◆ PART NUMBER SYSTEM(Example : 80V 1500μF)

T	G	1	K	1	5	2	M	N	D	2	5	3	5						

- Special Request
- Size code(2535 : 25×35)
- Terminal length code
- Lead forming Type code
- Capacitance tolerance code(M:±20%)
- Capacitance code (1500μF)
- Voltage code (80V)
- Series code (TG)

TG Series

◆ **Case size & Permissible rated ripple current (mA rms) at 125℃ / 120Hz**

Vdc / ΦD / uF	10								16							
	Φ 22		Φ 25.4		Φ30		Φ35		Φ 22		Φ 25.4		Φ30		Φ35	
	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC
6800	22×25	1140							5600	22×25	1200					
8200	22×30	1220	25.4×25	1220					6800	22×30	1340	25.4×25	1340			
10000	22×35	1445	25.4×30	1445					8200	22×35	1470	25.4×30	1470	30×25	1470	
12000	22×40	1660	25.4×35	1660	30×25	1660			10000	22×40	1700	25.4×35	1700	30×30	1700	
15000	22×45	1910	25.4×40	1910	30×30	1910			12000	22×45	1930	25.4×40	1930	30×35	1930	
18000	22×50	2140	25.4×45	2140	30×35	2140	35×25	2140	15000	22×50	2250	25.4×45	2250	30×40	2250	35×25	2250
22000			25.4×50	2510	30×40	2510	35×30	2510	18000			25.4×50	2580	30×45	2580	35×30	2580
27000					30×45	2800	35×35	2800	22000					30×50	2990	35×35	2990
33000					30×50	3185	35×40	3185	27000							35×40	3293
39000							35×45	3570	33000							35×45	3750
47000							35×50	3900	39000							35×50	4200

Vdc / ΦD / uF	25								35							
	Φ 22		Φ 25.4		Φ30		Φ35		Φ 22		Φ 25.4		Φ30		Φ35	
	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC
3900	22×25	1150							2700	22×25	1085					
4700	22×30	1280	25.4×25	1280					3300	22×30	1200					
5600	22×35	1390	25.4×30	1390					3900	22×35	1365	25.4×25	1365			
6800	22×40	1590	25.4×35	1590					4700	22×40	1470	25.4×30	1470	30×25	1470	
8200	22×45	1800	25.4×40	1800	30×25	1800			5600	22×45	1700	25.4×35	1700	30×30	1700	
10000	22×50	2045	25.4×45	2045	30×30	2045	35×25	2045	6800	22×50	1880	25.4×40	1880	30×35	1880	35×25	1880
12000			25.4×50	2340	30×35	2340	35×30	2340	8200			25.4×45	2350	30×40	2350	35×30	2350
15000					30×40	2750	35×35	2750	10000			25.4×50	2510	30×45	2510	35×35	2510
18000					30×45	3025	35×40	3025	12000					30×50	2830	35×40	2830
22000					30×50	3420	35×45	3420	15000							35×45	3250
27000							35×50	4040	18000							35×50	3820

Vdc / ΦD / uF	50								63							
	Φ 22		Φ 25.4		Φ30		Φ35		Φ 22		Φ 25.4		Φ30		Φ35	
	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC
1500	22×25	1030							1000	22×25	950					
1800	22×30	1170	25.4×25	1170					1200	22×30	1030					
2200	22×35	1440	25.4×30	1440					1500	22×35	1050	25.4×25	1050			
3300	22×40	1665	25.4×35	1665	30×25	1665			1800	22×40	1320	25.4×30	1320			
3900	22×45	1860	25.4×35	1860	30×30	1860			2200	22×45	1515	25.4×35	1515	30×25	1515	
4700	22×50	2150	25.4×40	2150	30×35	2150	35×25	2150	2700	22×50	1740	25.4×40	1740	30×30	1740	
5600			25.4×50	2330	30×40	2330	35×30	2330	3300			25.4×45	1980	30×35	1980	35×25	1980
6800					30×45	2820	35×35	2820	3900			25.4×50	2200	30×40	2200	35×30	2200
8200					30×50	3080	35×40	3080	4700					30×45	1980	35×35	1980
10000							35×45	3450	5600					30×50	2200	35×40	2200
12000							35×50	3930	6800							35×45	3155
									8200							35×50	3400

TG Series

◆ **Case size & Permissible rated ripple current (mA rms) at 125℃ / 120Hz**

Vdc / ΦD / uF	80								Vdc / ΦD / uF	100							
	Φ 22		Φ 25.4		Φ30		Φ35			Φ 22		Φ 25.4		Φ30		Φ35	
	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC		ΦD×L	RC	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC
820	22×25	945							680	22×25	1030						
1000	22×30	1050	25.4×25	1050					820	22×30	1145	25.4×25	1145				
1200	22×35	1200	25.4×30	1200					1000	22×35	1280	25.4×30	1280				
1500	22×40	1380	25.4×35	1380	30×25	1380			1200	22×40	1460	25.4×35	1460	30×25	1460		
1800	22×45	1555	25.4×40	1555	30×30	1555			1500	22×45	1700	25.4×40	1700	30×30	1700		
2200	22×50	1790	25.4×45	1790	30×35	1790	35×25	1790	1800	22×50	1900	25.4×45	1900	30×35	1900	35×25	1900
2700			25.4×50	2040	30×40	2040	35×30	2040	2200			25.4×50	2300	30×40	2300	35×30	2300
3300					30×45	2320	35×35	2320	2700					30×45	2460	35×35	2460
3900					30×50	2650	35×40	2650	3300					30×50	2800	35×40	2800
4700							35×45	2930	3900							35×45	3140
5600							35×50	3290	4700							35×50	3250

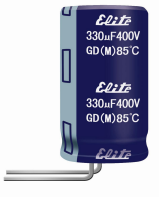
◆ **RIPPLE CURRENT MULTIPLIERS**

Frequency Multipliers

Vdc	Frequency (Hz)				
	50	120	1K	10K	≥50K
10 ~ 100	0.95	1.00	1.05	1.08	1.08

GD Series

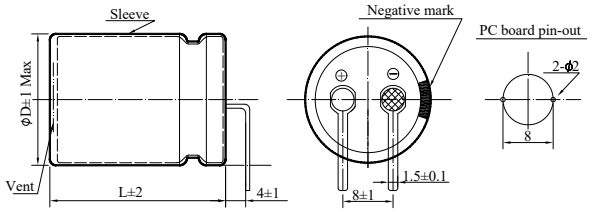
- **For Φ22, Φ25, suitable for horizontal mounting to assure flat and low-profile design**



◆ SPECIFICATIONS

Item	Performance Characteristics
Category Temperature Range	-25 ~ +85℃
Working Voltage Range	160 ~ 450Vdc
Capacitance Range	82 ~ 1,200 μF
Capacitance Tolerance	±20% (at 25℃ and 120Hz)
Dissipation Factor (tanδ) (at 25℃, 120Hz)	Rated Voltage (V): 160 ~ 450; tanδ(Max): 0.15 The above value should be increased by 0.02 for every additional 1000μF
Leakage Current	I=0.02CV or 3000μA,whichever is smaller I : Leakage current (μA) C : Rated capacitance (μF) V : Rated voltage (V) Impress the rated voltage for 5 minutes
Low Temperature Characteristics Impedance Ratio(MAX)	Rated voltage (V): 160 ~ 250 / 400 / 450 Z(-25℃)/Z(+20℃): 4 / 4 / 8 (at 120Hz)
Endurance	The following specifications shall be satisfied when the capacitors are restored to 25°C after subjected to DC voltage with the rated ripple current is applied for 2,000 hours at 85°C. Capacitance change: ≦ ±20% of the initial value Dissipation factor(tanδ): ≦ 200% of the specified value Leakage current: ≦ specified value
Shelf Life	The following requirements shall be satisfied when the capacitor are restored to 25℃ after the rated voltage applied for 1,000 hours at 85℃ without voltage applied. Capacitance change: ≦ ±15% of the initial value Dissipation factor(tanδ): ≦ 150% of the specified value Leakage current: ≦ 200% of the specified value
Others	Conforms to JIS-C-5101-4 (1998), characteristic W

◆ DIMENSIONS (mm)



◆ PART NUMBER SYSTEM(Example : 450V 82μF)

G	D	2	W	8	2	0	M	R	N	2	0	3	0						

- Special Request
- Size code(2030 : 20×30)
- Terminal length code
- Lead forming Type code
- Capacitance tolerance code(M:±20%)
- Capacitance code (82μF)
- Voltage code (450V)
- Series code (GD)

GD Series

◆ **Case size & Permissible rated ripple current (mA rms) at 85°C / 120Hz**

Vdc / ΦD / uF	160						200					
	Φ 20		Φ22		Φ 25.4		Φ 20		Φ22		Φ 25.4	
	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC	Φ D×L	RC	ΦD×L	RC	ΦD×L	RC
220	20×25	850	22×25	920								
270	20×25	950	22×25	1000			20×30	1320				
330	20×25	1150	22×25	1165			20×30	1490				
390	20×30	1325	22×30	1340			20×35	1660				
470	20×35	1560	22×30	1625			20×40	1930	22×35	1800		
560	20×40	1735	22×35	1830	25.4×30	1955	20×45	2000	22×40	1960		
680	20×45	2085	22×40	2100	25.4×35	2185	20×50	2300	22×45	2430	25.4×35	2680
820	20×50	2300	22×45	2455	25.4×40	2530			22×50	2800	25.4×40	2800
1000	20×60	2560	22×50	2615	25.4×45	2900			22×60	3000	25.4×45	3120
1200			22×55	3100	25.4×50	3125					25.4×60	3440

Vdc / ΦD / uF	250						400					
	Φ 20		Φ22		Φ 25.4		Φ 20		Φ22		Φ 25.4	
	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC
82							20×30	780				
100							20×30	900				
120							20×35	1020				
150							20×40	1170	22×35	1200		
180							20×50	1300	22×40	1380	25.4×35	1250
220	20×30	1050							22×45	1550	25.4×40	1560
270	20×35	1155	22×30	1170					22×60	1700	25.4×45	1700
330	20×40	1400	22×30	1495							25.4×50	1900
390	20×45	1625	22×35	1700							25.4×60	2150
470	20×50	1800	22×40	1955	25.4×30	2000						
560	20×55	2100	22×45	2150	25.4×35	2185						
680	20×60	2200	22×50	2290	25.4×40	2310						
820			22×60	2655	25.4×45	2760						

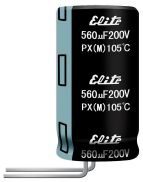
Vdc / ΦD / uF	450					
	Φ 20		Φ22		Φ 25.4	
	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC
82	20×30	800	22×25	815		
100	20×30	950	22×30	1000		
120	20×35	1100	22×30	1125		
150	20×40	1200	22×35	1250	25.4×30	1280
180	20×45	1325	22×40	1350	25.4×35	1385
220	20×50	1600	22×50	1625	25.4×40	1650
270	20×60	1750	22×60	1750	25.4×50	1750
330					25.4×55	1950

◆ **RIPPLE CURRENT MULTIPLIERS**

Frequency Multipliers

Vdc	Frequency (Hz)						
	50	60	120	300	1K	10K	50K
160 ~ 250	0.81	0.85	1.00	1.17	1.32	1.45	1.50
400 ~ 450	0.77	0.82	1.00	1.16	1.30	1.41	1.43

PX Series

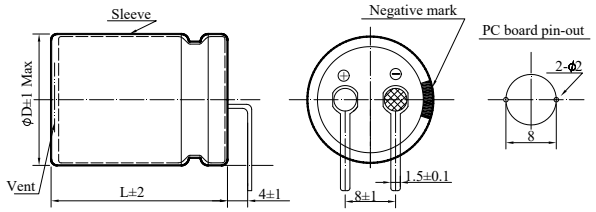


- **Load life: 105℃ 2,000 hours horizontal mounting**
- **Suitable for flat equipment design**

◆ SPECIFICATIONS

Item	Performance Characteristics
Category Temperature Range	-25 ~ +105℃
Working Voltage Range	160 ~ 450Vdc
Capacitance Range	68 ~ 1,500 μF
Capacitance Tolerance	±20% (at 25℃ and 120Hz)
Dissipation Factor (tanδ) (at 25℃, 120Hz)	Rated Voltage (V): 160 / 200 / 250 / 400 / 450 tanδ(Max): 0.15 / 0.15 / 0.15 / 0.15 / 0.15 The above value should be increased by 0.02 for every additional 1000μF
Leakage Current	I=0.02CV or 3000μA,whichever is smaller I : Leakage current (μA) C : Rated capacitance (μF) V : Rated voltage (V) Impress the rated voltage for 5 minutes
Low Temperature Characteristics Impedance Ratio(MAX)	Rated voltage (V): 160 ~ 250 / 400 / 450 Z(-25℃)/Z(+20℃): 4 / 4 / 8 (at 120Hz)
Endurance	The following specifications shall be satisfied when the capacitors are restored to 25°C after subjected to DC voltage with the rated ripple current is applied for 2,000 hours at 105°C. Capacitance change: ≦ ±20% of the initial value Dissipation factor(tanδ): ≦ 200% of the specified value Leakage current: ≦ Not more than the specified value
Shelf Life	The following requirements shall be satisfied when the capacitor are restored to 25℃ after exposing them for 1,000 hours at 105℃ without voltage applied. Capacitance change: ≦ ±20% of the initial value Dissipation factor(tanδ): ≦ 200% of the specified value Leakage current: ≦ Not more than the specified value
Others	Conforms to JIS-C-5101-4 (1998), characteristic W

◆ DIMENSIONS (mm)



◆ PART NUMBER SYSTEM(Example : 200V 820μF)

P	X	2	D	8	2	1	M	R	N	2	2	6	0						

Special Request
Size code(2260 : 22×60)
Terminal length code
Lead forming Type code
Capacitance tolerance code(M:±20%)
Capacitance code (820μF)
Voltage code (200V)
Series code (PX)

PX Series

◆ **Case size & Permissible rated ripple current (mA rms) at 105℃ / 120Hz**

Vdc / ΦD / uF	160						200					
	Φ 20		Φ22		Φ 25.4		Φ 20		Φ22		Φ 25.4	
	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC
270							20×30	970				
330	20×30	1020					20×35	1170	22×30	1200		
390	20×35	1150	22×30	1170			20×40	1270	22×35	1300		
470	20×40	1250	22×30	1280			20×45	1410	22×40	1440		
560	20×45	1420	22×35	1450			20×55	1560	22×45	1600	25.4×35	1600
680	20×50	1600	22×40	1640	25.4×35	1700	20×60	1710	22×50	1750	25.4×40	1760
820	20×55	1810	22×45	1850	25.4×40	1920			22×60	2100	25.4×45	2100
1000			22×55	2100	25.4×45	2170					25.4×50	2360
1200					25.4×50	2430						
1500					25.4×60	2620						

Vdc / ΦD / uF	250						400					
	Φ 20		Φ22		Φ 25.4		Φ 20		Φ22		Φ 25.4	
	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC
68							20×30	480				
82							20×30	540				
100							20×35	600	22×30	620		
120							20×40	710	22×35	730		
150							20×45	830	22×40	850	25.4×35	850
180	20×30	820					20×55	930	22×45	950	25.4×35	920
220	20×35	950	22×30	970					22×50	1080	25.4×40	1050
270	20×40	1080	22×35	1110					22×60	1200	25.4×50	1290
330	20×45	1230	22×40	1260							25.4×60	1410
390	20×50	1380	22×45	1410	25.4×35	1420						
470	20×60	1540	22×50	1580	25.4×40	1610						
560			22×55	1800	25.4×45	1800						
680					25.4×50	2030						
820					25.4×60	2260						

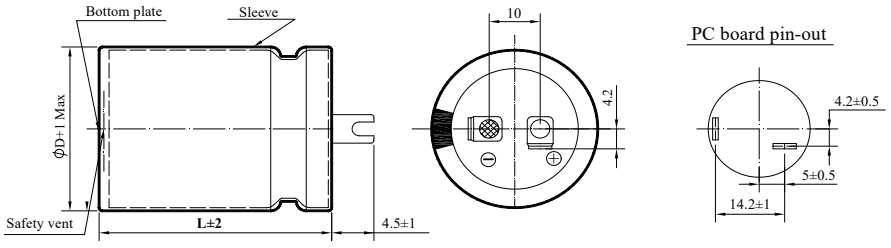
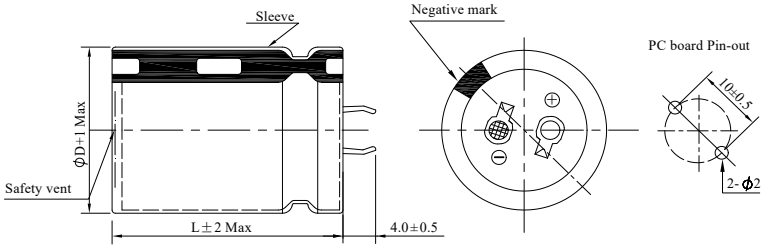
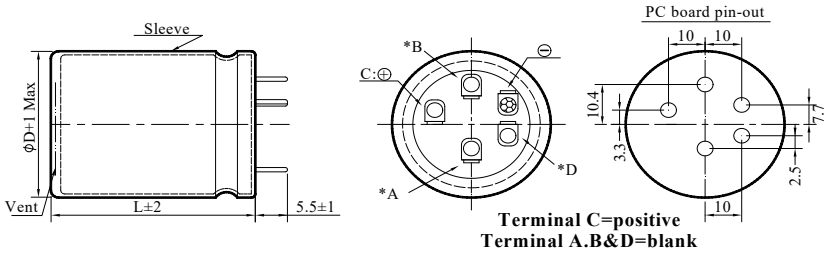
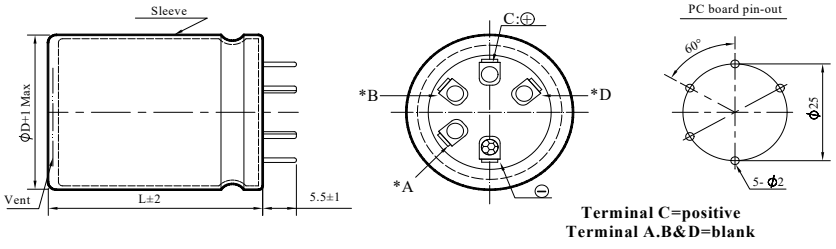
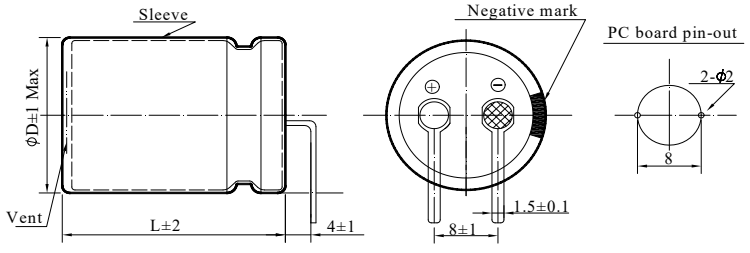
Vdc / ΦD / uF	450					
	Φ 20		Φ22		Φ25.4	
	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC
68	20×25	500	22×25	520		
82	20×30	630	22×30	660		
100	20×35	650	22×30	685		
120	20×40	750	22×35	790	25.4×30	800
150	20×45	870	22×40	895	25.4×35	900
180	20×50	1015	22×50	1030	25.4×40	1050
220	20×60	1150	22×55	1175	25.4×45	1190
270					25.4×55	1300

◆ **RIPPLE CURRENT MULTIPLIERS**

Frequency Multipliers

Vdc	Frequency (Hz)				
	50	120	1K	10K	≥50K
160 ~ 250	0.81	1.00	1.32	1.45	1.50
400 ~ 450	0.77	1.00	1.30	1.41	1.43

AVAILABLE TERMINALS FOR SNAP-IN TYPE (Unit:mm)

D=Ø30 to Ø35 mm	
D=Ø22 to Ø35 mm	
D=Ø35 to Ø40 mm	
D=Ø40 mm	
D=Ø20X25 to 61 mm **D=Ø25X31 to 61 mm**	

PART NUMBER SYSTEM (III)

♦ SPECIAL TYPE

Series	Rated Voltage	Capacitance	Tolerance	Terminal Forming Type	Case Dimension	Special Request
(1)	(2)	(3)	(4)	(5)	(6)	(7)
□□	□□	□□□	□	□□	□□□□	□□□□□□

(1) Series

Series	AQ	AN	SC	SA	SK	SX	SL		

(2) Rated Voltage

Code	1C	1E	1F	1V	1H	1J	1K	2A	2C	2Z	2D	2P	2E	2V	2G	2S	2W	2H	2L	2J
WV	16	25	30	35	50	63	80	100	160	180	200	220	250	350	400	420	450	500	550	600

(3) Capacitance

Code	R10	R47	010	4R7	100	470	101	471	102	472	473
µF	0.1	0.47	1.0	4.7	10	47	100	470	1000	4700	47000

(4) Capacitance Tolerance

Code	J	Q	R	K	V	M	H
%	± 5	+30 / -10	+20 / -0	± 10	+20 / -10	± 20	+20 / -5

(5) Terminal Forming Type

Code	AC	HU	LS (Screw M5×10)	LA (Screw M5×13)	LB (Screw M6×17)	CA	CL
Description	Two Parts of Terminals	Two Vertical Terminals	Two Screw Terminals			Snap-in Terminal	Lug Terminal

(6) Case Dimension

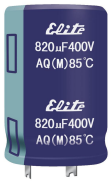
Code	3535	4095	40A5	51A5	51C0	64A0	64B0	76E3	76L5	90F0	90H0	90J0	90K5	90N0
Size	35x35	40x95	40x105	51x105	51x120	64x100	64x110	76x143	76x215	90x150	90x170	90x190	90x205	90x230

(7) Special Request

Code	R	F	L	D
Description	High Rated ripple current	Endurance	Low Leakage Current	Low Dissipation Factor
Code	H	E	P	---
Description	High Temperature	Low Impedance & ESR	PET Sleeve	---

AQ Series

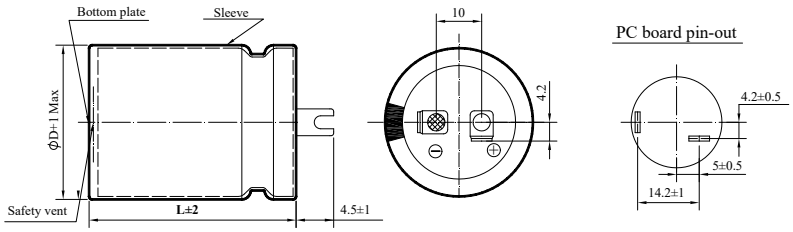
- **High ripple current capability**
- **High stability.Suitable for LCD and PDP**



◆ SPECIFICATIONS

Item	Performance Characteristics
Category Temperature Range	-25 ~ +85℃
Working Voltage Range	400 ~ 450Vdc
Capacitance Range	330 ~820μF
Capacitance Tolerance	±20% (at 25℃ and 120Hz)
Dissipation Factor (tanδ) (at 25℃, 120Hz)	Rated Voltage (V): 400 / 420 / 450; tanδ(Max): 0.15 / 0.15 / 0.15
Leakage Current	I= $\sqrt{CV}$ or 3000μA, whichever is smaller. I : Leakage current (μA) C : Rated capacitance (μF) V : Rated voltage (V) Impress the rated voltage for 5 minutes
Low Temperature Characteristics Impedance Ratio(MAX)	Rated voltage (V): 400 / 420~ 450; Z(-25℃)/Z(+20℃): 4 / 8 (at 120Hz)
Endurance	The following specifications shall be satisfied when the capacitors are restored to 25°C after subjected to DC voltage with the rated ripple current is applied for 3,000 hours at 85°C. Capacitance change: ≦ ±20% of the initial value; Dissipation factor(tanδ): ≦ 200% of the specified value; Leakage current: ≦ specified value
Shelf Life	The following requirements shall be satisfied when the capacitor are restored to 25℃ after the rated voltage applied for 1,000 hours at 85℃ without voltage applied. Capacitance change: ≦ ±20% of the initial value; Dissipation factor(tanδ): ≦ 200% of the specified value; Leakage current: ≦ 200% of the specified value
Others	Conforms to JIS-C-5101-4 (1998), characteristic W

◆ DIMENSIONS (mm)



◆ PART NUMBER SYSTEM(Example : 400V 820μF)

A	Q	2	G	8	2	1	M	H	U	3	5	5	8						

- Special Request
- Size code (3558:35×58)
- Terminal code
- Capacitance tolerance code (M:±20%)
- Capacitance code (820μF)
- Voltage code (400V)
- Series code (AQ)

AQ Series

◆ **Case size & Permissible rated ripple current (mA rms) 120Hz / 85℃**

Vdc / ΦD / uF	400				420				450			
	Φ30		Φ35		Φ30		Φ35		Φ30		Φ35	
	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC
330	30×40	1500	35×35	1500	30×40	1350	35×35	1350	30×45	1250	35×40	1250
360	30×40	1600	35×35	1600	30×40	1450	35×35	1450	30×50	1350	35×40	1350
390	30×40	1700	35×35	1700	30×45	1550	35×40	1550			35×45	1450
420	30×45	1800	35×40	1800	30×50	1700	35×40	1700			35×45	1550
440	30×50	1900	35×40	1900	30×50	1900	35×45	1900			35×50	1700
470	30×50	2000	35×40	2000			35×45	2050			35×50	1800
510			35×45	2150			35×50	2150			35×58	2000
560			35×50	2300			35×50	2300				
620			35×50	2450			35×58	2400				
680			35×50	2600								
820			35×58	2850								

◆ **RIPPLE CURRENT MULTIPLIERS**

Frequency Multipliers

Vdc	Frequency (Hz)				
	60	120	360	1K	10K
400 ~ 450	0.80	1.00	1.10	1.20	1.30

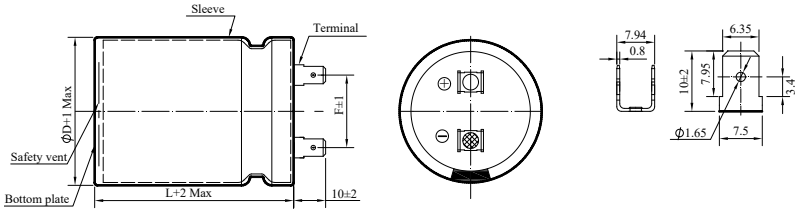
AN Series

- **Load life 3,000 hours 85°C**

◆ SPECIFICATIONS

Item	Performance Characteristics
Category Temperature Range	-25 ~ +85℃
Working Voltage Range	400 ~ 450Vdc
Capacitance Range	800 ~3,300μF
Capacitance Tolerance	±20% (at 25℃ and 120Hz)
Dissipation Factor (tanδ) (at 25℃, 120Hz)	Rated Voltage (V): 400 / 420 / 450 tanδ(Max): 0.15 / 0.15 / 0.15
Leakage Current	I< $\sqrt{CV}$ or 3000μA,whichever is smaller I : Leakage current (μA) C : Rated capacitance (μF) V : Rated voltage (V) Impress the rated voltage for 5 minutes
Low Temperature Characteristics Impedance Ratio(MAX)	Rated voltage (V): 400 ~ 450 Z(-25℃)/Z(+20℃): 8 (at 120Hz)
Endurance	The following specifications shall be satisfied when the capacitors are restored to 25°C after subjected to DC voltage with the rated ripple current is applied for 3,000 hours at 85°C. Capacitance change: ≦ ±20% of the initial value Dissipation factor(tanδ): ≦ 200% of the specified value Leakage current: ≦ specified value
Shelf Life	The following requirements shall be satisfied when the capacitor are restored to 25℃ after the rated voltage applied for 1,000 hours at 85℃ without voltage applied. Capacitance change: ≦ ±20% of the initial value Dissipation factor(tanδ): ≦ 200% of the specified value Leakage current: ≦ 200% of the specified value
Others	Conforms to JIS-C-5101-4 (1998), characteristic W

◆ DIMENSIONS (mm)



ΦD	35	40	51	64
F±1	14	14	20	25

◆ PART NUMBER SYSTEM(Example : 450V 1800μF)

A	N	2	W	1	8	2	M	A	C	5	1	A	0						

- Special Request
- Size code (51A0:51×100)
- Terminal code
- Capacitance tolerance code (M:±20%)
- Capacitance code (1800μF)
- Voltage code (450V)
- Series code (AN)

AN Series

◆ **Case size & Permissible rated ripple current (mA rms) 120Hz / 85℃**

Vdc / ΦD / uF	400							
	Φ35		Φ40		Φ51		Φ64	
	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC
800	35×80	3200						
900	35×90	3600						
1000	35×100	4000						
1200			40×100	4200				
1300			40×100	4900				
1500			40×120	5600				
1800					51×90	6050		
2000					51×100	6200		
2200					51×120	6500		
2500					51×120	6800	64×100	6800
2700							64×100	7300
2900							64×100	7850
3300							64×120	8100

Vdc / ΦD / uF	420							
	Φ35		Φ40		Φ51		Φ64	
	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC
800	35×90	3350						
900	35×100	3750						
1000	35×100	4200						
1200			40×120	4400				
1300			40×120	5100				
1500					51×100	5850		
1800					51×100	6350		
2000					51×120	6500		
2200					51×120	6800	64×100	6800
2500							64×100	7150
2700							64×120	7650
2900							64×120	8200

Vdc / ΦD / uF	450							
	Φ35		Φ40		Φ51		Φ64	
	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC
800	35×90	3000						
900	35×100	3400						
1000			40×100	3750				
1200			40×120	3950				
1300					51×90	4600		
1500					51×100	5250		
1800					51×100	5700		
2000					51×120	5850	64×100	5850
2200							64×100	6100
2500							64×100	6400
2700							64×120	6850

◆ **RIPPLE CURRENT MULTIPLIERS**

Frequency Multipliers

Vdc	Frequency (Hz)				
	60	120	360	1K	10K
400 ~ 450	0.82	1.00	1.20	1.35	1.40

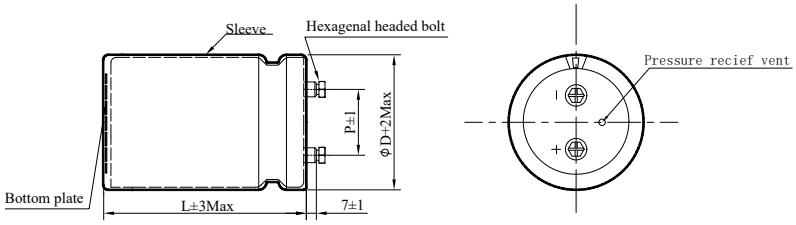
SC Series

- **High ripple, suitable to use in industrial power supplies for inverter circuitry, etc**

◆ SPECIFICATIONS

Item	Performance Characteristics
Category Temperature Range	-25 ~ +85℃
Working Voltage Range	200 ~ 600Vdc
Capacitance Range	820 ~ 33,000μF
Capacitance Tolerance	±20% (at 25℃ and 120Hz)
Dissipation Factor (tanδ) (at 25℃, 120Hz)	Rated Voltage (V): 200 ~ 250 / 350 ~ 450 / 500 ~600 tanδ(Max): 0.20 / 0.20 / 0.25
Leakage Current	I=0.01CV or 5000μA,whichever is smaller I : Leakage current (μA) C : Rated capacitance (μF) V : Rated voltage (V) Impress the rated voltage for 5 minutes
Endurance	The following specifications shall be satisfied when the capacitors are restored to 25°C after subjected to DC voltage with the rated ripple current is applied for 2,000 hours at 85°C. Capacitance change: ≦ ±15% of the initial value Dissipation factor(tanδ): ≦ 175% of the specified value Leakage current: ≦ specified value
Shelf Life	The following requirements shall be satisfied when the capacitor are restored to 25℃ after the rated voltage applied for 500 hours at 85℃ without voltage applied. Capacitance change: ≦ ±15% of the initial value Dissipation factor(tanδ): ≦ 175% of the specified value Leakage current: ≦ specified value
Others	Conforms to JIS-C-5101-4 (1998), characteristic W

◆ DIMENSIONS (mm)



ΦD	51	64	76	90
P±1	22.4	28.0	31.5	31.5

◆ PART NUMBER SYSTEM(Example : 450V 8200μF)

S	C	2	W	8	2	2	M	L	S	9	0	F	0						

- Special Request
- Size code (90F0:90×150)
- Terminal code
- Capacitance tolerance code (M:±20%)
- Capacitance code (8200μF)
- Voltage code (450V)
- Series code (SC)

SC Series

◆Case size & Permissible rated ripple current (A rms) 120Hz / 85℃

Vdc / ΦD / uF	200								250							
	Φ51		Φ64		Φ76		Φ90		Φ51		Φ64		Φ76		Φ90	
	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC
2200									51×80	3.9						
2700									51×80	4.4						
3300	51×80	4.9							51×100	5.4						
3900	51×80	5.3							51×120	6.2	64×80	6.2				
4700	51×100	6.4	64×80	6.4					51×120	7.1	64×100	7.1				
5600	51×120	7.5	64×80	7.5							64×100	7.7				
6800	51×120	8.7	64×100	8.7							64×120	9.1				
8200			64×100	9.3							64×120	10.0	76×100	10.0		
10000			64×100	10.3									76×100	11.6		
12000			64×120	12.0	76×100	12.0							76×120	12.8		
15000					76×100	14.4							76×120	15.0	90×100	15.0
18000					76×120	16.5	90×100	16.5					76×150	17.6	90×100	14.5
22000					76×150	19.6	90×120	19.6							90×150	20.9
27000					76×150	21.5	90×120	21.5								
33000							90×150	25.5								

Vdc / ΦD / uF	350								400							
	Φ51		Φ64		Φ76		Φ90		Φ51		Φ64		Φ76		Φ90	
	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC
1000									51×80	3.8						
1200	51×80	4.2							51×80	4.5						
1500	51×80	4.9							51×100	5.3						
1800	51×100	5.6							51×100	6.0	64×80	6.3				
2200	51×100	6.7	64×80	7.0					51×120	7.0	64×100	6.8				
2700	51×120	8.0	64×100	8.4							64×100	8.2				
3300			64×100	9.6							64×120	9.6	76×100	9.3		
3900			64×120	10.4									76×120	10.5		
4700					76×100	11.9							76×120	12.3	90×100	13.1
5600					76×120	13.5	90×100	14.4					76×120	14.3	90×100	14.5
6800					76×150	16.0	90×120	16.2					76×150	16.0	90×120	16.3
8200					76×150	18.7	90×120	19.0							90×150	19.0
10000							90×150	20.0							90×180	21.0
12000							90×150	21.3								

Vdc / ΦD / uF	450								500							
	Φ51		Φ64		Φ76		Φ90		Φ51		Φ64		Φ76		Φ90	
	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC
820	51×80	3.6							51×90	3.7						
1000	51×80	4.0							51×100	4.1						
1200	51×100	4.7							51×110	4.8						
1500	51×120	5.4	64×80	5.6					51×130	5.6	64×100	5.6				
1800	51×120	5.9	64×100	6.1							64×110	6.2				
2200			64×100	7.2							64×120	7.3	76×100	7.2		
2700			64×120	8.6	76×100	8.3					64×140	8.7	76×110	8.5		
3300					76×100	9.7							76×120	9.9		
3900					76×120	11.2	90×100	11.3					76×140	11.4	90×110	11.3
4700					76×150	12.9	90×100	13.1					76×160	13.1	90×130	13.1
5600					76×150	15.3	90×120	15.3					76×190	15.4	90×150	15.3
8200							90×150	17.3							90×190	17.4

SC Series

◆**Case size & Permissible rated ripple current (A rms) 120Hz / 85℃**

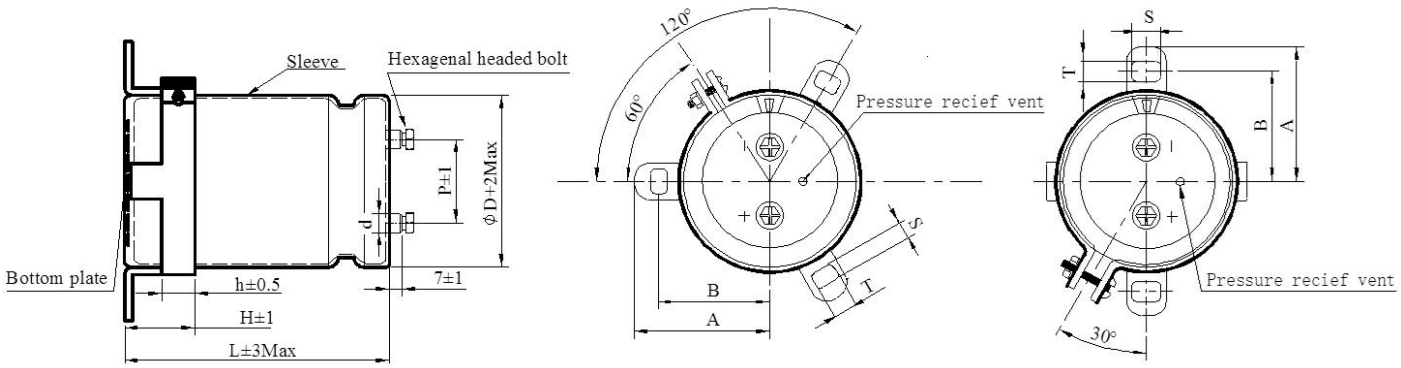
Vdc / ΦD / uF	550								600					
	Φ51		Φ64		Φ76		Φ90		Φ64		Φ76		Φ90	
	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC
820	51×90	3.9												
1000	51×110	4.3												
1200	51×130	5.0	64×90	4.8					64×100	5.4				
1500			64×110	5.9					64×120	6.6				
1800			64×120	6.3					64×135	7.5	76×100	7.2		
2200			64×140	7.5	76×110	7.5			64×155	8.3	76×120	8.0		
2700			64×170	8.9	76×130	8.7			64×185	9.7	76×135	9.4		
3300					76×150	10.1	90×120	10.1	64×220	11.0	76×160	10.8		
3900					76×170	11.6	90×130	11.4			76×185	12.4	90×140	12.2
4700					76×190	13.5	90×150	13.2			76×215	14.3	90×165	14.0
5600							90×170	15.6					90×190	16.5
6800							90×200	16.3					90×220	17.1

◆ **RIPPLE CURRENT MULTIPLIERS**

Frequency Multipliers

Vdc	Frequency (Hz)				
	60	120	360	1K	10K
200 ~ 450	0.82	1.00	1.20	1.35	1.40
500 ~ 600	0.80	1.00	1.10	1.30	1.35

◆ **DIMENSIONS (Screw-Mount) [mm]**



◆ **Tmerminal pitch and Nominal dia.of bolt**

Terminal Code	ΦD	P±1	Nominal dia.of bolt	d±0.5
LS	51	22.4	M5	10
	64	28.0	M5	10
	76	31.5	M5	10
	90	31.5	M5	10
LA	64	28.0	M5	13
	76	31.5	M5	13
	90	31.5	M5	13
LB	76	31.5	M6	17
	90	31.5	M6	17

◆ **Dimensions of mounting bracket**

Leg shape	D	A±2	B±1	T±0.5	S±0.5	H±1	h±0.5
2 – Leg (Code:K1)	51	40.0	34.0	7.0	5.0	30	24
	64	46.5	40.5	7.0	5.0	30	24
	76	53.0	46.8	7.0	5.0	30	24
	90	60.3	54.0	7.0	5.0	35	20
3 – Leg (Code:K2)	51	36.5	31.8	7.0	5.0	30	24
	64	43.6	38.1	7.0	5.0	30	24
	76	50.2	44.5	7.0	5.0	30	24
	90	56.5	50.8	7.0	5.0	30	24

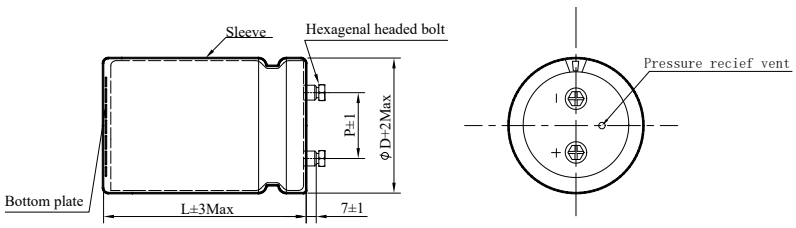
SA Series

- **High ripple, suitable to use in industrial power supplies for inverter circuitry, etc**

◆ SPECIFICATIONS

Item	Performance Characteristics	
Category Temperature Range	-40 ~ +85℃	-25 ~ +85℃
Working Voltage Range	160 ~ 250Vdc	350 ~ 450Vdc
Capacitance Range	2,700 ~ 68,000μF	1,000 ~ 18,000μF
Capacitance Tolerance	±20% (at 25℃ and 120Hz)	
Dissipation Factor (tanδ) (at 25℃, 120Hz)	Rated Voltage (V): 160 / 200 / 250 / 350 / 400 / 450 tanδ(Max): 0.25 / 0.25 / 0.25 / 0.20 / 0.20 / 0.20	
Leakage Current	I=0.01CV or 5000μA,whichever is smaller I : Leakage current (μA) C : Rated capacitance (μF) V : Rated voltage (V) Impress the rated voltage for 5 minutes	
Endurance	The following specifications shall be satisfied when the capacitors are restored to 25°C after subjected to DC voltage with the rated ripple current is applied for 5,000 hours at 85°C. Capacitance change: ≦ ±20% of the initial value Dissipation factor(tanδ): ≦ 200% of the specified value Leakage current: ≦ specified value	
Shelf Life	The following requirements shall be satisfied when the capacitor are restored to 25℃ after the rated voltage applied for 500 hours at 85℃ without voltage applied. Capacitance change: ≦ ±20% of the initial value Dissipation factor(tanδ): ≦ 200% of the specified value Leakage current: ≦ specified value	
Others	Conforms to JIS-C-5101-4 (1998), characteristic W	

◆ DIMENSIONS (mm)



ΦD	51	64	76	90
P±1	22.4	28.0	31.5	31.5

◆ PART NUMBER SYSTEM(Example : 400V 15000μF)

S	A	2	G	1	5	3	M	L	S	9	0	N	0						

- Special Request
- Size code (90N0 : 90×230)
- Terminal code
- Capacitance tolerance code (M:±20%)
- Capacitance code(15000μF)
- Voltage code(400V)
- Series code (SA)

SA Series

◆ **Case size & Permissible rated ripple current (A rms) 120Hz / 85℃**

Vdc / ΦD / uF	160								200							
	Φ51		Φ64		Φ76		Φ90		Φ51		Φ64		Φ76		Φ90	
	ΦD× L	RC	ΦD× L	RC	ΦD× L	RC	ΦD× L	RC	ΦD× L	RC	ΦD× L	RC	ΦD× L	RC	ΦD× L	RC
3300									51× 80	4.5						
3900	51× 80	5.1							51× 80	5.3						
4700	51× 80	5.6							51×100	7.1	64×80	6.8				
5600	51×100	6.4							51×120	8.2	64×80	7.9				
6800	51×100	7.5	64×80	7.2					51×120	9.2	64×100	8.9				
8200	51×120	8.4	64×100	8.1							64×100	10.0				
10000	51×120	11.1	64×100	9.8							64×120	11.0				
12000			64×100	10.8							64×140	11.5	76×100	11.1		
15000			64×120	12.7							64×160	12.8	76×120	12.4		
18000			64×150	14.0	76×100	13.6							76×140	13.5	90×110	13.0
22000			64×150	17.0	76×120	16.6							76×160	15.6	90×130	15.1
27000					76×150	18.1	90×120	17.6					76×190	17.6	90×150	17.1
33000					76×150	19.4	90×120	18.9					76×220	18.8	90×170	18.3
39000					76×190	20.8	90×150	20.3							90×200	19.6
47000					76×220	22.2	90×170	21.7								
68000							90×230	22.3								

Vdc / ΦD / uF	250								350							
	Φ51		Φ64		Φ76		Φ90		Φ51		Φ64		Φ76		Φ90	
	ΦD× L	RC	ΦD× L	RC	ΦD× L	RC	ΦD× L	RC	ΦD× L	RC	ΦD× L	RC	ΦD× L	RC	ΦD× L	RC
1200									51× 80	5.5						
1500									51× 80	6.1						
1800									51×100	7.4						
2200									51×100	7.9	64×80	7.6				
2700	51× 80	4.2							51×120	9.8	64×100	9.5				
3300	51×100	5.0							51×120	10.8	64×110	10.5				
3900	51×120	5.9	64×80	5.6							64×120	12.3	76×100	11.9		
4700	51×120	6.9	64×100	6.6							64×130	14.2	76×100	13.8		
5600			64×100	7.8							64×150	15.9	76×120	15.5	90×100	15.0
6800			64×120	8.7									76×150	18.0	90×100	17.5
8200			64×120	10.1	76×100	9.7							76×150	21.0	90×120	20.5
10000			64×150	11.1	76×110	11.7									90×150	25.3
12000			64×170	13.0	76×130	12.6									90×170	28.4
15000					76×150	14.9	90×120	14.4							90×190	34.6
18000					76×170	16.4	90×130	15.9							90×230	39.7
22000					76×200	17.9	90×160	17.4								
27000							90×180	19.3								
33000							90×220	21.2								

SA Series

◆ **Case size & Permissible rated ripple current (A rms) 120Hz / 85℃**

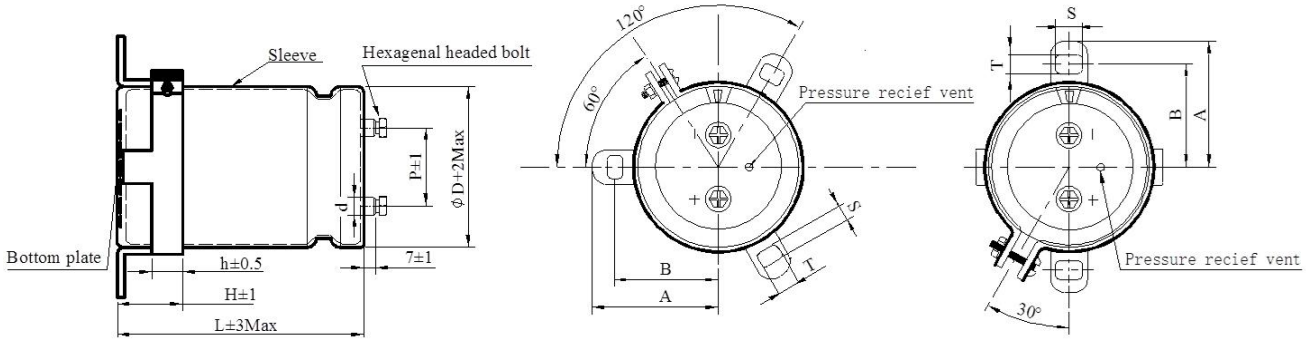
Vdc / ΦD / uF	400								450							
	Φ51		Φ64		Φ76		Φ90		Φ51		Φ64		Φ76		Φ90	
	ΦD× L	RC	ΦD× L	RC	ΦD× L	RC	ΦD× L	RC	ΦD× L	RC	ΦD× L	RC	ΦD× L	RC	ΦD× L	RC
1000	51× 80	5.0							51× 80	5.0						
1200	51× 80	5.5							51×100	5.5	64×80	5.2				
1500	51×100	6.5	64×80	6.2					51×120	6.9	64×100	6.6				
1800	51×100	7.1	64×80	6.8					51×120	8.1	64×100	7.7				
2200	51×120	8.8	64×100	8.5							64×100	9.0				
2700			64×100	9.9							64×120	10.3	76×100	9.9		
3300			64×120	11.3	76×100	10.9					64×130	11.6	76×100	11.2		
3900			64×130	12.9	76×100	12.5					64×150	13.4	76×120	13.0	90×100	12.5
4700			64×150	14.5	76×120	14.1	90×100	13.6					76×130	15.0	90×100	14.5
5600					76×130	16.3	90×100	15.8					76×150	17.5	90×120	17.0
6800					76×150	19.2	90×120	18.7					76×170	21.9	90×150	21.4
8200					76×170	24.0	90×150	23.5					76×200	24.0	90×170	23.5
10000					76×200	26.4	90×170	25.9					76×230	28.8	90×190	28.3
12000					76×230	31.5	90×190	31.0							90×230	33.0
15000							90×230	36.5								

◆ **RIPPLE CURRENT MULTIPLIERS**

Frequency Multipliers

Vdc	Frequency (Hz)				
	60	120	360	1K	10K
160 ~ 450	0.82	1.00	1.20	1.35	1.40

◆ **DIMENSIONS (Screw-Mount) [mm]**



◆ **Tmerminal pitch and Nominal dia.of bolt**

Terminal Code	ΦD	P±1	Nominal dia.of bolt	d±0.5
LS	51	22.4	M5	10
	64	28.0	M5	10
	76	31.5	M5	10
	90	31.5	M5	10
LA	64	28.0	M5	13
	76	31.5	M5	13
	90	31.5	M5	13
LB	76	31.5	M6	17
	90	31.5	M6	17

◆ **Dimensions of mounting bracket**

Leg shape	D	A±2	B±1	T±0.5	S±0.5	H±1	h±0.5
2 – Leg (Code:K1)	51	40.0	34.0	7.0	5.0	30	24
	64	46.5	40.5	7.0	5.0	30	24
	76	53.0	46.8	7.0	5.0	30	24
	90	60.3	54.0	7.0	5.0	35	20
3 – Leg (Code:K2)	51	36.5	31.8	7.0	5.0	30	24
	64	43.6	38.1	7.0	5.0	30	24
	76	50.2	44.5	7.0	5.0	30	24
	90	56.5	50.8	7.0	5.0	30	24

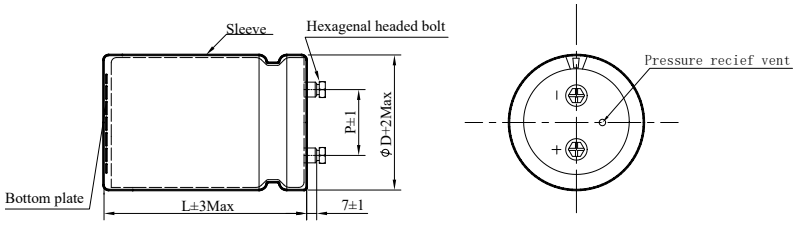
SL Series

- **High ripple current,suitable to use in industrial power supplies for inverter circuitry,etc**
- **Load life 20,000 hours at 85℃**

◆ SPECIFICATIONS

Item	Performance Characteristics	
Category Temperature Range	-40 ~ +85℃	-25 ~ +85℃
Working Voltage Range	200 ~ 250Vdc	350 ~ 400Vdc
Capacitance Range	1,500 ~ 39,000μF	1,000 ~ 15,000μF
Capacitance Tolerance	±20% (at 25℃ and 120Hz)	
Dissipation Factor (tanδ) (at 25℃, 120Hz)	Rated Voltage (V): 200 / 250 / 350 / 400 tanδ(Max): 0.25 / 0.25 / 0.20 / 0.20	
Leakage Current	I=0.01CV or 5000μA,whichever is smaller I : Leakage current (μA) C : Rated capacitance (μF) V : Rated voltage (V) Impress the rated voltage for 5 minutes	
Endurance	The following specifications shall be satisfied when the capacitors are restored to 25°C after subjected to DC voltage with the rated ripple current is applied for 20,000 hours at 85°C Capacitance change: ≦ ±20% of the initial value Dissipation factor(tanδ): ≦ 200% of the specified value Leakage current: ≦ specified value	
Shelf Life	The following requirements shall be satisfied when the capacitor are restored to 25℃ after the rated voltage applied for 500 hours at 85℃ without voltage applied. Capacitance change: ≦ ±20% of the initial value Dissipation factor(tanδ): ≦ 200% of the specified value Leakage current: ≦ specified value	
Others	Conforms to JIS-C-5101-4 (1998), characteristic W	

◆ DIMENSIONS (mm)



ΦD	51	64	76	90
P±1	22.4	28.0	31.5	31.5

◆ PART NUMBER SYSTEM(Example : 350V 15000μF)

S	L	2	V	1	5	3	M	L	S	9	0	N	0						

Special Request
Size code (90N0:90×230)
Terminal code
Capacitance tolerance code (M:±20%)
Capacitance code (15000μF)
Voltage code (350V)
Series code (SL)

SL Series

◆ **Case size & Permissible rated ripple current (A rms) 120Hz / 85°C**

Vdc / ΦD / uF	200								250							
	Φ51		Φ64		Φ76		Φ90		Φ51		Φ64		Φ76		Φ90	
	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC
1500									51×80	2.4						
1800									51×100	2.8						
2200	51×80	2.9							51×100	3.2	64×80	3.0				
2700	51×100	3.4							51×120	3.7	64×80	3.6				
3300	51×100	3.9	64×80	3.7					51×120	4.4	64×100	4.3				
3900	51×120	4.6	64×100	4.4							64×100	5.0				
4700			64×100	5.1							64×120	5.9	76×100	5.6		
5600			64×120	6.1							64×120	6.6	76×100	6.4		
6800			64×120	7.2	76×100	7.0					64×150	7.3	76×120	7.1		
8200			64×120	7.9	76×100	7.6					64×150	8.9	76×120	8.6		
10000			64×150	8.5	76×120	8.2							76×150	10.0	90×120	9.6
12000					76×120	9.3	90×100	8.9					76×190	11.5	90×150	11.1
15000					76×150	10.4	90×120	9.9							90×170	12.7
18000					76×170	13.2	90×120	12.7							90×190	14.1
22000					76×190	15.7	90×150	15.1							90×230	15.4
27000					76×190	15.7	90×150	15.1								
33000							90×190	15.9								
39000							90×230	18.0								

Vdc / ΦD / uF	350								400							
	Φ51		Φ64		Φ76		Φ90		Φ51		Φ64		Φ76		Φ90	
	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC
1000	51×80	3.9							51×80	3.9						
1200	51×80	4.2							51×100	4.6	64×80	4.2				
1500	51×100	5.2							51×120	5.6	64×80	6.0				
1800	51×100	5.7	64×80	5.4					51×120	6.4	64×100	5.2				
2200	51×120	7.1	64×100	6.7							64×100	6.9				
2700			64×100	7.7							64×120	8.2	76×100	7.7		
3300			64×120	9.1							64×120	9.5	76×100	9.0		
3900			64×120	10.4	76×100	9.8					64×150	11.1	76×120	10.5	90×100	9.9
4700			64×150	12.2	76×120	11.5							76×120	12.0	90×100	11.4
5600					76×120	13.1	90×100	12.4					76×150	14.0	90×120	13.3
6800					76×150	15.5	90×120	14.7					76×190	17.3	90×150	16.5
8200					76×170	19.0	90×150	18.1							90×170	18.1
10000					76×190	20.9	90×150	19.9							90×190	21.7
12000							90×190	23.8							90×230	25.8
15000							90×230	28.8								

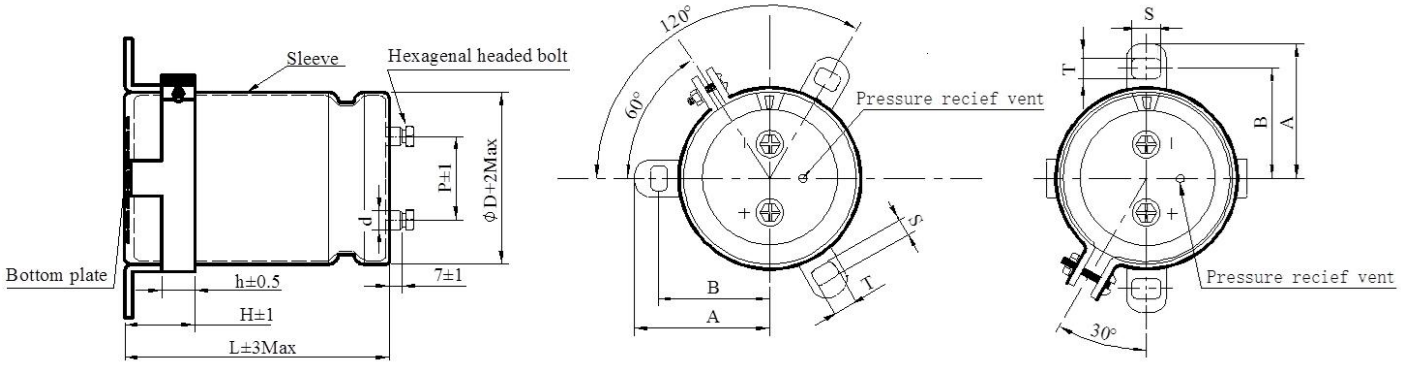
◆ **RIPPLE CURRENT MULTIPLIERS**

Frequency Multipliers

Vdc	Frequency (Hz)				
	60	120	360	1K	10K
200 ~ 400	0.70	1.00	1.10	1.30	1.40

SL Series

◆ **DIMENSIONS (Screw-Mount) [mm]:**



◆ **Tmerminal pitch and Nominal dia.of bolt**

Terminal Code	ΦD	P±1	Nominal dia.of bolt	d±0.5
LS	51	22.4	M5	10
	64	28.0	M5	10
	76	31.5	M5	10
	90	31.5	M5	10
LA	64	28.0	M5	13
	76	31.5	M5	13
	90	31.5	M5	13
LB	76	31.5	M6	17
	90	31.5	M6	17

◆ **Dimensions of mounting bracket**

Leg shape	D	A±2	B±1	T±0.5	S±0.5	H±1	h±0.5
2 – Leg (Code:K1)	51	40.0	34.0	7.0	5.0	30	24
	64	46.5	40.5	7.0	5.0	30	24
	76	53.0	46.8	7.0	5.0	30	24
	90	60.3	54.0	7.0	5.0	35	20
3 – Leg (Code:K2)	51	36.5	31.8	7.0	5.0	30	24
	64	43.6	38.1	7.0	5.0	30	24
	76	50.2	44.5	7.0	5.0	30	24
	90	56.5	50.8	7.0	5.0	30	24

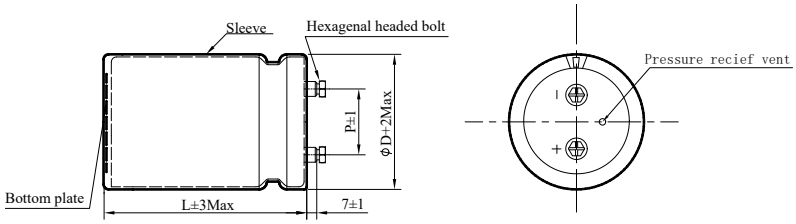
SK Series

- **High ripple, suitable to use in industrial power supplies for inverter circuitry, etc**
- **Load life 2,000 hours at 105℃**

◆ SPECIFICATIONS

Item	Performance Characteristics	
Category Temperature Range	-40 ~ +105℃	-25 ~ +105℃
Working Voltage Range	200 ~ 250Vdc	350 ~ 400Vdc
Capacitance Range	1,500 ~ 39,000μF	1,000 ~ 15,000μF
Capacitance Tolerance	±20% (at 25℃ and 120Hz)	
Dissipation Factor (tanδ) (at 25℃, 120Hz)	Rated Voltage (V): 200 / 250 / 350 / 400 tanδ(Max): 0.25 / 0.25 / 0.20 / 0.20	
Leakage Current	I=0.01CV or 5000μA,whichever is smaller I : Leakage current (μA) C : Rated capacitance (μF) V : Rated voltage (V) Impress the rated voltage for 5 minutes	
Endurance	The following specifications shall be satisfied when the capacitors are restored to 25°C after subjected to DC voltage with the rated ripple current is applied for 2,000 hours at 105°C. Capacitance change: ≦ ±20% of the initial value Dissipation factor(tanδ): ≦ 200% of the specified value Leakage current: ≦ specified value	
Shelf Life	The following requirements shall be satisfied when the capacitor are restored to 25℃ after the rated voltage applied for 500 hours at 105℃ without voltage applied. Capacitance change: ≦ ±20% of the initial value Dissipation factor(tanδ): ≦ 200% of the specified value Leakage current: ≦ specified value	
Others	Conforms to JIS-C-5101-4 (1998), characteristic W	

◆ DIMENSIONS (mm)



ΦD	51	64	76	90
P±1	22.4	28.0	31.5	31.5

◆ PART NUMBER SYSTEM(Example : 350V 10000μF)

S	K	2	V	1	0	3	M	L	S	7	6	J	0						

Special Request
Size code (76J0 : 76×190)
Terminal code
Capacitance tolerance code (M:±20%)
Capacitance code (10000μF)
Voltage code (350V)
Series code (SK)

SK Series

◆ **Case size & Permissible rated ripple current (A rms) 120Hz / 105℃**

Vdc / ΦD / uF	200								250							
	Φ51		Φ64		Φ76		Φ90		Φ51		Φ64		Φ76		Φ90	
	ΦD× L	RC	ΦD× L	RC	ΦD× L	RC	ΦD× L	RC	ΦD× L	RC	ΦD× L	RC	ΦD× L	RC	ΦD× L	RC
1500									51× 80	2.4						
1800									51×100	2.8						
2200	51× 80	2.9							51×100	3.2	64×80	3.0				
2700	51×100	3.4							51×120	3.7	64×80	3.6				
3300	51×100	3.9	64×80	3.7					51×120	4.4	64×100	4.3				
3900	51×120	4.6	64×100	4.4							64×100	5.0				
4700			64×100	5.1							64×120	5.9	76×100	5.6		
5600			64×120	6.1							64×120	6.6	76×100	6.4		
6800			64×120	7.2	76×100	7.0					64×150	7.3	76×120	7.1		
8200			64×120	7.9	76×100	7.6					64×150	8.9	76×120	8.6		
10000			64×150	8.5	76×120	8.2							76×150	10.0	90×120	9.6
12000					76×120	9.3	90×100	8.9					76×190	11.5	90×150	11.1
15000					76×150	10.4	90×120	9.9							90×170	12.7
18000					76×170	13.2	90×120	12.7							90×190	14.1
22000					76×190	15.7	90×150	15.1							90×230	15.4
27000					76×190	15.7	90×150	15.1								
33000							90×190	15.9								
39000							90×230	18.0								

Vdc / ΦD / uF	350								400							
	Φ51		Φ64		Φ76		Φ90		Φ51		Φ64		Φ76		Φ90	
	ΦD× L	RC	ΦD× L	RC	ΦD× L	RC	ΦD× L	RC	ΦD× L	RC	ΦD× L	RC	ΦD× L	RC	ΦD× L	RC
1000	51× 80	3.9							51× 80	3.9						
1200	51× 80	4.2							51×100	4.6	64× 80	4.2				
1500	51×100	5.2							51×120	5.6	64× 80	6.0				
1800	51×100	5.7	64×80	5.4					51×120	6.4	64×100	6.5				
2200	51×120	7.1	64×100	6.7							64×100	6.9				
2700			64×100	7.7							64×120	8.2	76×100	7.7		
3300			64×120	9.1							64×120	9.5	76×100	9.0		
3900			64×120	10.4	76×100	9.8					64×150	11.1	76×120	10.5	90×100	9.9
4700			64×150	12.2	76×120	11.5							76×120	12.0	90×100	11.4
5600					76×120	13.1	90×100	12.4					76×150	14.0	90×120	13.3
6800					76×150	15.5	90×120	14.7					76×190	17.3	90×150	16.5
8200					76×170	19.0	90×150	18.1							90×170	18.1
10000					76×190	20.9	90×150	19.9							90×190	21.7
12000							90×190	23.8							90×230	25.8
15000							90×230	28.8								

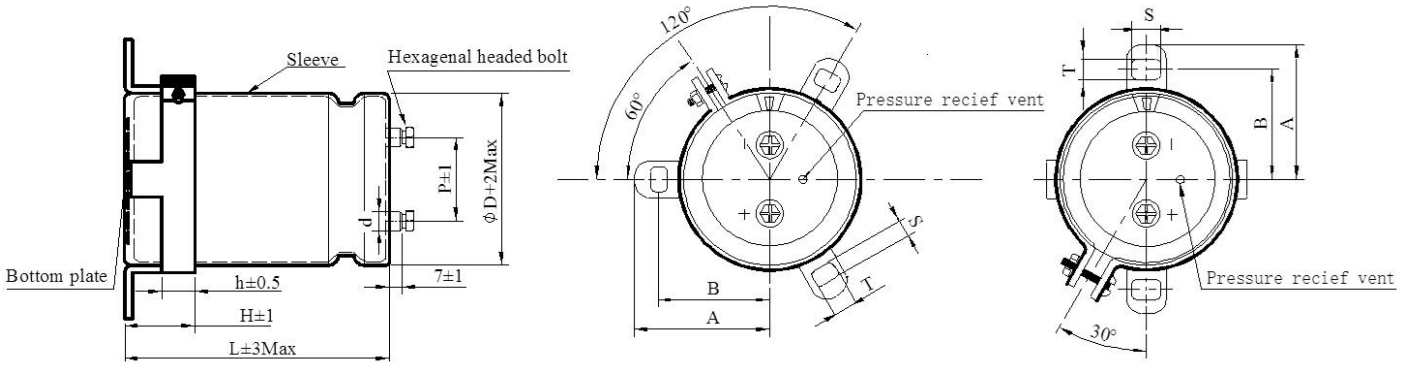
◆ **RIPPLE CURRENT MULTIPLIERS**

Frequency Multipliers

Vdc	Frequency (Hz)				
	60	120	360	1K	10K
200 ~ 400	0.70	1.00	1.10	1.30	1.40

SK Series

◆ **DIMENSIONS (Screw-Mount) [mm]**



◆ **Tmerminal pitch and Nominal dia.of bolt**

Terminal Code	ΦD	P±1	Nominal dia.of bolt	d±0.5
LS	51	22.4	M5	10
	64	28.0	M5	10
	76	31.5	M5	10
	90	31.5	M5	10
LA	64	28.0	M5	13
	76	31.5	M5	13
	90	31.5	M5	13
LB	76	31.5	M6	17
	90	31.5	M6	17

◆ **Dimensions of mounting bracket**

Leg shape	D	A±2	B±1	T±0.5	S±0.5	H±1	h±0.5
2 – Leg (Code:K1)	51	40.0	34.0	7.0	5.0	30	24
	64	46.5	40.5	7.0	5.0	30	24
	76	53.0	46.8	7.0	5.0	30	24
	90	60.3	54.0	7.0	5.0	35	20
3 – Leg (Code:K2)	51	36.5	31.8	7.0	5.0	30	24
	64	43.6	38.1	7.0	5.0	30	24
	76	50.2	44.5	7.0	5.0	30	24
	90	56.5	50.8	7.0	5.0	30	24

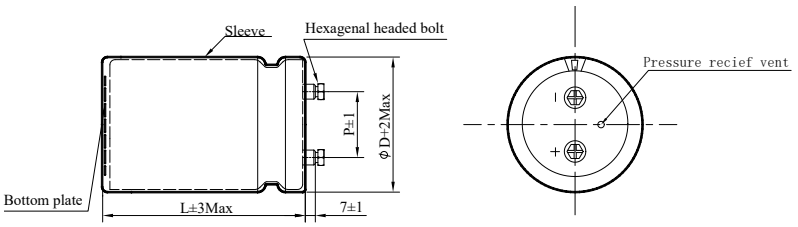
SX Series

- **High ripple, suitable to use in industrial power supplies for inverter circuitry, etc**
- **Load life 5,000 hours at 105℃**

◆ SPECIFICATIONS

Item	Performance Characteristics	
Category Temperature Range	-40 ~ +105℃	-25 ~ +105℃
Working Voltage Range	200 ~ 250Vdc	350 ~ 400Vdc
Capacitance Range	1,500 ~ 39,000μF	1,000 ~ 15,000μF
Capacitance Tolerance	±20% (at 25℃ and 120Hz)	
Dissipation Factor (tanδ) (at 25℃, 120Hz)	Rated Voltage (V): 200 / 250 / 350 / 400 tanδ(Max): 0.25 / 0.25 / 0.20 / 0.20	
Leakage Current	I=0.01CV or 5000μA,whichever is smaller I : Leakage current (μA) C : Rated capacitance (μF) V : Rated voltage (V) Impress the rated voltage for 5 minutes	
Endurance	The following specifications shall be satisfied when the capacitors are restored to 25°C after subjected to DC voltage with the rated ripple current is applied for 5,000 hours at 105°C Capacitance change: ≦ ±20% of the initial value Dissipation factor(tanδ): ≦ 200% of the specified value Leakage current: ≦ specified value	
Shelf Life	The following requirements shall be satisfied when the capacitor are restored to 25℃ after the rated voltage applied for 500 hours at 105℃ without voltage applied. Capacitance change: ≦ ±20% of the initial value Dissipation factor(tanδ): ≦ 200% of the specified value Leakage current: ≦specified value	
Others	Conforms to JIS-C-5101-4 (1998), characteristic W	

◆ DIMENSIONS (mm)



ΦD	51	64	76	90
P±1	22.4	28.0	31.5	31.5

◆ PART NUMBER SYSTEM(Example : 250V 3300μF)

S	X	2	E	3	3	2	M	L	S	5	1	C	0						

Special Request
Size code (51C0 : 51×120)
Terminal code
Capacitance tolerance code (M:±20%)
Capacitance code (3300μF)
Voltage code (250V)
Series code (SX)

SX Series

◆ **Case size & Permissible rated ripple current (A rms) 120Hz /105℃**

Vdc / ΦD / uF	200								250							
	Φ51		Φ64		Φ76		Φ90		Φ51		Φ64		Φ76		Φ90	
	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC
1500									51×80	2.4						
1800									51×100	2.8						
2200	51×80	2.9							51×100	3.2	64×80	3.0				
2700	51×100	3.4							51×120	3.7	64×80	3.6				
3300	51×100	3.9	64×80	3.7					51×120	4.4	64×100	4.3				
3900	51×120	4.6	64×100	4.4							64×100	5.0				
4700			64×100	5.1							64×120	5.9	76×100	5.6		
5600			64×120	6.1							64×120	6.6	76×100	6.4		
6800			64×120	7.2	76×100	7.0					64×150	7.3	76×120	7.1		
8200			64×120	7.9	76×100	7.6					64×150	8.9	76×120	8.6		
10000			64×150	8.5	76×120	8.2							76×150	10.0	90×120	9.6
12000					76×120	9.3	90×100	8.9					76×190	11.5	90×150	11.1
15000					76×150	10.4	90×120	9.9							90×170	12.7
18000					76×170	13.2	90×120	12.7							90×190	14.1
22000					76×190	15.7	90×150	15.1							90×230	15.4
27000					76×190	15.7	90×150	15.1								
33000							90×190	15.9								
39000							90×230	18.0								

Vdc / ΦD / uF	350								400							
	Φ51		Φ64		Φ76		Φ90		Φ51		Φ64		Φ76		Φ90	
	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC	ΦD×L	RC
1000	51×80	3.9							51×80	3.9						
1200	51×80	4.2							51×100	4.6	64×80	4.2				
1500	51×100	5.2							51×120	5.6	64×80	6.0				
1800	51×100	5.7	64×80	5.4					51×120	6.4	64×100	5.2				
2200	51×120	7.1	64×100	6.7							64×100	6.9				
2700			64×100	7.7							64×120	8.2	76×100	7.7		
3300			64×120	9.1							64×120	9.5	76×100	9.0		
3900			64×120	10.4	76×100	9.8					64×150	11.1	76×120	10.5	90×100	9.9
4700			64×150	12.2	76×120	11.5							76×120	12.0	90×100	11.4
5600					76×120	13.1	90×100	12.4					76×150	14.0	90×120	13.3
6800					76×150	15.5	90×120	14.7					76×190	17.3	90×150	16.5
8200					76×170	19.0	90×150	18.1							90×170	18.1
10000					76×190	20.9	90×150	19.9							90×190	21.7
12000							90×190	23.8							90×230	25.8
15000							90×230	28.8								

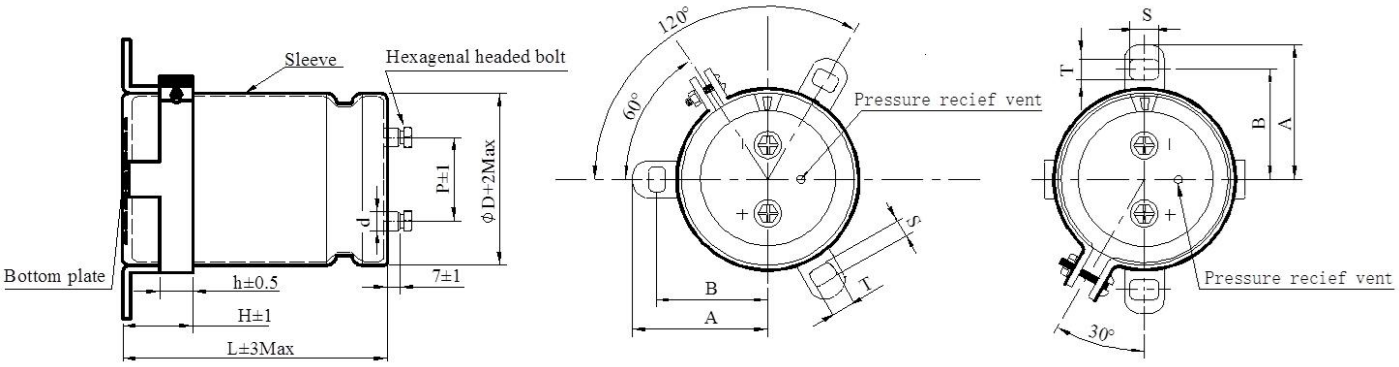
◆ **RIPPLE CURRENT MULTIPLIERS**

Frequency Multipliers

Vdc	Frequency (Hz)				
	60	120	360	1K	10K
200 ~ 400	0.70	1.00	1.10	1.30	1.40

SX Series

◆ **DIMENSIONS (Screw-Mount) [mm]**



◆ **Tmerminal pitch and Nominal dia.of bolt**

Terminal Code	ΦD	P±1	Nominal dia.of bolt	d±0.5
LS	51	22.4	M5	10
	64	28.0	M5	10
	76	31.5	M5	10
	90	31.5	M5	10
LA	64	28.0	M5	13
	76	31.5	M5	13
	90	31.5	M5	13
LB	76	31.5	M6	17
	90	31.5	M6	17

◆ **Dimensions of mounting bracket**

Leg shape	D	A±2	B±1	T±0.5	S±0.5	H±1	h±0.5
2 – Leg (Code:K1)	51	40.0	34.0	7.0	5.0	30	24
	64	46.5	40.5	7.0	5.0	30	24
	76	53.0	46.8	7.0	5.0	30	24
	90	60.3	54.0	7.0	5.0	35	20
3 – Leg (Code:K2)	51	36.5	31.8	7.0	5.0	30	24
	64	43.6	38.1	7.0	5.0	30	24
	76	50.2	44.5	7.0	5.0	30	24
	90	56.5	50.8	7.0	5.0	30	24