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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 used. 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 can 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 than 2 aluminum electrolytic capacitors are used in series. Please make sure that applied voltage will be lower than rated voltage and the voltage will be 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 1 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: $260 \pm 5^{\circ}\text{C}$, 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°C , 90 seconds max . Max. temperature at capacitor top during reflow: 230°C
The duration for over 200°C 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 than 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:

- ① Appearance: Remarkable abnormality such as vent operation . leaking electrolyte etc.
- ② Electrical 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°C.

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 it away using soap and water.

1-1-6. Storage

- (1) It is recommended to keep capacitors between the ambient temperatures of 5°C to 35°C and a relative humidity of 75% or below.
- (2) Confirm that the environment does not have any of the following conditions:
 - ① 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 is 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. NEW PRODUCT

Type	Series	Characteristics	Page
RB	RF	NEW Low impedance, Downsize, Long life	70
	TD	NEW High-temperature 130°C, High reliability.	78
	TX	NEW High-temperature 135°C, High reliability.	81
	KY	NEW Downsize, High ripple current, Long life	97
	MW	NEW Low ESR, High ripple current	99
	MV	NEW Low ESR, High ripple current, long life	101
	MJ	NEW Low ESR, Downsize, High ripple current, long life	103
	MZ	NEW Low ESR, High ripple current, Ultra miniature size	111
	MA	NEW Low ESR, long life, Ultra miniature size	113
	MQ	NEW Low ESR, High ripple current, long life, Ultra miniature size	115

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	SV	7~9mm height, Long life	ER	27
	BP	Bi-polar, Horizontal Deflection	—	—
	PS	General, Downsize, High temperature, 105°C 1,000	PF	44
	ES	Low impedance, High ripple current	EL	47
	EA	Extremely Low Impedance, Downsize		
	DW	High ripple current, Downsize	MW	99
	DV	High ripple current, Long life	MV	101
	DJ	High ripple current, Long life	MJ	103
	DZ	Downsize, High ripple current	MZ	111
	DA	Long life, High ripple current, Downsize	MA	113
	DQ	Long life, High ripple current, Downsize	MQ	115
	LM	Energy-saving lamps, General, Downsize	LF	89
	LS	Energy-saving lamps, General, Downsize, High ripple current		
Snap-in	GH	High ripple current, 85°C 2,000	GM	130
	GS	General, Long life, 85°C 3,000	GSF	137
	GV	High ripple current, Load life, 85°C 5,000	GVF	139
	PH	High ripple current, 105°C 1,000 ~ 2,000	PL	145
	PD	Smaller size with High ripple current, 105°C 3,000	PK	149
	GA	Audio equipment, Snap-in Terminal Type, 85°C 1,000	—	—
	GL	Audio equipment, Lug Terminal Type, 85°C 1,000	—	—

ALUMINUM ELECTROLYTIC CAPACITORS



Capacitor Series Table

◆ RADIAL LEAD TYPE

Series	Pags	Features	Voltage Range (Vdc)	Capacitance Range (μF)	Sleeve Color	Temperature Endurance (Hours)	
Mini Size	SS	15	7mm height	6.3 to 63	0.1 to 330	Dark Blue	85°C 1,000
	SS-H	15	7mm height, High temperature	6.3 to 63	0.1 to 330	Black	105°C 1,000
	SB	18	5mm height	4 to 50	0.1 to 470	Dark Blue	85°C 1,000
	SB-H	18	5mm height, High temperature	4 to 50	0.1 to 470	Black	105°C 1,000
	SF	21	7mm height	6.3 to 63	0.1 to 220	Black	105°C 2,000
	LK	23	Downsize, High ripple current ,12 mm height	160 to 200	22 to 39	Black	105°C 4,000
	EM	25	Low Impedance, High ripple current, Miniature Size	6.3 to 35	33 to 470	Brown	105°C 1,000 to 2,000
	ER	27	Low Impedance, miniature size with 7 to 9 mm height	6.3 to 35	33 to 470	Brown	105°C 3,000
	EH	29	Low Impedance ,High ripple current, 9 mm height	10 to 35	150 to 820	Brown	105°C 3,000 to 4,000
	EP	31	Miniaturized, Low Impedance, 12 mm height	10 to 100	68 to 1,800	Brown	105°C 4,000
EC	33	Miniaturized, Low ESR and low impedance.	10 to 100	68 to 1,800	Brown	105°C 5,000	
Standard	ND	35	Non-Polar Standard	6.3 to 250	0.47 to 2,200	Dark Blue	85°C 2,000
	ND-H	35	Non-Polar High temperature	6.3 to 250	0.47 to 2,200	Black	105°C 1,000
	LB	38	Low Leakage Current	6.3 to 100	0.47 to 4,700	Dark Blue	85°C 2,000
	LB-H	38	Low Leakage Current, High temperature	6.3 to 100	0.47 to 4,700	Black	105°C 1,000
	SM	41	General, Downsize	6.3 to 450	0.1 to 22,000	Dark Blue	85°C 2,000
	PF	44	Standard	6.3 to 450	0.47 to 22,000	Black	105°C 2,000
High Frequency, Low Impedance	EL	47	Extremely Low Impedance, Downsize	6.3 to 50	56 to 6,800	Brown	105°C 2,000
	EB	49	Extremely Low Impedance, High ripple current	6.3 to 16	82 to 3,300	Brown	105°C 1,000 to 2,000
	ED	51	Low Impedance, High ripple current	6.3 to 100	10 to 10,000	Brown	105°C 2,000 to 5,000
	EK	54	Miniaturized, Low Impedance, High ripple current	6.3 to 50	0.1 to 6,800	Brown	105°C 2,000 to 5,000
	EV	57	Low Impedance, High ripple current	6.3 to 35	10 to 8,200	Brown	105°C 3,000 to 6,000
	EJ	60	Low Impedance, Long life	6.3 to 63	10 to 10,000	Brown	105°C 3,000 to 5,000
	EG	63	Low Impedance, High ripple current, Long Life	6.3 to 63	10 to 10,000	Brown	105°C 3,000 to 6,000
	EY	66	Miniaturized, Low impedance, High ripple current	6.3 to 100	6.8 to 18,000	Brown	105°C 4,000 to 10,000
RF	70	Low impedance, Downsize,, Long life	6.3 to 100	6.8 to 18,000	Brown	105°C 6,000 to 12,000	
High reliability	PY	74	High-temperature 125°C, high reliability.	10 to 450	4.7 to 1,000	Black	125°C 2,000
	TL	76	High-temperature 125°C, long life	10 to 50	22 to 1,000	Black	125°C 3,000 to 5,000
	NEW TD	78	High-temperature 130°C, high reliability.	10 to 450	4.7 to 4700	Black	130°C 1,000 to 4,000
	NEW TX	81	High-temperature 135°C, high reliability.	10 to 50	22 to 1,000	Black	135°C 1,000 to 2,000

ALUMINUM ELECTROLYTIC CAPACITORS



Series	Pages	Features	Voltage Range (Vdc)	Capacitance Range (µF)	Sleeve Color	Temperature Endurance (Hours)	
Power supply with the product	PW	83	High ripple current, Downsize	200 to 500	10 to 470	Black	105°C 2,000
	PC	85	Downsize, Ideal for low profile power supply applications	200 to 450	56 to 560	Black	105°C 2,000
	PV	87	Downsize with high ripple current	200 to 450	6.8 to 470	Black	105°C 2,000 to 5,000
	LF	89	Energy-saving lamps, Standard Downsize	200 to 450	1 to 68	Black	105°C 2,000
	LL	91	Energy-saving lamps, High ripple current , Long life	200 to 450	1 to 68	Black	105°C 2,000 to 5,000
	PJ	93	long life 8,000 to 10,000 hours	160 to 500	6.8 to 330	Black	105°C 8,000 to 10,000
	KJ	95	Downsize, High ripple current , Long life	160 to 450	6.8 to 560	Black	105°C 10,000 to 12,000
	KY	97	Downsize, High ripple current, Long life	160 to 450	6.8 to 470	Black	105°C 12,000 to 15,000
	MW	99	Low ESR, High ripple current	200 to 450	68 to 470	Black	105°C 2,000
	MV	101	Low ESR, High ripple current , long life	200 to 450	6.8 to 470	Black	105°C 5,000
	NEW MJ	103	Low ESR, Downsize , High ripple current , long life	200 to 450	6.8 to 330	Black	105°C 8,000 to 10,000
	NEW PZ	105	Ideal for low profile power supply applications	200 to 450	18 to 270	Black	105°C 2,000
	NEW PA	107	105°C Long life 5,000 hours, Ultra miniature size	400 to 450	33 to 120	Black	105°C 5,000
	NEW PQ	109	105°C Long life 10,000 hours, miniature size	200 to 450	33 to 220	Black	105°C 10,000
	Counter-plan product	MZ	111	Low ESR, High ripple current , Ultra miniature size	200 to 450	18 to 270	Black
MA		113	Low ESR , Long life, Ultra miniature size	400 to 450	33 to 120	Black	105°C 5,000
MQ		115	Low ESR, High ripple current, Long life, Ultra miniature size	200 to 450	33 to 220	Black	105°C 10,000
NEW SW		117	High ripple current, Miniaturized	160 to 450	22 to 680	Black	105°C 2,000
NEW SQ		119	High ripple current, Long life 5,000 hours	160 to 450	22 to 680	Black	105°C 5,000
Capacitor For Over Voltage Application	SP	121	High ripple current, Long life 10,000 hours	160 to 450	22 to 680	Black	105°C 10,000
	VW	123	High ripple current, Miniaturized	160 to 450	22 to 680	Black	105°C 2,000
	VQ	125	High ripple current, Long life 5,000 hours	160 to 450	22 to 680	Black	105°C 5,000
VJ	127	High ripple current, Long life 10,000 hours	160 to 450	22 to 680	Black	105°C 10,000	

ALUMINUM ELECTROLYTIC CAPACITORS



◆ SNAP-IN TYPE

Series	Pags	Features	Voltage Range (Vdc)	Capacitance Range (μF)	Sleeve Color	Temperature Endurance (Hours)	
General Purpose	GM	130	General , Standard	16 to 500	56 to 68,000	Dark Blue	85°C 2,000
	GM	134	Downsize	200 to 450	82 to 1,000	Dark Blue	85°C 2,000
	GR	135	General , Downsize	350 to 450	82 to 680	Black	85°C 2,000
	GSF	137	General , Long life	200 to 450	68 to 2,200	Dark Blue	85°C 3,000
	GVF	139	High ripple current , Load life	200 to 500	56 to 2,200	Dark Blue	85°C 5,000
	PM	142	General , High temperature	16 to 450	56 to 68,000	Black	105°C 1,000
	PL	145	General, High temperature, Long life	16 to 500	39 to 47,000	Black	105°C 2,000
	PK	149	High temperature , Long life	200 to 450	56 to 1,800	Black	105°C 3,000
	PT	151	General, High temperature , Long life	200 to 400	68 to 1,000	Black	105°C 4,000
	PG	153	Smaller size with higher ripple current	200 to 500	47 to 1,800	Black	105°C 5,000
Server product	PO	156	Snap-in terminal, more downsized	400 to 450	68 to 680	Black	105°C 2,000
	PI	158	Snap-in terminal, downsized	400 to 450	56 to 680	Black	105°C 3,000
High reliability	TG	160	The double waist products, Long life	10 to 100	680 to 47,000	Black	125°C 5,000
Horizontal	GD	163	General , Standard , Horizontal mounting	160 to 450	82 to 1,200	Dark Blue	85°C 2,000
	PX	165	High temperature, Horizontal mounting	160 to 450	68 to 1,500	Black	105°C 2,000



◆ SPECIAL TYPE

Series	Pags	Features	Terminal Type	Voltage Range (Vdc)	Capacitance Range (μF)	Sleeve Color	Temperature Endurance (Hours)	
Frequency conversion	AQ	169	For Power Supply and Air-Conditioner	HU	400 to 450	330 to 820	Dark Blue	85°C 3,000
	AN	171	For Power Supply and Air-Conditioner	AC	400 to 450	800 to 3,300	Black	85°C 3,000
Screw General Purpose	SC	173	Standard	Screw	200 to 600	820 to 33,000	Black	85°C 2,000
	SA	176	Long life	Screw	160 to 450	1,000 to 68,000	Black	85°C 5,000
	SL	179	High ripple current , Long life	Screw	200 to 400	1,000 to 39,000	Black	85°C 20,000
	SK	182	High temperature , Long life	Screw	200 to 400	1,000 to 39,000	Black	105°C 2,000
	SX	185	High temperature , Long life	Screw	200 to 400	1,000 to 39,000	Black	105°C 5,000

ALUMINUM ELECTROLYTIC CAPACITORS



◆ 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	----																									
		18	7.5	----																									
		20	10	----																									
		22	10	----																									
Kink & Cut	B	4	5.0	1.1																									Fig 2
		5	5.0	1.1																									
		6.3	5.0	1.1																									
		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
		8	2.5	----																									
Cut	F	4	5.0	----																									Fig 4
		5	5.0	----																									
		6.3	5.0	----																									
		8	5.0	----																									

ALUMINUM ELECTROLYTIC CAPACITORS



◆ LEAD FORMING TYPE

Type	Part Number	Dimensions (Unit: mm)																											
		ΦD	F	t	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	----																										

ALUMINUM ELECTROLYTIC CAPACITORS



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)
<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>

(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 ⊖15mm min
Tolerance	±0.5								±0.3		±1.0	+0.3/-0.2	

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

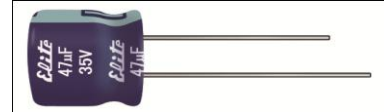
Code	R	F	L	D
Description	High Rated ripple current	Endurance	Low Leakage Current	Low Dissipation Factor
Code	H	E	P	---
Description	High Temperature	Low Impedance & ESR	PET Sleeve	---

ALUMINUM ELECTROLYTIC CAPACITORS



ESS & ESS-H Series

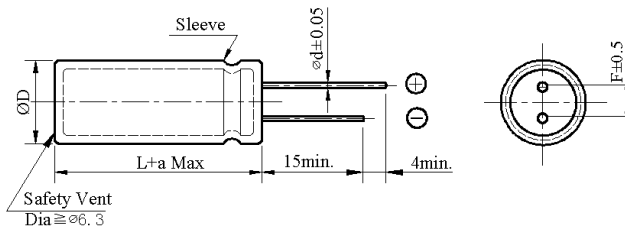
- Standard miniature series with 7mm height at 85 °C & 105°C.



SPECIFICATIONS

Item	Performance Characteristics	
Series	SS	SS-H
Category Temperature Range	-40 ~ +85°C	-40 ~ +105°C
Working Voltage Range	6.3 ~ 63 Vdc	
Capacitance Range	0.1 ~ 330 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 63
	tanδ(Max)	0.24 0.20 0.16 0.14 0.12 0.10 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)	6.3 10 16 25 35 50 63
	Z(-40°C)/Z(+20°C)	10 8 6 4 4 3 3
(at 120Hz)		
Endurance	The following requirements shall be satisfied when the capacitor are restored to 25°C after the rated voltage applied for 1,000 hours at 85°C(SS), or 1,000 hours at 105°C(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°C after the rated voltage applied for 500 hours at 85°C(SS), or 500 hours at 105°C(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.	

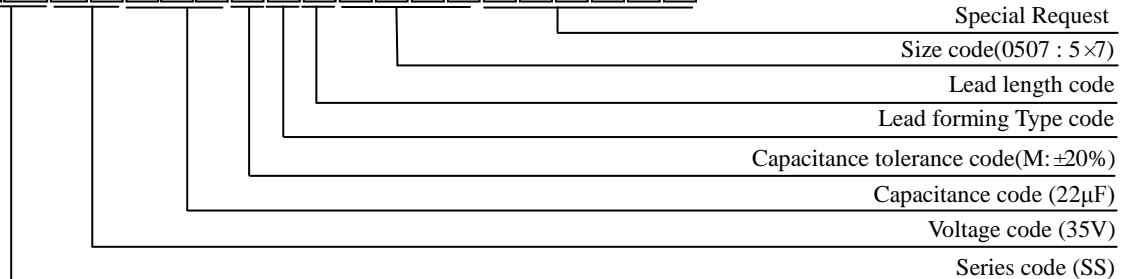
DIMENSIONS (mm)



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 NUMBERING SYSTEM(Example : 35V 22µF)

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



ALUMINUM ELECTROLYTIC CAPACITORS



SS Series

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

ALUMINUM ELECTROLYTIC CAPACITORS



SS-H Series

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

uF	Vdc	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

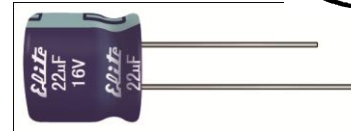
Vdc	Frequency (Hz)				
	60	120	1K	10K	100K
6.3 ~ 25	0.75	1.00	1.10	1.13	1.20
35 ~ 63	0.80	1.00	1.15	1.20	1.25

ALUMINUM ELECTROLYTIC CAPACITORS



ESB & ESB-H Series

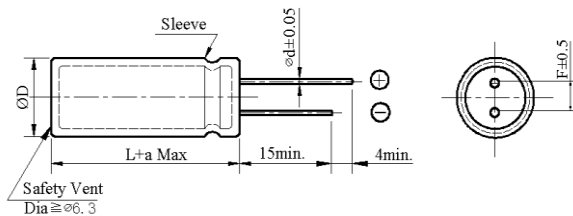
- Standard miniature series with 5mm height at 85 °C & 105°C.



SPECIFICATIONS

Item	Performance Characteristics							
Series	ESB				ESB-H			
Category Temperature Range	-40 ~ +85°C				-40 ~ +105°C			
Working Voltage Range	4 ~ 50 Vdc							
Capacitance Range	0.1 ~ 470 μF							
Capacitance Tolerance	±20% (at 25°C and 120Hz)							
Dissipation Factor (tanδ) (at 25°C, 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°C)/Z(+20°C)	15	8	8	6	4	4	3
Endurance	The following requirements shall be satisfied when the capacitor are restored to 25°C after the rated voltage applied for 1,000 hours at 85°C(SB), or 1,000 hours at 105°C(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°C after the rated voltage applied for 500 hours at 85°C(SB), or 500 hours at 105°C(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.							

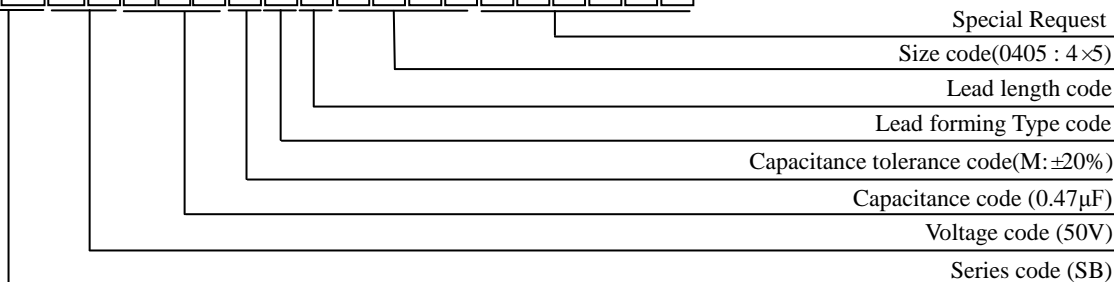
DIMENSIONS (mm)



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 NUMBERING SYSTEM(Example : 50V 0.47μF)

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





SB Series

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

uF	Vdc	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						

uF	Vdc	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

ALUMINUM ELECTROLYTIC CAPACITORS



SB-H Series

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

uF	Vdc	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						

uF	Vdc	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

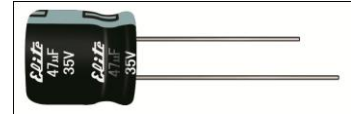
Vdc	Frequency (Hz)				
	60	120	1K	10K	100K
4 ~ 25	0.75	1.00	1.10	1.13	1.20
35 ~ 50	0.80	1.00	1.15	1.20	1.25

ALUMINUM ELECTROLYTIC CAPACITORS



SF Series

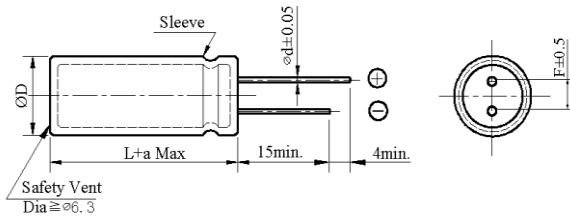
- Load life: 105°C 2,000 hours, 7mm height.
- Design for space-saving and high density insertion.
- Applications: VTR, car radio, car stereos, charger, et



SPECIFICATIONS

Item	Performance Characteristics							
Category Temperature Range	-40 ~ +105°C							
Working Voltage Range	6.3 ~ 63Vdc							
Capacitance Range	0.1 ~ 220 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	63
	tanδ(Max)	0.24	0.20	0.16	0.14	0.12	0.10	0.09
Leakage Current	$I \leq 0.01CV$ or $3 \mu A$ 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°C)/Z(+20°C)	10	6	5	4	4	3	3
Endurance	The following requirements shall be satisfied when the capacitor are restored to 25°C after the rated voltage applied for 2,000 hours at 105°C.							
Shelf Life	Capacitance change	≒ ±20% of the initial value						
	Dissipation factor(tanδ)	≒ 200% of the specified value						
	Leakage current	≒ specified value						
Others	The following requirements shall be satisfied when the capacitor are restored to 25°C after the rated voltage applied for 1,000 hours at 105°C without voltage applied.							
	Capacitance change	≒ ±20% of the initial value						
	Leakage current	≒ 200% of the specified value						
Others	Conforms to JIS-C-5101-4 (1998), characteristic W.							

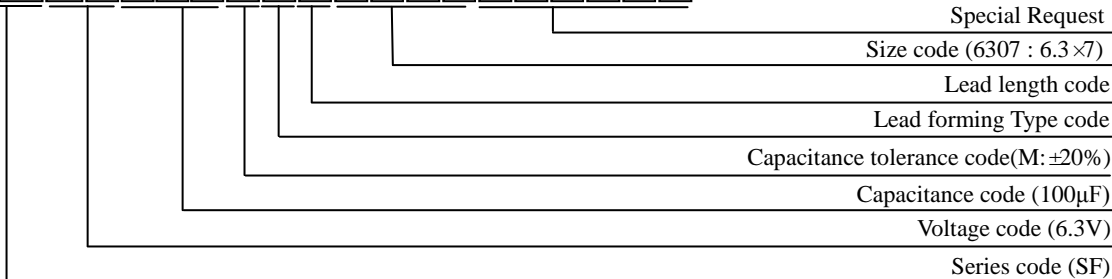
DIMENSIONS (mm)



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 NUMBERING SYSTEM (Example : 6.3V 100 μF)

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



ALUMINUM ELECTROLYTIC CAPACITORS



SF Series

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

uF	Vdc	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					

uF	Vdc	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

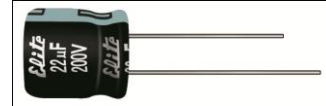
Vdc	Cap.(uF)	Frequency (Hz)					
		50/60	120	400	1K	10K	50K-100K
6.3 ~ 63	CAP ≤ 10	0.80	1.00	1.30	1.45	1.65	1.70
	100 < CAP ≤ 220	0.80	1.00	1.23	1.36	1.36	1.53

ALUMINUM ELECTROLYTIC CAPACITORS



LK Series

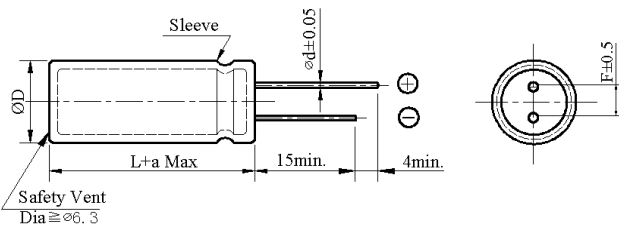
- Downsize and high ripple current.
- Load life: 4,000 hours at 105°C.



◆ SPECIFICATIONS

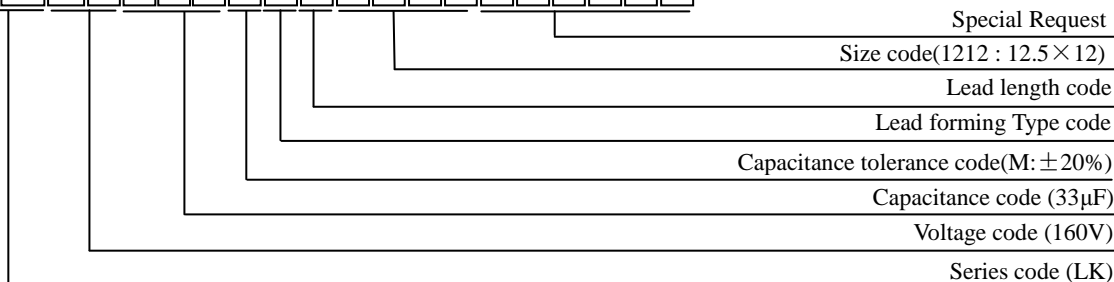
Item	Performance Characteristics						
Category Temperature Range	-25 ~ +105°C						
Working Voltage Range	160 ~ 200Vdc						
Capacitance Range	22 ~ 39 μF						
Capacitance Tolerance	±20% (at 25°C and 120Hz)						
Dissipation Factor (tanδ) (at 25°C, 120Hz)	<table border="1"> <tr> <td>Rated Voltage (V)</td> <td>160</td> <td>200</td> </tr> <tr> <td>tanδ(Max)</td> <td>0.15</td> <td>0.15</td> </tr> </table>	Rated Voltage (V)	160	200	tanδ(Max)	0.15	0.15
	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	$I=0.03CV+10\mu A$ 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)	<table border="1"> <tr> <td>Rated voltage (V)</td> <td>160</td> <td>200</td> </tr> <tr> <td>Z(-25°C)/Z(+20°C)</td> <td>3</td> <td>3</td> </tr> </table>	Rated voltage (V)	160	200	Z(-25°C)/Z(+20°C)	3	3
	Rated voltage (V)	160	200				
Z(-25°C)/Z(+20°C)	3	3					
(at 120Hz)							
Endurance	The following requirements shall be satisfied when the capacitor are restored to 25°C after the rated voltage applied for 4,000 hours at 105°C.						
	<table border="1"> <tr> <td>Capacitance change</td> <td>≒ ±20% of the initial value</td> </tr> <tr> <td>Dissipation factor(tanδ)</td> <td>≒ 200% of the specified value</td> </tr> <tr> <td>Leakage current</td> <td>≒ specified value</td> </tr> </table>	Capacitance change	≒ ±20% of the initial value	Dissipation factor(tanδ)	≒ 200% of the specified value	Leakage current	≒ specified value
	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°C after exposing them for 1,000 hours at 105°C without voltage applied.						
	<table border="1"> <tr> <td>Capacitance change</td> <td>≒ ±20% of the initial value</td> </tr> <tr> <td>Dissipation factor(tanδ)</td> <td>≒ 200% of the specified value</td> </tr> <tr> <td>Leakage current</td> <td>≒ 200% of the specified value</td> </tr> </table>	Capacitance change	≒ ±20% of the initial value	Dissipation factor(tanδ)	≒ 200% of the specified value	Leakage current	≒ 200% of the specified value
	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 NUMBERING SYSTEM(Example : 160V 33μF)



LK Series

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

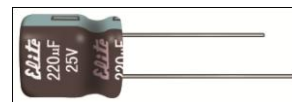
Vdc	Cap.(uF)	Frequency (Hz)				
		50/60	120	1K	10K	100K
160 ~ 200	22 ~ 39	0.80	1.00	1.40	1.40	1.40

ALUMINUM ELECTROLYTIC CAPACITORS



EM Series

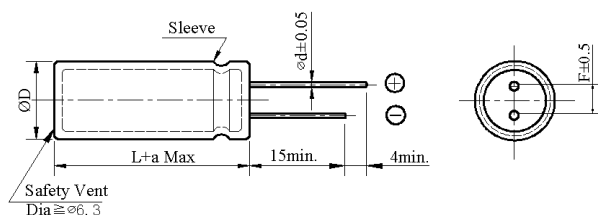
- Low impedance, high ripple current and miniature size with 7 to 9 mm height



SPECIFICATIONS

Item	Performance Characteristics														
Category Temperature Range	-40 ~ +105°C														
Working Voltage Range	6.3 ~ 35Vdc														
Capacitance Range	33 ~ 470 μF														
Capacitance Tolerance	±20% (at 25°C and 120Hz)														
Dissipation Factor (tanδ) (at 25°C, 120Hz)	<table border="1"> <tr> <td>Rated Voltage (V)</td> <td>6.3</td> <td>10</td> <td>16</td> <td>25</td> <td>30</td> <td>35</td> </tr> <tr> <td>tanδ(Max)</td> <td>0.24</td> <td>0.20</td> <td>0.16</td> <td>0.14</td> <td>0.14</td> <td>0.14</td> </tr> </table>	Rated Voltage (V)	6.3	10	16	25	30	35	tanδ(Max)	0.24	0.20	0.16	0.14	0.14	0.14
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)	<table border="1"> <tr> <td>Rated voltage (V)</td> <td>6.3</td> <td>10</td> <td>16</td> <td>25</td> <td>30</td> <td>35</td> </tr> <tr> <td>Z(-40°C)/Z(+20°C)</td> <td>8</td> <td>6</td> <td>6</td> <td>5</td> <td>4</td> <td>4</td> </tr> </table> <p style="text-align: right;">(at 120Hz)</p>	Rated voltage (V)	6.3	10	16	25	30	35	Z(-40°C)/Z(+20°C)	8	6	6	5	4	4
Rated voltage (V)	6.3	10	16	25	30	35									
Z(-40°C)/Z(+20°C)	8	6	6	5	4	4									
Endurance	<p>The following requirements shall be satisfied when the capacitor are restored to 25°C after the rated voltage applied for 1,000~2,000 hours at 105°C.</p> <table border="1"> <tr> <td>Capacitance change</td> <td>≒ ±25% of the initial value (6.3V、10V: ≒ ±30%)</td> <td>Size</td> <td>Life time (hours)</td> </tr> <tr> <td>Dissipation factor(tanδ)</td> <td>≒ 200% of the specified value</td> <td>≒ 6.3Φ</td> <td>1,000</td> </tr> <tr> <td>Leakage current</td> <td>≒ specified value</td> <td>≒ 8 Φ</td> <td>2,000</td> </tr> </table>	Capacitance change	≒ ±25% of the initial value (6.3V、10V: ≒ ±30%)	Size	Life time (hours)	Dissipation factor(tanδ)	≒ 200% of the specified value	≒ 6.3Φ	1,000	Leakage current	≒ specified value	≒ 8 Φ	2,000		
Capacitance change	≒ ±25% of the initial value (6.3V、10V: ≒ ±30%)	Size	Life time (hours)												
Dissipation factor(tanδ)	≒ 200% of the specified value	≒ 6.3Φ	1,000												
Leakage current	≒ specified value	≒ 8 Φ	2,000												
Shelf Life	<p>The following requirements shall be satisfied when the capacitor are restored to 25°C after the rated voltage applied for 500 hours at 105°C without voltage applied.</p> <table border="1"> <tr> <td>Capacitance change</td> <td>≒ ±25% of the initial value (6.3V、10V: ≒ ±30%)</td> </tr> <tr> <td>Dissipation factor(tanδ)</td> <td>≒ 200% of the specified value</td> </tr> <tr> <td>Leakage current</td> <td>≒ 200% of the specified value</td> </tr> </table>	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								
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.														

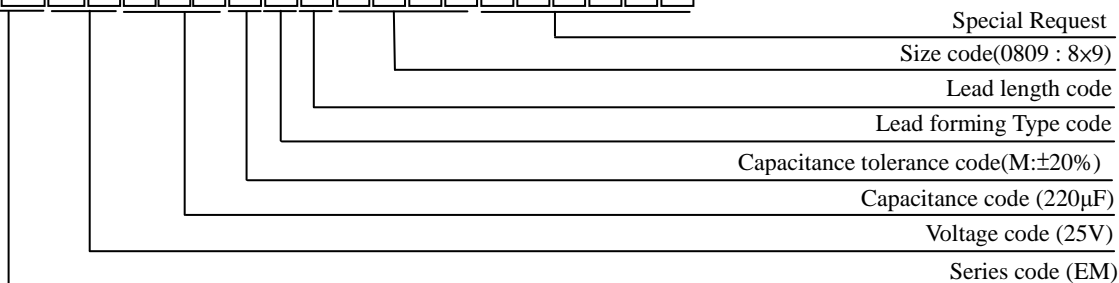
DIMENSIONS (mm)



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

PART NUMBERING SYSTEM (Example : 25V 220 μF)

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

◆ Case size & Permissible rated ripple current:

Nominal Capacitance (uF)	6.3V			10V			16V		
	Case size DΦ×L (mm)	Impedance @20°C (Ωmax/100kHz)	Max. Rated ripple current @ 105°C 100kHz (mA rms)	Case size DΦ×L (mm)	Impedance @20°C (Ωmax/100kHz)	Max. Rated ripple current @ 105°C 100kHz (mA rms)	Case size DΦ×L (mm)	Impedance @20°C (Ωmax/100kHz)	Max. Rated ripple current @ 105°C 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 DΦ×L (mm)	Impedance @20°C (Ωmax/100kHz)	Max. Rated ripple current @ 105°C 100kHz (mA rms)	Case size DΦ×L (mm)	Impedance @20°C (Ωmax/100kHz)	Max. Rated ripple current @ 105°C 100kHz (mA rms)	Case size DΦ×L (mm)	Impedance @20°C (Ωmax/100kHz)	Max. Rated ripple current @ 105°C 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



ER Series

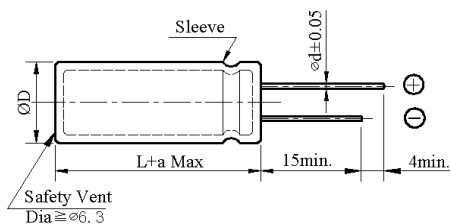
- Low impedance, high ripple current and miniature size with 7 to 9 mm height



◆ SPECIFICATIONS

Item	Performance Characteristics												
Category Temperature Range	-40 ~ +105°C												
Working Voltage Range	6.3 ~ 35Vdc												
Capacitance Range	33 ~ 470 µF												
Capacitance Tolerance	±20% (at 25°C and 120Hz)												
Dissipation Factor (tanδ) (at 25°C, 120Hz)	<table border="1"> <thead> <tr> <th>Rated Voltage (V)</th> <th>6.3</th> <th>10</th> <th>16</th> <th>25</th> <th>35</th> </tr> </thead> <tbody> <tr> <td>tanδ(Max)</td> <td>0.24</td> <td>0.20</td> <td>0.16</td> <td>0.14</td> <td>0.14</td> </tr> </tbody> </table>	Rated Voltage (V)	6.3	10	16	25	35	tanδ(Max)	0.24	0.20	0.16	0.14	0.14
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)	<table border="1"> <thead> <tr> <th>Rated voltage (V)</th> <th>6.3</th> <th>10</th> <th>16</th> <th>25</th> <th>35</th> </tr> </thead> <tbody> <tr> <td>Z(-40°C)/Z(+20°C)</td> <td>8</td> <td>6</td> <td>6</td> <td>5</td> <td>4</td> </tr> </tbody> </table> <p style="text-align: right;">(at 120Hz)</p>	Rated voltage (V)	6.3	10	16	25	35	Z(-40°C)/Z(+20°C)	8	6	6	5	4
Rated voltage (V)	6.3	10	16	25	35								
Z(-40°C)/Z(+20°C)	8	6	6	5	4								
Endurance	The following requirements shall be satisfied when the capacitor are restored to 25°C after the rated voltage applied for 3,000 hours at 105°C. <table border="1"> <tbody> <tr> <td>Capacitance change</td> <td>≒ ±25% of the initial value(6.3V、10V: ≒ ±30%)</td> </tr> <tr> <td>Dissipation factor(tanδ)</td> <td>≒ 200% of the specified value</td> </tr> <tr> <td>Leakage current</td> <td>≒ specified value</td> </tr> </tbody> </table>	Capacitance change	≒ ±25% of the initial value(6.3V、10V: ≒ ±30%)	Dissipation factor(tanδ)	≒ 200% of the specified value	Leakage current	≒ specified value						
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°C after the rated voltage applied for 500 hours at 105°C without voltage applied. <table border="1"> <tbody> <tr> <td>Capacitance change</td> <td>≒ ±25% of the initial value(6.3V、10V: ≒ ±30%)</td> </tr> <tr> <td>Dissipation factor(tanδ)</td> <td>≒ 200% of the specified value</td> </tr> <tr> <td>Leakage current</td> <td>≒ 200% of the specified value</td> </tr> </tbody> </table>	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						
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.												

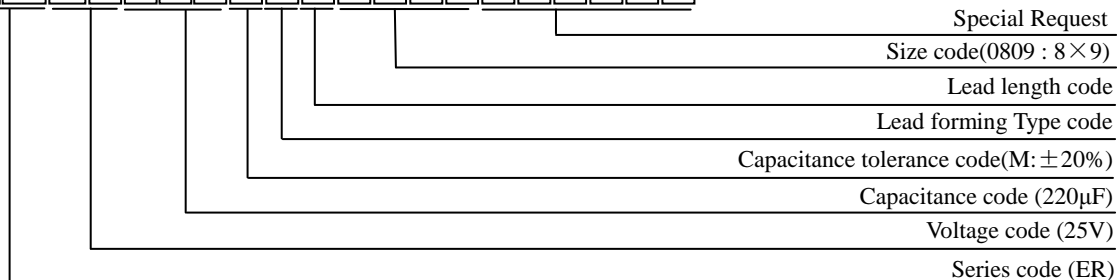
◆ DIMENSIONS (mm)



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

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

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



ALUMINUM ELECTROLYTIC CAPACITORS



ER Series

◆ Case size & Permissible rated ripple current:

Nominal Capacitance (uF)	6.3V			10V			16V		
	Case size DΦ×L (mm)	Impedance @20°C (Ωmax/100kHz)	Max. Rated ripple current @ 105°C 100kHz (mA rms)	Case size DΦ×L (mm)	Impedance @20°C (Ωmax/100kHz)	Max. Rated ripple current @ 105°C 100kHz (mA rms)	Case size DΦ×L (mm)	Impedance @20°C (Ωmax/100kHz)	Max. Rated ripple current @ 105°C 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 DΦ×L (mm)	Impedance @20°C (Ωmax/100kHz)	Max. Rated ripple current @ 105°C 100kHz (mA rms)	Case size DΦ×L (mm)	Impedance @20°C (Ωmax/100kHz)	Max. Rated ripple current @ 105°C 100kHz (mA rms)	Case size DΦ×L (mm)	Impedance @20°C (Ωmax/100kHz)	Max. Rated ripple current @ 105°C 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

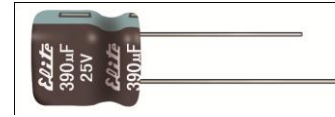
Vdc	Cap.(uF)	Frequency (Hz)			
		120	1K	10K	100K ≤ 200K
6.3 ~ 35	33 ~ 82	0.50	0.80	0.98	1.00
	100 ~ 470	0.55	0.85	0.95	1.00

ALUMINUM ELECTROLYTIC CAPACITORS



EH Series

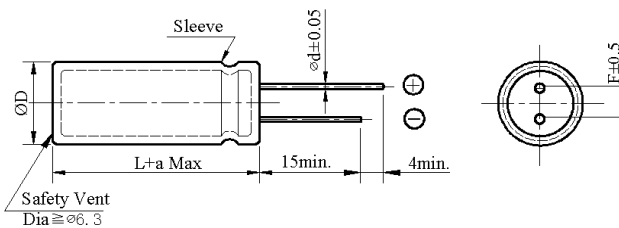
- Low impedance and High ripple current.
- Load life 3,000~4,000 hours at 105°C.



SPECIFICATIONS

Item	Performance Characteristics												
Category Temperature Range	-55~ +105°C												
Working Voltage Range	10 ~ 35Vdc												
Capacitance Range	150 ~820 µF												
Capacitance Tolerance	±20% (at 25°C and 120Hz)												
Dissipation Factor (tanδ) (at 25°C, 120Hz)	<table border="1"> <tr> <td>Rated Voltage (V)</td> <td>10</td> <td>16</td> <td>25</td> <td>35</td> </tr> <tr> <td>tanδ(Max)</td> <td>0.19</td> <td>0.16</td> <td>0.14</td> <td>0.12</td> </tr> </table>	Rated Voltage (V)	10	16	25	35	tanδ(Max)	0.19	0.16	0.14	0.12		
	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)	<table border="1"> <tr> <td>Rated voltage (V)</td> <td>10</td> <td>16</td> <td>25</td> <td>35</td> </tr> <tr> <td>Z(-55°C)/Z(+20°C)</td> <td>3</td> <td>3</td> <td>3</td> <td>3</td> </tr> </table>	Rated voltage (V)	10	16	25	35	Z(-55°C)/Z(+20°C)	3	3	3	3		
	Rated voltage (V)	10	16	25	35								
Z(-55°C)/Z(+20°C)	3	3	3	3									
(at 120Hz)													
Endurance	The following requirements shall be satisfied when the capacitor are restored to 25°C after the rated voltage applied for 3,000 to 4,000 hours at 105°C.												
	<table border="1"> <tr> <td>Capacitance change</td> <td>≧ ±25% of the initial value</td> <td>Size</td> <td>Life time (hours)</td> </tr> <tr> <td>Dissipation factor(tanδ)</td> <td>≧ 200% of the specified value</td> <td>10Φ</td> <td>3,000</td> </tr> <tr> <td>Leakage current</td> <td>≧ specified value</td> <td>12.5Φ</td> <td>4,000</td> </tr> </table>	Capacitance change	≧ ±25% of the initial value	Size	Life time (hours)	Dissipation factor(tanδ)	≧ 200% of the specified value	10Φ	3,000	Leakage current	≧ specified value	12.5Φ	4,000
	Capacitance change	≧ ±25% of the initial value	Size	Life time (hours)									
	Dissipation factor(tanδ)	≧ 200% of the specified value	10Φ	3,000									
Leakage current	≧ specified value	12.5Φ	4,000										
Shelf Life	The following requirements shall be satisfied when the capacitor are restored to 25°C after exposing them for 1,000 hours at 105°C without voltage applied.												
	<table border="1"> <tr> <td>Capacitance change</td> <td>≧ ±25% of the initial value</td> </tr> <tr> <td>Dissipation factor(tanδ)</td> <td>≧ 200% of the specified value</td> </tr> <tr> <td>Leakage current</td> <td>≧ 200% of the specified value</td> </tr> </table>	Capacitance change	≧ ±25% of the initial value	Dissipation factor(tanδ)	≧ 200% of the specified value	Leakage current	≧ 200% of the specified value						
	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.												

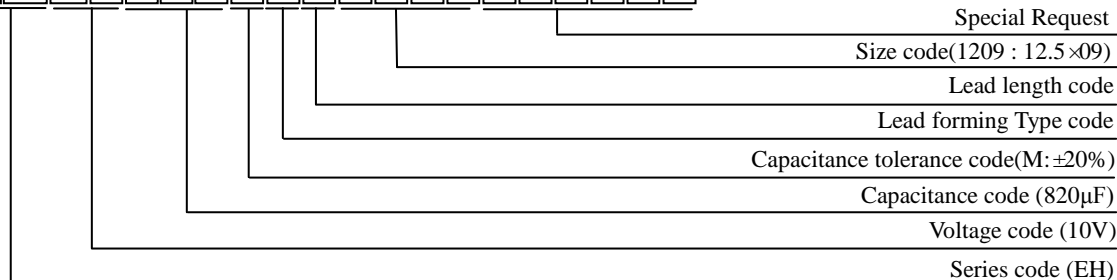
DIMENSIONS (mm)



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 NUMBERING SYSTEM(Example : 10V 820 µF)

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





EH Series

◆ Case size & Permissible rated ripple current:

Nominal capacitance (uF)	10V		16V		25V		35V	
	Case size DΦ×L (mm)	Max. Rated ripple current @105°C 100kHz (mA rms)	Case size DΦ×L (mm)	Max. Rated ripple current @105°C 100kHz (mA rms)	Case size DΦ×L (mm)	Max. Rated ripple current @105°C 100kHz (mA rms)	Case size DΦ×L (mm)	Max. Rated ripple current @105°C 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

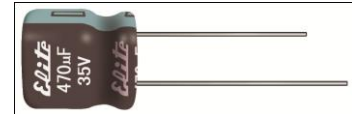
Vdc	Cap.(uF)	Frequency (Hz)				
		50/60	120	1K	10K	100K
10 ~ 35	150 ~ 270	0.30	0.50	0.80	0.95	1.00
	390 ~ 820	0.57	0.71	0.90	0.98	1.00

ALUMINUM ELECTROLYTIC CAPACITORS



EP Series

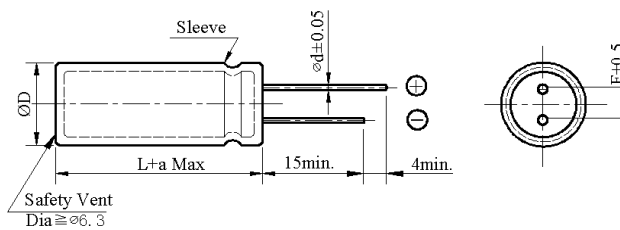
- Miniaturized, Low ESR and Low impedance.
- Suitable for use in high ripple current capability.
- Load life 4,000 hours at 105°C



SPECIFICATIONS

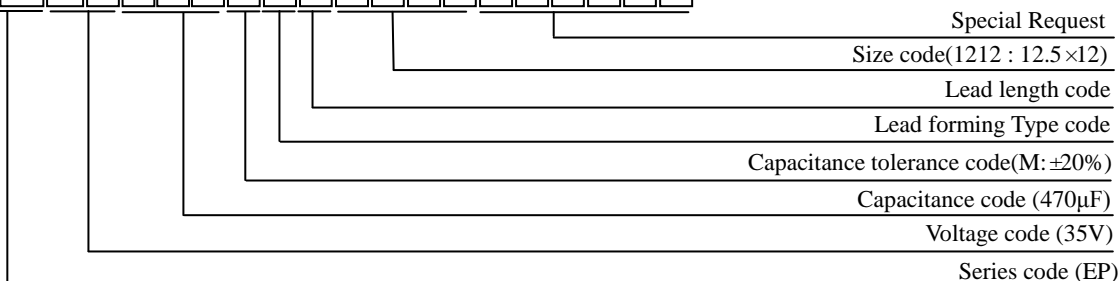
Item	Performance Characteristics												
Category Temperature Range	-40 ~ +105°C												
Working Voltage Range	10 ~ 100Vdc												
Capacitance Range	68 ~ 1,800 µF												
Capacitance Tolerance	±20% (at 25°C and 120Hz)												
Dissipation Factor (tanδ) (at 25°C, 120Hz)	<table border="1"> <tr> <td>Rated Voltage (V)</td> <td>10</td> <td>16</td> <td>25</td> <td>35</td> <td>100</td> </tr> <tr> <td>tanδ(Max)</td> <td>0.19</td> <td>0.16</td> <td>0.14</td> <td>0.12</td> <td>0.08</td> </tr> </table>	Rated Voltage (V)	10	16	25	35	100	tanδ(Max)	0.19	0.16	0.14	0.12	0.08
	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 for 2 minutes.												
Low Temperature Characteristics Impedance Ratio(MAX)	<table border="1"> <tr> <td>Rated voltage (V)</td> <td>10</td> <td>16</td> <td>25</td> <td>35</td> <td>100</td> </tr> <tr> <td>Z(-40°C)/Z(+20°C)</td> <td>6</td> <td>6</td> <td>5</td> <td>4</td> <td>3</td> </tr> </table>	Rated voltage (V)	10	16	25	35	100	Z(-40°C)/Z(+20°C)	6	6	5	4	3
	Rated voltage (V)	10	16	25	35	100							
Z(-40°C)/Z(+20°C)	6	6	5	4	3								
(at 120Hz)													
Endurance	The following requirements shall be satisfied when the capacitor are restored to 25°C after the rated voltage applied for 4,000 hours at 105°C.												
	<table border="1"> <tr> <td>Capacitance change</td> <td>≒ ±25% of the initial value</td> </tr> <tr> <td>Dissipation factor(tanδ)</td> <td>≒ 200% of the specified value</td> </tr> <tr> <td>Leakage current</td> <td>≒ specified value</td> </tr> </table>	Capacitance change	≒ ±25% of the initial value	Dissipation factor(tanδ)	≒ 200% of the specified value	Leakage current	≒ specified value						
	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°C after exposing them for 500 hours at 105°C without voltage applied.												
	<table border="1"> <tr> <td>Capacitance change</td> <td>≒ ±25% of the initial value</td> </tr> <tr> <td>Dissipation factor(tanδ)</td> <td>≒ 200% of the specified value</td> </tr> <tr> <td>Leakage current</td> <td>≒ 200% of the specified value</td> </tr> </table>	Capacitance change	≒ ±25% of the initial value	Dissipation factor(tanδ)	≒ 200% of the specified value	Leakage current	≒ 200% of the specified value						
	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 NUMBERING SYSTEM (Example : 35V 470µF)



ALUMINUM ELECTROLYTIC CAPACITORS



EP Series

◆ Case size & Permissible rated ripple current:

Nominal Capacitance (uF)	10V		16V		25 V	
	Case Size DΦ×L (mm)	Max. Rated ripple current @105°C 100kHz (mA rms)	Case Size DΦ×L (mm)	Max. Rated ripple current @105°C 100kHz (mA rms)	Case Size DΦ×L (mm)	Max. Rated ripple current @105°C 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 DΦ×L (mm)	Max. Rated ripple current @105°C 100kHz (mA rms)	Case Size DΦ×L (mm)	Max. Rated ripple current @105°C 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

ALUMINUM ELECTROLYTIC CAPACITORS



EC Series

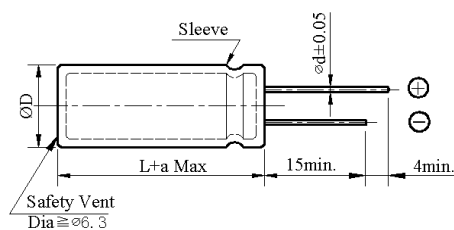
- Miniaturized, Low ESR and Low impedance.
- Suitable for use in high ripple current capability.
- Load life 5,000 hours at 105°C



SPECIFICATIONS

Item	Performance Characteristics					
Category Temperature Range	-40 ~ +105°C					
Working Voltage Range	10 ~ 100Vdc					
Capacitance Range	68 ~ 1,800 µF					
Capacitance Tolerance	±20% (at 25°C and 120Hz)					
Dissipation Factor (tanδ) (at 25°C, 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°C)/Z(+20°C)	6	6	5	4	3
Endurance	The following requirements shall be satisfied when the capacitor are restored to 25°C after the rated voltage applied for 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				
Shelf Life	The following requirements shall be satisfied when the capacitor are restored to 25°C after exposing them for 500 hours at 105°C 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.					

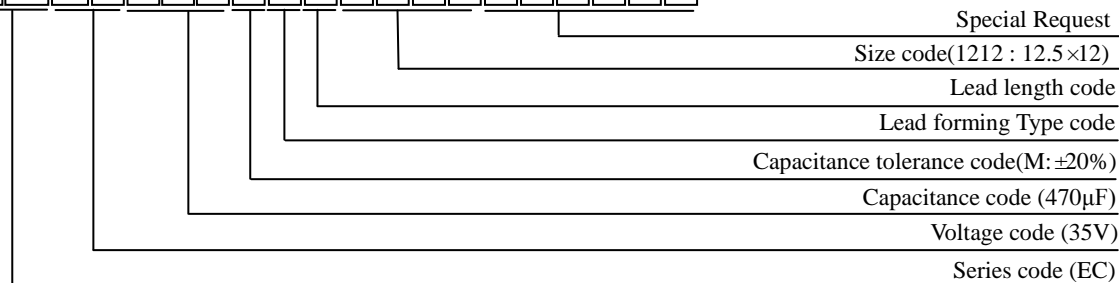
DIMENSIONS (mm)



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

PART NUMBERING SYSTEM (Example : 35V 470µF)

E	C	1	V	4	7	1	M	N	N	1	2	1	2						
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ALUMINUM ELECTROLYTIC CAPACITORS



EC Series

◆ Case size & Permissible rated ripple current:

Nominal Capacitance (uF)	10V		16V		25 V	
	Case Size DΦ×L (mm)	Max. Rated ripple current @105°C 100kHz (mA rms)	Case Size DΦ×L (mm)	Max. Rated ripple current @105°C 100kHz (mA rms)	Case Size DΦ×L (mm)	Max. Rated ripple current @105°C 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 DΦ×L (mm)	Max. Rated ripple current @105°C 100kHz (mA rms)	Case Size DΦ×L (mm)	Max. Rated ripple current @105°C 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

ALUMINUM ELECTROLYTIC CAPACITORS



ND&ND-H Series

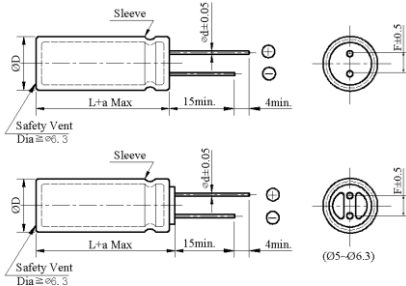
- Standard non-polarized type.
- Suitable for conditions where polarity reverses or where polarity is not constant.
- ND series 85°C 2,000Hrs, ND-H series 105°C 1,000Hrs.



SPECIFICATIONS

Item	Performance Characteristics									
	ND		ND-H							
Series	ND		ND-H							
Category Temperature Range	-40 ~ +85°C	-25 ~ +85°C	-40 ~ +105°C	-25 ~ +105°C						
Working Voltage Range	6.3 ~ 100 Vdc		160 ~ 250 Vdc							
Capacitance Range	0.47 ~ 2,200 µF		0.47 ~ 100 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	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°C)/Z(+20°C)	10	8	6	4	3	3	3	3	—
	Z(-25°C)/Z(+20°C)	—	—	—	—	—	—	—	—	3
(at 120Hz)										
Endurance	The following requirements shall be satisfied when the capacitor are restored to 25°C after the rated voltage applied for 2,000 hours at 85°C (ND), or 1,000 hours at 105°C (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°C after the rated voltage applied for 1,000 hours at 85°C (ND), or 500 hours at 105°C (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.									

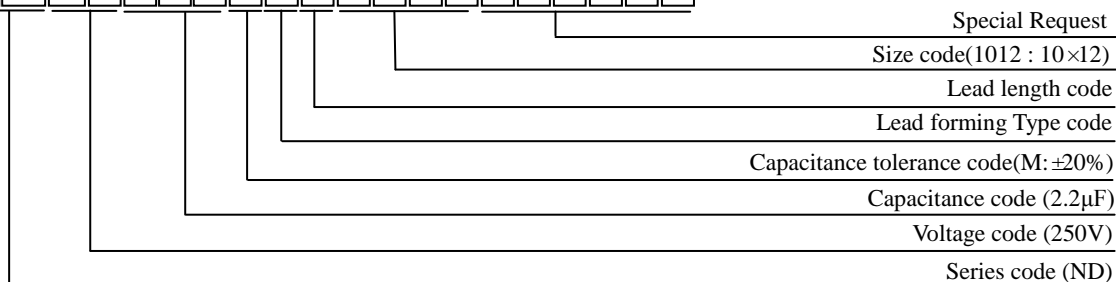
DIMENSIONS (mm)



ΦD	5	6.3	8	10	12.5 L<35	12.5 L≥35	16	18
ΦD	ΦD + 0.5 Max							ΦD + 0.5 Max
Φd	0.5	0.5	0.6	0.6	0.6	0.8	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 NUMBERING SYSTEM(Example : 250V 2.2µF)

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



ALUMINUM ELECTROLYTIC CAPACITORS



ND Series

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

uF	Vdc	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

uF	Vdc	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				

uF	Vdc	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

ALUMINUM ELECTROLYTIC CAPACITORS



ND-H Series

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

uF	Vdc	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

uF	Vdc	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				

uF	Vdc	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

ALUMINUM ELECTROLYTIC CAPACITORS



LB & LB-H Series

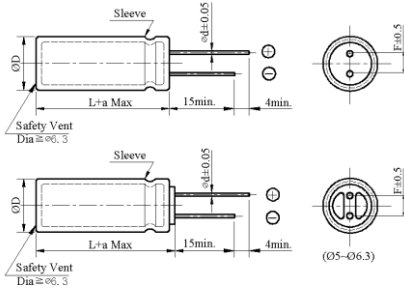
- Low leakage current at 85 °C & 105°C



SPECIFICATIONS

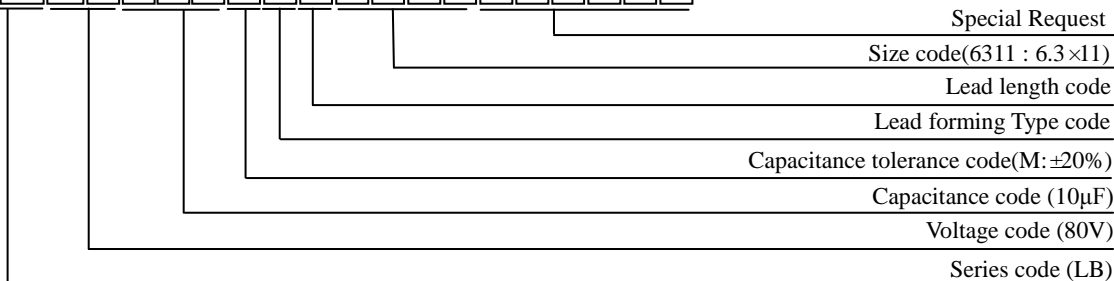
Item	Performance Characteristics									
Series	LB					LB-H				
Category Temperature Range	-40 ~ +85°C					-40 ~ +105°C				
Working Voltage Range	6.3 ~ 100 Vdc									
Capacitance Range	0.47 ~ 4,700 μF									
Capacitance Tolerance	±20% (at 25°C and 120Hz)									
Dissipation Factor (tanδ) (at 25°C, 120Hz)	Rated Voltage (V)	6.3	10	16	25	35	50	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°C)/Z(+20°C)	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°C after the rated voltage applied for 2,000 hours at 85°C(LB) or 1,000 hours at 105°C(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°C after the rated voltage applied for 1,000 hours at 85°C(LB) or 500 hours at 105°C(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 L < 35	12.5 L ≥ 35	16	18
ΦD	ΦD + 0.5 Max							
Φd	0.5	0.5	0.6	0.6	0.6	0.8	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 + 1.5 Max ≧ 40 L + 2.0 Max		L + 1.5 Max	

PART NUMBERING SYSTEM(Example : 80V 10 μF)



ALUMINUM ELECTROLYTIC CAPACITORS



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

ALUMINUM ELECTROLYTIC CAPACITORS



LB-H Series

◆ Case size & Permissible rated ripple current: (mA rms) at 105°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	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	5×11	15
2.2	5×11	18	5×11	20	5×11	21	5×11	5×11	22
3.3	5×11	22	5×11	24	5×11	25	5×11	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

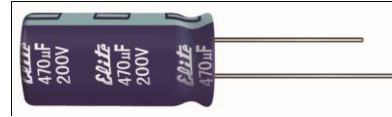
Cap.(uF)	Frequency (Hz)				
	50/60	120	1K	10K	100K
0.47 ~ 68	0.75	1.00	1.57	1.75	2.00
100 ~ 680	0.80	1.00	1.34	1.40	1.50
1000 ~ 4700	0.85	1.00	1.13	1.13	1.13

ALUMINUM ELECTROLYTIC CAPACITORS



SM Series

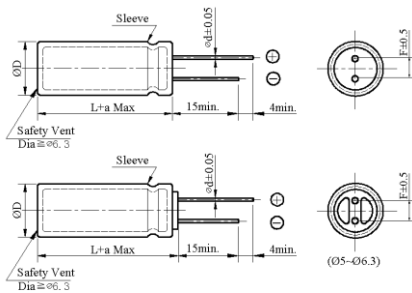
- Standard size downsized
- 2,000 hours assured at 85°C



◆ SPECIFICATIONS

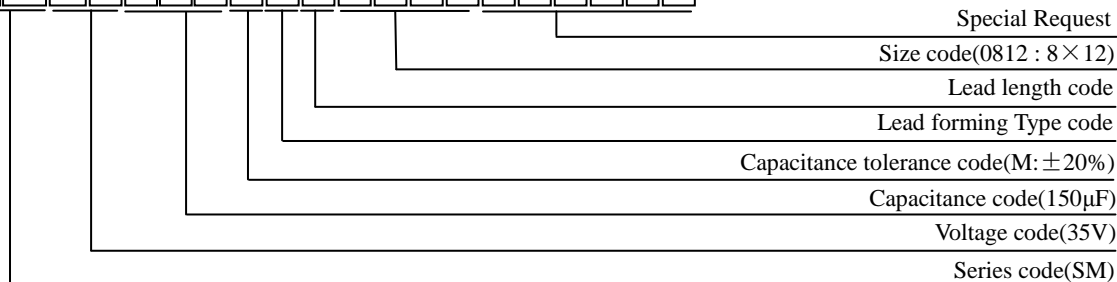
Item	Performance Characteristics																																				
Category Temperature Range	-40 ~ +85°C	-25 ~ +85°C																																			
Working Voltage Range	6.3 ~ 100Vdc	160 ~ 450Vdc																																			
Capacitance Range	0.1 ~ 22,000μF	0.47 ~ 470 μF																																			
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 63 100 160 ~ 250 350 ~ 450																																			
	tanδ(Max)	0.26 0.22 0.16 0.14 0.12 0.10 0.09 0.08 0.15 0.20																																			
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)	<table border="1"> <thead> <tr> <th>Rated voltage (V)</th> <th>6.3</th> <th>10</th> <th>16</th> <th>25</th> <th>35</th> <th>50</th> <th>63</th> <th>100</th> <th>160 ~ 250</th> <th>350</th> <th>400 ~ 450</th> </tr> </thead> <tbody> <tr> <td>Z(-40°C)/Z(+20°C)</td> <td>12</td> <td>10</td> <td>8</td> <td>5</td> <td>4</td> <td>3</td> <td>3</td> <td>3</td> <td>—</td> <td>—</td> <td>—</td> </tr> <tr> <td>Z(-25°C)/Z(+20°C)</td> <td>—</td> <td>—</td> <td>—</td> <td>—</td> <td>—</td> <td>—</td> <td>—</td> <td>—</td> <td>3</td> <td>6</td> <td>6</td> </tr> </tbody> </table>	Rated voltage (V)	6.3	10	16	25	35	50	63	100	160 ~ 250	350	400 ~ 450	Z(-40°C)/Z(+20°C)	12	10	8	5	4	3	3	3	—	—	—	Z(-25°C)/Z(+20°C)	—	—	—	—	—	—	—	—	3	6
Rated voltage (V)	6.3	10	16	25	35	50	63	100	160 ~ 250	350	400 ~ 450																										
Z(-40°C)/Z(+20°C)	12	10	8	5	4	3	3	3	—	—	—																										
Z(-25°C)/Z(+20°C)	—	—	—	—	—	—	—	—	3	6	6																										
Endurance	The following requirements shall be satisfied when the capacitor are restored to 25°C after the rated voltage applied for 2,000 hours at 85°C.																																				
	Capacitance change	≒ ±20% of the initial value																																			
Shelf Life	The following requirements shall be satisfied when the capacitor are restored to 25°C after the rated voltage applied for 1,000 hours at 85°C without voltage applied.																																				
	Capacitance change	≒ ±20% of the initial value																																			
Others	Conforms to JIS-C-5101-4 (1998), characteristic W.																																				

◆ DIMENSIONS (mm)



ΦD	5	6.3	8	10	12.5 L < 35	12.5 L ≥ 35	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	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 NUMBERING SYSTEM (Example : 35V 150μF)



ALUMINUM ELECTROLYTIC CAPACITORS



SM Series

◆ Case size & Permissible rated ripple current: (mA rms) at 85°C / 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	110	5×11	120
68		5×11	100	5×11	110	5×11	120	6.3×11	145
100		5×11	130	5×11	150	5×11	160	6.3×11	190
150		5×11	150	5×11	160	6.3×11	210	6.3×11	210
220		5×11	200	5×11	220	6.3×11	270	8×11.5	320
330		6.3×11	270	6.3×11	300	8×11.5	370	8×11.5	400
470		6.3×11	330	6.3×11	360	8×11.5	440	10×12.5	520
680		8×11.5	445	8×11.5	445	10×12.5	500	10×16	605
1000		8×11.5	540	10×12.5	650	10×16	770	10×20	930
2200		10×16	930	10×20	1130	12.5×20	1300	12.5×25	1550
3300		10×20	1230	12.5×20	1450	12.5×25	1700	16×25	1730
4700		12.5×20	1520	12.5×25	1790	16×25	1840	16×31.5	2140
6800		12.5×25	1890	16×25	1940	16×31.5	2280	18×35.5	2630
10000		16×25	2030	16×31.5	2470	18×35.5	2750		
15000		16×35.5	2590	18×35.5	2870				
22000		18×35.5	3220	18×40	3300				

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	40	5×11	45	5×11	50
10		5×11	60	5×11	65	5×11	65	6.3×11	80
22		5×11	90	5×11	95	5×11	95	6.3×11	120
33		5×11	110	6.3×11	120	6.3×11	130	8×11.5	170
47		5×11	130	6.3×11	160	6.3×11	160	10×12.5	220
68		6.3×11	160	6.3×11	170	8×11.5	180	10×12.5	235
100		6.3×11	210	8×11.5	270	10×12.5	290	10×16	340
150		8×11.5	290	10×12.5	345	10×12.5	345	12.5×20	490
220		8×11.5	360	10×12.5	430	10×16	470	12.5×25	710
330		10×12.5	490	10×20	600	12.5×20	660	12.5×25	870
470		10×16	580	12.5×20	760	12.5×20	850	16×25	1010
680		10×20	720	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	2220		
3300		16×35.5	2190	18×35.5	2500				
4700		18×35.5	2560						

ALUMINUM ELECTROLYTIC CAPACITORS



SM Series

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

uF \ Vdc	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				

uF \ Vdc	400		450	
	ΦD × L	RC	ΦD × L	RC
0.47	6.3×11	14	6.3×11	14
1	6.3×11	18	8×11.5	19
2.2	8×11.5	28	8×11.5	25
3.3	8×11.5	32	10×12.5	32
4.7	10×16	41	10×16	50
10	10×20	70	12.5×20	75
22	12.5×25	120	12.5×25	110
33	16×25	140	16×25	150
47	16×25	160	16×31.5	220
68	16×35.5	280	18×31.5	230
82	18×31.5	290	18×35.5	245
100	18×31.5	300	18×40	280
120	18×35.5	330	18×45	300
150	18×40	360		
180	18×45	400		

◆ RIPPLE CURRENT MULTIPLIERS

Frequency Multipliers

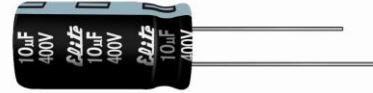
Vdc	Cap.(uF)	Frequency (Hz)				
		50/60	120	1K	10K	100K
6.3 ~ 100	0.1 ~ 68	0.75	1.00	1.57	2.00	2.00
	100 ~ 680	0.80	1.00	1.34	1.40	1.50
	1000 ~ 22000	0.85	1.00	1.13	1.13	1.13
160 ~ 450	0.47 ~ 220	0.80	1.00	1.40	1.40	1.40
	330 ~ 470	0.90	1.00	1.13	1.13	1.13

ALUMINUM ELECTROLYTIC CAPACITORS



PF Series

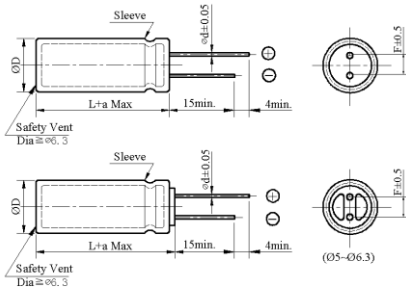
- General standard size
- Load life 2,000 hours at 105°C



SPECIFICATIONS

Item	Performance Characteristics	
Category Temperature Range	-40 ~ +105°C	-25 ~ +105°C
Working Voltage Range	6.3 ~ 100Vdc	160 ~ 450Vdc
Capacitance Range	0.47 ~ 22,000μF	0.47 ~ 560 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 63 100 160 ~ 250 350 ~ 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		
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)	Rated voltage (V)	6.3 10 16 25 35 50 63 100 160 ~ 250 350 400 ~ 450
	Z(-40°C)/Z(+20°C)	12 10 8 5 4 3 3 3 — — —
	Z(-25°C)/Z(+20°C)	— — — — — — — 3 6 6
(at 120Hz)		
Endurance	The following requirements shall be satisfied when the capacitor are restored to 25°C after the rated voltage 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°C after the rated voltage applied for 1,000 hours at 105°C 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.	

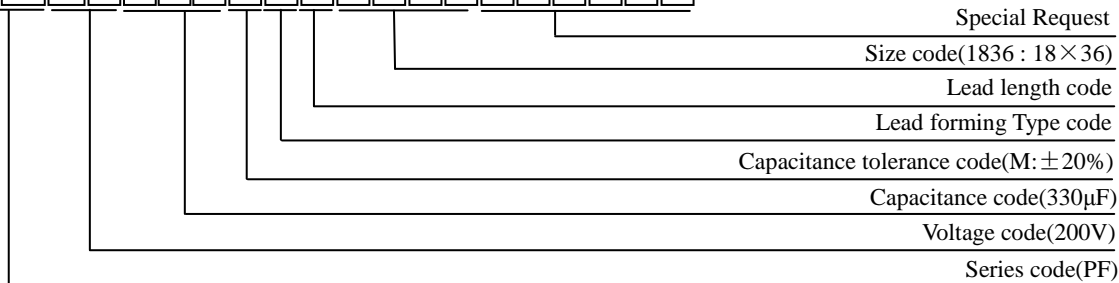
DIMENSIONS (mm)



ΦD	5	6.3	8	10	12.5 L<35	12.5 L≥35	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	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 NUMBERING SYSTEM(Example : 200V 330μF)

P F 2 D 3 3 I M N N 1 8 3 6



ALUMINUM ELECTROLYTIC CAPACITORS



PF Series

◆ Case size & Permissible rated ripple current: (mA rms) at 105°C / 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	6.3×11	140	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	190	8×11.5	270	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	10×16	570	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		12.5×20	1100	12.5×25	1250	16×25	1270	16×31.5	1540
4700		12.5×25	1320	16×25	1350	16×31.5	1570	16×35.5	1650
6800		16×25	1495	16×31.5	1670	18×35.5	1930	18×35.5	1950
10000		16×31.5	1832	18×35.5	2010	18×40	2060	18×40	2100
15000		18×35.5	2235	18×40	2360				
22000		18×40	2375						

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	125
47		6.3×11	115	6.3×11	125	8×11.5	150	10×12.5	165
68		8×11.5	130	8×11.5	159	10×12.5	198	10×16	200
100		8×11.5	200	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						

ALUMINUM ELECTROLYTIC CAPACITORS



PF Series

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

uF	Vdc	160		200		250		350	
		ΦD × L	RC	ΦD × L	RC	ΦD × L	RC	ΦD × L	RC
0.47		5×11	13	5×11	13	5×11	13	5×11	11
1		5×11	18	5×11	15	6.3×11	18	6.3×11	15
2.2		6.3×11	27	6.3×11	27	6.3×11	23	8×11.5	23
3.3		6.3×11	28	6.3×11	28	8×11.5	30	8×11.5	30
4.7		6.3×11	32	8×11.5	36	8×11.5	39	10×12.5	40
6.8		8×11.5	38	8×11.5	40	10×12.5	42	10×16	42
10		8×11.5	55	10×12.5	60	10×16	75	10×20	70
15		10×12.5	70	10×16	75	10×16	85	12.5×20	140
22		10×20	140	10×20	150	12.5×20	160	12.5×25	145
33		10×20	145	12.5×20	160	12.5×20	165	16×25	165
47		12.5×20	195	12.5×20	195	12.5×25	195	16×25	200
56		12.5×20	215	12.5×20	215	12.5×25	215	16×31.5	230
68		12.5×25	270	12.5×25	250	16×25	240	16×35.5	240
82		12.5×25	290	16×25	270	16×25	280	18×31.5	280
100		16×25	340	16×25	320	16×31.5	310	18×31.5	320
120		16×25	360	16×31.5	340	16×31.5	330	18×35.5	365
150		16×31.5	435	16×31.5	360	16×35.5	460	18×40	400
180		16×35.5	450	16×35.5	400	18×35.5	470	18×45	460
220		16×35.5	500	16×35.5	500	18×35.5	485		
330		18×35.5	600	18×35.5	610	18×45	610		
470		18×45	740	18×45	750				
560		18×50	800	18×50	805				

uF	Vdc	400		450	
		ΦD × L	RC	ΦD × L	RC
0.47		6.3×11	15	6.3×11	16
1		6.3×11	14	8×11.5	21
2.2		8×11.5	25	8×11.5	22
3.3		8×11.5	30	10×12.5	30
4.7		10×16	42	10×16	36
6.8		10×16	45	10×20	40
10		10×20	70	12.5×20	75
15		12.5×20	90	12.5×25	80
22		12.5×25	140	16×25	105
33		16×25	165	16×31.5	130
47		16×25	200	18×31.5	160
56		16×31.5	210	18×31.5	170
68		16×35.5	240	18×35.5	190
82		18×31.5	270	18×40	200
100		18×31.5	310	18×40	215
120		18×35.5	340	18×45	230
150		18×40	375		
180		18×45	410		

◆ 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
350 ~ 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

ALUMINUM ELECTROLYTIC CAPACITORS



EL Series

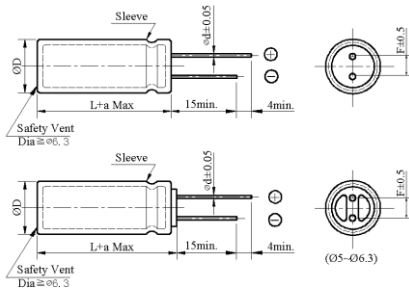
- Suitable for main board.
- Extremely low impedance, downsize and high ripple current



◆ 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)	<table border="1"> <tr> <td>Rated Voltage (V)</td> <td>6.3</td> <td>10</td> <td>16</td> <td>25</td> <td>35</td> <td>50</td> </tr> <tr> <td>tanδ(Max)</td> <td>0.22</td> <td>0.19</td> <td>0.16</td> <td>0.14</td> <td>0.12</td> <td>0.10</td> </tr> </table>	Rated Voltage (V)	6.3	10	16	25	35	50	tanδ(Max)	0.22	0.19	0.16	0.14	0.12	0.10
	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)	<table border="1"> <tr> <td>Rated voltage (V)</td> <td>6.3</td> <td>10</td> <td>16</td> <td>25</td> <td>35</td> <td>50</td> </tr> <tr> <td>Z(-40°C)/Z(+20°C)</td> <td>8</td> <td>6</td> <td>6</td> <td>5</td> <td>4</td> <td>3</td> </tr> </table>	Rated voltage (V)	6.3	10	16	25	35	50	Z(-40°C)/Z(+20°C)	8	6	6	5	4	3
	Rated voltage (V)	6.3	10	16	25	35	50								
Z(-40°C)/Z(+20°C)	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°C after exposing them for 500 hours at 105°C 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.														

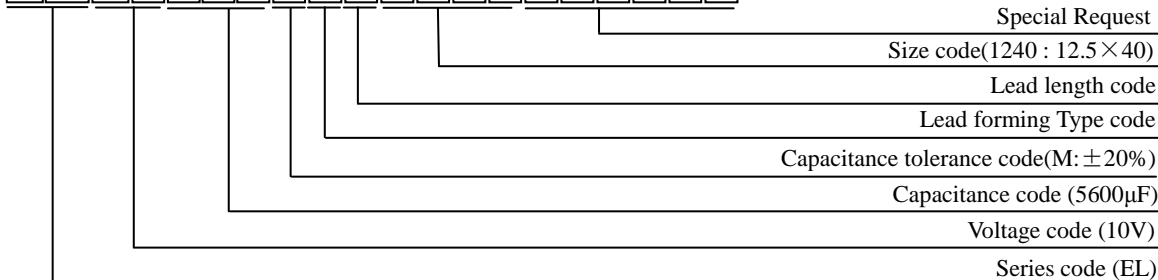
◆ DIMENSIONS (mm)



ΦD	5	6.3	8	10	12.5 L< 35	12.5 L≥ 35	16	18
ΦD	ΦD + 0.5 Max							
Φd	0.5	0.5	0.6	0.6	0.6	0.8	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 NUMBERING SYSTEM(Example : 10V 5600 µF)

ELI A 5 6 2 M N N I 2 4 0



ALUMINUM ELECTROLYTIC CAPACITORS



EL Series

◆ Case size & Permissible rated ripple current:

Nominal Capacitance (uF)	6.3V				10V				16V			
	Case Size DΦ×L (mm)	Impedance (Ωmax/100kHz)		Max. Rated ripple current @105°C 100kHz (mA rms)	Case Size DΦ×L (mm)	Impedance (Ωmax/100kHz)		Max. Rated ripple current @105°C 100kHz (mA rms)	Case Size DΦ×L (mm)	Impedance (Ωmax/100kHz)		Max. Rated ripple current @105°C 100kHz (mA rms)
		20°C	-10°C			20°C	-10°C			20°C	-10°C	
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 DΦ×L (mm)	Impedance (Ωmax/100kHz)		Max. Rated ripple current @105°C 100kHz (mA rms)	Case Size DΦ×L (mm)	Impedance (Ωmax/100kHz)		Max. Rated ripple current @105°C 100kHz (mA rms)	Case Size DΦ×L (mm)	Impedance (Ωmax/100kHz)		Max. Rated ripple current @105°C 100kHz (mA rms)
		20°C	-10°C			20°C	-10°C			20°C	-10°C	
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

ALUMINUM ELECTROLYTIC CAPACITORS



EB Series

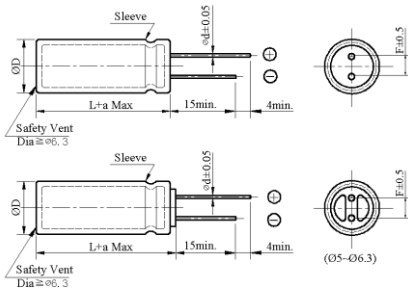
- Extremely low impedance, Downsize and high ripple current.
- Suitable for main board.



◆ SPECIFICATIONS

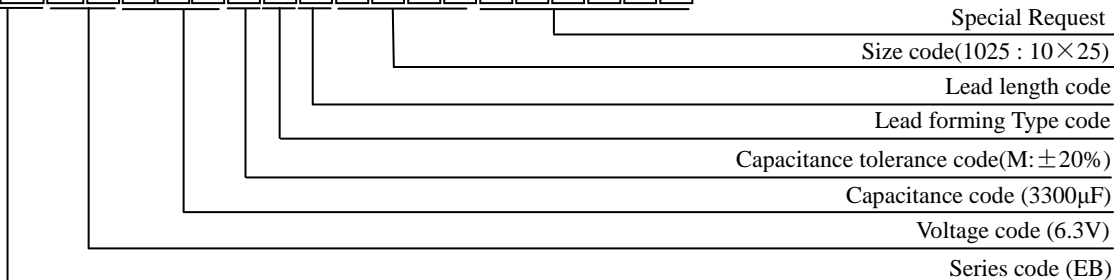
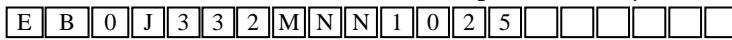
Item	Performance Characteristics												
Category Temperature Range	-40 ~ +105°C												
Working Voltage Range	6.3 ~ 16Vdc												
Capacitance Range	82 ~ 3,300 µF												
Capacitance Tolerance	±20% (at 25°C and 120Hz)												
Dissipation Factor (tanδ) (at 25°C, 120Hz)	<table border="1"> <tr> <td>Rated Voltage (V)</td> <td>6.3</td> <td>10</td> <td>16</td> </tr> <tr> <td>tanδ(Max)</td> <td>0.15</td> <td>0.14</td> <td>0.12</td> </tr> </table>	Rated Voltage (V)	6.3	10	16	tanδ(Max)	0.15	0.14	0.12				
	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)	<table border="1"> <tr> <td>Rated voltage (V)</td> <td>6.3</td> <td>10</td> <td>16</td> </tr> <tr> <td>Z(-40°C)/Z(+20°C)</td> <td>8</td> <td>6</td> <td>6</td> </tr> </table>	Rated voltage (V)	6.3	10	16	Z(-40°C)/Z(+20°C)	8	6	6				
	Rated voltage (V)	6.3	10	16									
Z(-40°C)/Z(+20°C)	8	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 1,000~2,000 hours at 105 °C												
	<table border="1"> <tr> <td>Capacitance change</td> <td>≒ ±25% of the initial value</td> <td>Size</td> <td>Life time (hours)</td> </tr> <tr> <td>Dissipation factor(tanδ)</td> <td>≒ 200% of the specified value</td> <td>≒ 6.3Φ</td> <td>1,000</td> </tr> <tr> <td>Leakage current</td> <td>≒ specified value</td> <td>≒ 8 Φ</td> <td>2,000</td> </tr> </table>	Capacitance change	≒ ±25% of the initial value	Size	Life time (hours)	Dissipation factor(tanδ)	≒ 200% of the specified value	≒ 6.3Φ	1,000	Leakage current	≒ specified value	≒ 8 Φ	2,000
	Capacitance change	≒ ±25% of the initial value	Size	Life time (hours)									
	Dissipation factor(tanδ)	≒ 200% of the specified value	≒ 6.3Φ	1,000									
Leakage current	≒ specified value	≒ 8 Φ	2,000										
Shelf Life	The following requirements shall be satisfied when the capacitor are restored to 25°C after exposing them for 500 hours at 105°C without voltage applied.												
	<table border="1"> <tr> <td>Capacitance change</td> <td>≒ ±25% of the initial value</td> </tr> <tr> <td>Dissipation factor(tanδ)</td> <td>≒ 200% of the specified value</td> </tr> <tr> <td>Leakage current</td> <td>≒ 200% of the specified value</td> </tr> </table>	Capacitance change	≒ ±25% of the initial value	Dissipation factor(tanδ)	≒ 200% of the specified value	Leakage current	≒ 200% of the specified value						
	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 NUMBERING SYSTEM(Example : 6.3V 3300 µF)



ALUMINUM ELECTROLYTIC CAPACITORS



EB Series

◆ Case size & Permissible rated ripple current:

Nominal Capacitance (uF)	6.3V			10V			16V		
	Case Size DΦ×L (mm)	Impedance @20°C (Ωmax/100kHz)	Max. Rated ripple current @105°C 100kHz (mA rms)	Case Size DΦ×L (mm)	Impedance @20°C (Ωmax/100kHz)	Max. Rated ripple current @105°C 100kHz (mA rms)	Case Size DΦ×L (mm)	Impedance @20°C (Ωmax/100kHz)	Max. Rated ripple current @105°C 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

ALUMINUM ELECTROLYTIC CAPACITORS



ED Series

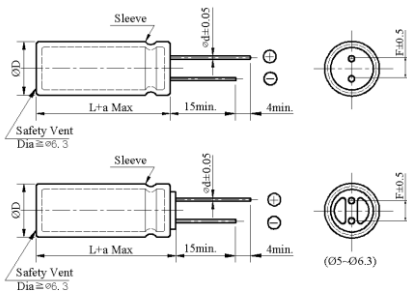
- Suitable for use in high ripple current capability.
- Miniaturized, Low E.S.R and low impedance



SPECIFICATIONS

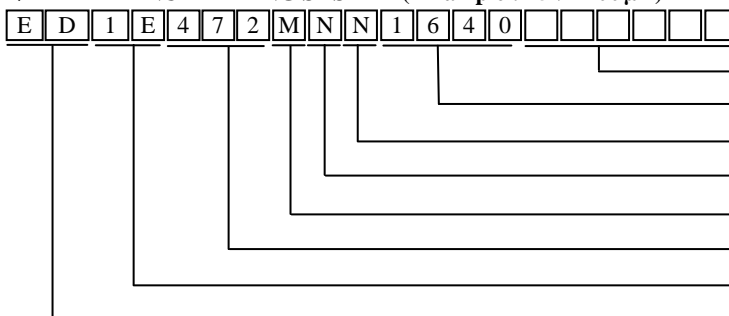
Item	Performance Characteristics																		
Category Temperature Range	-40 ~ +105°C																		
Working Voltage Range	6.3 ~ 100Vdc																		
Capacitance Range	10 ~ 10,000 μF																		
Capacitance Tolerance	±20% (at 25°C and 120Hz)																		
Dissipation Factor (tanδ) (at 25°C, 120Hz)	<table border="1"> <tr> <td>Rated Voltage (V)</td> <td>6.3</td> <td>10</td> <td>16</td> <td>25</td> <td>35</td> <td>50</td> <td>63</td> <td>100</td> </tr> <tr> <td>tanδ(Max)</td> <td>0.22</td> <td>0.19</td> <td>0.16</td> <td>0.14</td> <td>0.12</td> <td>0.10</td> <td>0.09</td> <td>0.08</td> </tr> </table>	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
	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)	<table border="1"> <tr> <td>Rated voltage (V)</td> <td>6.3</td> <td>10</td> <td>16</td> <td>25</td> <td>35</td> <td>50</td> <td>63</td> <td>100</td> </tr> <tr> <td>Z(-40°C)/Z(+20°C)</td> <td>8</td> <td>6</td> <td>6</td> <td>5</td> <td>4</td> <td>3</td> <td>3</td> <td>3</td> </tr> </table> <p style="text-align: right;">(at 120Hz)</p>	Rated voltage (V)	6.3	10	16	25	35	50	63	100	Z(-40°C)/Z(+20°C)	8	6	6	5	4	3	3	3
Rated voltage (V)	6.3	10	16	25	35	50	63	100											
Z(-40°C)/Z(+20°C)	8	6	6	5	4	3	3	3											
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 <table border="1"> <tr> <td>Capacitance change</td> <td>≒ ±25% of the initial value</td> <td>Size</td> <td>Life time (hours)</td> </tr> <tr> <td>Dissipation factor(tanδ)</td> <td>≒ 200% of the specified value</td> <td>D×L ~ 8×12</td> <td>2,000</td> </tr> <tr> <td>Leakage current</td> <td>≒ specified value</td> <td>8×16 ~ 10Φ</td> <td>3,000</td> </tr> <tr> <td></td> <td></td> <td>12.5Φ ~ 18Φ</td> <td>5,000</td> </tr> </table>	Capacitance change	≒ ±25% of the initial value	Size	Life time (hours)	Dissipation factor(tanδ)	≒ 200% of the specified value	D×L ~ 8×12	2,000	Leakage current	≒ specified value	8×16 ~ 10Φ	3,000			12.5Φ ~ 18Φ	5,000		
Capacitance change	≒ ±25% of the initial value	Size	Life time (hours)																
Dissipation factor(tanδ)	≒ 200% of the specified value	D×L ~ 8×12	2,000																
Leakage current	≒ specified value	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°C after exposing them for 500 hours at 105°C without voltage applied. <table border="1"> <tr> <td>Capacitance change</td> <td>≒ ±25% of the initial value</td> </tr> <tr> <td>Dissipation factor(tanδ)</td> <td>≒ 200% of the specified value</td> </tr> <tr> <td>Leakage current</td> <td>≒ 200% of the specified value</td> </tr> </table>	Capacitance change	≒ ±25% of the initial value	Dissipation factor(tanδ)	≒ 200% of the specified value	Leakage current	≒ 200% of the specified value												
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 L < 35	12.5 L ≥ 35	16	18
ΦD	ΦD + 0.5 Max							
Φd	0.5	0.5	0.6	0.6	0.6	0.8	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 + 1.5 Max ≥ 40 L + 2.0 Max		L + 1.5 Max	

PART NUMBERING SYSTEM (Example : 25V 4700 μF)



ALUMINUM ELECTROLYTIC CAPACITORS



ED Series

◆ Case size & Permissible rated ripple current:

Nominal capacitance (uF)	6.3V				10V			
	Case Size DΦ×L (mm)	Impedance (Ωmax/100kHz)		Max. Rated ripple current @105°C 100kHz (mA rms)	Case Size DΦ×L (mm)	Impedance (Ωmax/100kHz)		Max. Rated ripple current @105°C 100kHz (mA rms)
		20°C	-10°C			20°C	-10°C	
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 DΦ×L (mm)	Impedance (Ωmax/100kHz)		Max. Rated ripple current @105°C 100kHz (mA rms)	Case Size DΦ×L (mm)	Impedance (Ωmax/100kHz)		Max. Rated ripple current @105°C 100kHz (mA rms)
		20°C	-10°C			20°C	-10°C	
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				

ALUMINUM ELECTROLYTIC CAPACITORS



ED Series

◆ Case size & Permissible rated ripple current:

Nominal capacitance (uF)	35V				50V			
	Case Size DΦ×L (mm)	Impedance (Ωmax/100kHz)		Max. Rated ripple current @105°C 100kHz (mA rms)	Case Size DΦ×L (mm)	Impedance (Ωmax/100kHz)		Max. Rated ripple current @105°C 100kHz (mA rms)
		20°C	-10°C			20°C	-10°C	
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 DΦ×L (mm)	Impedance (Ωmax/100kHz)		Max. Rated ripple current @105°C 100kHz (mA rms)	Case Size DΦ×L (mm)	Impedance (Ωmax/100kHz)		Max. Rated ripple current @105°C 100kHz (mA rms)
		20°C	-10°C			20°C	-10°C	
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

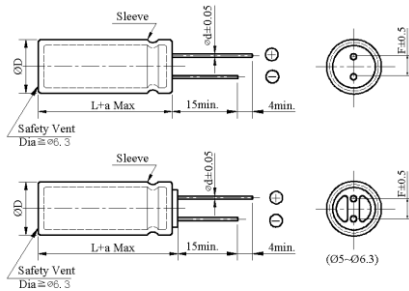
- Miniaturized, Low ESR and Low impedance.
- Suitable for use in high ripple current capability.



◆ SPECIFICATIONS

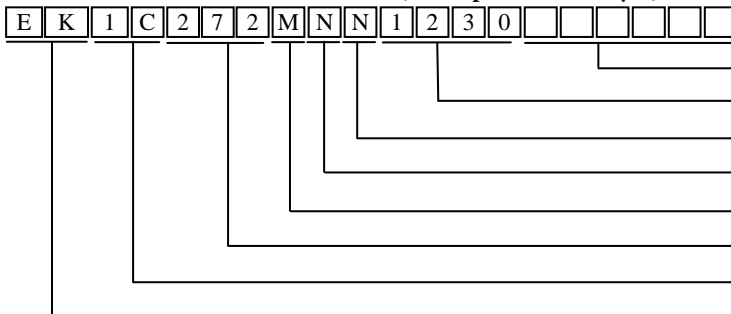
Item	Performance Characteristics																	
Category Temperature Range	-40 ~ +105°C																	
Working Voltage Range	6.3 ~ 50Vdc																	
Capacitance Range	0.10 ~ 6,800 µF																	
Capacitance Tolerance	±20% (at 25°C and 120Hz)																	
Dissipation Factor (tanδ) (at 25°C, 120Hz)	<table border="1"> <tr> <td>Rated Voltage (V)</td> <td>6.3</td> <td>10</td> <td>16</td> <td>25</td> <td>35</td> <td>50</td> </tr> <tr> <td>tanδ(Max)</td> <td>0.22</td> <td>0.19</td> <td>0.16</td> <td>0.14</td> <td>0.12</td> <td>0.10</td> </tr> </table>	Rated Voltage (V)	6.3	10	16	25	35	50	tanδ(Max)	0.22	0.19	0.16	0.14	0.12	0.10			
	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 for 2 minutes.																	
Low Temperature Characteristics Impedance Ratio(MAX)	<table border="1"> <tr> <td>Rated voltage (V)</td> <td>6.3</td> <td>10</td> <td>16</td> <td>25</td> <td>35</td> <td>50</td> </tr> <tr> <td>Z(-40°C)/Z(+20°C)</td> <td>8</td> <td>6</td> <td>6</td> <td>5</td> <td>4</td> <td>3</td> </tr> </table> <p style="text-align: right;">(at 120Hz)</p>	Rated voltage (V)	6.3	10	16	25	35	50	Z(-40°C)/Z(+20°C)	8	6	6	5	4	3			
Rated voltage (V)	6.3	10	16	25	35	50												
Z(-40°C)/Z(+20°C)	8	6	6	5	4	3												
Endurance	<p>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</p> <table border="1"> <tr> <td>Capacitance change</td> <td>≒ ±25% of the initial value</td> <td rowspan="4"> <table border="1"> <tr> <th>Size</th> <th>Life time (hours)</th> </tr> <tr> <td>≒ 6.3Φ</td> <td>2,000</td> </tr> <tr> <td>= 8 Φ</td> <td>3,000</td> </tr> <tr> <td>= 10Φ</td> <td>4,000</td> </tr> <tr> <td>≒ 12.5Φ</td> <td>5,000</td> </tr> </table> </td> </tr> <tr> <td>Dissipation factor(tanδ)</td> <td>≒ 200% of the specified value</td> </tr> <tr> <td>Leakage current</td> <td>≒ specified value</td> </tr> </table>	Capacitance change	≒ ±25% of the initial value	<table border="1"> <tr> <th>Size</th> <th>Life time (hours)</th> </tr> <tr> <td>≒ 6.3Φ</td> <td>2,000</td> </tr> <tr> <td>= 8 Φ</td> <td>3,000</td> </tr> <tr> <td>= 10Φ</td> <td>4,000</td> </tr> <tr> <td>≒ 12.5Φ</td> <td>5,000</td> </tr> </table>	Size	Life time (hours)	≒ 6.3Φ	2,000	= 8 Φ	3,000	= 10Φ	4,000	≒ 12.5Φ	5,000	Dissipation factor(tanδ)	≒ 200% of the specified value	Leakage current	≒ specified value
Capacitance change	≒ ±25% of the initial value	<table border="1"> <tr> <th>Size</th> <th>Life time (hours)</th> </tr> <tr> <td>≒ 6.3Φ</td> <td>2,000</td> </tr> <tr> <td>= 8 Φ</td> <td>3,000</td> </tr> <tr> <td>= 10Φ</td> <td>4,000</td> </tr> <tr> <td>≒ 12.5Φ</td> <td>5,000</td> </tr> </table>	Size		Life time (hours)	≒ 6.3Φ	2,000	= 8 Φ	3,000	= 10Φ	4,000	≒ 12.5Φ	5,000					
Size	Life time (hours)																	
≒ 6.3Φ	2,000																	
= 8 Φ	3,000																	
= 10Φ	4,000																	
≒ 12.5Φ	5,000																	
Dissipation factor(tanδ)	≒ 200% of the specified value																	
Leakage current	≒ specified value																	
Shelf Life	<p>The following requirements shall be satisfied when the capacitor are restored to 25°C after exposing them for 500 hours at 105°C without voltage applied.</p> <table border="1"> <tr> <td>Capacitance change</td> <td>≒ ±25% of the initial value</td> </tr> <tr> <td>Dissipation factor(tanδ)</td> <td>≒ 200% of the specified value</td> </tr> <tr> <td>Leakage current</td> <td>≒ 200% of the specified value</td> </tr> </table>	Capacitance change	≒ ±25% of the initial value	Dissipation factor(tanδ)	≒ 200% of the specified value	Leakage current	≒ 200% of the specified value											
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 L < 35	12.5 L ≥ 35	16
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
a	L + 1.5 Max				≒ 35 L + 1.5 Max ≒ 40 L + 2.0 Max		L + 1.5 Max

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



ALUMINUM ELECTROLYTIC CAPACITORS



EK Series

◆ Case size & Permissible rated ripple current:

Nominal Capacitance (uF)	6.3V			10V			16V		
	Case Size DΦ×L (mm)	Impedance @20°C (Ωmax/100kHz)	Max. Rated ripple current @105°C 100kHz (mA rms)	Case Size DΦ×L (mm)	Impedance @20°C (Ωmax/100kHz)	Max. Rated ripple current @105°C 100kHz (mA rms)	Case Size DΦ×L (mm)	Impedance @20°C (Ωmax/100kHz)	Max. Rated ripple current @105°C 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
120							6.3×11	0.150	350
150	5×11	0.300	250	5×11	0.380	300	6.3×11	0.130	405
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
				8×11.5	0.072	760	8×11.5	0.056	995
470							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						
				8×15	0.056	995	8×15	0.045	1200
680							8×20	0.041	1250
				10×12.5	0.053	1030	10×16	0.038	1430
820	8×15	0.056	995						
				8×20	0.041	1250			
1000	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						

ALUMINUM ELECTROLYTIC CAPACITORS



EK Series

◆ Case size & Permissible rated ripple current:

Nominal Capacitance (uF)	25V			35V			50V		
	Case Size DΦ×L (mm)	Impedance @20°C (Ωmax/100kHz)	Max. Rated ripple current @105°C 100kHz (mA rms)	Case Size DΦ×L (mm)	Impedance @20°C (Ωmax/100kHz)	Max. Rated ripple current @105°C 100kHz (mA rms)	Case Size DΦ×L (mm)	Impedance @20°C (Ωmax/100kHz)	Max. Rated ripple current @105°C 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
270				10×12.5	0.053	1030			
330				8×20	0.041	1250	10×20	0.030	1580
330	8×15	0.056	995						
330	10×12.5	0.053	1030	10×16	0.038	1430	10×25	0.028	1870
470	8×20	0.041	1250						
470	10×12.5	0.038	1300	10×16	0.030	1620			
470	10×16	0.038	1430	10×20	0.023	1820			
470	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
680	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
820							16×20	0.023	2730
1000	12.5×16	0.028	2250	12.5×20	0.050	2610			
1000	12.5×20	0.021	2360	12.5×25	0.018	2770	16×25	0.021	3010
1200				12.5×30	0.016	3290			
1200				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						
1800	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

ALUMINUM ELECTROLYTIC CAPACITORS



EV Series

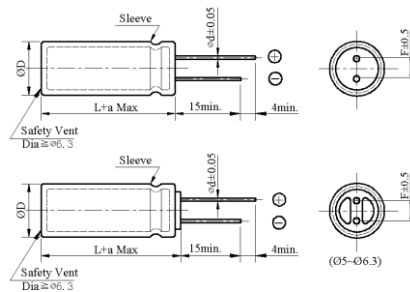
- Low impedance and High ripple current.
- Load life 3,000~6,000 hours at 105°C.



SPECIFICATIONS

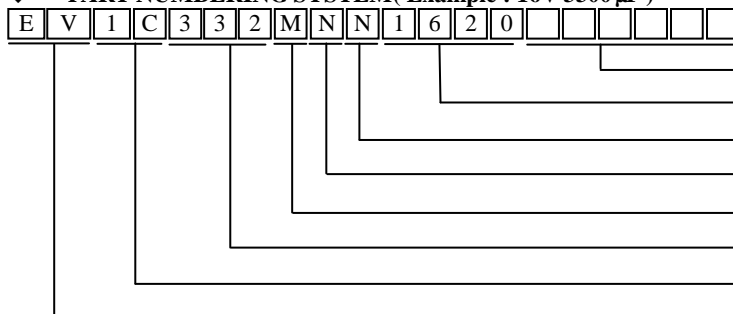
Item	Performance Characteristics																				
Category Temperature Range	-40~ +105°C																				
Working Voltage Range	6.3 ~ 35Vdc																				
Capacitance Range	10 ~8,200µF																				
Capacitance Tolerance	±20% (at 25°C and 120Hz)																				
Dissipation Factor (tanδ) (at 25°C, 120Hz)	<table border="1"> <tr> <td>Rated Voltage (V)</td> <td>6.3</td> <td>10</td> <td>16</td> <td>25</td> <td>35</td> </tr> <tr> <td>tanδ(Max)</td> <td>0.22</td> <td>0.19</td> <td>0.16</td> <td>0.14</td> <td>0.12</td> </tr> </table>	Rated Voltage (V)	6.3	10	16	25	35	tanδ(Max)	0.22	0.19	0.16	0.14	0.12								
	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)	<table border="1"> <tr> <td>Rated voltage (V)</td> <td>6.3</td> <td>10</td> <td>16</td> <td>25</td> <td>35</td> </tr> <tr> <td>Z(-40°C)/Z(+20°C)</td> <td>8</td> <td>6</td> <td>6</td> <td>5</td> <td>4</td> </tr> </table>	Rated voltage (V)	6.3	10	16	25	35	Z(-40°C)/Z(+20°C)	8	6	6	5	4								
	Rated voltage (V)	6.3	10	16	25	35															
Z(-40°C)/Z(+20°C)	8	6	6	5	4																
(at 120Hz)																					
Endurance	<p>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</p> <table border="1"> <tr> <td>Capacitance change</td> <td>≒ ±25% of the initial value</td> <td>Size</td> <td>Life time (hours)</td> </tr> <tr> <td>Dissipation factor(tanδ)</td> <td>≒ 200% of the specified value</td> <td>≒ 6.3Φ</td> <td>3,000</td> </tr> <tr> <td>Leakage current</td> <td>≒ specified value</td> <td>= 8 Φ</td> <td>4,000</td> </tr> <tr> <td></td> <td></td> <td>= 10Φ</td> <td>5,000</td> </tr> <tr> <td></td> <td></td> <td>≒ 12.5Φ</td> <td>6,000</td> </tr> </table>	Capacitance change	≒ ±25% of the initial value	Size	Life time (hours)	Dissipation factor(tanδ)	≒ 200% of the specified value	≒ 6.3Φ	3,000	Leakage current	≒ specified value	= 8 Φ	4,000			= 10Φ	5,000			≒ 12.5Φ	6,000
	Capacitance change	≒ ±25% of the initial value	Size	Life time (hours)																	
Dissipation factor(tanδ)	≒ 200% of the specified value	≒ 6.3Φ	3,000																		
Leakage current	≒ specified value	= 8 Φ	4,000																		
		= 10Φ	5,000																		
		≒ 12.5Φ	6,000																		
Shelf Life	<p>The following requirements shall be satisfied when the capacitor are restored to 25°C after exposing them for 1,000 hours at 105°C without voltage applied.</p> <table border="1"> <tr> <td>Capacitance change</td> <td>≒ ±25% of the initial value</td> </tr> <tr> <td>Dissipation factor(tanδ)</td> <td>≒ 200% of the specified value</td> </tr> <tr> <td>Leakage current</td> <td>≒ 200% of the specified value</td> </tr> </table>	Capacitance change	≒ ±25% of the initial value	Dissipation factor(tanδ)	≒ 200% of the specified value	Leakage current	≒ 200% of the specified value														
	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 L<35	12.5 L≥35	16	18
ΦD	ΦD + 0.5 Max							
Φd	0.5	0.5	0.6	0.6	0.6	0.8	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 NUMBERING SYSTEM (Example : 16V 3300 µF)



ALUMINUM ELECTROLYTIC CAPACITORS



EV Series

◆ Case size & Permissible rated ripple current:

Nominal Capacitance (uF)	25 V				35 V			
	Case Size DΦ×L (mm)	Impedance (Ω _{max} /100kHz)		Max. Rated ripple current @105°C 100kHz (mA rms)	Case Size DΦ×L (mm)	Impedance (Ω _{max} /100kHz)		Max. Rated ripple current @105°C 100kHz (mA rms)
		20°C	-10°C			20°C	-10°C	
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

ALUMINUM ELECTROLYTIC CAPACITORS



EJ Series

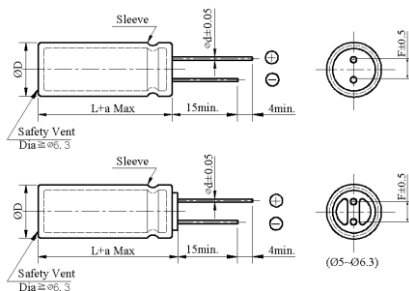
- Low impedance and High ripple current.
- Load life 3,000 to 5,000 hours at 105°C.



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)	<table border="1"> <tr> <td>Rated Voltage (V)</td> <td>6.3</td> <td>10</td> <td>16</td> <td>25</td> <td>35</td> <td>50</td> <td>63</td> </tr> <tr> <td>tanδ(Max)</td> <td>0.22</td> <td>0.19</td> <td>0.16</td> <td>0.14</td> <td>0.12</td> <td>0.10</td> <td>0.09</td> </tr> </table>	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
	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)	<table border="1"> <tr> <td>Rated voltage (V)</td> <td>6.3</td> <td>10</td> <td>16</td> <td>25</td> <td>35</td> <td>50</td> <td>63</td> </tr> <tr> <td>Z(-55°C)/Z(+20°C)</td> <td>4</td> <td>3</td> <td>3</td> <td>3</td> <td>3</td> <td>3</td> <td>3</td> </tr> </table>	Rated voltage (V)	6.3	10	16	25	35	50	63	Z(-55°C)/Z(+20°C)	4	3	3	3	3	3	3
	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																
	<table border="1"> <tr> <td>Capacitance change</td> <td>≒ ±25% of the initial value</td> <td>Size</td> <td>Life time (hours)</td> </tr> <tr> <td>Dissipation factor(tanδ)</td> <td>≒ 200% of the specified value</td> <td>≒ 6.3Φ</td> <td>3,000</td> </tr> <tr> <td>Leakage current</td> <td>≒ specified value</td> <td>≒ 8 Φ</td> <td>4,000</td> </tr> <tr> <td></td> <td></td> <td>≒ 10 Φ</td> <td>5,000</td> </tr> </table>	Capacitance change	≒ ±25% of the initial value	Size	Life time (hours)	Dissipation factor(tanδ)	≒ 200% of the specified value	≒ 6.3Φ	3,000	Leakage current	≒ specified value	≒ 8 Φ	4,000			≒ 10 Φ	5,000
	Capacitance change	≒ ±25% of the initial value	Size	Life time (hours)													
	Dissipation factor(tanδ)	≒ 200% of the specified value	≒ 6.3Φ	3,000													
Leakage current	≒ specified value	≒ 8 Φ	4,000														
		≒ 10 Φ	5,000														
Shelf Life	The following requirements shall be satisfied when the capacitor are restored to 25°C after exposing them for 1,000 hours at 105°C without voltage applied.																
	<table border="1"> <tr> <td>Capacitance change</td> <td>≒ ±25% of the initial value</td> </tr> <tr> <td>Dissipation factor(tanδ)</td> <td>≒ 200% of the specified value</td> </tr> <tr> <td>Leakage current</td> <td>≒ 200% of the specified value</td> </tr> </table>	Capacitance change	≒ ±25% of the initial value	Dissipation factor(tanδ)	≒ 200% of the specified value	Leakage current	≒ 200% of the specified value										
	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.																

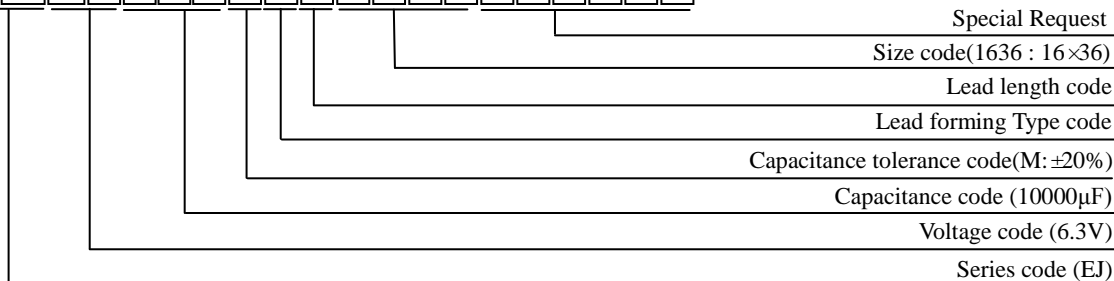
DIMENSIONS (mm)



ΦD	5	6.3	8	10	12.5 L<35	12.5 L≥35	16	18
ΦD	ΦD + 0.5 Max							
Φd	0.5	0.5	0.6	0.6	0.6	0.8	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 NUMBERING SYSTEM(Example : 6.3V 10000 μF)

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



ALUMINUM ELECTROLYTIC CAPACITORS



EJ Series

◆ Case size & Permissible rated ripple current:

Nominal capacitance (uF)	6.3V				10V			
	Case size DΦ×L (mm)	Impedance (Ω _{max} /100kHz)		Max. Rated ripple current @ 105°C 100kHz (mA rms)	Case size DΦ×L (mm)	Impedance (Ω _{max} /100kHz)		Max. Rated ripple current @ 105°C 100kHz (mA rms)
		20°C	-10°C			20°C	-10°C	
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	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	12.5×40	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 DΦ×L (mm)	Impedance (Ω _{max} /100kHz)		Max. Rated ripple current @ 105°C 100kHz (mA rms)	Case size DΦ×L (mm)	Impedance (Ω _{max} /100kHz)		Max. Rated ripple current @ 105°C 100kHz (mA rms)
		20°C	-10°C			20°C	-10°C	
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				

ALUMINUM ELECTROLYTIC CAPACITORS



EJ Series

◆ Case size & Permissible rated ripple current:

Nominal capacitance (uF)	35V				50V			
	Case size DΦ×L (mm)	Impedance (Ωmax/100kHz)		Max. Rated ripple current @105°C 100kHz (mA rms)	Case size DΦ×L (mm)	Impedance (Ωmax/100kHz)		Max. Rated ripple current @105°C 100kHz (mA rms)
		20°C	-10°C			20°C	-10°C	
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 DΦ×L (mm)	Impedance (Ωmax/100kHz)		Max. Rated ripple current @105°C 100kHz (mA rms)
		20°C	-10°C	
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

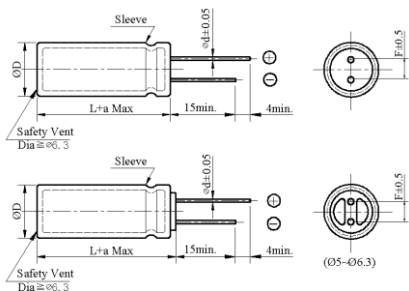
- Low impedance and High ripple current.
- Load life 3,000 to 6,000 hours at 105°C.



◆ SPECIFICATIONS

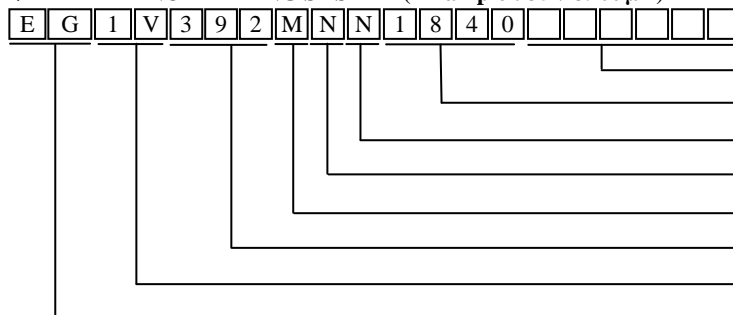
Item	Performance Characteristics																				
Category Temperature Range	-55~ +105°C																				
Working Voltage Range	6.3 ~ 63Vdc																				
Capacitance Range	10 ~ 10,000µF																				
Capacitance Tolerance	±20% (at 25°C and 120Hz)																				
Dissipation Factor (tanδ) (at 25°C, 120Hz)	<table border="1"> <tr> <td>Rated Voltage (V)</td> <td>6.3</td> <td>10</td> <td>16</td> <td>25</td> <td>35</td> <td>50</td> <td>63</td> </tr> <tr> <td>tanδ(Max)</td> <td>0.22</td> <td>0.19</td> <td>0.16</td> <td>0.14</td> <td>0.12</td> <td>0.10</td> <td>0.09</td> </tr> </table>	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				
	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)	<table border="1"> <tr> <td>Rated voltage (V)</td> <td>6.3</td> <td>10</td> <td>16</td> <td>25</td> <td>35</td> <td>50</td> <td>63</td> </tr> <tr> <td>Z(-55°C)/Z(+20°C)</td> <td>4</td> <td>3</td> <td>3</td> <td>3</td> <td>3</td> <td>3</td> <td>3</td> </tr> </table>	Rated voltage (V)	6.3	10	16	25	35	50	63	Z(-55°C)/Z(+20°C)	4	3	3	3	3	3	3				
	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																				
	<table border="1"> <tr> <td>Capacitance change</td> <td>≒ ±25% of the initial value</td> <td>Size</td> <td>Life time (hours)</td> </tr> <tr> <td>Dissipation factor(tanδ)</td> <td>≒ 200% of the specified value</td> <td>≒ 6.3Φ</td> <td>3,000</td> </tr> <tr> <td>Leakage current</td> <td>≒ specified value</td> <td>= 8 Φ</td> <td>4,000</td> </tr> <tr> <td></td> <td></td> <td>= 10Φ</td> <td>5,000</td> </tr> <tr> <td></td> <td></td> <td>≒ 12.5Φ</td> <td>6,000</td> </tr> </table>	Capacitance change	≒ ±25% of the initial value	Size	Life time (hours)	Dissipation factor(tanδ)	≒ 200% of the specified value	≒ 6.3Φ	3,000	Leakage current	≒ specified value	= 8 Φ	4,000			= 10Φ	5,000			≒ 12.5Φ	6,000
	Capacitance change	≒ ±25% of the initial value	Size	Life time (hours)																	
	Dissipation factor(tanδ)	≒ 200% of the specified value	≒ 6.3Φ	3,000																	
Leakage current	≒ specified value	= 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°C after exposing them for 1,000 hours at 105°C without voltage applied.																				
	<table border="1"> <tr> <td>Capacitance change</td> <td>≒ ±25% of the initial value</td> </tr> <tr> <td>Dissipation factor(tanδ)</td> <td>≒ 200% of the specified value</td> </tr> <tr> <td>Leakage current</td> <td>≒ 200% of the specified value</td> </tr> </table>	Capacitance change	≒ ±25% of the initial value	Dissipation factor(tanδ)	≒ 200% of the specified value	Leakage current	≒ 200% of the specified value														
	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 L < 35	12.5 L ≥ 35	16	18
ΦD	ΦD + 0.5 Max							
Φd	0.5	0.5	0.6	0.6	0.6	0.8	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 + 1.5 Max ≧ 40 L + 2.0 Max		L + 1.5 Max	

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



ALUMINUM ELECTROLYTIC CAPACITORS



EG Series

◆ Case size & Permissible rated ripple current:

Nominal capacitance (uF)	6.3V				10V			
	Case size DΦ×L (mm)	Impedance (Ω _{max} /100kHz)		Max. Rated ripple current @ 105°C 100kHz (mA rms)	Case size DΦ×L (mm)	Impedance (Ω _{max} /100kHz)		Max. Rated ripple current @ 105°C 100kHz (mA rms)
		20°C	-10°C			20°C	-10°C	
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	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	12.5×40	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 DΦ×L (mm)	Impedance (Ω _{max} /100kHz)		Max. Rated ripple current @ 105°C 100kHz (mA rms)	Case size DΦ×L (mm)	Impedance (Ω _{max} /100kHz)		Max. Rated ripple current @ 105°C 100kHz (mA rms)
		20°C	-10°C			20°C	-10°C	
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				

ALUMINUM ELECTROLYTIC CAPACITORS



EG Series

◆ Case size & Permissible rated ripple current:

Nominal capacitance (uF)	35V				50V			
	Case size DΦ×L (mm)	Impedance (Ω _{max} /100kHz)		Max. Rated ripple current @105°C 100kHz (mA rms)	Case size DΦ×L (mm)	Impedance (Ω _{max} /100kHz)		Max. Rated ripple current @105°C 100kHz (mA rms)
		20°C	-10°C			20°C	-10°C	
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 DΦ×L (mm)	Impedance (Ω _{max} /100kHz)		Max. Rated ripple current @105°C 100kHz (mA rms)
		20°C	-10°C	
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

ALUMINUM ELECTROLYTIC CAPACITORS



EY Series

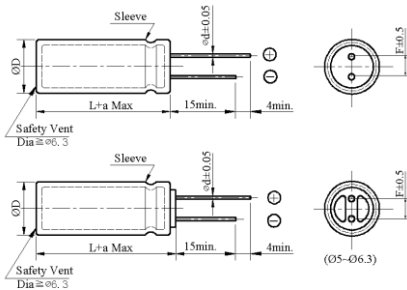
- Miniaturized, Low E.S.R and Low impedance.
- Suitable for use in high ripple current capability.
- Load life 4,000~10,000 hours at 105°C.



◆ SPECIFICATIONS

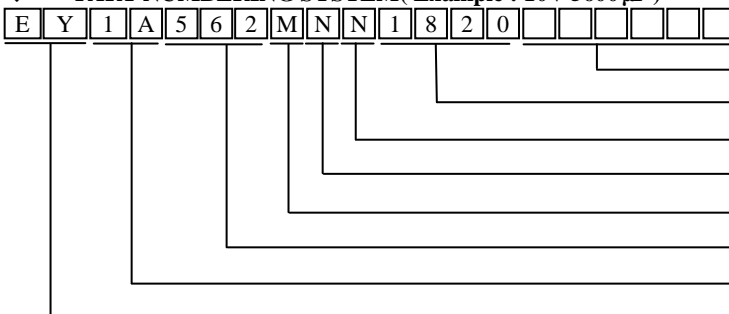
Item	Performance Characteristics																										
Category Temperature Range	-55~+105°C																										
Working Voltage Range	6.3 ~ 100Vdc																										
Capacitance Range	6.8 ~18,000µF																										
Capacitance Tolerance	±20% (at 25°C and 120Hz)																										
Dissipation Factor (tanδ) (at 25°C, 120Hz)	<table border="1"> <tr> <td>Rated Voltage (V)</td> <td>6.3</td> <td>10</td> <td>16</td> <td>25</td> <td>35</td> <td>50</td> <td>63</td> <td>100</td> </tr> <tr> <td>tanδ(Max)</td> <td>0.22</td> <td>0.19</td> <td>0.16</td> <td>0.14</td> <td>0.12</td> <td>0.10</td> <td>0.09</td> <td>0.08</td> </tr> </table>	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								
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																			
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)	<table border="1"> <tr> <td>Rated voltage (V)</td> <td>6.3</td> <td>10</td> <td>16</td> <td>25</td> <td>35</td> <td>50</td> <td>63</td> <td>100</td> </tr> <tr> <td>Z(-55°C)/Z(+20°C)</td> <td>4</td> <td>3</td> <td>3</td> <td>3</td> <td>3</td> <td>3</td> <td>3</td> <td>3</td> </tr> </table> <p style="text-align: right;">(at 120Hz)</p>	Rated voltage (V)	6.3	10	16	25	35	50	63	100	Z(-55°C)/Z(+20°C)	4	3	3	3	3	3	3	3								
Rated voltage (V)	6.3	10	16	25	35	50	63	100																			
Z(-55°C)/Z(+20°C)	4	3	3	3	3	3	3	3																			
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 4,000~10,000 hours at 105 °C <table border="1"> <tr> <td>Capacitance change</td> <td>≒ ±25% of the initial value</td> <td colspan="2"> <table border="1"> <tr> <th rowspan="2">Size</th> <th colspan="2">Life time (hours)</th> </tr> <tr> <th>(6.3~10WV)</th> <th>(16~100WV)</th> </tr> <tr> <td>≒ 6.3 Φ</td> <td>4,000</td> <td>5,000</td> </tr> <tr> <td>8 ~ 10 Φ</td> <td>6,000</td> <td>7,000</td> </tr> <tr> <td>≒ 12.5Φ</td> <td>8,000</td> <td>10,000</td> </tr> </table> </td> </tr> <tr> <td>Dissipation factor(tanδ)</td> <td>≒ 200% of the specified value</td> <td colspan="2"></td> </tr> <tr> <td>Leakage current</td> <td>≒ specified value</td> <td colspan="2"></td> </tr> </table>	Capacitance change	≒ ±25% of the initial value	<table border="1"> <tr> <th rowspan="2">Size</th> <th colspan="2">Life time (hours)</th> </tr> <tr> <th>(6.3~10WV)</th> <th>(16~100WV)</th> </tr> <tr> <td>≒ 6.3 Φ</td> <td>4,000</td> <td>5,000</td> </tr> <tr> <td>8 ~ 10 Φ</td> <td>6,000</td> <td>7,000</td> </tr> <tr> <td>≒ 12.5Φ</td> <td>8,000</td> <td>10,000</td> </tr> </table>		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	Dissipation factor(tanδ)	≒ 200% of the specified value			Leakage current	≒ specified value		
Capacitance change	≒ ±25% of the initial value	<table border="1"> <tr> <th rowspan="2">Size</th> <th colspan="2">Life time (hours)</th> </tr> <tr> <th>(6.3~10WV)</th> <th>(16~100WV)</th> </tr> <tr> <td>≒ 6.3 Φ</td> <td>4,000</td> <td>5,000</td> </tr> <tr> <td>8 ~ 10 Φ</td> <td>6,000</td> <td>7,000</td> </tr> <tr> <td>≒ 12.5Φ</td> <td>8,000</td> <td>10,000</td> </tr> </table>		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										
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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°C after exposing them for 1,000 hours at 105°C without voltage applied. <table border="1"> <tr> <td>Capacitance change</td> <td>≒ ±25% of the initial value</td> </tr> <tr> <td>Dissipation factor(tanδ)</td> <td>≒ 200% of the specified value</td> </tr> <tr> <td>Leakage current</td> <td>≒ 200% of the specified value</td> </tr> </table>	Capacitance change	≒ ±25% of the initial value	Dissipation factor(tanδ)	≒ 200% of the specified value	Leakage current	≒ 200% of the specified value																				
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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 L<35	12.5 L≥35	16	18
ΦD	ΦD + 0.5 Max							
Φd	0.5	0.5	0.6	0.6	0.6	0.8	0.8	0.8
F	2.0	2.5	3.5	5.0	5.0		7.5	7.5
a	L + 1.5 Max				$\leq 35 L + 1.5 \text{Max}$ $\geq 40 L + 2.0 \text{Max}$		L + 1.5 Max	

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



ALUMINUM ELECTROLYTIC CAPACITORS



EY Series

◆ Case size & Permissible rated ripple current:

Nominal capacitance (uF)	6.3V				10V			
	Case size DΦ×L (mm)	Impedance (Ω _{max} /100kHz)		Max. Rated ripple current @ 105°C 100kHz (mA rms)	Case size DΦ×L (mm)	Impedance (Ω _{max} /100kHz)		Max. Rated ripple current @ 105°C 100kHz (mA rms)
		20°C	-10°C			20°C	-10°C	
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	340	6.3×11	0.220	0.870	380
470	8×11.5	0.150	0.580	345	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	0.071	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	10×25	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	1900	18×15	0.042	0.110	2220
	16×15	0.041	0.120	1945				
3300	12.5×20	0.034	0.120	1900	12.5×25	0.026	0.089	2230
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	2650	12.5×35	0.020	0.065	2890
	12.5×35	0.020	0.065	2890	12.5×40	0.016	0.055	3360
5600	16×20	0.026	0.077	2540	16×25	0.020	0.060	2940
					18×20	0.025	0.066	2870
					16×31.5	0.016	0.050	3460
6800	12.5×40	0.016	0.055	3350	18×25	0.018	0.049	3150
	16×25	0.020	0.060	2940				
	18×20	0.025	0.066	2870				
8200	16×31.5	0.016	0.050	3450	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				

ALUMINUM ELECTROLYTIC CAPACITORS



EY Series

◆ Case size & Permissible rated ripple current:

Nominal capacitance (uF)	16V				25V			
	Case size DΦ×L (mm)	Impedance (Ω _{max} /100kHz)		Max. Rated ripple current @ 105°C 100kHz (mA rms)	Case size DΦ×L (mm)	Impedance (Ω _{max} /100kHz)		Max. Rated ripple current @ 105°C 100kHz (mA rms)
		20°C	-10°C			20°C	-10°C	
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	340
	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	840	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
2200	12.5×25	0.026	0.089	2240	16×20	0.026	0.078	2540
					18×20	0.025	0.066	2870
	18×15	0.042	0.110	2220	12.5×35	0.020	0.065	2890
2700	12.5×30	0.023	0.077	2650	18×20	0.025	0.066	2870
	16×20	0.026	0.078	2540	12.5×40	0.016	0.056	3360
3300	12.5×35	0.020	0.066	2890	16×25	0.021	0.060	2940
					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				

ALUMINUM ELECTROLYTIC CAPACITORS



EY Series

◆ Case size & Permissible rated ripple current:

Nominal capacitance (uF)	35V				50V			
	Case size DΦ×L (mm)	Impedance (Ω _{max} /100kHz)		Max. Rated ripple current @ 105°C 100kHz (mA rms)	Case size DΦ×L (mm)	Impedance (Ω _{max} /100kHz)		Max. Rated ripple current @ 105°C 100kHz (mA rms)
		20°C	-10°C			20°C	-10°C	
10					5×11	1.300	2.800	135
22					5×11	0.700	2.500	180
33	5×11	0.560	2.300	220	6.3×11	0.600	1.900	205
47	6.3×11	0.350	1.400	280	6.3×11	0.380	1.500	220
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	1050
330	10×16	0.060	0.240	1210	10×25	0.053	0.220	1450
470	10×20	0.045	0.180	1410	12.5×20	0.044	0.150	1670
560	10×25	0.041	0.160	1650	12.5×25	0.033	0.110	1950
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	2520
1000	12.5×25	0.028	0.088	2230	16×25	0.025	0.075	2555
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	2880	18×35.5	0.018	0.056	3150
2200	16×31.5	0.016	0.056	3350	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 DΦ×L (mm)	Impedance (Ω _{max} /100kHz)		Max. Rated ripple current @ 105°C 100kHz (mA rms)	Case size DΦ×L (mm)	Impedance (Ω _{max} /100kHz)		Max. Rated ripple current @ 105°C 100kHz (mA rms)
		20°C	-10°C			20°C	-10°C	
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	245	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	18×35.5	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

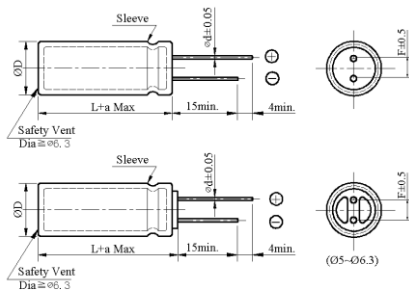
- Miniaturized, Low E.S.R and Low impedance.
- Suitable for use in high ripple current capability.
- Load life 6,000~12,000 hours at 105°C.



◆ SPECIFICATIONS

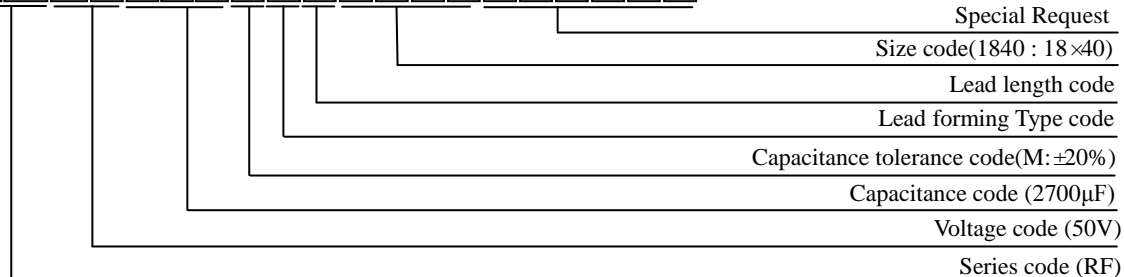
Item	Performance Characteristics																				
Category Temperature Range	-55~+105°C																				
Working Voltage Range	6.3 ~ 100Vdc																				
Capacitance Range	6.8 ~ 18,000µF																				
Capacitance Tolerance	±20% (at 25°C and 120Hz)																				
Dissipation Factor (tanδ) (at 25°C, 120Hz)	<table border="1"> <tr> <td>Rated Voltage (V)</td> <td>6.3</td> <td>10</td> <td>16</td> <td>25</td> <td>35</td> <td>50</td> <td>63</td> <td>100</td> </tr> <tr> <td>tanδ(Max)</td> <td>0.22</td> <td>0.19</td> <td>0.16</td> <td>0.14</td> <td>0.12</td> <td>0.10</td> <td>0.09</td> <td>0.08</td> </tr> </table>	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		
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													
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)	<table border="1"> <tr> <td>Rated voltage (V)</td> <td>6.3</td> <td>10</td> <td>16</td> <td>25</td> <td>35</td> <td>50</td> <td>63</td> <td>100</td> </tr> <tr> <td>Z(-55°C)/Z(+20°C)</td> <td>4</td> <td>3</td> <td>3</td> <td>3</td> <td>3</td> <td>3</td> <td>3</td> <td>3</td> </tr> </table> <p style="text-align: right;">(at 120Hz)</p>	Rated voltage (V)	6.3	10	16	25	35	50	63	100	Z(-55°C)/Z(+20°C)	4	3	3	3	3	3	3	3		
Rated voltage (V)	6.3	10	16	25	35	50	63	100													
Z(-55°C)/Z(+20°C)	4	3	3	3	3	3	3	3													
Endurance	<p>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 6,000~12,000 hours at 105°C</p> <table border="1"> <tr> <td>Capacitance change</td> <td>≒ ±25% of the initial value</td> <td>Size</td> <td>Life time (hours)</td> </tr> <tr> <td>Dissipation factor(tanδ)</td> <td>≒ 200% of the specified value</td> <td>≒ 6.3Φ</td> <td>6,000</td> </tr> <tr> <td>Leakage current</td> <td>≒ specified value</td> <td>8 Φ</td> <td>8,000</td> </tr> <tr> <td></td> <td></td> <td>10 Φ</td> <td>10,000</td> </tr> <tr> <td></td> <td></td> <td>≒ 12.5Φ</td> <td>12,000</td> </tr> </table>	Capacitance change	≒ ±25% of the initial value	Size	Life time (hours)	Dissipation factor(tanδ)	≒ 200% of the specified value	≒ 6.3Φ	6,000	Leakage current	≒ specified value	8 Φ	8,000			10 Φ	10,000			≒ 12.5Φ	12,000
Capacitance change	≒ ±25% of the initial value	Size	Life time (hours)																		
Dissipation factor(tanδ)	≒ 200% of the specified value	≒ 6.3Φ	6,000																		
Leakage current	≒ specified value	8 Φ	8,000																		
		10 Φ	10,000																		
		≒ 12.5Φ	12,000																		
Shelf Life	<p>The following requirements shall be satisfied when the capacitor are restored to 25°C after exposing them for 1,000 hours at 105°C without voltage applied.</p> <table border="1"> <tr> <td>Capacitance change</td> <td>≒ ±25% of the initial value</td> </tr> <tr> <td>Dissipation factor(tanδ)</td> <td>≒ 200% of the specified value</td> </tr> <tr> <td>Leakage current</td> <td>≒ 200% of the specified value</td> </tr> </table>	Capacitance change	≒ ±25% of the initial value	Dissipation factor(tanδ)	≒ 200% of the specified value	Leakage current	≒ 200% of the specified value														
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 L<35	12.5 L≥35	16	18
ΦD	ΦD + 0.5 Max							
Φd	0.5	0.5	0.6	0.6	0.6	0.8	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 NUMBERING SYSTEM(Example : 50V 2700µF)



ALUMINUM ELECTROLYTIC CAPACITORS



RF Series

◆ Case size & Permissible rated ripple current:

Nominal capacitance (uF)	6.3V				10V			
	Case size DΦ×L (mm)	Impedance (Ωmax/100kHz)		Max. Rated ripple current @ 105°C 100kHz (mA rms)	Case size DΦ×L (mm)	Impedance (Ωmax/100kHz)		Max. Rated ripple current @ 105°C 100kHz (mA rms)
		20°C	-10°C			20°C	-10°C	
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	340	6.3×11	0.220	0.870	380
470	8×11.5	0.150	0.580	345	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	0.071	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	10×25	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	1900	18×15	0.042	0.110	2220
	16×15	0.041	0.120	1945				
3300	12.5×20	0.034	0.120	1900	12.5×25	0.026	0.089	2230
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	2650	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	3450	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				

ALUMINUM ELECTROLYTIC CAPACITORS



RF Series

◆ Case size & Permissible rated ripple current:

Nominal capacitance (uF)	16V				25V			
	Case size DΦ×L (mm)	Impedance (Ωmax/100kHz)		Max. Rated ripple current @105°C 100kHz (mA rms)	Case size DΦ×L (mm)	Impedance (Ωmax/100kHz)		Max. Rated ripple current @105°C 100kHz (mA rms)
		20°C	-10°C			20°C	-10°C	
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	340
	6.3×11	0.210	0.820	310				
120	6.3×11	0.210	0.870	340	6.3×11	0.210	0.870	360
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	840	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
					16×35.5	0.014	0.043	3620
3900	12.5×40	0.016	0.056	3350	18×31.5	0.015	0.040	4180
	16×25	0.021	0.060	2930				
	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				

ALUMINUM ELECTROLYTIC CAPACITORS



RF Series

◆ Case size & Permissible rated ripple current:

Nominal capacitance (uF)	35V				50V			
	Case size DΦ×L (mm)	Impedance (Ωmax/100kHz)		Max. Rated ripple current @ 105°C 100kHz (mA rms)	Case size DΦ×L (mm)	Impedance (Ωmax/100kHz)		Max. Rated ripple current @ 105°C 100kHz (mA rms)
		20°C	-10°C			20°C	-10°C	
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	180
33	5×11	0.560	2.300	220	6.3×11	0.600	1.900	205
47	6.3×11	0.350	1.400	280	6.3×11	0.380	1.500	220
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	1050
330	10×16	0.060	0.240	1210	10×25	0.053	0.220	1450
470	10×20	0.045	0.180	1410	12.5×20	0.044	0.150	1670
560	10×25	0.041	0.160	1650	12.5×25	0.033	0.110	1950
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	2520
1000	12.5×25	0.028	0.088	2230	16×25	0.025	0.075	2555
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	2880	16×35.5	0.018	0.056	3150
2200	16×31.5	0.016	0.056	3350	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 DΦ×L (mm)	Impedance (Ωmax/100kHz)		Max. Rated ripple current @ 105°C 100kHz (mA rms)	Case size DΦ×L (mm)	Impedance (Ωmax/100kHz)		Max. Rated ripple current @ 105°C 100kHz (mA rms)
		20°C	-10°C			20°C	-10°C	
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	0.430	1.800	290
68	8×11.5	0.600	2.900	245	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

ALUMINUM ELECTROLYTIC CAPACITORS



PY Series

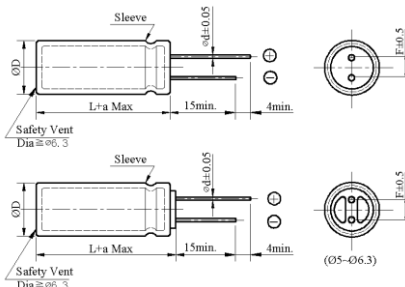
- High-temperature 125°C, High reliability
- Load life 2,000 hours at 125°C



◆ SPECIFICATIONS

Item	Performance Characteristics	
Category Temperature Range	-40 ~ +125°C	-25 ~ +125°C
Working Voltage Range	10 ~ 100Vdc	160 ~ 450Vdc
Capacitance Range	4.7 ~ 1000 μF	4.7 ~ 150 μF
Capacitance Tolerance	±20% (at 25°C and 120Hz)	
Dissipation Factor (tanδ) (at 25°C, 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°C after the rated voltage applied for 1,000 hours at 125°C 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.	

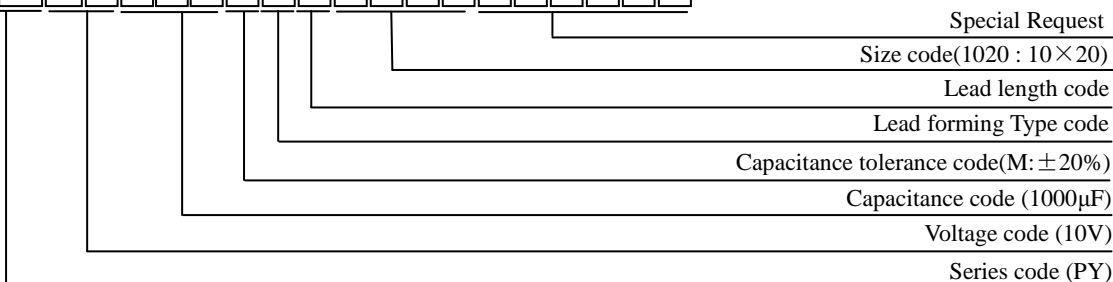
◆ DIMENSIONS (mm)



ΦD	6.3	8	10	12.5 L < 35	12.5 ≥ 35	16
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
a	L + 1.5 Max		≒ 35 L + 1.5 Max ≒ 40 L + 2.0 Max			L + 1.5 Max

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

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



ALUMINUM ELECTROLYTIC CAPACITORS



PY Series

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

uF	Vdc	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

uF	Vdc	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		

uF	Vdc	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				

uF	Vdc	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

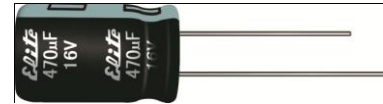
Vdc	Cap.(uF)	Frequency (Hz)				
		50	120	1 K	10 K	100 K
160 ~ 450	4.7~33	0.75	1.00	1.50	1.75	1.80
	47~150	0.80	1.00	1.30	1.40	1.50

ALUMINUM ELECTROLYTIC CAPACITORS



TL Series

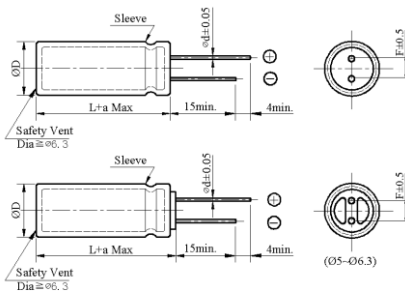
- High-temperature 125°C, high reliability
- Load life 3,000~ 5,000 hours at 125°C



◆ SPECIFICATIONS

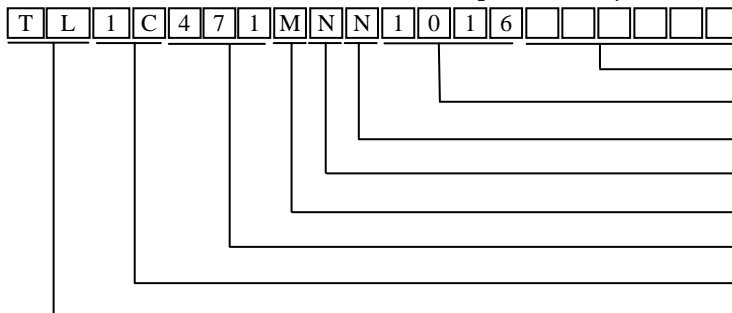
Item	Performance Characteristics															
Category Temperature Range	-55 ~ +125°C															
Working Voltage Range	10 ~ 50Vdc															
Capacitance Range	22 ~ 1000 µF															
Capacitance Tolerance	±20% (at 25°C and 120Hz)															
Dissipation Factor (tanδ) (at 25°C, 120Hz)	<table border="1"> <tr> <td>Rated Voltage (V)</td> <td>10</td> <td>16</td> <td>25</td> <td>35</td> <td>50</td> </tr> <tr> <td>tanδ(Max)</td> <td>0.20</td> <td>0.16</td> <td>0.14</td> <td>0.12</td> <td>0.10</td> </tr> </table>	Rated Voltage (V)	10	16	25	35	50	tanδ(Max)	0.20	0.16	0.14	0.12	0.10			
	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)	<table border="1"> <tr> <td>Rated voltage (V)</td> <td>10</td> <td>16</td> <td>25</td> <td>35</td> <td>50</td> </tr> <tr> <td>Z(-55°C)/Z(+20°C)</td> <td>6</td> <td>4</td> <td>4</td> <td>4</td> <td>4</td> </tr> </table>	Rated voltage (V)	10	16	25	35	50	Z(-55°C)/Z(+20°C)	6	4	4	4	4			
	Rated voltage (V)	10	16	25	35	50										
Z(-55°C)/Z(+20°C)	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 3,000~5,000 hours at 125 °C															
	<table border="1"> <tr> <td>Capacitance change</td> <td>≡ ±25% of the initial value</td> <td>Size</td> <td>Life time (hours)</td> </tr> <tr> <td>Dissipation factor(tanδ)</td> <td>≡ 200% of the specified value</td> <td>≡ 6.3Φ</td> <td>3,000</td> </tr> <tr> <td>Leakage current</td> <td>≡ specified value</td> <td>8 Φ</td> <td>4,000</td> </tr> <tr> <td></td> <td></td> <td>≧ 10 Φ</td> <td>5,000</td> </tr> </table>	Capacitance change	≡ ±25% of the initial value	Size	Life time (hours)	Dissipation factor(tanδ)	≡ 200% of the specified value	≡ 6.3Φ	3,000	Leakage current	≡ specified value	8 Φ	4,000			≧ 10 Φ
Capacitance change	≡ ±25% of the initial value	Size	Life time (hours)													
Dissipation factor(tanδ)	≡ 200% of the specified value	≡ 6.3Φ	3,000													
Leakage current	≡ specified value	8 Φ	4,000													
		≧ 10 Φ	5,000													
Shelf Life	The following requirements shall be satisfied when the capacitor are restored to 25°C after the rated voltage applied for 1,000 hours at 125°C without voltage applied. After test : UR to be applied for 30 minutes, 24 to 48 hours before measurement.															
	<table border="1"> <tr> <td>Capacitance change</td> <td>≡ ±25% of the initial value</td> </tr> <tr> <td>Dissipation factor(tanδ)</td> <td>≡ 200% of the specified value</td> </tr> <tr> <td>Leakage current</td> <td>≡ 200% of the specified value</td> </tr> </table>	Capacitance change	≡ ±25% of the initial value	Dissipation factor(tanδ)	≡ 200% of the specified value	Leakage current	≡ 200% of the specified value									
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 L < 35	12.5 ≥ 35	16
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
a	L + 1.5 Max			≧ 35 L+1.5Max ≧ 40 L+2.0 Max		L + 1.5 Max

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



TL Series

◆ Case size & Permissible rated ripple current: (mA rms) at 125°C / 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

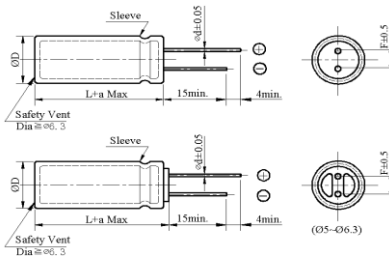
- High-temperature 130°C, high reliability
- Load life 1,000~ 4,000 hours at 130°C
- For automotive electronics and lighting equipment and other high temperature applications



◆ SPECIFICATIONS

Item	Performance Characteristics												
Category Temperature Range	-40 ~ +130°C						-25 ~ +130°C						
Working Voltage Range	10 ~ 100Vdc						200 ~ 450Vdc						
Capacitance Range	4.7 ~ 4,700 µF						3.3~ 100 µF						
Capacitance Tolerance	±20% (at 25°C and 120Hz)												
Dissipation Factor (tanδ) (at 25°C, 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°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 1,000~4,000 hours at 130°C												
		10~100 Vdc				200~450Vdc				Case Size		Life time (hours)	
	Capacitance change	≒ ±30% of the initial value				≒ ±20% of the initial value				10~100V		200~450	
	Dissipation factor(tanδ)	≒ ±300% of the specified value				≒ ±200% of the specified value				ΦD=6,3		—	
	Leakage curren	≒ Specified value								ΦD=8,10		2,000	
Shelf Life	The following requirements shall be satisfied when the capacitor are restored to 25°C after the rated voltage applied for 1,000 hours at 130°C 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.												

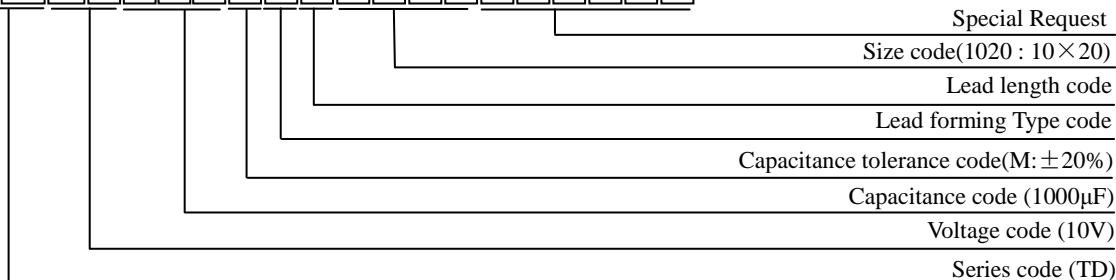
◆ DIMENSIONS (mm)



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

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

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



ALUMINUM ELECTROLYTIC CAPACITORS



TD Series

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

uF	Vdc	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		

uF	Vdc	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				

uF	Vdc	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				

ALUMINUM ELECTROLYTIC CAPACITORS



TD Series

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

uF	Vdc	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)

(200 to 450Vdc)

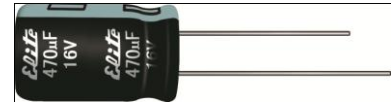
Vdc	Cap.(uF)	Frequency (Hz)				Vdc	Cap.(uF)	Frequency (Hz)			
		120K	1K	10K	≥100K			120	1K	10K	100K
10 ~ 100	<100	0.40	0.75	0.90	1.00	200 ~ 450	3.3~15	0.30	0.60	0.90	1.00
	100 ~ 470	0.50	0.85	0.94	1.00						
	>470	0.60	0.87	0.95	1.00		22~100	0.50	0.80	0.90	1.00

ALUMINUM ELECTROLYTIC CAPACITORS



TX Series

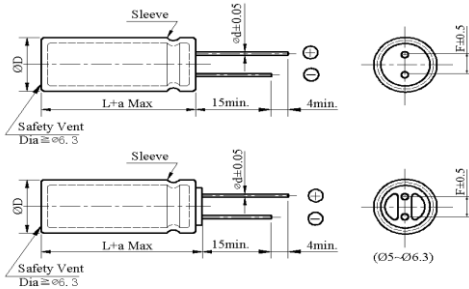
- High-temperature 135°C, high reliability
- Load life 1,000~ 2,000 hours at 135°C
- For automotive electronics and lighting equipment and other high temperature applications



◆ SPECIFICATIONS

Item	Performance Characteristics												
Category Temperature Range	-55 ~ +135°C												
Working Voltage Range	10 ~ 50Vdc												
Capacitance Range	22 ~ 1000 µF												
Capacitance Tolerance	±20% (at 25°C and 120Hz)												
Dissipation Factor (tanδ) (at 25°C, 120Hz)	<table border="1"> <tr> <td>Rated Voltage (V)</td> <td>10</td> <td>16</td> <td>25</td> <td>35</td> <td>50</td> </tr> <tr> <td>tanδ(Max)</td> <td>0.20</td> <td>0.16</td> <td>0.14</td> <td>0.12</td> <td>0.10</td> </tr> </table>	Rated Voltage (V)	10	16	25	35	50	tanδ(Max)	0.20	0.16	0.14	0.12	0.10
	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	$I \leq 0.03CV$ 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)	<table border="1"> <tr> <td>Rated voltage (V)</td> <td>10</td> <td>16</td> <td>25</td> <td>35</td> <td>50</td> </tr> <tr> <td>Z(-55°C)/Z(+20°C)</td> <td>6</td> <td>4</td> <td>4</td> <td>4</td> <td>4</td> </tr> </table> <p style="text-align: right;">(at 120Hz)</p>	Rated voltage (V)	10	16	25	35	50	Z(-55°C)/Z(+20°C)	6	4	4	4	4
Rated voltage (V)	10	16	25	35	50								
Z(-55°C)/Z(+20°C)	6	4	4	4	4								
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												
Shelf Life	<table border="1"> <tr> <td>Capacitance change</td> <td>≒ ±25% of the initial value</td> <td>Size</td> <td>Life time (hours)</td> </tr> <tr> <td>Dissipation factor(tanδ)</td> <td>≒ 200% of the specified value</td> <td>≒ 10Φ</td> <td>1,000</td> </tr> <tr> <td>Leakage current</td> <td>≒ specified value</td> <td>≒ 12.5Φ</td> <td>2,000</td> </tr> </table>	Capacitance change	≒ ±25% of the initial value	Size	Life time (hours)	Dissipation factor(tanδ)	≒ 200% of the specified value	≒ 10Φ	1,000	Leakage current	≒ specified value	≒ 12.5Φ	2,000
	Capacitance change	≒ ±25% of the initial value	Size	Life time (hours)									
	Dissipation factor(tanδ)	≒ 200% of the specified value	≒ 10Φ	1,000									
Leakage current	≒ specified value	≒ 12.5Φ	2,000										
The following requirements shall be satisfied when the capacitor are restored to 25 °C after the rated voltage applied for 1,000 hours at 135 °C without voltage applied. After test : UR to be applied for 30 minutes, 24 to 48 hours before measurement.													
<table border="1"> <tr> <td>Capacitance change</td> <td>≒ ±25% of the initial value</td> </tr> <tr> <td>Dissipation factor(tanδ)</td> <td>≒ 200% of the specified value</td> </tr> <tr> <td>Leakage current</td> <td>≒ 200% of the specified value</td> </tr> </table>				Capacitance change	≒ ±25% of the initial value	Dissipation factor(tanδ)	≒ 200% of the specified value	Leakage current	≒ 200% of the specified value				
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.												

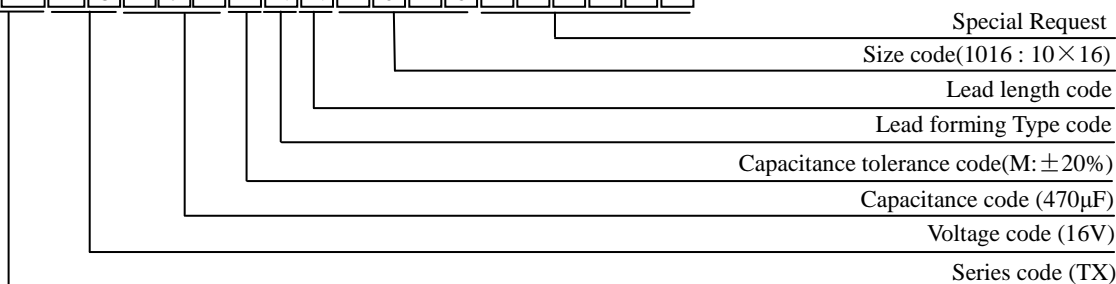
◆ DIMENSIONS (mm)



ΦD	6.3	8	10	12.5 L < 35	12.5 ≥ 35	16
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
a	L + 1.5 Max			≒ 35 L + 1.5 Max ≒ 40 L + 2.0 Max		L + 1.5 Max

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

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



TX Series

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

uF	Vdc	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

uF	Vdc	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

ALUMINUM ELECTROLYTIC CAPACITORS



PW Series

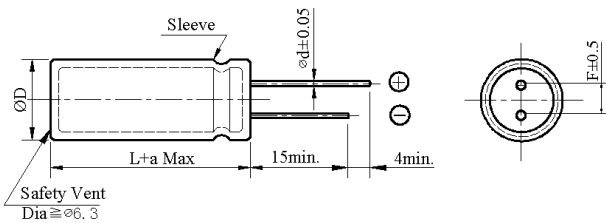
- Downsize and high ripple version of PF series
- Load life 2,000 hours at 105°C



SPECIFICATIONS

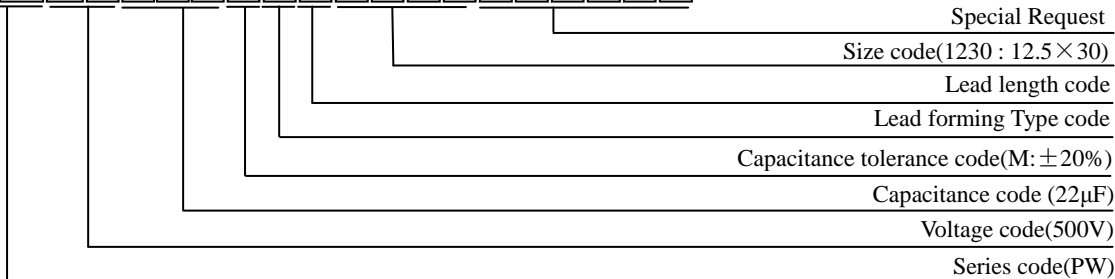
Item	Performance Characteristics						
Category Temperature Range	-25 ~ +105°C						
Working Voltage Range	200 ~ 500Vdc						
Capacitance Range	10 ~ 470 µF						
Capacitance Tolerance	±20% (at 25°C and 120Hz)						
Dissipation Factor (tanδ) (at 25°C, 120Hz)	Rated Voltage (V)	200 ~ 250	350 ~ 500				
	tanδ(Max)	0.15	0.20				
	The above values should be increased by 0.02 for every additional 1000µF						
Leakage Current	$I=0.03CV + 10\mu A$ 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	475	500
	Z(-25°C)/Z(+20°C)	3	5	5	6	6	6
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					
Shelf Life	The following requirements shall be satisfied when the capacitor are restored to 25°C after the rated voltage applied for 1,000 hours at 105°C without voltage applied.						
	Capacitance change	≒ ±20% of the initial value					
	Dissipation factor(tanδ)	≒ 200% of the specified value					
Others	Conforms to JIS-C-5101-4 (1998), characteristic W.						

DIMENSIONS (mm)



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

PART NUMBERING SYSTEM(Example : 500V 22µF)



ALUMINUM ELECTROLYTIC CAPACITORS



PW Series

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

uF	Vdc	200		220		250		400	
		ΦD × L	RC	ΦD × L	RC	ΦD × L	RC	ΦD × L	RC
68								16×30	480
82								16×31.5	500
								18×31.5	520
100								16×35.5	560
								18×31.5	580
120								16×40	660
								18×35.5	670
150				16×30	580	16×31.5	620	18×40	770
180				16×31.5	650	16×35.5	720	18×45	880
220		16×35.5	760	16×35.5	785	16×40	810		
		18×31.5	810	18×31.5	820	18×35.5	830		
330		16×40	980	18×40	1040	18×45	1070		
		18×35.5	1010						
470		18×45	1270	18×50	1350				

uF	Vdc	420		450		475		500	
		ΦD × L	RC	ΦD × L	RC	ΦD × L	RC	ΦD × L	RC
10						12.5×20	100	12.5×20	117
15						12.5×25	128	12.5×25	144
22						12.5×30	160	12.5×30	180
33						16×25	255	16×25	279
47						18×25	340	18×25	360
68		16×31.5	495	16×35.5	505	18×31.5	475	18×35.5	495
		18×30	520	18×31.5	530				
82		16×35.5	520	16×40	535	18×35.5	550	18×40	575
		18×31.5	535	18×35.5	550				
100		16×40	590	18×40	650	18×40	630	18×45	648
		18×35.5	625						
120		18×40	720	18×45	740	18×45	675	18×50	693
150		18×45	785	18×50	800	18×50	830		
180		18×50	950						

◆ RIPPLE CURRENT MULTIPLIERS

Frequency Multipliers

Vdc	Frequency (Hz)				
	50	120	1K	10K	100K
200 ~ 500	0.80	1.00	1.30	1.40	1.50

ALUMINUM ELECTROLYTIC CAPACITORS



PC Series

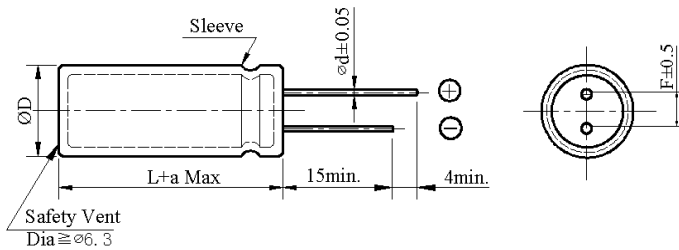
- Downsize, high ripple current design.
- Load life 2,000 hours at 105°C
- Ideal for low profile power supply application



◆ SPECIFICATIONS

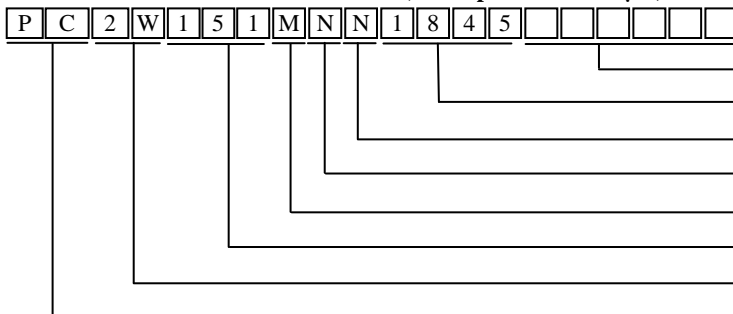
Item	Performance Characteristics				
Category Temperature Range	-25 ~ +105°C				
Working Voltage Range	200 ~ 450Vdc				
Capacitance Range	56 ~ 560 µF				
Capacitance Tolerance	±20% (at 25°C and 120Hz)				
Dissipation Factor (tanδ) (at 25°C, 120Hz)	Rated Voltage (V)	200	400	420	450
	tanδ(Max)	0.15	0.20	0.20	0.20
The above values should be increased by 0.02 for every additional 1000µF					
Leakage Current	$I=0.03CV + 10\mu A$ 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	(at 120Hz)
	Z(-25°C)/Z(+20°C)	3	5	6	
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			
Shelf Life	The following requirements shall be satisfied when the capacitor are restored to 25°C after the rated voltage applied for 1,000 hours at 105°C 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 NUMBERING SYSTEM(Example : 450V 150µF)





PC Series

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

uF	Vdc	200		400		420		450	
		ΦD × L	RC	ΦD × L	RC	ΦD × L	RC	ΦD × L	RC
56								16×30	390
68				16×30	400	16×30	430	16×35.5	450
82						16×35.5	490	16×40	510
					18×30			510	
100				16×35.5	500	16×40	520	18×35.5	600
							18×30		
120				16×40	570	18×31.5	570	18×40	700
				18×30	570	18×35.5	620		
150				16×50	700	18×40	790	18×45	810
				18×35.5	700				
180				18×45	880				
220				18×50	1000				
270		16×35.5	810						
330		16×40	930						
		18×35.5	930						
390		16×45	1050						
		18×35.5	1050						
470		18×40	1180						
560		18×50	1320						

◆ RIPPLE CURRENT MULTIPLIERS

Frequency Multipliers

Vdc	Cap.(uF)	Frequency (Hz)			
		120	1K	10K	100K
200 ~ 450	56 ~ 82	1.00	1.50	1.75	1.80
	100 ~ 560	1.00	1.30	1.40	1.50