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ALUMINUM ELECTROLYTIC CAPACITORS

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1-1 Precautions in Using Aluminum Electrolytic Capacitors

Please note the following recommendations when use capacitors:

1. Electrolytic capacitors for DC applications require polarization .
   Confirm the polarity before use . The circuit life may be shortened or the capacitor may be damaged if insert in reversed polarity . For use on circuits whose polarity is occasionally reversed , or whose polarity is unknown , use non-polar capacitors . Also note that the electrolytic capacitors cannot be used for AC applications .

2. Do not apply a voltage exceeding the capacitor's voltage rating.
   If a voltage exceeding the capacitor's voltage rating is applied , the capacitor may be damaged by increased leakage current . When using the capacitor with AC voltage do not exceed the rated voltage .

3. Do not allow excessive ripple current passing.
   Use the electrolytic capacitor at current value within the permissible ripple range . If the ripple exceeds the specified value , request capacitors for high ripple current applications .

4. Ascertain the operation temperature range .
   Use the electrolytic capacitors according to the specified operation temperature range . Use at room temperature will ensure a longer life .

5. The electrolytic capacitor is not suitable for circuits which are charged and discharged repeatedly .
   If used in circuits which are charged and discharged repeatedly , the capacitance value may drop or the capacitor may be damaged .
   Please consult our engineering department for assistance in these applications .

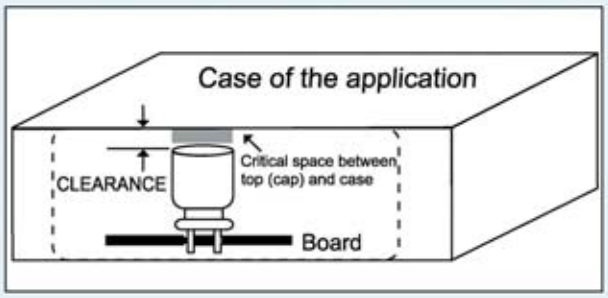
6. When capacitors have been left unused for long time , use them only after due voltage treatments . Long storage of capacitors tends to rise their leakage current levels . In such cases , be sure to provide the necessary voltage treatment before use .

7. Be careful of temperature and time when soldering .
   When soldering a printed circuit board with various components , care must be taken that the soldering temperature is not too high and that the dipping time is not too long .
   Otherwise , there will be adverse effect on the electrical characteristics and insulation sleeve of electrolytic capacitors . In the case of small -size electrolytic capacitors , nothing abnormal will be occurred if dipping is performed at less than 260°C for less than 10 seconds .

8. Cleaning circuit boards after soldering .
   Halogenated hydrocarbon cleaning solvents are not recommended for use in cleaning capacitors supplied with exposed end seals .
   Where cleaning with a halogenated solvent is desired , capacitors should be ordered with an Epoxy-coated end seal .

9. Do not apply excessive force to the lead wires or terminals .
   If excessive force is applied to the lead wires and terminals , they may be broken or their connections on the internal elements may be affected . (For strength of terminals , please refer to JIS C5102 and C5141 .)

10. Keep the following clearance between the vent of the capacitor and the case of the appliance . Do not block the operation of the vent , unless otherwise described on the catalogues or product specifications . The narrower clearance may adversely affect the vent operation and result in an explosion of the capacitor .



Case diameter	Clearance
ø 6.3 to ø 16 mm	2 mm minimum
ø 18 to ø 35 mm	3 mm minimum
ø 40 mm & up	5 mm minimum

Fig.1-1

Attention

- The description in this catalogue is subject to change without prior notice for product improvement . Therefore , please confirm the specification before ordering products .
- The general characteristics , reliability data , etc ., described in this catalogue should not be construed as guaranteed values , they are merely standard values .
- Before using the products , please read the notes in this catalogue carefully for proper use .

1-2 Technical Concepts

1. The material and structure of Electrolytic Capacitors

Electrolytic Capacitor is a simple module . It simply contains an insulator between relative conductors in an electrode. The major internal raw material contains an element constructed by an separator paper wrap around the anode foil and cathode foil , which is then impregnated with the electrolyte , inserted into an aluminum case and sealed.

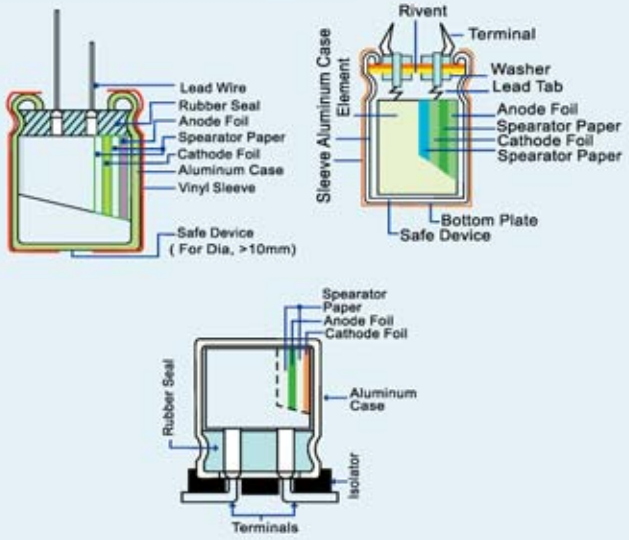


Fig.1-2

2. Production Processes

1. Etching : The process to increase surface area of aluminum foil by using chemical erosion or chemical corrosion method is called Etching Normally chemical corrosion method uses the ripple current of electrolyte , combination of the liquid and temperature to determine the size, shape , and quantity of the dense network of microscopic channels on the aluminum foil surface .
2. Forming : The production process of the anode aluminum foil of electrolytic capacitors is by anodic oxidation of the etched aluminum foil . The production of the cathode aluminum foil sometimes involves oxidation in special purposes . This anodic oxidation process is called Forming . Boric acid or organic acid is used for high voltage forming and phosphoric acid or ammonium adipate is used for low voltage forming in order to obtain stable natural oxide layer of Al_2O_3 .
3. Slitting : The cutting of the aluminum foil and separator paper according to the required length .
4. Winding : The stitching or cold welding of cut anode and cathode foils and tab terminal , and wrap the electrolytic paper in between the anode and cathode , then fix the end with glue or sticky tape , and attached leads is called the capacitor "element" .
5. Impregnation : The process of eliminating the water from the elements by pressurizes or vacuum in order to soak the element with the electrolyte is called Impregnation . The elements fully filled with electrolyte is then centrifuged to remove excess electrolyte .
6. Assembly : The elements seal with rubber to stop the leakage of electrolyte then slip into a sleeve to form the final product .
7. Aging : The purpose of Aging is to repair the oxide film damage by recharging and electrolyte .

1-3 The Function of Electrolytic Capacitors

The electrolytic capacitors could be widely used in appliance (ie. TV , radio , audio equipment , watching machine and air conditioner.....etc .), computer equipment (mother board, image device & the peripherals such as the printer , drawing device, scanner etc) , communication equipment , estate equipment , measure instrument and also the industrial instrument , air plane , firebomb , satellite... etc. as a piloting equipment.

*According to the inflict electric wave & using purpose , it basically with some classified purposes as below :

1. DC Voltage :
   a. For Momentary High Voltage : For using to the impulse generator such as the shock wave resistance test of the heavy electric machine .
   b. For High Electric Current : For using to the welding machine , X - Ray facility , copy machine and discharge processing device .
   c. For DC High Voltage : The electrolytic capacitor and rectifier composing , a special DC high voltage been happened after charged , for using to the power of electronic microscope and accelerator .
   d. For Integration & Memory : For either memory circuit or compare circuit inside the calculator .

2. The DC voltage that with alternate ingredient :

   a. For Wave Filter : Combination with the chip resistor & inductoras a internet , to be past by DC current or some frequency to closure or decline some other frequency .
   b. For Bypass : A parallel track that outside from the circuit element , the IC (integrated circuit) has been rapidly developing in this years and thus a miniaturization or chip of electrolytic capa citors for by pass was conduced .
   c. For Coupling : Combination of the electrolytic capacitor , chip resistor and inductor and thus coupling together .
   d. For Arising of Toothed Wave : Composing of RC charge/discharge circuit through the electrolytic capacitor as well as the resistor and a toothed wave to be created by the RC charge/discharge circuit .
   e. For Reverse (Change) of Circuit : The equipment for change the AC voltage to DC voltage .

3. **For AC voltage :**
   a. For Power Improving : Connect the end loading of layout transporting & electrolytic capacitor for power improving .
   b. For Wave Filter : Prevention of external interference in SCR circuit , use the LC wave filter circuit to inhibit or erase the interference .
   c. For Phase Across : Phase change of the inductive electromotor(motor) with single phase .

1-4 Basic Electrical Characteristics

1. Capacitance (E.S.C.)

C : Capacitance(F)
R : Equivalent series resistance(Ω)
L : Equivalent aeries inductance(H)

Fig.1-3 Simplified equivalent circuit diagram of an electrolytic capacitor

The capacitive component of the equivalent series circuit (equiv alent series capacitance ESC) is determined by applying an alternate voltage of 0.5V at a frequency of 120 Hz .

Temperature dependence of the capacitance
The capacitance of an electrolytic capacitor depends on the temperature : with decreasing temperature , the viscosity of the electrolyte increa ses reducing its conductivity . The capacitance will decrease if the temperature decreases . Furthermore temperature drifts cause armature dilatation and the refore capacitance changes (up to 20% , depending on the series considered, from 0 to 80°C) . This phenomenon is more evident for electrolytic capacitors than for other types .

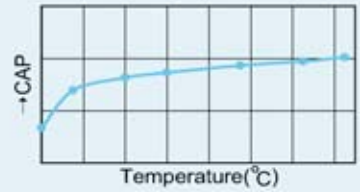


Fig 1-4 Capacitance change vs. temperature

Frequency dependence of the capacitance
The effective capacitance value is derived from the impedance curve , as long as the impedance is still in the range where the capacitance component is dominant .

$$C = \frac{1}{2\pi f Z}$$

C = Capacitance(F)
f = Frequency(Hz)
Z = Impedance(Ω)

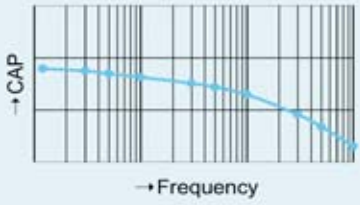


Fig 1-5 Capacitance change vs. frequency

2. Dissipation factor (tanδ)

The dissipation factor is the ratio between the active and the reactive power for a sinusoidal waveform voltage . It can be thought as a measurement of the gap between an actual and an ideal capacitor .

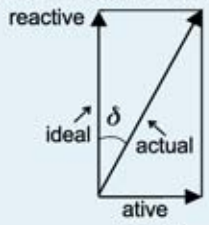


Fig 1-6

D.F. = tanδ x 100 (%) = ωCR x 100 (%)
= 2πfCR x 100 (%)

where: R = Equivalent Series Resistance
C = Equivalent Series Capacitance
ω = 2πf

The tan δ is measured with the same set up as for the series capacitance ESC .

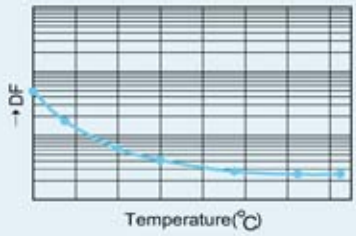


Fig 1-7 Dissipation factor vs. temperature

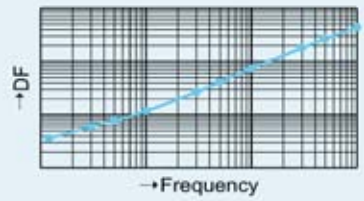


Fig 1-8 Dissipation factor vs. frequency

3. Equivalent series resistance (E.S.R.)

The equivalent series resistanceis the resistive component of the equivalent series circuit . The ESR value depends on frequency and temperature and is related to the tan δ by the following equation :

$$ESR = \frac{\tan\delta}{2\pi f ESC}$$

ESR = Equivalent Series Resistance (Ω)
tanδ = Dissipation Factor
ESC = Equivalent Series Capacitance (F)
f = Frequency (Hz)

The tolerance limits of the rated capacitance must be taken into account when calculating this value .

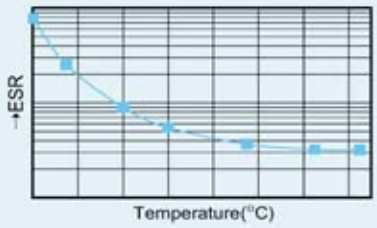


Fig 1-9 ESR change vs. temperature

The resistance of the electrolyte decreases strongly with increasing temperature.

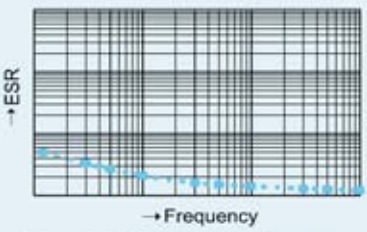


Fig 1-10 ESR change vs. frequency

4. Impedance (Z)

The impedance of an electrolytic capacitor results from here below circuit formed by the following individual equivalent series components :

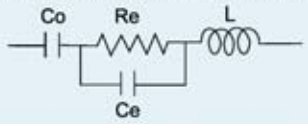


Fig 1-11

Co = Aluminum oxide capacitance (surface and thickness of the dielectric).
Re = Resistance of electrolyte and paper mixture (other resistances not depending on the frequency are not considered : tabs , plates , and so on).
Ce = Electrolyte soaked paper capacitance.
L = Inductive reactance of the capacitor winding and terminals.

The impedance of an electrolytic capacitor is not a constant quantity that retains its value under all the conditions : it changes depending on the frequency and the temperature .

The impedance as a function of frequency (sinusoidal waveform) for a certain temperature can be represented as follows :

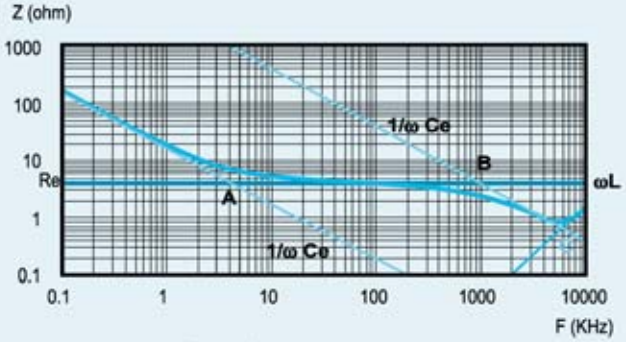


Fig 1-12

- Capacitive reactance predominates at low frequencies
- With increasing frequency , the Capacitive reactance Xc=1/ω Cdecreases until it reaches the order of magnitude of the electrolyte resistance Re (A)
- At even higher frequencies , the resistance of the electrolyte predominates : Z= Re (A - B)
- When the capacitor's resonance frequency is reached (ω 0) , capacitive and cancel each other 1/ω Cinductive reactance mutually cancel each other 1/ω Ce =ω L ,ω 0=SQR(1/LCe)(C) .
- Above this frequency , the inductive reactance of the winding and its terminals (XL=Z=ω L) becomes effective and leads to an increase in impedance .

Generally speaking it can be estimated that Ce ≒ 0.01 Co .

The impedance as a function of frequency (sinusoidal waveform) for different temperature values can be represented as follows (typical values) :

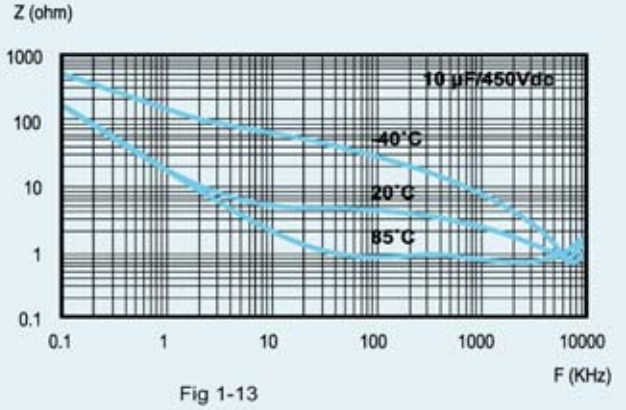


Fig 1-13

Re is the most temperature dependant component of electrolytic capacitor equivalent circuit . The electrolyte resistivity will decrease if the temperature rises . In order to obtain a low impedance value all over the temperature range , Re must be as little as possible , but too low Re values means a very aggressive electrolyte and then a shorter life of the electrolytic capacitor at the high temperatures . A compromise must be reached .

5. Leakage current (L.C.)

Duetothealuminum oxidelayer that serves as adielectric , a small current will continueto flow even after a DC voltage has been applied for long periods . This current is called leakage current . A high leakageurrent flows after applying a voltage to the capacitor and then decreases in few minutes (e.g. after a prolonged storage without any applied voltage) . In the course of the continuous operation ,the leakage current will decrease and reach an almost constant value .

After avoltage free storage the oxide layer may deteriorate , especially at high temperature . Since there are no leakage current to transport oxygen ions to the anode , the oxide layer is not regenerated . The result is that ahigher thannormal leakagecurrent will flow whenavoltageis appliedafter prolongedstorage . As the oxide layer is regenerated in use , the leakage current will gradually decrease to its normal level .

The relationship between the leakage current and the voltage applied at constant temperature can be shown schematically as follows :

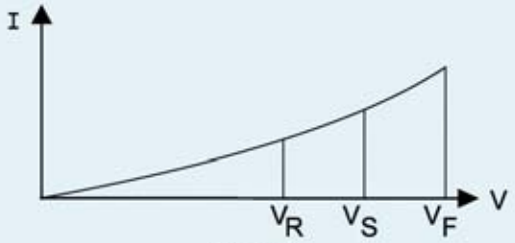


Fig 1-14

Where :

V_F = Forming voltage

If this level is exceeded a large quantity of heat and gas will be generated and the capacitor could be damaged .

V_R = Rated Voltage

This level represents the top of the linear part of the curve .

V_S = Surge voltage

It lies between VR and VF: the capacitor can be subjected to VS for short periods only .

1-5 Reliability

(1)The bathtub curve:

Aluminum electrolytic capacitors feature failure rates shown by the following bathtub curve.

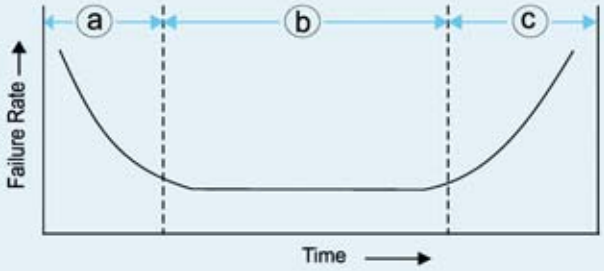


Fig.1-15 Bathtub curve

a. Initial failure period
Deficient Capacitors include any products before dispatch that may have some deficiency caused by the design, production process or used in inappropriate environments.

b. Random failure period
The capacitors have a low defect ratio in the period after it has been stabilized.

c. Wear out failure period
The performance of capacitors will decrease with an increase in usage period. The malfunction rate may vary due to the structural design.

(2) Failure types: (See Table-1)

a). Completely malfunction:
Capacitor is completely disabled to all functions, e.g.: short circuit, open circuit.

b). Malfunction cause by wear and tear gradual malfunctioning of the capacitor, the cause of the malfunction would depend on the environmental conditions.

1-6 Life of the Electrolytic Capacitors

A effects by using condition for the life of electrolytic capacitors which environmental condition & electrical condition .
Environmental condition include temperature , humidity , atmospheric pressure & vibration··· etc. and mostly affected by temperature factor .
Electrical condition include voltage , ripple current and charge / discharge condition··· etc.

1. Temperature & Life

The reduce capacitance & increase DF will be created by the influence from temperature on the life, such condition mostly caused by a slow evaporation from the electrolyte to seal position; the electric specificity that is affected by timing and surrounding temperature as following formula below and similar to the chemical kinetics of Arrhenius' rule and to be reputed as the connection rule of life in electrolytic capacitors.

$$Lx = L0 \times B^{\frac{T0-Tx}{10}} \qquad \text{Eq.1}$$

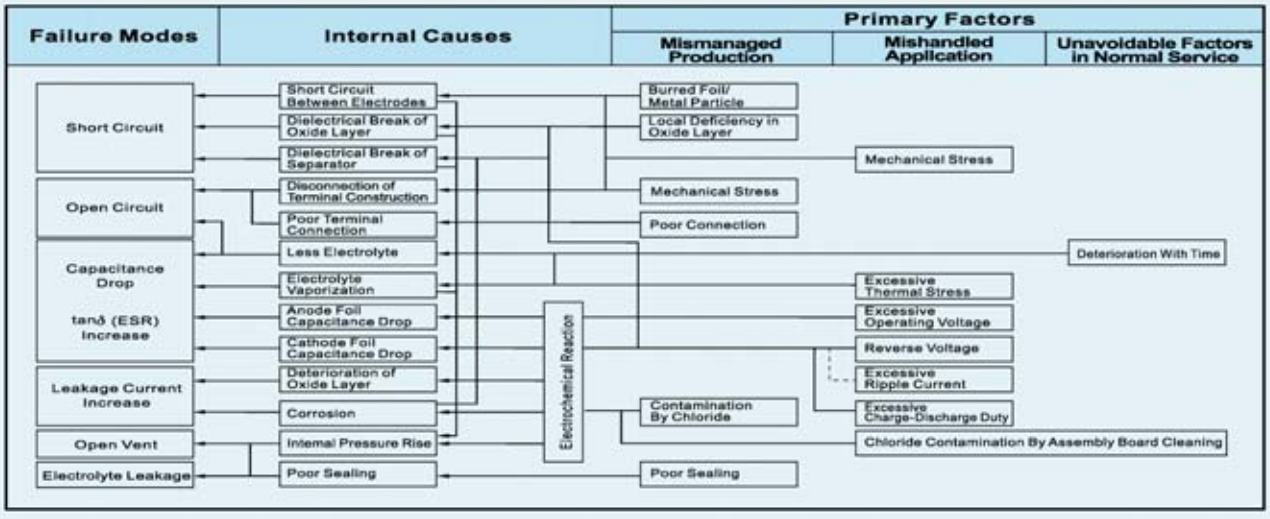
Lx: Expected Life at Operating Temperature Tx℃ (hour)
Lo: Load Life at Maximum Operating Temperature To℃ (hour)
To: Maximum Operating Temperature (℃)
Tx:Actual Operating Temperature. (℃)
B: Accelerate Coefficient of Temperature(≒2)

From the Eq.1 , it means about double acceleration for temperature raising at 10 C . Therefore , it comes a longer working life once a temperature setting lower than Tx while products design .

2. Rated Voltage and Life

While working , the voltage under the input of rated voltage and for the reducing of volt age, although with little or more influence to electrolytic capacitors but, no necessary for special concern after compare with the influence by temperature.

Table-1 Failure modes and causes



3. Influence of Input Ripple Current Against Working life

Passing of some ripple current when the electrolytic capacitor a s a wave filteror smoothing function , the internal temperature of electrolytic capacitor will be bring some more influence to working life as well . Hence , amaximum ripple current will be listed caused by such ripple current anddirectly specifically by each manufacturer; it has been considered as æverlapping by DC voltage & AC voltage when incorporate electrolytic capacitors with a power that ripple current included . The losing electronic power caused by the alternate resistance & direct leakage current inside the electrolytic capacitors will be come to heat . Kindly refer to following for relation between in rated ripple current and temperate raising:

$$W = (I_{Ripple})^2 \cdot R_{ESR} + V \cdot I_{Leakage} \qquad \text{Eq.3}$$

where W: Internal power loss
I Ripple : Ripple current
R ESR: Equivalent Series Resistance
V : Applied voltage
I Leakage : Leakage current

Normally the losing voltage power of DC leakage current that caused by the DC voltage which to be inflicted in the electrolytic capacitor will be lower than a losing voltage power caused by ripple current, therefore:

$$W \fallingdotseq (I_{RIPPLE})^2 \cdot R_{ESR} \qquad \text{Eq.4}$$

The formula for reaching of temperature balance on the internal temperature raising as well as the hot dissipation as below:

$$W \fallingdotseq (I_{RIPPLE})^2 \quad R_{ESR} = \beta \cdot A \cdot \triangle T \qquad \text{Eq.5}$$

β : Heat radiation constant
A = Surface area of container $(cm)^2$
$A = \pi/4 \cdot D \cdot (D + 4L)$
D: case diameter (cm)
L: case length (cm)
△T : Temperature raising created by internal heating (℃).
Through the formula above can see the temperature raising caused by the ripple current and:

$$\triangle T = \frac{(I_{RIPPLE})^2 \cdot R_{ESR}}{\beta A} = \frac{(I_{RIPPLE})^2 \cdot \tan\delta}{\beta A \omega C} \qquad \text{Eq.6}$$

Due to : $R_{ESR} = \frac{\tan\delta}{\omega C}$

Tan δ : DF at 120HZ
w : 2πf (f = 120HZ)
C : The static capacity (F) at 120HZ
In general , the allowed ripple current value would be specifica lly listed by the manufacturer - A revised coefficient of allowed ripple current & working frequency to the electrolytic capacitor .

Table-2 Snap-in terminal type capacitors (for input smoothing circuit)

Frequency (Hz)		50	60	120	1K	10K~100K
Frequency Coefficient Kf	6.3~100V	0.88	0.90	1.00	1.15	1.16
	160~250V	0.85	0.88	1.00	1.15	1.20
	315~450V	0.88	0.90	1.00	1.10	1.15

Table-3 Lead type capacitors (for output smoothing circuit)

Frequency (Hz)	50	120	300	1K	10K	100K
~47μF	0.30	0.40	0.50	0.70	0.80	1.00
5.6~33 μF	0.40	0.50	0.60	0.80	0.90	1.00
34~330 μF	0.60	0.70	0.80	0.90	0.95	1.00
331~1000μF	0.65	0.90	0.90	0.98	1.00	1.00
1200μF~Higher	0.85	0.90	0.95	0.98	1.00	1.00

Table-4 The coefficient between allowed ripple current & working temperature to the electrolytic capacitors.

Surrounding Temp[℃] / Type	Revised coefficient of Temperature				
	60	65	70	85	105
Snap-in terminal type	2.37		2.17	1.67	1.00
Lead type capacitors		1.80		1.50	1.00

1-7 Cleaning Agings

Circuit Board Cleaning

1. Foreword

When a halide substance seeps into the aluminum electrolytic capacitor The halide dissolves and frees halogen ions.

$$RX + H_2O \Longrightarrow ROH + H^+ + X^-$$

Also the following reaction can occur

$$Al + 3X^- \Longrightarrow AlX_3 + 3e^-$$

$$AlX_3 + 3H_2O \Longrightarrow Al(OH)_3 + 3H^+ + 3X^-$$

When this reaction is repeated. The leakage current increases and the safety vent will be activated and may lead to open vent. Because of this halogen type cleaning agents or adhesive material and coating material is not recommended for usage. The following explains the recommended condition for cleaning. When a halogen type cleaning agent will be used due to cleaning capabilities.

2. Recommended Cleaning Condition

Applicable : Any type.any ratings
Cleaning Agents : Pine Alpha ST-100S
Clean Through 750H,750L,710M
Sanelek B-12
Aquq Cleaner 210 SEP
Techno Care FRw 14～17
Isopropyl Alcohol
Cleaning Conditions : Total cleaning time shall be no greater than 5 minutes by immersion , ultrasonic or other method .
After cleaning , capacitors should be dried using hot air for minimum of 10 minutes along with the PC board .
Hot air temperature should be below the maximum operating temperature of the capacitor .
Insufficient dries after water runse may cause appearance problems , such as sleeve shrinking , bottom-plate bulging .
It is recommended to monitor conductivity , pH , and concentration of the agent . Please do not keep a product after cleaning in condition that cleaning agents exists as steam, or in non ventilated containers .

3. CFC substitute

The anti-solvent capacitor listed in the catalogue can be cleaned using AK-255AES. If used within the following condition.
Please monitor contamination of solution by measuring conductivity, pH , specific gravity , water content and such .
Furthermore , do not store capacitors in a cleaning agent atmosphere or sealed container after cleaning .
Also avoid using using ozone depleting substances for cleaning agents in difference to our global environments.

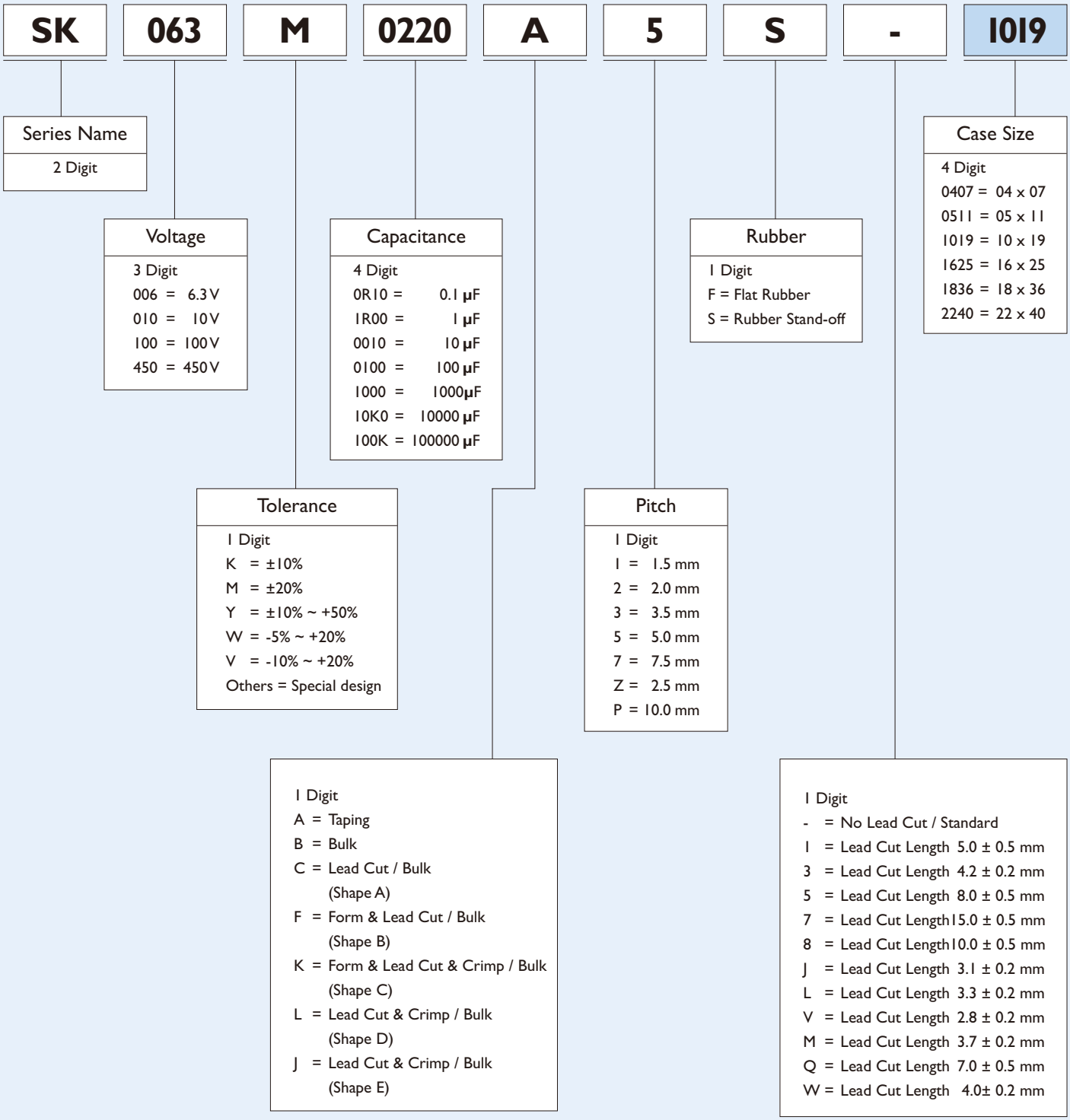
Applicable : Anti-solvent capacitors
Cleaning Agents : AK-255AES
Cleaning Conditions : Within 5 minutes, total cleaning time by immersion , vapor spray , or ultrasonic and such . For SMD and ultra-miniature type 2 minutes maximum of total cleaning time .

4. Fixing Material and Coating Material

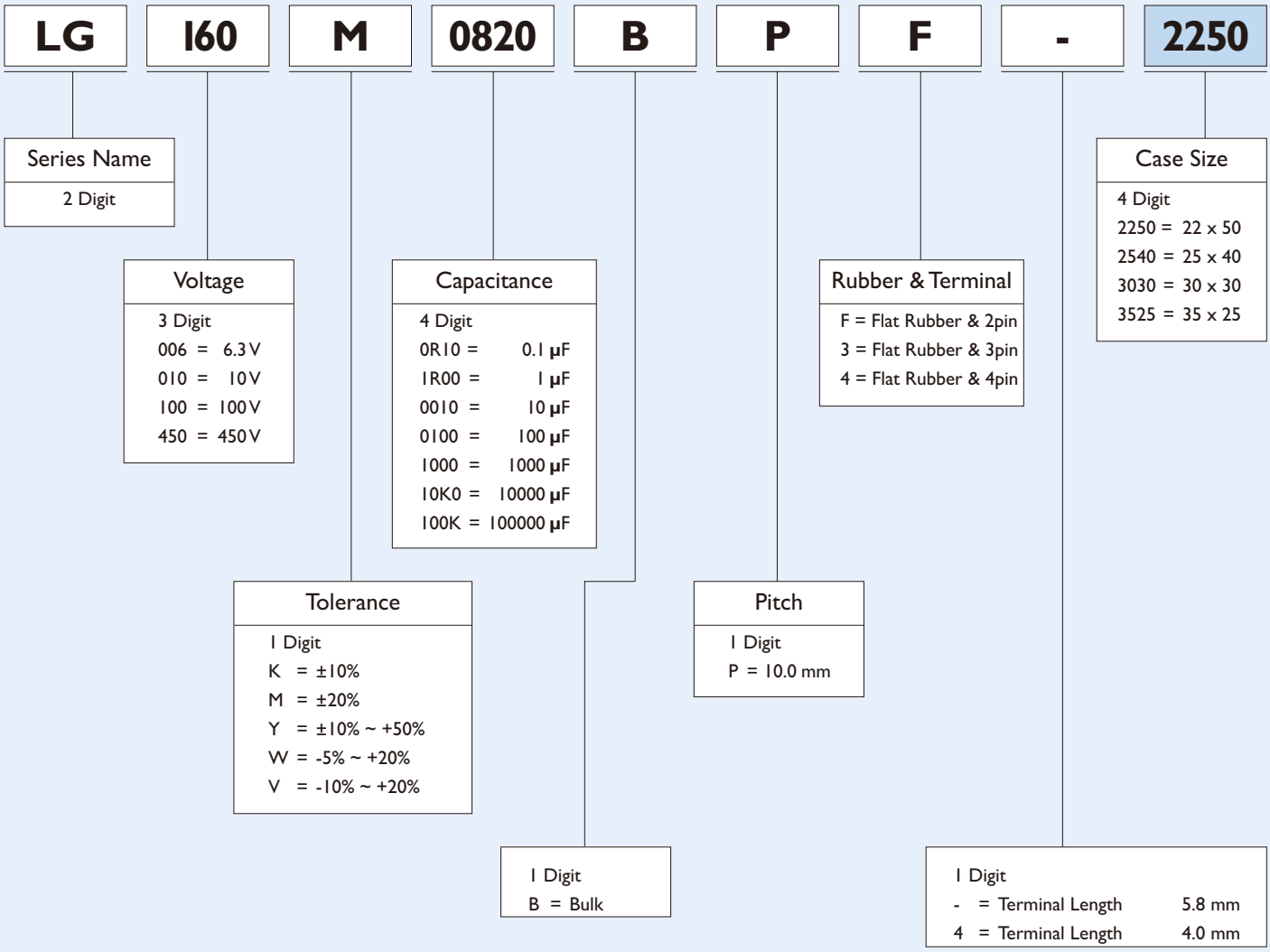
- DO not use any affixing or coating materials, which contain halide substance.
- Remove flux and any contamination, which remains in the gap between the end seal and PC board.
- Remove flux and any contamination, which remains in the gap between the end seal and PC board.
- Please dry the cleaning agent on the PC board before using affixing or coating material.
- Please do not apply any material all around the end seal when using affixing or coating material.

There are variations of cleaning agents, fixing and coating material, so please contact those manufacture or our sales office to make sure that the material would not cause any problems.

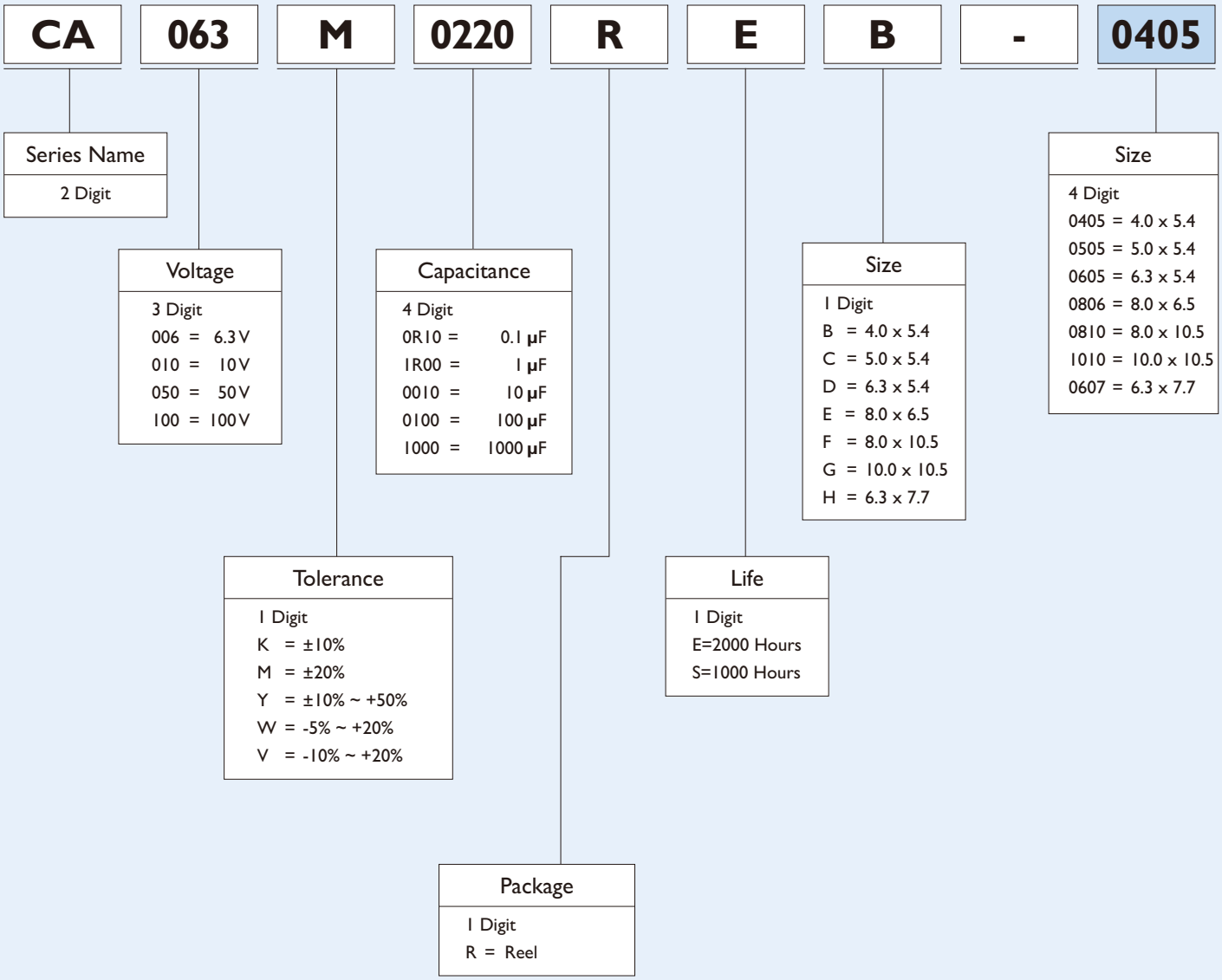
RADIAL TYPE ORDERING CODE



SNAP IN TYPE ORDERING CODE



SMD TYPE ORDERING CODE



PACKAGE INFORMATION

TYPE	D x L	BULK			TAPING		LEAD CUTTING		
RADIL	(mm)	BAG/PCS	INNER BOX	CARTON	INNER BOX	CARTON	BAG/PCS	INNER BOX	CARTON
04 x 05		1000	10,000	20,000	2,500	25,000	1000	15,000	30,000
05 x 05		1000	10,000	20,000	2,000	20,000	1000	15,000	30,000
06 x 05		1000	10,000	20,000	2,000	20,000	1000	15,000	30,000
04 x 07		1000	10,000	20,000	2,500	25,000	1000	15,000	30,000
05 x 07		1000	10,000	20,000	2,000	20,000	1000	15,000	30,000
06 x 07		1000	10,000	20,000	2,000	20,000	1000	15,000	30,000
05 x 11		500	10,000	20,000	2,000	20,000	500	15,000	30,000
06 x 11		500	10,000	20,000	2,000	20,000	500	15,000	30,000
08 x 11		500	6,000	12,000	1,000	10,000	500	8,000	16,000
08 x 15		500	5,000	10,000	1,000	10,000	500	5,000	10,000
08 x 20		200	4,000	8,000	1,000	10,000	200	4,000	8,000
10 x 12		200	4,000	8,000	700	7,000	200	4,000	8,000
10 x 15		200	3,000	6,000	700	7,000	200	4,000	8,000
10 x 16		200	3,000	6,000	700	7,000	200	4,000	8,000
10 x 19		200	2,400	4,800	700	7,000	200	3,000	6,000
10 x 25		200	2,400	4,800	700	7,000	200	2,400	4,800
10 x 27		200	2,000	4,000			200	2,000	4,000
10 x 30		200	2,000	4,000			200	2,000	4,000
12 x 20		200	2,000	4,000	500	5,000	200	2,000	4,000
12 x 25		200	1,800	3,600	500	5,000	200	1,800	3,600
12 x 30		200	1,600	3,200	500	5,000	200	1,600	3,200
12 x 35		200	1,000	2,000	500	5,000		500	3,000
12 x 40		200	1,000	2,000	500	5,000		500	3,000
13 x 20		200	1,800	3,600	500	5,000	200	1,800	3,600
13 x 25		200	1,400	2,800	500	5,000	200	1,400	2,800
13 x 30		200	1,200	2,400	500	5,000		500	3,000
13 x 40		200	1,000	2,000	500	5,000		500	3,000
16 x 25		200	1,000	2,000	300	3,000		500	4,000
16 x 32		200	1,000	1,600				500	3,000
16 x 36		200	1,000	1,200				500	3,000
16 x 40		200	1,000	1,200				500	3,000
18 x 20		200	1,000	1,600			200	1,000	2,000
18 x 25		200	1,000	1,600				500	2,000
18 x 32		100	1,000	1,000				500	2,000
18 x 36		100	1,000	1,000				500	2,000
18 x 40		100	1,000	1,000				500	2,000
22 x 40		100	1,000	600				400	800

TYPE	D x L	BULK		
SNAPIN	(mm)	I BAG/PCS	I INNER BOX	I CARTON
	22 x 25 ~ 45		400	800
	25 x 25 ~ 50		200	800
	30 x 25 ~ 35		200	800
	30 x 40 ~ 50		200	800
	35 x 30 ~ 50		200	800

SMD Type

	SPQ(Reel)	MOQ(Reel)
4 x 5	2000	20000
5 x 5	1000	10000
6 x 5	1000	10000
6 x 7	1000	10000
8 x 6	1000	10000
8 x 10	500	3000
10 x 10	5000	3000

DIAGRAM OF TAPING DIMENSIONS

Unit : mm

Fig. 1

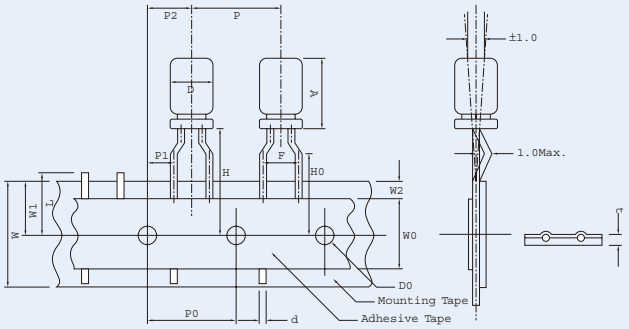


Fig. 2

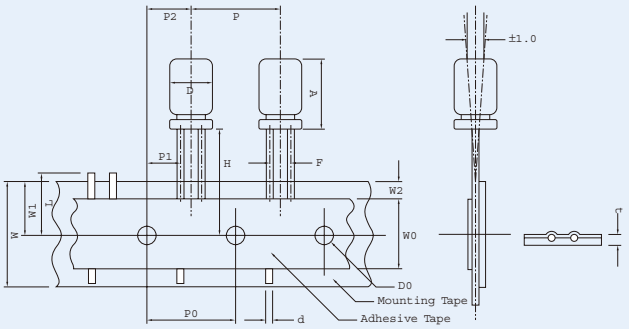


Fig. 3

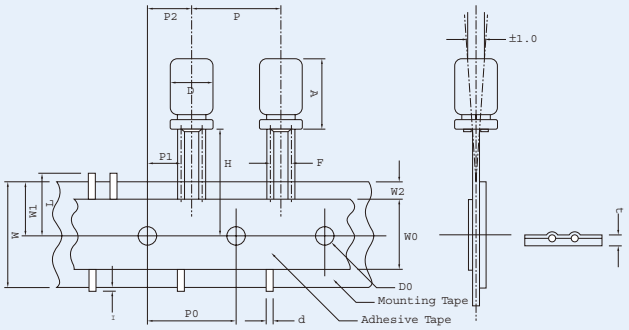


Fig. 4

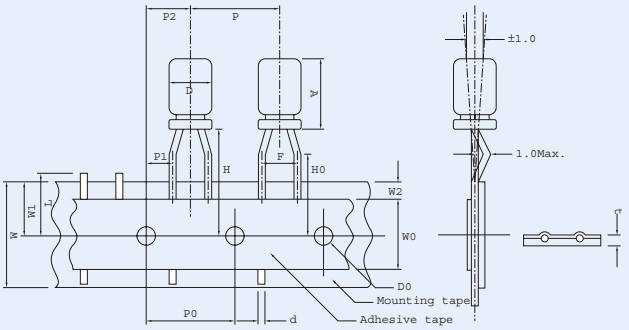


Fig. 5

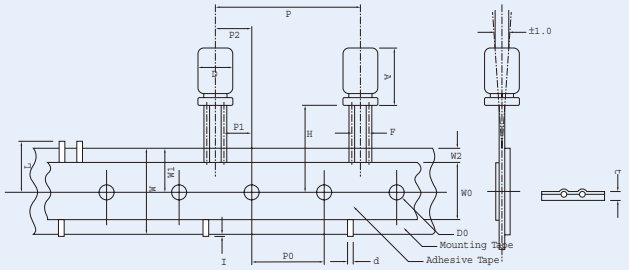
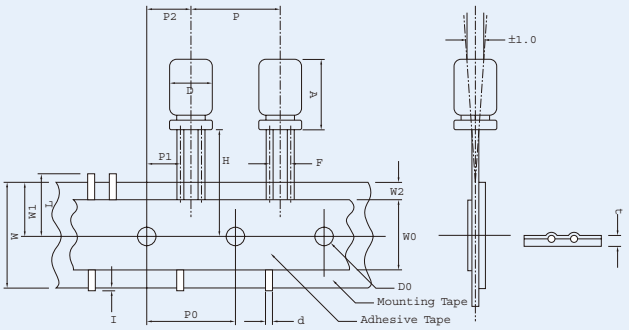


Fig. 6



SPECIFICATIONS INFORMATION

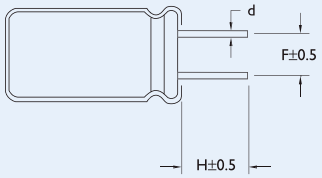
Unit : mm

ITEM	TOLERANCE	PH = 2.5			FORMED LEAD TYPE							STRAIGHT LEAD TYPE												
		L			L							L												
		5~7	≤7	>7	5~7	≤7	>7	≤7	>7	≤7	>7	5~7	≤7	>7	≤7	>7	≤7	>7	12~25	15~25			15~25	
D	+0.5 -0	4ø	5ø		4ø	5ø		6ø		8ø		4ø	5ø		6ø		8ø		10ø	12ø	12.5ø	13ø	16ø	18ø
A	Max.	8.0		13	8.0		13	8.0	13	8.0	22.0	8.0		13	8.0	13	8.0	22.0	27.0					
d	±0.05	0.45		0.5	0.45		0.5	0.5	0.5	0.5	0.5	0.45		0.5	0.5	0.5	0.5	0.5	0.6				0.8	
P	±1.0	12.7			12.7							12.7								15.0			30.0	
P0	±0.3	12.7			12.7							12.7								15.0				
P1	±0.7	5.1			3.85							5.6	5.35		5.1		4.6		3.85				3.75	
P2	±1.3	6.35			6.35							6.35								7.5				
F	+0.8, -0.2	2.5			5.0							1.5	2.0		2.5		3.5		5.0				7.5 ± 0.8	
W	+1.0, -0.5	18.0			18.0							18.0												
W0	±0.5	12.0			12.0							12.0												
W1	±0.5	9.0			9.0							9.0												
W2	Max.	3.0			3.0							3.0												
H	±0.75	18.5			18.5							18.5												
H0	±0.5	16.0			16.0							-												
I	Max.	-			-							-							1.0					
D0	±0.2	4.0			4.0							4.0												
t	±0.2	0.7			0.7							0.7												
L	Max.	11.0			11.0							11.0												
Fig.		**4**			**1**							**2**							**3, 6**				**5**	

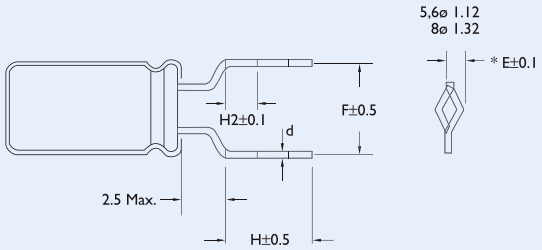
DIAGRAM OF LEAD CUTTING AND FORMING

Unit : mm

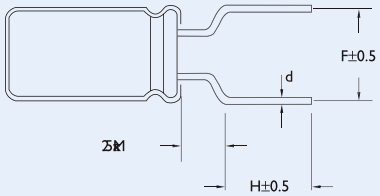
Shape (A)



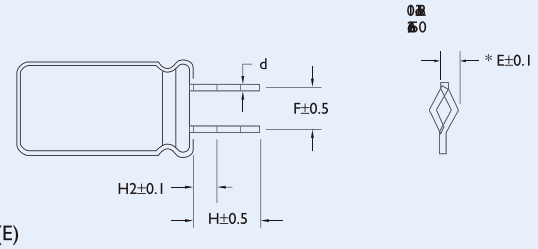
Shape (C)



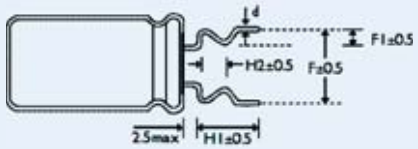
Shape (B)



Shape (D)



Shape (E)



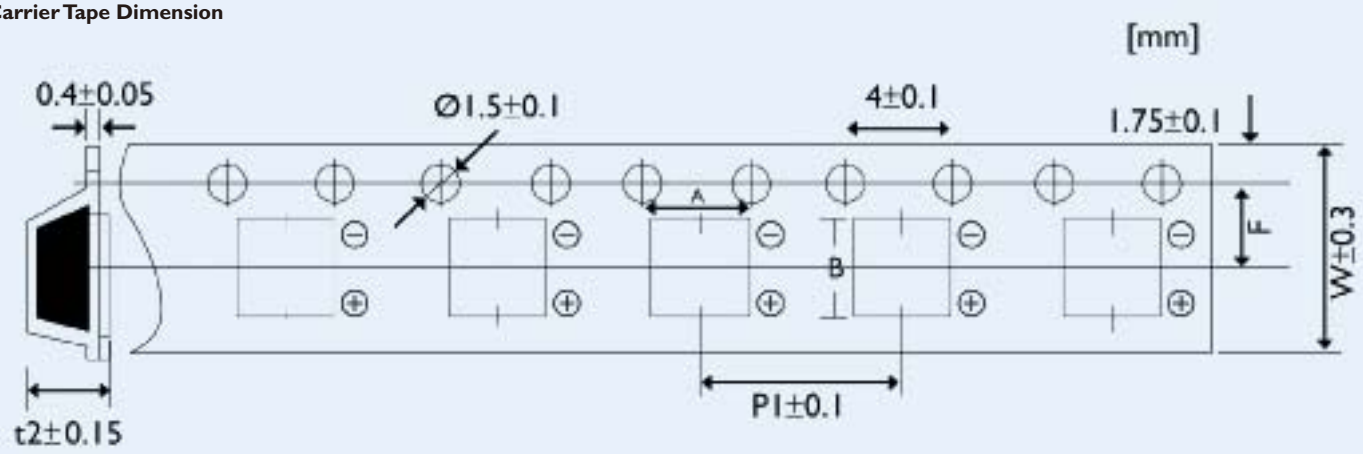
SPECIFICATIONS INFORMATION

Unit : mm

NO.CUTTING &

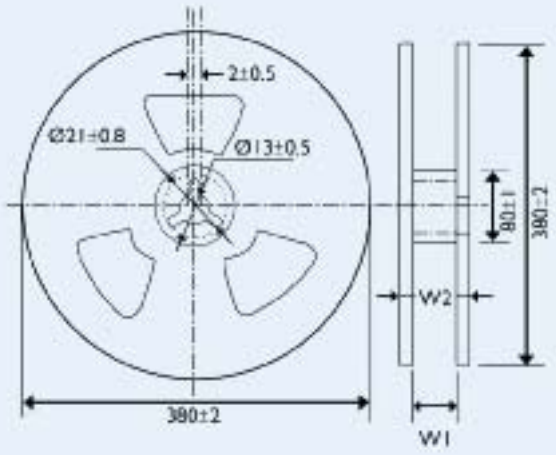
	FORMING METHODS	Dø	4ø	5ø	6ø	8ø	10ø	12ø	13ø	16ø	18ø	22ø
A	Lead Cut Only	F	1.5	2.0	2.5	3.5	5.0	5.0	5.0	7.5	7.5	10
		H	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
		d	0.45	0.5	0.5	0.5	0.6	0.6	0.6	0.8	0.8	0.8
B	Lead Cut and Form	F	5.0	5.0	5.0	5.0						
		H	5.0	5.0	5.0	5.0						
		d	0.45	0.5	0.5	0.5						
C	Lead Cut, Crimp and Form	F	5.0	5.0 5.0 5.0	5.0 5.0 5.0	5.0 5.0 5.0						
		H1	5.0 4.2	5.0 4.2 4.0	5.0 4.2 4.0	5.0 4.2 4.0						
		H2	2.5 2.0	2.5 2.0 2.0	2.5 2.0 2.0	2.5 2.0 2.0						
		d	0.45	0.5 0.5 0.5	0.5 0.5 0.5	0.5 0.5 0.5						
D	Lead Cut and Crimp	F					5.0	5.0	5.0	7.5	7.5	7.5 10
		H1					5.0 4.2 4.0	5.0 4.2 4.0	5.0 4.2 4.0	5.0 4.2 4.0	5.0 4.2 4.0	5.0 4.2 4.0
		H2					2.5 2.0 2.0	2.5 2.0 2.0	2.5 2.0 2.0	2.5 2.0 2.0	2.5 2.0 2.0	2.5 2.0 2.0
		d					0.6	0.6	0.6	0.8	0.8	0.8
E	Lead Cut Form and Crimp	F	5.0	5.0	5.0	5.0						
		F1	1.2	1.2	1.2	1.2						
		H1	4.0	4.0	4.0	4.0						
		H2	1.8	1.8	1.8	1.8						
		d	0.45	0.5	0.5	0.5						

1.Carrier Tape Dimension



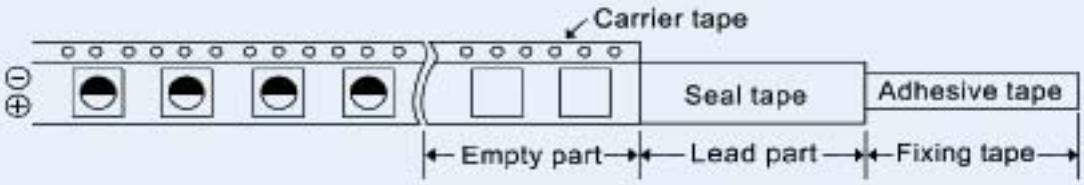
CASE SIZE	(øD mm)	W	A	B	P1	F	t2
B	ø4	12.0	4.7	4.7	8.0	5.5	5.75
C	ø5	12.0	5.7	5.7	12.0	5.5	5.8
D	ø6.3 x 5.4	16.0	7.0	7.0	12.0	7.5	5.75
E	ø8 x 6.2	16.0	8.7	8.7	12.0	7.5	6.8
F	ø8 x 10.2	24.0	8.7	8.7	16.0	11.5	11.0
G	ø10 x 10.2	24.0	10.7	10.7	16.0	11.5	11.0
H	ø6.3 x 7.7	16.0	7.0	7.0	12.0	7.5	8.0

2.Reel Dimension



SIZE CODE	B	C	D	E	F	G
W1	14	14	18	18	26	26
W2	18	18	22	22	30	30

3. Details of Carrier Tape

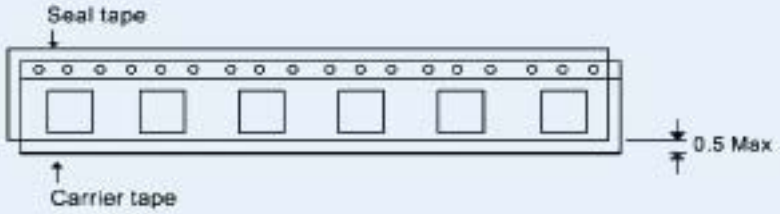


(1)

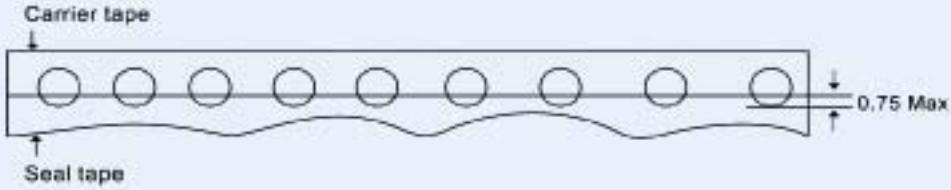
a. Last reeling empty part of carrier tape shall be more than 10 cm
b. Leader part of seal tape shall be more than 20 cm.
c. First reeling Empty part of carrier tape shall beomre than 10 cm
d. Adhesive tape fixing the end of the leader part shall be approx 10 cm

(2) Deviation between carrier tape and seal tape

a. Deviation between carrier tape and seal tape shall be less than 0.5 mm.

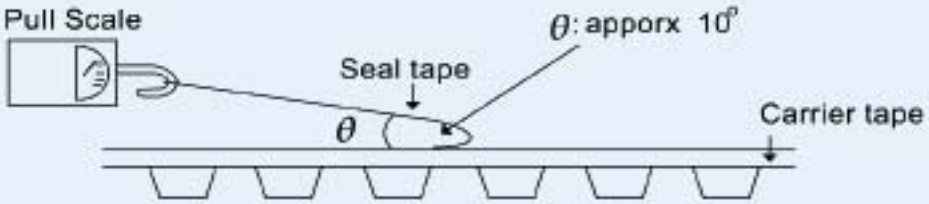


b. Seal tape shall not cover on the feeding holes more than 0.75 mm.



4. Adhesion Test

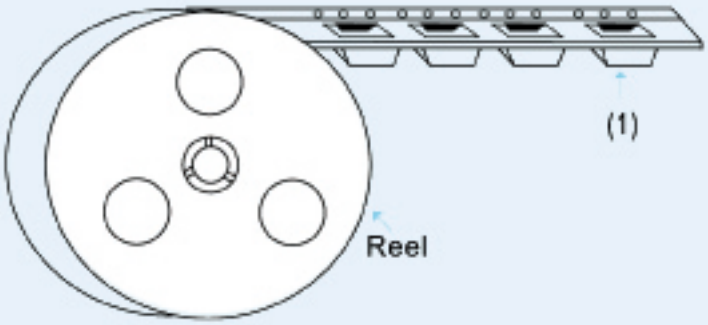
Reasonable pulling strength: 0.1~0.7N
Pulling speed: 300mm / min



5. Packing Style

(1) Carrier tape shall be reeled inside.(seal tape shall be outside)

(2) End of the tape shall be inside to the reel physically as shown in the below figure and leader part of seal tape shall not be attached.



6. Packaging Quantity

Size Code	D x L	One Reel (pcs)	Total Quantity pcs)
B	4x5.4	2000	20000
C	5x5.4	1000	10000
D	6.3x5.4	1000	10000
E	6.3x7.7	1000	10000
F	8x6.2	1000	10000
G	8x10.2	500	3000
H	10x10.2	500	3000

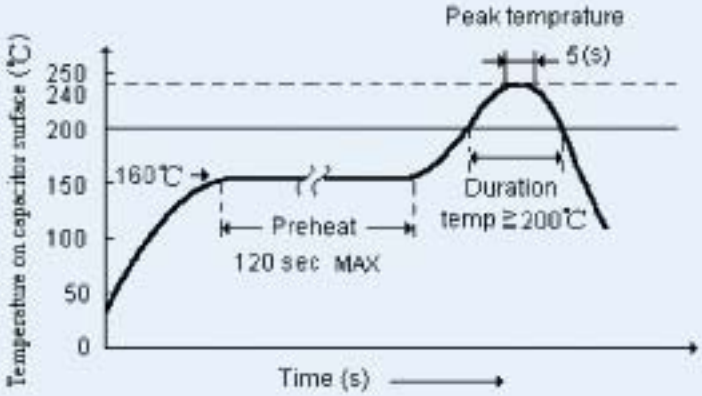
Reflow soldering for chip capacitors

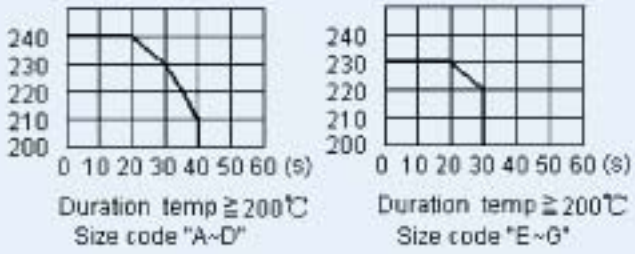
(1) For reflow, use a thermal conduction system such as infrared radiation (IR) or hot blast. Vapor heat transfer systems (VPS) are not recommended.

(2) Pbserve proper soldering conditions(temperature, time, etc.). Do not exceed the specified limits.

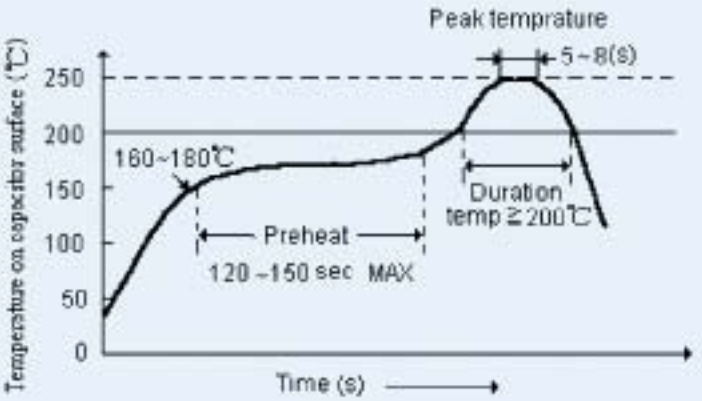
(3) Reflow shoud be performed one time. Consult us for additional reflow restrictions.

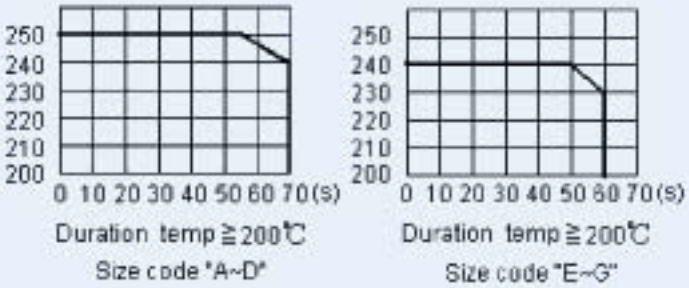
(4) Reflow soldering profile for standard :





(5) Reflow soldering profile for lead free :





■ Manual Soldering

(1) Observe temperature and time soldering specifications or do not exceed temperatures of 300℃ for 3 seconds or less.

(2) If a soldered capacitor must be removed and reinserted , avoid excessive stress on the capacitor leads.

■ Capacitor handing after soldering

(1) Avoid moving the capacitor after soldering to prevent excessive stress on the lead wires where they enter the seal.

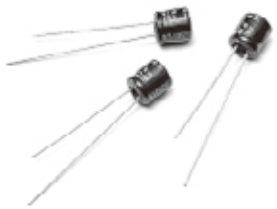
(2) Do not use the capacitor as a handle when moving the circuit board assembly.

(3) Avoid striking the capacitor after assembly to prevent failure due to excessive shock.

Miniature Size Aluminum Electrolytic Capacitors

S5 [For Super Miniature]

105°C Single-Ended Lead, 5.0mm Height Type Aluminum Electrolytic Capacitors



DESCRIPTION

The S5 series are smaller than SS series.

This type is designed for saving space and high density insertion.

Applications : VTR, Camera, Car Audio,Miniaudio and Other Industrial and Commercial Applications

Multiplier for Ripple Current

Frequency coefficient

Frequency (Hz)	20	300	1K	10K~100K
0.1~47μF	1.00	1.20	1.30	1.50
100~330μF	1.00	1.10	1.15	1.20

Temperature coefficient

Temperature(°C)	65	85	105
Factor	1.40	1.20	1.00

ELECTRICAL CHARACTERISTICS

Operating Temperature : -40° ~ +105°C

Working Voltage : 4 ~ 50V

Rate Capacitance Range : 0.1 ~ 100μF

Capacitance Tolerance : -20 ~ +20%

DC Leakage Current (μA) : I = 0.01CV (μA) or 3μA Whichever is greater.

(After 2 Minutes Application of DC Working Voltage at 25°C)

Dissipation Factor : at 120 Hz, 25°C

WV (V) :	4	6.3	10	16	25	35	50
D.F (%) :	35	24	20	17	15	12	10

Load Life : 1000 Hours at 105°C Assured with Full Rated Maximum Ripple Current Applied

(a) Capacitance Change : Within 20% of Initial Value
(b) Dissipation Factor : Not Exceed 200% of Initial Requirement
(c) Leakage Current : Not Exceed the Initial Requirement

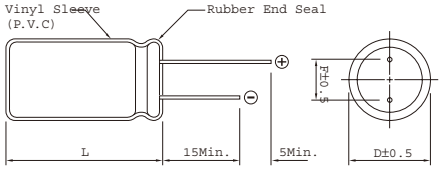
Shelf Life : 500 Hours, No Voltage Applied, at 105°C
(a) Capacitance Change : Within 20% of Initial Value
(b) Dissipation Factor : Not Exceed 200% of Initial Requirement
(c) Leakage Current : Not Exceed 200% of Initial Requirement

Pb-free

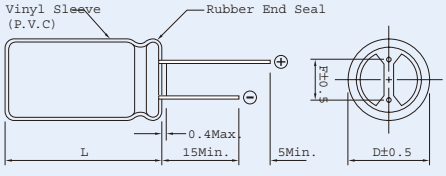
RoHS COMPLIANT

DIAGRAM OF DIMENSIONS

Dimensions : mm



Rubber Stand-off



L ≤16 : L+1.5max
L >16 : L+2max
Dø =8&10 : L+2.5

Dø <20 : Dø+0.5
Dø ≥20 : Dø+1

Dø	F	dø
4.0	1.5	0.45
5.0	2.0	
6.3	2.5	
8.0	3.5	0.5

CASE SIZE & PERMISSIBLE RIPPLE CURRENT OF STANDARD PRODUCTS

CAP. (μF)	RATED VOLTAGE WV													
	4		6.3		10		16		25		35		50	
	Size	Ripple	Size	Ripple	Size	Ripple	Size	Ripple	Size	Ripple	Size	Ripple	Size	Ripple
0.1													4 x 5	1
0.22													4 x 5	2
0.33													4 x 5	3
0.47													4 x 5	4
1.0													4 x 5	6
2.2													4 x 5	11
3.3													4 x 5	14
4.7							4 x 5	20	4 x 5	13	4 x 5	15		
													5 x 5	19
10			4 x 5	18	4 x 5	15	4 x 5	18	4 x 5	23	5 x 5	25	6 x 5	30
									5 x 5	23			5 x 5	29
22	4 x 5	22	4 x 5	22	5 x 5	27	4 x 5	29	6 x 5	38	6 x 5	48	6.3 x 5	45
			5 x 5	22			5 x 5	30						
33	5 x 5	30	5 x 5	30			5 x 5	40	5 x 5	48				
					5 x 5	35	6 x 5	40	6 x 5	48				
47	5 x 5	36	5 x 5	36	5 x 5	46	5 x 5	50						
			5 x 5	36	6 x 5	46	6 x 5	50	6.3 x 5	65				
68														
100	6 x 5	60	6 x 5	60	6 x 5	80	6 x 5	50						
220	6 x 5	60	6 x 5	90										
330			8 x 5	115										

Note : * 1. D x L : mm

* 2. Size : 6 x 5 Actually is 6.3 x 5

* 3. mA rms at 105°C, 120Hz

Miniature Size Aluminum Electrolytic Capacitors

SS [For Super Miniature]

105□C Single-Ended Lead Aluminum Electrolytic Capacitors

DESCRIPTION

This type is designed to meet the demand or equipments for greatly reduced size and thickness, such as: portable micro computer, disk driver, small calculator and audio equipement.

Application : Portable Micro Computer,
Disk Driver,
Small Calculator and Audio

Multiplier for Ripple Current

Frequency coefficient

Frequency (Hz)	50	120	300	1K	10K
0.1~47μF	0.75	1.00	1.20	1.30	1.50
100~330μF	0.75	1.00	1.10	1.15	1.20

Temperature coefficient

Temperature(°C)	65	85	105
Factor	1.70	1.30	1.00

ELECTRICAL CHARACTERISTICS

Operating Temperature : -40° ~ +105°C

Working Voltage : 6.3 ~ 80V

Rate Capacitance Range : 0.1 ~ 470μF

Capacitance Tolerance : -20 ~ +20%

DC Leakage Current (μA) : I = 0.01CV (μA) or 3μA Whichever is greater.

(After 2 Minutes Application of DC Working Voltage at 25°C)

Dissipation Factor : at 120 Hz, 25°C

WV (V) :	6.3	10	16	25	35	50	63	80
D.F (%) :	24	20	17	15	12	10	8	8

Load Life : 1000 Hours at 105°C Assured with Full Rated Maximum Ripple Current Applied

(a) Capacitance Change : Within 20% of Initial Value
(b) Dissipation Factor : Not Exceed 200% of Initial Requirement
(c) Leakage Current : Not Exceed the Initial Requirement

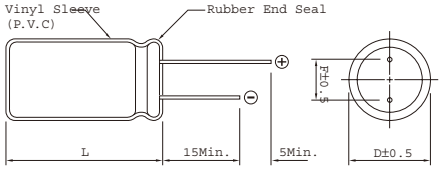
Shelf Life : 500 Hours, No Voltage Applied, at 105°C

(a) Capacitance Change : Within 20% of Initial Value
(b) Dissipation Factor : Not Exceed 200% of Initial Requirement
(c) Leakage Current : Not Exceed 200% of Initial Requirement

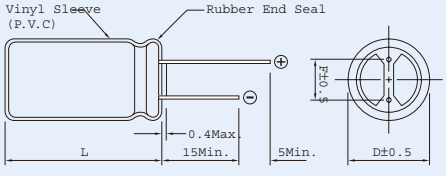
Pb-free
RoHS
COMPLIANT

DIAGRAM OF DIMENSIONS

Dimensions : mm



Rubber Stand-off



L ≤16 : L+1.5max
L >16 : L+2max
Dø =8&10 : L+2.5

Dø <20 : Dø+0.5
Dø ≥20 : Dø+1

Dø	F	dø
4.0	1.5	0.45
5.0	2.0	
6.3	2.5	
8.0	3.5	0.5

CASE SIZE & PERMISSIBLE RIPPLE CURRENT OF STANDARD PRODUCTS

CAP. (μF)	RATED VOLTAGE WV															
	6.3		10		16		25		35		50		63		80	
	Size	Ripple	Size	Ripple	Size	Ripple	Size	Ripple	Size	Ripple	Size	Ripple	Size	Ripple	Size	Ripple
0.1											4 x 7	1	4 x 7	1		
0.22											4 x 7	2	4 x 7	2		
0.33											4 x 7	3	4 x 7	4		
0.47											4 x 7	5	4 x 7	6		
0.68											4 x 7	6				
1.0											4 x 7	10	4 x 7	13		
2.2					4 x 7	7					4 x 7	19	4 x 7	21		
3.3					4 x 7	13					4 x 7	24	4 x 7	26		
4.7					4 x 7	19	4 x 7	24	4 x 7	24	4 x 7	29	4 x 7	26		
									5 x 7	28	5 x 7	29	6 x 7	33		
			4 x 7	10	4 x 7	29	4 x 7	33	4 x 7	34	4 x 7	37	5 x 7	42	6 x 7	32
10							5 x 7	35	5 x 7	36	5 x 7	45	6 x 7	50		
							6 x 7	35			6 x 7	45				
	4 x 7	34	4 x 7	31	4 x 7	44	4 x 7	43	5 x 7	48	6 x 7	65				
22			5 x7	38	5 x 7	44	5 x 7	51	6 x7	57						
							6 x 7	51								
33	5 x 7	42	4 x 7	39	4 x 7	50	5 x 7	55	6 x 7	59						
			5 x 7	47	5 x 7	57	6 x 7	65								
	4 x 7	46	4 x 7	50	5 x 7	75	5 x 7	67	6 x 7	85						
47	5 x 7	50	5 x 7	60	6 x 7	75	6 x 7	80	8 x 7	59						
			6 x 7	59												
68					5 x 7	84	6 x 7	91								
100	5 x 7	75	5 x 7	85	5 x 7	75	6 x 7	89								
	6 x 7	77	6 x 7	100	6 x 7	89	8 x 7	120								
150					6 x 7	120										
220	6 x 7	130	6 x 7	130	8 x 7	140										
330	8 x 7	159														
470			8 x 9	226												

Note : * 1. D x L : mm

* 2. Size : 6 x 7 Actually is 6.3 x 7

* 3. mA rms at 105°C, 120Hz

Miniature Size Aluminum Electrolytic Capacitors

SK [For General]

85°C Single-Ended Lead Aluminum Electrolytic Capacitors

DESCRIPTION

Lower-cost capacitors expressly intended for high density printed circuit board.

Very High Volumetric Efficiency

Ideally suited for general-purpose applications, de-coupling, by pass, and filtering circuit in entertainment electronics.

Feature High CV Product with Moderate Cost

Multiplier for Ripple Current

Frequency coefficient

Frequency (Hz)	120	300	1K	10K~100K
6.3~100V Below~68μF	1.00	1.20	1.30	1.50
6.3~100V 100~680μF	1.00	1.10	1.15	1.20
6.3~110V 1000~22000μF	1.00	1.05	1.10	1.15
160~450V Below~220μF	1.00	1.25	1.40	1.40
160~450V 220μF Above	1.00	1.10	1.13	1.13

Temperature coefficient

Temperature(°C)	50	70	85
Factor	1.30	1.15	1.00

ELECTRICAL CHARACTERISTICS

Operating Temperature : -40° ~ +85°C / -25° ~ +85°C

Working Voltage : 6.3 ~ 100V / 160 ~ 450V

Rate Capacitance Range : 0.1 ~ 22000μF / 0.47 ~ 330μF

Capacitance Tolerance : -20 ~ +20%

DC Leakage Current (μA) : 0.01 CV or 3 μA / 0.03 CV +10 Whichever is greater.
(After 2 Minutes Application of DC Working Voltage at 25°C)

Dissipation Factor : at 120Hz, 25°C

WV (V) :	6.3	10	16	25	35	50	63	100	160 ~ 250	350 ~ 450
D.F (%) :	24	20	16	14	12	10	9	8	18	20

For capacitor whose capacitance exceeds 1000μF. The value of DF(%) is increased by 2% for every addition of 1000μF.

Load Life : 2000 Hours at 85°C Assured with Full Rated Maximum Ripple Current Applied
(a) Capacitance Change : Within 20% of Initial Value
(b) Dissipation Factor : Not Exceed 200% of Initial Requirement
(c) Leakage Current : Not Exceed the Initial Requirement

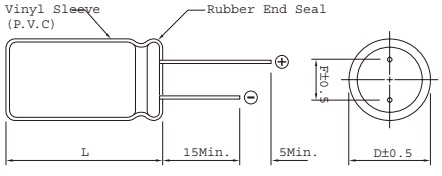
Shelf Life : 1000 Hours, No Voltage Applied at 85°C
(a) Capacitance Change : Within 20% of Initial Value
(b) Dissipation Factor : Not Exceed 200% of Initial Requirement
(c) Leakage Current : Not Exceed 200% of Initial Requirement

Pb-free

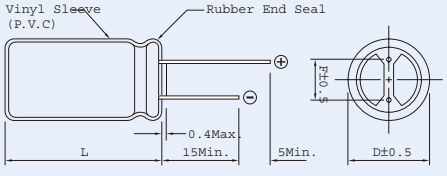
RoHS COMPLIANT

DIAGRAM OF DIMENSIONS

Dimensions : mm



Rubber Stand-off



L ≤16 : L+1.5max
L >16 : L+2max
Dø =8&10 : L+2.5

Dø <20 : Dø+0.5
Dø ≥20 : Dø+1

Dø	F	dø4.0 1.5
0.45		
5.0	2.0	0.5
6.0	2.5	
8.0	3.5	
10.0	5.0	0.6
12.0		
13.0		
16.0	7.5	0.8
18.0		
22.0	10.0	0.8

CASE SIZE & PERMISSIBLE RIPPLE CURRENT OF STANDARD PRODUCTS

CAP. (μF)	RATED VOLTAGE WV													
	6.3		10		16		25		35		50		63	
	Size	Ripple	Size	Ripple	Size	Ripple	Size	Ripple	Size	Ripple	Size	Ripple	Size	Ripple
0.1											5 x 11	1		
0.22											5 x 11	2		
0.33											5 x 11	3		
0.47											5 x 11	5	5 x 11	5
0.68														
1.0											5 x 11	10	5 x 11	10
2.2											5 x 11	20	5 x 11	29
3.3											5 x 11	25	5 x 11	30
4.7							5 x 11	25	5 x 11	30	5 x 11	30	5 x 11	35
6.8														
10					5 x 11	40	5 x 11	40	5 x 11	45	5 x 11	45	5 x 11	50
15														
22			5 x 11	50	5 x 11	55	5 x 11	60	5 x 11	60	5 x 11	70	5 x 11 6.3 x 11	85 115
33	5 x 11	55	5 x 11	65	5 x 11	70	5 x 11	70	5 x 11	80	6.3 x 11	110	6.3 x 11 8 x 11	100 140
47	5 x 11	70	5 x 11	75	5 x 11	80	5 x 11	90	5 x 11 6.3 x 11	100 110	6.3 x 11 8 x 11	120 150	8 x 11	150
68														
100	5 x 11 6.3 x 11	100 154	5 x 11	110	5 x 11 6.3 x 11	140 140	6.3 x 11	150	6.3 x 11 8 x 11	185 190	8 x 11 10 x 12	200 250	10 x12	260
220	5 x 11 6.3 x 11	170 170	5 x 11 6.3 x 11	190 190	6.3 x 11 8 x 11	200 240	8 x 11 10 x 12	260 320	10 x 12	330	10 x 12	380	10 x 15 10 x 19.5	410 460
330	6.3 x 11 8 x 11	210 300	8 x 11	330	8 x 11	300	10 x 12	380	10 x 12 10 x 15	420 450	10 x 15 10 x 19.5	490 540	10 x 19.5 13 x 20	540 650
470	8 x 11	300	6.3 x 11 8 x 11	300 330	8 x 11 10 x 12	400 420	10 x 12 10 x 15	420 500	10 x 15 10 x 19.5 13 x 20	430 510 590	13 x 20	740	13 x 20 13 x 25	755 850
680														
1000	10 x 12	530	10 x 12 10 x 15	580 620	10 x 15 10 x 19.5	630 740	10 x 19.5 13 x 20	760 950	13 x 20 13 x 25 10 x 30	950 1050 900	13 x 25 16 x 25	1100 1350	16 x 25 16 x 32	1310 1550
1500														
2200	10 x 19.5 13 x 20	840 990	10 x 19.5 13 x 20	880 1050	13 x 25 13 x 20	1200 1100	13 x 25 16 x 25	1300 1500	16 x 25 16 x 32	1600 1750	16 x 36 18 x 36	1850 2090		
3300	10 x 19.5 13 x 20	1000 1150	13 x 20 13 x 25	1250 1350	13 x 25 16 x 25	1200 1200	16 x 25 16 x 32	1660 1900	16 x 36 18 x 36	1970 2220	18 x 36	2170		
4700	13 x 25 16 x 25	1700 1700	13 x 25 16 x 25	1500 1800	16 x 25 16 x 32	1650 2100	16 x 32 18 x 36	1950 2360	18 x 36	2400				
6800	16 x 25	1900	16 x 25 16 x 32	2150 2150	16 x 36 18 x 36	2100 2500	18 x 36	2500						
10000	16 x 25 16 x 32	2250 2250	18 x 36 16 x 36	2500 2225	18 x 36	2600								
15000	18 x 36 16 x 36	2680 2680	18 x 36	2950										
22000	18 x 40	3200												

Note : * 1. D x L : mm

* 2. mA rms at 85°C, 120Hz

CASE SIZE & PERMISSIBLE RIPPLE CURRENT OF STANDARD PRODUCTS

CAP. (μF)	RATED VOLTAGE WV													
	100		160		200		250		350		400		450	
	Size	Ripple	Size	Ripple	Size	Ripple	Size	Ripple	Size	Ripple	Size	Ripple	Size	Ripple
0.22														
0.47	5 x 11	10	5 x 11	10	5 x 11	12	5 x 11	12			6.3 x 11	14	6.3 x 11	14
1.0	5 x 11	15	5 x 11	15	5 x 11	17	5 x 11	15			6.3 x 11	15	8 x 11	19
							6.3 x 11	15			8 x 11	19		
2.2	5 x 11	25	6.3 x 11	20	6.3 x 11	20	6.3 x 11	24					10 x 12	29
					8 x 11	26	8 x 11	25			10 x 12	20		
3.3	5 x 11	30	6.3 x 11	30	6.3 x 11	30	8 x 11	30			10 x 12	32	10 x 15	35
			8 x 11	35	8 x 11	35	10 x 12	35						
4.7	5 x 11	35	6.3 x 11	32	8 x 11	36	8 x 11	36					10 x 15	50
			8 x 11	40	10 x 12	45	10 x 12	40			10 x 15	41		
6.8														
	5 x 11	60	8 x 11	50	10 x 12	57	10 x 15	70					10 x 19	75
10	6.3 x 11	70	10 x 12	65	10 x 15	70					10 x 19.5	45	13 x 20	60
											13 x 20	70	13 x 25	75
15														
	6.3 x 11	105	10 x 15	110	10 x 15	110	10 x 19.5	130			13 x 20	105		
22	8 x 11	110									13 x 25	110	16 x 25	110
											16 x 25	120	16 x 32	110
	8 x 11	140	10 x 19.5	150	10 x 19.5	160	13 x 20	140						
33	10 x 12	160					13 x 25	160						
											16 x 25	140	16 x 36	150
	10 x 12	190			13 x 20	160	13 x 25	210						
47	10 x 15	210			13 x 25	180					16 x 32	220	18 x 40	230
			13 x 20	180										
68														
100	10 x 19.5	380	13 x 25	250	16 x 25	330	16 x 32	310						
			16 x 25	300										
150														
	13 x 25	710	16 x 32	450										
220			16 x 36	510	18 x 36	520								
					18 x 40	520								
	13 x 25	720	18 x 36	540										
	16 x 25	860	18 x 40	600										
330														
470	16 x 25	1100												
	16 x 32	1100												
680														
1000	18 x 40	1350												
2200														

Note : * 1. D x L : mm

* 2. mA rms at 85°C, 120Hz

SE-K [For General]

105°C Single-Ended Lead Aluminum Electrolytic Capacitors Rated Voltage up to 450V

Miniature Size Aluminum Electrolytic Capacitors

ELECTRICAL CHARACTERISTICS

Operating Temperature : -40° ~ +105°C / -25° ~ +105°C

Working Voltage : 6.3 ~ 250V / 350 ~ 450V

Rate Capacitance Range : 0.47 ~ 15000μF / 0.47 ~ 150μF

Capacitance Tolerance : -20 ~ +20%

DC Leakage Current (μA) : I = 0.01CV + 3 / 0.03CV + 10

(After 2 Minutes Application of DC Working Voltage at 25°C)

Dissipation Factor : at 120 Hz, 25°C

W.V (V) :	6.3	10	16	25	35	50	63	80	100	160 ~ 250	350 ~ 450
D.F (%) :	26	22	18	16	14	12	10	10	10	15	20

For capacitor whose capacitance exceeds 1000 μF. The value of DF(%) is increased by 2% for every addition of 1000 μF.

Load Life : 1000 Hours at Assured with Full Rated Maximum Ripple Current Applied

(a) Capacitance Change : Within 20% of Initial Value
(b) Dissipation Factor : Not Exceed 200% of Initial Requirement
(c) Leakage Current : Not Exceed the Initial Requirement

Shelf Life : 500 Hours, No Voltage Applied

(a) Capacitance Change : Within 20% of Initial Value
(b) Dissipation Factor : Not Exceed 200% of Initial Requirement
(c) Leakage Current : Not Exceed 200% of Initial Requirement

Pb-free
RoHS
COMPLIANT

DESCRIPTION

Lower-cost capacitors expressly intended for high density printed circuit board.

Very High Volumetric Efficiency

Ideally suited for general-purpose applications, coupling, decoupling, by pass, and filtering circuit in entertainment electronics.

Feature High CV Product with Moderate Cost

Multiplier for Ripple Current

Frequency coefficient

Frequency (Hz)	120	300	1K	10K~100K
6.3~100V Below~68μF	1.00	1.20	1.30	1.45
6.3~100V 100~680μF	1.00	1.10	1.15	1.25
6.3~110V 1000~22000μF	1.00	1.05	1.10	1.15
160~450V ALL Cap(μF)	1.00	1.05	1.10	1.50

Temperature coefficient

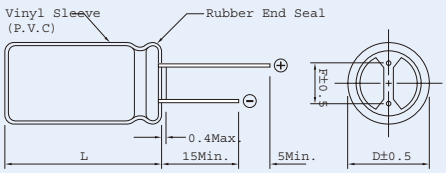
Temperature(°C)	65	85	105
Factor	1.80	1.40	1.00

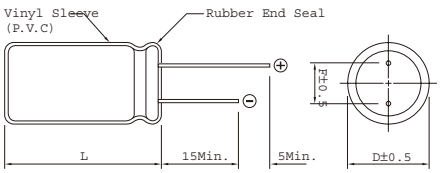
DIAGRAM OF DIMENSIONS

Dimensions : mm

Dø	F	dø
4.0	1.5	0.45
5.0	2.0	0.5
6.0	2.5	
8.0	3.5	
10.0	5.0	0.6
12.0		
13.0		
16.0	7.5	0.8
18.0		
22.0	10.0	0.8

Rubber Stand-off





CASE SIZE & PERMISSIBLE RIPPLE CURRENT OF STANDARD PRODUCTS

CAP. (μF)	RATED VOLTAGE W V													
	6.3		10		16		25		35		50		63	
	Size	Ripple	Size	Ripple	Size	Ripple	Size	Ripple	Size	Ripple	Size	Ripple	Size	Ripple
0.1											5 x 11	3		
0.22											5 x 11	4		
0.33											5 x 11	5		
0.47											5 x 11	6	5 x 11	8
1.0											5 x 11	9	5 x 11	12
2.2											5 x 11	11	5 x 11	20
3.3											5 x 11	15	5 x 11	20
4.7							5 x 11	20	5 x 11	18	5 x 11	18	5 x 11	20
6.8							5 x 11	20	5 x 11	18	5 x 11	25	5 x 11	30
10			5 x 11	18	5 x 11	20	5 x 11	20	5 x 11	25	5 x 11 8 x 11	25 54	5 x 11	50
15					5 x 11	30	5 x 11	20	5 x 11	30	5 x 11	35	5 x 11	50
22			5 x 11	45	5 x 11	30	5 x 11	35	5 x 11	35	5 x 11	35	6.3 x 11	90
33			5 x 11	60	5 x 11	40	5 x 11	40	5 x 11	50	6.3 x 11 8 x 11	50 50	6.3 x 11 8 x 11	60 60
47	5 x 11	60	5 x 11	45	5 x 11	50	5 x 11	50	5 x 11 8x 11 6 .3 x 11	65 65 65	6.3 x 11 8 x 11	70 70	8 x 11	90
68	5 x 11	75	5 x 11	80	5 x 11	50	6.3 x 11	80	8 x 11	110	8 x 11	120	10 x 12	90
100	5 x 11	60	5 x 11	80	5 x 11 6.3 x 11 8 x 11	80 80 80	6 .3x 11 8 x 11	90 90	6.3 x 11 8 x 11	110 110	8 x 11 10 x 12	120 120	8 x 15 10 x12	90 150
150	5 x 11	60	5 x 11 6.3 x 11	110 130	8 x 11	110	8 x 11	140	10 x 12	190	10 x 12	120	10 x 15	150
220	5 x 11 6.3 x 11 8 x 11	100 100 100	6.3 x 11 8 x 11	110 110	6.3 x 11 8 x 11	140 140	8 x 11 10 x 12	140 140	8 x 11 8 x 15 10 x 12	190 190 190	10 x 12 10 x 15	240 240	10 x 15 10 x 19.5	270 270
330	6.3 x 11 8 x 11	120 120	6.3 x 11 8 x 11	160 160	8 x 11	180	8 x 11 8 x 15 10 x 12	140 140 220	8 x 15 8 x 20 10 x 12 10 x 15	220 220 260 260	10 x 15 10 X 19.5	320 320	10 x 19.5 13 X20	380 380
470	6.3 x 11 8 x 11	125 170	6 .3x 11 8 x 11	110 170	8 x 11 8 x 15 10 x 12	250 250 250	8 x 15 10 x 12 10 x 15	290 290 290	10 x 15 10 x 19.5 13 x 20	350 350 350	10 x 19.5 13 x 20	430 430	13 x 20 13 x 25	500 500
680	8 x 11 10 x 12	255 320	8 x 11 8 x 15 10 x 12	300 300 300	10 x 12 10 x 15 13 x 25	455 530 300	10 x 19.5	290	13 x 20	620	13 x 25	430	13 x 25 16 x 25	500 500
1000	8 x 11 10 x 12	300 300	8 x 11 8 x 15 10 x 12 10 x 15	300 300 300 300	8 x 20 10 x 15 10 x 19.5	300 360 360	10 x 19.5 12 x 20 13 x 20	540 540 540	13 x 20 13 x 25	620 620	13 x 25 16 x 25	790 790	16 x 25 16 x 32	900 900
1500	10 x 15	600	10 x 19.5	300	10 x 19.5 13 x 20	360 700	13 x 25	540	13 x 25 16 x 25	620 620	16 x 32	790	16 x 32 16 x 36	900 900
2200	10 x 19.5 13 x 20	580 580	10 x 19.5 13 x 20	580 580	10 x 25 12 x 25 13 x 20 13 x 25	895 1040 620 620	13 x 25 16 x 25	880 880	16 x 25 16 x 32	1030 1030	16 x 36 18 x 36	1230 1230	18 x 36	1455
3300	10 x 19.5 13 x 20	670 670	10 x 25 10 x 30 13 x 20 13 x 25	550 550 670 670	13 x 25 16 x 25	970 970	13 x 25 16 x 25 16 x 32	1120 1120 1120	16 x 36 18 x 36	1320 1120	18 x 36 18 x 40	1400 1400	22 x 40	1730
4700	13 x 25 16 x 25	1320 1000	13 x 25 16 x 25	1000 1000	16 x 25 16 x 32	1240 1240	16 x 32 18 x 36	1420 1440	18 x 36 18 x 40	1540 1540	22 x 35 22 x 40	1900 1780		
6800	13 x 25 16 x 25	1120 1120	16 x 25 16 x 32	1120 1120	16 x 36 16 x 40 18 x 36	1530 1530 1530	18 x 36 18 x 40	1630 1630	22 x 40	1880				
10000	16 x 25 16 x 32 18 x 36	1320 1320 1320	16 x 36 18 x 36	1320 1320	18 x 36 18 x 40	1730 1730	22 x 40	2000						
15000	18 x 36	2280	18 x 40	1960										

Note : * 1. D x L : mm

* 2. mA rms at 85°C, 120Hz

CASE SIZE & PERMISSIBLE RIPPLE CURRENT OF STANDARD PRODUCTS

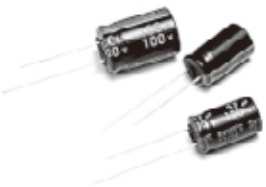
CAP. (μF)	RATED VOLTAGE W V													
	100		160		200		250		350		400		450	
	Size	Ripple	Size	Ripple	Size	Ripple	Size	Ripple	Size	Ripple	Size	Ripple	Size	Ripple
0.1	5 x 11	3												
0.22	5 x 11	4												
0.33	5 x 11	5												
0.47	5 x 11	6	5 x 11	8	5 x 11 8 x 11	6 6	5 x 11 8 x 11	6 9	5 x 11	14	6.3 x 11	14	6.3 x 11	14
1.0	5 x 11	9	5 x 11	12	5 x 11 8 x 11	9 9	6.3 x 11 8 x 11	9 9	6.3 x 11	20	6.3 x 11 8 x 11 10 x 15	15 15 15	8 x 11	20
2.2	5 x 11	15	6.3 x 11 8 x 11	15 15	6.3 x 11 8 x 11	15 15	6.3 x 11 8 x 11	15 15	8 x 11	35	8 x 11 10 x 12 10 x 15	20 20 20	10 x 12 8 x 11 10 x 15	29 15 29
3.3	5 x 11	18	6.3 x 11 8 x 11	20 20	6.3 x 11 8 x 11	20 20	8 x 11 10 x 12	20 20	8 x 11 10 x 12	37 47	8 x 11 10 x 15 10 x 12 10 x 19.5	20 20 25 25	10 x 15 10 x 19.5	35 35
4.7	5 x 11	20	6.3 x 11 8 x 11	30 30	8 x 11 10 x 12	30 30	8 x 11 10 x 12	30 30	10 x 12 10 x 15 8 x 11	55 55 55	8 x 15 8 x 11 10 x 12 10 x 15 13 x 20 16 x 25	37 37 47 47 77 47	10 x 15 13 x 20	50 50
6.8	5 x 11	35	10 x 12	30	10 x 12	45	8 x 15 10 x 12	45 45	10 x 15	65	10 x 15 10 x 19	70 70	10 x 19.5 12 x 20	80 40
10	5 x 11 6.3 x 11	35 35	8 x 11 10 x 12	40 40	10 x 12 10 x 15	45 45	10 x 15 10 x 19.5	45 45	10 x 15	95	10 x 15 10 x 19.5 13 x 20	70 70 70	13 x 20 13 x 25 10 x 19.5	75 75 75
15	8 x 11	35	10 x 15	40	10 x 15	45	10 x 15	80	10 x 19.5	140	10 x 19 13 x 20 13 x 25	100 110 110	16 x 25	75
22	8 x 11	65	8 x 20 10 x 15 10 x 19.5	70 70 70	10 x 15 10 x 19.5	70 70	10 x 19.5	80	13 x 20	165	13 x 20 13 x 25 16 x 32	110 110 110	13 x 25 16 x 25 16 x 32	110 110 110
33	8 x 11 10 x 12	95 95	10 x 19.5 13 x 20	110 110	10 x 19.5 13 x 25	110 110	13 x 20 13 x 25	100 100	13 x 25	195	13 x 25 16 x 20 16 x 25	180 180 180	16 x 25 16 x 36 16 x 20	150 150 170
47	10 x 12 10 x 15	120 120	13 x 20 13 x 25	140 140	13 x 20 13 x 25	140 140	13 x 25 16 x 25	140	16 x 25	340	16 x 25 16 x 32 16 x 36 18 x 20 18 x 25	250 250 250 250 250	16 x 36 18 x 40 22 x 40	230 230 230
68	10 x 15	220	13 x 25	250	13 x 25	140	16 x 25	140	16 x 32	320	16 x 32 16 x 36 18 x 25 18 x 36 18 x 40	320 320 320 320 330	18 x 32 22 x 40	340 340
100	10 x 19	220	13 x 25 16 x 25	250 250	13 x 25 16 x 25	335 335	16 x 32	260	18 x 36	360	16 x 36 18 x 32 18 x 36	425 430 480		
120											18 x 36	480		
150	13 x 20 13 x 25	414 414	16 x 32	250	16 x 36	450	18 x 40	460	22 x 40	480	22 x 40	450		
220	13 x 25	420	16 x 32 16 x 36	430 430	18 x 32 18 x 36 18 x 40	515 515 515	22 x 40	525						
330	13 x 25 16 x 25	510 510	18 x 36 18 x 40	850 850	18 x 36 18 x 40 22 x 40	705 780 920								
470	16 x 25 16 x 32	680 680	22 x 40	980										
680	16 x 36	1200												
1000	18 x 40 22 x 40	1340 1500												

Note : * 1. D x L : mm
* 2. mA rms at 105°C, 120Hz

Miniature Size Aluminum Electrolytic Capacitors

SH [For General]

105°C Single-Ended Lead Aluminum Electrolytic Capacitors
for the Rated Voltage up to 450V



DESCRIPTION

Long life for 2,000 hours at 105°C, ideally suited for high quality and high reliability applications.

Feature High CV Product

Multiplier for Ripple Current
Frequency coefficient

Frequency (Hz)	120	300	1K	10K~100K
6.3~100V Below~68μF	1.00	1.30	1.57	2.00
6.3~100V 100~470μF	1.00	1.23	1.34	1.50
6.3~100V 471~22000μF	1.00	1.10	1.13	1.15
160~450V ALL Cap(μF)	1.00	1.25	1.40	1.60

Temperature coefficient

Temperature(°C)	65	85	105
Factor	1.70	1.40	1.00

ELECTRICAL CHARACTERISTICS

Operating Temperature : -40° ~ +105°C / -25°~ +105°C

Working Voltage : 6.3 ~ 100V / 160 ~ 450V

Rate Capacitance Range : 0.1 ~ 15000μF / 0.1 ~ 15000μF

Capacitance Tolerance : -20 ~ +20%

DC Leakage Current (μA) : 0.01CV +3 / 0.03CV+10
(Measurements shall be made after a2 minute charge at rated working voltage at 25°C)

Dissipation Factor : at 120 Hz, 25°C

WV (V) :	6.3	10	16	25	35	50	63 ~ 100	160 ~ 250	350 ~ 450
D.F (%) :	26	22	18	16	14	12	10	15	20

For capacitor whose capacitance excceds 1000μF. The value of DF(%) is increased by 2% for every addition of 1000μF.

WV (V)	:	6.3	10	16	25	35 ~ 100	160 ~ 250	350 ~ 450
Impedance	Z - 25°C / Z + 25°C	4	3	2	2	2	4	4
	Z - 40°C / Z + 20°C	8	6	4	3	3	8	8

Load Life : 2000 Hours at 105°C Assured with Full Rated Maximum Ripple Current Applied

(a) Capacitance Change : Within 20% of Initial Value
(b) Dissipation Factor : Not Exceed 200% of Initial Requirement
(c) Leakage Current : Not Exceed the Initial Requirement

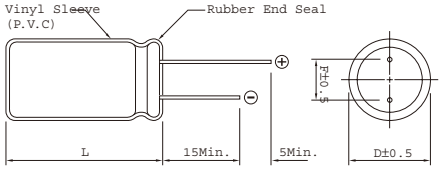
Shelf Life : 1000 Hours, No Voltage Applied

(a) Capacitance Change : Within 20% of Initial Value
(b) Dissipation Factor : Not Exceed 200% of Initial Requirement
(c) Leakage Current : Not Exceed 200% of Initial Requirement

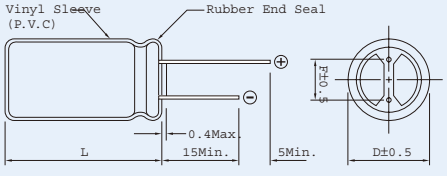
Pb-free
RoHS
COMPLIANT

DIAGRAM OF DIMENSIONS

Dimensions : mm



Rubber Stand-off



L ≤16 : L+1.5max
L >16 : L+2max
Dø =8&10 : L+2.5

Dø <20 : Dø+0.5
Dø ≥20 : Dø+1

Dø	F	dø
4.0	1.5	0.45
5.0	2.0	0.5
6.0	2.5	
8.0	3.5	
10.0	5.0	0.6
12.0		
13.0		
16.0	7.5	0.8
18.0		
22.0	10.0	0.8

CASE SIZE & PERMISSIBLE RIPPLE CURRENT OF STANDARD PRODUCTS

CAP. (μF)	RATED VOLTAGE WV													
	6.3		10		16		25		35		50		63	
	Size	Ripple	Size	Ripple	Size	Ripple	Size	Ripple	Size	Ripple	Size	Ripple	Size	Ripple
0.1											5 x 11	10		
0.22											5 x 11	15		
0.33											5 x 11	18		
0.47											5 x 11	7	5 x 11	8
1.0											5 x 11	12	5 x 11	12
2.2											5 x 11	18	5 x 11	20
3.3											5 x 11	25	5 x 11	24
4.7							5 x 11	85	5 x 11	92	5 x 11	30	5 x 11	34
6.8											5 x 11	30	5 x 11	37
10							5 x 11	92	5 x 11	44	5 x 11	50	5 x 11	55
15									5 x 11	50	5 x 11	50	5 x 11	65
22							5 x 11	60	5 x 11	65	5 x 11	75	6 x 11	90
33					5 x 11	70	5 x 11	75	5 x 11	85	6.3 x 11	105		
47			5 x 11	75	5 x 11	85	5 x 11	90	5 x 11	104	6.3 x 11	125	8 x 11	155
									6.3 x 11	115				
68			5 x 11	80	5 x 11	100	6.3 x 11	125	8 x 11	130	8 x 11	159	10 x 12	198
100	5 x 11	100	5 x 11	110	6.3 x 11	135	6.3 x 11	145	8 x 11	190	8 x 11	210	10 x 12	260
											6.3 x 11	210		
150	5 x 11	120	6.3 x 11	130	8 x 11	180	8 x 11	200	10 x 12	240	10 x 12	289	10 x 15	330
220	6.3 x 11	165	6.3 x 11	180			10 x 12	250	10 x 12	315	10 x 15	400	10 x 19.5	465
					8 x 11	235			8 x 11	315				
330	8 x 11	200	8 x 11	255	8 x 11	285	10 x 12	355	10 x15	440	10 x 19	535	13 x 20	650
470	8 x 11	280	8 x 11	305			10 x 15	470			13 x 20	730	13 x 25	800
					10 x 12	395	10 x 12	470	13 x 20	580				
680	10 x 12	320	10 x 12	420	10 x 15	530	10 x 19.5	650	13 x 20	730	13 x 25	860	16 x 25	1000
1000	10 x 12	470			10 x 19.5	700	13 x 20	855	13 x 25	995	16 x 25	1110	16 x 32	1200
			10 x 15	570			10 x 19.5	821	13 x 20	1023				
1500	10 x 15	600	10 x 19.5	750	13 x 20	860	13 x 25	1020	16 x 25	1110	16 x 32	1350	16 x 36	1450
2200	13 x 20	930			13 x 25	1150	16 x 25	1230	16 x 32	1450	18 x 36	1530		
			13 x 20	1010					16 x 25	1200	18 x 32	1340		
3300	13 x 20	1100	13 x 25	1220	16 x 25	1350	16 x 32	1450	18 x 36	1660				
4700	16 x 25	1320	16 x 25	1410			18 x 36	1690						
			13 x 25	1190	16 x 32	1560								
6800	16 x 25	1490	16 x 32	1610	18 x 36	1790								
10000	16 x 32	1830	18 x 36	1980										
15000	18 x 36	2280												

Note : * 1. D x L : mm

* 2. mA rms at 105°C, 120Hz

CASE SIZE & PERMISSIBLE RIPPLE CURRENT OF STANDARD PRODUCTS

CAP. (μF)	RATED VOLTAGE WV													
	100		160		200		250		350		400		450	
	Size	Ripple	Size	Ripple	Size	Ripple	Size	Ripple	Size	Ripple	Size	Ripple	Size	Ripple
0.47	5 x 11	10	5 x 11	12	5 x 11	12	5 x 11	12			8 x 11	1/8	6.3 x 11	11
							6.3 x 11	18						
1.0	5 x 11	15	5 x 11	17	6.3 x 11	17	6.3 x 11	17			10 x 12	30	8 x 11	22
													10 x 12	19
			6.3 x 11	18										
2.2	5 x 11	22	6 x 11	25	6.3 x 11	25	8 x 11	29			10 x 12	35	10 x 12	29
													10 x 15	29
3.3	5 x 11	29	8 x 11	36	8 x 11	36	10 x 12	42			10 x 12	41	10 x 19.5	35
											10 x 15	49		
4.7	5 x 11	37	8 x 11	43	10 x 12	50	10 x 12	50			8 x 11	57	10 x 15	50
											10 x 15	57	13 x 20	50
6.8	6.3 x 11	46	10 x 12	54	10 x 12	60	10 x 12	60			10 x 19.5	67		
10	6.3 x 11	65	10 x 12	70	10 x 15	80	10 x 19.5	80			10 x 19.5	97	13 x 25	75
											13 x 20	97		
15	8 x 11	82	10 x 15	90	10 x 19.5	110	13 x 20	120						
22	8 x 11	115	10 x 19.5	130	10 x 19.5	135	13 x 25	155			13 x 25	170	16 x 32	110
											16 x 25	170		
											16 x 25	170		
											16 x 32	175		
33	10 x 12	160	13 x 20	175			13 x 25	190					18 x 36	205
					13 x 25	190					16 x 32	200		
											16 x 36	220		
	10 x 15	210	13 x 25	230			16 x 25	230			16 x 25	213	18 x 40	250
47					13 x 25	220					16 x 32	245		
68	10 x 19.5	241	13 x 25	270	16 x 25	270	16 x 32	300			18 x 36	325		
100	13 x 20	385	16 x25	330	16 x 32	335	18 x 36	340						
120														
150	13 x 25	414	16 x 32	435	16 x 36	450	18 x 40	460			18 x 40	654		
220			16 x36	500			22 x 40	525						
	16 x 25	590			18 x 40	515								
330	16 x 25	720	18 x 40	850										
					22 x 40	920								
470	16 x 32	875	22 x 40	980	22 x 40	1016								
680	16 x 36	1200												

Note : * 1. D x L : mm

* 2. mA rms at105°C, 120Hz

SG [Electronic Ballast]

105□C Single-Ended Lead Aluminum Electrolytic Capacitors

Miniature Size Aluminum Electrolytic Capacitors

ELECTRICAL CHARACTERISTICS

Operating Temperature : -40 ~ +105°C / -25 ~ +105°C

Working Voltage : 160 ~ 400V / 450V

Rate Capacitance Range : 4.7 ~ 330μF / 3.3~100μF

Capacitance Tolerance : -20 ~ +20%

DC Leakage Current (μA) : I = 0.02 CV + 25

(After 2 Minute Application of DC Working Voltage at 25°C)

Dissipation Factor : at 120 Hz, 25°C

WV (V) :	160	200	250	350	400	450
D.F (%) :	15	15	15	20	24	24

For capacitor whose capacitance exceeds 1000μF. The value of D.F(%) is increased by 2% for every addition of 1000μF.

Load Life : 5000 Hours at Assured with Full Rated Maximum Ripple Current Applied

(a) Capacitance Change : Within 20% of Initial Value

(b) Dissipation Factor : Not Exceed 200% of Initial Requirement

(c) Leakage Current : Not Exceed the Initial Requirement

Shelf Life : Hours, No Voltage Applied

(a) Capacitance Change : Within 20% of Initial Value

(b) Dissipation Factor : Not Exceed 200 % of Initial Requirement

(c) Leakage Current : Not Exceed 200% of Initial Requirement

Pb-free

RoHS COMPLIANT

Multiplier for Ripple Current
Frequency coefficient

Frequency (Hz)	50,60	120	300	1K	10K~100K
6.3~100V Below~68μF	0.80	1.00	1.20	1.40	1.6

Temperature coefficient

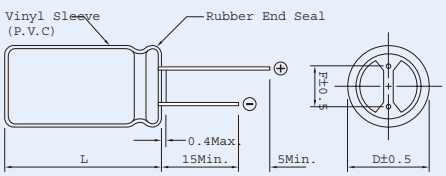
Temperature(°C)	65	85	105
Factor	1.70	1.40	1.00

DIAGRAM OF DIMENSIONS

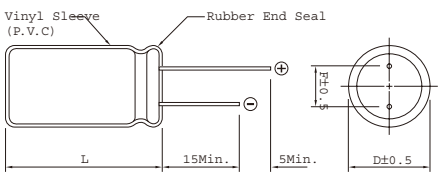
Dimensions : mm

Dø	F	dø
4.0	1.5	0.5
5.0	2.0	0.5
6.3	2.5	
8.0	3.5	
10.0	5.0	0.6
12.0		
13.0		
16.0	7.5	0.8
18.0		
22.0	10.0	0.8

Rubber Stand-off



L ≤16 : L+1.5max
L >16 : L+2max
Dø =8&10 : L+2.5



Dø <20 : Dø+0.5
Dø ≥20 : Dø+1

CASE SIZE OF STANDARD PRODUCTS

CAP. (μF)	RATED VOLTAGE								
	160			200			250		
	SIZE	Ripple	Impedance	SIZE	Ripple	Impedance	SIZE	Ripple	Impedance
10	10 x 15	320	2.90						
							10 x 19.5	100	3.50
15							10 x 19.5	130	3.50
22	10 x 19.5	160	1.52	10 x 19.5	160	1.50			
							13 x 20	160	2.50
33	10 x 19.5	210	1.30				13 x 20	210	1.90
				13 x 20	210	0.95			
47	13 x 20	260	0.95	13 x 20	260	0.91	13 x 25	270	1.70
	10 x 19.5	750	1.50				16 x 20	275	1.50
68	13 x 25	360	0.60	13 x 25	360	0.60	16 x 25	380	0.80
	16 x 20	430	0.55	16 x 20	430	0.55	18 x 20	375	0.90
82				16 x 20	1380	0.55	16 x 25	400	0.80
100	16 x 20	400	0.40	16 x 25	475	0.30	16 x 25	440	0.86
	16 x 25	475	0.30						
	18 x 20	465	0.31	18 x 20	465	0.31	18 x 25	500	0.65
150	16 x 32	650	0.22	18 x 25	650	0.27	18 x 32	650	0.45
	18 x 25	625	0.24	16 x 25	650	0.22			
220	16 x 32	750	0.22	18 x 32	780	0.22	18 x 40	820	0.43
	18 x 25	725	0.24						
330	18 x 32	960	0.22						

Note : * 1. D x L : mm

* 2. mA rms at 105°C, 100KHz

* 3. Impedance Spec :100KHz / 25°C (Ω MAX)

* 4. Down Size : 3000Hrs

CASE SIZE OF STANDARD PRODUCTS

CAP. (μF)	RATED VOLTAGE								
	350			400			450		
	SIZE	Ripple	Impedance	SIZE	Ripple	Impedance	SIZE	Ripple	Impedance
3.3							10 x 19.5	60	6.50
4.7							13 x 20	80	3.60
6.8	10 x 19.5	84	4.00						
10	10 x 19.5	100	3.00	10 x 19.5	100	2.90	13 x 20	110	3.00
15	13 x 20	130	2.75	13 x 20	120	2.85			
22	13 x 20	160	2.10	13 x 25	170	1.35			
				16 x 20	200	1.00	18 x 20	200	2.20
33	13 x 25	230	1.00	16 x 25	230	0.95	16 x 32	275	1.30
	16 x 20	250	0.91	18 x 20	250	0.91	18 x 25	280	1.20
47	16 x 25	300	0.75	16 x 25	300	0.85	18 x 32	340	1.00
				16 x 32	300	0.85			
	18 x 20	315	0.80	18 x 25	325	0.80			
68	16 x 32	400	0.50	18 x 36	420	0.49	18 x 40	460	0.80
	18 x 25	400	0.62	18 x 32	390	0.59			
82	18 x 25	400	0.55	18 x 40	490	0.48			
100	18 x 32	530	0.40	18 x 40	545	0.34			
150				22 x 40	650	0.30			

Note : * 1. D x L : mm

* 2. mA rms at 105°C, 100KHz

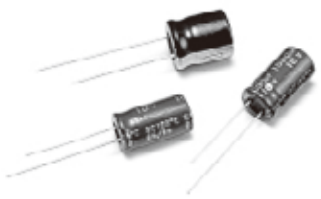
* 3. Impedance Spec : 100KHz / 25°C (Ω MAX)

* 4. Down Size : 3000Hrs

Miniature Size Aluminum Electrolytic Capacitors

SA [High Ripple Current and Long load life]

105°C Single-Ended Lead Aluminum Electrolytic Capacitors



DESCRIPTION

High Temperature Load Life at 105°C for 3000~8000 Hours

Frequency coefficient

Rated voltage(V)	Freq.(Hz) / Cap(μF)	50	120	300	1K	10K-
6.3~100V	-47	0.75	1.00	1.35	1.57	2.00
	100~470	0.80	1.00	1.23	1.34	1.50
	≥560	0.85	1.00	1.10	1.13	1.15
160~450	0.47~220	0.80	1.00	1.25	1.40	1.60
	≥270	0.90	1.00	1.10	1.13	1.15

Temperature coefficient

Temperature(°C)	~55	60	70	85	105
Factor	2.23	2.17	2.00	1.75	1.00

ELECTRICAL CHARACTERISTICS

Operating Temperature : -40° ~ +105°C -25° ~ +105°C

Working Voltage : 6.3 ~ 100V 160 ~ 450V

Rate Capacitance Range : 0.1 ~ 22000μF

Capacitance Tolerance : -20 ~ +20%

DC Leakage Current (μA) : $I \leq 0.03$ CV or 4(μA) after 1 minute , $I \leq 0.04$ CV +40(μA) after 1 minute

(Measurements shall be Made After a 1 Minute Charge at Rated Working Voltage)

Dissipation Factor : at 120 Hz, 25°C

WV (V) :	6.3	10	16	25	35	50	63	100	160	200	250	315	400	450
D.F (%) :	28	24	20	16	14	12	10	8	20	20	20	25	25	25

For capacitor whose capacitance exceeds 1000μF. The value of D.F(%) is increased by 2% for every addition of 1000μF.

WV (V) :	6.3	10	16	25	35	50	63	100
Impedance : Z - 25°C / Z + 20°C	5	4	3	2	2	2	2	2
Impedance : Z - 40°C / Z + 20°C	12	10	8	5	4	3	3	3

WV (V) :	160	200	250	350	400	450
Impedance : Z - 25°C / Z + 20°C	3	3	4	4	6	15

Load Life : At 105°C Assured with Full Rated Maximum Ripple Current Applied

ø5~ø6=3000 hours.
ø8~ø10=5000 hours.
>ø12=8000 hours.
(a) Capacitance Change : Within 20% of Initial Value
(b) Dissipation Factor : Not Exceed 200% of Initial Requirement
(c) Leakage Current : Not Exceed the Initial Requirement

Pb-free

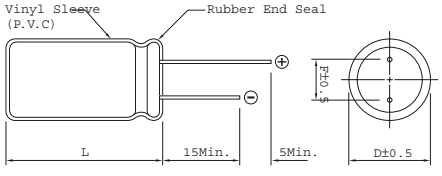
RoHS COMPLIANT

Shelf Life : 1000 Hours, No Voltage Applied, at 105°C

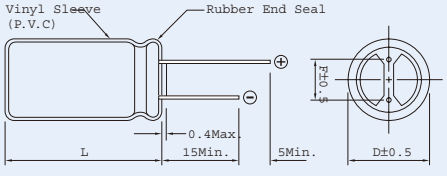
(a) Capacitance Change : Within 20% of Initial Value
(b) Dissipation Factor : Not Exceed 200 % of Initial Requirement
(c) Leakage Current : Not Exceed 200% of Initial Requirement

DIAGRAM OF DIMENSIONS

Dimensions : mm



Rubber Stand-off



L ≤16 : L+1.5max
L >16 : L+2max
Dø =8&10 : L+2.5

Dø <20 : Dø+0.5
Dø ≥20 : Dø+1

Dø	F	dø
4.0	1.5	0.45
5.0	2.0	0.5
6.0	2.5	
8.0	3.5	
10.0	5.0	0.6
12.0		
13.0		
16.0	7.5	0.8
18.0		
22.0	10.0	0.8

CASE SIZE OF STANDARD PRODUCTS Dø ≥ 6mm with Safety Vent at Can Bottom

CAP. (μF)	RATED VOLTAGE WV									
	6.3		10		16		25		35	
	Size	Ripple	Size	Ripple	Size	Ripple	Size	Ripple	Size	Ripple
0.1										
0.22										
0.33										
0.47										
1										
2.2										
3.3										
4.7							5 x 11	18	5 x 11	21
10					5 x 11	24	5 x 11	30	5 x 11	33
22	5 x 11	21	5 x 11	33	5 x 11	45	5 x 11	48	5 x 11	51
33	5 x 11	33	5 x 11	48	5 x 11	54	5 x 11	57	5 x 11	63
47	5 x 11	45	5 x 11	57	5 x 11	66	5 x 11	69	6.3 x 11	84
100	5 x 11	78	5 x 11	87	6.3 x 11	105	6.3 x 11	111	8 x 11	138
220	6.3 x 11	129	6.3 x 11	138	8 x 11	180	8 x 11	192	10 x 12	222
330	6.3 x 11	159	8 x 11	198	8 x 11	216	10 x 12	252	10 x 15	294
470	8 x 11	216	8 x 11	234	10 x 12	282	10 x 15	324	10 x 19.5	384
1000	10 x 12	342	10 x 15	378	10 x 19.5	474	12 x 20	570	13 x 25	660
2200	13 x 20	630	13 x 20	660	13 x 25	810	16 x 25	730	16 x 32	708
3300	13 x 20	750	13 x 25	840	16 x 25	1020	16 x 32	1170	18 x 36	1330
									22 x 30	1330
									18 x 40	1330
4700	16 x 25	1020	16 x 25	1080	16 x 32	1260	18 x 36	1410	18 x 40	1490
							22 x 30	1410	22 x 35	1470
							18 x 40	1410		
6800	16 x 25	1140	16 x 32	1290	18 x 36	1500	22 x 40	1550		
					22 x 30	1480	18 x 40	1550		
10000	16 x 32	1350	18 x 36	1500	18 x 40	1580				
			22 x 30	1480	22 x 35	1560				
			18 x 40	1480						
12000	16 x 36	1470	18 x 36	1560	22 x 40	1640				
			22 x 30	1530						
15000	18 x 36	1508	18 x 40	1632						
	22 x 30	1590	22 x 35	1600						
	18 x 40	1590								
18000	18 x 40	1650	22 x 40	1710						
	22 x 35	1650								
22000	22 x 40	1710								

Note : * 1. D x L : mm

* 2. mA rms at 105°C, 120Hz

CASE SIZE OF STANDARD PRODUCTS Dø ≥ 6mm with Safety Vent at Can Bottom

CAP. (μF)	RATED VOLTAGE WV									
	50		63		100		160		200	
	Size	Ripple	Size	Ripple	Size	Ripple	Size	Ripple	Size	Ripple
0.1	5 x 11	1.1			5 x 11	1.1				
0.22	5 x 11	2.3			5 x 11	2.3				
0.33	5 x 11	3.5			5 x 11	3.5				
0.47	5 x 11	5			5 x 11	5	6.3 x 11	7.2	6.3 x 11	7.2
1	5 x 11	10			5 x 11	10	6.3 x 11	10.2	6.3 x 11	10.2
2.2	5 x 11	14			5 x 11	18	6.3 x 11	16	6.3 x 11	16
3.3	5 x 11	21			5 x 11	24	8 x 11	21	8 x 11	21
4.7	5 x 11	24	5 x 11	27	5 x 11	27	8 x 11	24	10 x 12	27
10	5 x 11	39	5 x 11	42	6.3 x 11	45	10 x 12	39	10 x 15	42
22	6.3 x 11	57	6.3 x 11	69	8 x 11	78	10 x 19.5	66	10 x 22	66
33	6.3 x 11	75	8 x 11	84	10 x 12	102	13 x 20	90	13 x 25	96
47	6.3 x 11	90	8 x 11	114	10 x 15	138	13 x 25	108	13 x 25	108
100	8 x 11	150	10 x 12	180	13 x 20	240	16 x 25	180	16 x 32	198
150							16 x 36	252	18 x 36	270
									18 x 40	270
									22 x 30	270
220	10 x 15	264	10 x 19.5	294	16 x 25	436	18 x 36	306	18 x 40	312
									18 x 36	312
							22 x 30	306	22 x 35	312
							16 x 36	306		
270							18 x 40	324	22 x 40	342
							22 x 35	324	18 x 40	342
							18 x 32	324		
330	10 x 19.5	398	13 x 20	408	16 x 25	516	22 x 40	360		
							18 x 36	360		
470	13 x 20	456	13 x 25	528	16 x 32	660				
1000	16 x 25	810	18 x 32	930	18 x 40	1010				
					22 x 35	1010				
2200	18 x 36	1250	18 x 40	1320						
	18 x 40	1250								
	22 x 30	1250	22 x 35	1350						
3300	22 x 40	1420								

Note : * 1. D x L : mm

* 2. mA rms at 105°C, 120Hz

CASE SIZE OF STANDARD PRODUCTS Dø ≥ 6mm with Safety Vent at Can Bottom

CAP. (μF)	RATED VOLTAGE WV									
	250		315		350		400		450	
	Size	Ripple	Size	Ripple	Size	Ripple	Size	Ripple	Size	Ripple
0.47	6.3 x 11	7.2								
1	6.3 x 11	10.2	6.3 x 11	10.2	8 x 11	10.8	8 x 11	10.8	10 x 12	11.4
2.2	8 x 11	18	8 x 11	18	10 x 12	18	10 x 12	18	10 x 19.5	17.4
3.3	10 x 12	21	10 x 12	21	10 x 15	21	10 x 19.5	21	10 x 19.5	21
4.7	10 x 12	27	10 x 15	45	10 x 15	27	10 x 19.5	27	13 x 20	30
10	10 x 19.5	42	10 x 19.5	42	13 x 20	42	13 x 20	42	13 x 25	45
22	13 x 25	78	13 x 25	72	13 x 25	66	16 x 25	66	16 x 32	66
33	13 x 25	96	16 x 25	90	16 x 32	84	16 x 32	84	18 x 36	90
									22 x 30	84
47	16 x 25	126	16 x 32	144	18 x 36	132	18 x 36	132	22 x 40	138
					22 x 30	132	22 x 30	132		
100	18 x 36	204	18 x 40	204	22 x 40	216				
	18 x 40	204								
	22 x 30	204	22 x 35	204						
150	18 x 40	276	22 x 40	270						
	22 x 35	276								
220	22 x 40	320								

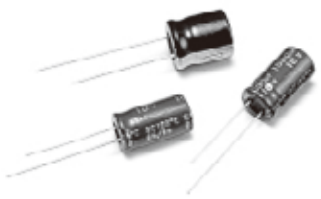
Note : * 1. D x L : mm

* 2. mA rms at 105°C, 120Hz

Miniature Size Aluminum Electrolytic Capacitors

SP [Miniature and Long Life]

105°C Single-Ended Lead Aluminum Electrolytic Capacitors For Electronic Ballast



DESCRIPTION

Applicable for Electronic Ballast

High Temperature Load Life at 105°C for 8000~10000 Hours

Frequency coefficient

Frequency(Hz)	120	1K	10K	100K
Coefficient	0.50	0.80	0.90	1.00

Temperature coefficient

Temperature(°C)	65	85	105
Factor	1.70	1.40	1.00

ELECTRICAL CHARACTERISTICS

Operating Temperature : -40° ~ +105°C -25° ~ +105°C

Working Voltage : 160 ~ 400V 450V

Rate Capacitance Range : 2.2 ~ 330μF

Capacitance Tolerance : -20 ~ +20%

DC Leakage Current (μA) : I = 0.04 + 100 CV(μA)

(Measurements shall be Made After a 2 Minute Charge at Rated Working Voltage at 25°C)

Dissipation Factor : at 120 Hz, 25°C

WV (V) :	160	200	350	400	450
D.F (%) :	20	20	20	24	24

WV (V) :	160	250	350	400	450
Z - 25°C / Z + 20°C	3		6	6	6
Z - 40°C / Z + 20°C	6		-		

Load Life : 8000~10000 Hours at 105°C Assured with Full Rated Maximum Ripple Current Applied

(a) Capacitance Change : Within 20% of Initial Value
(b) Dissipation Factor : Not Exceed 200% of Initial Requirement
(c) Leakage Current : Not Exceed the Initial Requirement

Shelf Life : 1000 Hours, No Voltage Applied, at 105°C

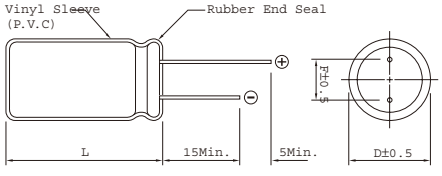
(a) Capacitance Change : Within 20% of Initial Value
(b) Dissipation Factor : Not Exceed 200 % of Initial Requirement
(c) Leakage Current : Not Exceed 200% of Initial Requirement

Pb-free

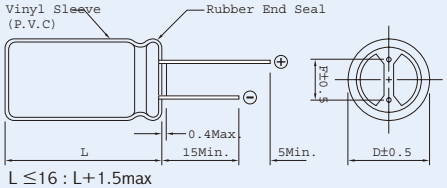
RoHS COMPLIANT

DIAGRAM OF DIMENSIONS

Dimensions : mm



Rubber Stand-off



L ≤16 : L+1.5max
L >16 : L+2max
Dø =8&10 : L+2.5

Dø <20 : Dø+0.5
Dø ≥20 : Dø+1

Dø	F	dø
4.0	1.5	0.45
5.0	2.0	0.5
6.0	2.5	
8.0	3.5	
10.0	5.0	0.6
12.0		
13.0		
16.0	7.5	0.8
18.0		
22.0	10.0	0.8

CASE SIZE OF STANDARD PRODUCTS AND PERMISSIBLE RIPPLE CURRENT

CAP. (μF)	RATED VOLTAGE WV											
	160			200			250			350		
	Size	Ripple	Impedance	Size	Ripple	Impedance	Size	Ripple	Impedance	Size	Ripple	Impedance
10										13 x 19.5	350	0.31
22	10 x 19.5	500	1.75	10 x 19.5	440	1.30	10 x 19.5	560	1.30	13 x 20	480	1.25
33	10 x 19.5	500	1.30	10 x 19.5	520	0.91	13 x 20	710	0.90			
				13 x 20	580	0.91						
47	10 x 19.5	580	0.96	13 x 20	660	0.91	13 x 25	710	0.90	16 x 25	800	0.85
	13 x 20	660	0.96							18 x 20	800	0.90
68	12 x 25	720	0.64	13 x 25	720	0.63				16 x 32	1100	0.75
	13 x 20	950	0.85							18 x 25	1000	0.84
	16 x 20	760	0.64	16 x 20	760	0.56						
	13 x 25	1060	0.64				16 x 25	1200	0.54	18 x 32	1100	0.75
							18 x 20	1200	0.62			
	13 x 25	970	0.48	16 x 25	1120	0.27	16 x 32	1500	0.25	18 x 32	1200	0.25
100	16 x 20	1120	0.56	18 x 20	1280	0.31	18 x 25	1500	0.28			
	16 x 25	1120	0.48									
	18 x 20	1120	0.56									
	16 x 25	1200	0.40	16 x 32	1280	0.22	18 x 32	1800	0.21			
150	16 x 32	1300	0.40									
	18 x 25	1300	0.40									
220	16 x 32	1300	0.27	18 x 32	2000	0.22						
	18 x 25	1300	0.36	18 x 40	2400	0.21						
330	18 x 36	1380	0.21									
	18 x 32	2000	0.27									

Note : * 1.D x L : mm

* 2. mA rms at 105°C, 120Hz

CASE SIZE OF STANDARD PRODUCTS AND PERMISSIBLE RIPPLE CURRENT

CAP. (μF)	RATED VOLTAGE WV					
	400			450		
	Size	Ripple	Impedance	Size	Ripple	Impedance
2.2						
3.3				10 x 15	120	7.00
4.7				10 x 19.5	140	5.10
6.8	10 x 19.5	150	4.80	10 x 19.5	150	4.80
				13 x 20	180	4.20
10	10 x 19.5	180	2.90	13 x 20	310	2.50
15	13 x 25	410	2.85	13 x 25	560	2.45
22	16 x 20	300	0.95	16 x 25	560	1.70
				13 x 25	560	2.30
	13 x 25	300	1.10	18 x 20	550	2.10
33	16 x 25	520	0.91	16 x 32	850	1.10
				18 x 25	850	1.10
47	16 x 32	700	0.68	16 x 36	880	0.93
	18 x 20	700	0.95	18 x 32	1000	0.93
68	18 x 32	870	0.63			
82	18 x 40	1500	0.58			

Note : * 1. D x L : mm

* 2. mA rms at 105°C, 120Hz

SB [For Low Leakage Current]

105°C Single-Ended Lead Aluminum Electrolytic Capacitors

Miniature Size Aluminum Electrolytic Capacitors

ELECTRICAL CHARACTERISTICS

Operating Temperature : -40° ~ +105°C

Working Voltage : 6.3 ~ 100V

Rate Capacitance Range : 0.1 ~ 4700μF

Capacitance Tolerance : -20 ~ +20%

DC Leakage Current (μA) : I = 0.002CV (μA) or 0.4μA Whichever is greater.

(After 2 Minutes Application of DC Working Voltage at 25°C)

Equivalent Series Resistance (E.S.R., at 120Hz):

When measured at 25°C and 1 KHz E.S.R value shall not exceed the value given in the table on the next page.

WV (V) :	6.3	10	16	25	35 ~ 100
D.F (%) :	20	16	13	12	10

For capacitor whose capacitance exceeds 1000μF. The value of D.F(%) is increased by 2% for every addition of 1000μF.

Load Life : 1000 Hours at 105°C Assured with Full Rated Maximum Ripple Current Applied

(a) Capacitance Change :Within 25% of Initial Value
(b) Dissipation Factor : Not Exceed 200% of Initial Requirement
(c) Leakage Current : Not Exceed the Initial Requirement

Shelf Life : 500 Hours, No Voltage Applied, at 105°C

(a) Capacitance Change :Within 25% of Initial Value
(b) Dissipation Factor : Not Exceed 200% of Initial Requirement
(c) Leakage Current : Not Exceed 200% of Initial Requirement

WV (V) :	6.3	10	16	25	35 ~ 100
Impedance : Z - 40°C / Z + 20°C	4	4	3	3	3

DESCRIPTION

Used in where low leakage current is essential as in coupling of pre-amplifies.

Very low leakage current remains even after prolonged storage.

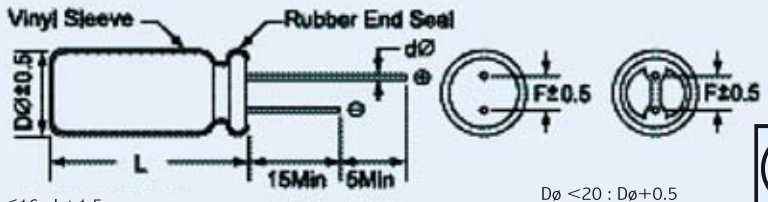
Multiplier for Ripple Current
Frequency coefficient

Frequency(Hz)	50	120	300	1K	10K	100K
6.3~25V	0.85	1.00	1.04	1.08	1.19	1.19
26~50V	0.80	1.00	1.30	1.40	1.43	1.43
50~100V	0.77	1.00	1.34	1.43	1.48	1.48

Temperature coefficient

Temperature(°C)	60	70	85	105
Factor	1.95	1.75	1.20	1.00

DIAGRAM OF DIMENSIONS



L ≤16 : L+1.5max
L >16 : L+2max
Dø =8&10 : L+2.5

Dø <20 : Dø+0.5
Dø ≥20 : Dø+1

Pb-free
RoHS
COMPLIANT

Dimensions : mm

Dø	F	dø
4.0	1.5	0.45
5.0	2.0	0.5
6.0	2.5	
8.0	3.5	
10.0	5.0	0.6
12.0		
13.0		
16.0	7.5	0.8
18.0		
22.0	10.0	0.8

CASE SIZE OF STANDARD PRODUCTS Dø ≥ 6mm with Safety Vent at Can Bottom

CAP. (μF)	RATED VOLTAGE WV														
	6.3					10					16				
	SIZE	Ripple	Impedance	ESR		SIZE	Ripple	Impedance	ESR		SIZE	Ripple	Impedance	ESR	
0.1															
0.15															
0.22															
0.33															
0.47															
0.56															
0.68															
1.0															
1.5															
2.2															
3.3															
4.7															
6.8															
10											5x11	24	5.00	17.00	11.30
15											5x11	56	4.43	10.60	7.07
22											5x11	45		14.48	
	5 x11	21		16.89		5x11	33	4.01	7.83	5.22	6.3x11	70	3.70	7.23	4.82
33						5x11	48		9.65		5x11	54		8.04	
	5 x11	33		11.26		6.3x11	78	2.67	3.482	3.48	6.3x11	95	2.46	4.82	3.21
47						5x11	57		6.78		5x11	66		5.65	
	5 x11	45		7.91		6.3x11	106	1.87	2.44	2.44	8 x11	122	1.73	3.38	2.25
68	6.3x11	80	1.50	3.00	2.00	6.3x11	142	1.29	0.68	1.68	8 x11	168	1.20	2.34	1.56
100	5 x11	78		3.72		5 x11	81				6.3x11	105		2.65	
	6.3x11	126	0.88	1.72	1.15	8 x11	179	0.87	1.14	1.14	10x12	254	0.81	1.59	1.06
150	8 x11	196	0.59	1.15	0.77	10x12	280	0.58	0.76	0.76	10x15	416	0.53	1.06	0.70
220	6.3 x11	272		1.69		6.3 x11	138		1.45		8 x11	180		1.21	
	10 x12	272	0.40	0.78	0.52	10 x15	355	0.40	0.52	0.52	10x19.5	553	0.36	0.72	0.48
330	6.3 x11	388		1.13		8 x11	198		0.97		8 x11	216		0.80	
	10x15	388	0.26	0.52	0.34	10x19.5	480	0.26	0.34	0.34	13x20	732	0.24	0.48	0.32
470	8 x11	507		0.79		8 x11	234		0.68		10 x12	282		0.56	
	10x19.5	507	0.18	0.36	0.24	13x20	640	0.18	0.24	0.24	13x20	1040	0.16	0.33	0.22
680	13x25	627	0.12	0.25	0.16	13x20	848	0.12	0.16	0.16	13x25	1280	0.11	0.23	0.15
820	13x25	770	0.11	0.21	0.14						16x25	1450	0.09	0.18	0.12
1000	10x12	896		0.37	0.11						10x19.5	474		0.27	
	13x25	896	0.08	0.17	0.11	10 x15	378	0.08	0.32	0.11	16x25	1700	0.06	0.14	0.10
1500	13x25	1204	0.05	0.11	0.07						16x32	1750	0.06	0.10	0.06
2200	13x20			0.18	0.06	13 x20	660		0.16						
	16x25	1513	0.04	0.09	0.06	16x32	1680	0.04	0.06	0.06	18x36	1900	0.05	0.08	0.06
3300	13x20			0.13	0.04										
	16x36	1902	0.04	0.06	0.04	16x36	2155	0.03	0.04	0.04	18x40	2250	0.04	0.06	0.04
4700	18x36	2272	0.02	0.05	0.03	18x40	2560	0.02	0.03	0.03					

Note : * 1. D x L : mm

* 2. Ripple Current mA rms at 105°C, 100Hz

* 3. Impedance : (ohm) 25°C/10KHz

* 4. ESR : (ohm) 25°C/120Hz and 1KHz

CASE SIZE OF STANDARD PRODUCTS Dø ≥ 6mm with Safety Vent at Can Bottom

CAP. (μF)	RATED VOLTAGE WV														
	25					35					50				
	SIZE	Ripple 120Hz	Impedance 10K Hz	ESR 120Hz	ESR 1K Hz	SIZE	Ripple 120Hz	Impedance 10K Hz	ESR 120Hz	ESR 1K Hz	SIZE	Ripple 120Hz	Impedance 10K Hz	ESR 120Hz	ESR 1K Hz
0.1											5x11	1	323.00	510.0	215.0
0.15											5x11	4	270.00	355.0	126.0
0.22											5x11	2	235.00	223.0	80.00
0.33											5x11	4	175.00	185.0	65.20
0.47											5x11	5	90.00	96.00	45.70
0.56											5x11	5	40.00	50.00	33.00
0.68											5x11	9	38.50	47.00	31.20
1.0											5x11	10	32.70	43.40	25.30
1.5											5x11	24	28.50	35.20	21.70
2.2											5x11	14	22.40	32.50	17.50
3.3											5x11	21	17.40	24.30	13.20
4.7											5x11	45		33.88	
	5x11	18	8.00	20.00	13.00	5x11	21	14.40	39.53	18.80	6.3x11	45	12.50	20.70	9.20
6.8	5x11	42	7.60	19.50	11.00	5x11	45	10.00	19.50	13.00	6.3x11	55	10.00	19.50	9.00
10	5x11	30		21.23		5x11	33		18.58		5x11	39		15.92	
	6.3x11	63	6.80	13.20	8.84	6.3x11	67	6.80	13.20	8.84	8x11	82	6.80	13.20	8.84
15	6.3x11	67	4.53	8.84	5.89	8x11	75	4.53	8.80	5.89	8x11	97	4.56	8.84	5.89
22	5x11	48		9.65		5x11	97		8.44		6.3x11	57		7.24	
	8x11	84	3.08	6.02	4.01	8x11	97	3.08	6.02	4.01	10x12	127	3.08	6.02	4.01
33	5x11	57		6.43		5x11	63		5.63		6.3x11	75		4.83	
	8x11	102	2.05	4.01	2.67	10x12	139	2.05	4.01	2.67	10x15	156	2.05	4.01	2.67
47	5x11	69		4.52		6.3x11	84		3.95		6.3x11	90		3.39	
	10x12	141	1.44	2.82	1.88	10x12	166	1.44	2.82	1.88	10x15	217	1.44	2.82	1.88
68	10x12	190	1.00	1.95	1.30	10x15	238	1.00	1.95	1.30	10x19.5	300	1.00	1.95	1.30
100	6.3x11	111		2.12		8 x11	138		1.86		10 x12	250		1.6	
	10x15	277	0.67	1.32	0.88	10x19.5	310	0.67	1.32	0.88	13x20	390	0.67	1.32	0.88
150	10x19.5	455	0.44	0.88	0.58	13x20	491	0.44	0.88	0.58	13x25	569	0.44	0.88	0.58
220	8 x11										10 x15			0.72	
	13x20	590	0.30	0.60	0.40	10x12	222	0.30	0.84	0.40	16x25	910	0.30	0.60	0.40
330	10 x12	252		0.64							10x19.5	398		0.48	
	13x25	754	0.20	0.40	0.26	10x15	294	0.20	0.56	0.26	16x32	986	0.20	0.40	0.26
470	10 x15	324		0.45							13 x25	825		0.339	
	16x25	1110	0.13	0.28	0.18	10x19.5	384	0.15	0.4	0.18	16x36	1249	0.13	0.28	0.18
680	16x32	1385	0.09	0.19	0.12	16x32	1462	0.09	0.19	0.12	16x36	1870	0.09	0.19	0.12
820	16x32	1540	0.08	0.15	0.10	16x36	1630	0.08	0.15	0.10	16x36	1950	0.08	0.15	0.10
1000	13x20	570		0.21											
	16x36	1710	0.06	0.13	0.08	18x36	1723	0.06	0.13	0.08	18x40	2070	0.06	0.13	0.08
1500	16x36	1779	0.03	0.08	0.05	18x4	2006	0.03	0.08	0.05					
2200	18x40	2174	0.03	0.06	0.04										
3300															
4700															

Note : * 1. D x L : mm

* 2. Ripple Current mA rms at 105°C, 100Hz

* 3. Impedance : (ohm) 25°C/10KHz

* 4. ESR : (ohm) 25°C/120Hz and 1KHz

CASE SIZE OF STANDARD PRODUCTS Dø ≥ 6mm with Safety Vent at Can Bottom

CAP. (µF)	RATED VOLTAGE WV								
	SIZE	63 Ripple 120Hz	ESR 120Hz	SIZE	80 Ripple 120Hz	ESR 120Hz	SIZE	100 Ripple 120Hz	ESR 120Hz
0.1	5 x 11	1	484	5 x 11	1	409	5 x 11	1	1061
0.15	5 x 11	4	337	5 x 11	4	319			
0.22	5 x 11	4	209	5 x 11	4	198	5 x 11	2	187
0.33	5 x 11	6	175	5 x 11	6	166	5 x 11	4	157
0.47	5 x 11	7	91.2				5 x 11	5	81.6
0.56	5 x 11	7	47.5	5 x 11	7	45	5 x 11	7	42.5
0.68	5 x 11	9	45.1	5 x 11	9	42.7	5 x 11	9	40.3
1.0	5 x 11	18	41.2	5 x 11	18	39.0	5 x 11	10	36.8
1.5	5 x 11	24	33.4	5 x 11	24	31.6	5 x 11	24	29.9
2.2							5 x 11	18	48.25
	5 x 11	30	30.8	5 x 11	30	29.2	6.3 x 11	30	27.6
3.3							5 x 11	24	32.17
	5 x 11	36	23	6.3 x 11	36	21.9	8 x 11	36	20.6
4.7	5 x 11	27	28.23				5 x 11	27	22.59
	6.3 x 11	45	19.6	6.3 x 11	45	18.6	8 x 11	60	17.5
6.8	6.3 x 11	55	18.5	8 x 11	60	17.5	10 x 12	67	16.5
10	5 x 11	42	13.27				6.3 x 11	45	10.62
	8 x 11	82	12.5	10 x 12	90	11.9	10 x 15	94	11.2
15	10 x 12	103	8.39	10 x 15	112	7.59	10 x 19.5	117	7.51
22	6.3 x 11	69	6.03						
	10 x 15	148	5.17	10 x 15	165	5.41	8 x 11	78	4.83
33	8 x 11	84	4.02						
	10 x 15	210	3.3	10 x 19.5	217	3.6	10 x 12	102	3.22
47	8 x 11	114	2.82				10 x 15	138	2.26
	10 x 19.5	240	2.67	10 x 19.5	276	2.53	13 x 25	285	2.39
68	10 x 19.5	328	1.85	13 x 20	631	1.75	13 x 25	375	1.65
100	10 x 12	180	1.33				13 x 20	240	1.06
	13 x 25	420	1.25	13 x 25	447	1.18	16 x 25	456	1.12
150	13 x 25	618	0.83	16 x 25	663	0.79	16 x 32	707	0.74
220	13 x 20	640	0.603						
	16 x 32	930	0.57	16 x 32	970	0.54	18 x 36	1010	0.51
330	13 x 20	750	2.533						
	16 x 36	1088	0.38	16 x 36	1198	0.36	18 x 40	1377	0.34
470	18 x 36	1385	0.26	18 x 36	1509	0.25			
680	18 x 36	1870	0.18						
820									
1000									
1500									
2200									
3300									
4700									

Miniature Size Aluminum Electrolytic Capacitors

SN [For Non Polar]

105°C Single-Ended Lead Aluminum Electrolytic Capacitors For Non-Polar General Purpose

DESCRIPTION

Non-polar miniature type for used in reversing polarity DC voltage circuits.

Frequency coefficient

Frequency(Hz)	60	120	300	1K	10K~100K
Factor	0.75	1.00	1.20	1.32	1.65

Temperature coefficient

Temperature(°C)	65	85	105
Factor	1.30	1.20	1.00

ELECTRICAL CHARACTERISTICS

Operating Temperature : -40°C ~ +105°C

Working Voltage : 6.3 ~ 100V

Rate Capacitance Range : 0.47 ~ 2200μF

Capacitance Tolerance : -20 ~ +20%

DC Leakage Current (μA) : I = 0.03 CV + 3μA

(After 5 Minutes Application of DC Working Voltage at 25°C)

Dissipation Factor : at 120Hz, 25°C

WV (V) :	6.3	10	16	25	35	50	63	100
D.F (%) :	26	24	22	20	16	14	12	10

For capacitor whose capacitance exceeds 1000μF. The value of D.F(%) is increased by 2% for every addition of 1000μF.

Load Life : 1000 Hours at 105°C with the Polarity Inverted Every 250 Hours

(a) Capacitance Change : Within 25% of Initial Value
(b) Dissipation Factor : Not Exceed 150% of Initial Requirement
(c) Leakage Current : Not Exceed the Initial Requirement

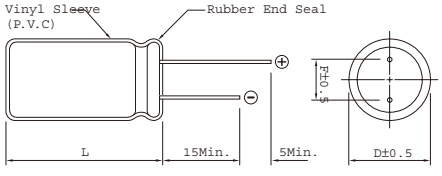
Shelf Life : 500 Hours, No Voltage Applied, at 105°C

(a) Capacitance Change : Within 25% of Initial Value
(b) Dissipation Factor : Not Exceed 200% of Initial Requirement
(c) Leakage Current : Not Exceed 200% of Initial Requirement

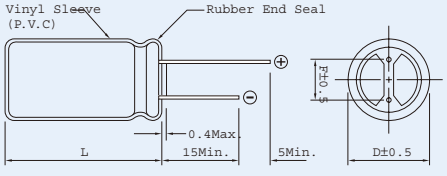
Pb-free
RoHS
COMPLIANT

DIAGRAM OF DIMENSIONS

Dimensions : mm



Rubber Stand-off



L ≤16 : L+1.5max
L >16 : L+2max
Dø =8&10 : L+2.5

Dø <20 : Dø+0.5
Dø ≥20 : Dø+1

Dø	F	dø
4.0	1.5	0.45
5.0	2.0	0.5
6.0	2.5	
8.0	3.5	
10.0	5.0	0.6
12.0		
13.0		
16.0	7.5	0.8
18.0		
22.0	10.0	0.8

CASE SIZE & PERMISSIBLE RIPPLE CURRENT OF STANDARD PRODUCTS

CAP. (μF)	RATED VOLTAGE WV																			
	6.3		10		16		25		35		50		63		80		100		160	
	Size	Ripple	Size	Ripple	Size	Ripple	Size	Ripple	Size	Ripple	Size	Ripple	Size	Ripple	Size	Ripple	Size	Ripple	Size	Ripple
0.22																				
0.47											5x11	11			5x11	11	5x11	14		
0.68											5x11	13								
1											5x11	17	5x11	18	5x11	17	5x11	21		
1.5											5x11	20								
2.2											5x11	25	5x11	25	5x11	29	6.3x11	34		
3.3											5x11	27	5x11	28			6.3x11	39		
											6.3x11	31	6.3x11	37	6.3x11	39	8x11	49		
4.7							5x11	26	5x11	34	5x11	34	5x11	37	8x11	47	8x11	48	10x15	85
											6.3x11	41	6.3x11	44			6.3x11	47		
10					6.3x11	42	5x11	42	6.3x11	54	6.3x11	51	8x11	74	10x12	88	8x11	71		
											5x11	51	6.3x11	57						
							6.3x11	50	5x11	43	8x11	70					10x12	100		
			5x11	57	5x11	57	6.3x11	65	8x11	94			8x11	95	10x19.5	150	13x20	180		
22					6.3x11	69	8x11	86	6.3x11	73	8x11	89	10x15	130			10x15	135		
											10x12	115								
33	5x11	46	6.3x11	64	8x11	95	8x11	105	10x12	125	8x11	105	10x12	135	13x20	205	13x20	220		
			5x11	64	5x11	71	6.3x11	80	8x11	100	10x15	150	10x19.5	175						
47	6.3x11	76	6.3x11	93	8x11	115	10x12	95	10x15	120	8x11	130	13x20	180	13x20	245	13x25	285		
	5x11	76	5x11	76	6.3x11	95	6.3x11	95	8x11	120	10x12	150	10x15	180						
											10x19.5	190								
68											10x15	198								
100	8x11	125	8x11	125	8x11	160	10x19.5	240	13x20	285	13x20	310	16x25	410	16x25	435	16x32	510		
	6.3x11	125					8x11	160	10x12	187	10x19.5	265	13x20	320			16x25	425		
					10x15	205			10x15	230										
220	8x11	215			10x12	275	10x15	305	13x20	410	13x25	480	16x25	575						
	10x12	215	10x15	215	10x19.5	275	13x20	305	16x25	520	16x25	570	16x32	660			18x36	720		
330	8x11	265	10x15	345	10x15	375	13x20	450			16x25	650								
	10x15	365	10x19.5	345	13x20	375	16x25	450	16x25	630	16x36	790	16x32	655						
470	10x12	370							13x25	655										
	10x19..	370	13x20	410	13x25	485	16x25	540	16x32	820	16x32	835								
1000	13x25	690	16x25	885	16x32	855	16x25	950	16x32	1140										
2200	16x32	1250	16x36	1280	16x32	1510					22x40	1800								
3300	16x25	1570			18x36	1980														
4700	16x32	2020																		

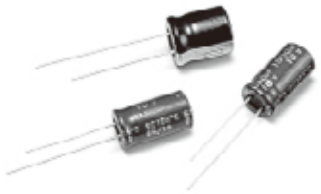
Note : * 1. D x L : mm

* 2. Ripple Current mA rms at 105°C, 120KHz

Miniature Size Aluminum Electrolytic Capacitors

SC [For Low Impedance and Low E.S.R Suitable for Output of Mother Board]

105°C Single-Ended Lead Aluminum Electrolytic Capacitors For High Frequency Applications



DESCRIPTION

Used in switching regulator applications in computers. Especially for high frequency.

Low impedance and E.S.R., high permissible ripple current at high frequency and higher operating temperature (-40°C to +105°C).

High Temperature Load Life at 105°C for 3000 Hours

Multiplier for Ripple Current
Frequency coefficient

Frequency(Hz)	50	120	300	1K	10K	100K
~4.7μF	0.30	0.40	0.50	0.70	0.80	1.00
5.6~33μF	0.40	0.50	0.60	0.80	0.90	1.00
34~330μF	0.60	0.70	0.80	0.90	0.95	1.00
331~1000μF	0.65	0.80	0.90	0.98	1.00	1.00
1200μF Higher	0.85	0.90	0.95	0.98	1.00	1.00

Temperature coefficient

Temperature(°C)	65	85	105
Factor	1.80	1.50	1.00

ELECTRICAL CHARACTERISTICS

Operating Temperature : -40° ~ +105°C

Working Voltage : 6.3 ~ 100V

Rate Capacitance Range : 4.7 ~ 15000μF

Capacitance Tolerance : -20 ~ +20%

DC Leakage Current (μA) : I = 0.01 CV(μA) or 3μA Whichever is greater.

(Measurements shall be Made After a 2 Minute Charge at Rated Working Voltage)

Dissipation Factor : at 120 Hz, 25°C

WV (V) :	6.3	10	16	25	35	50	63	80	100
D.F (%) :	15	14	12	10	10	8	8	7	7

For capacitor whose capacitance exceeds 2000μF. The value of D.F(%) is increased by 2% for every addition of 1000μF.

WV (V) :	6.3	10	16	25	35	50	63	100
Impedance : Z - 40°C / Z + 20°C	10	8	5	4	4	4	4	4

Load Life : 3000 Hours at 105°C Assured with Full Rated Maximum Ripple Current Applied

5 x 11 ~ 10 x 12 : Life = 2000 Hours
10 x 15 or Higher : Life = 3000 Hours
(a) Capacitance Change : Within 20% of Initial Value
(b) Dissipation Factor : Not Exceed 200% of Initial Requirement
(c) Leakage Current : Not Exceed the Initial Requirement

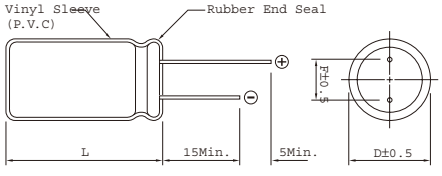
Shelf Life : 1000 Hours, No Voltage Applied, at 105°C

(a) Capacitance Change : Within 20% of Initial Value
(b) Dissipation Factor : Not Exceed 200 % of Initial Requirement
(c) Leakage Current : Not Exceed 200% of Initial Requirement

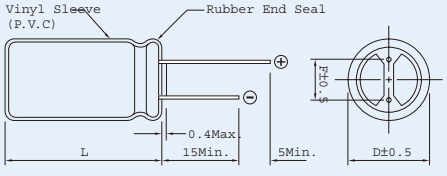
Pb-free
RoHS
COMPLIANT

DIAGRAM OF DIMENSIONS

Dimensions : mm



Rubber Stand-off



L ≤16 : L+1.5max
L >16 : L+2max
Dø =8&10 : L+2.5

Dø <20 : Dø+0.5
Dø ≥20 : Dø+1

Dø	F	dø
4.0	1.5	0.45
5.0	2.0	0.5
6.3	2.5	
8.0	3.5	
10.0	5.0	0.6
12.0		
13.0		
16.0	7.5	0.8
18.0		
22.0	10.0	0.8

CASE SIZE OF STANDARD PRODUCTS Dø ≥ 6mm with Safety Vent at Can Bottom

CAP. (μF)	RATED VOLTAGE WV											
	6.3			10			16			25		
	Size	Ripple	ESR	Size	Ripple	ESR	Size	Ripple	ESR	Size	Ripple	ESR
4.7												
6.8												
10												
22										5 x 11	60	0.51
39										5 x 11	10	0.58
47							5 x 11	210	0.580	5 x 11	150	0.058
56							5 x 11	210	0.580	5 x 11	150	0.58
68							5 x 11	150	0.580	6 x 11	200	0.370
82				5 x 11	150	0.580	5 x 11	210	0.580	6 x 11	200	0.22
100				5 x 11	150	0.580	5 x 11	200	0.370	6 x 11	250	0.220
	5 x 11	210	0.580				6 x 11	200	0.370			
120	5 x 11	210	0.580	5 x 11	200	0.370	6 x 11	250	0.22	8 x 11	300	0.200
							8 x 11	330	0.22			
150	5 x 11	200	0.580	6 x 11	250	0.320	6 x 11	300	0.220	8 x 11	550	0.140
180				6 x 11	250	0.32				8 x 11	640	0.13
220	6 x 11	250	0.320	6 x 11	300	0.220	8 x 11	550	0.140	*8 x 11	640	0.130
				8 x 11	300	0.220				8 x 15	750	0.100
270	*6 x 11	300	0.220	8 x 11	300	0.220	8 x 11	640	0.10	10 x 12	865	0.08
330	*6 x 11	170	0.22	8 x 11	550	0.140	*8 x 11	750	0.120	*8 x 15	840	0.087
	8 x 11	400	0.22				8 x 15	750	0.100	8 x 20	800	0.069
										10 x 12	865	0.080
390				8 x 11	550	0.140	10 x 12	750	0.10	10 x 15	1210	0.060
470	*6 x 11	540	0.22	*8 x 11	750	0.120	*8 x 15	780	0.09	*8 x 20	1050	0.069
	8 x 11	550	0.13	8 x 15	750	0.100	10 x 12	800	0.085			
				10 x 12	750	0.10	8 x 20	780	0.09	10 x 15	1210	0.060
560	8 x 11	640	0.13	10 x 12	750	0.1				10 x 19	1400	0.046
680				*8 x 15	780	0.09	10 x 15	1210	0.65	10 x 19	1100	0.046
				8 x 20	380	0.09						
	8 x 15	700	0.100	10 x 12	800	0.08	8 x 15	1050	0.69			
820	8 x 15	730	0.09	8 x 20	1000	0.08				10 x 25	1650	0.042
	8 x 20	750	0.085	10 x 15	1050	0.045	10 x 19	1100	0.046	10 x 19	1250	0.039
	10 x 12	750	0.085							13 x 20	1900	0.035
1000	*8 x 11	580	0.150	8 x 20	1080	0.069				*10 x 30	1450	0.038
	*8 x 15	780	0.085	8 x 15	1050	0.070						
	8 x 20	800	0.069	10 x 12	930	0.075	10 x 19	1250	0.046	*10 x 25	1310	0.042
	10 x 12	865	0.080	10 x 15	1100	0.065	10 x 25	1250	0.046	13 x 20	1450	0.038
				10 x 19	1100	0.050						
1200	10 x 15	1000	0.064	10 x 19	1250	0.046	*10 x 25	1450	0.038	13 x 25	1600	0.030
	8 x 15	950	0.067				13 x 20	1450	0.038			
	8 x 20	1000	0.069									
1500	*10 x 15	1200	0.055	10 x 19	1450	0.039	*10 x 30	1600	0.035	*13 x 25	2124	0.030
	10 x 19	1250	0.046	10 x 25	1450	0.042	13 x 20	1600	0.035	16 x 25	2000	0.028
	10 x 25	1650	0.042	13 x 20	1330	0.047						
1800	10 x 25	1650	0.042				13 x 25	2124	0.030	13 x 30	2524	0.026
2200				*10 x 19	1330	0.047	*10 x 30	1780	0.032	12 x 35	2743	0.022
	*10 x 25	1450	0.042	*10 x 30	1330	0.047				18 x 20	2495	0.034
	13 x 20	1450	0.043	13 x 20	1330	0.047	13 x 25	2000	0.028	16 x 32	2200	0.024
2700	10 x 30	1450	0.35	13 x 25	2000	0.038	13 x 30	2524	0.026	16 x 25	2552	0.028
	13 x 20	1700	0.35									
3300	10 x 20	1700	0.035							16 x 36	2550	0.019
	13 x 25	1700	0.035	13 x 25	2000	0.028	16 x 25	2200	0.024	16 x 32	3029	0.022
				13 x 30	2000	0.026	18 x 20	2459	0.034	18 x 25	2771	0.022
3900	13 x 25	1700	0.030				16 x 25	2552	0.028	16 x 36	3124	0.024
							18 x 20	2495	0.034	16 x 32	3600	0.020
4700	*13 x 30	1800	0.028				16 x 32	2298	0.022	18 x 36	2800	0.019
				16 x 25	2200	0.028	16 x 36	2550	0.019			
	16 x 25	1800	0.028				18 x 25	2771	0.024			
5600				16 x 25	2550	0.028	16 x 36	3124	0.02	18 x 40	3781	0.015
				18 x 20	2495	0.034	18 x 32	3600	0.02			
6800	16 x 25	2000	0.024	16 x 32	2550	0.022						
	16 x 32	2000	0.024	16 x 36	2550	0.019	18 x 36	2800	0.019			
	18 x 20	2000	0.024	18 x 25	2550	0.024	16 x 40	2886	0.017			
8200	16 x 32	2350	0.022	16 x 32	2550	0.022	18 x 36	3638	0.019			
				16 x 25	2550	0.024						
				16 x 36	2550	0.019						
10000	16 x 36	2350	0.022	18 x 32	3638	0.019	18 x 40	3781	0.015			
	18 x 25	2550	0.020									
12000	16 x 40	3886	0.017									
	18 x 32	3600	0.020									
15000	18 x 36	3000	0.019	18 x 40	3781	0.015						
18000	18 x 40	3781	0.015									

Note : * 1. D x L : mm

* 2. Ripple Current :(mA r.m.s 105°C / 100KHz), ESR (Ω Max20°C/100KHz)

* 3." * " is down size, Edurance is less 1000 hrs than standard

CASE SIZE OF STANDARD PRODUCTS Dø ≥ 6mm with Safety Vent at Can Bottom

CAP. (μF)	RATED VOLTAGE WV											
	35			50			63			100		
	Size	Ripple	ESR	Size	Ripple	ESR	Size	Ripple	ESR	Size	Ripple	ESR
1.0				5 x 11	180	2.4				5 x 11	80	3.5
2.2				5 x 11	180	1.3						
3.3				5 x 11	180	1.3						
4.7	5 x 11	115	1.200	5 x 11	115	2.000	5 x 11	115	2.200	5 x 11	120	2.000
6.8	5 x 11	120	1.000	5 x 11	120	1.850	5 x 11	120	2.000	5 x 11	55	1.850
10	5 x 11	140	0.900	5 x 11	140	1.700	5 x 11	140	1.850	6 x 11	200	1.500
12							5 x 11	55	1.84			
15	5 x 11	170	0.690	5 x 11	180	1.3	5 x 11	200	1.700	6 x 11	115	1.200
18				5 x 11	180	0.700	5 x 11	55	1.84			
22	5 x 11	190	0.58	5 x 11	200	0.700	6 x 11	115	1.200	8 x 11	300	0.790
27	5 x 11	190	0.58	5 x 11	180	0.700				8 x 11	232	0.504
33	5 x 11	200	0.58	6 x 11	295	0.600	6 x 11	115	0.96	8 x 15	450	0.590
39	5 x 11	200	0.58	6.3 x 11	295	0.30	8 x 11	232	0.504	8 x 15	300	0.36
47	6.3 x 11	250	0.370	6.3 x 11	295	0.520	8 x 11	232	0.700	10 x 15	550	0.350
										10 x 12	288	0.344
56	6.3 x 11	340	0.220	8 x 11	555	0.17	8 x 11	232	0.504	8 x 20	362	0.264
68	6 x 11	340	0.220	8 x 11	555	0.17	8 x 11	232	0.520	10 x 19.5	650	0.240
	8 x 11	300	0.220							10 x 15	357	0.248
82	8 x 11	640	0.130	8 x 11	555	0.17	10 x 12	288	0.344			
100	*6.3 x 11	340	0.220	*8 x 11	480	0.290	8 x 20	650	0.350	13 x 20	800	0.180
				10 x 12	760	0.120	8 x 15	300	0.36			
	8 x 11	450	0.140	8 x 15	550	0.250	10 x 12	288	0.344	10 x 25	531	0.16
120				8 x 15	650	0.21				10 x 30	663	0.120
	8 x 11	550	0.130	8 x 20	650	0.210	10 x 15	357	0.300	13 x 25	1050	0.150
				10 x 12	560	0.24				13 x 20	690	0.128
150	8 x 11	640	0.13	10 x 12	800	0.160	8 x 20	362	0.264	13 x 25	1300	0.110
	8 x 15	650	0.100	8 x 20	780	0.18	10 x 15	1050	0.200			
				10 x 15	1050	0.084						
180	10 x 12	865	0.08	8 x 20	910	0.091	10 x 19.5	466	0.168	13 x 25	784	0.078
				10 x 15	1050	0.084						
220	*8 x 15	840	0.087	10 x 15	1050	0.100	10 x 19.5	466	0.168	16 x 25	1400	0.071
	8 x 20	780	0.085	10 x 12	908	0.115	10 x 25	531	0.160	13 x 30	905	0.08
	10 x 12	800	0.080	10 x 19.5	1220	0.06	13 x 20	690	0.128			
270	10 x 15	1210	0.060	10 x 25	1440	0.055				16 x 25	1250	0.058
330	*10 x 15	1210	0.06	10 x 19	1300	0.072	10 x 30	1180	0.057	16 x 32	1550	0.049
	8 x 20	1050	0.069	10 x 30	1690	0.043	13 x 20	690	0.128	18 x 20	1240	0.064
	10 x 19.5	1050	0.044	13 x 20	1690	0.045						
390				13 x 20	1660	0.045	13 x 25	784	0.096	16 x 32	1570	0.043
										18 x 25	1490	0.046
470	10 x 19.5	1300	0.046	*10 x 30	1440	0.060	13 x 25	1550	0.064	18 x 36	1700	0.038
				13 x 25	1400	0.060	13 x 30	1040	0.073	18 x 32	630	0.038
				13 x 20	1400	0.060				16 x 36	790	0.036
560	10 x 25	1650	0.042	13 x 25	1950	0.034	16 x 25	1250	0.058	18 x 40	2020	0.032
	13 x 20	1900	0.038									
680	13 x 20	1400	0.038	13 x 25	1550	0.050	16 x 25	1700	0.052	18 x 36	1790	0.032
	10 x 30	1400	0.035	13 x 30	2310	0.03	18 x 20	1240	0.064	18 x 40	1870	0.030
820	13 x 20	1550	0.034	16 x 25	1700	0.040	16 x 32	1570	0.048	18 x 40	2330	0.03
	13 x 25	1550	0.030	18 x 20	2490	0.036	18 x 25	1490	0.046			
1000	13 x 25	1700	0.030	16 x 25	1900	0.039	16 x 32	2100	0.042			
							16 x 36	1790	0.036			
1200	13 x 30	1900	0.026	16 x 32	2100	0.025	16 x 36	2550	0.036			
	16 x 25	1900	0.028	18 x 25	2740	0.026	16 x 40	2020	0.032			
							18 x 32	1630	0.038			
1500	16 x 25	2100	0.028	16 x 36	2550	0.025	18 x 36	1790	0.033			
1800	18 x 20	2882	0.034	16 x 40	3710	0.016						
	16 x 25	2948	0.028	18 x 32	3535	0.021						
2200	*16 x 32	2500	0.022	18 x 40	2800	0.025						
	16 x 25	1960	0.025	18 x 36	3680	0.017						
	16 x 36	2550	0.019									
	18 x 25	3201	0.024									
2700	16 x 36	3608	0.02	18 x 40	3800	0.014						
	18 x 32	4158	0.02									
3300	18 x 36	2880	0.019									
3900	18 x 40	4367	0.015									
4700												
6800												
8200												
10000												
15000												

Note : * 1. D x L : mm

* 2. Ripple Current :(mA r.m.s 105°C / 100KHz), ESR (Ω Max20°C / 100KHz)

* 3." * " is down size, Edurance is less 1000 hrs than standard

SM [For Very Low Impedance and Very Low E.S.R Suitable for Output of Mother Board]

105°C Single-Ended Lead Aluminum Electrolytic Capacitors For High Frequency Applications

Miniature Size Aluminum Electrolytic Capacitors

ELECTRICAL CHARACTERISTICS

Operating Temperature : -40° ~ +105°C

Working Voltage : 6.3 ~ 50V

Rate Capacitance Range : 22 ~ 6800μF

Capacitance Tolerance : -20 ~ +20%

DC Leakage Current (μA) : I = 0.01 CV(μA)

(Measurements shall be Made After a 2 Minute Charge at Rated Working Voltage)

Dissipation Factor : at 120 Hz, 25°C

W.V (V) :	6.3	10	16	25	35	50
D.F (%) :	2.2	19	16	14	12	10

For capacitor whose capacitance exceeds 1000μF. The value of D.F(%) is increased by 2% for every addition of 1000μF.

Load Life : 2000 Hours for D = 8ø; 3000 Hours for D ≥ 10ø at 105°C

(a) Capacitance Change : Within 20% of Initial Value
(b) Dissipation Factor : Not Exceed 200% of Initial Requirement
(c) Leakage Current : Not Exceed the Initial Requirement

Shelf Life : 1000 Hours, No Voltage Applied, at 105°C

(a) Capacitance Change : Within 20% of Initial Value
(b) Dissipation Factor : Not Exceed 200 % of Initial Requirement
(c) Leakage Current : Not Exceed 200% of Initial Requirement

Pb-free
RoHS
COMPLIANT

DESCRIPTION

Used in switching regulator applications in computers. Especially for high frequency.

Very low impedance and E.S.R., high permissible ripple current at high frequency and higher operating temperature (-40°C to +105°C).

High Temperature Load Life at 105°C for 3000 Hours

Multiplier for Ripple Current
Frequency coefficient

Frequency(Hz)	60	120	1K	10K	100K
5.6~33μF	0.45	0.55	0.75	0.90	1.00
39~330μF	0.6	0.70	0.85	0.95	1.00
470~1000μF	0.65	0.75	0.90	0.98	1.00
1200~6800μF	0.75	0.80	0.95	1.00	1.00

Temperature coefficient

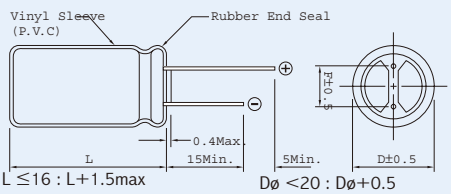
Temperature(°C)	65	85	105
Factor	2.00	1.60	1.00

DIAGRAM OF DIMENSIONS

Dimensions : mm

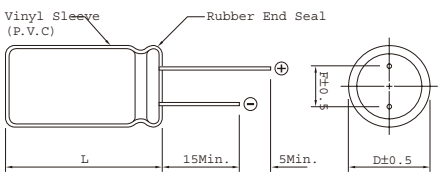
Dø	F	dø
5.0	2.0	0.5
6.3	2.5	
8.0	3.5	
10.0	5.0	0.6
12.0		
13.0		
16.0	7.5	0.8
18.0		
22.0	10.0	0.8

Rubber Stand-off



L ≤16 : L+1.5max
L >16 : L+2max
Dø =8&10 : L+2.5

Dø <20 : Dø+0.5
Dø ≥20 : Dø+1



CASE SIZE OF STANDARD PRODUCTS Dø ≥ 6mm with Safety Vent at Can Bottom

CAP. (μF)	RATED VOLTAGE								
	6.3			10			16		
	SIZE	Ripple	ESR	SIZE	Ripple	ESR	SIZE	Ripple	ESR
56							5 x 11	250	0.30
100				5 x 11	250	0.300			
120							6.3 x 11	405	0.130
150	5 x 11	250	0.30						
220	6.3 x 11	405	0.13	6.3 x 11	405	0.13	8 x 11	760	0.072
330	6.3 x 11	405	0.13	8 x 11	622	0.072	*8 x 11	760	0.072
470	8 x 11	582	0.100	8 x 11	760	0.072	8 x 15	995	0.056
							10 x 12	995	0.056
560	8 x 11	760	0.072						
680				10 x 12	995	0.056	8 x 20	1250	0.041
				8 x 15	995	0.056	10 x 15	1250	0.041
820	8 x 15	995	0.056						
1000	8 x 15	950	0.053	8 x 20	1250	0.041	10 x 19.5	1820	0.023
	10 x 12	1030	0.053	10 x 15	1430	0.038			
1200	8 x 20	1250	0.041	10 x 19.5	1820	0.023	*10 x 25	2150	0.022
	10 x 15	1430	0.038				10 x 22	2150	0.022
1500	10 x 19.5	1820	0.023	10 x 25	2150	0.022	13 x 20	2360	0.028
2200	10 x 22	2150	0.023	13 x 20	2360	0.021	13 x 25	2770	0.025
	10 x 25	2150	0.023						
2700	10 x 25	2200	0.021				12 x 30	3140	0.018
							16 x 20	3140	0.018
3300	13 x 20	2360	0.021	13 x 25	2770	0.018	12 x 35	3400	0.015
3900	13 x 25	2770	0.018	13 x 30	3140	0.018	16 x 25	3460	0.016
				16 x 20	3140	0.018			
4700	13 x 30	3290	0.016	12 x 35	3400	0.015			
5600	12 x 35	3140	0.018	16 x 25	3460	0.016			
	16 x 20	3140	0.018						
6800	16 x 25	3460	0.016						

Note : * 1. D x L : mm

*2. Ripple Current :(mA r.m.s 105°C / 100KHz), ESR (Ω Max20°C / 100KHz)

*3. " * " is down size, Edurance is less 1000 hrs than standard

CASE SIZE OF STANDARD PRODUCTS Dø ≥ 6mm with Safety Vent at Can Bottom

CAP. (μF)	RATED VOLTAGE								
	25			35			50		
	SIZE	Ripple	ESR	SIZE	Ripple	ESR	SIZE	Ripple	ESR
22							5 x 11	238	0.340
33				5 x 11	250	0.30	6.3 x 11	385	0.140
47	5 x 11	250	0.30	6.3 x 11	405	0.130	6.3 x 11	385	0.140
56				6.3 x 11	405	0.130	6.3 x 11	385	0.140
100	6.3 x 11	405	0.13	8 x 11	760	0.072	8 x 11	724	0.074
120							8 x 15	950	0.061
150				8 x 11	760	0.072	10 x 12	979	0.061
180							8 x 20	1190	0.046
220	8 x 11	760	0.072	8 x 15	995	0.056	10 x 15	1370	0.042
				10 x 12	995	0.056			
270	*8 x 15		0.057	8 x 20	1250	0.041	10 x 19.5	1580	0.030
330	10 x 12	995	0.056	10 x 15	1430	0.038	10 x 25	1870	0.028
	8 x 15	995	0.056						
470	8 x 20	1250	0.041	10 x 19.5	1820	0.023	13 x 20	2050	0.027
	10 x 15	1430	0.038						
560				10 x 25	2150	0.022	13 x 25	2410	0.023
680	10 x 19.5	1820	0.028	13 x 20	2360	0.021	12 x 30	2860	0.021
820	10 x 25	2200	0.021				12 x 35	2730	0.023
							16 x 20	2730	0.023
1000	12 x 20	2360	0.021	13 x 25	2770	0.018	16 x 25	3010	0.021
	13 x 20	2360	0.021						
1200				12 x 30	3140	0.018			
				16 x 20	3140	0.018			
1500	13 x 25	2770	0.018	12 x 35	3400	0.015			
1800	16 x 20	3140	0.018	16 x 25	3460	0.016			
2200	12 x 35	3400	0.015						
	16 x 32	3633	0.015	16 x 32	3460	0.016			
2700	16 x 25	3460	0.016						
3300									
3900									
4700									

Note : * 1. D x L : mm

*2. Ripple Current :(mA r.m.s 105°C / 100KHz), ESR (Ω Max20°C / 100KHz)

*3." * " is down size, Edurance is less 1000 hrs than standard

SX [For Low Impedance & Low E.S.R]

105°C Single-Ended Lead Aluminum Electrolytic Capacitors For High Frequency Applications

Miniature Size Aluminum Electrolytic Capacitors

ELECTRICAL CHARACTERISTICS

Operating Temperature : -40° ~ +105°C

Working Voltage : 6.3 ~ 100V

Rate Capacitance Range : 1 ~ 15000μF

Capacitance Tolerance : -20 ~ +20%

DC Leakage Current (μA) : I = 0.01 CV or 3(μA) Whichever is greater.

(Measurements shall be Made After a 2 Minute Charge at Rated Working Voltage)

Dissipation Factor : at 120 Hz, 25°C

WV (V) :	6.3	10	16	25	35	50	63	80	100
D.F (%) :	19	16	14	12	10	8	8	7	7

For capacitor whose capacitance exceeds 1000μF. The value of D.F(%) is increased by 2% for every addition of 1000μF.

Temperature Characteristics : at 120 Hz

WV (V) :	6.3	10	16	25	35	50	63	100
Impedance : Z - 40°C / Z + 20°C	10	6	5	4	4	4	4	4

Load Life : At 105°C Assured with Full Rated Maximum Ripple Current Applied

Case Dia	øD ≤ 8	øD = 10	øD ≥ 12
Load Life	2000	3000	5000

(a) Capacitance Change : Within 20% of Initial Value

(b) Dissipation Factor : Not Exceed 200% of Initial Requirement

(c) Leakage Current : Not Exceed the Initial Requirement

Pb-free RoHS COMPLIANT

Shelf Life : 1000 Hours, No Voltage Applied, at 105°C

(a) Capacitance Change : Within 20% of Initial Value

(b) Dissipation Factor : Not Exceed 200 % of Initial Requirement

(c) Leakage Current : Not Exceed 200% of Initial Requirement

DESCRIPTION

Used in switching regulator applications in computers. Especially for high frequency.

Low impedance and E.S.R., high permissible ripple current at high frequency and highter operation temperature (-40°C to +105°C).

High Temperature Load Life at 105°C for 2000 ~ 5000 Hours

Multiplier for Ripple Current
Frequency coefficient

Frequency(Hz)	50	120	300	1K	10K	100K
~4.4μF	0.30	0.40	0.50	0.70	0.80	1.00
5.6~33μF	0.40	0.50	0.60	0.80	0.90	1.00
34~330μF	0.60	0.70	0.80	0.90	0.95	1.00
331~1000μF	0.65	0.90	0.90	0.98	1.00	1.00
1200μF higher	0.85	0.90	0.95	0.98	1.00	1.00

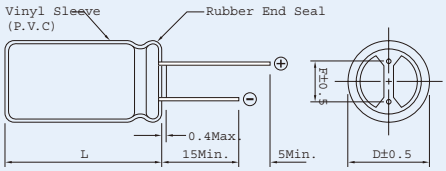
Temperature coefficient

Temperature(°C)	65	85	105
Factor	1.80	1.50	1.00

DIAGRAM OF DIMENSIONS

Dø	F	dø
4.0	1.5	0.45
5.0	2.0	0.5
6.0	2.5	
8.0	3.5	
10.0	5.0	0.6
12.0		
13.0		
16.0	7.5	0.8
18.0		
22.0	10.0	0.8

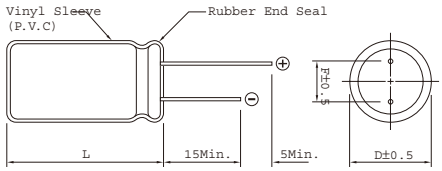
Rubber Stand-off



L ≤16 : L+1.5max
L >16 : L+2max
Dø =8&10 : L+2.5

Dø <20 : Dø+0.5
Dø ≥20 : Dø+1

Dimensions : mm



CASE SIZE OF STANDARD PRODUCTS D≥ ø 6mm with Safety Vent at Can Bottom

CAP. (μF)	RATED VOLTAGE								
		6.3			10			16	
	SIZE	Ripple	ESR	SIZE	Ripple	ESR	SIZE	Ripple	ESR
4.7									
6.8									
10				5 x 11	20	5.900			
							5 x 11	42	1.180
22				5 x 11	44	5.400	5 x 11	53	3.300
33	5 x 11	131	0.217	5 x 11	66	3.300	5 x 11	79	2.100
47	5 x 11	139	0.203	5 x 11	94	2.200	5 x 11	210	0.580
56							5 x 11	210	0.580
68	5 x 11	150	0.182	5 x 11	136	1.300	5 x 11	210	0.580
							6.3 x 11	163	0.920
82				5 x 11	210	0.58	5 x 11	210	0.580
100	5 x 11	210	0.58	5 x 11	210	0.58	6.3 x 11	340	0.220
				6.3 x 11	200	0.10	8 x 11	241	0.890
120	5 x 11	210	0.58	5 x 11	210	0.58	6.3 x 11	340	0.220
				6.3 x 11	240	0.91	8 x 11	290	0.580
150	5 x 11	210	0.58	6.3 x 11	265	0.700	6.3 x 11	340	0.470
	6.3 x 11	210	0.58				8 x 11	380	0.470
180	6.3 x 11	340	0.22	6.3 x 11	340	0.22	8 x 11	640	0.130
220	8 x 11	285	0.61	6.3 x 11	340	0.22	8 x 11	410	0.330
	6.3 x 11	340	0.22	8 x 11	370	0.480			
270	6.3 x 11	340	0.22	8 x 11	640	0.13	8 x 11	640	0.130
330	8 x 11	410	0.40	8 x 11	470	0.330	10 x 12	600	0.230
	6.3 x 11	340	0.22				8 x 11	600	0.230
390	8 x 11	640	0.13				10 x 12	640	0.130
470	10 x 12	550	0.28	8 x 11	480	0.300	8 x 20	710	0.180
	6.3 x 11	540	0.22	10 x 12	590	0.240	8 x 15	750	0.180
	8 x 11	640	0.13				10 x 15	750	0.180
							10 x 12	750	0.180
560	8 x 11	640	0.13	8 x 15	790	0.18	8 x 15	840	0.06
							10 x 15	1050	0.14
680	10 x 15	735	0.220	8 x 20	790	0.180	10 x 19	1050	0.140
	8 x 11	640	0.13	10 x 12	750	0.18	8 x 20	1050	0.140
	8 x 15	840	0.087	10 x 15	790	0.18	10 x 15	1050	0.140
820	8 x 11	640	0.13	10 x 15	990	0.14	10 x 12	865	0.140
	10 x 15	795	0.190	10 x 19.5	990	0.140	10 x 15	1050	0.140
	8 x 15	840	0.089						
	10 x 12	865	0.08						
1000	10 x 19.5	950	0.170	8 x 20	1060	0.12	10 x 19	990	0.042
	10 x 12	865	0.08	10 x 15	1060	0.12	10 x 30	1400	0.091
				10 x 19.5	1060	0.12	10 x 25	990	0.042
1200	10 x 19.5	1000	0.136	10 x 25	1290	0.120	10 x 25	1450	0.086
	8 x 20	1050	0.069				12 x 25	1450	0.086
	10 x 15	1210	0.06						
1500	10 x 12	865	0.08	10 x 30	1450	0.093	12 x 25	1650	0.072
	10 x 19.5	1000	0.046	10 x 25	1450	0.093	10 x 30	1650	0.072
	8 x 20	1050	0.069				13 x 25	1790	0.055
	10 x 25	1200	0.120						
1800	10 x 25	1650	0.042	13 x 20	1900	0.046	13 x 25	1924	0.056
2200	10 x 30	1450	0.095	12 x 30	1900	0.073	12 x 30	2000	0.063
	10 x 25	1650	0.042	10 x 30	1900	0.073	16 x 20	2210	0.030
				13 x 20	1900	0.073	13 x 25	2124	0.030
2700	10 x 30	1910	0.031	13 x 25	2020	0.051	13 x 30	2524	0.035
	13 x 20	1900	0.035				16 x 20	2210	0.035
3300	12 x 35	1700	0.081	10 x 30	1690	0.077	13 x 40	2400	0.055
	10 x 25	1650	0.042	13 x 30	2110	0.052	18 x 20	2400	0.045
	13 x 20	1700	0.035	12 x 35	2110	0.052	12 x 35	2400	0.045
				16 x 20	2210	0.035	12 x 40	2400	0.045
3900	13 x 25	2124	0.03	16 x 20	2210	0.035	16 x 25	2552	0.028
							18 x 20	2495	0.034
4700	12 x 35	2110	0.063	13 x 40	2300	0.057	16 x 36	2650	0.046
	12 x 30	2110	0.053	12 x 40	2450	0.054	16 x 32	3029	0.220
				16 x 32	2450	0.054	18 x 25	2771	0.024
				16 x 25	2450	0.054			
5600	13 x 35	2743	0.022	16 x 25	2495	0.034	18 x 32	3600	0.020
	16 x 20	2210	0.035						
				18 x 20	2495	0.034			
6800	16 x 32	2350	0.055	16 x 36	2680	0.046	18 x 36	2900	0.040
	12 x 35	2743	0.022	16 x 32	2680	0.046	16 x 40	2900	0.040
	16 x 25	2552	0.028	18 x 25	2680	0.046			
	18 x 20	2495	0.034						
8200	16 x 36	2550	0.047	16 x 40	2850	0.038	18 x 40	3050	0.036
	16 x 32	3029	0.022	16 x 36	2850	0.038	18 x 36	3050	0.036
				18 x 32	2850	0.038			
10000	16 x 40	2750	0.039	18 x 36	3050	0.037	18 x 40	3781	0.015
	16 x 36	2750	0.039	16 x 40	3050	0.037			
	18 x 25	2771	0.024						
15000	18 x 40	2950	0.037						
	18 x 36	2950	0.037						
12000	16 x 40	3886	0.017	18 x 40	3781	0.020			
	18 x 32	3600	0.020						
18000	18 x 40	3781	0.02						

Note : * 1. D x L : mm

* 2. Ripple Current : (mA r.m.s 105°C / 100KHz)

* 3. ESR (Ω Max20°C / 100KHz)

CASE SIZE OF STANDARD PRODUCTS D≥ ø 6mm with Safety Vent at Can Bottom

CAP. (μF)	RATED VOLTAGE								
	25			35			50		
	SIZE	Ripple	ESR	SIZE	Ripple	ESR	SIZE	Ripple	ESR
1							5 x 11	180	2.4
2.2							5 x 11	180	1.3
3.3							5 x 11	180	1.3
15							5 x 11	180	1.3
18							5 x 11	180	0.7
4.7							5 x 11	180	1.3
6.8				4 x 7	20	0.770	5 x 11	180	1.3
10				5 x 11	42	0.310	5 x 11	180	1.3
12							5 x 11	180	1.3
22	5 x 11	66	3.300	5 x 11	101	0.580	6.3 x 11	129	0.900
							5 x 11	180	0.7
27				5 x 11	210	0.580	5 x 11	180	0.7
33	5 x 11	99	1.300	6.3 x 11	151	0.870	8 x 11	194	0.720
							6.3 x 11	295	0.3
39	5 x 11	210	0.580	5 x 11	210	0.580	6.3 x 11	295	0.3
47	5 x 11	210	0.580	8 x 11	216	0.870	8 x 11	276	0.660
				6.3 x 11	340	0.220	6.3 x 11	222	0.82
56	5 x 11	210	0.580	6.3 x 11	340	0.220	8 x 11	555	0.17
68	8 x 11	204	0.570	8 x 11	340	0.220	10 x 12	400	0.310
				6.3 x 11	340	0.220	8 x 11	555	0.17
82	5 x 11	340	0.220	8 x 11	640	0.130	8 x 11	555	0.17
100	6.3 x 11	340	0.220	8 x 11	370	0.390	8 x 15	730	0.12
							8 x 11	400	0.29
	8 x 11	300	0.420	10 x 12	460	0.320	10 x 15	440	0.29
							10 x 12	440	0.29
120	8 x 11	400	0.380	8 x 11	550	0.260	8 x 15	670	0.17
				10 x 12	550	0.260	10 x 15	670	0.170
							10 x 12	670	0.17
150	8 x 11	460	0.330	8 x 11	600	0.230	10 x 19.5	860	0.150
	10 x 12	460	0.330	10 x 12	600	0.230	10 x 15	860	0.15
180	8 x 11	640	0.130	10 x 12	800	0.180	8 x 20	910	0.091
							10 x 15	910	0.091
220	10 x 15	630	0.230	10 x 12	690	0.210	10 x 15	780	0.150
				8 x 15	800	0.180	10 x 19.5	1030	0.110
				10 x 15	800	0.180	10 x 25	1030	0.110
270	10 x 12	865	0.08	10 x 15	800	0.180	10 x 25	1440	0.550
330	10 x 12	800	0.190	10 x 19.5	1060	0.130	10 x 30	1070	0.110
	8 x 15	800	0.190	8 x 20	1060	0.130	12 x 20	1220	0.092
	10 x 15	800	0.190	10 x 15	1060	0.130	13 x 20	1300	0.086
	8 x 20	525	0.069				13 x 25	1300	0.086
390	10 x 15	1210	0.060	10 x 19.5	1420	0.089	13 x 20	1660	0.055
470	10 x 15	1050	0.140	10 x 30	990	0.089	12 x 25	1500	0.068
	8 x 20	1050	0.140	10 x 19.5	1420	0.089	10 x 30	1690	0.043
	10 x 19.5	1050	0.140	13 x 25	1060	0.086	13 x 25	1690	0.043
560	10 x 19.5	1400	0.046	12 x 20	1500	0.080	13 x 25	1930	0.054
				10 x 25	1650	0.042			
				10 x 30	1450	0.035			
680	10 x 15.5	1400	0.090	12 x 25	1650	0.070	13 x 30	1850	0.048
	10 x 30	1400	0.090	10 x 30	1450	0.035	12 x 35	1850	0.048
				13 x 20	1650	0.070	16 x 20	1850	0.048
820	12 x 25	1450	0.085	12 x 30	1750	0.066	12 x 40	2020	0.042
	10 x 25	1650	0.042	12 x 25	1750	0.076	16 x 25	1553	0.025
	13 x 20	1900	0.035	13 x 25	1750	0.076	18 x 20	2020	0.042
				18 x 15	1750	0.076			
1000	10 x 30	1650	0.071	12 x 30	2000	0.061	16 x 25	1800	0.060
	12 x 20	1420	0.091	13 x 25	2000	0.061	16 x 32	2120	0.050
	13 x 20	1650	0.071	16 x 20	2000	0.061			
	12 x 25	1650	0.071						
1200	12 x 30	1700	0.078	12 x 35	2200	0.049	16 x 36	2260	0.043
	13 x 25	1700	0.078	13 x 30	2200	0.049	18 x 25	2260	0.043
	18 x 15	1700	0.078						
1500	12 x 30	1950	0.062	12 x 40	2350	0.046	16 x 40	2420	0.035
	13 x 25	1950	0.062	16 x 25	2948	0.028	16 x 36	2420	0.035
	16 x 20	1950	0.062						
1800	13 x 30	2210	0.035	18 x 20	2882	0.034	16 x 40	3635	0.021
				16 x 25	2882	0.034			
2200	12 x 40	2360	0.044	16 x 36	2700	0.044	18 x 32	3635	0.021
	12 x 35	2360	0.044	16 x 32	2700	0.044	18 x 36	3680	0.017
	16 x 25	2495	0.034	18 x 25	2700	0.044			
	18 x 20	2495	0.034						
2700	16 x 25	2552	0.028	16 x 36	3608	0.020	18 x 40	3800	0.014
				18 x 32	3608	0.020			
3300	16 x 36	2700	0.045	18 x 36	3050	0.035			
	16 x 32	2700	0.045	18 x 40	3050	0.035			
	18 x 25	2700	0.045						
3900	16 x 36	3124	0.024	18 x 40	4367	0.015			
	18 x 32	3124	0.024						
4700	18 x 36	3000	0.036						
	18 x 40	3000	0.036						
4900	18 x 40	3781	0.015						
5600	18 x 40	3781	0.015						
6800									
8200									
10000									
15000									

Note : * 1. D x L : mm

* 2. Ripple Current : (mA r.m.s 105°C / 100KHz)

* 3. ESR (Ω Max.20°C / 100KHz)

CASE SIZE OF STANDARD PRODUCTS D≥ ø 6mm with Safety Vent at Can Bottom

CAP. (μF)	RATED VOLTAGE								
	63			80			100		
	SIZE	Ripple	ESR	SIZE	Ripple	ESR	SIZE	Ripple	ESR
4.7	5 x 11	36	4.600	5 x 11	43	4.200	5 x 11	65	4.100
6.8	5 x 11	52	4.300	5 x 11	62	1.900	5 x 11	55	1.840
							8 x 11	94	1.300
10	5 x 11	77	2.000	6.3 x 11	92	1.400	8 x 11	138	1.100
12	5 x 11	55	1.840				6.3 x 11	115	0.960
15	6.3 x 11	116	1.400	8 x 11	138	1.100	8 x 11	207	0.800
18	6.3 x 11	85	1.500						
22	8 x 11	170	1.200	8 x 11	203	0.640	10 x 12	305	0.530
	6.3 x 11	115	0.960						
27							8 x 11	232	0.504
33	8 x 11	250	0.750	10 x 12	305	0.540	10 x 15	500	0.350
39	8 x 11	232	0.504				8 x 15	288	0.344
47	10 x 12	365	0.560	10 x 15	410	0.360	10 x 19.5	288	0.344
	8 x 11	232	0.504				10 x 12	288	0.344
56	8 x 11	232	0.504				8 x 20	362	0.264
68	10 x 15	500	0.360	10 x 19.5	600	0.260	10 x 25	357	0.248
	8 x 11	232	0.504				10 x 15	357	0.248
82	10 x 12	288	0.344				10 x 19.5	466	0.168
100	10 x 15	288	0.344	10 x 25	795	0.190	10 x 30	531	0.160
	8 x 15	300	0.344				13 x 20	531	0.160
	10 x 12	288	0.344				10 x 25	531	0.160
120	10 x 15	357	0.248	10 x 30	900	0.170	12 x 30	663	0.130
	10 x 19.5	820	0.270						
	10 x 30	663	0.120						
	13 x 20	690	0.128						
150	8 x 20	362	0.264	10 x 30	955	0.150	12 x 30	1200	0.128
	10 x 25	950	0.200						
180	10 x 19.5	466	0.168				13 x 25	784	0.096
220	12 x 25	531	0.160	12 x 30	1200	0.130	16 x 32	905	0.086
	10 x 19.5	466	0.210				12 x 30	905	0.080
	10 x 25	531	0.160				16 x 20	905	0.080
	13 x 20	531	0.160						
270							12 x 35	1050	0.066
							16 x 25	1050	0.066
330	10 x 30	663	0.130	12 x 35	1450	0.088	12 x 40	1180	0.057
	12 x 30	663	0.130				16 x 32	1180	0.062
	13 x 20	663	0.130				18 x 20	1180	0.064
	13 x 25	663	0.130				16 x 36	1180	0.062
390	13 x 25	784	0.096				16 x 32	1570	0.043
							18 x 25	1490	0.046
470	12 x 35	905	0.091	16 x 32	1790	0.063	16 x 36	1790	0.036
	12 x 30	905	0.080				16 x 40	2160	0.048
	13 x 25	392	0.096				18 x 32	1630	0.038
	16 x 20	905	0.073				18 x 36	1630	0.047
560	16 x 25	1250	0.058				18 x 40	2020	0.032
680	16 x 32	1240	0.065	16 x 40	1990	0.060	18 x 36	1790	0.032
	12 x 35	1050	0.066						
	16 x 25	1250	0.058						
	18 x 20	1240	0.064						
820	16 x 36	1490	0.056	18 x 36	2200	0.060	18 x 40	2330	0.029
	12 x 40	1180	0.057						
	16 x 32	1180	0.057						
	18 x 25	1490	0.046						
1000	18 x 36	1570	0.049	18 x 40	2370	0.044			
	16 x 32	1570	0.043						
	16 x 36	1570	0.036						
1200	18 x 40	2520	0.046						
	16 x 40	1630	0.032						
	18 x 32	1630	0.038						
1500	18 x 36	1790	0.032						
1800	18 x 40	2330	0.029						
2200									
3300									
3900									
4700									
6800									
8200									
10000									
15000									

Note : * 1. D x L : mm

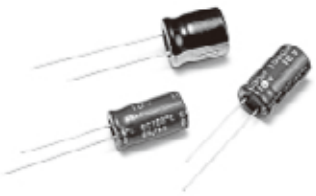
* 2. Ripple Current : (mA r.m.s 105°C / 100KHz)

* 3. ESR (Ω Max25°C / 100KHz)

Miniature Size Aluminum Electrolytic Capacitors

SY [For Low Impedance and Low E.S.R Suitable for Output of Mother Board]

105°C Single-Ended Lead Aluminum Electrolytic Capacitors For High Frequency Applications



DESCRIPTION

Used in switching regulator applications in computers. Especially for high frequency.

Low impedance and E.S.R., high permissible ripple current at high frequency and higher operating temperature (-40°C to +105°C).

High Temperature Load Life at 105°C for 6000 Hours

Frequency coefficient

Frequency(Hz)	120	1K	10K	100K
22~180μF	0.40	0.75	0.90	1.00
220~560μF	0.50	0.85	0.94	1.00
680~1800μF	0.60	0.87	0.95	1.00
2200~3900μF	0.75	0.90	0.95	1.00
4700μF Higher	0.85	0.95	0.98	1.00

Temperature coefficient

Temperature(°C)	65	85	105
Factor	1.80	1.50	1.00

ELECTRICAL CHARACTERISTICS

Operating Temperature : -40° ~ +105°C

Working Voltage : 6.3 ~ 50V

Rate Capacitance Range : 1 ~ 18000μF

Capacitance Tolerance : -20 ~ +20%

DC Leakage Current (μA) : I = 0.01 CV(μA) or 3μA Whichever is greater.

(Measurements shall be Made After a 2 Minute Charge at Rated Working Voltage)

Dissipation Factor : at 120 Hz, 25°C

WV (V) :	6.3	10	16	25	35	50
D.F (%) :	22	19	16	14	12	10

For capacitor whose capacitance exceeds 1000μF. The value of D.F(%) is increased by 2% for every addition of 1000μF.

WV (V) : Rated Voltage (V)	6.3	10	16	25	35	50
Impedance : Z - 25°C / Z + 20°C	4	3	2	2	2	2
Impedance : Z - 40°C / Z + 20°C	8	6	4	3	3	3

Load Life

Dø :	5ø~6.3ø	8ø~10øx12	10øx15~10øx30	12ø~18ø
Life :	3000hrs	4000hrs	5000hrs	6000hrs

If dimension is down size , Endurance will be less 1000 hrs than standard.

(a) Capacitance Change : Within 25% of Initial Value

(b) Dissipation Factor : Not Exceed 200% of Initial Requirement

(c) Leakage Current : Not Exceed the Initial Requirement

Pb-free RoHS COMPLIANT

Shelf Life : 500 Hours, No Voltage Applied, at 105°C

(a) Capacitance Change : Within 25% of Initial Value

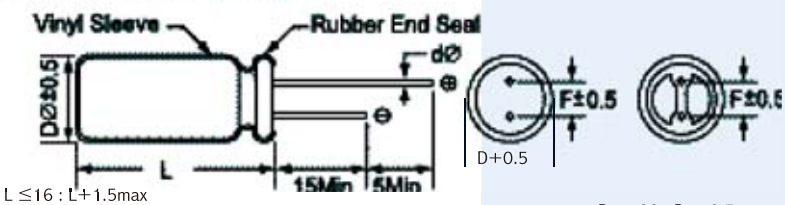
(b) Dissipation Factor : Not more than 200% of specified value

(c) Leakage Current : Not more than 200% of specified value

DIAGRAM OF DIMENSIONS

Dimensions : mm

■ Dimensions[mm]



L ≤16 : L+1.5max
L >16 : L+2max
Dø =8&10 : L+2.5

Dø <20 : Dø+0.5
Dø ≥20 : Dø+1

Dø	F	dø
4.0	1.5	0.45
5.0	2.0	0.5
6.0	2.5	
8.0	3.5	
10.0	5.0	0.6
12.0		
13.0		
16.0	7.5	0.8
18.0		
22.0	10.0	0.8

CASE SIZE OF STANDARD PRODUCTS D≥ ø 6mm with Safety Vent at Can Bottom

CAP. (μF)	RATED VOLTAGE								
	6.3			10			16		
	Size	Ripple	Impedance	Size	Ripple	Impedance	Size	Ripple	Impedance
47							5 x 11	184	0.754
68							5 x 11	184	0.754
56							5 x 11	184	0.580
82				5 x 11	184	0.754	5 x 11	184	0.754
100	5 x 11	184	0.754	5 x 11	184	0.754	6.3 x 11	298	0.286
120							6.3 x 11	298	0.286
150	5 x 11	210	0.754	6.3 x 11	298	0.286			
180				6.3 x 11	298	0.286	8 x 11	561	0.169
220	6.3 x 11	298	0.286	6 x 11	298	0.286	8 x 11	561	0.169
				8 x 11	561	0.169			
330	6.3 x 11	298	0.286	8 x 11	561	0.169	8 x 11	561	0.169
	8 x 11	340	0.220						
390	8 x 11	561	0.169	8 x 11	561	0.169	10 x 12	561	0.169
470	8 x 11	561	0.169	8 x 11	561	0.169	8 x 15	737	0.113
	8 x 11	561	0.169				10 x 12	759	0.104
560	8 x 11	561	0.169				10 x 15	1061	0.078
680	8 x 11	640	0.130	8 x 15	737	0.113	8 x 20	921	0.090
				10 x 12	759	0.104	10 x 15	1061	0.078
820	8 x 15	737	0.113	10 x 12	865	0.080	10 x 19.5	1228	0.060
	10 x 12	759	0.104	10 x 15	1061	0.078			
1000	8 x 15	840	0.087	8 x 20	921	0.090	10 x 19.5	1228	0.006
	10 x 12	759	0.104	10 x 15	1061	0.078	10 x 25	1447	0.055
							13 x 15	1450	0.049
1200	8 x 20	921	0.090	10 x 19.5	1228	0.060	10 x 25	1447	0.055
	10 x 15	1061	0.078						
1500	10 x 19.5	1228	0.060	10 x 25	1272	0.055	10 x 30	1675	0.040
				13 x 15	1450	0.049	13 x 20	1666	0.046
							16 x 15	1570	0.072
1800	10 x 25	1447	0.055	10 x 19.5	1666	0.060	13 x 25	1863	0.039
	13 x 15	1450	0.049						
2200	10 x 25	1447	0.055	10 x 30	1675	0.040	13 x 25	1863	0.039
				13 x 20	1666	0.046	18 x 15	2210	0.043
				16 x 15	1940	0.042			
2700	10 x 30	1675	0.040	18 x 15	1772	0.066	13 x 30	2214	0.034
	13 x 20	1666	0.046	13 x 25	1863	0.039	16 x 20	1938	0.046
	16 x 15	1940	0.042						
3300	13 x 20	1900	0.035	13 x 25	2210	0.034	13 x 35	2406	0.029
							18 x 20	2157	0.044
3900	13 x 25	1863	0.039	13 x 30	2406	0.029	13 x 40	3350	0.017
	18 x 15	2210	0.043	16 x 20	1938	0.046	16 x 25	2238	0.036
							18 x 20	2188	0.044
4700	13 x 30	2214	0.034	13 x 25	2798	0.025	16 x 32	2657	0.029
				16 x 25	2238	0.036	18 x 25	2430	0.031
5600	13 x 35	2406	0.029	13 x 40	3350	0.017	16 x 36	2740	0.026
	16 x 20	1938	0.046	16 x 25	2238	0.036	18 x 32	3157	0.026
				18 x 20	2188	0.044			
6800	13 x 40	2798	0.025	16 x 32	2657	0.029	16 x 40	3408	0.022
	16 x 25	2238	0.036	18 x 25	2430	0.031			
	18 x 20	2188	0.044						
8200	16 x 32	2657	0.029	16 x 36	2740	0.026	18 x 36	3191	0.025
				18 x 32	3157	0.026	18 x 40	4280	0.012
				18 x 36	4170	0.015			
10000	16 x 36	2740	0.026	16 x 40	4080	0.013	18 x 40	3316	0.020
	18 x 25	2430	0.031	18 x 36	3191	0.025			
12000	16 x 40	3408	0.022	18 x 40	3316	0.020			
	18 x 32	3157	0.026						
15000	18 x 36	3191	0.025						
18000	18 x 40	3316	0.020						

Note : * 1. D x L : mm

*2. Ripple Current : (mA r.m.s 105°C / 100KHz), Impedance (Ω Max25°C / 100KHz)

CASE SIZE OF STANDARD PRODUCTS D≥ ø 6mm with Safety Vent at Can Bottom

CAP. (μF)	RATED VOLTAGE								
	25			35			50		
	Size	Ripple	Impedance	Size	Ripple	Impedance	Size	Ripple	Impedance
1							5 x 11	30	4.0
2.2							5 x 11	43	2.5
3.3							5 x 11	53	2.2
4.7							5 x 11	88	1.9
10							5 x 11	100	1.5
12							5 x 11	100	1.5
15							5 x 11	158	0.910
18							5 x 11	158	0.910
22				5 x 11	184	0.754	5 x 11	158	0.910
27				5 x 11	184	0.754	5 x 11	158	0.910
33				5 x 11	184	0.754	6 x 11	259	0.390
39	5 x 11	184	0.754	5 x 11	184	0.754	6 x 11	259	0.390
47	5 x 11	184	0.754	6 x 11	298	0.286	6 x 11	259	0.390
56	5 x 11	184	0.754	6 x 11	298	0.286	6 x 11	295	0.300
							8 x 11	487	0.221
68				6 x 11	298	0.286	8 x 11	487	0.221
82	6 x 11	298	0.286	8 x 11	561	0.169	8 x 11	481	0.221
100	6 x 11	298	0.286	8 x 11	561	0.169	8 x 11	555	0.170
							10 x 12	667	0.156
120	8 x 11	561	0.169	8 x 11	561	0.169	8 x 15	640	0.156
							10 x 12	667	0.156
150				8 x 11	759	0.169	10 x 12	760	0.120
							10 x 15	921	0.1096
180	8 x 11	561	0.169	10 x 12	759	0.104	8 x 20	798	0.1183
							10 x 15	921	0.1092
220	8 x 11	561	0.169	8 x 15	737	0.113	10 x 15	1050	0.084
				10 x 12	759	0.104	10 x 19	1070	0.780
270	10 x 12	759	0.104	8 x 20	1050	0.069	10 x 19	1220	0.060
				10 x 15	1061	0.078	10 x 25	1263	0.715
							13 x 15	1260	0.061
330	8 x 15	737	0.113	10 x 15	1061	0.078	10 x 25	1440	0.055
	10 x 12	759	0.104	8 x 20	921	0.090	10 x 30	1482	0.0559
							13 x 20	1456	0.0585
390	10 x 15	1061	0.078	10 x 19	1228	0.060	13 x 20	1456	0.0585
470	8 x 20	921	0.090	10 x 19	1228	0.006	10 x 30	1482	0.0559
	10 x 15	1210	0.060	13 x 15	1450	0.049	13 x 20	1660	0.045
							13 x 25	1710	0.0442
							16 x 15	1690	0.055
560	10 x 19	1228	0.060	10 x 25	1447	0.55	13 x 25	1710	0.0442
				13 x 20	1666	0.046	18 x 15	1693	0.0702
680	10 x 19	1228	0.060	10 x 30	1650	0.042	13 x 30	2026	0.039
	13 x 15	1450	0.049	13 x 20	1910	0.031			
				13 x 25	1666	0.046			
				16 x 15	1814	0.072			
820	10 x 25	1447	0.055	13 x 20	1940	0.042	13 x 35	2201	0.0325
	13 x 20	1666	0.046	13 x 25	2151	0.039	16 x 20	2210	0.034
							18 x 20	2184	0.0468
1000	10 x 30	1675	0.040	13 x 25	2151	0.039	13 x 40	2920	0.021
	13 x 20	1666	0.046	18 x 15	2210	0.043	16 x 25	2241	0.0325
	16 x 15	1570	0.072				18 x 20	2490	0.036
1200	18 x 15	1687	0.073	13 x 30	2557	0.034	16 x 32	2640	0.0286
	13 x 25	1863	0.039	16 x 20	2238	0.046	18 x 25	2403	0.0338
1500	13 x 25	1863	0.039	13 x 35	2779	0.029	16 x 36	2763	0.0247
				16 x 25	2586	0.036			
1800	13 x 30	2214	0.034	13 x 40	2355	0.025	16 x 40	3254	0.0208
	16 x 20	1938	0.046	16 x 25	2586	0.036	18 x 32	2635	0.0273
				18 x 20	2528	0.044			
2200	13 x 35	2406	0.029	16 x 32	3068	0.029	18 x 36	3228	0.0221
	18 x 20	2188	0.044	18 x 25	2807	0.031			
2700	13 x 40	3350	0.017	16 x 36	2610	0.026	18 x 40	3333	0.0182
	16 x 25	2238	0.036	18 x 32	3647	0.026			
3300	16 x 32	2657	0.029	16 x 40	4080	0.013			
	18 x 25	2430	0.029	18 x 36	3685	0.025			
3900	18 x 32	3157	0.026	18 x 36	3830	0.020			
	16 x 36	2740	0.031						
4700	18 x 36	3191	0.025						
5600	18 x 40	3316	0.020						

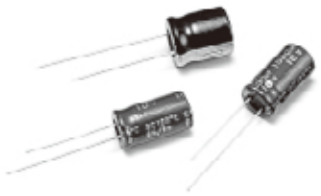
Note : * 1. D x L : mm

* 2. Ripple Current : (A r.m.s 105°C / 100KHz), Impedance (Ω Max25°C / 100KHz)

Miniature Size Aluminum Electrolytic Capacitors

SZ [Ultra Low ESR]

105°C Single-Ended Lead Aluminum Electrolytic Capacitors For High Frequency Applications



DESCRIPTION

Used in switching regulator applications in computers. Especially for high frequency.

Low impedance and E.S.R., high permissible ripple current at high frequency and higher operating temperature (-40°C to +105°C).

High Temperature Load Life at 105°C for 2000 Hours

Frequency coefficient

Frequency(Hz)	120	1K	10K	100K ≤
Factor	0.50	0.80	0.90	1.00

Temperature coefficient

Temperature(°C)	65	85	105
Factor	2.10	1.70	1.00

ELECTRICAL CHARACTERISTICS

Operating Temperature : -40° ~ +105°C

Working Voltage : 6.3 ~ 16V

Rate Capacitance Range : 470 ~ 3300μF

Capacitance Tolerance : -20 ~ +20%

DC Leakage Current (μA) : I = 0.03 CV Whichever is greater.

(Measurements shall be Made After a 2 Minute Charge at Rated Working Voltage)

Dissipation Factor : at 120 Hz, 25°C

WV (V) :	6.3	10	16
D.F (%) :	22	19	16

For capacitor whose capacitance exceeds 1000μF. The value of D.F(%) is increased by 2% for every addition of 1000μF.

WV (V) : Rated Voltage (V)	6.3	10	16
Impedance : Z - 25°C / Z + 20°C	2	2	2
Impedance : Z - 40°C / Z + 20°C	3	3	3

Load Life : 2000 Hours at 105°C Assured with Full Rated Maximum Ripple Current Applied

(a) Capacitance Change : Within 20% of Initial Value
(b) Dissipation Factor : Not Exceed 200% of Initial Requirement
(c) Leakage Current : Not Exceed the Initial Requirement

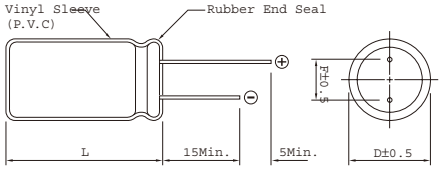
Shelf Life : 1000 Hours, No Voltage Applied, at 105°C

(a) Capacitance Change : Within 20% of Initial Value
(b) Dissipation Factor : Not Exceed 200 % of Initial Requirement
(c) Leakage Current : Not Exceed 200% of Initial Requirement

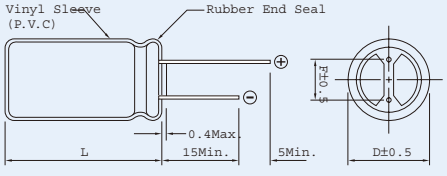
Pb-free
RoHS
COMPLIANT

DIAGRAM OF DIMENSIONS

Dimensions : mm



Rubber Stand-off



L ≤16 : L+1.5max
L >16 : L+2max
Dø =8&10 : L+2.5

Dø <20 : Dø+0.5
Dø ≥20 : Dø+1

Dø	F	dø
4.0	1.5	0.45
5.0	2.0	0.5
6.0	2.5	
8.0	3.5	
10.0	5.0	0.6
12.0		
13.0		
16.0	7.5	0.8
18.0		
22.0	10.0	0.8

CASE SIZE OF STANDARD PRODUCTS Dø ≥ 6mm with Safety Vent at Can Bottom

CAP. (μF)	RATED VOLTAGE WV														
	6.3					10					16				
	Size	D.F.	Ripple	L.C.	Impedance	Size	D.F.	Ripple	L.C.	Impedance	Size	D.F.	Ripple	L.C.	Impedance
470											8 x 11	225.6	0.16	1140	33
											8 x 11	225.6	0.16	1140	33
680						8 x 11	204.0	0.19	1140	36	10 x 12	326.4	0.16	1540	26
											8 x 15	326.4	0.16	1490	28
820	8 x 11	155.0	0.22	1140	36										
1000	10 x 12	189.0	0.22	770	26	8 x 15	300.0	0.19	1490	28	8 x 20	480.0	0.16	1870	21
						10 x 12	300.0	0.19	1540	26	10 x 15	480.0	0.16	2000	19
						10 x 12	300.0	0.19	1540	26	10 x 15	480.0	0.16	2000	19
1200	8 x 15	226.8	0.22	1490	28										
1300	8 x 20	245.7	0.22	1870	19										
1500	8 x 20	283.5	0.22	1540	26	8 x 20	450.0	0.19	1870	21	10 x 19.5	720.0	0.16	2550	13
	10 x 12	283.5	0.22	1870	26	10 x 15	450.0	0.19	2000	19					
	10 x 12	283.5	0.22	1870	26	10 x 15	450.0	0.19	2000	19					
	10 x 12	283.5	0.22	1870	26										
1800	8 x 20	340.2	0.22	1870	21	10 x 19.5	540.0	0.19	2550	13	10 x 22	864.0	0.16	2800	12
	10 x 15	340.2	0.22	2000	19						10 x 22	864.0	0.16	2800	12
2200	10 x 19.5	415.8	0.22	2550	13	10 x 22	660.0	0.19	2800	12					
	10 x 19.5	415.8	0.22	2550	13										
	10 x 19.5	415.8	0.22	2550	13										
3300	10 x 22	623.7	0.22	2800	12										

Note : * 1. D x L : mm

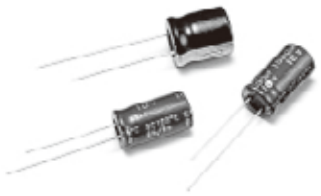
* 2. Ripple Current : (A r.m.s 105°C / 120Hz)

* 3. D.F. ; Disspation Factor(Tan ∂) , L.C. ; Leakage Current(μA)

Miniature Size Aluminum Electrolytic Capacitors

SV [For adapter and power supply applications Series]

105°C Single-Ended Lead Aluminum Electrolytic Capacitors For High Frequency Applications



DESCRIPTION

Used in switching regulator applications in computers. Especially for high frequency.

Low impedance and E.S.R., high permissible ripple current at high frequency and higher operating temperature (-40°C to +105°C).

ELECTRICAL CHARACTERISTICS

Operating Temperature : -40° ~ +105°C -25° ~ +105°C

Working Voltage : 160V 450V

Rate Capacitance Range : 22 ~ 220μF 10 ~ 150μF

Capacitance Tolerance : -20 ~ +20%

DC Leakage Current (μA) : I = 0.06 CV + 10(μA)

whichever is greater.(After 2 minutes application of rated voltage at 25°C)

Dissipation Factor : at 120 Hz, 25°C

WV (V) :	160	200	250	350	400	450
D.F (%) :	15	15	15	20	20	20

WV (V) :	200	400
Impedance : Z - 25°C / Z + 20°C	3	5
Impedance : Z - 40°C / Z + 20°C	6	—

Load Life : After apply rated voltage with rated ripple current for 2000hrs at 105°C the capacitors shall meet the following reuirements.
(a) Capacitance Change : Within 20% of Initial Value
(b) Dissipation Factor : Not Exceed 200% of Initial Requirement
(c) Leakage Current : Not Exceed the Initial Requirement

Shelf Life : 1000 Hours, No Voltage Applied, at 105°C

(a) Capacitance Change : Within 20% of Initial Value
(b) Dissipation Factor : Not Exceed 200 % of Initial Requirement
(c) Leakage Current : Not Exceed 200% of Initial Requirement

Pb-free
RoHS
COMPLIANT

Frequency coefficient

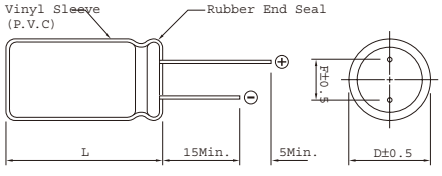
Frequency(Hz)	120	500	1K	10K~100K
Coefficient	1.00	1.20	1.40	1.50

Temperature coefficient

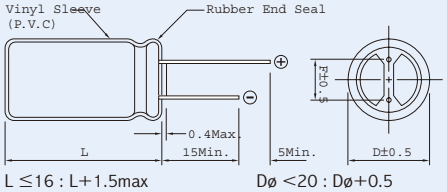
Temperature(°C)	65	85	105
Factor	2.10	1.70	1.00

DIAGRAM OF DIMENSIONS

Dimensions : mm



Rubber Stand-off



L ≤16 : L+1.5max
L >16 : L+2max
Dø =8&10 : L+2.5

Dø <20 : Dø+0.5
Dø ≥20 : Dø+1

Dø	F	dø
4.0	1.5	0.45
5.0	2.0	0.5
6.0	2.5	
8.0	3.5	
10.0	5.0	0.6
12.0		
13.0		
16.0	7.5	0.8
18.0		
22.0	10.0	0.8

CASE SIZE OF STANDARD PRODUCTS Dø ≥ 6mm with Safety Vent at Can Bottom

CAP. (μF)	RATED VOLTAGE WV											
	160		200		250		350		400		450	
	Size	Ripple	Size	Ripple	Size	Ripple	Size	Ripple	Size	Ripple	Size	Ripple
1									8 x 11	60		
									10 x 12	70		
1.5									10 x 12	30		
									10 x 12	30		
1.8									10 x 12	35		
									10 x 12	35		
2.2									10 x 12	40		
									10 x 12	140		
3.3									10 x 12	150		
									10 x12	180		
4.7					10 x 12	100	10 x 15	55	10 x 15	20	10 x 19.5	220
5.6							10 x 15	58	10 x 15	250	10 x 19.5	250
6.8							10 x 19.5	65	10 x 15	280	10 x 19.5	280
10	10 x 15	320	10 x 15	320	10 x 15	320	10 x 19.5	350	10 x 15	64	13 x 20	450
									10 x 19.5	120		
									13 x 25	200		
15									13 x 20	550	13 x 25	600
22	10 x 19.5	500	10 x 19	233	10 x 19.5	500	13 x 20	650	12 x 25	190		
									13 x 20	225		
									13 x 25	225		
									16 x 25	300		
33	13 x 20	315	13 x 20	366	13 x 20	800			16 x 20	360	16 x 25	980
			10 x 19	366					16 x 25	400		
									16 x 32	437		
47	13 x 25	420	13 x 25	400	16 x 25	500			13 x 30	370	18 x 25	1200
			13 x 20	400					16 x 25	450		
									18 x 25	470		
									18 x 32	538		
68	13 x 20	1180	13 x 25	600			18 x 25	1470	13 x 40	480		
									18 x 25	480		
82							18 x 40	380	16 x 32	520		
									18 x 32	520		
100	13 x 25	1420	16 x 32	800	16 x 25	1530			18 x 32	580		
	16 x 20	1420							16 x 36	540		
120									18 x 32	670		
									18 x 36	670		
150	16 x 25	1890	16 x 36	800	18 x 40	750			18 x 36	770		
220	18 x 25	2370	16 x 36	933								

Note : * 1. D x L : mm

* 2. Ripple Current : (mA r.m.s 105°C / 100KHz), ESR (MΩ Max25°C / 100KHz)

LH [For 85°C, 2000 Hours Miniature]

For Printed Circuit Board High-Performance Aluminum Electrolytic Power Supply Input and Output Filter Capacitors

Miniature Size Aluminum Electrolytic Capacitors

ELECTRICAL CHARACTERISTICS

Operating Temperature Range	-40 to+85°C	-25 to+85°C
Rated Voltage Range	10 to 400V	160 to 450VDC
Capacitance Tolerance	±20% (at 20°C,120Hz)	
Leakage Current	I = 0.02CV or 3mA Whichever is smaller. (At 20°C, After 5 Minutes Application of DC Working Voltage at 20°C) Where, I; Leakage Current (μA) C: Nominal Capacitance (μF) V; Rated Voltage (V)	

Dissipation Factor

Rate Voltage (V)	6.3	10	16	25	35-50	63-100	160~200	250~450
D.F (%)	60	50	40	35	35	20	10 *	15

Note: * (15%) For Case Size D L(mm) = 35x20

The value of D.F(%) is increased by 2% for every addition of 1000μF.

Rated Voltage(v)	6.3~16	25	35	50~63	80~100	160~400	450
Z(-25°C) / Z(20°C)	5	4	4	3	3	4	8
Z(-40°C) / Z(20°C)	18	15	10	10	10	8	-

Load Life

After the capacitors are subjected to DC with the full rated ripple current ap 85°C for 2000 hours.

Capacitance Change	Within 20% of the Inital Value
D.F (tanδ)	200% or less of initial specified value
Leakage Current	not exceed the Initial Specified Value

Shelf Life

The following specifications shall be satisfied when the capacitor are restored to 25°C after exposing them for 10 0 hours at 85°C without voltage applied.

Capacitance Change	Within 20% of the Inital Value
D.F (%)	150% or less of initial Specified Value
Leakage Current	not exceed the Initial Speciffied Value

Pb-free

RoHS COMPLIANT

DESCRIPTION

LH type capacitiors, size are combined with snap-lock terminals for easy to mount on P.C. Board.

They are ideally suitable to be used in switching.

Power Supplies and Orther Industrial or Commercial Applications

Multiplier for Ripple Current

Frequency coefficient

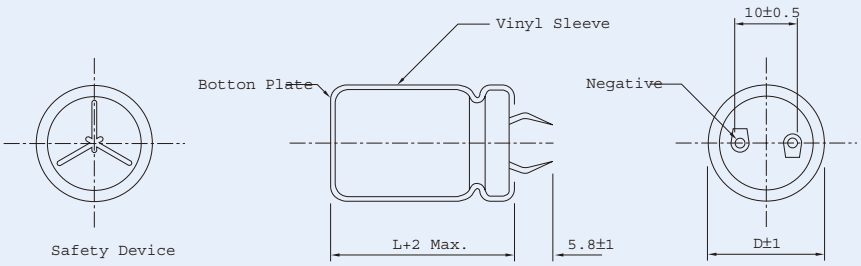
Frequency(Hz)	50	60	120	1K	10K~00K
6.3~100V	0.88	0.90	1.00	1.15	1.16
160~250V	0.75	0.78	1.00	1.16	1.23
350~450V	0.74	0.76	1.00	1.10	1.15

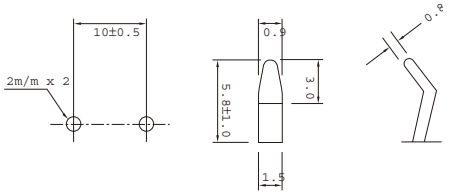
Temperature coefficient

Temperature(°C)	45	60	70	85
Factor	1.48	1.42	1.30	1.00

DIAGRAM OF DIMENSIONS

Location of P.C.B. Holes Unit : mm





CASE SIZE OF STANDARD PRODUCTS AND PERMISSIBLE RIPPLE CURRENT

CAP. (μF)	RATED VOLTAGE WV							
	6.3		10		16		25	
	Size	Ripple	Size	Ripple	Size	Ripple	Size	Ripple
5600							22 x 25	2.00
6800							22 x 25	2.30
							22 x 30	2.30
							25 x 25	2.30
8200					22 x 25	2.50	22 x 35	2.60
							25 x 25	2.75
					22 x 30	2.6	22 x 40	2.90
10000			22 x 25	2.50	25 x 25	2.6	25 x 30	2.80
							30 x 25	3.00
			22 x 25	2.40	22 x 30	2.90	22 x 45	3.30
12000					22 x 40	2.90	25 x 35	3.20
					25 x 30	2.90	30 x 30	3.40
					30 x 25	2.90	35 x 25	3.50
	22 x 25	2.44	22 x 30	2.75	22 x 35	3.30	22 x 50	3.70
15000			25 x 25	2.75	25 x 40	3.30	25 x 40	3.70
					30 x 25	3.40	30 x 35	3.90
					25 x 30	3.30	35 x 25	3.90
							35 x 30	3.90
	22 x 30	2.60	22 x 35	3.15	22 x 40	3.70	25 x 45	4.30
							25 x 50	4.30
18000	25 x 25	2.62	25 x 25	3.05	25 x 35	3.70	30 x 35	4.20
			25 x 30	3.05	30 x 30	3.80	35 x 30	4.40
	22 x 30	3.06	22 x 40	3.55	22 x 50	4.20	30 x 40	4.80
22000	25 x 25	3.07	25 x 30	3.50	25 x 40	4.20	35 x 35	5.00
			25 x 35	3.50	30 x 30	4.20		
			30 x 25	3.55	35 x 25	4.20		
	22 x 25	3.49	22 x 45	4.05	25 x 45	4.65	30 x 45	5.90
27000	25 x 30	3.52	25 x 35	4.00	30 x 35	4.65	35 x 40	5.90
	30 x 25	3.57	30 x 30	4.05	35 x 30	4.65		
	22 x 40	3.97	22 x 50	4.60	30 x 40	5.60	30 x 50	6.50
33000	25 x 35	4.02	25 x 40	4.55	35 x 30	5.60	35 x 40	6.50
	30 x 30	4.05	30 x 30	4.50			35 x 45	6.50
	35 x 25	4.10	35 x 25	4.50				
	22 x 45	4.56	25 x 45	5.10	30 x 45	6.00	34 x 45	7.50
39000	25 x 40	4.50	30 x 35	5.05	35 x 35	5.95	35 x 50	7.50
	30 x 30	4.46	35 x 30	5.05				
	35 x 25	4.51						
	25 x 45	5.09	25 x 50	5.75	30 x 50	6.80		
47000	30 x 35	5.06	30 x 40	5.70	35 x 40	6.75		
	35 x 30	5.03	35 x 30	5.65				
	25 x 50	5.71	30 x 45	6.45	35 x 45	7.60		
56000	30 x 40	5.70	35 x 35	6.40				
	35 x 40	5.75						
68000	30 x 45	6.48	30 x 50	7.05	35 x 50	8.00		
	35 x 35	6.42	35 x 40	7.10				
82000	30 x 50	7.32	35 x 50	7.50				
	35 x 40	7.29	35 x 45	7.50				
100000	35 x 45	8.31						
120000	35 x 50	8.60						

Note : *1. D x L : mm

*2. Ripple Current : (A r.m.s 85°C / 120Hz)

CASE SIZE OF STANDARD PRODUCTS AND PERMISSIBLE RIPPLE CURRENT

CAP. (μF)	RATED VOLTAGE WV							
	35		50		63		80	
	Size	Ripple	Size	Ripple	Size	Ripple	Size	Ripple
1000							22 x 5	1.30
1200							22 x 25	1.50
							22 x 33	1.50
1500							22 x 30	1.70
					22 x 25	1.60	25 x 25	1.70
					22 x 25	1.85	22 x 35	1.90
1800							25 x 30	1.90
							30 x 25	1.90
			22 x 25	1.70	22 x 30	2.0	22 x 40	2.10
2200					25 x 25	2.0	25 x 30	2.10
							25 x 35	2.10
							30 x 25	2.20
			22 x 30	1.90	22 x 35	2.20	22 x 45	2.50
							22 x 50	2.50
2700			25 x 25	1.90	25 x 30	2.30	25 x 35	2.50
							25 x 40	2.50
					30 x 25	2.50	30 x 30	2.50
							30 x 25	2.50
							35 x 25	2.85
	22 x 25	1.80			22 x 40	2.30	22 x 50	2.80
3300					25 x 30	2.30	25 x 40	2.80
					25 x 35	2.30	25 x 45	2.80
					30 x 25	2.30	30 x 30	2.80
							30 x 35	
							35 x 25	3.20
	22 x 25	2.10	22 x 35	2.10	22 x 45	2.50	25 x 45	3.10
	22 x 30	2.10					25 x 30	3.10
3900			25 x 30	2.10	25 x 35	2.60	30 x 35	3.20
					25 x 40	2.60	25 x 50	3.10
			30 x 25	2.40	30 x 30	2.60	35 x 30	3.20
							30 x 40	3.20
	22 x 30	2.20	22 x 40	2.40	22 x 50	3.40	25 x 50	3.60
4700	25 x 25	2.20	25 x 35	2.40	25 x 40	3.35	30 x 40	3.60
					30 x 30	3.35	30 x 45	3.60
					35 x 25	3.40	35 x 35	3.60
	22 x 35	2.30	22 x 50	2.50	25 x 45	3.10	30 x 45	3.50
							30 x 50	3.50
5600	25 x 25	2.30	25 x 40	2.50	30 x 35	3.20	35 x 35	3.50
			30 x 30	2.50	35 x 30	3.30	35 x 40	3.50
	25 x 30	2.30	35 x 25	2.60				
	22 x 40	2.60			30 x 40	3.60	30 x 50	4.10
	25 x 30	2.60	25 x 45	2.80	35 x 30	3.60	35 x 40	4.10
	25 x 35	2.60			35 x 35	3.70	35 x 50	4.10
6800	30 x 25	2.70	30 x 30	3.80				
			30 x 35	3.85				
6900					35 x 25	2.70		
	22 x 45	2.80	25 x 50	3.20	30 x 45	4.80	35 x 45	5.85
	22 x 50	2.80						
8200	25 x 35	2.80	30 x 40	3.20	35 x 35	4.80		
	25 x 40	2.80						
	30 x 30	2.80	35 x 30	3.0				
	35 x 25	2.90						
	22 x 50	3.10	30 x 45	3.40	30 x 50	5.50	35 x 50	6.60
10000	25 x 40	3.10	35 x 35	3.40				
	25 x 45	3.10			35 x 35	4.30		
	30 x 30	3.20			35 x 40	4.30		
	30 x 35	3.20						
	35 x 25	3.40						
	25 x 45	3.50	30 x 50	3.80	35 x 45	4.80		
	25 x 50	3.50			35 x 50	4.80		
12000	30 x 35	3.50	35 x 40	3.80				
	30 x 40	3.50						
	35 x 30	3.60						
	25 x 50	4.10	35 x 45	3.80	35 x 50	6.50		
15000	30 x 40	4.10	35 x 50	4.50				
	30 x 45	4.10						
	35 x 35	4.10						
18000	30 x 45	4.60	35 x 50	6.70				
	30 x 50	4.60						
	35 x 40	4.70						
22000	30 x 50	5.30	35 x 50	6.70				
	35 x 45	5.30						
27000	35 x 50	6.90						

Note : *1. D x L : mm

*2. Ripple Current : (A r.m.s 85°C / 120Hz)

CASE SIZE OF STANDARD PRODUCTS AND PERMISSIBLE RIPPLE CURRENT

CAP. (μF)	RATED VOLTAGE WV							
	100		160		180		200	
	Size	Ripple	Size	Ripple	Size	Ripple	Size	Ripple
180					22 × 20	1.00	22 × 25	0.95
220					22 × 25	1.10	22 × 25	1.10
			22 × 25	1.15	22 × 25	1.25	22 × 25	1.25
270					25 × 20	1.25	22 × 30	1.25
			22 × 25	1.30			22 × 25	1.40
330			25 × 20	1.30	22 × 30	1.40	22 × 30	1.40
					25 × 25	1.40	25 × 25	1.40
			22 × 30	1.50	22 × 30	1.60	22 × 30	1.60
							22 × 35	1.60
390			25 × 25	1.50	25 × 25	1.50	25 × 25	1.55
			30 × 25	1.50			25 × 30	1.55
							22 × 30	1.80
			22 × 30	1.70	22 × 35	1.70	22 × 35	1.80
							22 × 40	1.80
470			25 × 25	1.70	25 × 30	1.70	25 × 30	1.80
			30 × 25	1.70	30 × 25	1.80	30 × 25	1.80
			22 × 35	1.90			22 × 40	2.00
							22 × 45	2.00
560			25 × 30	1.90	22 × 40	1.90	25 × 35	2.00
					25 × 35	1.95	30 × 30	2.00
			30 × 25	1.90	25 × 35	1.95	30 × 25	2.00
					30 × 25	2.00	35 × 25	2.00
			22 × 40	2.10	22 × 45	2.25	22 × 45	2.35
					22 × 50	2.30		
680	22 × 25	1.10	25 × 30	2.20	25 × 35	2.20	25 × 40	2.30
			25 × 35	2.20	25 × 40	2.20		
			30 × 25	2.15	30 × 30	2.20	30 × 30	2.30
							30 × 25	2.30
					30 × 25	2.20	35 × 25	2.30
	22 × 25	1.10	22 × 45	2.50	22 × 50	2.55	25 × 40	2.60
			22 × 50	2.40	25 × 45	2.55	25 × 50	2.60
820	22 × 30	1.20	25 × 35	2.40	30 × 30	2.55	30 × 35	2.60
			25 × 40	2.40	30 × 35	2.60	30 × 40	2.60
			30 × 30	2.40	35 × 25	2.50	35 × 30	2.50
			35 × 25	2.40	35 × 30	2.50		
	22 × 30	1.40	22 × 50	2.70	25 × 45	2.85	25 × 50	2.80
			25 × 40	2.70	25 × 50	2.85	30 × 35	2.80
	25 × 25	1.40	25 × 45	2.70	30 × 35	2.85	30 × 40	2.80
					30 × 40	2.85	30 × 45	2.80
1000			30 × 35	2.70	35 × 30	2.90		
			35 × 25	2.70			35 × 30	2.80
			35 × 30	2.70			35 × 35	2.80
1200	22 × 35	1.60	25 × 45	3.10	30 × 40	3.25	30 × 45	3.20
			25 × 50	3.10			35 × 50	3.20
	25 × 30	1.60	30 × 35	3.15	35 × 45	3.25	35 × 35	3.20
			30 × 40	3.15			35 × 40	3.20
			35 × 30	3.00	35 × 35	3.10		
			35 × 35	3.00				
	22 × 40	1.80	30 × 45	3.50	30 × 45	3.60	30 × 50	3.80
1500	25 × 30	1.70	35 × 35	3.50	35 × 40	3.60	35 × 40	3.80
	25 × 35	1.70						
	30 × 25	1.80	35 × 40	3.50	35 × 45	3.60	35 × 50	3.80
	22 × 45	2.10	30 × 50	3.90			35 × 45	4.35
	22 × 50	2.10						
1800	25 × 35	2.20	35 × 40	3.90	35 × 50	4.10		
	25 × 40	2.20						
	30 × 30	2.10	35 × 45	3.90				
	35 × 25	2.20						
	22 × 50	2.20						
2200	25 × 40	2.20	35 × 45	4.50	35 × 50	4.90	35 × 50	4.95
	25 × 45	2.20	35 × 50	4.50				
	30 × 30	2.30						
	30 × 35	2.30						
	35 × 25	2.50						
	35 × 30	2.50						
	25 × 45	2.60						
	25 × 50	2.60						
2700	30 × 35	2.70						
	30 × 40	2.70						
	35 × 25	4.05						
	25 × 50	3.00						
3300	30 × 40	3.00						
	30 × 45	3.00						
	35 × 30	3.10						
	35 × 35	3.10						
3900	30 × 45	3.40						
	30 × 50	3.40						
	35 × 35	3.40						
	35 × 40	3.40						
4700	35 × 40	4.00						
	35 × 50	4.00						
5600	35 × 50	6.20						
10000	35 × 60	7.88						

Note : *1. D x L : mm
*2. Ripple Current : (A r.m.s 85°C / 120Hz)

CASE SIZE OF STANDARD PRODUCTS AND PERMISSIBLE RIPPLE CURRENT

CAP. (μF)	RATED VOLTAGE WV									
	250		315		350		400		450	
	Size	Ripple	Size	Ripple	Size	Ripple	Size	Ripple	Size	Ripple
47							22 x 25	0.45	22 x 25	0.50
56							22 x 20	0.55	25 x 25	0.65
68					22 x 20	0.55	22 x 25	0.55	22 x 30	0.57
							25 x 20	0.60	22 x 25	0.70
82					22 x 25	0.64	22 x 25	0.80	22 x 30	0.80
					25 x 20	0.64	25 x 25	0.80	25 x 25	0.80
100					22 x 30	0.90	22 x 30	0.70	22 x 35	0.72
			22 x 25	0.67	25 x 20	0.90	25 x 25	0.70	25 x 30	0.73
									30 x 25	0.95
120	22 x 20	0.78			22 x 30	0.82	22 x 35	0.79	22 x 40	0.80
					25 x 25	0.81	25 x 25	0.79	25 x 30	0.83
									25 x 35	0.83
									30 x 25	0.95
150	22 x 25	0.90	22 x 30	0.85	22 x 35	0.94	22 x 40	0.9	22 x 45	0.95
									22 x 50	0.95
									25 x 30	0.73
			25 x 25	0.85	25 x 30	0.94	25 x 30	0.89	25 x 35	0.95
									25 x 40	0.98
					30 x 25	1.15	30 x 25	0.95	30 x 30	0.98
180	22 x 25	0.94	22 x 35	0.96	22 x 40	1.10	22 x 45	1.0	25 x 40	1.10
	25 x 20	1.00	25 x 30	0.96	25 x 30	1.10	25 x 35	1.0	25 x 45	1.10
					30 x 25	1.10	30 x 30	1.1	30 x 35	1.10
							35 x 25	1.20	35 x 25	1.20
220	22 x 30	1.15	22 x 40	1.10	22 x 45	1.20	22 x 50	1.10	25 x 50	1.20
	22 x 35	1.15	25 x 35	1.10	25 x 35	1.20	25 x 40	1.20	30 x 40	1.30
	25 x 25	1.15	30 x 25	1.10	30 x 30	1.20	30 x 30	1.20	35 x 30	1.30
					35 x 25	1.30	30 x 35	1.20		
							35 x 25	1.50		
270	22 x 30	1.20	22 x 45	1.20	25 x 40	1.40	25 x 40	1.30	30 x 45	1.40
	22 x 35	1.20	25 x 40	1.30	25 x 45	1.40	25 x 45	1.30	35 x 35	1.50
	25 x 25	1.30	30 x 30	1.30	30 x 35	1.40	30 x 35	1.40		
			35 x 25	1.30	35 x 25	1.65	30 x 40	1.40		
							35 x 30	1.50		
300	25 x 30	1.40								
330	22 x 35	1.40	25 x 45	1.40	22 x 50	1.60	25 x 50	1.60	30 x 40	2.00
	22 x 40	1.40	30 x 35	1.40	25 x 50	1.60	30 x 40	1.60	30 x 50	2.00
	25 x 30	1.50			30 x 40	1.60	30 x 45	1.60	35 x 35	2.00
	30 x 25	1.50			35 x 30	1.60	35 x 30	1.80	35 x 40	2.00
390	22 x 40	1.60	25 x 50	1.60	30 x 40	1.70	30 x 45	1.80	35 x 45	1.90
	22 x 45	1.60	30 x 40	1.60	35 x 30	1.80	30 x 35	1.80		
	25 x 35	1.60	35 x 30	1.60	35 x 35	1.80	35 x 35	1.80		
	30 x 25	1.65					35 x 40	1.80		
470	22 x 45	1.80	30 x 45	1.80	30 x 45	2.00	30 x 50	2.40	35 x 50	2.20
	22 x 50	1.80	35 x 35	1.80	35 x 35	2.00	35 x 40	2.10		
	25 x 35	1.80			35 x 40	2.00	35 x 45	2.10		
	25 x 40	1.80								
	30 x 30	1.80								
	35 x 25	1.90								
560	22 x 50	2.0	30 x 50	2.00	35 x 40	2.30	35 x 45	2.30		
	25 x 40	2.0	35 x 40	2.00	35 x 45	2.30	35 x 50	2.30		
	25 x 45	2.0								
	30 x 35	2.0								
	35 x 25	2.10								
680	25 x 50	2.30	35 x 45	2.30	35 x 45	2.60	35 x 50	2.90	35 x 60	2.9
	30 x 40	2.30			35 x 50	2.60				
	35 x 30	2.45								
820	30 x 45	2.60								
	35 x 35	2.60								
1000	30 x 50	3.00								
	35 x 40	3.00								
1200	35 x 45	3.40								

Note : *1. D x L : mm

*2. Ripple Current : (A r.m.s 105°C / 120Hz)

Miniature Size Aluminum Electrolytic Capacitors

LG [For 105°C, 2000 Hours General]

For Printed Circuit Board High-Performance Aluminum Electrolytic Power Supply Input and Output Filter Capacitors

DESCRIPTION (LG Series 105°C 2000 Hours Assured)

LG type capacitors are combined with snaplock terminals for easy to mount on P.C. Board.

They are ideally suitable to be used in switching power supplies and other industrial or commercial applications.

Multiplier for Ripple Current

Frequency coefficient

Frequency(Hz)	50	60	120	1K	10K~00K
6.3~100V	0.88	0.90	1.00	1.15	1.16
160~250V	0.85	0.88	1.00	1.15	1.20
315~450V	0.88	0.9	1.00	1.10	1.15

Temperature coefficient

Temperature(°C)	60	70	85	105
Factor	2.37	2.17	1.67	1.00

ELECTRICAL CHARACTERISTICS

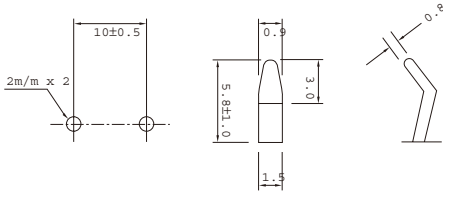
Rated Voltage Range	6.3 to 100VDC						160 to 450VDC		
Operating Temperature Range	-40 to +105°C						-25 to+105°C		
Capacitance Tolerance	±20% (At 20°C,120Hz)								
Leakage Current	I = 0.02CV, L = 20m/m, I = 0.03CV or 3mA Whichever is smaller. (At 25°C, After 5 Minutes) Where, I; Leakage Current (μA) C: Nominal Capacitance (μF) V; Rated Voltage (V)								
Dissipation Factor (tanδ)	Rate Voltage (V)	6.3	10	16	25	35	50	63-100	160-450
	D.F (%)	60	55	50	45	35	30	30	15
	* Note : 15% For D = 35m/m or L = 20m/m (At 20°C, 120Hz) (WV = 6.3 ~ 100V For Capacitor Whose Capacitance Exceeds 1000μF The value of D.F (%) is increased by 2% for every addition of 1000μF.)								
Low Temperature Characteristics (120Hz)	Rated Voltage (V)	6.3~16	25	35	50~63	80~100	160~400	450	
	Z(-25°C) / Z(20°C)	4	3	3	2	2	4	8	
	Z(-40°C) / Z(20°C)	15	10	8	6	5	-	-	
Load Life	The following specifications shall be satisfied when the capacitors are restored to 20°C after the rated voltage with maximum ripple current is applied for 2000 hours at 105°C.								
	Capacitance Change	≤ ±20% of the Inital Value							
	D.F	≤ 200% of the Initial Specified Value							
	Leakage Current	≤ the Initial Specified Value							
Shelf Life 25°C	The following specifications shall be satisfied when the capacitor are restored to after exposing them for 1000 hours at 105°C without voltage applied.								
	Capacitance Change	≤ ±20% of the Inital Value							
	D.F	≤ 150% of the Intial Specitied Value							
	Leakage Current	≤ 150% of Initial Speciffied Value							

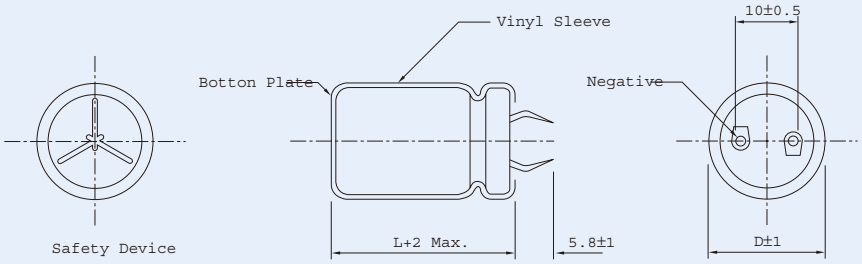
Pb-free RoHS COMPLIANT

DIAGRAM OF DIMENSIONS

Location of P.C.B. Holes

Unit : mm





CASE SIZE OF STANDARD PRODUCTS AND PERMISSIBLE RIPPLE CURRENT

CAP. (μF)	RATED VOLTAGE WV							
	6.3		10		16		25	
	Size	Ripple	Size	Ripple	Size	Ripple	Size	Ripple
3900							20 x 25	1.58
4700							22 x 25	1.50
							20 x 30	1.65
5600					20 x 25	1.68	20 x 35	1.65
							22 x 30	1.65
							25 x 25	1.65
6800			20 x 25	1.31	22 x 25	1.55	22 x 40	1.85
					20 x 30	1.80	25 x 25	1.85
8200			20 x 30	1.59	22 x 30	1.70	22 x 35	2.10
					25 x 25	1.70	25 x 30	2.10
					20 x 35	1.70	30 x 25	2.15
10000			25 x 25	1.55	22 x 30	1.95	22 x 40	2.40
			20 x 30	1.88	25 x 25	1.95	25 x 35	2.40
					20 x 40	1.95	30 x 30	2.40
							35 x 25	2.40
12000	22 x 25	1.55	22 x 30	1.75	22 x 35	2.20	22 x 45	2.70
			20 x 35	2.18	25 x 30	2.25		
			25 x 25	1.94	30 x 25	2.30	25 x 40	2.75
							30 x 30	2.70
							35 x 25	2.75
15000	22 x 30	1.70	22 x 30	1.90	22 x 40	2.55	25 x 45	3.15
	25 x 25	1.70	25 x 25	1.90	25 x 35	2.58	30 x 35	3.15
			22 x 40	2.41	30 x 30	2.57	35 x 30	3.25
			22 x 35	2.23	35 x 25	2.65		
			25 x 30	2.10				
18000	22 x 30	1.95	22 x 35	2.20	22 x 45	2.90	25 x 50	3.55
	25 x 25	1.95	25 x 30	2.25	25 x 40	2.90	30 x 40	3.55
			22 x 40	2.41	30 x 30	2.90	35 x 35	3.55
			30 x 25	2.25	35 x 25	2.95		
22000	22 x 35	2.25	22 x 40	2.50	25 x 45	3.30	30 x 45	4.04
	25 x 30	2.25	25 x 35	2.55	30 x 35	3.30	35 x 35	3.75
	30 x 25	2.25	30 x 25	2.45	35 x 30	3.25		
			22 x 45	2.50				
			30 x 30	2.50				
27000	22 x 40	2.55	22 x 50	2.95	25 x 50	3.80	35 x 45	4.70
	25 x 35	2.55	25 x 40	2.90	30 x 40	3.75		
	30 x 30	2.55	30 x 30	2.85	35 x 30	3.75		
	35 x 25	2.55	35 x 25	2.80	35 x 35	3.93		
33000	22 x 45	2.90	25 x 45	3.30	30 x 45	4.30	35 x 50	5.40
	25 x 40	2.95	30 x 35	3.30	35 x 35	4.25		
	30 x 30	2.90	35 x 30	3.30				
	35 x 25	2.95						
39000	25 x 50	3.25	25 x 50	3.70	30 x 50	4.80		
	30 x 35	3.25	30 x 40	3.70	35 x 40	4.80		
	35 x 30	3.30	35 x 30	3.65				
			35 x 35	3.65				
47000	25 x 50	3.70	30 x 45	4.20	35 x 45	5.45		
	30 x 40	3.70	35 x 35	3.80				
			35 x 40	4.16				
56000	30 x 45	4.15	30 x 50	4.65				
	35 x 35	4.10	35 x 40	4.65				
68000	30 x 50	4.70	35 x 50	5.50				
	35 x 40	4.70						
82000	35 x 45	5.30						

Note : *1. D x L : mm

*2. Ripple Current : (A r.m.s 105°C / 120Hz)

CASE SIZE OF STANDARD PRODUCTS AND PERMISSIBLE RIPPLE CURRENT

CAP. (μF)	RATED VOLTAGE WV							
	35		50		63		80	
	Size	Ripple	Size	Ripple	Size	Ripple	Size	Ripple
820							22 x 25	1.04
							20 x 25	1.04
1000					20 x 25	1.10	22 x 25	1.19
							22 x 30	1.20
							25 x 25	1.20
							20 x 30	1.20
1200							20 x 35	1.43
					22 x 25	1.20	22 x 30	1.40
					20 x 30	1.20	25 x 25	1.40
1500			20 x 25	1.15	20 x 35	1.30	20 x 35	1.57
					22 x 30	1.30	22 x 30	1.57
					25 x 25	1.30	25 x 25	1.57
							22 x 35	1.60
							25 x 30	1.60
							30 x 25	1.65
1800			22 x 25	1.30	22 x 30	1.50	22 x 40	1.71
			20 x 30	1.39	25 x 25	1.50	25 x 35	1.71
					20 x 35	1.50	30 x 25	1.71
							20 x 40	1.77
							22 x 35	1.77
							25 x 30	1.71
2200			22 x 30	1.55	22 x 35	1.70	22 x 45	2.05
			25 x 25	1.55	25 x 30	1.75	25 x 35	1.98
			20 x 35	1.55	30 x 25	1.80	30 x 30	2.05
					20 x 40	1.80	35 x 25	2.05
					22 x 25	1.58	22 x 40	2.03
							30 x 25	2.05
2700	20 x 25	1.29	22 x 30	1.70	22 x 40	2.00	25 x 45	2.35
			25 x 25	1.70	25 x 35	2.00	30 x 35	2.35
			20 x 35	1.70	30 x 25	1.72	35 x 30	2.35
							22 x 45	2.35
							25 x 40	2.35
							30 x 30	2.35
3300	22 x 25	1.40	22 x 35	1.95	22 x 50	2.30	25 x 50	2.61
	20 x 30	1.57	25 x 30	1.85	25 x 40	2.30	30 x 40	2.70
			20 x 40	1.95	30 x 30	2.24	35 x 30	2.47
					35 x 25	2.10	30 x 35	2.61
					22 x 45	2.30	20 x 45	2.64
					25 x 35	2.27		
3900	22 x 30	1.55	22 x 40	2.15	25 x 45	2.51	30 x 45	3.82
	25 x 25	1.55	25 x 35	2.20	30 x 35	2.55	35 x 35	3.00
	20 x 35	1.55	30 x 25	1.95	35 x 30	2.55	35 x 30	2.97
			25 x 30	2.20	25 x 40	2.51	25 x 50	2.92
							30 x 40	2.82
4700	22 x 35	1.80	22 x 45	2.43	25 x 50	2.85	30 x 50	3.34
	25 x 25	1.80	25 x 40	2.43	30 x 40	2.85	35 x 40	3.40
	20 x 40	1.80	30 x 30	2.25	35 x 30	2.80	35 x 50	3.40
			35 x 25	2.50			30 x 45	3.34
			25 x 35	2.43			35 x 35	3.38
5600	22 x 35	1.95	22 x 50	2.75	30 x 45	3.20	35 x 45	3.80
	25 x 30	1.95	25 x 40	2.70	35 x 35	3.20	30 x 50	3.80
	30 x 25	2.00	30 x 35	2.75	30 x 40	3.20	35 x 70	3.80
			35 x 30	2.75				
			30 x 30	2.64				
6800	22 x 40	2.20	25 x 50	3.30	30 x 50	3.65	35 x 50	3.90
	25 x 35	2.25	30 x 40	3.30	35 x 40	3.65	35 x 45	3.90
	30 x 30	2.30	35 x 30	3.25				
	35 x 25	2.35	25 x 40	3.30				
	30 x 25	2.25	30 x 35	3.30				
8200	22 x 50	2.55	30 x 45	3.60	35 x 45	3.90	35 x 50	4.20
	25 x 40	2.50	35 x 35	3.55				
	30 x 30	2.75	30 x 40	3.60				
	35 x 25	2.75						
10000	25 x 45	2.85	30 x 50	4.05	35 x 50	4.40		
	30 x 35	2.90	35 x 40	4.00				
	35 x 30	2.95	30 x 40	3.49				
12000	25 x 50	3.25	35 x 45	4.55				
	30 x 40	3.23						
	35 x 30	3.15						
	35 x 40	3.19						
15000	30 x 45	3.70	35 x 50	4.77				
	35 x 35	3.65						
18000	35 x 40	4.35						
22000	35 x 50	4.90						
	35 x 45	4.90						

Note : *1. D x L : mm

*2. Ripple Current : (A r.m.s 105°C / 120Hz)

CASE SIZE OF STANDARD PRODUCTS AND PERMISSIBLE RIPPLE CURRENT

CAP. (μF)	RATED VOLTAGE WV									
	100		160		180		200		220	
	Size	Ripple	Size	Ripple	Size	Ripple	Size	Ripple	Size	Ripple
150							22 x 20	0.65		
180					22 x 20	0.75	22 x 20	0.70	20 x 25	0.81
220			22 x 20	0.80	22 x 25	0.85	22 x 25	0.80	20 x 30	0.94
					20 x 25	0.81	25 x 20	0.80	22 x 25	0.94
							20 x 25	0.80		
270			22 x 25	0.87	22 x 25	0.95	22 x 25	0.85	20 x 35	1.10
					25 x 20	0.90	25 x 25	0.85	22 x 30	1.09
					20 x 30	0.95	20 x 30	0.85		
330			22 x 25	1.20	22 x 25	1.20	22 x 30	1.20	20 x 40	1.18
			25 x 20	1.15	22 x 30	1.10	25 x 25	1.20	22 x 35	1.24
					25 x 25	1.10	20 x 35	1.17	25 x 25	1.14
					20 x 35	0.11				
390			22 x 30	1.17	22 x 30	1.30	22 x 40	1.27	20 x 45	1.33
			25 x 25	1.30	25 x 25	1.30	22 x 35	1.27	22 x 35	1.30
			20 x 35	1.15	20 x 35	1.28	25 x 30	1.30	25 x 30	1.26
							30 x 25	1.30		
							25 x 25	1.30		
470			22 x 30	1.28	20 x 40	1.35	22 x 35	1.40	22 x 40	1.41
			20 x 40	1.25	22 x 35	1.35	22 x 40	1.40	25 x 30	1.39
			25 x 25	1.29	25 x 30	1.40	25 x 30	1.40	30 x 25	1.37
			22 x 35	1.28	30 x 25	1.40	30 x 25	1.48		
560	22 x 25	1.05	22 x 40	1.45	22 x 40	1.50	22 x 45	1.55	22 x 45	1.60
	20 x 25	0.95	25 x 30	1.45	25 x 35	1.55	25 x 35	1.55	25 x 35	1.56
			30 x 25	1.49	30 x 25	1.50	30 x 30	1.55	30 x 30	1.61
			22 x 35	1.45	25 x 30	1.53			35 x 25	1.52
680	22 x 25	1.20	22 x 45	1.64	22 x 45	1.76	22 x 50	1.75	25 x 40	1.75
	20 x 30	1.15	25 x 35	1.70	22 x 50	1.70	25 x 40	1.75	30 x 35	1.76
			30 x 25	1.63	25 x 35	1.76	30 x 30	1.74	35 x 30	1.72
			22 x 40	1.64	25 x 40	1.75	35 x 25	1.70		
					30 x 30	1.70				
					35 x 25	1.70				
820	22 x 30	1.30	22 x 50	1.85	22 x 50	1.97	25 x 50	2.05	25 x 45	1.97
	25 x 25	1.33	25 x 40	1.92	25 x 40	1.99	30 x 35	2.00	30 x 40	2.06
	20 x 35	1.30	30 x 30	1.91	25 x 45	1.99	35 x 30	2.05	35 x 30	1.95
			35 x 25	1.90	30 x 35	1.93	25 x 45	2.10		
			22 x 45	1.85	35 x 25	1.90				
1000	22 x 35	1.43	25 x 45	2.17	25 x 45	2.24	30 x 45	2.30	30 x 45	2.44
	25 x 30	1.43	30 x 35	2.19	25 x 50	2.20	35 x 35	2.30	35 x 35	2.20
	20 x 35	1.43	35 x 30	2.19	30 x 35	2.20	25 x 50	2.36		
	25 x 25	1.43			30 x 40	2.25	30 x 40	2.40		
					35 x 30	2.25				
1200	22 x 40	1.69	25 x 50	2.43	30 x 40	2.53	30 x 50	2.60	35 x 40	2.37
	25 x 35	1.69	30 x 40	2.45	30 x 45	2.53	35 x 40	2.65		
	30 x 25	1.68	35 x 30	2.25	35 x 35	2.50	30 x 45	2.69		
	22 x 35	1.69					35 x 35	2.53		
	25 x 30	1.68								
	20 x 40	1.61								
1500	22 x 45	1.95	30 x 45	2.80	30 x 50	2.90	35 x 45	2.97	35 x 45	2.64
	25 x 40	1.95	35 x 35	2.62	35 x 40	2.90	35 x 40	2.97		
	30 x 30	1.95								
	35 x 25	1.95								
	22 x 40	1.97								
	25 x 35	1.98								
	30 x 25	1.95								
1800	25 x 45	2.20	30 x 50	3.13	35 x 50	3.30	35 x 50	3.15		
	30 x 35	2.50	35 x 45	2.97	35 x 45	3.25				
	35 x 30	2.45	35 x 40	2.97						
	22 x 45	2.20								
	25 x 40	2.20								
	30 x 30	2.20								
2200	25 x 50	2.55	35 x 50	3.34	35 x 50	3.60	35 x 50	3.80		
	30 x 40	2.50								
	35 x 30	2.55								
	25 x 45	2.53								
	30 x 35	2.55								
2700	30 x 45	2.90								
	35 x 35	2.85								
	25 x 50	2.82								
	30 x 40	2.86								
3300	30 x 50	3.25								
	35 x 40	3.25								
	30 x 45	3.25								
	30 x 45	3.25								
3900	35 x 40	3.67								
	30 x 50	3.60								
	35 x 45	3.67								
4700	30 x 50	3.80								
	35 x 45	3.80								
	35 x 50	3.80								
5600	35 x 50	4.05								

Note : *1. D x L : mm

*2. Ripple Current : (A r.m.s 105°C / 120Hz)

CASE SIZE OF STANDARD PRODUCTS AND PERMISSIBLE RIPPLE CURRENT

CAP. (μF)	RATED VOLTAGE WV													
	250		315		350		385		400		420		450	
	Size	Ripple	Size	Ripple	Size	Ripple	Size	Ripple	Size	Ripple	Size	Ripple	Size	Ripple
47									22 x 20	0.35			20 x 25	0.36
													22 x 25	0.35
56					22 x 20	0.40	20 x 25	0.37	22 x 20	0.40	20 x 25	0340	22 x 25	0.40
									20 x 25	0.40			20 x 30	0.41
68					22 x 25	0.45	20 x 30	0.44	22 x 25	0.49	20 x 30	0.48	22 x 30	0.50
					20 x 25	0.41	22 x 25	0.45	25 x 20	0.49	22 x 25	0.50	25 x 25	0.50
									20 x 30	0.48			20 x 35	0.47
82			20 x 25	0.39	22 x 25	0.50	20 x 30	0.50	22 x 30	0.56	20 x 35	0.53	22 x 35	0.55
					25 x 20	0.50	22 x 30	0.52	25 x 25	0.56	22 x 30	0.56	25 x 30	0.55
					20 x 30	0.45					25 x 25	0.56	30 x 25	0.55
													20 x 40	0.53
100			20 x 30	0.45	22 x 30	0.70	20x x35	0.56	22 x 35	0.62	20 x 35	0.58	22 x 40	0.64
					25 x 25	0.70	22 x 30	0.58	25 x 30	0.65	22 x 30	0.63	25 x 30	0.60
					20 x 30	0.51	25 x 25	0.57	20 x 35	0.60	25 x 25	0.63	30 x 25	0.65
					22 x 25	0.53			25 x 25	0.61				
									22 x 30	0.62				
120	22 x 20	0.60	20 x 30	0.54	22 x 35	0.61	20 x 40	0.66	22 x 35	0.70	20 x 45	0.71	22 x 45	0.70
			22 x 25	0.56	25 x 30	0.62	22 x 35	0.68	25 x 30	0.70	22 x 35	0.73	25 x 35	0.70
					30 x 25	0.62	25 x 30	0.68	30 x 25	0.73	25 x 30	0.72	30 x 30	0.70
					20 x 35	0.59			20 x 40	0.71	30 x 25	0.75	35 x 25	0.70
					22 x 30	0.61								
					25 x 25	0.62								
150	22 x 25	0.65	20 x 35	0.64	22 x 40	0.73	22 x 40	0.79	22 x 40	0.80	22 x 45	0.86	22 x 50	0.80
	20 x 25	0.71	22 x 30	0.66	25 x 30	0.73	25 x 30	0.78	25 x 30	0.85	25 x 35	0.83	25 x 40	0.80
			25 x 25	0.65	30 x 25	0.73	30 x 25	0.75	25 x 35	0.80	30 x 25	0.83	30 x 30	0.75
					20 x 40	0.70			30 x 30	0.79			35 x 25	0.75
					22 x 35	0.73			35 x 25	0.79				
									30 x 25	0.79				
180	22 x 25	0.80	20 x 40	0.75	22 x 45	0.83	22 x 45	0.89	25 x 40	0.95	22 x 50	1.02	25 x 45	0.85
	25 x 20	0.75	22 x 35	0.78	25 x 35	0.8	25 x 35	0.86	30 x 30	0.92	25 x 40	0.94	30 x 35	0.85
	20 x 30	0.82	25 x 30	0.71	30 x 30	0.8	30 x 30	0.88	22 x 45	0.95	30 x 30	0.95	35 x 30	0.85
					22 x 40	0.83			22 x 50	0.95	35 x 25	0.90		
					25 x 30	0.8			22 x 35	0.92				
					30 x 25	0.81								
220	22 x 30	0.95	22 x 40	0.89	22 x 50	0.94	22 x 50	1.01	25 x 45	1.05	25 x 45	1.13	25 x 50	1.00
	25 x 25	0.95	25 x 30	0.85	25 x 40	0.92	25 x 40	1.00	30 x 35	1.05	30 x 35	1.09	30 x 40	1.00
	20 x 35	0.95	30 x 25	0.83	30 x 30	0.98	30 x 30	1.00	35 x 30	1.10	35 x 30	1.01	35 x 30	1.00
					35 x 25	0.98			22 x 50	1.08			30 x 35	1.04
					22 x 45	0.94			25 x 40	1.05				
					25 x 35	0.92			30 x 30	1.10				
270	22 x 35	1.11	22 x 45	1.01	25 x 45	1.05	25x x45	1.13	25 x 50	1.20	25 x 50	1.37	30 x 45	1.15
	25 x 30	1.15	25 x 35	0.98	30 x 35	1.03	30 x 40	1.14	30 x 40	1.20	30 x 40	1.25	35 x 35	1.15
	30 x 25	1.15	30 x 30	1.01	35 x 30	1.03	35 x 30	1.10	35 x 35	1.20	35 x 35	1.25		
	20 x 40	1.08			22 x 50	1.07			25 x 35	1.20				
					25 x 40	1.05			35 x 30	1.18				
					30 x 30	1.03								
330	22 x 40	1.25	22 x 50	1.14	30 x 40	1.18	30 x 45	1.31	30 x 45	1.40	30 x 45	1.49	30 x 50	1.40
	25 x 30	1.20	25 x 40	1.12	35 x 35	1.18	35 x 35	1.32	35 x 35	1.35	35 x 35	1.42	35 x 40	1.40
	30 x 25	1.25	30 x 35	1.21	25 x 45	1.24			30 x 40	1.40				
					30 x 35	1.24			35 x 30	1.33				
					35 x 30	1.18								
390	22 x 45	1.41	25 x 45	1.31	30 x 45	1.39	30 x 50	1.48	30 x 50	1.55	30 x 50	1.67	35 x 45	1.55
	25 x 35	1.42	30 x 35	1.30	35 x 35	1.39	35 x 40	1.48	35 x 40	1.55	35 x 40	1.61		
	30 x 30	1.42	35 x 30	1.23	25 x 50	1.38								
					30 x 40	1.39								
470	22 x 50	1.55	30 x 40	1.53	35 x 40	1.70	35 x 40	1.76	30 x 50	1.75	35 x 45	1.86	35 x 50	1.70
	25 x 40	1.55	35 x 35	1.47	30 x 45	1.50	35 x 50	1.95	35 x 45	1.75			35 x 45	1.70
	30 x 30	1.55			35 x 35	1.50			35 x 40	1.75				
	35 x 25	1.55												
560	25 x 45	1.80	30 x 45	1.65	35 x 45	1.69			35 x 45	1.90				
	30 x 35	1.80	35 x 40	1.66	30 x 50	1.75			35 x 50	1.90				
	35 x 30	1.80			35 x 40	1.69								
680	25 x 50	1.95	35 x 45	1.96	35 x 45	1.96			35 x 50	1.95			35 x 50	2.15
	30 x 40	2.00											35 x 60	2.15
	35 x 35	1.96												
	35 x 30	1.96												
820	30 x 45	2.15	35 x 50	2.19										
	35 x 35	2.10												
1000	35 x 40	2.30												
	30 x 50	2.64												
1200	35 x 45	2.88												

Note : *1. D x L : mm

*2. Ripple Current : (A r.m.s 105°C / 120Hz)

Miniature Size Aluminum Electrolytic Capacitors

LV [For 105°C, 3000 Hours General]

For Printed Circuit Board High-Performance Aluminum Electrolytic Power Supply Input and Output Filter Capacitors

DESCRIPTION (LG Series 105°C 2000 Hours Assured)

LV type capacitors are combined with snaplock terminals for easy to mount on P.C. Board.

Highly reiable capacitors that withstand under high ripple current. Two to Four dimensions with same ratings. Aluminum case designed explosion-proof vent.

Best for switching power supplies.

ELECTRICAL CHARACTERISTICS

Operating Temperature Range	-40 to +105°C							-25 to+105°C				
Rated Voltage Range	10 to 100VDC							160 to 450VDC				
Nominal Capacitance Range	47 to 56000μF											
Capacitance Tolerance	±20% (At 25°C,120Hz)											
Leakage Current	$I = 3\sqrt{CV}$ (μA) after 5 minutes application of rated working voltage at +20°C											
Dissipation Factor (tanδ)	Rate Voltage (V)	10	16	25	35	50	63	80	100	160	250	315~450
	D.F (%)	55	50	45	40	35	30	25	20	15	15	25
	For capacitance value > 33000μF, add following calculated value : (rated capacitance) - 33000μF X 0.1 / 10000μF											
Low Temperature Characteristics (120Hz)	Rated Voltage (V)	16~25		35		50		63~100		160		450
	Z(-25°C) / Z(20°C)	6		6		4		3		8		8
	Z(-40°C) / Z(20°C)	15		10		8		6		-		-
High Temperature Loading	Test conditions After 3000 hours application of rated voltage at +105°C the capacitor shall meet the following limits Post test requirements at +20°C Leakage current : ≤ Initial specified valus Capacitance Change : within ±20% of the Inital measured value tan δ : ≤ 200% of initial specified value											
Shelf Life 25°C	The following specifications shall be satisfied when the capacitor are restored to after exposing them for 1000 hours at 105°C without voltage applied. Capacitance Change ≤ ±20% of the Inital Value D.F ≤ 200% of the Intial Specitied Value Leakage Current ≤ 200% of Initial Speciffied Value											

MULTIPLIER FOR RIPPLE CURRENT

Frequency coefficient

Frequency(Hz)	60	120	1K	10~50K
160~250V	0.8	1.0	1.15	1.18
315~450V	0.8	1.0	1.10	1.15

Temperature coefficient

Temperature(°C)	20~45	65	85	105
Factor	2-10	1.89	1.52	1.0

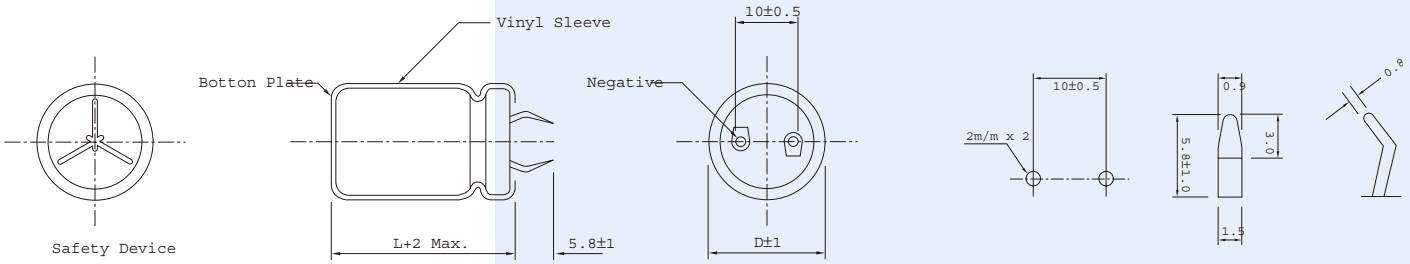
Pb-free

RoHS COMPLIANT

DIAGRAM OF DIMENSIONS

Unit : mm

Location of P.C.B. Holes



CASE SIZE OF STANDARD PRODUCTS AND PERMISSIBLE RIPPLE CURRENT

CAP. (μF)	RATED VOLTAGE WV											
	10		16		25		35		50		63	
	Size	Ripple	Size	Ripple	Size	Ripple	Size	Ripple	Size	Ripple	Size	Ripple
1000											20 x 25	1.10
1200											20 x 30	1.20
											22 x 25	1.20
1500									20 x 25	1.15	20 x 35	1.47
											22 x 30	1.47
									20 x 30	1.39	20 x 35	1.58
1800									22 x 25	1.34	22 x 30	1.58
											25 x 25	1.52
									20 x 35	1.60	20 x 40	1.80
2200									22 x 30	1.60	22 x 35	1.82
											25 x 30	1.75
							20 x 25	1.29	20 x 35	1.73	22 x 40	2.07
2700									22 x 30	1.70	25 x 35	2.11
									25 x 25	1.70	30 x 25	1.72
							20 x 30	1.57	20 x 40	1.97	22 x 45	2.33
3300							22 x 25	1.45	22 x 35	1.97	25 x 35	2.27
									25 x 30	1.88	30 x 30	2.24
					20 x 25	1.58	20 x 35	1.78	22 x 40	2.22	25 x 40	2.51
3900							22 x 30	1.69	25 x 30	2.20	30 x 35	2.55
									30 x 25	1.95		
					20 x 30	1.65	20 x 40	2.02	22 x 45	2.43	25 x 50	2.91
4700					22 x 25	1.61	22 x 35	2.02	25 x 35	2.43	30 x 40	2.86
							25 x 25	1.62	30 x 30	2.25	35 x 30	2.80
			20 x 25	1.68	20 x 35	1.85	22 x 35	2.13	22 x 50	2.75	30 x 40	3.22
5600					22 x 30	1.80	25 x 30	2.00	25 x 40	2.72	35 x 35	3.20
									30 x 30	2.64		
	20 x 25	1.31	20 x 30	1.80	20 x 40	2.11	22 x 40	2.41	25 x 45	3.30	30 x 50	3.65
6800			22 x 25	1.75	22 x 35	2.09	25 x 35	2.31	30 x 35	3.30	35 x 40	3.65
					25 x 25	1.87	30 x 25	2.31	35 x 30	3.25		
	20 x 30	1.59	20 x 35	2.08	22 x 40	2.31	22 x 50	2.85	30 x 40	3.60	35 x 45	4.04
8200			22 x 30	2.00	25 x 30	2.34	25 x 40	2.73	35 x 35	3.60		
					30 x 25	2.16	30 x 30	2.75				
	20 x 30	1.88	20 x 40	2.15	22 x 45	2.65	25 x 45	3.05	30 x 50	4.05	35 x 50	4.48
10000	22 x 25	1.77	22 x 30	2.10	25 x 35	2.61	30 x 35	3.05	35 x 40	4.04		
			25 x 25	2.05	30 x 30	2.61						
	20 x 35	2.18	22 x 35	2.31	22 x 50	2.80	25 x 50	3.37	35 x 45	4.56		
12000	22 x 30	2.10	25 x 30	2.30	25 x 40	2.81	30 x 40	3.23				
	25 x 25	1.94			30 x 30	2.74	35 x 30	3.19				
	20 x 40	2.27	22 x 40	2.68	25 x 45	3.27	30 x 45	3.75	35 x 50	4.77		
15000	22 x 35	2.23	25 x 35	2.58	30 x 35	3.13						
	25 x 30	2.10	30 x 25	2.30	35 x 30	3.26	30 x 30	3.67				
	22 x 40	2.41	22 x 50	3.20	30 x 40	3.56	30 x 40	4.37				
18000	25 x 30	2.34	25 x 40	3.16	35 x 35	3.84						
	30 x 25	2.25	30 x 30	2.57								
	22 x 45	2.58	25 x 45	3.36	30 x 45	4.04	35 x 45	4.92				
22000	25 x 35	2.54	30 x 30	2.98	35 x 35	3.75						
	30 x 30	2.50	35 x 30	3.25								
	22 x 50	3.17	25 x 50	3.85	35 x 45	4.74						
27000	25 x 40	3.07	30 x 35	3.30								
	30 x 30	2.95	35 x 35	3.93								
	25 x 45	3.39	30 x 40	3.80	35 x 50	5.50						
33000	30 x 35	3.33	35 x 35	4.27								
	35 x 30	3.21										
39000	30 x 40	3.70	30 x 45	4.30								
	35 x 35	3.68	35 x 40	4.80								
47000	30 x 45	4.22	30 x 50	4.81								
	35 x 40	4.16	35 x 45	5.53								
56000	35 x 50	5.00										

Note : *1. D x L : mm

*2. Ripple Current : (A r.m.s 105°C / 120Hz)

CASE SIZE OF STANDARD PRODUCTS AND PERMISSIBLE RIPPLE CURRENT

CAP. (μF)	RATED VOLTAGE WV											
	80		100		160		180		200		220	
	Size	Ripple	Size	Ripple	Size	Ripple	Size	Ripple	Size	Ripple	Size	Ripple
180											20 x 25	0.81
220							20 x 25	0.81	20 x 25	0.83	20 x 30	0.94
									22 x 25	0.80	22 x 25	0.94
270					20 x 25	0.87	20 x 30	0.95	20 x 30	0.97	20 x 35	1.10
							22 x 25	0.97	22 x 25	0.99	22 x 30	1.09
					20 x 30	1.02	20 x 35	1.09	20 x 35	1.17	20 x 40	1.18
330					22 x 25	1.03	22 x 30	1.13	22 x 30	1.20	22 x 35	1.24
									25 x 25	1.20	25 x 25	1.14
					20 x 35	1.15	20 x 35	1.28	20 x 40	1.27	20 x 45	1.33
390					22 x 30	1.17	22 x 30	1.32	22 x 35	1.30	22 x 35	1.30
							25 x 25	1.33	25 x 30	1.34	25 x 25	1.26
					20 x 40	1.25	22 x 40	1.34	22 x 40	1.44	22 x 40	1.41
470					22 x 30	1.28	22 x 35	1.39	25 x 30	1.44	25 x 30	1.39
					25 x 25	1.29	25 x 30	1.43	30 x 25	1.48	30 x 25	1.37
			20 x 25	0.95	22 x 35	1.45	22 x 40	1.56	22 x 45	1.60	22 x 45	1.60
560					25 x 30	1.49	25 x 30	1.53	25 x 35	1.60	25 x 35	1.56
							30 x 25	1.56	30 x 30	1.60	30 x 30	1.61
											35 x 25	1.52
			20 x 30	1.15	22 x 40	1.64	22 x 45	1.76	22 x 50	1.75	25 x 40	1.75
680			22 x 25	1.09	25 x 35	1.70	25 x 35	1.76	25 x 40	1.76	30 x 35	1.76
					30 x 25	1.63	30 x 30	1.74	30 x 30	1.74	35 x 30	1.72
	20 x 25	1.04	20 x 35	1.31	22 x 45	1.85	22 x 50	1.97	25 x 45	2.10	25 x 45	1.97
820			22 x 30	1.32	20 x 40	1.92	25 x 40	1.99	30 x 35	2.11	30 x 40	2.06
					30 x 30	1.91	30 x 30	1.93	35 x 30	2.10	35 x 30	1.95
	20 x 30	1.24	20 x 35	1.43	25 x 45	2.17	25 x 45	2.24	25 x 50	2.36	30 x 45	2.44
1000	22 x 25	1.19	22 x 30	1.47	30 x 35	2.19	30 x 35	2.24	30 x 40	2.40	35 x 35	2.20
			25 x 25	1.45			35 x 30	2.20	35 x 35	2.30		
	20 x 35	1.43	20 x 40	1.61	25 x 50	2.43	30 x 40	2.53	30 x 45	2.69	35 x 40	2.37
1200	22 x 30	1.44	22 x 35	1.69	30 x 40	2.48	35 x 35	2.54	35 x 35	2.53		
			25 x 30	1.68	35 x 30	2.25						
	20 x 35	1.57	22 x 40	1.97	30 x 45	2.82	30 x 50	3.03	35 x 40	2.97	35 x 45	2.64
1500	22 x 30	1.59	25 x 35	1.98	35 x 35	2.62	35 x 40	2.91				
	25 x 25	1.59	30 x 25	1.95								
	20 x 40	1.77	22 x 45	2.23	30 x 50	3.13	35 x 45	3.25	35 x 45	3.45		
1800	22 x 35	1.79	25 x 40	2.20	35 x 40	2.97						
	25 x 30	1.71	30 x 30	2.20								
	22 x 40	2.03	25 x 45	2.53	35 x 45	3.34	35 x 50	3.62				
2200	25 x 35	1.98	30 x 35	2.55								
	30 x 25	1.98	35 x 30	2.50								
	22 x 45	2.39	25 x 50	2.82								
2700	25 x 40	2.35	30 x 40	2.86								
	30 x 30	2.35	35 x 35	2.89								
	25 x 45	2.64	30 x 45	3.30								
3300	30 x 35	2.61	35 x 35	3.25								
	35 x 30	2.47										
	25 x 50	2.92	30 x 50	3.60								
3900	30 x 40	2.82	35 x 40	3.67								
	35 x 30	2.97										
	30 x 45	3.34	35 x 45	3.80								
4700	35 x 35	3.38										
	30 x 50	3.80	35 x 50	4.05								
5600	35 x 40	3.80										
6800	35 x 45	3.90										
8200	35 x 50	4.20										

Note : *1. D x L : mm

*2. Ripple Current : (A r.m.s 105°C / 120Hz)

CASE SIZE OF STANDARD PRODUCTS AND PERMISSIBLE RIPPLE CURRENT

CAP. (μF)	RATED VOLTAGE WV													
	250		315		350		385		400		420		450	
	Size	Ripple	Size	Ripple	Size	Ripple	Size	Ripple	Size	Ripple	Size	Ripple	Size	Ripple
47													20 x 25	0.36
56							20 x 25	0.37	20 x 25	0.40	20 x 25	0.40	20 x 30	0.41
													22 x 25	0.42
					20 x 25	0.41	20 x 30	0.44	20 x 30	0.48	20 x 30	0.48	20 x 35	0.47
68							22 x 25	0.45	22 x 25	0.49	22 x 25	0.50	22 x 30	0.50
													25 x 25	0.50
			20 x 25	0.39	20 x 30	0.45	20 x 30	0.50	20 x 30	0.54	20 x 35	0.53	20 x 40	0.53
82							22 x 30	0.52	22 x 30	0.56	22 x 30	0.56	22 x 35	0.56
											25 x 25	0.56	25 x 30	0.57
			20 x 30	0.45	20 x 30	0.51	20 x 35	0.56	20 x 35	0.60	20 x 35	0.58	22 x 40	0.64
100					22 x 25	0.53	22 x 30	0.58	22 x 30	0.62	22 x 30	0.63	25 x 30	0.63
							25 x 25	0.57	25 x 25	0.61	25 x 25	0.63	30 x 25	0.67
			20 x 30	0.54	20 x 35	0.59	20 x 40	0.66	20 x 40	0.71	20 x 45	0.71	22 x 45	0.72
120			22 x 25	0.56	22 x 30	0.61	22 x 35	0.68	22 x 35	0.73	22 x 35	0.73	25 x 35	0.71
					25 x 25	0.62	25 x 30	0.68	25 x 30	0.73	25 x 30	0.72	30 x 30	0.77
											30 x 25	0.75		
	20 x 25	0.71	20 x 35	0.64	20 x 40	0.70	22 x 40	0.79	22 x 40	0.85	22 x 45	0.86	22 x 50	0.80
150			22 x 30	0.66	22 x 35	0.73	25 x 30	0.78	25 x 35	0.85	25 x 35	0.83	25 x 40	0.82
			25 x 25	0.65	25 x 30	0.73	30 x 25	0.75	30 x 25	0.79	30 x 25	0.83	30 x 30	0.85
	20 x 30	0.82	20 x 40	0.75	22 x 40	0.83	22 x 45	0.89	22 x 45	0.95	22 x 50	1.02	25 x 45	0.93
180	22 x 25	0.84	22 x 35	0.78	25 x 30	0.80	25 x 35	0.86	25 x 35	0.92	25 x 40	0.94	30 x 35	0.94
			25 x 30	0.71	30 x 25	0.81	30 x 30	0.88	30 x 30	0.95	30 x 30	0.95		
											35 x 25	0.90		
	20 x 35	0.95	22 x 40	0.89	22 x 45	0.94	22 x 50	1.01	22 x 50	1.08	25 x 45	1.13	25 x 50	1.05
220	22 x 30	0.97	25 x 30	0.85	25 x 35	0.92	25 x 40	1.00	25 x 40	1.05	30 x 35	1.09	30 x 40	1.10
	25 x 25	0.99	30 x 25	0.83	30 x 30	0.98	30 x 30	1.00	30 x 35	1.24	35 x 30	1.05	35 x 30	1.01
	20 x 40	1.08	22 x 45	1.01	22 x 50	1.07	25 x 45	1.13	25 x 50	1.29	25 x 50	1.37	30 x 45	1.25
270	22 x 35	1.11	25 x 35	0.98	25 x 40	1.05	30 x 40	1.14	30 x 40	1.30	30 x 40	1.25	35 x 35	1.26
	25 x 30	1.15	30 x 30	1.01	30 x 30	1.03	35 x 30	1.10	35 x 30	1.18	35 x 35	1.25		
	22 x 40	1.26	22 x 50	1.14	25 x 45	1.24	30 x 45	1.31	30 x 45	1.47	30 x 45	1.49	30 x 50	1.42
330	25 x 30	1.26	25 x 40	1.12	30 x 35	1.24	35 x 35	1.32	35 x 35	1.41	35 x 35	1.42	35 x 40	1.44
	30 x 25	1.31	30 x 35	1.21	35 x 30	1.18								
	22 x 45	1.41	25 x 45	1.31	25 x 50	1.38	30 x 50	1.48	30 x 50	1.64	30 x 50	1.67	35 x 45	1.61
390	25 x 35	1.42	30 x 35	1.30	30 x 40	1.39	35 x 40	1.48	35 x 40	1.59	35 x 40	1.61		
	30 x 30	1.50	35 x 30	1.23	35 x 35	1.39								
	22 x 50	1.58	30 x 40	1.53	30 x 45	1.57	35 x 45	1.76	35 x 45	1.87	35 x 45	1.86	30 x 50	1.80
470	25 x 40	1.61	35 x 35	1.47	35 x 35	1.50							35 x 50	1.80
	30 x 30	1.61												
	25 x 45	1.80	30 x 45	1.65	30 x 50	1.75	35 x 50	1.95	35 x 50	2.09				
560	30 x 35	1.84	35 x 40	1.66	35 x 40	1.69								
	25 x 50	2.03	35 x 45	1.96	35 x 45	1.96			30 x 50	1.95				
680	30 x 40	2.09												
	35 x 30	1.96												
	30 x 45	2.35	35 x 50	2.19										
820	35 x 35	2.26												
	30 x 50	2.64												
1000	35 x 40	2.57												
1200	30 x 45	2.88												

Note : *1. D x L : mm

*2. Ripple Current : (A r.m.s 105°C / 120Hz)

Surface Mount
Aluminum Electrolytic

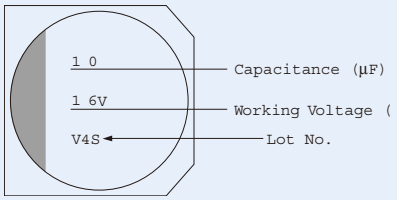
CA Series

FEATURE

For General Purposes Series with 85°C 2000 Hours

Suitable for AV (TV, Video, Audio), Personal Computer, Home Appliance

MARKING

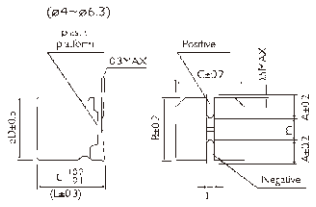


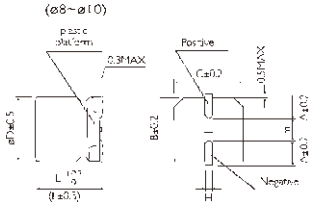
Pb-free

RoHS
COMPLIANT

DIMENSIONS

Unit : mm





SIZE CODE	Dø	L	A	H	I	W	P	K
B	4.0	5.4	4.3	5.5 Max.	1.8	0.65 ± 0.1	1.0	$0.35^{+0.15}_{-0.20}$
C	5.0	5.4	5.3	6.5 Max.	2.2	0.65 ± 0.1	1.5	$0.35^{+0.15}_{-0.20}$
D	6.3	5.4	6.6	7.8 Max.	2.6	0.65 ± 0.1	2.2	$0.35^{+0.15}_{-0.20}$
E	8.0	6.5	8.3	9.4 Max.	3.4	0.65 ± 0.1	2.2	$0.35^{+0.15}_{-0.20}$
F	8.0	10.5	8.3	10.0 Max.	3.4	0.90 ± 0.2	3.1	0.70 ± 0.20
G	10.0	10.5	10.3	12.0 Max.	3.5	0.90 ± 0.2	4.6	0.70 ± 0.20
H	6.3	7.7	6.6	0.8 Max.	2.6	0.65 ± 0.1	2.2	$0.35^{+0.15}_{-0.20}$

SPECIFICATION

ITEM	CHARACTERISTIC
Operation Temperature Range	-40 to +85°C
Rated Working Voltage Range	4 to 100 V.DC
Rated Capacitqnce	Range = 0.1 ~ 1500μF
Capacitance Tolerance	±20% (120Hz / +25°C)
Leakage Current (25°C)	Polarized : I ≤ 0.01CV or 3 (μA) Whichever is greater after 2 minutes application of DC rated working voltage at 25°C. I : Leakage Current (μA) C : Rated Capacitance (μF) V : Working Voltage (V)
Dissipation Factor (tanδ) (120Hz / +25°C)	Polarized ( ) : D.F of Downsized

W V (V)	4	6.3	10	16	25	35	50	63	100
D.F	40	35	26	20	16	14	14	18	18

Low Temperature Stability — Impedance Ratio at 120. Hz

W V (V)		4	6.3	10	16	25	35	50	63	100
Z(-25°C)	<ø8	7	4	3	2	2	2	2	3	3
/Z(+20°C)	≥ø8	7	5	4	3	2	2	2	3	3
Z(-40°C)	<ø8	15	8	8	4	4	3	3	4	4
/Z(+20°C)	≥ø8	15	10	8	6	4	3	3	4	4

Shelf Life	At +85°C no voltage application after 1000 hours and then through the aging treatment, the capacitor shall meet limits for load life characteristics.

CASE SIZE & MAX RIPPLE CURRENT

POLARIZED — Max. Ripple Current (mA) r.m.s. (120Hz / +85°C)

μF	4		6.3		10		16		25		35		50		63		100	
0.1													4 x 5.4	1.0	4 x 5.4	1.0		
0.22													4 x 5.4	2.0	4 x 5.4	2.3		
0.33													4 x 5.4	2.8	4 x 5.4	3.5		
0.47													4 x 5.4	4.0	4 x 5.4	5.0		
1.0													4 x 5.4	8.4	4 x 5.4	10		
2.2													4 x 5.4	13	4 x 5.4	15		
3.3													4 x 5.4	16	4 x 5.4	20	6.3 x 7.7 8 x 6.2	28 50
4.7							4 x 5	23	4 x 5.4	16	4 x 5.4	18	4 x 5.4	18	4 x 5.4	23	6.3 x 7.7 8 x 10.5	35 80
10							4 x 5.4	23	4 x 5.4 5 x 5.4	21 27	4 x 5.4	24	5 x 5.4	30	6.3 x 5.4 8 x 6.2	34 35	6.3 x 7.7 8 x 10.5	50 85
22			4 x 5.4	28	4 x 5.4 5 x 5.4	28 33	4 x 5.4 5 x 5.4	38 37	5 x 5.4 6.3 x 5.4	38 55	5 x 5.4	39	6.3 x 5.4 8 x 6.2	43 120	6.3 x 7.7 8 x 10.5	70 40	8 x 10.5 10 x 10.5	120 85
33	4 x 5.4	28	4 x 5.4 5 x 5.4	22 29	4 x 5.4 5 x 5.4	29 41	5 x 5.4 6.3 x 5.4	35 49	5 x 5.4 6.3 x 5.4	46 52	6.3 x 5.4 8 x 6.2	53 130	8 x 10.5 6.3 x 7.7 8 x 6.2	110 85 65	8 x 10.5	45	10 x 10.5	90
47	4 x 5.4	33	4 x 5.4 5 x 5.4	40 45	5 x 5.4 6.3 x 5.4	43 43	5 x 5.4 6.3 x 5.4	39 58	6.3 x 5.4	60	6.3 x 7.7 8 x 6.2	70 165	6.3 x 7.7 8 x 10.5 10 x 10.5	90 110 130	8 x 10.5	170		
56	5 x 5.4	42	5 x 5.4 6.3 x 5.4	46 52	5 x 5.4 6.3 x 5.4	50 57	5 x 5.4 6.3 x 5.4	57 63	6.3 x 7.7	65	6.3 x 7.7	80	8 x 10.5	150	8 x 10.5	230		
100	5 x 5.4	56	5 x 5.4 6.3 x 5.4	47 70	5 x 5.4 6.3 x 5.4	54 70	6.3 x 5.4 8 x 6.2	70 200	8 x 10.5 6.3 x 7.7 8 x 6.2	180 130 91	6.3 x 7.7 8 x 10.5 10 x 10.5	120 140 210	8 x 10.5	181	8 x 10.5 10 x 10.5	280 60		
150	6.3 x 5.4	79	6.3 x 5.4	71	6.3 x 7.7	76	6.3 x 7.7	135	8 x 10.5	192	8 x 10.5	214	10 x 10.5	238				
220	6.3 x 5.4	96	6.3 x 7.7	95	6.3 x 7.7 8 x 6.2	150 250	6.3 x 7.7 8 x 10.5	150 215	8 x 10.5 10 x 10.5	140 250	8 x 10.5 10 x 10.5	246 265	10 x 10.5	289				
330	6.3 x 7.7	152	6.3 x 7.7 8 x 6.2	150 300	8 x 10.5	240	8 x 10.5 10 x 10.5	320 380	8 x 10.5 10 x 10.5	284 340	10 x 10.5	324						
470	6.3 x 7.7	200	8 x 10.5	265	8 x 10.5 10 x 10.5	290 400	8 x 10.5	307	10 x 10.5	393								
680	8 x 10.5	284	8 x 10.5	318	10 x 10.5	374	10 x 10.5	396										
1000	8 x 0.5	344	8 x 10.5	372	10 x 10.5	374	10 x 10.5	454										
1500	10 x 10.5	347	10 x 10.5	489														

Surface Mount
Aluminum Electrolytic

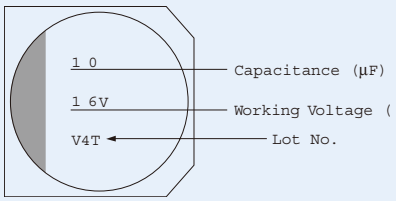
CB Series

FEATURE

For General Purposes Series with 105°C 1000 Hours

Suitable for AV (TV, Video, Audio), Personal Computer, Home Appliance

MARKING

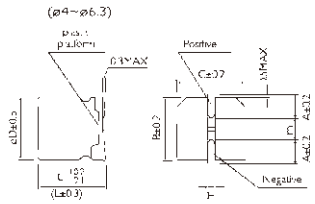


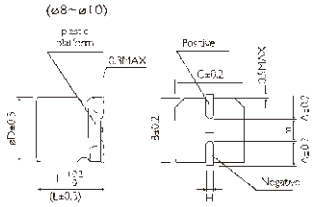
Pb-free

RoHS
COMPLIANT

DIMENSIONS

Unit : mm





SIZE CODE	Dø	L	A	H	I	W	P	K
B	4.0	5.4	4.3	5.5 Max.	1.8	0.65 ± 0.15	1.0	0.35 ± 0.15
C	5.0	5.4	5.3	6.5 Max.	2.2	0.65 ± 0.15	1.5	0.35 ± 0.15
D	6.3	5.4	6.6	7.8 Max.	2.6	0.65 ± 0.15	2.2	0.35 ± 0.15
E	8.0	6.2	8.3	9.5 Max.	3.4	0.65 ± 0.15	2.2	0.35 ± 0.15
F	8.0	6.2	8.3	10.0 Max.	3.4	0.90 ± 0.2	3.1	0.70 ± 0.20
G	10.0	10.5	10.3	12.0 Max.	3.5	0.90 ± 0.2	4.6	0.70 ± 0.20
H	6.3	7.7	6.6	7.8 Max.	2.6	0.65 ± 0.1	2.2	0.35 ± 0.15

SPECIFICATION

ITEM	CHARACTERISTIC									
Operation Temperature Range	-40 to +105°C									
Rated Working Voltage Range	6.3 to 50V. DC									
Rated Capacitqnce	Range = 0.1 ~ 470μF									
Capacitance Tolerance	±20% (120Hz / +25°C)									
Leakage Current (25°C)	Polarized : I ≤ 0.01CV or 3 (μA)									
	Whichever is greater after 2 minutes application of DC rated working voltage at 25°C.									
	I : Leakage Current (μA) C : Rated Capacitance (μF) V : Working Voltage (V)									
Dissipation Factor (tanδ)	Polarized ( ) : D.F of Downsized									
(120Hz / +25°C)	W V (V)	4	6.3	10	16	25	35	50	63	100
	D.F.	35	30	24	20	16	14	12	18	18
Low Temperature Stability	Impedance Ratio at 120Hz									
	W V (V)	4	6.3	10	16	25	35	50	63	100
	Z(-25°C)/Z(+20°C)	7	4	3	2	2	2	2	3	3
	Z(-40°C)/Z(+20°C)	15	8	6	4	4	3	3	4	4
Load Life	After 1000 hours application of W V at 105°C, the capacitor shall meet following limits.									
	Capacitance Change	≤ ±20% of Initial Value								
	Dissipation Factor	≤ 200% of Initial Specified Value								
	Leakage Current	≤ Initial Specified Value								
Shelf Life	At +105°C no voltage application after 1000 hours and then through the aging treatment,									
	the capacitor shall meet limits for load life characteristics.									

CASE SIZE & MAX RIPPLE CURRENT

Max. Ripple Current (mA) r.m.s. (120Hz / +85°C)

POLARIZED

μF	4		6.3		10		16		25		35		50		63		100	
0.1													4 x 5.4	0.7				
0.22													4 x 5.4	1.6				
0.33													4 x 5.4	2.5				
0.47													4 x 5.4	3.5				
1.0													4 x 5.4	4				
2.2													4 x 5.4	11				
3.3											4 x 5.4	13	4 x 5.4	13			8 x 6.2	30
4.7									4 x 5.4	13	4 x 5.4	14	5 x 5.4	16			8 x 10.5	50
10									4 x 5.4	25	4 x 5.4	24	6.3 x 5.4	24	8 x 6.2	25	8 x 10.5	55
							4 x 5.4	18	5 x 5.4	20	5 x 5.4	21						
22			4 x 5.4	22			4 x 5.4	30	6.3 x 5.4	36	5 x 5.4	38	6.3 x 7.7	51	8 x 6.2	30	10 x 10.5	60
					5 x 5.4	25	5 x 5.4	27					8 x 6.2	70				
33	4 x 5.4	18	5 x 5.4	27	5 x 5.4	30	6.3 x 5.4	40	6.3 x 5.4	44	6.3 x 5.4	42	6.3 x 7.7	60	10 x 10.5	45	10 x 10.5	65
							8 x 6.2	84			8 x 6.2	84	8 x 10.5	91				
47	4 x 5.4	23	4 x 5.4	43	6.3 x 5.4	41	6.3 x 5.4	48	6.3 x 5.4	48	6.3 x 7.7	49	6.3 x 7.7	63				
			5 x 5.4	33					8 x 6.2	91	8 x 10.5	98	10 x 10.5	100	10 x 10.5	50		
100	5 x 5.4	42	6.3 x 5.4	50	6.3 x 5.4	53	6.3 x 5.4	60	6.3 x 7.7	91	8 x 10.5	155	8 x 10.5	155				
					8 x 6.2	110			8 x 10.5	130	10 x 10.5	160	10 x 10.5	120				
150	6.3 x 5.4	61	6.3 x 5.4	55	6.3 x 5.4	62	6.3 x 7.7	95	8 x 10.5	140	8 x 10.5	155	10 x 10.5	300				
220	6.3 x 5.4	68	6.3 x 7.7	105	6.3 x 7.7	105	6.3 x 7.7	105	8 x 10.5	175	10 x 10.5	300						
					8 x 10.5	160	10 x 10.5	210	10 x 10.5	190								
330	6.3 x 7.7	73	6.3 x 7.7	105	8 x 10.5	175	8 x 10.5	195										
			8 x 10.5	230			10 x 10.5	230	10 x 10.5	220								
470	6.3 x 7.7	105	8 x 10.5	170	8 x 10.5	210	8 x 10.5	310	10 x 10.5	220								
					10 x 10.5	270	10 x 10.5	340										
680	8 x 10.5	210	8 x 10.5	210	10 x 10.5	230	10 x 10.5	350										
1000	8 x 10.5	260	10 x 10.5	230														