



Aluminum Electrolytic Capacitors

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■ Type List for Miniature and Chip Type Aluminum Electrolytic Capacitors

★ : New product series ☆ : Extension product series
 ○ : Circle symbols apply to those capacitors with rated voltage of 250V or less.

Category	Series	Page	Applications	Feature								Category Temp. Range °C		Rated Voltage Range V.DC		Rated capacitance Range μF		Color of sleeve	JIS Configuration	Note					
				Thin and small Size	Reliability at 105°C					Low Impedance	For Audio	Anti-cleaning solvent	Reflow Soldering Resistance	Max.	Min.	Max.	Min.								
					1000hrs	2000hrs	3000hrs	5000hrs	10000hrs																
Poly-mer	★PVO	20	Conductive Polymer Chip															+105	-55	25	4	6.8 to 470	Silver	32	
Surface Mounting Type	RV2	23	5.5mm L	●														+85	-40	50	4	0.1 to 220	Silver	32	
	RV	24	Higher Capacitance Range															+85	-40	100	6.3	10 to 1000	Silver Brown	32	
	RV	25	Large size, Higher Capacitance Range															+85	-40	100	6.3	100 to 3300	Brown	32	
	RV3	26	High CV	●														+85	-40	50	6.3	4.7 to 330	Silver	32	
	RV4	27	4.5mm L	●														+85	-40	50	6.3	0.1 to 100	Silver	32	
	★RV5	28	High CV	●														+85	-40	100	6.3	2.2 to 1500	Silver Brown	32	
	RVB	30	Non Polarized	●														+85	-40	50	6.3	0.1 to 47	Silver	32	
	RVS	31	105°C, 5.5mm L	●	●													+105	-55	50	6.3	0.1 to 100	Silver	32	
	RVL	32	Long Life, 105°C, 6.0mm L	●	●													+105	-55	50	6.3	0.1 to 100	Silver	32	
	RVJ	33	105°C, Higher Capacitance			●												+105	-55	100	6.3	10 to 1000	Silver Brown	32	
	RVJ	34	105°C, Large size, Higher Capacitance Range				●											+105	-55	100	6.3	47 to 1000	Brown	32	
	RVH	35	105°C, Low Impedance			●			●									+105	-55	35	6.3	47 to 470	Brown	32	
	RVZ	36	105°C, Low Impedance			●			●									+105	-55	35	6.3	4.7 to 1500	Silver Brown	32	
	RVK	38	125°C, Higher Reliability				●											+125	-40	63	10	10 to 330	Brown	32	
	RVK	39	125°C, Large size, Higher Capacitance Range					●										+125	-40	6.3	10	100 to 1000	Brown	32	
	RT	40	Higher Capacitance, Vibration resistance			●												+85	-40	100	6.3	10 to 1000	Brown	32	
	RTJ	41	105°C, Higher Capacitance, Vibration resistance			●			●									+105	-55	100	6.3	10 to 470	Brown	32	
	RTH	42	105°C, Low Impedance, Vibration resistance				●											+105	-55	35	6.3	47 to 470	Brown	32	
RTK	43	125°C, Vibration resistance															+125	-40	63	10	10 to 330	Brown	32		
RYK	44	125°C, Horizontal type			●												+125	-40	63	6.3	56 to 820	Black	32		
Ultra-miniature Type	RC3	45	5mm L, Standard	●													+85	-40	50	4	0.1 to 470	Black Blue	04		
	R3S	46	5mm L, 105°C	●	●												+105	-55	50	6.3	0.1 to 100	Black	04		
	RB3	47	5mm L, Bipolar	●													+85	-40	50	6.3	0.1 to 47	Blue	04		
	RC2	48	7mm L, Standard	●													+85	-40	100	4	0.1 to 330	Blue	04		
	R2S	49	7mm L, 105°C	●	●												+105	-55	50	6.3	0.1 to 100	Black	04		
	RB2	50	7mm L, Bipolar	●													+85	-40	50	6.3	0.1 to 47	Blue	04		
Standard Type	RE3	51	Miniaturized Standard	●							○						+85	-40	450	6.3	0.1 to 22000	Blue	04		
	R2B	53	Bipolarity Standard														+85	-40	100	6.3	0.1 to 4700	Blue	04		
	★RJ5	54	105°C, Miniaturized, High CV	●	●												+105	-40	100	6.3	0.1 to 22000	Black	04		
	RJ4	56	105°C, Miniaturized	●	●							○					+105	-55	100	6.3	0.1 to 22000	Black	04		
High Reliability Type	RJ3	58	105°C, Low Impedance			●											+105	-55	100	6.3	0.1 to 15000	Black	04		
	RJJ	—	105°C, Low Impedance				●		●								+105	-55	100	6.3	0.47 to 15000	Black	04	*1	
	RJH	60	105°C, Extra Low Impedance				●		●								+105	-55	100	6.3	0.47 to 15000	Black	04		
	RJB	63	105°C, Low Impedance, Miniaturized				●		●								+105	-55	100	6.3	0.47 to 10000	Black	04		
	☆RJF	65	105°C, Extra Low Impedance, Miniaturized				●		●								+105	-40	50	6.3	22 to 6800	Black	04		
	☆RK	67	125°C, Longevity				●		●								+125	-40	63	10	47 to 3300	Black	04		
Special Type	RLB	69	Low-leakage Current														+85	-40	50	6.3	0.47 to 2200	Blue	04		
Large Capacitance Type	LA5	70	PCB Terminal, Snap-In Type	●													+85	-40	400	10	56 to 82000	Black	692	*2	
	LH7	72															+85	-25	450	—	47 to 470	Black	—	*2	
	L3J	—	105°C, Standard			●											+105	-40	200	10	150 to 22000	Black	692	*1,*2	
	LAG	74	High-Reliability, High Ripple	●	●					●							+105	-25	400	160	39 to 820	Black	692	*2	
	LAH	76	High-Reliability, Ultra-Miniaturized	●	●												+105	-25	450	16	56 to 47000	Black	692	*2	
	LAT	79	Super Miniaturization, High Ripple	●	●												+105	-25	400	160	82 to 2700	Black	692	*2	
	LAV	81	105°C, Compatible with VDE			●											+105	-25	250	—	82 to 1000	Black	692	*2	
	LUH	83	105°C, Durable against Over Voltage			●											+105	-25	400	200	68 to 1500	Black	692	*2	
	LAX	84	105°C, Ultra-Longevity	●			●										+105	-25	400	160	56 to 1800	Black	692	*2	

■ Type List for Large Aluminum Electrolytic Capacitors

Category	Series	Page	Applications	Feature							Category Temp. Range °C		Rated Voltage Range V.DC		Rated capacitance Range μF	Color of sleeve	JIS Configuration	Note			
				Thin and small Size	Reliability at 105°C					Low Impedance	For Audio	Anti-cleaning solvent	Reflow Soldering Resistance	Max.					Min.	Max.	Min.
					1000hrs	2000hrs	3000hrs	5000hrs	10000hrs												
For Audio	RVO	86	Chip Type (PURECAP)	•						•	•	+85	-40	50	6.3	0.1 to 1000	Silver Brown	32			
	★RVW	87	Chip Type 105°C (PURECAP)	•	•					•	•	+105	-40	50	6.3	0.1 to 1000	Silver Brown	32			
	RFS	88	High Grade (SILMIC II)							•		+85	-55	100	6.3	0.47 to 3300		04			
	ROS	89	High Grade (SILMIC)							•		+85	-40	100	16	2.2 to 4700		04			
	ROA	90	High Grade (Cerafine)							•		+85	-40	100	6.3	0.47 to 6800		04			
	ROB	91	Miniaturized Standard (TONEREX)							•		+85	-40	100	6.3	0.47 to 10000		04			
	R2O	92	Miniaturized Standard	•						•		+85	-40	100	6.3	0.47 to 15000		04			
	R2A	93	7mm L	•						•		+85	-40	50	4	0.1 to 330		04			
	R3A	94	5mm L	•						•		+85	-40	50	4	0.1 to 220		04			
	★RFO	95	Standard (PURECAP)							•		+85	-40	100	6.3	0.47 to 15000		04			
	RA2	96	Standard	•						•		+85	-40	100	6.3	0.47 to 15000		04			
	RA3	97	Miniaturized Standard	•						•		+85	-40	100	6.3	0.1 to 22000		04			
	RBD	98	Miniaturized Bipolar	•						•		+85	-40	100	6.3	0.1 to 4700		04			
LPO	99	For Audio(TONEREX)							•		+85	-40	100	16	680 to 10000		692	*2			

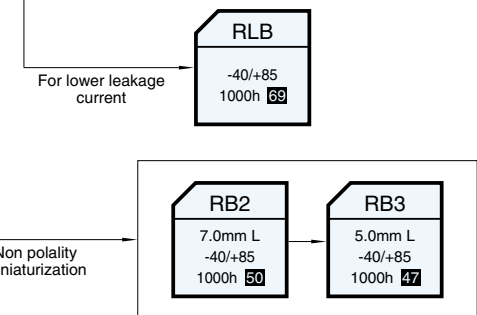
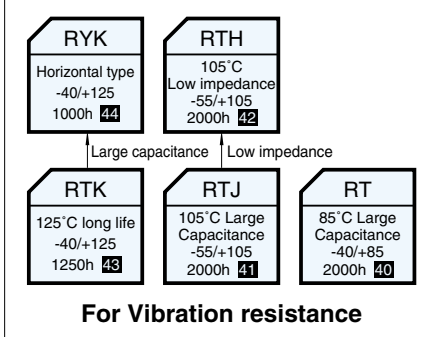
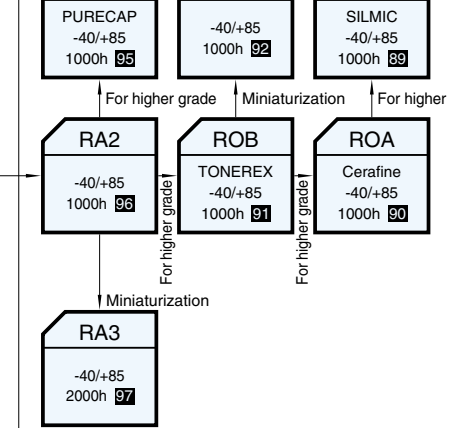
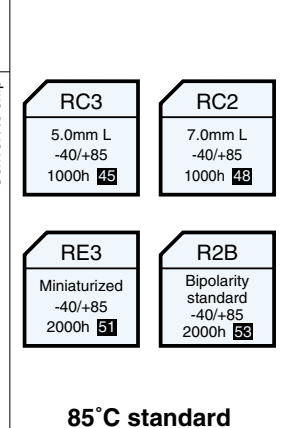
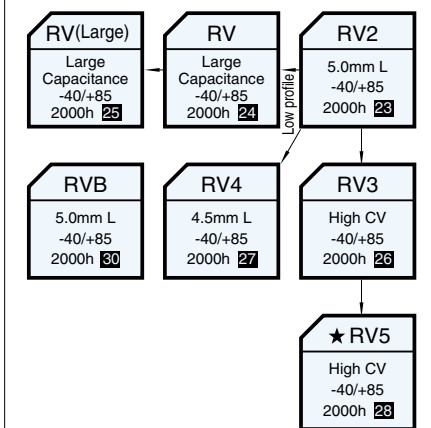
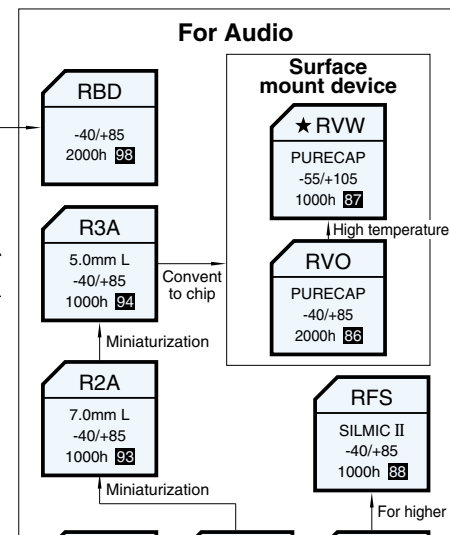
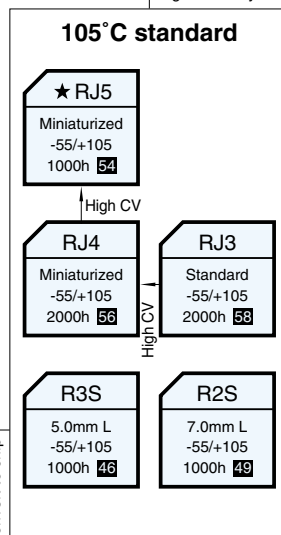
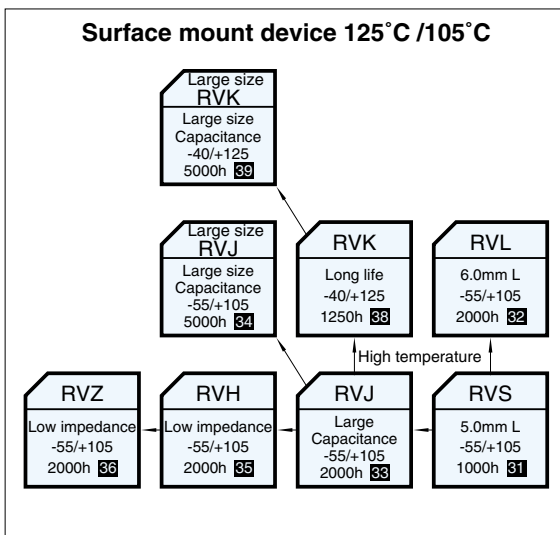
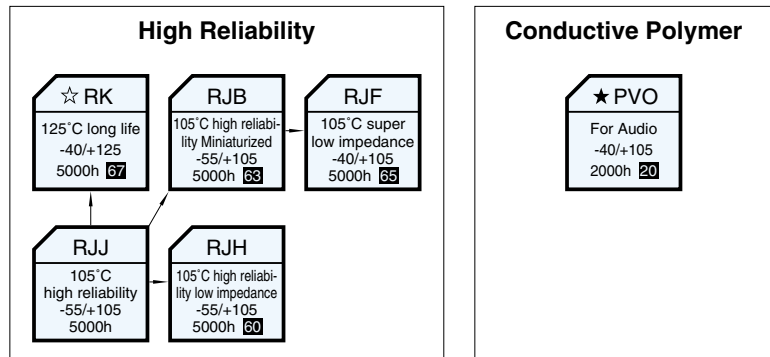
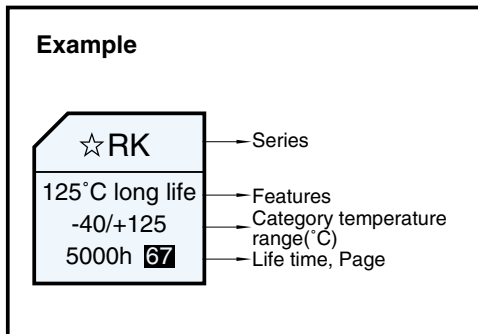
* Be sure to "Cautions for Using Aluminum Electrolytic Capacitors", before using these products.

*1 Please refer to our web-page about RJJ series and L3J series. (web-address <http://www.elna.co.jp/>)

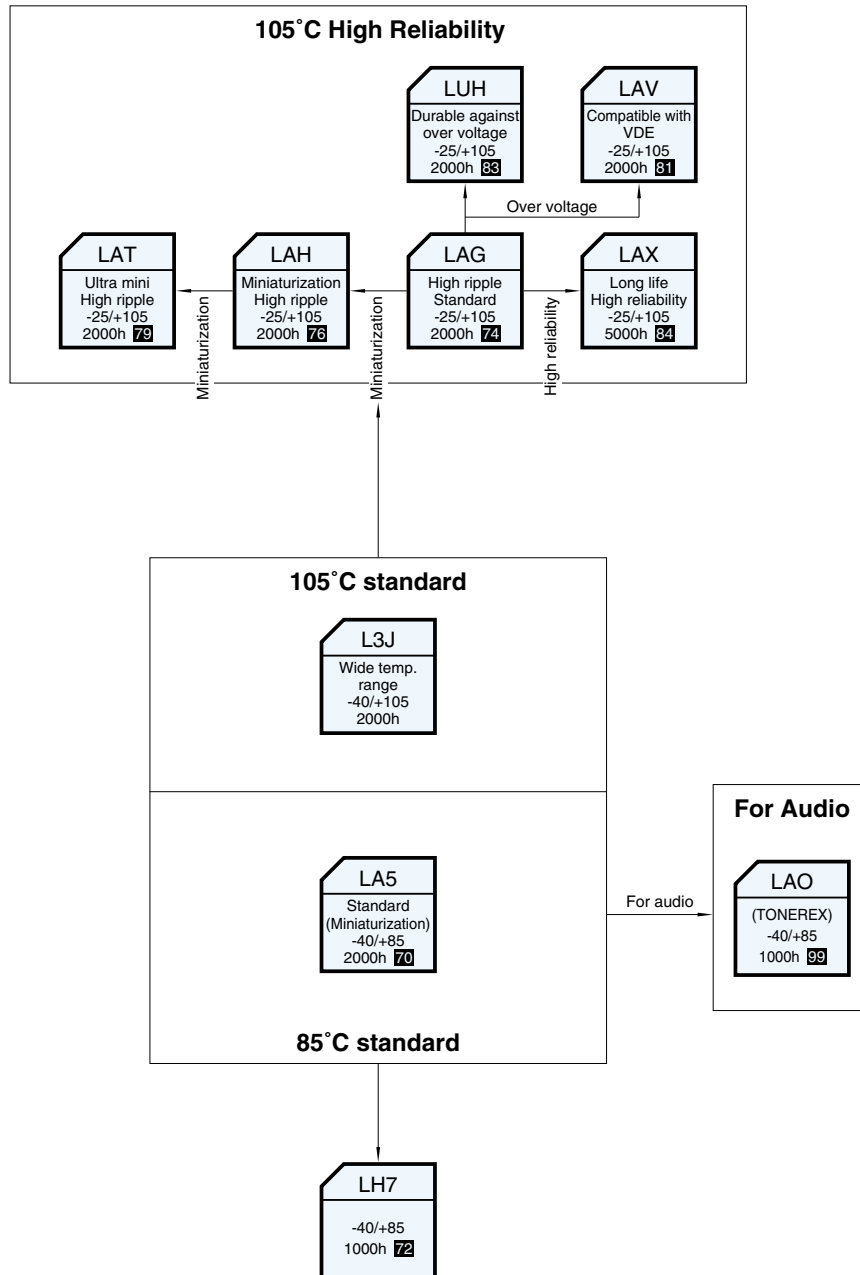
*2 There are overseas factory product only on above table.

Systematized Classification of Miniature and Chip Type Aluminum Electrolytic Capacitors

★ : New product series ☆ : Extension product series



■ Systematized Classification of Large Aluminum Electrolytic Capacitors



* There are overseas factory product only on this page.

■ Cautions for Using Aluminum Electrolytic Capacitors

Please read product specifications before using ELNA products.

The following cautions should be observed when using our aluminum electrolytic capacitors to assure their maximum stability and performance. When your application design conditions or operating conditions exceed the limit of the product specification, please contact us. If used under conditions beyond the limit of our specifications, it may cause defects such as short circuit, open circuit, leakage, explosion or combustion.

■ Cautions for usage

1. DC electrolytic capacitors are polarized.

If used with a wrong polarity, it creates an abnormal current resulting in a short circuit or damage to itself. Use DC bipolar electrolytic capacitors for use with uncertain or unknown polarity. DC capacitors cannot be used in AC circuits.

2. Use within the rated voltage.

If a voltage exceeding the rated voltage is applied, it may cause characteristic deterioration or damage due to the increased leakage current. When ripple current is loaded, make sure that the peak value of the ripple voltage does not exceed the rated voltage.

3. Do not use in a circuit which requires rapid charging or discharging.

If used in a circuit requiring rapid charging or discharging, it may cause characteristic deterioration or damage to itself due to the heat generated inside the capacitor. In such cases, contact us for our rapid charging/discharging capacitors.

4. Use within the rated ripple current.

If applied ripple current exceeds rated ripple current, the life of the capacitor may be shortened, or in an extreme case it gets destroyed due to its internal heat. Use high-ripple type capacitors for such circuits.

5. Changes in characteristics due to operating temperature.

The characteristics of an electrolytic capacitor will change with a change in the temperature. Such changes are temporary and the original characteristics will be restored at the original temperature (if the characteristics are not deteriorated by remaining at a high temperature for a long time). If used at a temperature exceeding the guaranteed temperature range, the capacitor may be damaged due to the increased leakage current. Pay attention to the capacitor temperature being affected by the ambient temperature of the unit, the temperature inside the appliance, the heat radiated by another hot component in the unit and the heat inside the capacitor itself due to the ripple current.

- The electrostatic capacitance is normally shown as the value at 20°C-120Hz. It increases as the temperature raises and decreases as it lowers.
- The tangent of loss angle ($\tan\delta$) is normally shown as the value at 20°C-120Hz. It decreases as the

ambient temperature gets high and increases as it gets low.

- The leakage current increases as the temperature gets high and decreases as it gets low.

6. Changes in the characteristics due to frequency.

The characteristics of an electrolytic capacitor will change according to the change in the operating frequency.

- The electrostatic capacity is normally shown as the value at 20°C-120Hz. It decreases as the frequency increases.
- The tangent of loss angle ($\tan\delta$) is normally shown as the value at 20°C-120Hz. It increases as the frequency gets high.
- The impedance is normally shown as the value at 100kHz 20°C. It increases as the frequency lowers.

7. Aluminum electrolytic capacitor life.

The life of an aluminum electrolytic capacitor terminates when it fails due to the deterioration in its electronic characteristics. Temperature and the ripple current since they especially affect the life. See chart on page.

8. Changes in aluminum electrolytic capacitors during storage.

After storage for a long period, whether unused or mounted on the appliance, the leakage current of an aluminum electrolytic capacitor will increase. This tendency is more prominent when the ambient temperature is high. If a capacitor has been stored for more than 2 years under normal temperature (shorter if high temperature) and it shows increased leakage current, a treatment by voltage application is recommended. Addition of a protective circuit in the design of the appliance is also recommended, considering the effect of the initial increased current.

9. Insulation between the capacitor case and the cathode terminal.

The capacitor case and the cathode terminal are connected through the electrolyte which has uncertain resistance. If a complete insulation of the case is necessary, add an insulator at assembly.

10. External sleeve.

During a preheating or a hardening of mounting adhesive may cause a sleeve cracked.

The capacitors are usually sleeved with poly vinyl-

chromaide or poly ethylene terephtharate for the indication purpose only. Please do not consider it as an insulation.

11. Fumigation Process

When exporting electronic equipment abroad, fumigation process may be performed on wooden packaging material with a halogen (compound) gas such as methyl bromide. Exercise care as this halogen gas may corrode capacitors. Also, use caution to epidemic preventive agent as corrosive component such as halogen may be contained.

12. Specific Operating Environments

Capacitors may corrode when stored or used in a place filled with acidic toxic gases (such as hydrogen sulfide, sulfurous acid, nitrous acid, chlorine, bromine, methyl bromide, etc.)

If capacitors are used or stored in such environments, please let us know.

13. Use at a high altitude

The use of capacitors at high altitudes such as on an airplane causes a large difference between the internal pressure of the capacitors and the atmospheric pressure. However, there is no problem in use under atmospheric pressure up to about an altitude of 10,000 meters. Please check the operation of electronic equipment at the operating environmental temperature because the temperature lowers with increased altitude.

14. Hole pitch adjustment of the PCB to the capacitors.

Set the hole pitch of the PCB to the lead pitch (the “F” distance in the catalog) of the capacitor. Be careful since a short circuit, a cut or an increase in the leakage current etc. may be caused by the stress given to the lead wire terminals due to the difference between the hole pitch and the lead pitch.

15. Capacitors with pressure valves.

- (1) A part of the capacitor case is made thin to have the function as the pressure valve in order to prevent explosion due to the rise of inside pressure when a reverse or excessive voltage is applied to the capacitor. Once it has worked as a valve, the whole capacitor needs to be replaced since the valve will not restore.
- (2) When you use a capacitor with pressure valve, provide certain space above the pressure valve as below to prevent an interference when it works as a valve.

Diameter of the capacitor (mm)	18 to less	20 to 35
Required space above the valve(mm)	2.0	3.0

16. Double-sided PCB's

When you use electrolytic capacitors on a double-sided PCB, be careful not to have the circuit pattern run under where the capacitor is mounted. Otherwise it may cause a short circuit on the PCB depending on the condition of mounting.

17. Regarding Connection of capacitors.

- When connecting more than one capacitor in parallel, over-ripple current may develop in some capacitors with the current balance lost if resistance values of the wires to be connected to each capacitor are different because the resistive component of the capacitors is close to the circuit resistance value. Careful consideration shall therefore be given in designing the circuits to prevent over-ripple current from flowing.
- When two or more capacitors are arranged in series, the voltage given to each capacitors shall be kept below the rated voltage level, by also giving consideration to the balance of the voltage impressed on the capacitors. Further, partial pressure resistor which considers leakage current shall be provided parallel to each condenser not to have over-voltage impressed on. Barance resistance are explained on p.88 of our Catalog.

■Cautions for Mounting

1. Cautions for mounting.

- (1)Check the ratings (electrostatic capacitance and rated voltage) of the capacitor before mounting.
- (2)Check the polarity of the capacitor to the chassis.
- (3)Do not drop the capacitor to the floor. Do not use the dropped capacitor.
- (4)Do not deform the capacitor for mounting.

2. Do not apply excessive pressure to the capacitor, its terminals or lead wires.

- (1)Make sure that the contact path of the capacitor meets the hole pitch of the PCB before mounting.
- (2)Transient recovery voltage may be generated in the capacitor due to dielectric absorption. If required, this voltage can be discharged with a resistor with a value of about 1 kΩ.
- (3)A PCB self-standing (snap-in) type capacitor should be pushed to the end (till there is no space) to the PCB for mounting.
- (4)Do not set the automatic insertion machine to clinch the capacitor lead wires too strong.
- (5)Pay attention to the impact given by the component receptacles of the automatic insertion/mounting machines and the product checker, and from the centering operation.

3. Soldering.

- (1) Do not dip the capacitor into melted solder.
- (2) The soldering conditions
 - Chip type: Please refer to 14 page.
 - small and large type: 260°C, 10 s (max.)
 - The preliminary heating and other conditions described in the catalog or product specifications.
- (3) Do not flux other part than the terminals.
- (4) If there is a direct contact between the sleeve of the capacitor and the printed circuit pattern or a metal part of another component such as a lead wire, it may cause shrinkage or crack.
- (5) When you use the capacitor with its sleeve touching directly to the PCB, excessive solder temperature or excessive soldering time may cause the sleeve to shrink or crack during the heat.
- (6) If the application is for extended use, understand and manage the soldering characteristics to avoid abnormal current caused by a contact failure between the capacitor and the PCB.

4. Handling after soldering.

- (1) After soldering, do not tilt, push down or twist the capacitor.
- (2) After soldering, do not hold the capacitor as a handle to carry the PCB.
- (3) After soldering, do not hit the capacitor with any obstacle. If PCB's are piled up for storage, the capacitor should not touch another PCB or component.

5. Cleaning after soldering.

- (1) Capacitors must not be clean with halogen based solvents. If cleaning is required, clean-insured capacitors should be used within the scope of the delivery specifications. Clean-insured capacitors are explained on p.6 of our Catalog.
- (2) Recommended cleaning method
 - Cleaning Solvent : Clean Through 710M, 750H and 750L;
Pine ALpha ST-100S;
Technocare FRW-14~17;
Isopropyl alcohol
 - Cleaning conditions: The cleaner temperature shall be 60°C or less with the cleaning periods within 5 minutes. After cleaning, thoroughly rinse the capacitor with water and dry it together with the printed circuit board using hot air for more than 10 minutes.
The hot air shall not exceed the maximum operating temperature.
Insufficient drying can damage appearance such as secondary contraction of sleeve and

swelling of the base plastic holder.

- (3) Other cleaning liquids:
 - Cleaning Solvent : AK225AES
 - Cleaning conditions: Any of immersion, ultrasonic immersion and steam within 5 minutes, with the exception of the surface-mount chip capacitors within 2 minutes.
- CFC substitute (AK225AES) is use prohibition will be carried out in the future, please avoid use.
- Please consult us regarding other cleaning agents or cleaning methods.

6. Fixing adhesives and coating materials.

- (1) Do not use fixing adhesive or coating material containing halogen-based solvent.
- (2) Before applying the fixing adhesive or the coating material, make sure that there is no remaining flux or stains between the PCB and the sealed part of the capacitor.
- (3) Before applying the fixing adhesive or the coating material, make sure that the detergent etc. has dried up.
- (4) Do not cover the whole surface of the sealed part (terminal side) of the capacitor with the fixing adhesive or the coating material.
- (5) Observe the description in the catalog or the product specifications concerning the thermal stiffening conditions of the fixing adhesive or the coating material. (If there is no such description, contact us.) When both discrete and SMT components are on the same PCB, the fixing material for the SMT components may cause crack, tear or shrinkage on the external sleeve depending on the thermal stiffening condition.
- (6) Recommended fixing adhesives and coating materials
 - Fixing adhesives: Cemedine 210,501,540,545N,Diabond DN83K,DA3288,Bond G103
 - Coating materials: Taffy TF1159,HumiSeal 1B66,1A27NS

■ Other Cautions

1. Do not touch capacitor terminals with bare hands.
You may get electric shock or your hand may be burnt. Discharge it with a 1 KΩ resistance before use if necessary.

2. Do not short the capacitor terminals with a conductor.

Do not spill conductive solution including acid or alkaline solution on the capacitor.

3. Periodical inspections should be established for the capacitors used in industrial appliances.

The following items should be checked:

- (1) Appearance: Check if there is any open valve or

leakage.

- (2)Electronic performance: Check the leakage current, the electrostatic capacitance, the tangent of loss angle and other items described in the catalog or the product specifications.

4. Take the following measures in case of emergency.

- (1)If you see gas coming out of the capacitor valve when the set is in operation, turn off the power switch of the unit or unplug the power cord from the outlet.
- (2)Keep your face away from the capacitor pressure valve, since the high temperature gas at over 100°C bursts out when the valve works. If the gas gets into your eyes or your mouth, wash your eyes or your mouth. Do not ingest the capacitor electrolyte. If the electrolyte gets on your skin, wash it out with soap.

5. Storing conditions.

- (1)Avoid high temperature or high humidity when storing capacitors. Keep the storing temperature at 5°C to 35°C and the relative humidity not more than 75%.
- (2)The leakage current of an aluminum electrolytic capacitor tends to increase when stored for a long time. This tendency becomes more prominent if the ambient temperature is high. The leakage current will be decreased by voltage application. If necessary, treatment by voltage application should

be made on the capacitors which have been stored for a long period (more than 2 years after production).

- (3)Do not store capacitors at a place where there is a possibility that they may get water, salt or oil spill.
- (4)Do not store capacitors at a place where the air contains dense hazardous gas (hydrogen sulfide, sulfurous acid, nitrous acid, chlorine, ammonia, etc.).
- (5)Fumigation treatment with toxic gas covering the whole wooden container frames as moth proofing during shipment may leave residual toxic gas.
- (6)Do not store capacitors at a place where it gets ultraviolet or radioactive rays.

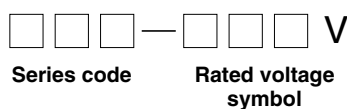
6. Disposing of capacitors.

- (1)Punch a hole or crush the capacitors (to prevent explosion) before incineration at approved facility.
- (2)If they are not to be incinerated, bring them to a professional industrial waste disposal company.

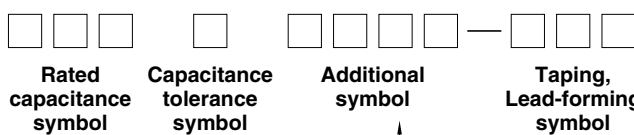
7. Other notes.

Please refer to the following literature for anything not described in the product specifications or the catalog. (Technical report of Japan Electronics and Information Technology Industries Association, EIAJ RCR-2367B “Guideline of notabilia for fixed aluminum electrolytic capacitors for use in electronic equipment”)

■ Product Symbol System for Aluminum Electrolytic Capacitors



Write down the rated voltage itself; however, write 6 for 6.3WV.



Tolerance on Capacitance	Symbol
±10%	K
±20%	M
-10 to +30%	Q
-10 to +50%	T

Write down one of the forming symbols given on page 16 through 18 for taping and lead-forming capacitors. When taping or lead-forming is not necessary, leave the boxes blank.

Rated capacitance (μF)	Symbol
0.1	R10
1	010
2.2	2R2
33	330
100	101
2200	222
33000	333
470000	474

Additional symbols for denoting the case symbols and others. Refer to the examples given on the page for each series.

Recommended pad pattern and size (Vertical chip type)

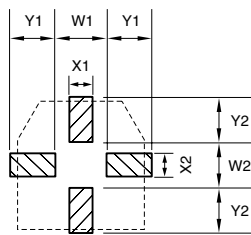
Standard type

(Unit : mm)

Case Size ∅DxL	Land Size			Thin of Solder paste
	X	Y	W	
3x5.3	1.6	2.2	0.8	0.15
4x5.3, 5.7	1.6	2.6	1.0	0.15
5x5.3, 5.7	1.6	3.0	1.4	0.15
6.3x5.3, 5.7	1.6	3.6	1.9	0.15
6.3x7.7	1.6	3.6	1.9	0.15
8x6.5	1.6	4.0	2.1	0.15
8x10, 10.5	2.5	* 3.5	* 3.0	0.15
10x10, 10.5	2.5	* 4.0	* 4.0	0.15
12x13.5, 17.5	3.2	6.0	4.0	0.15

* For Vibration resistance use
 ∅8x10, ∅8x10.5 Y=4.0 W=2.5
 ∅10x10, ∅10x10.5 Y=4.5 W=3.0

For vibration resistance type

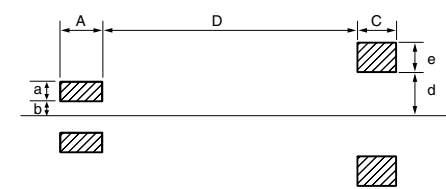


(Unit : mm)

Case Size ∅DxL	Land Size						Thin of Solder paste
	X1	X2	Y1	Y2	W1	W2	
8 x 10	2.5	2.5	3.0	3.5	4.0	3.0	0.20
10 x 10.5	2.5	2.5	4.0	4.5	4.0	3.0	0.20

(Horizontal chip type)

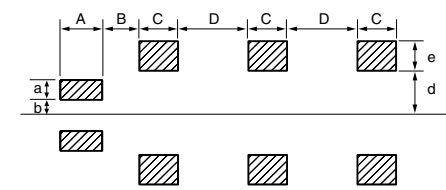
∅9.5 x 24.0 (4 pin type)



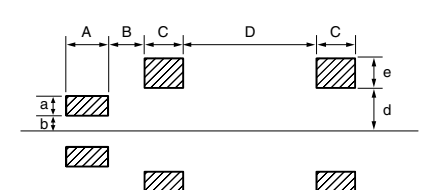
(Unit : mm)

	4 pin	8 pin
A	4.0	4.0
B	—	1.0
C	3.0	3.0
D	5.5	5.5
a	1.5	1.5
b	1.0	1.0
c	3.0	3.0
d	2.0	2.0

∅9.5 x 24.0 (8 pin type)



∅9.5 x 19.0 (6 pin type)



(Unit : mm)

	6 pin
A	4.0
B	1.0
C	3.0
D	9.0
a	1.5
b	1.0
c	3.0
d	2.0

Thin of solder paste: 0.15mm

Recommended soldering conditions

Standard type

(1) Methods

See the following

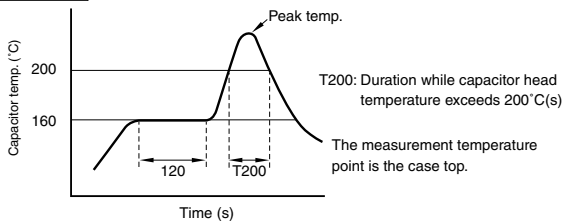
Methods	Reflow soldering	Soldering iron	Flow soldering
Advisability	○	○	×

(2) Soldering iron conditions

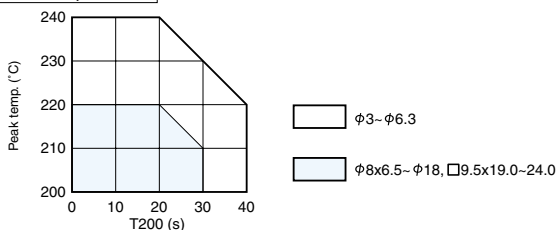
Iron tip temperature shall be 350°C±5°C within the duration of 3^{±1} seconds.

(3) Reflow soldering conditions

Profile



Peak temp. matrix



1. Preheating shall be under 160°C within 120 seconds.
2. Peak temperature shall be within the peak temperature matrix.
3. For conditions exceeding the tolerances, consult with us.

Lead-free type

(1) Methods

See the following

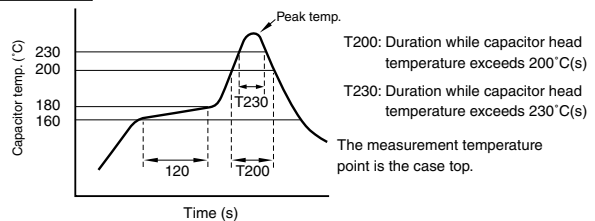
Methods	Reflow soldering	Soldering iron	Flow soldering
Advisability	○	○	×

(2) Soldering iron conditions

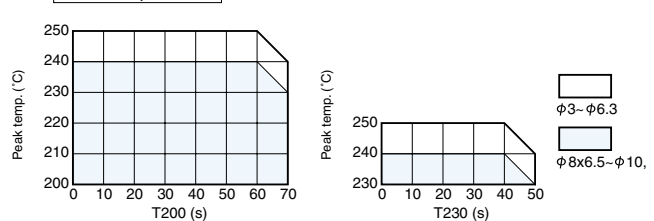
Iron tip temperature shall be 400°C±5°C within the duration of 3^{±1} seconds.

(3) Reflow soldering conditions

Profile



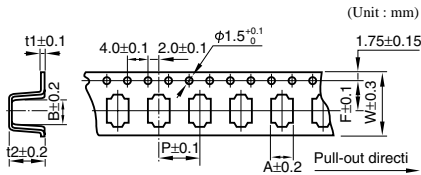
Peak temp. matrix



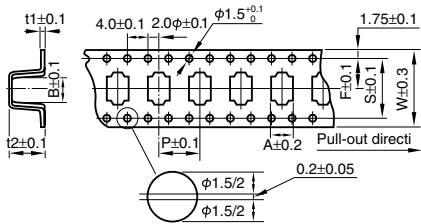
1. Preheating shall be under 180°C within 120 seconds.
2. Peak temperature shall be within the peak temperature matrix.
3. For conditions exceeding the tolerances, consult with us.

■ Taping

■ Carrier tape dimension (taping polarity R)

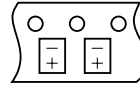


● Series RYK, RV(φ12.5), RVJ(φ12.5), RVK(φ12.5)

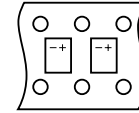


■ Taping polarity

(The all series except RVB and RYK)



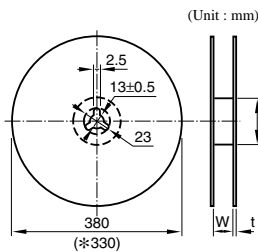
(Series RYK)



(Unit: mm)

Outside size ø DxL	W	A	B	P	t2	F	t1	S
3x5.3	12	3.4	3.4	8.0	5.9	5.5	0.4	—
4x4.5	12	5.0	5.0	8.0	4.8	5.5	0.4	—
4x5.3	12	5.0	5.0	8.0	5.8	5.5	0.4	—
4x5.7	12	5.0	5.0	8.0	6.2	5.5	0.4	—
5x4.5	12	6.0	6.0	12	4.8	5.5	0.4	—
5x5.3	12	6.0	6.0	12	5.8	5.5	0.4	—
5x5.7	12	6.0	6.0	12	6.2	5.5	0.4	—
6.3x4.5	16	7.0	7.0	12	4.8	7.5	0.4	—
6.3x5.3	16	7.0	7.0	12	5.8	7.5	0.4	—
6.3x5.7	16	7.0	7.0	12	6.2	7.5	0.4	—
6.3x7.7	16	7.0	7.0	12	8.3	7.5	0.4	—
8x6.5	16	8.7	8.7	12	6.8	7.5	0.4	—
8x10	24	8.7	8.7	16	11	11.5	0.4	—
8x10.5	24	8.7	8.7	16	11.5	11.5	0.4	—
10x10	24	10.7	10.7	16	11	11.5	0.4	—
10x10.5	24	10.7	10.7	16	11.5	11.5	0.4	—
* 12.5x13.5	32	13.4	13.4	24	14.5	14.2	0.4	28.4
* 12.5x17.5	32	13.4	13.4	24	18.5	14.2	0.4	28.4
* 9.5x19.0	44	9.9	22.9	16	9.5	20.2	0.4	40.4
* 9.5x24.0	44	9.9	27.9	16	9.5	20.2	0.4	40.4

■ Reel dimension



(Unit: mm)

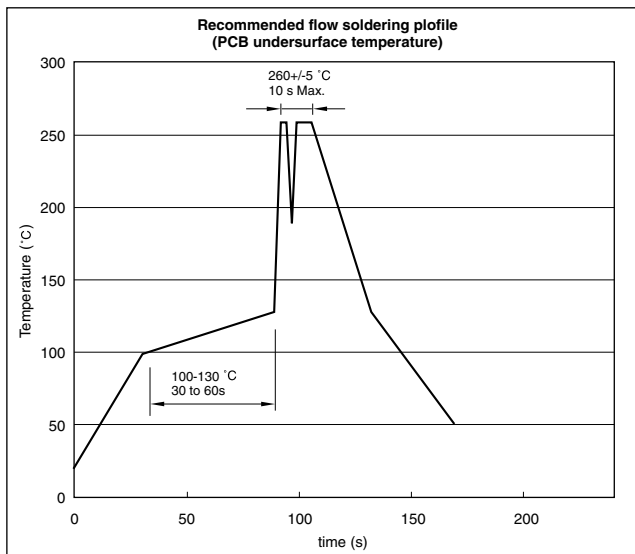
Outside size ø DxL	Reel dimension	
	W	t
3, 4	14	3
5	14	3
6.3	18	3
8x6.5	18	3
8, 10	26	3
* 12.5	34	3
* 9.5x24.0	45	3
* 9.5x19.0	45	3

■ Packing quantity (Reel)

Outside size ø DxL	Quantity (PCS.)
3, 4	2000
5, 6.3	1000
8x6.5	1000
8, 10	500
* 12.5x13.5	200
* 12.5x17.5	150
* 9.5x19.0	400
* 9.5x24.0	400

■ Recommended soldering condition (Pb-free flow soldering)

The recommendation soldering conditions of the product in which flow soldering is possible are as graph.

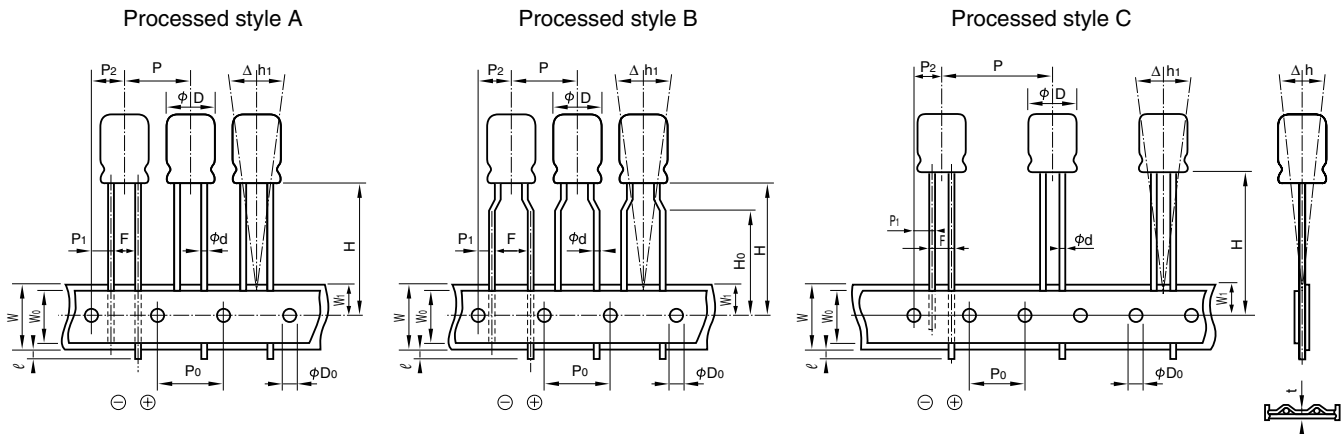


Caution for Using aluminum Electrolytic Capacitors

- (1) Do not dip the capacitor into melted solder.
- (2) Do not flux other part than the terminals.
- (3) If there is a direct contact between the sleeve of the capacitor and the printed circuit pattern or a metal part of another component such as a lead wire, it may cause shrinkage of crack.
- (4) If the application is for extended use, understand and manage the soldering characteristics to avoid abnormal current caused by a contact failure between the capacitor and the PCB.
- (5) Please refer to product specifications about other notes.

■ Taping

- For automatic insertion (radial lead type)



*The shape of a lead wire sandwiched by the mounting strips may differ from the ones shown in the figures.

Product Size Table

Unit: mm

Item	Symbol	Tolerance	5L to 7L	
			ø3 to ø8(except ø8x7L)	ø4 to ø8
Lead forming symbol			T36	T58
Style			A or B	
Lead-wire diameter	ød	±0.05	0.4 or 0.45	
Pitch of componet	P	±1.0	12.7	
Feed hole pitch	P ₀	±0.3	12.7	
Hole center to lead	P ₁	±0.5	5.1	3.85
Hole center to component	P ₂	±1.0	6.35	
Lead to lead distance	F	+0.8 -0.2	2.5	5.0
Tape width	W	±0.5	18.0	
Hold down tape width	W ₀	Min.	6.0	
Feed hole position	W ₁	±0.5	9.0	
Height of component from tape center	H	+0.75 -0.5	18.5	17.5
Lead-wire clinch height	H ₀	±0.5	—	16.0
Max. lead protrusion	ℓ	Max.	1.0	
Feed hole diameter	øD ₀	±0.2	4.0	
Alignment of component to center	Δh	±1.0	0	
Alignment of component to center	Δh ₁	±1.0	0	
Total tape thickness	t	±0.2	0.7	

■ Taping

• For automatic insertion (radial lead type)

Product Size Table

Unit: mm

Item	Symbol	Tolerance	11L to 25L						
			ø5, ø6.3			ø8	ø10	ø12.5	ø16, ø18
Lead forming symbol			T36	T58	T2	T2	T2	T4	T50
Style			A or B		B		A		C
Lead-wire diameter	ød	±0.05	0.5 or 0.6			0.6			0.8
Pitch of componet	P	±1.0	12.7				15.0	30.0	
Feed hole pitch	P ₀	±0.3	12.7				15.0		
Hole center to lead	P ₁	+0.5 (10 to ø18 ±0.7)	5.1		3.85		5.0	3.75	
Hole center to component	P ₂	±1.0	6.35				7.5		
Lead to lead distance	F	+0.8 -0.2	2.5		5.0			7.5	
Tape width	W	±0.5	18.0						
Hold down tape width	W ₀	Min.	6.0						
Feed hole position	W ₁	±0.5	9.0						
Height of component from tape center	H	+0.75 -0.5	18.5	17.5	18.5	20.0	18.5		18.5 ^{+1.5} -0.5
Lead-wire clinch height	H ₀	±0.5	—	16.0			—		
Max. lead protrusion	ℓ	Max.	1.0						
Feed hole diameter	øD ₀	±0.2	4.0						
Alignment of component to center	Δh	±1.0	0						
Alignment of component to center	Δh ₁	±1.0	0						
Total tape thickness	t	±0.2	0.7						

* Compatible with a lead pitch of 2.0mm also. (Ø5)

Part numbering system (example: Series RJB, 10V470μF, 5mm pitch taping)

RJB	—	10	V	471	M	G3	#	—	T2
Series code		Rated voltage symbol		Rated capacitance symbol	Capacitance tolerance symbol	Additional symbol			Taping symbol

Lead Forming

• In order to facilitate insertion into printed circuit board, lead wires are cut or formed.

Product Size Table

Unit: mm

Forming name	Lead forming symbol	Dimension			Style	Outline drawing
		F (Lead pitch)	φD (Case diameter)	L (Applicable case length)		
Forming cut	F10	2.0	4	5,7	B	<p>Processed style A</p> <p>Processed style B</p>
	F 1		5	5 to 11.5	A	
	F12	2.5	4	5,7	B	
	F12		5	5 to 11.5	B	
	F 1	6.3	5 to 11.5	A		
	F 4	3.5	4	5,7	B	
	F 4		5	5,7	B	
	F 4		6.3	5,7	B	
	F 1	8	7 to 11.5	A		
	F	5.0	4	5,7	B	
	F		5	5 to 11.5	B	
	F		6.3	5 to 11.5	B	
	F		8	5 to 11.5	B	
	F		10	9 to 30	A	
	F		12.5	15 to 40	A	
	F		7.5	16	15 to 40	
F	18			15 to 40	A	
Snap-in	S 1	5.0	4	5,7	B	<p>Processed style A</p> <p>Processed style B</p>
	S 1		5	5 to 11.5	B	
	S 1		6.3	5 to 11.5	B	
	S 1		8	7 to 11.5	B	
	S 1		10	9 to 30	A	
	S 1		12.5	15 to 40	A	
	S 1	7.5	16	15 to 40	A	
	S 1		18	15 to 40	A	
For 90° side mount of case	G 9,10	1.5	4	5,7	A	<p>Processed style A</p> <p>Processed style B</p>
	G11,12		3 to 4	5,7	B	
	G 9,10	2.0	5	5,7	A	
	G11,12		5	5,7	B	
	G 9,10	2.5	6.3	5,7	A	
	G11,12		6.3	5,7	B	

Note: Negative terminal appears this side for G9,11, while positive terminal for G10,12.

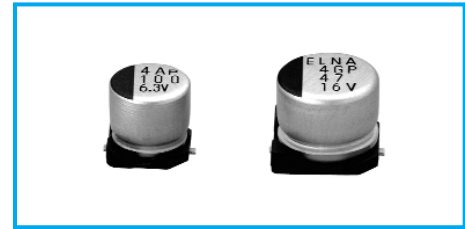
Part numbering system (example: Series RJB, 10V470μF, 5mm pitch forming cut)

RJB	—	10	471	M	G3	#	—	F
Series code		Rated voltage symbol	Rated capacitance symbol	Capacitance tolerance symbol	Additional symbol			Taping symbol

**Conductive Polymer
Aluminum Electrolytic Capacitors**

Chip Type For Audio Series PVO

- A conductive Polymer electrolyte is adopted. Super low E.S.R. and high ripple current are realized.
- Guaranteed 105°C, 2000 hours.
- Use materials are selected carefully, the high quality is realized.



Marking color : Black print

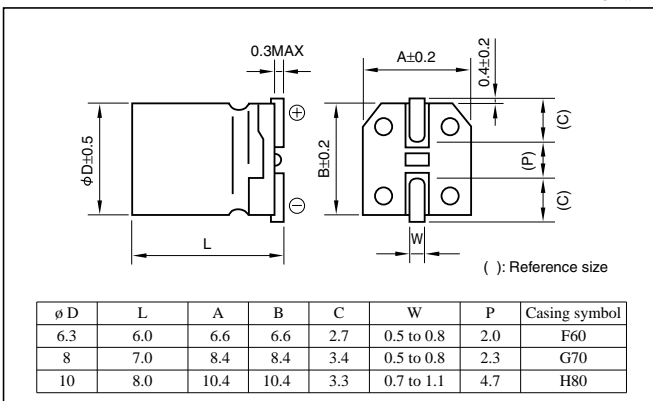
Specifications

Item	Performance	
Category temperature range (°C)	-55 to +105	
Tolerance at rated capacitance (%)	±20 (20°C, 120Hz)	
Leakage current (μA) *Note	Rated voltage (V)	4 to 20
	Leakage current (μA)	Less than 0.2 CV
C: Rated capacitance(μF); V: Rated voltage(V)		25 Less than 0.5 CV
Tangent of the loss angle (tanδ)	Less than 0.12 (20°C, 120Hz)	
Characteristics at high and low temperature	Impedance ratio (max.) Z-55°C / Z+20°C : 1.50 (120Hz)	
Endurance (105°C) (Applied ripple current)	Test time	2000 hours
	Leakage current	The initial specified value or less
	Percentage of capacitance change	Within ±20% of initial value
	Tangent of the loss angle	150% or less of the initial specified value
	E.S.R. change	200% or less of the initial specified value
Damp heat, steady state (humidity) 60°C, 90 to 95%RH	Test time	500 hours
	Leakage current	The initial specified value or less
	Percentage of capacitance change	Within ±20% of initial value
	Tangent of the loss angle	150% or less of the initial specified value
	E.S.R. change	200% or less of the initial specified value
Characteristics of applied surge voltage	The capacitors shall be subject to 1000 cycles each consisting of charge with the surge voltage specified at 15 to 35°C for 30 seconds through a protective resistor (Rc=1kΩ) in 6 minutes per cycle. Surge voltage : 1.15 times of rated voltage	
	Leakage current	The initial specified value or less
	Percentage of capacitance change	Within ±15% of initial value
	Tangent of the loss angle	150% or less of the initial specified value
	E.S.R. change	200% or less of the initial specified value
Failure rate	1% per 1000 hours maximum (Confidence level 60% at 105°C)	

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

Outline Drawing

Unit: mm



Part numbering system (example: 4V151M F60)					
PVO	4	V	151	M	F60
Series code	Rated voltage symbol	Rated capacitance symbol	Capacitance tolerance symbol	Casing symbol	Taping symbol

Standard Ratings

Rated voltage(V) Rated capacitance(μF)	Item	4			6.3			10		
		Case	E.S.R.	Rated ripple current	Case	E.S.R.	Rated ripple current	Case	E.S.R.	Rated ripple current
		φ DxL(mm)	(mΩ)	(mA _{rms})	φ DxL(mm)	(mΩ)	(mA _{rms})	φ DxL(mm)	(mΩ)	(mA _{rms})
47	—	—	—	—	—	—	6.3x6.0	55	1620	
56	—	—	—	6.3x6.0	50	1620	6.3x6.0	55	1620	
82	6.3x6.0	50	1620	6.3x6.0	50	1620	8x7.0	40	2120	
100	6.3x6.0	50	1620	6.3x6.0	50	1620	8x7.0	40	2120	
150	6.3x6.0	50	1620	8x7.0	35	2560	10x8.0	30	3020	
220	8x7.0	35	2560	10x8.0	25	3700	10x8.0	30	3020	
330	8x7.0	35	2560	10x8.0	25	3700	—	—	—	
470	10x8.0	25	3700	—	—	—	—	—	—	

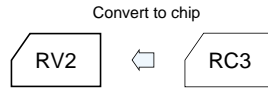
Rated voltage(V) Rated capacitance(μF)	Item	16			20			25		
		Case	E.S.R.	Rated ripple current	Case	E.S.R.	Rated ripple current	Case	E.S.R.	Rated ripple current
		φ DxL(mm)	(mΩ)	(mA _{rms})	φ DxL(mm)	(mΩ)	(mA _{rms})	φ DxL(mm)	(mΩ)	(mA _{rms})
6.8	—	—	—	—	—	—	6.3x6.0	75	1250	
10	—	—	—	—	—	—	8x7.0	55	1570	
22	—	—	—	6.3x6.0	70	1320	10x8.0	45	2200	
27	6.3x6.0	65	1390	6.3x6.0	70	1320	—	—	—	
33	6.3x6.0	65	1390	8x7.0	50	1800	—	—	—	
39	6.3x6.0	65	1390	8x7.0	50	1800	—	—	—	
47	8x7.0	50	1800	8x7.0	50	1800	—	—	—	
56	8x7.0	45	1890	10x8.0	40	2400	—	—	—	
82	8x7.0	45	1890	10x8.0	40	2400	—	—	—	
100	10x8.0	35	2670	—	—	—	—	—	—	
150	10x8.0	35	2670	—	—	—	—	—	—	

(Note) Rated ripple current : 105°C, 100kHz ; E.S.R. : 20°C, 100kHz

**Chip Type, Miniature and Large Capacitance
Aluminum Electrolytic Capacitors**

Chip Type Standard Capacitors (height:5.5mm) Series RV2

- Compatible with surface mounting for 5.5mm high capacitors.
- Supplied with carrier taping.
- Guarantees 2000 hours at 85°C.

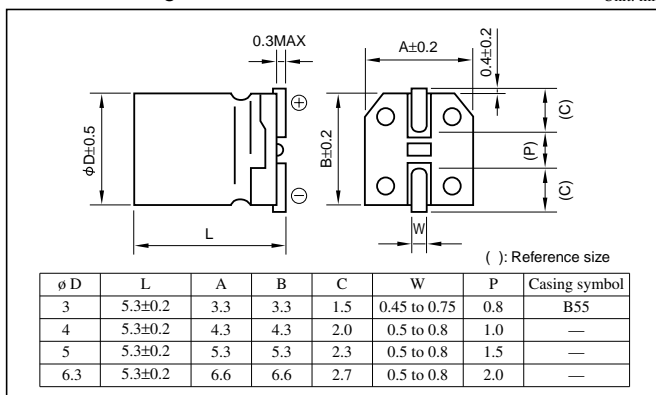


Marking color : Black print

Specifications

Item	Performance																																				
Category temperature range (°C)	-40 to +85																																				
Tolerance at rated capacitance (%)	±20 (20°C,120Hz)																																				
Leakage current (µA)	Less than 0.01CV or 3 whichever is larger(after 2 minutes) C: Rated capacitance(µF); V: Rated voltage(V) (20°C)																																				
Tangent of loss angle (tanδ)	Rated voltage (V)																																				
	<table border="1"> <tr> <td></td> <td>4</td> <td>6.3</td> <td>10</td> <td>16</td> <td>25</td> <td>35</td> <td>50</td> </tr> <tr> <td>tanδ (max.)</td> <td>0.42</td> <td>0.30</td> <td>0.24</td> <td>0.22</td> <td>0.16</td> <td>0.14</td> <td>0.12</td> </tr> <tr> <td></td> <td>φ 3</td> <td>φ 4 to φ 6.3</td> <td>0.42</td> <td>0.28</td> <td>0.24</td> <td>0.20</td> <td>0.14</td> </tr> </table>			4	6.3	10	16	25	35	50	tanδ (max.)	0.42	0.30	0.24	0.22	0.16	0.14	0.12		φ 3	φ 4 to φ 6.3	0.42	0.28	0.24	0.20	0.14											
	4	6.3	10	16	25	35	50																														
tanδ (max.)	0.42	0.30	0.24	0.22	0.16	0.14	0.12																														
	φ 3	φ 4 to φ 6.3	0.42	0.28	0.24	0.20	0.14																														
Characteristics at high and low temperature	Rated voltage (V)																																				
	<table border="1"> <tr> <td rowspan="2">Impedance ratio (max.)</td> <td rowspan="2">φ 3</td> <td>Z-25°C / Z+20°C</td> <td>7</td> <td>4</td> <td>3</td> <td>2</td> <td>2</td> <td>2</td> <td>2</td> </tr> <tr> <td>Z-40°C / Z+20°C</td> <td>17</td> <td>10</td> <td>8</td> <td>6</td> <td>4</td> <td>3</td> <td>3</td> </tr> <tr> <td rowspan="2"></td> <td rowspan="2">φ 4 to φ 6.3</td> <td>Z-25°C / Z+20°C</td> <td>7</td> <td>3</td> <td>3</td> <td>2</td> <td>2</td> <td>2</td> <td>2</td> </tr> <tr> <td>Z-40°C / Z+20°C</td> <td>15</td> <td>8</td> <td>5</td> <td>4</td> <td>3</td> <td>3</td> <td>3</td> </tr> </table>		Impedance ratio (max.)	φ 3	Z-25°C / Z+20°C	7	4	3	2	2	2	2	Z-40°C / Z+20°C	17	10	8	6	4	3	3		φ 4 to φ 6.3	Z-25°C / Z+20°C	7	3	3	2	2	2	2	Z-40°C / Z+20°C	15	8	5	4	3	3
Impedance ratio (max.)	φ 3	Z-25°C / Z+20°C			7	4	3	2	2	2	2																										
		Z-40°C / Z+20°C	17	10	8	6	4	3	3																												
	φ 4 to φ 6.3	Z-25°C / Z+20°C	7	3	3	2	2	2	2																												
		Z-40°C / Z+20°C	15	8	5	4	3	3	3																												
Endurance (85°C) (Applied ripple current)	Test time		2000 hours (φ 3:1000 hours)																																		
	Leakage current		The initial specified value or less																																		
	Percentage of capacitance change		Within ±20% of initial value (4WV: ±30%)																																		
	Tangent of the loss angle		200% or less of the initial specified value (4WV: 300%)																																		
Shelf life (85°C)	Test time : 1000 hours; other items are the same as those for the endurance. Voltage application treatment : According to JIS C5101-1																																				
Applicable standards	JIS C5101-1, -18 1998 (IEC 60384-1 1992, -18 1993)																																				

Outline Drawing



- Soldering conditions and land size are described on page 14.
- The taping specifications are described on page 15.

Coefficient of Frequency for Rated Ripple Current

Rated voltage(V)	Frequency(Hz)			
	50 · 60	120	1k	10k · 100k
4 to 16	0.80	1	1.15	1.25
25 to 35	0.80	1	1.25	1.40
50	0.80	1	1.35	1.50

Part numbering system

Environmental item	• φ3 (example: 16V10µF) RV2 — 16 V 100 M B55 U —							
	Series code	Rated voltage symbol	Rated capacitance symbol	Capacitance tolerance symbol	Casing symbol	Additional symbol	Taping symbol	
Former item	• φ4 to φ6.3 (example: 16V47µF) RV2 — 16 V 470 M B55 U —							
	Series code	Rated voltage symbol	Rated capacitance symbol	Capacitance tolerance symbol	Casing symbol	Additional symbol	Taping symbol	
	• φ3 (example: 16V10µF) RV2 — 16 V 100 M B55 U —							
	Series code	Rated voltage symbol	Rated capacitance symbol	Capacitance tolerance symbol	Casing symbol	Additional symbol	Taping symbol	
	• φ4 to φ6.3 (example: 16V47µF) RV2 — 16 V 470 M B55 U —							
	Series code	Rated voltage symbol	Rated capacitance symbol	Capacitance tolerance symbol	Casing symbol	Additional symbol	Taping symbol	

- For 16V 100µF, "S" is suffixed to the tolerance, as MS□-□-□

Standard Ratings

Rated capacitance (µF)	4				6.3				10				16				25				35				50			
	Case φ D(mm)	Casing symbol	ESR Ω	Rated ripple current mArms	Case φ D(mm)	Casing symbol	ESR Ω	Rated ripple current mArms	Case φ D(mm)	Casing symbol	ESR Ω	Rated ripple current mArms	Case φ D(mm)	Casing symbol	ESR Ω	Rated ripple current mArms	Case φ D(mm)	Casing symbol	ESR Ω	Rated ripple current mArms	Case φ D(mm)	Casing symbol	ESR Ω	Rated ripple current mArms	Case φ D(mm)	Casing symbol	ESR Ω	Rated ripple current mArms
0.1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
0.22	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
0.33	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
0.47	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2.2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
3.3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
4.7	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
10	—	—	—	—	—	—	—	—	4	—	40	23	3	B55	37	18	5	—	23	32	5	—	20	34	6.3	—	17	44
22	3	B55	32	14	4	—	21	31	5	—	18	39	4	—	33	26	6.3	—	11	55	6.3	—	9.1	59	—	—	—	—
33	4	—	21	31	5	—	14	44	5	—	12	48	6.3	—	15	44	6.3	—	7.0	67	—	—	—	—	—	—	—	—
47	4	—	15	37	5	—	10	52	6.3	—	8.5	67	6.3	—	7.1	75	—	—	—	—	—	—	—	—	—	—	—	—
100	5	—	7.0	63	6.3	—	5.0	89	6.3	—	4.0	98	6.3	—	3.3	103	—	—	—	—	—	—	—	—	—	—	—	—
220	6.3	—	3.2	110	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

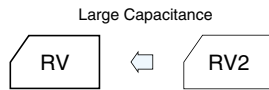
(Note) Rated ripple current : 85°C, 120Hz ; ESR : 20°C, 120Hz

NOTE

Design, Specifications are subject to change without notice. Ask factory for technical specifications before purchase and/or use.

Chip Type Large Capacitance Capacitors Series RV

- Compatible with surface mounting.
- Supplied with carrier taping.
- Guarantees 2000 hours at 85°C.



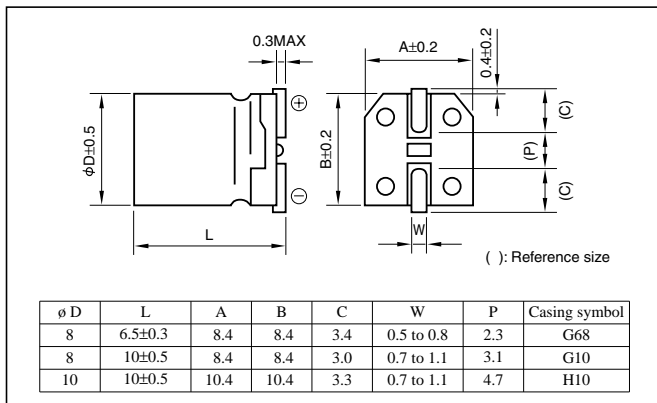
Marking color : Black print (ø8x6.5L)
White print on a brown sleeve (ø8x10L · ø10x10L)

Specifications

Item	Performance	
Category temperature range (°C)	-40 to +85	
Tolerance at rated capacitance (%)	±20 (20°C, 120Hz)	
Leakage current (µA)	Less than 0.01CV or 3 whichever is larger(after 2 minutes) C: Rated capacitance(µF); V: Rated voltage(V) (20°C)	
Tangent of loss angle (tanδ)	Rated voltage (V)	6.3 10 16 25 35 50 63 100
	tanδ (max.)	0.28 0.24 0.20 0.14 0.12 0.10 0.10 0.10
Characteristics at high and low temperature	Rated voltage (V)	6.3 10 16 25 35 50 63 100
	Impedance ratio (max.)	Z-25°C / Z+20°C: 4 3 2 2 2 2 2 2 Z-40°C / Z+20°C: 8 5 4 3 3 3 3 3
Endurance (85°C) (Applied ripple current)	Test time	2000 hours
	Leakage current	The initial specified value or less
	Percentage of capacitance change	Within ±20% of initial value
	Tangent of the loss angle	200% or less of the initial specified value
Shelf life (85°C)	Test time : 1000 hours; other items are the same as those for the endurance. Voltage application treatment : According to JIS C5101-1	
Applicable standards	JIS C5101-1, -18 1998 (IEC 60384-1 1992, -18 1993)	

Outline Drawing

Unit: mm



Coefficient of Frequency for Rated Ripple Current

Rated voltage(V)	Frequency(Hz)			
	50 · 60	120	1k	10k · 100k
6.3 to 16	0.80	1	1.15	1.25
25 to 35	0.80	1	1.25	1.40
50 to 63	0.80	1	1.35	1.50
100	0.70	1	1.35	1.50

Part numbering system (example: 10V1000µF)

Environmental item	RV	10	V	102	M	H10	U	
	Series code	Rated voltage symbol	Rated capacitance symbol	Capacitance tolerance symbol	Casing symbol	Additional symbol	Taping symbol	
Former item	RV	10	V	102	M	H10		
	Series code	Rated voltage symbol	Rated capacitance symbol	Capacitance tolerance symbol	Casing symbol	Additional symbol	Taping symbol	

- Soldering conditions and land size are described on page 14.
- The taping specifications are described on page 15.

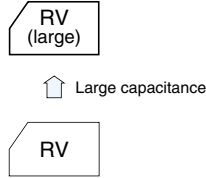
Standard Ratings

Rated voltage (V)	6.3				10				16				25				35				50				63				100			
	Case	Casing symbol	ESR	Rated ripple current	Case	Casing symbol	ESR	Rated ripple current	Case	Casing symbol	ESR	Rated ripple current	Case	Casing symbol	ESR	Rated ripple current	Case	Casing symbol	ESR	Rated ripple current	Case	Casing symbol	ESR	Rated ripple current	Case	Casing symbol	ESR	Rated ripple current				
Rated capacitance (µF)	ø D(mm)		Ω	mArms	ø D(mm)		Ω	mArms	ø D(mm)		Ω	mArms	ø D(mm)		Ω	mArms	ø D(mm)		Ω	mArms	ø D(mm)		Ω	mArms	ø D(mm)		Ω	mArms	ø D(mm)		Ω	mArms
10	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
22	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
33	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
47	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
68	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
100	—	—	—	—	8x6.5	G68	4.0	155	8x6.5	G68	3.3	155	8x6.5	G68	2.3	155	8x10	G10	2.0	252	10x10	H10	1.7	458	10x10	H10	1.7	226	—	—	—	
220	8x6.5	G68	2.1	155	8x6.5	G68	1.8	155	8x10	G10	1.5	252	8x10	G10	1.1	252	10x10	H10	0.91	458	—	—	—	—	—	—	—	—	—	—	—	
330	8x6.5	G68	1.4	155	8x10	G10	1.2	252	8x10	G10	1.0	252	10x10	H10	0.70	458	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
470	8x10	G10	0.99	252	10x10	H10	0.85	458	8x10	G10	0.71	252	10x10	H10	0.71	458	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
1000	10x10	H10	0.46	458	10x10	H10	0.34	458	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	

(Note) Rated ripple current : 85°C, 120Hz ; ESR : 20°C, 120Hz

Chip Type, 85°C Use, Large Capacitance Capacitors Series RV (large)

- Surface mount device.
- Supplied with taping.
- Guarantees 2000 hours at 85°C.



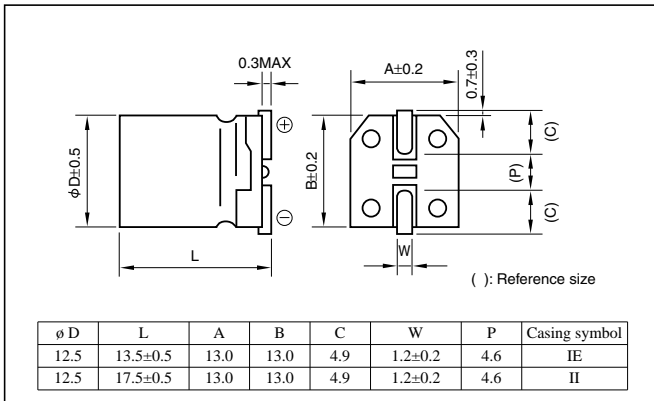
Marking color : White print on a brown sleeve

Specifications

Item	Performance									
Category temperature range (°C)	-40 to +85									
Tolerance at rated capacitance (%)	±20 (20°C, 120Hz)									
Leakage current (µA)	Less than 0.01CV (after 2 minutes) C: Rated capacitance(µF); V: Rated voltage(V) (20°C)									
Tangent of loss angle (tanδ)	Rated voltage (V)									
	6.3	10	16	25	35	50	63	100		
Characteristics at high and low temperature	Rated voltage (V)									
	Z-25°C / Z+20°C		4	3	2	2	2	2	2	2
Endurance (85°C) (Applied ripple current)	Test time									
	Leakage current					2000 hours				
Shelf life (85°C)	Test time : 1000 hours; other items are the same as those for the endurance. Voltage application treatment : According to JIS C5101-1									
	Applicable standards									
JIS C5101-1, -18 1998 (IEC 60384-1 1992, -18 1993)										

Outline Drawing

Unit: mm



Coefficient of Frequency for Rated Ripple Current

Rated capacitance(µF)	Frequency(Hz)			
	120	1k	10k	100k
100 to 220	1	1.21	1.29	1.43
330 to 1000	1	1.16	1.23	1.25
1500 to 3300	1	1.06	1.11	1.11

Part numbering system (example: 10V220µF)

RV	—	10	V	222	M	II	—	R5
Series code		Rated voltage symbol		Rated capacitance symbol	Capacitance tolerance symbol	Casing symbol		Taping symbol

- Soldering conditions and land size are described on page 14. The taping specifications are described on page 15.

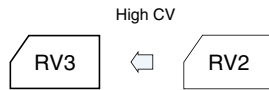
Standard Ratings

Rated capacitance (µF)	6.3				10				16				25				35				50				63				100			
	Case	Casing symbol	ESR	Rated ripple current	Case	Casing symbol	ESR	Rated ripple current	Case	Casing symbol	ESR	Rated ripple current	Case	Casing symbol	ESR	Rated ripple current	Case	Casing symbol	ESR	Rated ripple current	Case	Casing symbol	ESR	Rated ripple current	Case	Casing symbol	ESR	Rated ripple current				
100	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—			
220	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	12.5x13.5	IE	0.83	343	—	—	—	—	—			
330	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	12.5x13.5	IE	0.48	451	12.5x17.5	II	0.55	462	—	—	—		
470	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	12.5x13.5	IE	0.46	460	12.5x17.5	II	0.42	529	—	—	—	—	
820	—	—	—	—	—	—	—	—	—	—	—	—	12.5x13.5	IE	0.32	552	—	—	—	—	—	—	—	—	—	—	—	—	—	—		
1000	—	—	—	—	—	—	—	—	—	—	—	—	12.5x13.5	IE	0.36	521	12.5x17.5	II	0.27	659	—	—	—	—	—	—	—	—	—	—		
1500	—	—	—	—	12.5x13.5	IE	0.29	580	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—			
2200	12.5x13.5	IE	0.23	651	12.5x17.5	II	0.20	0766	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—			
3300	12.5x17.5	II	0.15	885	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—			

(Note) Rated ripple current : 85°C, 120Hz ; ESR : 20°C, 120Hz

Chip Type 85°C Capacitors (height:5.5mm,8.0mm) Series RV3

- Compatible with surface mounting for 5.5mm, 8.0mm high capacitors.
- Supplied with carrier taping.
- Guarantees 2000 hours at 85°C.



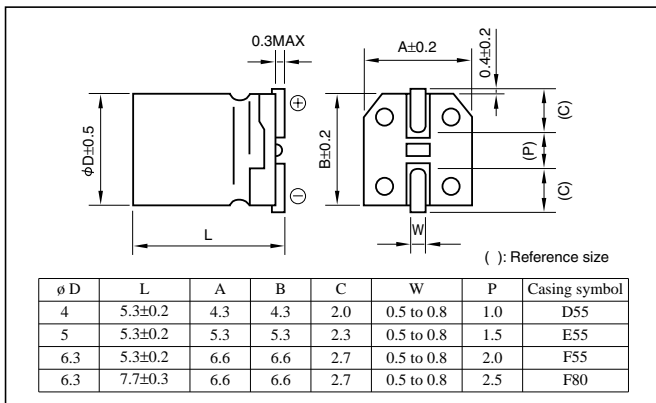
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Specifications

Item	Performance								
Category temperature range (°C)	-40 to +85								
Tolerance at rated capacitance (%)	±20 (20°C, 120Hz)								
Leakage current (µA)	Less than 0.01CV or 3 whichever is larger(after 2 minutes) C: Rated capacitance(µF); V: Rated voltage(V) (20°C)								
Tangent of loss angle (tanδ)	Rated voltage (V)	6.3	10	16	25	35	50		
	tanδ (max.)	0.42	0.32	0.26	0.18	0.14	0.12	(20°C, 120Hz)	
Characteristics at high and low temperature	Impedance ratio (max.)	Rated voltage (V)	6.3	10	16	25	35	50	
		Z-25°C / Z+20°C	4	3	2	2	2	2	(120Hz)
		Z-40°C / Z+20°C	8	8	5	5	4	4	
Endurance (85°C) (Applied ripple current)	Test time	2000 hours							
	Leakage current	The initial specified value or less							
	Percentage of capacitance change	Within ±30% of initial value							
	Tangent of the loss angle	300% or less of the initial specified value							
Shelf life (85°C)	Test time : 1000 hours; other items are the same as those for the endurance. Voltage application treatment : According to JIS C5101-1								
Applicable standards	JIS C5101-1, -18 1998 (IEC 60384-1 1992, -18 1993)								

Outline Drawing

Unit: mm



Coefficient of Frequency for Rated Ripple Current

Rated voltage(V)	Frequency(Hz)			
	50	120	1k	10k · 100k
6.3 to 16	0.80	1	1.15	1.25
25 to 35	0.80	1	1.25	1.40
50	0.70	1	1.35	1.50

Part numbering system (example: 16V220µF)

Environmental item	RV3	16	V	221	M	F80	□	U	□
	Series code	Rated voltage symbol		Rated capacitance symbol	Capacitance tolerance symbol	Casing symbol	Additional symbol		Taping symbol
Former item	RV3	16	V	221	M	F80	□	—	□
	Series code	Rated voltage symbol		Rated capacitance symbol	Capacitance tolerance symbol	Casing symbol	Additional symbol		Taping symbol

- Soldering conditions and land size are described on page 14.
- The taping specifications are described on page 15.

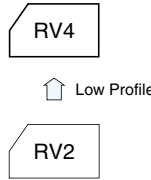
Standard Ratings

Rated voltage(V)	6.3			10			16			25			35			50		
	Case	ESR	Rated ripple current	Case	ESR	Rated ripple current	Case	ESR	Rated ripple current	Case	ESR	Rated ripple current	Case	ESR	Rated ripple current	Case	ESR	Rated ripple current
Rated capacitance(µF)	φ D(mm)	Ω	mArms	φ D(mm)	Ω	mArms	φ D(mm)	Ω	mArms	φ D(mm)	Ω	mArms	φ D(mm)	Ω	mArms	φ D(mm)	Ω	mArms
4.7	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	4x5.3	42	20
10	—	—	—	—	—	—	—	—	—	4x5.3	30	23	4x5.3	23	27	5x5.3	20	34
22	—	—	—	4x5.3	24	26	4x5.3	20	30	5x5.3	14	43	5x5.3	11	47	6.3x5.3	9.0	59
33	4x5.3	21	28	4x5.3	16	33	5x5.3	13	44	5x5.3	9.0	54	6.3x5.3	7.0	67	6.3x7.7	6.0	82
47	4x5.3	15	34	5x5.3	11	45	5x5.3	9.2	50	6.3x5.3	6.4	75	6.3x5.3	4.9	90	6.3x7.7	4.2	98
68	5x5.3	10	47	5x5.3	7.8	54	6.3x5.3	6.3	74	6.3x5.3	4.4	90	6.3x7.7	3.4	109	—	—	—
100	5x5.3	7.0	58	—	—	—	6.3x5.3	4.3	103	6.3x7.7	3.0	124	—	—	—	—	—	—
150	6.3x5.3	4.6	83	6.3x7.7	3.5	98	6.3x7.7	2.9	109	—	—	—	—	—	—	—	—	—
220	6.3x7.7	3.2	113	6.3x7.7	2.4	130	6.3x7.7	2.0	144	—	—	—	—	—	—	—	—	—
330	6.3x7.7	2.1	139	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

(Note) Rated ripple current : 85°C, 120Hz ; ESR : 20°C, 120Hz

Chip Type 85°C Capacitors (height:4.5mm) Series RV4

- Compatible with surface mounting for 4.5mm high capacitors.
- Supplied with carrier taping.
- Guarantees 2000 hours at 85°C.



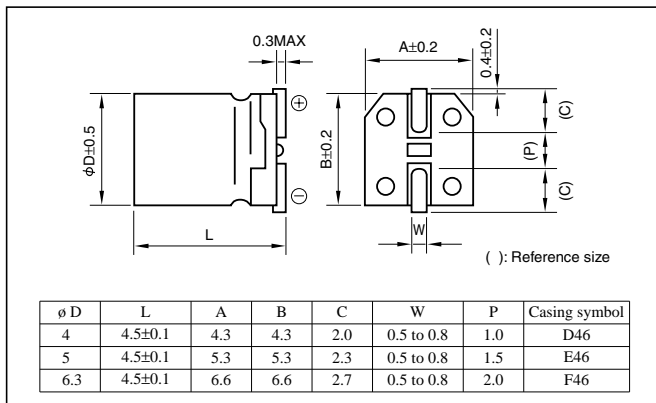
Marking color : Black print

Specifications

Item	Performance						
Category temperature range (°C)	-40 to +85						
Tolerance at rated capacitance (%)	±20 (20°C,120Hz)						
Leakage current (µA)	Less than 0.01CV or 3 whichever is larger(after 2 minutes) C: Rated capacitance(µF); V: Rated voltage(V) (20°C)						
Tangent of loss angle (tanδ)	Rated voltage (V)	6.3	10	16	25	35	50
	tanδ (max.)	0.30	0.24	0.19	0.16	0.14	0.12
Characteristics at high and low temperature	Impedance ratio (max.)	Z-25°C / Z+20°C		Z-40°C / Z+20°C			
		4	3	2	2	2	2
Endurance (85°C) (Applied ripple current)	Test time	2000 hours					
	Leakage current	The initial specified value or less					
	Percentage of capacitance change	Within ±20% of initial value					
	Tangent of the loss angle	300% or less of the initial specified value					
Shelf life (85°C)	Test time : 1000 hours; other items are the same as those for the endurance. Voltage application treatment : According to JIS C5101-1						
Applicable standards	JIS C5101-1, -18 1998 (IEC 60384-1 1992, -18 1993)						

Outline Drawing

Unit: mm



Coefficient of Frequency for Rated Ripple Current

Rated voltage(V)	Frequency(Hz)			
	50 · 60	120	1k	10k · 100k
6.3 to 16	0.80	1	1.15	1.25
25 to 35	0.70	1	1.25	1.40
50	0.1 to 3.3µF	0.50	1	1.35
	4.7 to 10µF	0.70	1	1.35

Part numbering system (example: 6.3V47µF)

Environmental item Except ø6.3	RV4	—	6	V	470	M	E46	□	U	□
Former item	RV4	—	6	V	470	M	E46	□	—	□

- Soldering conditions and land size are described on page 14.
- The taping specifications are described on page 15.

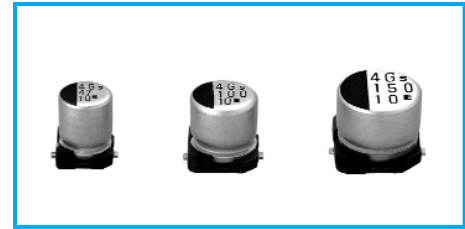
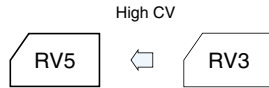
Standard Ratings

Rated capacitance(µF)	6.3			10			16			25			35			50		
	Case	ESR	Rated ripple current	Case	ESR	Rated ripple current	Case	ESR	Rated ripple current	Case	ESR	Rated ripple current	Case	ESR	Rated ripple current	Case	ESR	Rated ripple current
0.1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	4	1990	3
0.22	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	4	905	4
0.33	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	4	603	5
0.47	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	4	423	6
1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	4	199	8
2.2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	4	90	12
3.3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	4	60	15
4.7	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	5	42	21
10	—	—	—	—	—	—	4	32	22	5	27	28	5	23	30	6.3	20	35
22	4	23	26	5	18	34	5	14	38	6.3	12	49	6.3	11	52	—	—	—
33	5	15	37	5	12	42	6.3	10	55	6.3	8	60	—	—	—	—	—	—
47	5	11	45	6.3	8	59	6.3	7	76	—	—	—	—	—	—	—	—	—
100	6.3	5	76	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

(Note) Rated ripple current : 85°C, 120Hz ; ESR : 20°C, 120Hz

Chip Type Large Capacitance Capacitors Series RV5

- Compatible with surface mounting.
- Supplied with carrier taping.
- Guarantees 2000 hours at 85°C.



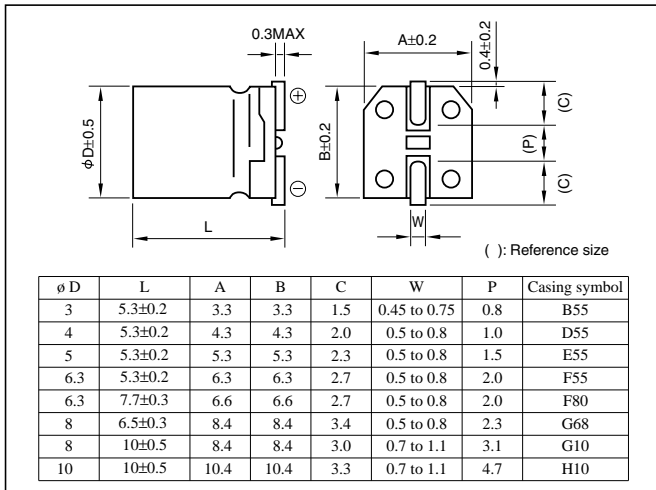
Marking color : Black print (ø3x5.3L – ø8x10L)
White print on a brown sleeve (ø10x10L)

Specifications

Item	Performance	
Category temperature range (°C)	-40 to +85	
Tolerance at rated capacitance (%)	±20 (20°C, 120Hz)	
Leakage current (µA)	Less than 0.01CV or 3 whichever is larger(after 2 minutes) C: Rated capacitance(µF); V: Rated voltage(V) (20°C)	
Tangent of loss angle (tanδ)	Rated voltage (V)	6.3 10 16 25 35 50 63 100
	tanδ (max.)	0.35 0.32 0.28 0.18 0.14 0.12 0.12 0.12
Characteristics at high and low temperature	Rated voltage (V)	6.3 10 16 25 35 50 63 100
	Impedance ratio (max.)	Z-25°C / Z+20°C 4 3 2 2 2 2 2 2 Z-40°C / Z+20°C 10 8 6 4 3 3 3 3
Endurance (85°C) (Applied ripple current)	Test time	2000 hours (ø 3:1000 hours)
	Leakage current	The initial specified value or less
	Percentage of capacitance change	Within ±30% of initial value
	Tangent of the loss angle	300% or less of the initial specified value
Shelf life (85°C)	Test time : 1000 hours; other items are the same as those for the endurance. Voltage application treatment : According to JIS C5101-1	
Applicable standards	JIS C5101-1, -18 1998 (IEC 60384-1 1992, -18 1993)	

Outline Drawing

Unit: mm



Coefficient of Frequency for Rated Ripple Current

Rated voltage (V)	Frequency(Hz)			
	50 · 60	120	1k	10k · 100k
6.3 to 16	0.80	1	1.15	1.25
25 to 35	0.80	1	1.25	1.40
50 to 63	0.80	1	1.35	1.50
100	0.70	1	1.35	1.50

Part numbering system (example: 16V471M G10 U)

Environmental item	RV5	16	V	471	M	G10	U
	Series code	Rated voltage symbol	Rated capacitance symbol	Capacitance tolerance symbol	Casing symbol	Additional symbol	Taping symbol
Former item	RV5	16	V	471	M	G10	U
	Series code	Rated voltage symbol	Rated capacitance symbol	Capacitance tolerance symbol	Casing symbol	Additional symbol	Taping symbol

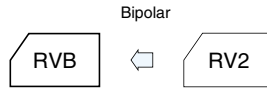
Standard Ratings

Rated voltage (V)	6.3			10			16			25			35			50			63			100		
	Item			Item			Item			Item			Item			Item			Item			Item		
	Case	Casing symbol	Rated ripple current	Case	Casing symbol	Rated ripple current	Case	Casing symbol	Rated ripple current	Case	Casing symbol	Rated ripple current	Case	Casing symbol	Rated ripple current	Case	Casing symbol	Rated ripple current	Case	Casing symbol	Rated ripple current	Case	Casing symbol	Rated ripple current
Rated capacitance (μF)	φ D(mm)		mArms	φ D(mm)		mArms	φ D(mm)		mArms	φ D(mm)		mArms	φ D(mm)		mArms	φ D(mm)		mArms	φ D(mm)		mArms	φ D(mm)		mArms
2.2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
3.3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
4.7	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
10	—	—	—	—	—	—	3x5.3	B55	18	3x5.3	B55	16	4x5.3	D55	24	5x5.3	E55	30	6.3x5.3	F55	32	—	—	—
22	3x5.3	B55	21	3x5.3	B55	20	—	—	—	4x5.3	D55	24	5x5.3	E55	41	6.3x5.3	F55	47	6.3x7.7	F80	60	—	—	—
																			8x6.5	G68	62			
33	—	—	—	—	—	—	4x5.3	D55	32	5x5.3	E55	47	—	—	—	8x6.5	G68	83	—	—	—	8x10	G10	94
47	4x5.3	D55	34	4x5.3	D55	33	5x5.3	E55	52	—	—	—	6.3x5.3	F55	54	6.3x7.7	F80	85	8x10	G10	139	10x10	H10	189
100	5x5.3	E55	55	5x5.3	E55	54	6.3x5.3	F55	70	6.3x7.7	F80	120	6.3x7.7	F80	120	8x10	G10	252	10x10	H10	226	—	—	—
150	—	—	—	6.3x5.3	F55	79	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
220	6.3x5.3	F55	88	6.3x7.7	F80	173	6.3x7.7	F80	162	—	—	—	8x10	G10	260	10x10	H10	320	—	—	—	—	—	—
				8x6.5	G68	175																		
330	6.3x7.7	F80	188	—	—	—	—	—	—	8x10	G10	300	10x10	H10	360	—	—	—	—	—	—	—	—	—
	8x6.5	G68	190																					
470	—	—	—	8x10	G10	310	8x10	G10	307	10x10	H10	400	—	—	—	—	—	—	—	—	—	—	—	—
680	—	—	—	—	—	—	10x10	H10	380	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
820	8x10	G10	320	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
1000	—	—	—	10x10	H10	454	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
1500	10x10	H10	489	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

(Note) Rated ripple current : 85°C, 120Hz

Chip Type Bipolar Capacitors (height:5.5mm) Series RVB

- Compatible with surface mounting for 5.5mm high capacitors.
- Supplied with carrier taping.
- Guarantees 2000 hours at 85°C.



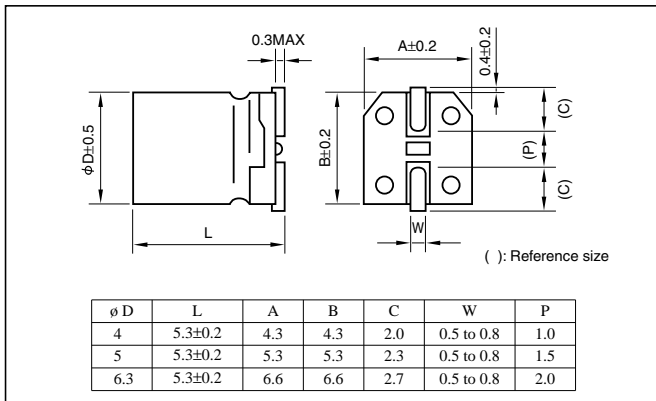
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Specifications

Item	Performance							
Category temperature range (°C)	-40 to +85							
Tolerance at rated capacitance (%)	±20 (20°C, 120Hz)							
Leakage current (µA)	Less than 0.01CV or 3 whichever is larger(after 2 minutes) C: Rated capacitance(µF); V: Rated voltage(V) (20°C)							
Tangent of loss angle (tanδ)	Rated voltage (V)		6.3	10	16	25	35	50
	tanδ (max.)	φ 4	0.35	0.30	0.25	0.25	0.25	0.25
		φ 5, 6.3	0.30	0.25	0.20	0.15	0.15	0.15
Characteristics at high and low temperature	Rated voltage (V)		6.3	10	16	25	35	50
	Impedance ratio (max.)	Z-25°C / Z+20°C	3	3	2	2	2	2
Z-40°C / Z+20°C		8	5	4	3	3	3	
Endurance (85°C) (Applied ripple current)	Test time		2000 hours (with the polarity inverted every 250 hours)					
	Leakage current		The initial specified value or less					
	Percentage of capacitance change		Within ±20% of initial value					
	Tangent of the loss angle		200% or less of the initial specified value					
Shelf life (85°C)	Test time : 1000 hours; other items are the same as those for the endurance. Voltage application treatment : According to JIS C5101-1							
Applicable standards	JIS C5101-1, -18 1998 (IEC 60384-1 1992, -18 1993)							

Outline Drawing

Unit: mm



- Soldering conditions and land size are described on page 14.
- The taping specifications are described on page 15.

Coefficient of Frequency for Rated Ripple Current

Rated voltage(V)	Frequency(Hz)			
	50	120	1k	10k · 100k
6.3 to 16	0.80	1	1.15	1.25
25 to 35	0.80	1	1.25	1.40
50	0.80	1	1.35	1.50

Part numbering system (example: 6.3V47µF)

Environmental item	RVB	—	6	V	470	M	F55	□	U	□
Former item	RVB	—	6	V	470	M	□	□	—	□
	Series code		Rated voltage symbol		Rated capacitance symbol	Capacitance tolerance symbol	Casing symbol	Additional symbol		Taping symbol

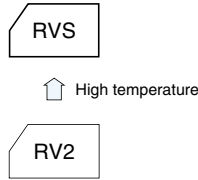
Standard Ratings

Rated capacitance(µF)	Item	6.3			10			16			25			35			50		
		Case	ESR	Rated ripple current	Case	ESR	Rated ripple current	Case	ESR	Rated ripple current	Case	ESR	Rated ripple current	Case	ESR	Rated ripple current	Case	ESR	Rated ripple current
		φ D(mm)	Ω	mArms	φ D(mm)	Ω	mArms	φ D(mm)	Ω	mArms	φ D(mm)	Ω	mArms	φ D(mm)	Ω	mArms	φ D(mm)	Ω	mArms
0.1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	4	3320	2.3
0.22	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	4	1510	3.3
0.33	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	4	1010	4.1
0.47	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	4	706	4.9
1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	4	332	7.2
2.2	—	—	—	—	—	—	—	—	—	—	—	—	—	4	151	10	5	113	14
3.3	—	—	—	—	—	—	—	—	—	—	4	101	13	5	75	17	5	75	17
4.7	—	—	—	—	—	—	—	4	88	14	5	53	20	5	53	21	6.3	53	24
10	—	—	—	4	50	18	5	33	26	6.3	25	35	6.3	25	35	—	—	—	—
22	5	23	27	6.3	19	40	6.3	15	45	—	—	—	—	—	—	—	—	—	—
33	6.3	15	45	6.3	13	50	6.3	10	55	—	—	—	—	—	—	—	—	—	—
47	6.3	11	54	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

(Note) Rated ripple current : 85°C, 120Hz ; ESR : 20°C, 120Hz

Chip Type 105°C Capacitors (height:5.5mm) Series RVS

- Compatible with surface mounting for 5.5mm high capacitors.
- Supplied with carrier taping.
- Guarantees 1000 hours at 105°C.



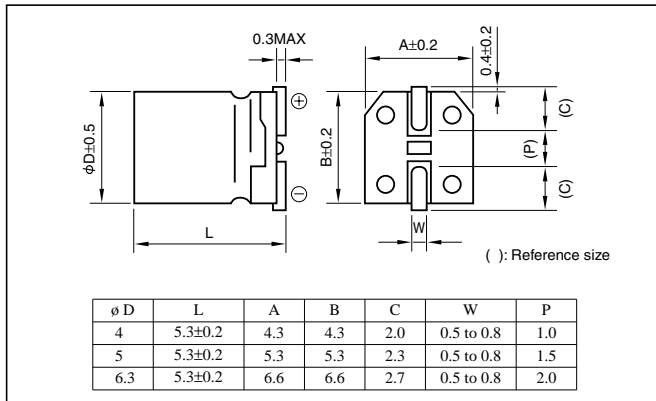
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Specifications

Item	Performance								
Category temperature range (°C)	-55 to +105								
Tolerance at rated capacitance (%)	±20 (20°C,120Hz)								
Leakage current (µA)	Less than 0.01CV or 3 whichever is larger(after 2 minutes) C: Rated capacitance(µF); V: Rated voltage(V) (20°C)								
Tangent of loss angle (tanδ)	Rated voltage (V)	6.3	10	16	25	35	50		
	tanδ (max.)	0.30	0.26	0.22	0.16	0.13	0.12	(20°C,120Hz)	
Characteristics at high and low temperature	Impedance ratio (max.)	Rated voltage (V)	6.3	10	16	25	35	50	
		Z-25°C / Z+20°C	4	3	2	2	2	2	(120Hz)
Endurance (105°C) (Applied ripple current)	Test time	1000 hours							
	Leakage current	The initial specified value or less							
	Percentage of capacitance change	Within ±20% of initial value							
	Tangent of the loss angle	200% or less of the initial specified value							
Shelf life (105°C)	Test time : 1000 hours; other items are the same as those for the endurance. Voltage application treatment : According to JIS C5101-1								
Applicable standards	JIS C5101-1, -18 1998 (IEC 60384-1 1992, -18 1993)								

Outline Drawing

Unit: mm



Coefficient of Frequency for Rated Ripple Current

Rated voltage(V)	Frequency(Hz)			
	50 · 60	120	1k	10k · 100k
6.3 to 16	0.80	1	1.15	1.25
25 to 35	0.80	1	1.25	1.40
50	0.80	1	1.35	1.50

Part numbering system (example: 16V47µF)

Environmental item	RVS	16	V	470	M	□	U	□
	Series code	Rated voltage symbol		Rated capacitance symbol	Capacitance tolerance symbol	Additional symbol		Taping symbol
Former item	RVS	16	V	470	M	□	—	□
	Series code	Rated voltage symbol		Rated capacitance symbol	Capacitance tolerance symbol	Additional symbol		Taping symbol

- Soldering conditions and land size are described on page 14.
- The taping specifications are described on page 15.

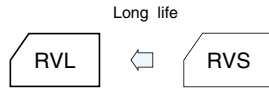
Standard Ratings

Rated capacitance(µF)	6.3			10			16			25			35			50		
	Case	ESR	Rated ripple current	Case	ESR	Rated ripple current	Case	ESR	Rated ripple current	Case	ESR	Rated ripple current	Case	ESR	Rated ripple current	Case	ESR	Rated ripple current
0.1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	4	1190	2
0.22	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	4	905	3
0.33	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	4	603	4
0.47	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	4	424	5
1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	4	199	7
2.2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	4	91	10
3.3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	4	60	12
4.7	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	4	42	17
10	—	—	—	4	43	15	4	36	16	5	27	21	5	22	23	6.3	20	26
22	4	23	21	5	20	25	5	17	28	6.3	12	36	6.3	10	50	—	—	—
33	5	15	30	5	13	31	6.3	11	40	6.3	8.0	44	—	—	—	—	—	—
47	5	11	36	6.3	9.2	43	6.3	7.8	47	—	—	—	—	—	—	—	—	—
100	6.3	5.0	61	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

(Note) Rated ripple current : 105°C, 120Hz; ESR : 20°C, 120Hz

Chip Type 105°C Capacitors (height:6.0mm) Series RVL

- Compatible with surface mounting for 6.0mm high capacitors.
- Supplied with carrier taping.
- Guarantees 2000 hours at 105°C.



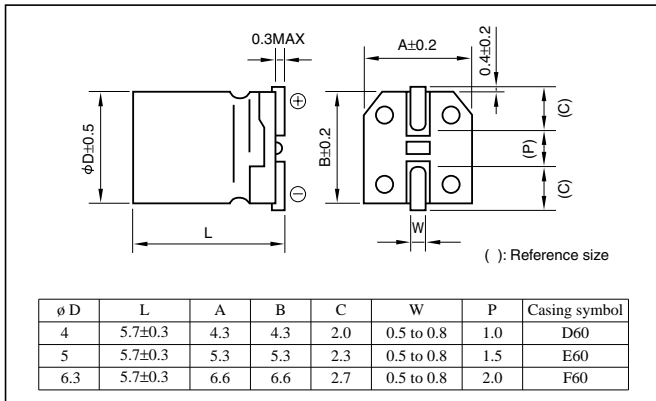
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Specifications

Item	Performance								
Category temperature range (°C)	-55 to +105								
Tolerance at rated capacitance (%)	±20 (20°C, 120Hz)								
Leakage current (µA)	Less than 0.01CV or 3 whichever is larger(after 2 minutes) C: Rated capacitance(µF); V: Rated voltage(V) (20°C)								
Tangent of loss angle (tanδ)	Rated voltage (V)	6.3	10	16	25	35	50		
	tanδ (max.)	0.32	0.28	0.24	0.18	0.15	0.14	(20°C, 120Hz)	
Characteristics at high and low temperature	Impedance ratio (max.)	Rated voltage (V)	6.3	10	16	25	35	50	
		Z-25°C / Z+20°C	4	3	2	2	2	2	(120Hz)
		Z-40°C / Z+20°C	8	5	4	3	3		
Endurance (105°C) (Applied ripple current)	Test time	2000 hours							
	Leakage current	The initial specified value or less							
	Percentage of capacitance change	Within ±30% of initial value							
	Tangent of the loss angle	300% or less of the initial specified value							
Shelf life (105°C)	Test time : 1000 hours; other items are the same as those for the endurance. Voltage application treatment : According to JIS C5101-1								
Applicable standards	JIS C5101-1, -18 1998 (IEC 60384-1 1992, -18 1993)								

Outline Drawing

Unit: mm



Coefficient of Frequency for Rated Ripple Current

Rated voltage(V)	Frequency(Hz)			
	50 · 60	120	1k	10k · 100k
6.3 to 16	0.8	1	1.15	1.25
25 · 35	0.8	1	1.25	1.40
50	0.1 to 3.3µF	0.5	1	1.35
	4.7 to 10µF	0.7	1	1.35

Part numbering system (example: 16V470µF)

Environmental item	RVL	—	16	V	470	M	F60	□	U	□
	Series code		Rated voltage symbol		Rated capacitance symbol	Capacitance tolerance symbol	Casing symbol	Additional symbol		Taping symbol
Former item	RVL	—	16	V	470	M	F60	□	—	□
	Series code		Rated voltage symbol		Rated capacitance symbol	Capacitance tolerance symbol	Casing symbol			Taping symbol

- Soldering conditions and land size are described on page 14.
- The taping specifications are described on page 15.

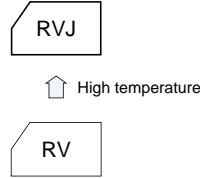
Standard Ratings

Rated capacitance(µF)	6.3			10			16			25			35			50		
	Case	ESR	Rated ripple current	Case	ESR	Rated ripple current	Case	ESR	Rated ripple current	Case	ESR	Rated ripple current	Case	ESR	Rated ripple current	Case	ESR	Rated ripple current
Item	φ D(mm)	Ω	mArms	φ D(mm)	Ω	mArms	φ D(mm)	Ω	mArms	φ D(mm)	Ω	mArms	φ D(mm)	Ω	mArms	φ D(mm)	Ω	mArms
0.1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	4	22	4
0.22	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	4	14	5
0.33	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	4	14	6
0.47	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	4	14	7
1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	4	14	12
2.2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	4	14	19
3.3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	4	14	22
4.7	—	—	—	—	—	—	—	—	—	4	10	21	4	14	23	5	7.0	29
10	—	—	—	—	—	—	4	10	27	5	5.0	36	5	7.0	39	6.3	3.5	47
22	—	—	—	—	—	—	5	5.0	46	6.3	2.5	62	6.3	3.5	65	—	—	—
33	—	—	—	—	—	—	6.3	2.5	66	6.3	2.5	76	—	—	—	—	—	—
47	—	—	—	—	—	—	6.3	2.5	74	6.3	2.5	78	—	—	—	—	—	—
100	6.3	2.5	99	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

(Note) Rated ripple current : 105°C, 120Hz ; ESR : 20°C, 120Hz

Chip Type, 105°C Use, Large Capacitance Capacitors Series RVJ

- Compatible with surface mounting.
- Supplied with carrier taping.
- Guarantees 2000 hours at 105°C.



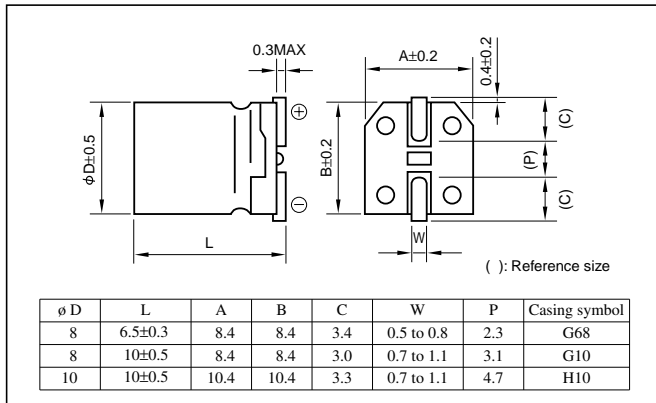
Marking color : Black print (ø8x6.5L)
White print on a brown sleeve (ø8x10L · ø10x10L)

Specifications

Item	Performance									
Category temperature range (°C)	-55 to +105									
Tolerance at rated capacitance (%)	±20 (20°C,120Hz)									
Leakage current (µA)	Less than 0.01CV or 3 whichever is larger(after 2 minutes) C: Rated capacitance(µF); V: Rated voltage(V) (20°C)									
Tangent of loss angle (tanδ)	Rated voltage (V)									
	6.3	10	16	25	35	50	63	100		
	tanδ (max.)									
	0.30	0.24	0.22	0.16	0.13	0.12	0.11	0.10		
Characteristics at high and low temperature	Rated voltage (V)									
	Z-25°C / Z+20°C									
	Z-40°C / Z+20°C									
Endurance (105°C) (Applied ripple current)	Test time					2000 hours				
	Leakage current					The initial specified value or less				
	Percentage of capacitance change					Within ±20% of initial value				
	Tangent of the loss angle					200% or less of the initial specified value				
Shelf life (105°C)	Test time : 1000 hours; other items are the same as those for the endurance. Voltage application treatment : According to JIS C5101-1									
Applicable standards	JIS C5101-1, -18 1998 (IEC 60384-1 1992, -18 1993)									

Outline Drawing

Unit: mm



Coefficient of Frequency for Rated Ripple Current

Rated voltage(V)	Frequency(Hz)			
	50 · 60	120	1k	10k · 100k
6.3 to 16	0.80	1	1.15	1.25
25 to 35	0.80	1	1.25	1.40
50 to 63	0.80	1	1.35	1.50
100	0.70	1	1.35	1.50

Part numbering system (example: 16V470µF)

Environmental item	RVJ	—	16	V	471	M	H10	U	
	Series code		Rated voltage symbol		Rated capacitance symbol	Capacitance tolerance symbol	Casing symbol	Additional symbol	Taping symbol
Former item	RVJ	—	16	V	471	M	H10		
	Series code		Rated voltage symbol		Rated capacitance symbol	Capacitance tolerance symbol	Casing symbol	Additional symbol	Taping symbol

- Soldering conditions and land size are described on page 14.
- The taping specifications are described on page 15.

Standard Ratings

Rated voltage (V)	6.3				10				16				25				35				50				63				100			
	Case	Casing symbol	ESR	Rated ripple current	Case	Casing symbol	ESR	Rated ripple current	Case	Casing symbol	ESR	Rated ripple current	Case	Casing symbol	ESR	Rated ripple current	Case	Casing symbol	ESR	Rated ripple current	Case	Casing symbol	ESR	Rated ripple current	Case	Casing symbol	ESR	Rated ripple current				
10	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—			
22	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	8x6.5	G68	9.1	110	8x10	G10	8.3	99	10x10	H10	7.5	133				
33	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	8x6.5	G68	6.5	110	8x10	G10	6.0	178	10x10	H10	5.5	160	10x10	H10	5.0	133
47	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	8x6.5	G68	5.7	110	8x10	G10	4.2	178	10x10	H10	3.9	160	—	—	—	—
100	—	—	—	—	8x6.5	G68	4.3	110	8x6.5	G68	3.6	110	8x10	G10	2.7	178	10x10	H10	2.2	324	8x10	G10	2.0	178	10x10	H10	2.0	324	—	—	—	—
220	8x10	G10	2.3	178	8x10	G10	2.0	178	10x10	H10	1.7	324	10x10	H10	1.2	324	10x10	H10	0.98	324	—	—	—	—	—	—	—	—	—	—	—	
330	8x10	G10	1.5	178	10x10	H10	1.3	324	10x10	H10	1.1	324	10x10	H10	0.80	324	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
470	10x10	H10	1.0	324	10x10	H10	0.92	324	10x10	H10	0.78	324	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
1000	10x10	H10	0.50	324	10x10	H10	0.40	324	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	

(Note) Rated ripple current : 105°C, 120Hz ; ESR : 20°C, 120Hz

Chip Type, 105°C Use, Large Capacitance Capacitors Series RVJ (large)

- Surface mount device.
- Supplied with taping.
- Guarantees 5000 hours at 105°C.



High temperature



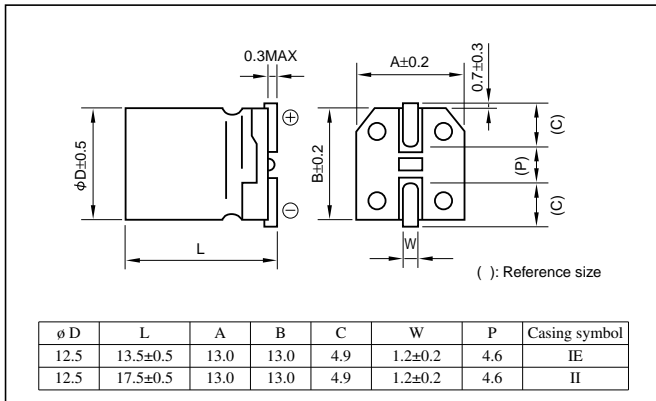
Marking color : White print on a brown sleeve

Specifications

Item	Performance									
Category temperature range (°C)	-55 to +105									
Tolerance at rated capacitance (%)	±20 (20°C,120Hz)									
Leakage current (µA)	Less than 0.01CV (after 2 minutes) C: Rated capacitance(µF); V: Rated voltage(V) (20°C)									
Tangent of loss angle (tanδ)	Rated voltage (V)	6.3	10	16	25	35	50	63	100	
	tanδ (max.)	0.30	0.26	0.22	0.16	0.13	0.12	0.11	0.10	
0.02 is added to every 1000µF increase over 1000µF. (20°C,120Hz)										
Characteristics at high and low temperature	Rated voltage (V)	6.3	10	16	25	35	50	63	100	
	Impedance ratio (max.)	Z-25°C / Z+20°C	4	3	2	2	2	2	2	2
Z-40°C / Z+20°C 8 5 4 3 3 3 3 3 3 (120Hz)										
Endurance (105°C) (Applied ripple current)	Test time	5000 hours								
	Leakage current	The initial specified value or less								
	Percentage of capacitance change	Within ±20% of initial value								
	Tangent of the loss angle	200% or less of the initial specified value								
Shelf life (105°C)	Test time : 1000 hours; other items are the same as those for the endurance. Voltage application treatment : According to JIS C5101-1									
Applicable standards	JIS C5101-1, -18 1998 (IEC 60384-1 1992, -18 1993)									

Outline Drawing

Unit: mm



Coefficient of Frequency for Rated Ripple Current

Frequency(Hz)	120	1k	10k	100k
Rated capacitance(µF)				
47	0.50	0.76	0.87	1
100 to 220	0.70	0.85	0.90	1
330 to 1000	0.80	0.93	0.98	1

Part numbering system (example: 10V1000µF)

RVJ	—	10	V	102	M	IE	—	R5
Series code		Rated voltage symbol		Rated capacitance symbol	Capacitance tolerance symbol	Casing symbol		Taping symbol

- Soldering conditions and land size are described on page 14.
- The taping specifications are described on page 15.

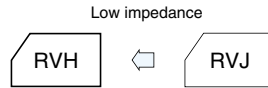
Standard Ratings

Rated capacitance (µF)	6.3				10				16				25				35				50				63				100			
	Case	Casing symbol	Imp.	Rated ripple current	Case	Casing symbol	Imp.	Rated ripple current	Case	Casing symbol	Imp.	Rated ripple current	Case	Casing symbol	Imp.	Rated ripple current	Case	Casing symbol	Imp.	Rated ripple current	Case	Casing symbol	Imp.	Rated ripple current	Case	Casing symbol	Imp.	Rated ripple current				
Item	ø D(mm)		Ω	mArms	ø D(mm)		Ω	mArms	ø D(mm)		Ω	mArms	ø D(mm)		Ω	mArms	ø D(mm)		Ω	mArms	ø D(mm)		Ω	mArms	ø D(mm)		Ω	mArms				
47	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—			
100	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—			
220	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—			
330	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—			
470	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—			
1000	12.5x13.5	IE	0.105	747	12.5x13.5	IE	0.105	747	12.5x13.5	IE	0.105	747	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—			

(Note) Rated ripple current : 105°C, 120Hz ; Impedance(Imp.) : 20°C, 100kHz

Chip Type, 105°C Use, Low Impedance Capacitors Series RVH

- Compatible with surface mounting.
- Supplied with carrier taping.
- Guarantees 2000 hours at 105°C.



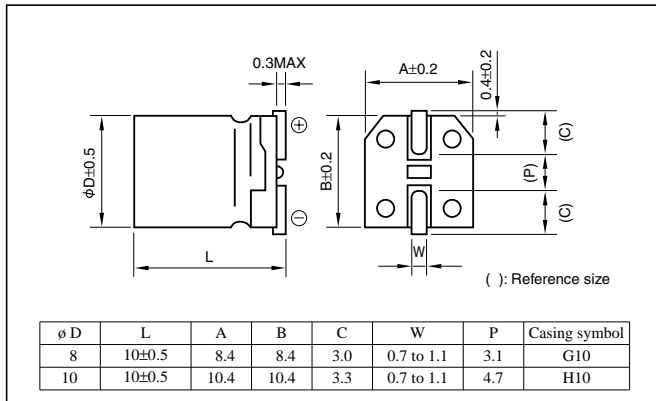
Marking color : White print on a brown sleeve

Specifications

Item	Performance					
Category temperature range (°C)	-55 to +105					
Tolerance at rated capacitance (%)	±20 (20°C,120Hz)					
Leakage current (µA)	Less than 0.01CV or 3 whichever is larger(after 2 minutes) C: Rated capacitance(µF); V: Rated voltage(V) (20°C)					
Tangent of loss angle (tanδ)	Rated voltage (V)	6.3	10	16	25	35
	tanδ (max.)	0.30	0.26	0.22	0.16	0.13
Characteristics at high and low temperature	Impedance ratio (max.)	Z-25°C / Z+20°C	4	3	2	2
		Z-40°C / Z+20°C	8	5	4	3
Endurance (105°C) (Applied ripple current)	Test time	2000 hours				
	Leakage current	The initial specified value or less				
	Percentage of capacitance change	Within ±20% of initial value				
	Tangent of the loss angle	200% or less of the initial specified value				
Shelf life (105°C)	Test time : 1000 hours; other items are the same as those for the endurance. Voltage application treatment : According to JIS C5101-1					
Applicable standards	JIS C5101-1, -18 1998 (IEC 60384-1 1992, -18 1993)					

Outline Drawing

Unit: mm



Coefficient of Frequency for Rated Ripple Current

Frequency (Hz)	50 · 60	120	1k	10k · 100k
Coefficient	0.64	0.8	0.93	1

Part numbering system (example: 16V330µF)

Environmental item	RVH	16	V	331	M	H10	U	
	Series code	Rated voltage symbol		Rated capacitance symbol	Capacitance tolerance symbol	Casing symbol	Additional symbol	Taping symbol
Former item	RVH	16	V	331	M	H10		
	Series code	Rated voltage symbol		Rated capacitance symbol	Capacitance tolerance symbol	Casing symbol	Additional symbol	Taping symbol

- Soldering conditions and land size are described on page 14.
- The taping specifications are described on page 15.

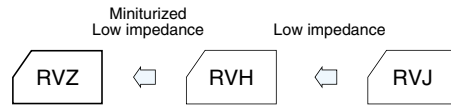
Standard Ratings

Rated capacitance (µF)	Item	6.3				10				16				25				35			
		Case	Casing symbol	Impedance Ω	Rated ripple current mArms	Case	Casing symbol	Impedance Ω	Rated ripple current mArms	Case	Casing symbol	Impedance Ω	Rated ripple current mArms	Case	Casing symbol	Impedance Ω	Rated ripple current mArms	Case	Casing symbol	Impedance Ω	Rated ripple current mArms
47																		8x10	G10	0.45	369
100														8x10	G10	0.45	369	10x10	H10	0.25	553
220					8x10	G10	0.45	369						10x10	H10	0.25	553				
330		8x10	G10	0.45	369					10x10	H10	0.25	553								
470																					

(Note) Rated ripple current : 105°C, 100kHz ; Impedance : 20°C, 100kHz

Chip Type, 105°C Use, Low Impedance Capacitors Series RVZ

- Compatible with surface mounting.
- Supplied with carrier taping.
- Guarantees 2000 hours at 105°C.



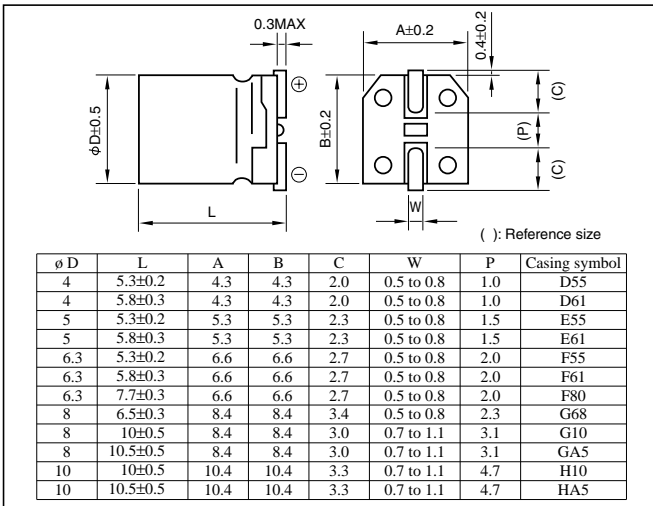
Marking color : Black print (ø4x5.3L – ø8x6.5L)
White print on a brown sleeve (ø8x10L · ø10x10L)

Specifications

Item	Performance						
Category temperature range (°C)	-55 to +105						
Tolerance at rated capacitance (%)	±20 (20°C, 120Hz)						
Leakage current (µA)	Less than 0.01CV or 3 whichever is larger (after 2 minutes) C: Rated capacitance(µF); V: Rated voltage(V) (20°C)						
Tangent of loss angle (tanδ)	Rated voltage (V)	6.3	10	16	25	35	
	tanδ (max.)	0.28	0.24	0.20	0.16	0.14	
Characteristics at high and low temperature	Rated voltage (V)	6.3	10	16	25	35	
	Impedance ratio (max.)	Z-25°C / Z+20°C	4	3	2	2	2
		Z-55°C / Z+20°C	8	5	4	3	3
Endurance (105°C) (Applied ripple current)	Test time	2000 hours (8x6.5 or less: 1000 hours)					
	Leakage current	The initial specified value or less					
	Percentage of capacitance change	Within ±25% of initial value					
	Tangent of the loss angle	200% or less of the initial specified value					
Shelf life (105°C)	Test time : 1000 hours; other items are the same as those for the endurance. Voltage application treatment : According to JIS C5101-1						
Applicable standards	JIS C5101-1, -18 1998 (IEC 60384-1 1992, -18 1993)						

Outline Drawing

Unit: mm



- Soldering conditions and land size are described on page 14.
- The taping specifications are described on page 15.

Coefficient of Frequency for Rated Ripple Current

Rated voltage(V)	Frequency(Hz)			
	120	1k	10k	100k
6.3 to 35	0.5	0.75	0.9	1.0

Part numbering system (example: 6.3V1500µF)

Environmental item	RVZ	6	V	152	M	HA5	U	
	Series code	Rated voltage symbol		Rated capacitance symbol	Capacitance tolerance symbol	Casing symbol	Additional symbol	Taping symbol
Former item	RVZ	6	V	152	M	HA5		
	Series code	Rated voltage symbol		Rated capacitance symbol	Capacitance tolerance symbol	Casing symbol	Additional symbol	Taping symbol

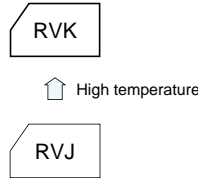
Standard Ratings

Rated voltage (V)	Item	6.3				10				16				25				35			
		Case	Casing symbol	Impedance	Rated ripple current	Case	Casing symbol	Impedance	Rated ripple current	Case	Casing symbol	Impedance	Rated ripple current	Case	Casing symbol	Impedance	Rated ripple current	Case	Casing symbol	Impedance	Rated ripple current
		∅ D(mm)		Ω	mArms	∅ D(mm)		Ω	mArms	∅ D(mm)		Ω	mArms	∅ D(mm)		Ω	mArms	∅ D(mm)		Ω	mArms
4.7	—	—	—	—	—	—	—	—	—	—	—	—	4x5.3	D55	3.20	65	4x5.3	D55	3.20	65	
10	—	—	—	—	4x5.3	D55	3.20	65	4x5.3	D55	3.20	65	4x5.8	D61	1.80	80	5x5.3	E55	1.50	110	
	—	—	—	—	—	—	—	—	—	—	—	—	5x5.3	E55	1.50	110	5x5.8	E61	0.76	150	
15	—	—	—	—	—	—	—	—	4x5.8	D61	1.80	80	5x5.8	E61	0.76	150	5x5.8	E61	0.76	150	
22	4x5.3	D55	3.20	65	4x5.8	D61	1.80	80	5x5.3	E55	1.50	110	5x5.8	E61	0.76	150	5x5.8	E61	0.76	150	
	4x5.8	D61	1.80	80	5x5.3	E55	1.50	110	5x5.8	E61	0.76	150	6.3x5.3	F55	0.85	170	6.3x5.3	F55	0.85	170	
33	5x5.3	E55	1.50	110	5x5.3	E55	1.50	110	6.3x5.3	F55	0.85	170	6.3x5.3	F55	0.85	170	6.3x5.3	F55	0.85	170	
	5x5.8	E61	0.76	150	5x5.8	E61	0.76	150	6.3x5.8	F61	0.44	230	6.3x5.8	F61	0.44	230	6.3x5.8	F61	0.44	230	
47	5x5.3	E55	1.50	110	6.3x5.3	F55	0.85	170	6.3x5.3	F55	0.85	170	6.3x5.3	F55	0.85	170	6.3x5.8	F61	0.44	230	
	5x5.8	E61	0.76	150	6.3x5.8	F61	0.44	230	6.3x5.8	F61	0.44	230	6.3x5.8	F61	0.44	230	6.3x7.7	F80	0.34	280	
68	6.3x5.8	F61	0.44	230	6.3x5.8	F61	0.44	230	6.3x5.8	F61	0.44	230	6.3x5.8	F61	0.44	230	6.3x7.7	F80	0.34	280	
																	8x6.5	G68	0.34	280	
100	6.3x5.3	F55	0.85	170	6.3x5.3	F55	0.85	170	6.3x5.3	F55	0.85	170	6.3x7.7	F80	0.34	280	8x10	G10	0.20	450	
	6.3x5.8	F61	0.44	230	6.3x5.8	F61	0.44	230	8x6.5	G68	0.34	280	8x6.5	G68	0.34	280	8x10.5	GA5	0.17	450	
150	6.3x5.8	F61	0.44	230	6.3x5.8	F61	0.44	230	6.3x7.7	F80	0.34	280	8x10	G10	0.20	450	8x10.5	GA5	0.17	450	
									8x6.5	G68	0.34	280	8x10.5	GA5	0.17	450	10x10	H10	0.10	670	
220	6.3x5.8	F61	0.44	230	6.3x7.7	F80	0.34	280	6.3x7.7	F80	0.34	280	8x10.5	GA5	0.17	450	8x10.5	GA5	0.17	450	
	6.3x7.7	F80	0.34	280	8x6.5	G68	0.34	280	8x10	G10	0.20	450	10x10	H10	0.10	670	10x10	H10	0.10	670	
330	6.3x7.7	F80	0.34	280	8x10.5	GA5	0.17	450	8x10.5	GA5	0.17	450	8x10.5	GA5	0.17	450	10x10.5	HA5	0.09	670	
	8x6.5	G68	0.34	200	10x10	H10	0.10	670	10x10	H10	0.10	670	10x10	H10	0.10	670					
470	8x10.5	GA5	0.17	450	8x10.5	GA5	0.17	450	8x10.5	GA5	0.17	450	10x10.5	HA5	0.09	670	—	—	—	—	
	10x10	H10	0.10	670	10x10	H10	0.10	670	10x10	H10	0.10	670									
680	8x10.5	GA5	0.17	450	10x10.5	HA5	0.09	670	10x10.5	HA5	0.09	670	—	—	—	—	—	—	—	—	
1000	8x10.5	GA5	0.17	450	10x10.5	HA5	0.09	670	—	—	—	—	—	—	—	—	—	—	—	—	—
	10x10	H10	0.10	670																	
1500	10x10.5	HA5	0.09	670	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	

(Note) Rated ripple current : 105°C, 100kHz ; Impedance : 20°C, 100kHz

Chip Type 125°C Capacitors Series RVK

- Compatible with surface mounting.
- Supplied with carrier taping.
- Guarantees 1250 hours at 125°C.
(ø8 : 1000 hours)
- Guarantees 5000 hours at 105°C.
(ø8 : 4000 hours)



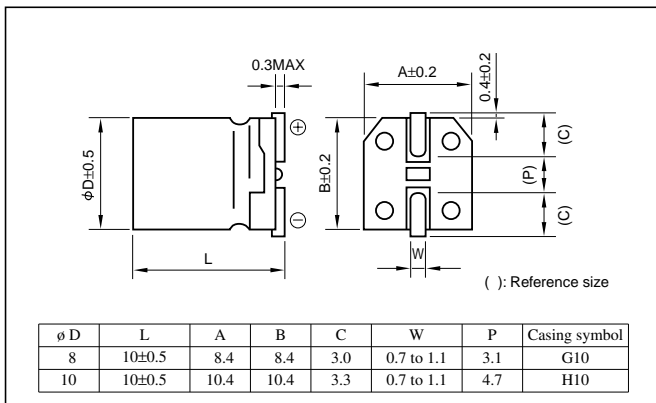
Marking color : Gold print on a brown sleeve

Specifications

Item	Performance						
Category temperature range (°C)	-40 to +125						
Tolerance at rated capacitance (%)	±20 (20°C, 120Hz)						
Leakage current (µA)	Less than 0.02CV or 3 whichever is larger(after 2 minutes) C: Rated capacitance(µF); V: Rated voltage(V) (20°C)						
Tangent of loss angle (tanδ)	Rated voltage (V)	10	16	25	35	50	63
	tanδ (max.)	0.28	0.26	0.24	0.20	0.19	0.18
Characteristics at high and low temperature	Impedance ratio (max.)	Z-25°C / Z+20°C	3	3	3	3	3
		Z-40°C / Z+20°C	5	5	5	5	5
Endurance (Applied ripple current)	Test temp.	125°C			105°C		
	Test time	ø10 : 1250h, ø8 : 1000h			ø10 : 5000h, ø8 : 4000h		
	Percentage of capacitance change	Within ±30% of initial value					
	Tangent of the loss angle	300% or less of the initial specified value					
Shelf life	Test temp.	125°C			105°C		
	Test time	500 h			1000h		
	Percentage of capacitance change	Within ±20% of initial value					
	Tangent of the loss angle	200% or less of the initial specified value					
Leakage current	The initial specified value or less						
Applicable standards	JIS C5101-1, -18 1998 (IEC 60384-1 1992, -18 1993)						

Outline Drawing

Unit: mm



- Soldering conditions and land size are described on page 14.
- The taping specifications are described on page 15.

Coefficient of Frequency for Rated Ripple Current

Frequency(Hz)	120	1k	10k	100k
Rated voltage(V)				
10 to 63	0.77	0.88	0.96	1

Part numbering system (example: 16V220µF)

Environmental item	RVK	16	V	221	M	H10	U
	Series code	Rated voltage symbol	Rated capacitance symbol	Capacitance tolerance symbol	Casing symbol	Additional symbol	Taping symbol
Former item	RVK	16	V	221	M	H10	
	Series code	Rated voltage symbol	Rated capacitance symbol	Capacitance tolerance symbol	Casing symbol	Additional symbol	Taping symbol

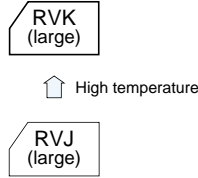
Standard Ratings

Rated voltage (V)	Item	10				16				25				35				50				63			
		Case	ESR	Impedance	Rated ripple current	Case	ESR	Impedance	Rated ripple current	Case	ESR	Impedance	Rated ripple current	Case	ESR	Impedance	Rated ripple current	Case	ESR	Impedance	Rated ripple current	Case	ESR	Impedance	Rated ripple current
Rated capacitance (µF)	φ D(mm)	Ω	Ω	mArms	φ D(mm)	Ω	Ω	mArms	φ D(mm)	Ω	Ω	mArms	φ D(mm)	Ω	Ω	mArms	φ D(mm)	Ω	Ω	mArms	φ D(mm)	Ω	Ω	mArms	
10	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	8x10	32	0.80	38	—	—	—	—	
22	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	8x10	14	0.80	38	8x10	14	1.00	33	
33	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	10x10	14	0.65	48	10x10	14	0.67	48	
47	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	8x10	10	0.80	40	—	—	—	—	
100	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	10x10	10	0.60	58	—	—	—	—	
220	8x10	2.1	0.68	60	10x10	2.0	0.55	107	—	—	—	—	—	—	—	—	8x10	7.1	0.68	55	—	—	—	—	
330	10x10	1.4	0.55	111	—	—	—	—	—	—	—	—	—	—	—	—	10x10	7.1	0.58	70	—	—	—	—	

(Note) Impedance : 20°C, 100kHz ; Rated ripple current : 125°C, 100kHz ; ESR : 20°C, 120Hz

Chip Type, 125°C Use, Large Capacitance Capacitors Series RVK (large)

- Surface mount device.
- Supplied with taping.
- Guarantees 5000 hours at 125°C.



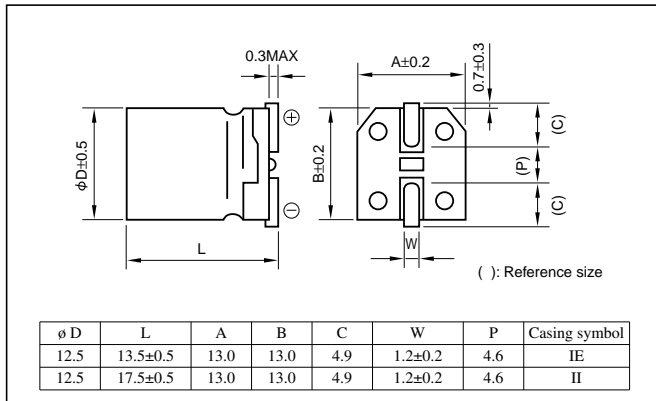
Marking color : White print on a brown sleeve

Specifications

Item	Performance						
Category temperature range (°C)	-40 to +125						
Tolerance at rated capacitance (%)	±20 (20°C, 120Hz)						
Leakage current (µA)	Less than 0.02CV (after 2 minutes) C: Rated capacitance(µF); V: Rated voltage(V) (20°C)						
Tangent of loss angle (tanδ)	Rated voltage (V)	10	16	25	35	50	63
	tanδ (max.)	0.26	0.22	0.16	0.13	0.12	0.11
0.02 is added to each 1000µF (20°C, 120Hz)							
Characteristics at high and low temperature	Rated voltage (V)	10	16	25	35	50	63
	Impedance ratio (max.)	Z-25°C / Z+20°C	3	2	2	2	2
Z-40°C / Z+20°C							
(120Hz)							
Endurance (125°C) (Applied ripple current)	Test time	5000 hours					
	Leakage current	The initial specified value or less					
	Percentage of capacitance change	Within ±30% of initial value					
	Tangent of the loss angle	300% or less of the initial specified value					
Shelf life (125°C)	Test time : 1000 hours; other items are the same as those for the endurance. Voltage application treatment : According to JIS C5101-1						
Applicable standards	JIS C5101-1, -18 1998 (IEC 60384-1 1992, -18 1993)						

Outline Drawing

Unit: mm



Coefficient of Frequency for Rated Ripple Current

Frequency(Hz)	120	1k	10k	100k
Rated capacitance(µF)				
100	0.40	0.75	0.90	1
220 to 330	0.50	0.85	0.95	1
470 to 1000	0.60	0.88	0.96	1

Part numbering system (example: 10V1000µF)

RVK	—	10	V	102	M	II	—	R5
Series code		Rated voltage symbol		Rated capacitance symbol	Capacitance tolerance symbol	Casing symbol		Taping symbol

- Soldering conditions and land size are described on page 14.
- The taping specifications are described on page 15.

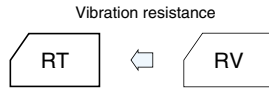
Standard Ratings

Rated voltage (V)	10				16				25				35				50				63			
	Case	Casing symbol	Imp. Ω	Rated ripple current mArms	Case	Casing symbol	Imp. Ω	Rated ripple current mArms	Case	Casing symbol	Imp. Ω	Rated ripple current mArms	Case	Casing symbol	Imp. Ω	Rated ripple current mArms	Case	Casing symbol	Imp. Ω	Rated ripple current mArms	Case	Casing symbol	Imp. Ω	Rated ripple current mArms
100	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	12.5x13.5	IE	0.136	509	12.5x13.5	IE	0.176	447
220	—	—	—	—	—	—	—	—	—	—	—	—	12.5x13.5	IE	0.105	579	12.5x17.5	II	0.121	591	12.5x17.5	II	0.135	560
330	—	—	—	—	—	—	—	—	—	12.5x13.5	IE	0.105	579	12.5x17.5	II	0.093	674	—	—	—	—	—	—	—
470	12.5x13.5	IE	0.105	579	12.5x13.5	IE	0.105	579	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
1000	12.5x17.5	II	0.093	674	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

(Note) Rated ripple current : 125°C, 100kHz ; Impedance(Imp.) : 20°C, 100kHz

Chip Type Large Capacitance Capacitors Series RT

- Compatible with surface mounting.
- For Vibration resistance.
- Supplied with carrier taping.
- Guarantees 2000 hours at 85°C.



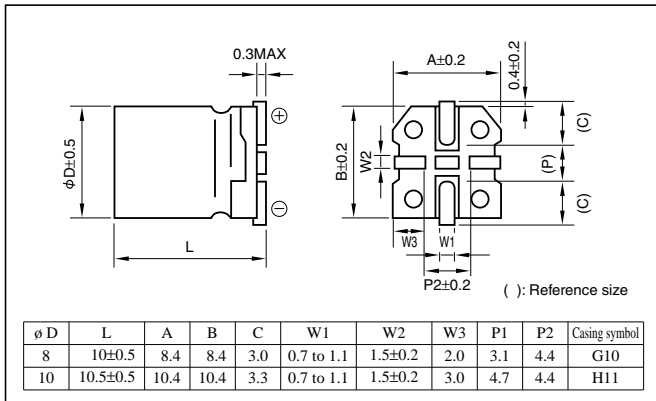
Marking color : White print on a brown sleeve

Specifications

Item	Performance										
Category temperature range (°C)	-40 to +85										
Tolerance at rated capacitance (%)	±20 (20°C, 120Hz)										
Leakage current (µA)	Less than 0.01CV or 3 whichever is larger(after 2 minutes) C: Rated capacitance(µF); V: Rated voltage(V) (20°C)										
Tangent of loss angle (tanδ)	Rated voltage (V)	6.3	10	16	25	35	50	63	100		
	tanδ (max.)	0.28	0.24	0.20	0.14	0.12	0.10	0.10	0.10	(20°C, 120Hz)	
Characteristics at high and low temperature	Impedance ratio (max.)	Rated voltage (V)		6.3	10	16	25	35	50	63	100
		Z-25°C / Z+20°C	4	3	2	2	2	2	2	2	(120Hz)
Endurance (85°C) (Applied ripple current)	Test time	2000 hours									
	Leakage current	The initial specified value or less									
	Percentage of capacitance change	Within ±20% of initial value									
	Tangent of the loss angle	200% or less of the initial specified value									
Shelf life (85°C)	Test time : 1000 hours; other items are the same as those for the endurance. Voltage application treatment : According to JIS C5101-1										
Applicable standards	JIS C5101-1, -18 1998 (IEC 60384-1 1992, -18 1993)										

Outline Drawing

Unit: mm



Coefficient of Frequency for Rated Ripple Current

Rated voltage(V)	Frequency(Hz)			
	50 · 60	120	1k	10k · 100k
6.3 to 16	0.80	1	1.15	1.25
25 to 35	0.80	1	1.25	1.40
50 to 63	0.80	1	1.35	1.50
100	0.70	1	1.35	1.50

Part numbering system (example: 16V470µF)

RT	—	16	V	471	M	H11	□	—	□
Series code		Rated voltage symbol		Rated capacitance symbol	Capacitance tolerance symbol	Casing symbol	Additional symbol		Taping symbol

- Soldering conditions and land size are described on page 14.
- The taping specifications are described on page 15.

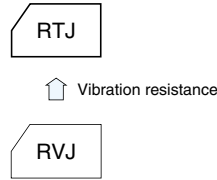
Standard Ratings

Rated voltage (V)	6.3				10				16				25				35				50				63				100			
	Case	Casing symbol	ESR	Rated ripple current	Case	Casing symbol	ESR	Rated ripple current	Case	Casing symbol	ESR	Rated ripple current	Case	Casing symbol	ESR	Rated ripple current	Case	Casing symbol	ESR	Rated ripple current	Case	Casing symbol	ESR	Rated ripple current	Case	Casing symbol	ESR	Rated ripple current				
Item	φ D(mm)	Ω	mArms	φ D(mm)	Ω	mArms	φ D(mm)	Ω	mArms	φ D(mm)	Ω	mArms	φ D(mm)	Ω	mArms	φ D(mm)	Ω	mArms	φ D(mm)	Ω	mArms	φ D(mm)	Ω	mArms	φ D(mm)	Ω	mArms	φ D(mm)	Ω	mArms		
10	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—		
22	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	8x10	G10	7.5	139	10x10.5	H11	7.5	189
33	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	8x10	G10	5.0	139	10x10.5	H11	5.0	189
47	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	8x10	G10	3.5	252	10x10.5	H11	3.5	226
68	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
100	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	8x10	G10	2.0	252	10x10.5	H11	1.7	458
220	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
330	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
470	8x10	G10	0.99	252	10x10.5	H11	1.2	252	8x10	G10	1.0	252	10x10.5	H11	0.70	458	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
1000	10x10.5	H11	0.46	458	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

(Note) Rated ripple current : 85°C, 120Hz ; ESR : 20°C, 120Hz

Chip Type, 105°C Use, Large Capacitance Capacitors Series RTJ

- Compatible with surface mounting.
- For Vibration resistance.
- Supplied with carrier taping.
- Guarantees 2000 hours at 105°C.



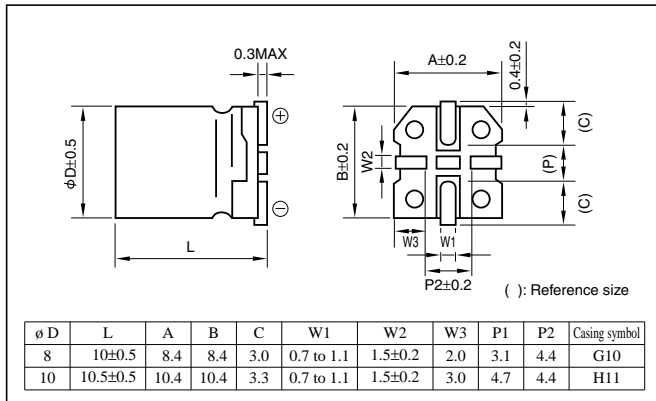
Marking color : White print on a brown sleeve

Specifications

Item	Performance										
Category temperature range (°C)	-55 to +105										
Tolerance at rated capacitance (%)	±20 (20°C, 120Hz)										
Leakage current (µA)	Less than 0.01CV or 3 whichever is larger(after 2 minutes) C: Rated capacitance(µF); V: Rated voltage(V) (20°C)										
Tangent of loss angle (tanδ)	Rated voltage (V)	6.3	10	16	25	35	50	63	100		
	tanδ (max.)	0.30	0.26	0.22	0.16	0.13	0.12	0.11	0.10	(20°C, 120Hz)	
Characteristics at high and low temperature	Rated voltage (V)	6.3	10	16	25	35	50	63	100		
	Impedance ratio (max.)	Z-25°C / Z+20°C	4	3	2	2	2	2	2	2	(120Hz)
Endurance (105°C) (Applied ripple current)	Test time	2000 hours									
	Leakage current	The initial specified value or less									
	Percentage of capacitance change	Within ±20% of initial value									
	Tangent of the loss angle	200% or less of the initial specified value									
Shelf life (105°C)	Test time : 1000 hours; other items are the same as those for the endurance. Voltage application treatment : According to JIS C5101-1										
Applicable standards	JIS C5101-1, -18 1998 (IEC 60384-1 1992, -18 1993)										

Outline Drawing

Unit: mm



Coefficient of Frequency for Rated Ripple Current

Frequency(Hz)	Rated voltage(V)			
	50 · 60	120	1k	10k · 100k
6.3 to 16	0.80	1	1.15	1.25
25 to 35	0.80	1	1.25	1.40
50 to 63	0.80	1	1.35	1.50
100	0.70	1	1.35	1.50

Part numbering system (example: 25V220µF)

RTJ	—	25	V	221	M	H11	□	—	□
Series code		Rated voltage symbol		Rated capacitance symbol	Capacitance tolerance symbol	Casing symbol	Additional symbol		Taping symbol

- Soldering conditions and land size are described on page 14.
- The taping specifications are described on page 15.

Standard Ratings

Rated capacitance (µF)	6.3				10				16				25				35				50				63				100			
	Case	Casing symbol	ESR	Rated ripple current	Case	Casing symbol	ESR	Rated ripple current	Case	Casing symbol	ESR	Rated ripple current	Case	Casing symbol	ESR	Rated ripple current	Case	Casing symbol	ESR	Rated ripple current	Case	Casing symbol	ESR	Rated ripple current	Case	Casing symbol	ESR	Rated ripple current	Case	Casing symbol	ESR	Rated ripple current
10	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	8x10	G10	16.6	67	—	—	—	—
22	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	8x10	G10	8.3	99	10x10.5	H11	7.5	133	—	—	—	—
33	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	8x10	G10	6.0	178	10x10.5	H11	5.5	160	—	—	—	—	—	—	—	—
47	—	—	—	—	—	—	—	—	—	—	—	—	8x10	G10	4.6	178	8x10	G10	4.2	178	10x10.5	H11	3.9	160	—	—	—	—	—	—	—	—
100	—	—	—	—	—	—	—	—	8x10	G10	3.6	178	8x10	G10	2.7	178	10x10.5	H11	2.2	324	10x10.5	H11	2.0	324	—	—	—	—	—	—	—	—
220	8x10	G10	2.3	178	8x10	G10	2.0	178	10x10.5	H11	1.7	324	10x10.5	H11	1.2	324	10x10.5	H11	0.98	324	—	—	—	—	—	—	—	—	—	—	—	—
330	8x10	G10	1.5	178	10x10.5	H11	1.3	324	10x10.5	H11	1.1	324	10x10.5	H11	0.80	324	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
470	10x10.5	H11	1.0	324	10x10.5	H11	0.92	324	10x10.5	H11	0.78	324	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

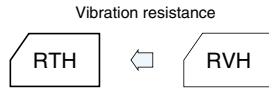
(Note) Rated ripple current : 105°C, 120Hz ; ESR : 20°C, 120Hz

NOTE

Design, Specifications are subject to change without notice.
Ask factory for technical specifications before purchase and/or use.

Chip Type, 105°C Use, Low Impedance Capacitors Series RTH

- Compatible with surface mounting.
- For Vibration resistance.
- Supplied with carrier taping.
- Guarantees 2000 hours at 105°C.



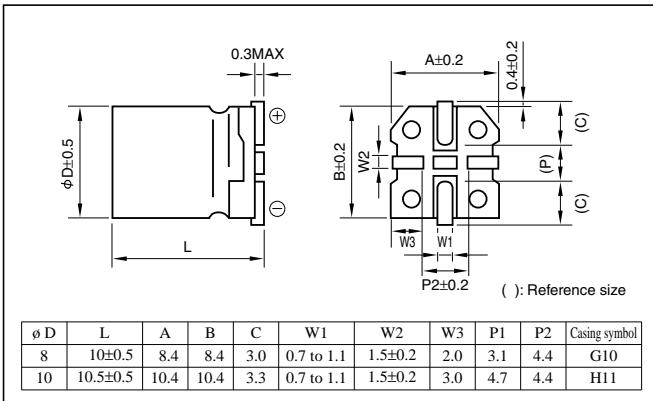
Marking color : White print on a brown sleeve

Specifications

Item	Performance						
Category temperature range (°C)	-55 to +105						
Tolerance at rated capacitance (%)	±20 (20°C, 120Hz)						
Leakage current (µA)	Less than 0.01CV or 3 whichever is larger(after 2 minutes) C: Rated capacitance(µF); V: Rated voltage(V) (20°C)						
Tangent of loss angle (tanδ)	Rated voltage (V)	6.3	10	16	25	35	
	tanδ (max.)	0.30	0.26	0.22	0.16	0.13	
Characteristics at high and low temperature	Impedance ratio (max.)	Z-25°C / Z+20°C	4	3	2	2	2
		Z-40°C / Z+20°C	8	5	4	3	3
Endurance (105°C) (Applied ripple current)	Test time	2000 hours					
	Leakage current	The initial specified value or less					
	Percentage of capacitance change	Within ±20% of initial value					
	Tangent of the loss angle	200% or less of the initial specified value					
Shelf life (105°C)	Test time : 1000 hours; other items are the same as those for the endurance. Voltage application treatment : According to JIS C5102						
Applicable standards	JIS C5101-1, -18 1998 (IEC 60384-1 1992, -18 1993)						

Outline Drawing

Unit: mm



Coefficient of Frequency for Rated Ripple Current

Frequency (Hz)	50 · 60	120	1k	10k · 100k
Coefficient	0.64	0.8	0.93	1

Part numbering system (example: 25V100µF)

RTH	—	25	V	101	M	G10	□	—	□
Series code		Rated voltage symbol		Rated capacitance symbol	Capacitance tolerance symbol	Casing symbol	Additional symbol		Taping symbol

- Soldering conditions and land size are described on page 14.
- The taping specifications are described on page 15.

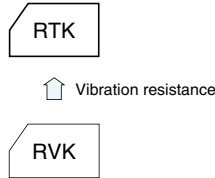
Standard Ratings

Rated voltage (V)	6.3				10				16				25				35			
	Case	Casing symbol	Impedance	Rated ripple current	Case	Casing symbol	Impedance	Rated ripple current	Case	Casing symbol	Impedance	Rated ripple current	Case	Casing symbol	Impedance	Rated ripple current	Case	Casing symbol	Impedance	Rated ripple current
Rated capacitance (µF)	φ D(mm)		Ω	mArms	φ D(mm)		Ω	mArms	φ D(mm)		Ω	mArms	φ D(mm)		Ω	mArms	φ D(mm)		Ω	mArms
47	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	8x10	G10	0.45	369
100	—	—	—	—	—	—	—	—	—	—	—	—	8x10	G10	0.45	369	10x10.5	H11	0.25	553
220	—	—	—	—	8x10	G10	0.45	369	—	—	—	—	10x10.5	H11	0.25	553	—	—	—	—
330	8x10	G10	0.45	369	—	—	—	—	10x10.5	H11	0.25	553	—	—	—	—	—	—	—	—
470	—	—	—	—	10x10.5	H11	0.25	553	—	—	—	—	—	—	—	—	—	—	—	—

(Note) Rated ripple current : 105°C, 100kHz ; Impedance : 20°C, 100kHz

Chip Type 125°C Capacitors Series RTK

- Compatible with surface mounting.
- For Vibration resistance.
- Supplied with carrier taping.
- Guarantees 1250 hours at 125°C.
(ø8 : 1000 hours)
- Guarantees 5000 hours at 105°C.
(ø8 : 4000 hours)

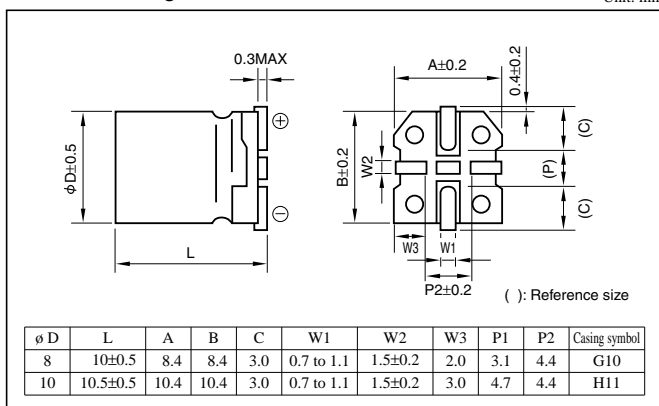


Marking color : Gold print on a brown sleeve

Specifications

Item	Performance							
Category temperature range (°C)	-40 to +125							
Tolerance at rated capacitance (%)	±20 (20°C,120Hz)							
Leakage current (µA)	Less than 0.02CV or 3 whichever is larger(after 2 minutes) C: Rated capacitance(µF); V: Rated voltage(V) (20°C)							
Tangent of loss angle (tanδ)	Rated voltage (V)	10	16	25	35	50	63	
	tanδ (max.)	0.28	0.26	0.24	0.20	0.19	0.18	
Characteristics at high and low temperature	Rated voltage (V)	10	16	25	35	50	63	
	Impedance ratio (max.)	Z-25°C / Z+20°C	3	3	3	3	3	3
Endurance (Applied ripple current)	Test temp.	125°C			105°C			
	Test time	ø10 : 1250h, ø8 : 1000h			ø10 : 5000h, ø8 : 4000h			
	Percentage of capacitance change	Within ±30% of initial value						
	Tangent of the loss angle	300% or less of the initial specified value						
Shelf life	Test temp.	125°C			105°C			
	Test time	500 h			1000h			
	Percentage of capacitance change	Within ±20% of initial value						
	Tangent of the loss angle	200% or less of the initial specified value						
Applicable standards	JIS C5101-1, -18 1998 (IEC 60384-1 1992, -18 1993)							

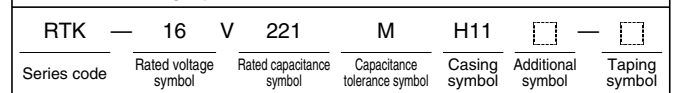
Outline Drawing



Coefficient of Frequency for Rated Ripple Current

Frequency(Hz)	120	1k	10k	100k
Rated voltage(V)				
10 to 63	0.77	0.88	0.96	1

Part numbering system (example: 16V220µF)



- Soldering conditions and land size are described on page 14.
- The taping specifications are described on page 15.

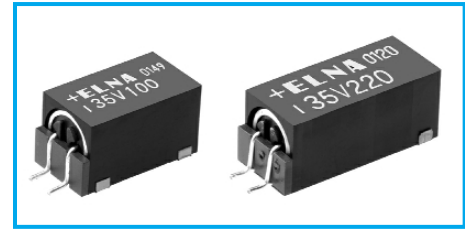
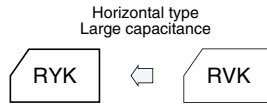
Standard Ratings

Rated voltage (V)	10				16				25				35				50				63			
	Case	ESR	Impedance	Rated ripple current	Case	ESR	Impedance	Rated ripple current	Case	ESR	Impedance	Rated ripple current	Case	ESR	Impedance	Rated ripple current	Case	ESR	Impedance	Rated ripple current	Case	ESR	Impedance	Rated ripple current
Rated capacitance (µF)	ø D(mm)	Ω	Ω	mArms	ø D(mm)	Ω	Ω	mArms	ø D(mm)	Ω	Ω	mArms	ø D(mm)	Ω	Ω	mArms	ø D(mm)	Ω	Ω	mArms	ø D(mm)	Ω	Ω	mArms
10	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	8x10	32	0.80	38	—	—	—	—
22	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	8x10	14	0.80	38	8x10	14	1.00	33
33	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	10x10.5	14	0.65	48	10x10.5	14	0.67	48
47	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	8x10	10	0.80	40	—	—	—	—
100	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	10x10.5	10	0.60	58	—	—	—	—
220	8x10	2.1	0.68	60	10x10.5	2.0	0.55	107	8x10	4.0	0.68	60	10x10.5	7.1	0.58	70	—	—	—	—	—	—	—	—
330	10x10.5	1.4	0.55	111	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

(Note) Impedance : 20°C, 100kHz ; Rated ripple current : 125°C, 100kHz ; ESR : 20°C, 120Hz

Horizontal type, 125°C Use, High-temperature Capacitors Series RYK

- 125°C high temperature surface mount.
- Highly resistant to vibration.
- Available in horizontal configurations only.
- Carrier taping supplied.
- Guarantees 1000 hours at 125°C.



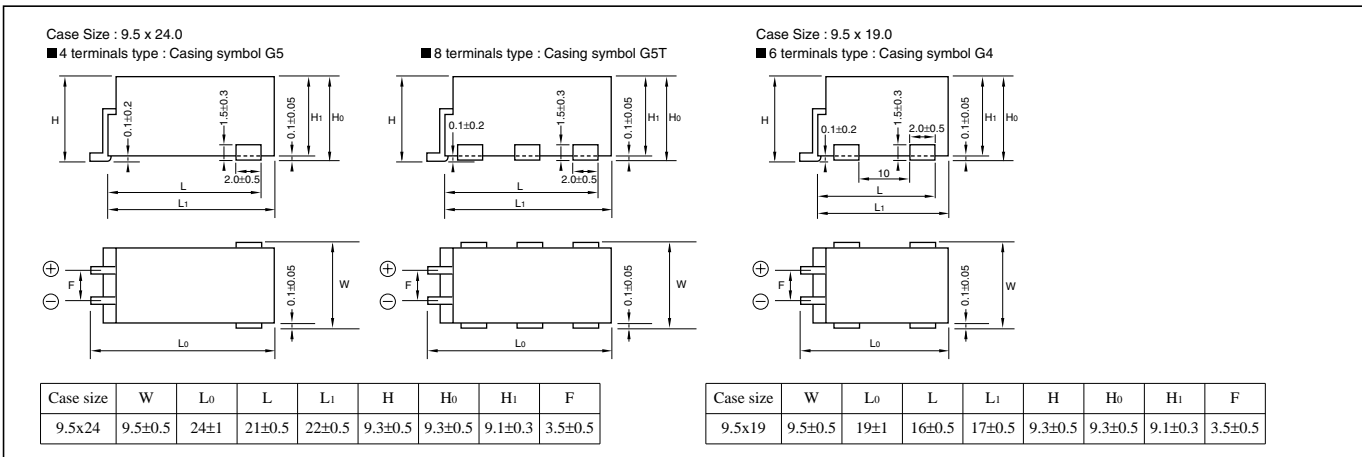
Marking color : White print on a black case

Specifications

Item	Performance							
Category temperature range (°C)	-40 to +125							
Tolerance at rated capacitance (%)	±20 (20°C, 120Hz)							
Leakage current (µA)	Less than 0.02CV (after 2 minutes) C: Rated capacitance(µF); V: Rated voltage(V) (20°C)							
Tangent of loss angle (tanδ)	Rated voltage (V)	6.3	10	16	25	35	50	63
	tanδ (max.)	0.3	0.28	0.26	0.24	0.20	0.19	0.18
Characteristics at high and low temperature	Rated voltage (V)	6.3	10	16	25	35	50	63
	Impedance ratio (max.)	Z-25°C / Z+20°C	3	3	3	3	3	3
Endurance (125°C) (Applied ripple current)	Test time	1000 hours						
	Percentage of capacitance change	Within ±30% of initial value						
	Tangent of the loss angle	300% or less of the initial specified value						
	Leakage current	The initial specified value or less						
Shelf life (125°C)	Test time	1000 hours						
	Percentage of capacitance change	Within ±20% of initial value						
	Tangent of the loss angle	200% or less of the initial specified value						
	Leakage current	The initial specified value or less						
Applicable standards	JIS C5101-1, -18 1998 (IEC 60384-1 1992, -18 1993)							

Outline Drawing

Unit: mm



Part numbering system (example: 10V560µF)

RYK	—	10	V	561	M	G5	—	FL
Series code		Rated voltage symbol		Rated capacitance symbol	Capacitance tolerance symbol	Casing symbol		Tray polarity symbol

Coefficient of Frequency for Rated Ripple Current

Frequency(Hz)	120	1k	10k	100k
Rated voltage(V)				
10 to 63	0.77	0.88	0.96	1

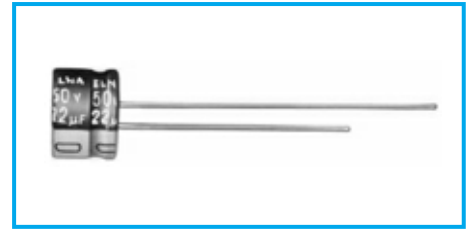
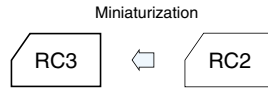
Standard Ratings

Rated capacitance (µF)	Item	6.3			10			16			25			35			50			63		
		Case	Impedance	Rated ripple current	Case	Impedance	Rated ripple current	Case	Impedance	Rated ripple current	Case	Impedance	Rated ripple current	Case	Impedance	Rated ripple current	Case	Impedance	Rated ripple current	Case	Impedance	Rated ripple current
		WxL(mm)	Ω	mArms	WxL(mm)	Ω	mArms	WxL(mm)	Ω	mArms	WxL(mm)	Ω	mArms	WxL(mm)	Ω	mArms	WxL(mm)	Ω	mArms	WxL(mm)	Ω	mArms
56	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	9.5x19.0	0.52	204
82	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	9.5x19.0	0.37	272
100	—	—	—	—	—	—	—	—	—	—	—	—	—	9.5x19.0	0.40	232	9.5x24.0	0.35	279	—	—	—
220	—	—	—	—	—	—	—	—	—	—	9.5x19.0	0.40	232	9.5x24.0	0.30	302	—	—	—	—	—	—
270	—	—	—	—	—	—	—	9.5x19.0	0.40	232	9.5x24.0	0.30	302	—	—	—	—	—	—	—	—	—
470	—	—	—	—	9.5x19.0	0.40	232	9.5x24.0	0.30	302	—	—	—	—	—	—	—	—	—	—	—	—
560	9.5x19.0	0.40	232	9.5x24.0	0.30	302	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
820	9.5x24.0	0.30	302	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

(Note) Rated ripple current : 125°C, 100kHz ; Impedance : 20°C, 100kHz

5mm L Standard Capacitors Series RC3

- Diameters from $\phi 3$ to $\phi 8$ mm and a height of 5mm.



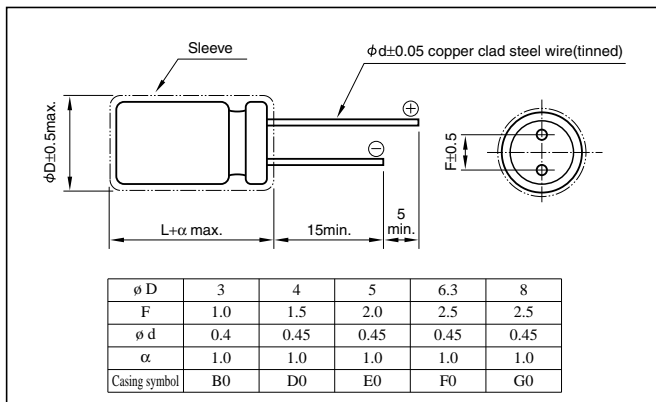
Marking color : White print on a blue sleeve ($\phi 3$: black sleeve) or White print on an indigo blue sleeve.

Specifications

Item	Performance																									
Category temperature range (°C)	-40 to +85																									
Tolerance at rated capacitance (%)	±20 (20°C,120Hz)																									
Leakage current (μA)	Less than 0.01CV or 3 whichever is larger(after 2 minutes) C: Rated capacitance(μF); V: Rated voltage(V) (20°C)																									
Tangent of loss angle (tanδ)	Rated voltage (V)																									
	<table border="1"> <tr> <td></td> <td>4</td> <td>6.3</td> <td>10</td> <td>16</td> <td>25</td> <td>35</td> <td>50</td> </tr> <tr> <td rowspan="2">tanδ (max.)</td> <td>$\phi 3$ to $\phi 6.3$</td> <td>0.35</td> <td>0.24</td> <td>0.20</td> <td>0.16</td> <td>0.14</td> <td>0.12</td> <td>0.10</td> </tr> <tr> <td>$\phi 8$</td> <td>0.39</td> <td>0.28</td> <td>0.24</td> <td>0.16</td> <td>0.14</td> <td>0.12</td> <td>0.10</td> </tr> </table>			4	6.3	10	16	25	35	50	tanδ (max.)	$\phi 3$ to $\phi 6.3$	0.35	0.24	0.20	0.16	0.14	0.12	0.10	$\phi 8$	0.39	0.28	0.24	0.16	0.14	0.12
	4	6.3	10	16	25	35	50																			
tanδ (max.)	$\phi 3$ to $\phi 6.3$	0.35	0.24	0.20	0.16	0.14	0.12	0.10																		
	$\phi 8$	0.39	0.28	0.24	0.16	0.14	0.12	0.10																		
Characteristics at high and low temperature	Rated voltage (V)																									
	<table border="1"> <tr> <td rowspan="2">Impedance ratio (max.)</td> <td>Z-25°C / Z+20°C</td> <td>6</td> <td>4</td> <td>3</td> <td>2</td> <td>2</td> <td>2</td> <td>2</td> </tr> <tr> <td>Z-40°C / Z+20°C</td> <td>16</td> <td>10</td> <td>8</td> <td>6</td> <td>4</td> <td>4</td> <td>4</td> </tr> </table>		Impedance ratio (max.)	Z-25°C / Z+20°C	6	4	3	2	2	2	2	Z-40°C / Z+20°C	16	10	8	6	4	4	4							
Impedance ratio (max.)	Z-25°C / Z+20°C	6		4	3	2	2	2	2																	
	Z-40°C / Z+20°C	16	10	8	6	4	4	4																		
Endurance (85°C) (Applied ripple current)	Test time	1000 hours																								
	Leakage current	The initial specified value or less																								
	Percentage of capacitance change	Within ±20% of initial value																								
	Tangent of the loss angle	200% or less of the initial specified value																								
Shelf life (85°C)	Test time : 1000 hours; other items are the same as those for the endurance. Voltage application treatment : According to JIS C5101-1																									
Applicable standards	JIS C5101-1, -4 1998 (IEC 60384-1 1992, -4 1985)																									

Outline Drawing

Unit: mm



Coefficient of Frequency for Rated Ripple Current

Rated voltage(V)	Frequency(Hz)			
	50 · 60	120	1k	10k · 100k
4 to 16	0.8	1	1.1	1.2
25 to 35	0.8	1	1.5	1.7
50	0.8	1	1.6	1.9

Part numbering system (example: 6.3V100μF)

Environmental item	RC3	—	6	V	101	M	F0	#	[]
	Series code		Rated voltage symbol		Rated capacitance symbol	Capacitance tolerance symbol	Casing symbol		Additional symbol
Former item	RC3	—	6	V	101	M	[]		[]
	Series code		Rated voltage symbol		Rated capacitance symbol	Capacitance tolerance symbol	Additional symbol		

To denote former item $\phi 3$, "S" is suffixed to the tolerance, as MS-[]
To denote former item $\phi 8$, "GZ" is suffixed to the tolerance, as MGZ-[]

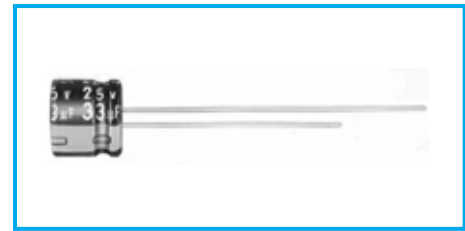
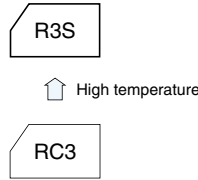
Standard Ratings

Rated capacitance(μF)	4		6.3		10		16		25		35		50	
	Case	Rated ripple current	Case	Rated ripple current	Case	Rated ripple current	Case	Rated ripple current	Case	Rated ripple current	Case	Rated ripple current	Case	Rated ripple current
Item	ϕ DxL(mm)	mArms	ϕ DxL(mm)	mArms	ϕ DxL(mm)	mArms	ϕ DxL(mm)	mArms	ϕ DxL(mm)	mArms	ϕ DxL(mm)	mArms	ϕ DxL(mm)	mArms
0.1	—	—	—	—	—	—	—	—	—	—	—	—	—	—
0.22	—	—	—	—	—	—	—	—	—	—	—	—	• 4x5	3(3)
0.33	—	—	—	—	—	—	—	—	—	—	—	—	• 4x5	5(4)
0.47	—	—	—	—	—	—	—	—	—	—	—	—	• 4x5	7(6)
1	—	—	—	—	—	—	—	—	—	—	—	—	• 4x5	10(8)
2.2	—	—	—	—	—	—	—	—	—	—	• 4x5	14(11)	4x5	15
3.3	—	—	—	—	—	—	—	—	• 4x5	15(13)	4x5	17	4x5	18
4.7	—	—	—	—	—	—	• 4x5	17(14)	4x5	18	4x5	20	5x5	25
10	—	—	• 4x5	20(17)	4x5	22	4x5	25	5x5	30	5x5	30	6.3x5	40
22	• 4x5	25(21)	4x5	30	5x5	35	5x5	40	6.3x5	50	6.3x5	55	8x5	75
33	4x5	30	5x5	40	5x5	45	6.3x5	60	6.3x5	65	8x5	80	8x5	90
47	4x5	35	5x5	50	6.3x5	65	6.3x5	70	8x5	95	8x5	100	—	—
100	5x5	60	6.3x5	85	6.3x5	95	8x5	125	8x5	135	—	—	—	—
220	6.3x5	105	8x5	145	8x5	155	—	—	—	—	—	—	—	—
330	8x5	150	8x5	175	—	—	—	—	—	—	—	—	—	—
470	8x5	180	—	—	—	—	—	—	—	—	—	—	—	—

(Note) Rated ripple current : 85°C, 120Hz ; The types of capacitor marked with a black circle are manufactured in the $\phi 3$ x5 size also; the figures in the parentheses are applicable to capacitors with $\phi 3$.

5mm L, 105°C Use Capacitors Series R3S

- Diameters from ϕ 4 to ϕ 6.3mm and a height of 5mm.
- Guarantees 1000 hours at 105°C.



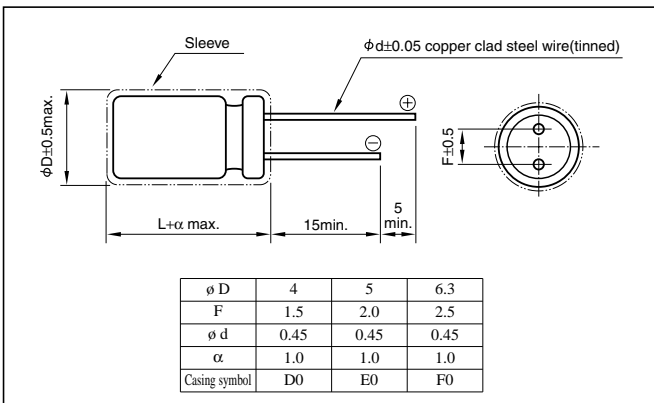
Marking color : White print on a black sleeve or White print on brown sleeve

Specifications

Item	Performance								
Category temperature range (°C)	-55 to +105								
Tolerance at rated capacitance (%)	±20 (20°C, 120Hz)								
Leakage current (µA)	Less than 0.01CV or 3 whichever is larger(after 2 minutes) C: Rated capacitance(µF); V: Rated voltage(V) (20°C)								
Tangent of loss angle (tanδ)	Rated voltage (V)	6.3	10	16	25	35	50		
	tanδ (max.)	0.28	0.24	0.20	0.14	0.12	0.10	(20°C, 120Hz)	
Characteristics at high and low temperature	Impedance ratio (max.)	Rated voltage (V)	6.3	10	16	25	35	50	
		Z-25°C / Z+20°C	3	3	2	2	2	2	(120Hz)
		Z-40°C / Z+20°C	8	5	4	3	3	3	
Endurance (105°C) (Applied ripple current)	Test time	1000 hours							
	Leakage current	The initial specified value or less							
	Percentage of capacitance change	Within ±20% of initial value							
	Tangent of the loss angle	200% or less of the initial specified value							
Shelf life (105°C)	Test time : 1000 hours; other items are the same as those for the endurance. Voltage application treatment : According to JIS C5101-1								
Applicable standards	JIS C5101-1, -4 1998 (IEC 60384-1 1992, -4 1985)								

Outline Drawing

Unit: mm



Coefficient of Frequency for Rated Ripple Current

Rated voltage(V)	Frequency(Hz)			
	50 · 60	120	1k	10k · 100k
6.3 to 16	0.64	0.80	0.92	1
25 to 35	0.57	0.71	0.89	1
50	0.53	0.67	0.90	1

Part numbering system (example: 16V47µF)

Environmental item	R3S	—	16	V	470	M	F0	#	□
	Series code		Rated voltage symbol		Rated capacitance symbol	Capacitance tolerance symbol	Casing symbol		Taping symbol
Former item	R3S	—	16	V	470	M	□		
	Series code		Rated voltage symbol		Rated capacitance symbol	Capacitance tolerance symbol	Additional symbol		

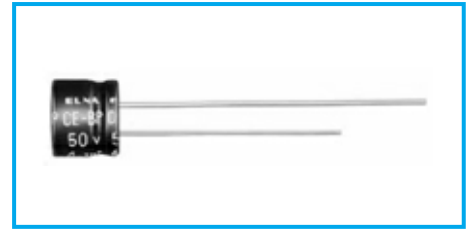
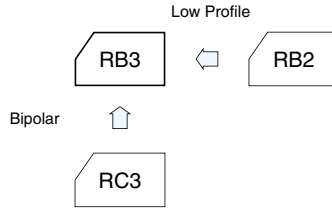
Standard Ratings

Rated voltage(V)	6.3		10		16		25		35		50	
	Case	Rated ripple current	Case	Rated ripple current	Case	Rated ripple current	Case	Rated ripple current	Case	Rated ripple current	Case	Rated ripple current
Rated capacitance(µF)	ϕ DxL(mm)	mArms	ϕ DxL(mm)	mArms	ϕ DxL(mm)	mArms	ϕ DxL(mm)	mArms	ϕ DxL(mm)	mArms	ϕ DxL(mm)	mArms
0.1	—	—	—	—	—	—	—	—	—	—	4x5	3
0.22	—	—	—	—	—	—	—	—	—	—	4x5	5
0.33	—	—	—	—	—	—	—	—	—	—	4x5	6
0.47	—	—	—	—	—	—	—	—	—	—	4x5	8
1	—	—	—	—	—	—	—	—	—	—	4x5	11
2.2	—	—	—	—	—	—	—	—	—	—	4x5	17
3.3	—	—	—	—	—	—	—	—	4x5	17	4x5	20
4.7	—	—	—	—	4x5	15	4x5	18	4x5	20	5x5	27
10	—	—	4x5	20	4x5	23	5x5	31	5x5	34	6.3x5	45
22	4x5	26	5x5	34	5x5	38	6.3x5	53	6.3x5	57	—	—
33	5x5	33	5x5	43	6.3x5	56	6.3x5	66	—	—	—	—
47	5x5	45	6.3x5	58	6.3x5	65	—	—	—	—	—	—
100	6.3x5	78	—	—	—	—	—	—	—	—	—	—

(Note) Rated ripple current : 105°C, 100kHz.

5mm L Bipolar Capacitors Series RB3

- Diameters from $\phi 4$ to $\phi 6.3$ mm and a height of 5mm.

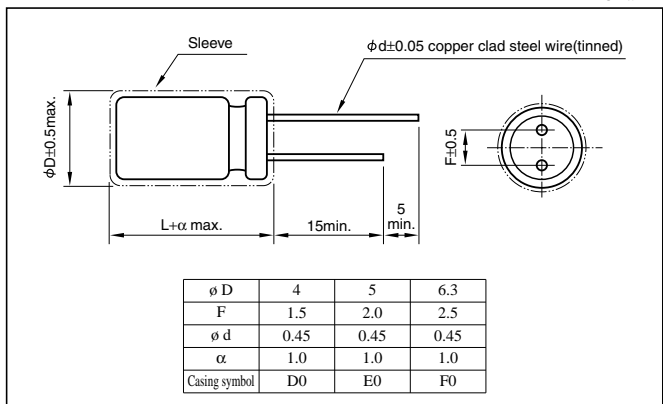


Marking color : White print on a blue sleeve or
White print on an indigo blue sleeve

Specifications

Item	Performance
Category temperature range (°C)	-40 to +85
Tolerance at rated capacitance (%)	± 20 (20°C, 120Hz)
Leakage current (μA)	Less than $0.03CV + 3$ (after 5 minutes) C: Rated capacitance(μF); V: Rated voltage(V) (20°C)
Tangent of loss angle (tan δ)	Rated voltage (V)
	tan δ (max.)
Endurance (85°C) (Applied ripple current)	Test time
	Leakage current
Applicable standards	Percentage of capacitance change
	Tangent of the loss angle

Outline Drawing



Coefficient of Frequency for Rated Ripple Current

Rated voltage(V)	Frequency(Hz)			
	50 · 60	120	1k	10k · 100k
6.3 to 16	0.8	1	1.1	1.2
25 to 35	0.8	1	1.5	1.7
50	0.8	1	1.6	1.9

Part numbering system (example: 10V47 μF)

Environmental item	RB3	10	V	470	M	F0	#
	Series code	Rated voltage symbol		Rated capacitance symbol	Capacitance tolerance symbol	Casing symbol	
Former item	RB3	10	V	470	M		
	Series code	Rated voltage symbol		Rated capacitance symbol	Capacitance tolerance symbol	Additional symbol	

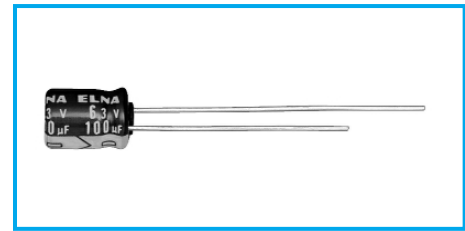
Standard Ratings

Rated voltage(V)	6.3		10		16		25		35		50	
	Case	Rated ripple current	Case	Rated ripple current	Case	Rated ripple current	Case	Rated ripple current	Case	Rated ripple current	Case	Rated ripple current
Rated capacitance(μF)	$\phi D \times L$ (mm)	mArms	$\phi D \times L$ (mm)	mArms	$\phi D \times L$ (mm)	mArms	$\phi D \times L$ (mm)	mArms	$\phi D \times L$ (mm)	mArms	$\phi D \times L$ (mm)	mArms
0.1	—	—	—	—	—	—	—	—	—	—	4x5	2
0.22	—	—	—	—	—	—	—	—	—	—	4x5	3
0.33	—	—	—	—	—	—	—	—	—	—	4x5	4
0.47	—	—	—	—	—	—	—	—	—	—	4x5	5
1	—	—	—	—	—	—	—	—	—	—	4x5	7
2.2	—	—	—	—	—	—	—	—	4x5	11	5x5	14
3.3	—	—	—	—	—	—	4x5	13	5x5	17	6.3x5	20
4.7	—	—	—	—	4x5	14	5x5	21	6.3x5	24	6.3x5	24
10	—	—	4x5	18	5x5	26	6.3x5	35	6.3x5	35	—	—
22	5x5	31	6.3x5	40	6.3x5	45	—	—	—	—	—	—
33	6.3x5	45	6.3x5	49	—	—	—	—	—	—	—	—
47	6.3x5	54	6.3x5	59	—	—	—	—	—	—	—	—

(Note) Rated ripple current : 85°C, 120Hz.

7mm L, Standard Capacitors Series RC2

- Conventional RC2 further downsized, diameters from $\phi 4$ to $\phi 8$ mm.
- Guarantees 1000 hours at 85°C.



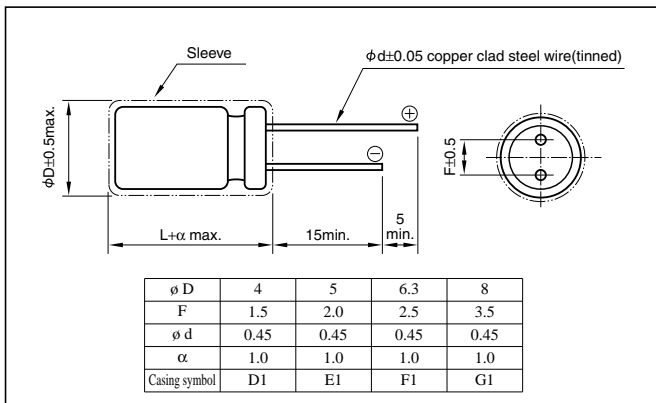
Marking color : White print on a blue sleeve or
Black print on a yellow sleeve

Specifications

Item	Performance										
Category temperature range (°C)	-40 to +85										
Tolerance at rated capacitance (%)	±20 (20°C, 120Hz)										
Leakage current (µA)	Less than 0.01CV or 3 whichever is larger(after 2 minutes) C: Rated capacitance(µF); V: Rated voltage(V) (20°C)										
Tangent of loss angle (tanδ)	Rated voltage (V)	4	6.3	10	16	25	35	50	63	100	
	tanδ (max.)	0.35	0.24	0.20	0.16	0.14	0.12	0.10	0.08	0.08	
Characteristics at high and low temperature	Impedance ratio (max.)	Z-25°C / Z+20°C	6	4	3	2	2	2	2	2	2
		Z-40°C / Z+20°C	16	10	8	6	4	4	4	4	4
	(120Hz)										
Endurance (85°C) (Applied ripple current)	Test time	1000 hours									
	Leakage current	The initial specified value or less									
	Percentage of capacitance change	Within ±20% of initial value									
	Tangent of the loss angle	200% or less of the initial specified value									
Shelf life (85°C)	Test time : 1000 hours; other items are the same as those for the endurance. Voltage application treatment : According to JIS C5101-1										
Applicable standards	JIS C5101-1, -4 1998 (IEC 60384-1 1992, -4 1985)										

Outline Drawing

Unit: mm



Coefficient of Frequency for Rated Ripple Current

Rated voltage(V)	Frequency(Hz)			
	50 · 60	120	1k	10k · 100k
4 to 16	0.8	1	1.1	1.2
25 to 35	0.8	1	1.5	1.7
50 to 100	0.8	1	1.6	1.9

Part numbering system (example: 10V220µF)

Environmental item	RC2	—	10	V	221	M	G1	#
	Series code		Rated voltage symbol		Rated capacitance symbol	Capacitance tolerance symbol	Casing symbol	
Former item	RC2	—	10	V	221	M		
	Series code		Rated voltage symbol		Rated capacitance symbol	Capacitance tolerance symbol	Additional symbol	

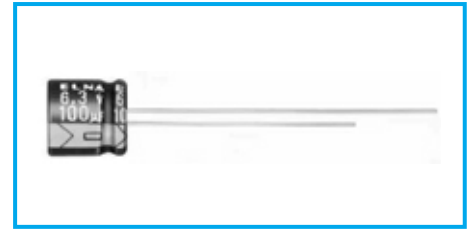
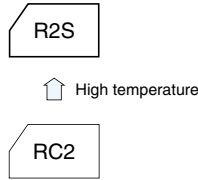
Standard Ratings

Rated capacitance(µF)	4		6.3		10		16		25		35		50		63		100	
	Case	Rated ripple current	Case	Rated ripple current	Case	Rated ripple current	Case	Rated ripple current	Case	Rated ripple current	Case	Rated ripple current	Case	Rated ripple current	Case	Rated ripple current	Case	Rated ripple current
0.1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
0.22	—	—	—	—	—	—	—	—	—	—	—	—	4x7	4	4x7	4	—	—
0.33	—	—	—	—	—	—	—	—	—	—	—	—	4x7	7	4x7	7	—	—
0.47	—	—	—	—	—	—	—	—	—	—	—	—	4x7	8	4x7	8	—	—
1	—	—	—	—	—	—	—	—	—	—	—	—	4x7	10	4x7	10	4x7	12
2.2	—	—	—	—	—	—	—	—	—	—	—	—	4x7	15	4x7	15	5x7	20
3.3	—	—	—	—	—	—	—	—	4x7	15	4x7	15	4x7	20	4x7	23	6.3x7	30
4.7	—	—	—	—	—	—	—	—	4x7	20	4x7	20	4x7	24	5x7	30	6.3x7	35
10	—	—	—	—	—	—	4x7	25	4x7	30	4x7	30	5x7	40	6.3x7	50	—	—
22	—	—	4x7	35	4x7	35	4x7	40	5x7	50	5x7	55	6.3x7	70	—	—	—	—
33	4x7	35	4x7	40	4x7	45	5x7	55	6.3x7	70	6.3x7	75	8x7	100	—	—	—	—
47	4x7	40	4x7	50	5x7	60	5x7	70	6.3x7	85	8x7	110	—	—	—	—	—	—
100	5x7	70	5x7	80	6.3x7	105	6.3x7	120	8x7	145	—	—	—	—	—	—	—	—
220	6.3x7	120	6.3x7	140	8x7	185	8x7	205	—	—	—	—	—	—	—	—	—	—
330	8x7	170	8x7	205	—	—	—	—	—	—	—	—	—	—	—	—	—	—

(Note) Rated ripple current : 85°C, 120Hz.

7mm L, 105°C Use Capacitors Series R2S

- Diameters from $\phi 4$ to $\phi 6.3$ mm and a height of 7mm.
- Guarantees 1000 hours at 105°C.



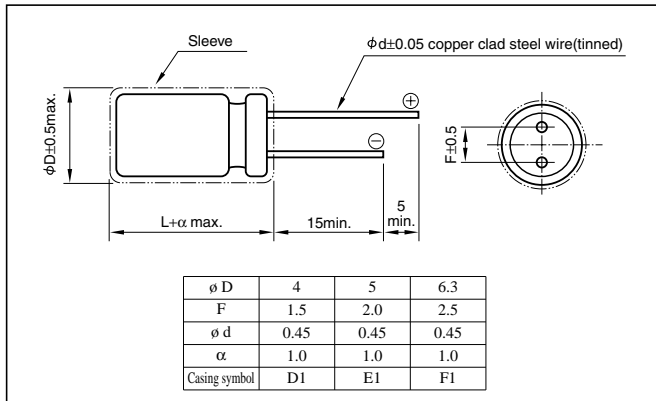
Marking color : White print on a black sleeve or White print on a brown sleeve

Specifications

Item	Performance	
Category temperature range (°C)	-55 to +105	
Tolerance at rated capacitance (%)	±20 (20°C, 120Hz)	
Leakage current (µA)	Less than 0.01CV or 3 whichever is larger(after 2 minutes) C: Rated capacitance(µF); V: Rated voltage(V) (20°C)	
Tangent of loss angle (tanδ)	Rated voltage (V)	6.3 10 16 25 35 50
	tanδ (max.)	0.22 0.19 0.16 0.14 0.12 0.10
Characteristics at high and low temperature	Rated voltage (V)	6.3 10 16 25 35 50
	Impedance ratio (max.)	Z-25°C / Z+20°C: 3 3 2 2 2 2 Z-40°C / Z+20°C: 8 5 4 3 3 3
Endurance (105°C) (Applied ripple current)	Test time	1000 hours
	Leakage current	The initial specified value or less
	Percentage of capacitance change	Within ±20% of initial value
	Tangent of the loss angle	200% or less of the initial specified value
Shelf life (105°C)	Test time : 1000 hours; other items are the same as those for the endurance. Voltage application treatment : According to JIS C5101-1	
Applicable standards	JIS C5101-1, -4 1998 (IEC 60384-1 1992, -4 1985)	

Outline Drawing

Unit: mm



Coefficient of Frequency for Rated Ripple Current

Rated voltage(V)	Frequency(Hz)			
	50 · 60	120	1k	10k · 100k
6.3 to 16	0.68	0.72	0.92	1
25 to 35	0.48	0.63	0.80	1
50	0.45	0.50	0.70	1

Part numbering system (example: 25V33µF)

Environmental item	R2S	—	25	V	330	M	F1	#
	Series code		Rated voltage symbol		Rated capacitance symbol	Capacitance tolerance symbol	Casing symbol	
Former item	R2S	—	25	V	330	M		
	Series code		Rated voltage symbol		Rated capacitance symbol	Capacitance tolerance symbol	Additional symbol	

Standard Ratings

Rated capacitance(µF)	Item	6.3		10		16		25		35		50	
		Case	Rated ripple current	Case	Rated ripple current	Case	Rated ripple current	Case	Rated ripple current	Case	Rated ripple current	Case	Rated ripple current
		ϕ DxL(mm)	mArms	ϕ DxL(mm)	mArms	ϕ DxL(mm)	mArms	ϕ DxL(mm)	mArms	ϕ DxL(mm)	mArms	ϕ DxL(mm)	mArms
0.1	—	—	—	—	—	—	—	—	—	—	—	4x7	6
0.22	—	—	—	—	—	—	—	—	—	—	—	4x7	8
0.33	—	—	—	—	—	—	—	—	—	—	—	4x7	10
0.47	—	—	—	—	—	—	—	—	—	—	—	4x7	12
1	—	—	—	—	—	—	—	—	—	—	—	4x7	16
2.2	—	—	—	—	—	—	—	—	—	—	—	4x7	25
3.3	—	—	—	—	—	—	—	4x7	21	4x7	23	4x7	28
4.7	—	—	—	—	—	—	—	4x7	25	4x7	25	5x7	48
10	—	—	—	—	—	—	—	4x7	39	5x7	47	6.3x7	75
22	—	4x7	42	—	4x7	49	—	5x7	54	6.3x7	87	6.3x7	90
33	—	5x7	53	—	5x7	60	—	6.3x7	83	6.3x7	90	—	—
47	—	5x7	64	—	6.3x7	95	—	6.3x7	95	—	—	—	—
100	—	6.3x7	96	—	—	—	—	—	—	—	—	—	—

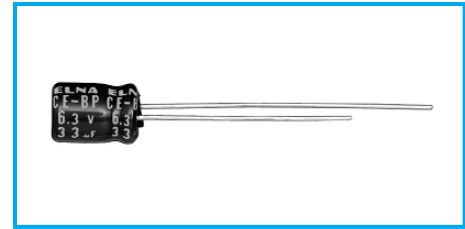
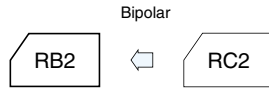
(Note) Rated ripple current : 105°C, 100kHz.

NOTE

Design, Specifications are subject to change without notice. Ask factory for technical specifications before purchase and/or use.

7mm L Bipolar Capacitors Series RB2

• Diameters from $\phi 4$ to $\phi 6.3$ mm and a height of 7mm.



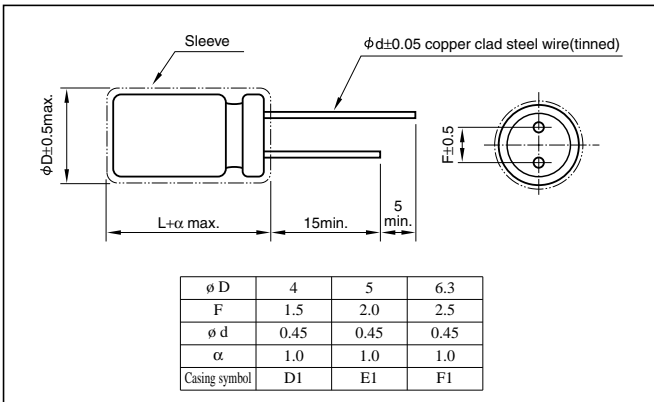
Marking color : White print on a blue sleeve or Black print on a yellow sleeve

Specifications

Item	Performance						
Category temperature range (°C)	-40 to +85						
Tolerance at rated capacitance (%)	± 20 (20°C, 120Hz)						
Leakage current (μ A)	Less than $0.03CV + 3$ (after 5 minutes) C: Rated capacitance(μ F); V: Rated voltage(V) (20°C)						
Tangent of loss angle (tan δ)	Rated voltage (V)	6.3	10	16	25	35	50
	tan δ (max.)	0.30	0.25	0.20	0.15	0.15	0.15
(20°C, 120Hz)							
Endurance (85°C)	Test time	1000 hours (with the polarity inverted every 250 hours)					
	Leakage current	The initial specified value or less					
	Percentage of capacitance change	Within $\pm 20\%$ of initial value					
	Tangent of the loss angle	200% or less of the initial specified value					
Applicable standards	JIS C5101-1, -4 1998 (IEC 60384-1 1992, -4 1985)						

Outline Drawing

Unit: mm



Coefficient of Frequency for Rated Ripple Current

Rated voltage(V)	Frequency(Hz)			
	50 · 60	120	1k	10k · 100k
6.3 to 16	0.8	1	1.1	1.2
25 to 35	0.8	1	1.5	1.7
50	0.8	1	1.6	1.9

Part numbering system (example: 16V47 μ F)

Environmental item	RB2	—	16	V	470	M	F1	#
	Series code		Rated voltage symbol		Rated capacitance symbol	Capacitance tolerance symbol	Casing symbol	
Former item	RB2	—	16	V	470	M		
	Series code		Rated voltage symbol		Rated capacitance symbol	Capacitance tolerance symbol	Additional symbol	

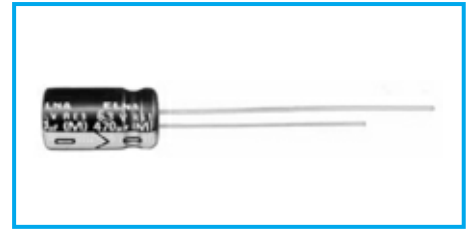
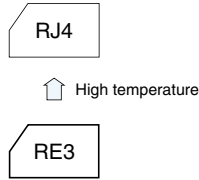
Standard Ratings

Rated capacitance(μ F)	6.3		10		16		25		35		50	
	Case	Rated ripple current	Case	Rated ripple current	Case	Rated ripple current	Case	Rated ripple current	Case	Rated ripple current	Case	Rated ripple current
	ϕ DxL(mm)	mArms	ϕ DxL(mm)	mArms	ϕ DxL(mm)	mArms	ϕ DxL(mm)	mArms	ϕ DxL(mm)	mArms	ϕ DxL(mm)	mArms
0.1	—	—	—	—	—	—	—	—	—	—	4x7	3
0.22	—	—	—	—	—	—	—	—	—	—	4x7	4
0.33	—	—	—	—	—	—	—	—	—	—	4x7	5
0.47	—	—	—	—	—	—	—	—	—	—	4x7	6
1	—	—	—	—	—	—	—	—	—	—	4x7	9
2.2	—	—	—	—	—	—	—	—	4x7	14	5x7	16
3.3	—	—	—	—	—	—	4x7	17	5x7	19	5x7	19
4.7	—	—	—	—	4x7	17	5x7	23	5x7	23	6.3x7	27
10	—	—	4x7	23	5x7	29	6.3x7	39	6.3x7	39	—	—
22	5x7	35	5x7	39	6.3x7	50	6.3x7	58	—	—	—	—
33	5x7	43	6.3x7	55	6.3x7	61	6.3x7	71	—	—	—	—
47	6.3x7	60	6.3x7	66	6.3x7	73	—	—	—	—	—	—

(Note) Rated ripple current : 85°C, 120Hz.

Standard Capacitors Series RE3

- Guarantees 2000 hours at 85°C.



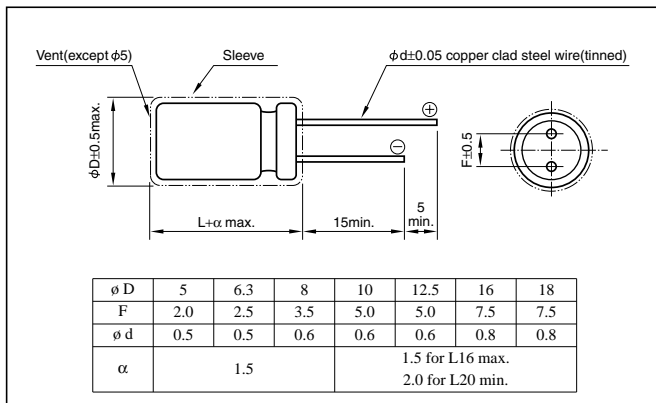
Marking color : White print on a blue sleeve or White print on an indigo blue sleeve

Specifications

Item	Performance
Category temperature range (°C)	-40 to +85
Tolerance at rated capacitance (%)	±20 (20°C,120Hz)
Leakage current (µA)	Rated voltage (V) 6.3 to 10 160 to 450
	Leakage current (µA) Less than 0.03CV or 4 whichever is larger(after 1 minute) Less than 0.01CV or 3 whichever is larger(after 2 minutes) CV≤1000: Less than 0.1CV+40(after 1 minute) CV>1000: Less than 0.04CV+100(after 1 minute)
C: Rated capacitance(µF) V: Rated voltage(V) (20°C)	
Tangent of loss angle (tanδ)	Rated voltage (V) 6.3 10 16 25 35 50 63 100 160 200 250 315 350 400 450
	tanδ (max.) 0.28 0.24 0.20 0.16 0.14 0.12 0.10 0.08 0.20 0.20 0.20 0.24 0.24 0.24 0.24
0.02 is added to every 1000µF increase over 1000µF. (20°C,120Hz)	
Characteristics at high and low temperature	Rated voltage (V) 6.3 10 16 25 35 50 63 100 160 200 250 315 350 400 450
	Impedance ratio (max.) Z-25°C / Z+20°C 5 4 3 2 2 2 2 2 4 4 4 4 4 4 4 Z-40°C / Z+20°C 12 10 8 5 4 3 3 3 15 15 15 10 10 10 10
(120Hz)	
Endurance (85°C) (Applied ripple current)	Test time 2000 hours
	Leakage current The initial specified value or less
	Percentage of capacitance change Within ±20% of initial value
	Tangent of the loss angle 200% or less of the initial specified value
Shelf life (85°C)	Test time : 1000 hours; other items are the same as those for the endurance. Voltage application treatment
Applicable standards	JIS C5101-1, -4 1998 (IEC 60384-1 1992, -4 1985)

Outline Drawing

Unit: mm



Coefficient of Frequency for Rated Ripple Current

Rated voltage(V)	Frequency(Hz) CV(µF×V)	50 · 60	120	1k	10k	100k
		6.3 to 16	All CV value	0.8	1	1.1
25 to 35	≤1000	0.8	1	1.5	1.7	1.7
	1000<	0.8	1	1.2	1.3	1.3
50 to 100	≤1000	0.8	1	1.6	1.9	1.9
	1000<	0.8	1	1.2	1.3	1.3
160 to 450	All CV value	0.8	1	1.3	1.5	1.6

Part numbering system (example: 16V1000µF)

Environmental item	RE3	—	16	V	102	M	H4	#
	Series code		Rated voltage symbol		Rated capacitance symbol	Capacitance tolerance symbol	Casing symbol	
Former item	RE3	—	16	V	102	M		
	Series code		Rated voltage symbol		Rated capacitance symbol	Capacitance tolerance symbol		

Casing symbol

Size φ DxL(mm)	Casing Symbol	Size φ DxL(mm)	Casing Symbol
5x11	E3	12.5x25	I 6
6.3x11	F3	16x25	J 6
8x11.5	G3	16x31.5	J 7
10x12.5	H3	16x35.5	J 8
10x16	H4	18x35.5	K8
10x20	H5	18x40	K9
12.5x20	I 5		

- The standard ratings are described on the next page.

Standard Ratings

Rated voltage (V)	Item	6.3			10			16			25			35			50			63			100						
		Case	ESR	Rated ripple current	Case	ESR	Rated ripple current	Case	ESR	Rated ripple current	Case	ESR	Rated ripple current	Case	ESR	Rated ripple current	Case	ESR	Rated ripple current	Case	ESR	Rated ripple current	Case	ESR	Rated ripple current				
		∅D x L (mm)	Ω	mArms	∅D x L (mm)	Ω	mArms	∅D x L (mm)	Ω	mArms	∅D x L (mm)	Ω	mArms	∅D x L (mm)	Ω	mArms	∅D x L (mm)	Ω	mArms	∅D x L (mm)	Ω	mArms	∅D x L (mm)	Ω	mArms				
0.1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	5x11	1990	3	—	—	—	5x11	1330	2.1					
0.22	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	5x11	905	6	—	—	—	5x11	603	4.7					
0.33	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	5x11	603	9	—	—	—	5x11	402	7					
0.47	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	5x11	423	13	—	—	—	5x11	282	10					
1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	5x11	199	21	—	—	—	5x11	133	21					
2.2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	5x11	90.5	31	—	—	—	5x11	60.3	30					
3.3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	5x11	60.3	38	—	—	—	5x11	40.2	40					
4.7	—	—	—	—	—	—	—	—	—	—	—	—	—	—	5x11	56.5	38	5x11	49.4	40	5x11	42.3	45	5x11	35.3	45	5x11	28.2	45
10	—	—	—	—	—	—	—	—	5x11	33.2	50	5x11	26.5	55	5x11	23.2	59	5x11	19.9	66	5x11	16.6	66	6.3x11	13.3	75			
22	—	—	—	—	—	—	—	—	5x11	15.1	75	5x11	12.1	82	5x11	10.6	87	5x11	9.05	98	5x11	7.54	100	6.3x11	6.03	130			
33	—	—	—	—	—	—	—	—	5x11	10.1	92	5x11	8.04	100	5x11	7.04	107	5x11	6.03	126	6.3x11	5.03	140	8x11.5	4.02	180			
47	—	—	—	5x11	8.47	99	5x11	7.06	110	5x11	5.65	118	5x11	4.94	130	6.3x11	4.23	155	6.3x11	3.53	170	10x12.5	2.82	230					
100	—	—	—	5x11	3.78	146	5x11	3.32	160	6.3x11	2.65	199	6.3x11	2.32	214	8x11.5	1.99	260	10x12.5	1.66	300	10x20	1.33	370					
220	5x11	2.11	200	6.3x11	1.81	240	6.3x11	1.51	264	8x11.5	1.21	349	10x12.5	1.06	443	10x12.5	0.905	443	10x16	7.54	470	12.5x20	0.603	620					
330	6.3x11	1.41	270	6.3x11	1.21	290	8x11.5	1.01	383	10x12.5	0.804	510	10x12.5	0.704	542	10x16	0.603	595	10x20	0.503	710	12.5x25	0.402	760					
470	6.3x11	0.988	322	8x11.5	0.847	417	8x11.5	0.706	457	10x12.5	0.565	545	10x16	0.494	664	12.5x20	0.423	887	12.5x20	0.353	900	16x25	0.282	1000					
1000	8x11.5	0.464	546	10x12.5	0.398	650	10x16	0.332	791	10x20	0.265	996	12.5x20	0.232	1210	12.5x25	0.199	1400	16x25	0.166	1300	18x40	0.133	1380					
2200	10x20	0.226	1010	10x20	0.196	1080	12.5x20	0.166	1350	12.5x25	0.136	1660	16x25	0.121	1950	16x35.5	0.106	2340	—	—	—	—	—	—	—				
3300	10x20	0.161	1230	12.5x20	0.141	1430	12.5x25	0.121	1690	16x25	0.101	2030	16x35.5	0.09	2510	18x35.5	0.08	2810	—	—	—	—	—	—	—				
4700	12.5x20	0.12	1710	12.5x25	0.106	1780	16x25	0.092	2100	16x31.5	0.078	2650	18x35.5	0.071	2990	—	—	—	—	—	—	—	—	—	—				
6800	12.5x25	0.093	1930	16x25	0.083	2200	16x35.5	0.073	2580	18x35.5	0.063	3290	—	—	—	—	—	—	—	—	—	—	—	—	—				
10000	16x25	0.076	2450	16x35.5	0.07	2700	18x35.5	0.063	3130	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—				
15000	16x35.5	0.062	2860	18x35.5	0.058	3100	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—				
22000	18x40	0.053	3340	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—				

Rated voltage (V)	Item	160			200			250			315			350			400			450				
		Case	ESR	Rated ripple current	Case	ESR	Rated ripple current	Case	ESR	Rated ripple current	Case	ESR	Rated ripple current	Case	ESR	Rated ripple current	Case	ESR	Rated ripple current	Case	ESR	Rated ripple current		
		∅D x L (mm)	Ω	mArms	∅D x L (mm)	Ω	mArms	∅D x L (mm)	Ω	mArms	∅D x L (mm)	Ω	mArms	∅D x L (mm)	Ω	mArms	∅D x L (mm)	Ω	mArms	∅D x L (mm)	Ω	mArms		
0.47	6.3x11	706	15	6.3x11	706	15	6.3x11	706	15	6.3x11	847	15	6.3x11	847	15	6.3x11	847	15	8x11.5	847	18			
1	6.3x11	332	22	6.3x11	332	22	6.3x11	332	22	6.3x11	398	22	6.3x11	398	22	6.3x11	398	22	8x11.5	398	25			
2.2	6.3x11	151	32	6.3x11	151	32	6.3x11	151	32	8x11.5	181	38	8x11.5	181	38	8x11.5	181	38	10x12.5	181	43			
3.3	6.3x11	101	40	6.3x11	101	40	8x11.5	101	48	10x12.5	121	53	10x12.5	121	53	10x12.5	121	54	10x16	121	59			
4.7	6.3x11	70.6	48	8x11.5	70.6	56	8x11.5	70.6	56	10x12.5	84.7	65	10x12.5	84.7	65	10x16	84.7	71	10x20	84.7	76			
10	8x11.5	33.2	81	10x12.5	33.2	94	10x16	33.2	101	10x20	39.8	115	10x20	39.8	115	12.5x20	39.8	123	12.5x20	39.8	123			
22	10x16	15.1	151	10x20	15.1	170	12.5x20	15.1	182	12.5x20	18.1	182	12.5x25	18.1	197	12.5x25	18.1	197	16x25	18.1	226			
33	10x20	10.1	202	12.5x20	10.1	223	12.5x25	10.1	243	16x25	12.1	277	16x25	12.1	277	16x25	12.1	277	16x31.5	12.1	304			
47	12.5x20	7.06	266	12.5x25	7.06	265	12.5x25	7.06	295	16x25	8.47	330	16x25	8.47	330	16x31.5	8.47	361	16x35.5	8.47	380			
100	12.5x25	3.32	422	16x25	3.32	483	16x31.5	3.32	528	18x31.5	3.98	567	18x31.5	3.98	567	—	—	—	—	—	—	—	—	—
220	16x31.5	1.51	783	18x35.5	1.51	882	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
330	18x35.5	1.01	1080	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

(Note) ESR : 20°C, 120Hz ; Rated ripple current : 85°C, 120Hz

Standard Bipolar Capacitors Series R2B [RBP2]

• Guarantees 2000 hours at 85°C.



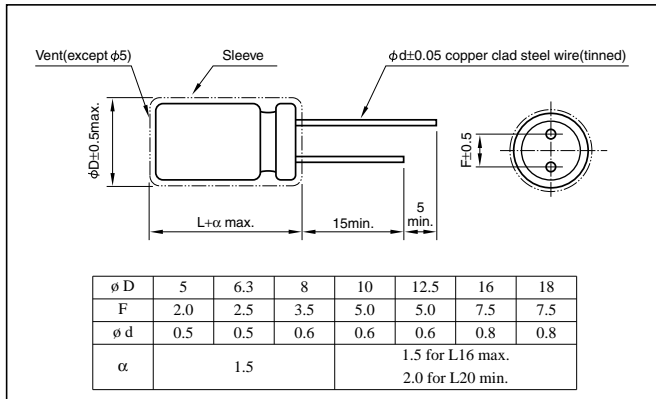
Marking color : White print on a blue sleeve or White print on an indigo blue sleeve

Specifications

Item	Performance									
Category temperature range (°C)	-40 to +85									
Tolerance at rated capacitance (%)	±20 (20°C, 120Hz)									
Leakage current (µA)	Less than 0.03CV + 3 (after 5 minutes) C: Rated capacitance(µF); V: Rated voltage(V) (20°C)									
Tangent of loss angle (tanδ)	Rated voltage (V)		6.3	10	16	25	35	50	63	100
	tanδ (max.)		0.24	0.24	0.20	0.20	0.16	0.14	0.12	0.10
0.02 is added to every 1000µF increase over 1000µF (20°C, 120Hz)										
Characteristics at high and low temperature	Rated voltage (V)		6.3	10	16	25	35	50	63	100
	Impedance ratio (max.)	Z-25°C / Z+20°C	4	3	2	2	2	2	2	2
Z-40°C / Z+20°C		10	8	6	4	3	3	3	3	
0.5 for -25°C, 1 for -40°C are added to every 1000µF increase over 1000µF (120Hz)										
Endurance (85°C) (Applied ripple current)	Test time		2000 hours (with the polarity inverted every 250 hours)							
	Leakage current		The initial specified value or less							
	Percentage of capacitance change		Within ±20% of initial value							
	Tangent of the loss angle		150% or less of the initial specified value							
Shelf life (85°C)	Test time : 1000 hours. Other have same as endurance. Voltage application treatment									
Applicable standards	JIS C5101-1, -4 1998 (IEC 60384-1 1992, -4 1985)									

Outline Drawing

Unit: mm



Coefficient of Frequency for Rated Ripple Current

Frequency(Hz)	50 - 60	120	1k	10k - 100k
Rated voltage(V)				
6.3 to 16	0.8	1	1.1	1.2
25 to 35	0.8	1	1.5	1.7
50 to 100	0.8	1	1.6	1.9

Part numbering system (example: 10V1000µF)

Environmental item	R2B	10	V	102	M	15	#
	Series code	Rated voltage symbol		Rated capacitance symbol	Capacitance tolerance symbol		Casing symbol
Former item	R2B	10	V	102	M		
	Series code	Rated voltage symbol		Rated capacitance symbol	Capacitance tolerance symbol		

Casing symbol

Case φ DxL(mm)	Casing Symbol	Case φ DxL(mm)	Casing Symbol	Case φ DxL(mm)	Casing Symbol	Case φ DxL(mm)	Casing Symbol
5x11	E3	10x12.5	H3	12.5x20	I5	16x31.5	J7
6.3x11	F3	10x16	H4	12.5x25	I6	16x35.5	J8
8x11.5	G3	10x20	H5	16x25	J6	18x35.5	K8
						18x40	K9

Standard Ratings

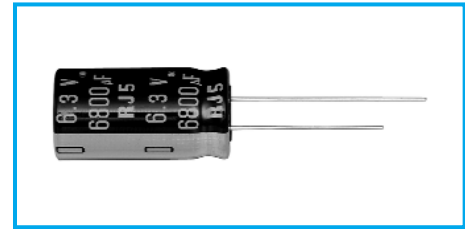
Rated capacitance(µF)	6.3		10		16		25		35		50		63		100	
	Case φ DxL(mm)	Rated ripple current mArms	Case φ DxL(mm)	Rated ripple current mArms	Case φ DxL(mm)	Rated ripple current mArms	Case φ DxL(mm)	Rated ripple current mArms	Case φ DxL(mm)	Rated ripple current mArms	Case φ DxL(mm)	Rated ripple current mArms	Case φ DxL(mm)	Rated ripple current mArms	Case φ DxL(mm)	Rated ripple current mArms
0.1	—	—	—	—	—	—	—	—	—	—	5x11	4	—	—	5x11	5
0.22	—	—	—	—	—	—	—	—	—	—	5x11	7	—	—	5x11	8
0.33	—	—	—	—	—	—	—	—	—	—	5x11	8	—	—	5x11	9
0.47	—	—	—	—	—	—	—	—	—	—	5x11	10	—	—	5x11	11
1	—	—	—	—	—	—	—	—	—	—	5x11	14	—	—	5x11	16
2.2	—	—	—	—	—	—	—	—	—	—	5x11	21	5x11	23	5x11	24
3.3	—	—	—	—	—	—	—	—	—	—	5x11	26	5x11	28	6.3x11	34
4.7	—	—	—	—	—	—	5x11	28	5x11	28	5x11	31	5x11	34	6.3x11	41
10	—	—	—	—	5x11	39	5x11	40	5x11	42	5x11	45	6.3x11	57	8x11.5	70
22	—	—	5x11	52	5x11	58	5x11	60	6.3x11	71	6.3x11	77	8x11.5	89	10x16	136
33	5x11	58	5x11	63	5x11	71	6.3x11	84	6.3x11	87	8x11.5	111	10x12.5	144	10x20	181
47	5x11	69	5x11	75	6.3x11	97	6.3x11	100	8x11.5	122	10x12.5	157	10x16	18	12.5x20	248
100	6.3x11	115	6.3x11	126	8x11.5	167	10x12.5	204	10x12.5	212	10x20	273	12.5x20	343	16x25	458
220	8x11.5	202	8x11.5	221	10x12.5	294	10x16	332	10x20	375	12.5x25	506	16x25	645	18x35.5	837
330	8x11.5	247	10x12.5	322	10x16	394	10x20	444	12.5x20	526	12.5x25	620	—	—	—	—
470	10x12.5	350	10x16	420	10x20	513	12.5x20	607	12.5x25	685	16x25	861	—	—	—	—
1000	10x20	611	12.5x20	767	12.5x25	935	16x25	1120	16x31.5	1270	—	—	—	—	—	—
2200	12.5x25	1090	16x25	1380	16x31.5	1660	—	—	—	—	—	—	—	—	—	—
3300	16x25	1490	16x31.5	1760	—	—	—	—	—	—	—	—	—	—	—	—
4700	16x31.5	1880	18x35.5	2280	—	—	—	—	—	—	—	—	—	—	—	—

(Note) Rated ripple current : 85°C, 120Hz

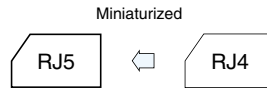
NOTE Design, Specifications are subject to change without notice. Ask factory for technical specifications before purchase and/or use.

105°C Miniature Capacitors Series RJ5

- Case size is one rank smaller than Series RJ4.
- Guarantees 1000 hours at 105°C.



Marking color : White print on a black sleeve

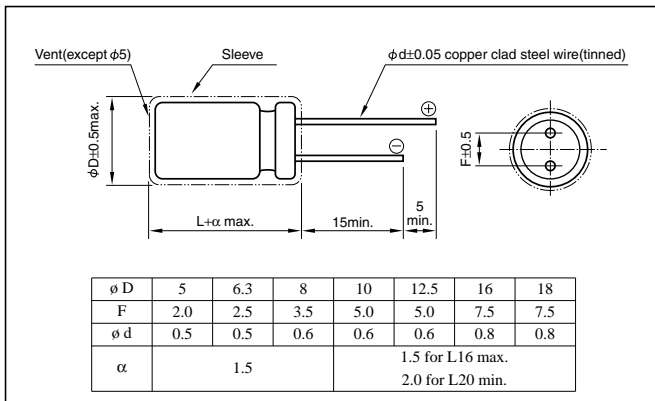


Specifications

Item	Performance																										
Category temperature range (°C)	-55 to +105																										
Rated voltage (V)	6.3 to 100																										
Tolerance at rated capacitance (%)	±20 (20°C, 120Hz)																										
Leakage current (µA)	Less than 0.03CV or 4 whichever is larger(after 1 minute) (20°C) C: Rated capacitance(µF) V: Rated voltage(V)																										
Tangent of loss angle (tanδ)	<table border="1"> <thead> <tr> <th>Rated voltage (V)</th> <th>6.3</th> <th>10</th> <th>16</th> <th>25</th> <th>35</th> <th>50</th> <th>63</th> <th>100</th> </tr> </thead> <tbody> <tr> <td>tanδ (max.)</td> <td>0.34</td> <td>0.26</td> <td>0.20</td> <td>0.16</td> <td>0.14</td> <td>0.12</td> <td>0.10</td> <td>0.08</td> </tr> </tbody> </table> <p>0.02 is added to every 1000µF increase over 1000µF (20°C, 120Hz)</p>	Rated voltage (V)	6.3	10	16	25	35	50	63	100	tanδ (max.)	0.34	0.26	0.20	0.16	0.14	0.12	0.10	0.08								
Rated voltage (V)	6.3	10	16	25	35	50	63	100																			
tanδ (max.)	0.34	0.26	0.20	0.16	0.14	0.12	0.10	0.08																			
Characteristics at high and low temperature	<table border="1"> <thead> <tr> <th>Rated voltage (V)</th> <th>6.3</th> <th>10</th> <th>16</th> <th>25</th> <th>35</th> <th>50</th> <th>63</th> <th>100</th> </tr> </thead> <tbody> <tr> <td rowspan="2">Impedance ratio (max.)</td> <td>Z-25°C / Z+20°C</td> <td>5</td> <td>4</td> <td>3</td> <td>2</td> <td>2</td> <td>2</td> <td>2</td> </tr> <tr> <td>Z-40°C / Z+20°C</td> <td>10</td> <td>8</td> <td>6</td> <td>4</td> <td>3</td> <td>3</td> <td>3</td> </tr> </tbody> </table> <p>(120Hz)</p>	Rated voltage (V)	6.3	10	16	25	35	50	63	100	Impedance ratio (max.)	Z-25°C / Z+20°C	5	4	3	2	2	2	2	Z-40°C / Z+20°C	10	8	6	4	3	3	3
Rated voltage (V)	6.3	10	16	25	35	50	63	100																			
Impedance ratio (max.)	Z-25°C / Z+20°C	5	4	3	2	2	2	2																			
	Z-40°C / Z+20°C	10	8	6	4	3	3	3																			
Endurance (105°C) (Applied ripple current)	<table border="1"> <tbody> <tr> <td>Test time</td> <td>1000 hours</td> </tr> <tr> <td>Leakage current</td> <td>The initial specified value or less</td> </tr> <tr> <td>Percentage of capacitance change</td> <td>Within ±20% of initial value</td> </tr> <tr> <td>Tangent of the loss angle</td> <td>200% or less of the initial specified value</td> </tr> </tbody> </table>	Test time	1000 hours	Leakage current	The initial specified value or less	Percentage of capacitance change	Within ±20% of initial value	Tangent of the loss angle	200% or less of the initial specified value																		
Test time	1000 hours																										
Leakage current	The initial specified value or less																										
Percentage of capacitance change	Within ±20% of initial value																										
Tangent of the loss angle	200% or less of the initial specified value																										
Shelf life (105°C)	Test time : 1000 hours; other items are the same as those for the endurance. Voltage application treatment																										
Applicable standards	JIS C5101-1, -4 1998 (IEC 60384-1 1992, -4 1985)																										

Outline Drawing

Unit: mm



Coefficient of Frequency for Rated Ripple Current

Rated voltage(V)	Rated capacitance(µF)	Frequency(Hz)					
		50 · 60	120	1k	10k	100k	
6.3 to 100	0.1 to 47	0.8	1	1.5	1.7	2.0	
	100 to 220	0.8	1	1.2	1.3	1.4	
	330 to 1000	0.8	1	1.2	1.2	1.3	
	2200 to 22000	0.8	1	1.1	1.1	1.1	

Part numbering system (example: 10V1000µF)

Environmental item	RJ5	—	10	V	102	M	H3	#
	Series code		Rated voltage symbol		Rated capacitance symbol	Capacitance tolerance symbol	Casing symbol	Additional symbol

Casing symbol

Size φ DxL(mm)	Casing Symbol	Size φ DxL(mm)	Casing Symbol
5x11	E3	12.5x25	I 6
6.3x11	F3	16x25	J 6
8x11.5	G3	16x31.5	J 7
10x12.5	H3	16x35.5	J 8
10x16	H4	18x35.5	K8
10x20	H5	18x40	K9
12.5x20	I 5		

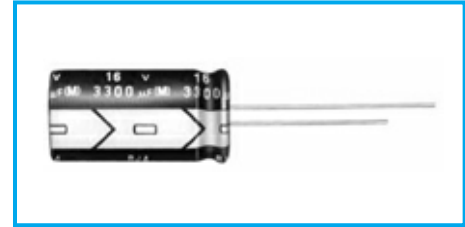
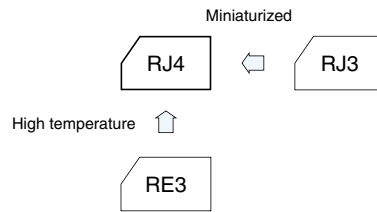
Standard Ratings

Rated capacitance(μF)	6.3		10		16		25		35		50		63		100	
	Item		Case	Rated ripple current	Case	Rated ripple current	Case	Rated ripple current	Case	Rated ripple current	Case	Rated ripple current	Case	Rated ripple current	Case	Rated ripple current
	φ DxL(mm)	mArms	φ DxL(mm)	mArms	φ DxL(mm)	mArms	φ DxL(mm)	mArms	φ DxL(mm)	mArms	φ DxL(mm)	mArms	φ DxL(mm)	mArms	φ DxL(mm)	mArms
0.1	—	—	—	—	—	—	—	—	—	—	5x11	3	—	—	5x11	1.5
0.22	—	—	—	—	—	—	—	—	—	—	5x11	6	—	—	5x11	3.4
0.33	—	—	—	—	—	—	—	—	—	—	5x11	9	—	—	5x11	5
0.47	—	—	—	—	—	—	—	—	—	—	5x11	10	—	—	5x11	7.1
1	—	—	—	—	—	—	—	—	—	—	5x11	15	—	—	5x11	15
2.2	—	—	—	—	—	—	—	—	—	—	5x11	22	—	—	5x11	21
3.3	—	—	—	—	—	—	—	—	—	—	5x11	27	—	—	5x11	29
4.7	—	—	—	—	—	—	—	—	—	—	5x11	32	—	—	5x11	32
10	—	—	—	—	—	—	—	—	—	—	5x11	47	—	—	5x11	50
22	—	—	—	—	—	—	—	—	—	—	5x11	70	5x11	71	6.3x11	93
33	—	—	—	—	—	—	—	—	—	—	5x11	90	6.3x11	100	8x11.5	130
47	—	—	—	—	—	—	—	—	5x11	93	6.3x11	115	6.3x11	120	8x11.5	140
68	—	—	—	—	—	—	—	—	6.3x11	110	6.3x11	150	8x11.5	155	10x12.5	190
100	—	—	—	—	—	—	5x11	125	6.3x11	151	8x11.5	190	8x11.5	200	10x16	240
220	—	—	5x11	155	6.3x11	190	6.3x11	200	8x11.5	270	10x12.5	314	10x16	335	12.5x20	390
330	—	—	6.3x11	210	6.3x11	225	8x11.5	310	10x12.5	384	10x16	421	10x20	510	12.5x25	540
470	—	—	6.3x11	250	8x11.5	323	10x12.5	429	10x16	470	10x20	540	12.5x20	640	16x25	715
1000	8x11.5	398	10x12.5	460	10x12.5	500	10x16	610	12.5x20	857	12.5x25	1000	16x25	930	18x35.5	960
2200	10x16	635	10x16	705	10x20	710	12.5x25	1180	16x25	1380	16x31.5	1410	18x35.5	1650	—	—
3300	10x20	882	12.5x20	1010	12.5x25	1200	16x25	1440	16x31.5	1500	18x35.5	1990	—	—	—	—
4700	12.5x20	1120	12.5x25	1260	16x25	1500	16x25	1570	16x35.5	1780	—	—	—	—	—	—
6800	12.5x25	1380	16x25	1570	16x25	1600	16x35.5	1850	18x40	2000	—	—	—	—	—	—
10000	16x25	1750	16x31.5	1820	16x35.5	1930	18x40	2000	—	—	—	—	—	—	—	—
15000	16x31.5	1820	16x35.5	2050	18x40	2210	—	—	—	—	—	—	—	—	—	—
22000	18x35.5	2280	18x40	2420	—	—	—	—	—	—	—	—	—	—	—	—

(Note) Rated ripple current : 105°C, 120Hz

105°C Miniature Capacitors Series RJ4

- Case size is one rank smaller than Series RJ3.
- Guarantees 1000 hours at 105°C.



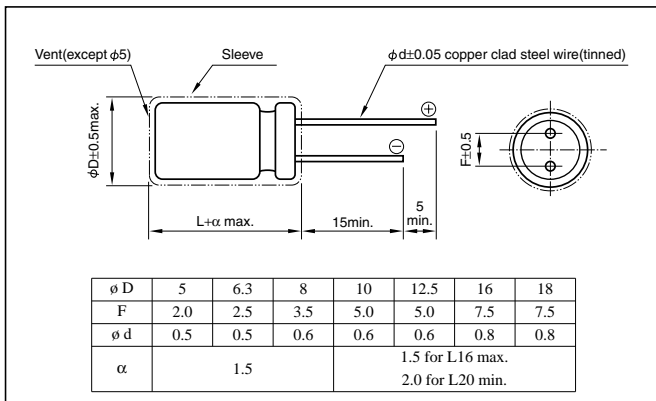
Marking color : White print on a black sleeve or
White print on a brown sleeve

Specifications

Item	Performance																																					
Category temperature range (°C)	-55 to +105	-40 to +105																																				
Rated voltage (V)	6.3 to 100	160 to 450																																				
Tolerance at rated capacitance (%)	±20 (20°C, 120Hz)	±20 (20°C, 120Hz)																																				
Leakage current (µA)	Less than 0.03CV or 4 whichever is larger(after 1 minute) Less than 0.01CV or 3 whichever is larger(after 2 minutes) (20°C)	CV≤1000: Less than 0.1CV+40(after 1 minute) CV>1000: Less than 0.04CV+100(after 1 minute) (20°C)																																				
C: Rated capacitance(µF) V: Rated voltage(V)																																						
Tangent of loss angle (tanδ)	<table border="1"> <tr> <th>Rated voltage (V)</th> <td>6.3</td><td>10</td><td>16</td><td>25</td><td>35</td><td>50</td><td>63</td><td>100</td> </tr> <tr> <th>tanδ (max.)</th> <td>0.28</td><td>0.24</td><td>0.20</td><td>0.16</td><td>0.14</td><td>0.12</td><td>0.10</td><td>0.08</td> </tr> </table>	Rated voltage (V)	6.3	10	16	25	35	50	63	100	tanδ (max.)	0.28	0.24	0.20	0.16	0.14	0.12	0.10	0.08	<table border="1"> <tr> <th>Rated voltage (V)</th> <td>160</td><td>200</td><td>250</td><td>315</td><td>350</td><td>400</td><td>450</td> </tr> <tr> <th>tanδ (max.)</th> <td>0.20</td><td>0.20</td><td>0.20</td><td>0.24</td><td>0.24</td><td>0.24</td><td>0.24</td> </tr> </table>	Rated voltage (V)	160	200	250	315	350	400	450	tanδ (max.)	0.20	0.20	0.20	0.24	0.24	0.24	0.24		
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tanδ (max.)	0.28	0.24	0.20	0.16	0.14	0.12	0.10	0.08																														
Rated voltage (V)	160	200	250	315	350	400	450																															
tanδ (max.)	0.20	0.20	0.20	0.24	0.24	0.24	0.24																															
0.02 is added to every 1000µF increase over 1000µF (20°C, 120Hz)																																						
Characteristics at high and low temperature	<table border="1"> <tr> <th>Rated voltage (V)</th> <td>6.3</td><td>10</td><td>16</td><td>25</td><td>35</td><td>50</td><td>63</td><td>100</td> </tr> <tr> <th rowspan="2">Impedance ratio (max.)</th> <td>Z-25°C / Z+20°C</td> <td>5</td><td>4</td><td>3</td><td>2</td><td>2</td><td>2</td><td>2</td> </tr> <tr> <td>Z-40°C / Z+20°C</td> <td>10</td><td>8</td><td>6</td><td>4</td><td>3</td><td>3</td><td>3</td> </tr> </table>	Rated voltage (V)	6.3	10	16	25	35	50	63	100	Impedance ratio (max.)	Z-25°C / Z+20°C	5	4	3	2	2	2	2	Z-40°C / Z+20°C	10	8	6	4	3	3	3	<table border="1"> <tr> <th>Rated voltage (V)</th> <td>160 to 250</td><td>315 to 450</td> </tr> <tr> <th rowspan="2">Impedance ratio (max.)</th> <td>Z-25°C / Z+20°C</td> <td>4</td><td>4</td> </tr> <tr> <td>Z-40°C / Z+20°C</td> <td>15</td><td>10</td> </tr> </table>	Rated voltage (V)	160 to 250	315 to 450	Impedance ratio (max.)	Z-25°C / Z+20°C	4	4	Z-40°C / Z+20°C	15	10
	Rated voltage (V)	6.3	10	16	25	35	50	63	100																													
Impedance ratio (max.)	Z-25°C / Z+20°C	5	4	3	2	2	2	2																														
	Z-40°C / Z+20°C	10	8	6	4	3	3	3																														
Rated voltage (V)	160 to 250	315 to 450																																				
Impedance ratio (max.)	Z-25°C / Z+20°C	4	4																																			
	Z-40°C / Z+20°C	15	10																																			
(120Hz)																																						
Endurance (105°C) (Applied ripple current)	Test time	1000 hours																																				
	Leakage current	The initial specified value or less																																				
	Percentage of capacitance change	Within ±20% of initial value																																				
	Tangent of the loss angle	200% or less of the initial specified value																																				
Shelf life (105°C)	Test time : 1000 hours; other items are the same as those for the endurance. Voltage application treatment																																					
Applicable standards	JIS C5101-1, -4 1998 (IEC 60384-1 1992, -4 1985)																																					

Outline Drawing

Unit: mm



Coefficient of Frequency for Rated Ripple Current

Rated voltage(V)	Rated capacitance(µF)	Frequency(Hz)				
		50 - 60	120	1k	10k	100k
6.3 to 100	0.1 to 47	0.8	1	1.5	1.7	2.0
	100 to 220	0.8	1	1.2	1.3	1.4
	330 to 1000	0.8	1	1.2	1.2	1.3
	2200 to 22000	0.8	1	1.1	1.1	1.1
160 to 450	0.47 to 330	0.8	1	1.3	1.4	1.6

Part numbering system (example: 16V220µF)

Environmental item	RJ4	—	16	V	222	M	15	#
	Series code		Rated voltage symbol		Rated capacitance symbol	Capacitance tolerance symbol		Casing symbol
Former item	RJ4	—	16	V	222	M	*	
	Series code		Rated voltage symbol		Rated capacitance symbol	Capacitance tolerance symbol		Additional symbol

*	Rated voltage	Additional symbol
	6.3 to 100V	X
	160 to 450V	—

Casing symbol

Size φ DxL(mm)	Casing Symbol	Size φ DxL(mm)	Casing Symbol
5x11	E3	12.5x25	I 6
6.3x11	F3	16x25	J 6
8x11.5	G3	16x31.5	J 7
10x12.5	H3	16x35.5	J 8
10x16	H4	18x35.5	K8
10x20	H5	18x40	K9
12.5x20	I 5		

Standard Ratings

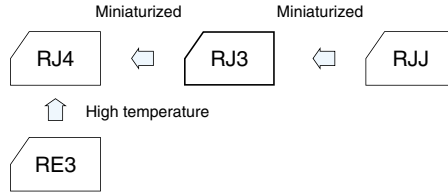
Rated capacitance (µF)	6.3			10			16			25			35			50			63			100		
	Item			Item			Item			Item			Item			Item			Item			Item		
	Case	ESR	Rated ripple current	Case	ESR	Rated ripple current	Case	ESR	Rated ripple current	Case	ESR	Rated ripple current	Case	ESR	Rated ripple current	Case	ESR	Rated ripple current	Case	ESR	Rated ripple current	Case	ESR	Rated ripple current
Rated voltage (V)	Case	ESR	Rated ripple current	Case	ESR	Rated ripple current	Case	ESR	Rated ripple current	Case	ESR	Rated ripple current	Case	ESR	Rated ripple current	Case	ESR	Rated ripple current	Case	ESR	Rated ripple current	Case	ESR	Rated ripple current
	φD x L (mm)	Ω	mArms	φD x L (mm)	Ω	mArms	φD x L (mm)	Ω	mArms	φD x L (mm)	Ω	mArms	φD x L (mm)	Ω	mArms	φD x L (mm)	Ω	mArms	φD x L (mm)	Ω	mArms	φD x L (mm)	Ω	mArms
0.1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	5x11	1990	3	—	—	—	5x11	1327	1.5
0.22	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	5x11	905	6	—	—	—	5x11	603	3.4
0.33	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	5x11	603	9	—	—	—	5x11	402	5
0.47	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	5x11	424	10	—	—	—	5x11	282	7.1
1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	5x11	199	15	—	—	—	5x11	133	15
2.2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	5x11	90.5	22	—	—	—	5x11	60.3	21
3.3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	5x11	60.3	27	—	—	—	5x11	40.2	29
4.7	—	—	—	—	—	—	—	—	—	5x11	56.5	27	5x11	49.4	30	5x11	42.4	32	—	—	—	5x11	28.2	32
10	—	—	—	—	—	—	5x11	33.2	37	5x11	26.5	39	5x11	23.2	43	5x11	19.9	47	5x11	16.6	46	6.3x11	13.3	54
22	—	—	—	—	—	—	5x11	15.1	54	5x11	12.1	58	5x11	10.6	64	5x11	9.05	70	5x11	7.54	71	6.3x11	6.03	93
33	—	—	—	—	—	—	5x11	10.1	67	5x11	8.04	71	5x11	7.04	78	5x11	6.03	90	6.3x11	5.03	100	8x11.5	4.02	130
47	—	—	—	5x11	8.47	72	5x11	7.06	79	5x11	5.65	84	5x11	4.94	90	6.3x11	4.24	115	6.3x11	3.53	120	10x12.5	2.82	165
100	—	—	—	5x11	3.98	105	5x11	3.32	115	6.3x11	2.65	141	6.3x11	2.32	151	8x11.5	1.99	190	10x12.5	1.66	215	10x20	1.33	265
220	5x11	2.11	140	6.3x11	1.81	166	6.3x11	1.51	190	8x11.5	1.21	247	10x12.5	1.06	314	10x12.5	0.91	314	10x16	0.75	335	12.5x25	0.60	440
330	6.3x11	1.41	195	6.3x11	1.21	210	8x11.5	1.01	271	10x12.5	0.81	360	10x12.5	0.70	384	10x16	0.60	421	10x20	0.50	510	12.5x25	0.40	540
470	6.3x11	0.99	232	8x11.5	0.85	325	8x11.5	0.71	323	10x12.5	0.57	429	10x16	0.50	470	12.5x20	0.42	628	12.5x20	0.35	640	16x25	0.28	715
1000	8x11.5	0.47	398	10x12.5	0.40	457	10x16	0.33	560	10x20	0.27	705	12.5x20	0.23	857	12.5x25	0.20	1000	16x25	0.17	930	18x40	0.13	985
2200	10x20	0.23	720	10x20	0.20	761	12.5x20	0.17	961	12.5x25	0.14	1180	16x25	0.12	1380	16x35.5	0.11	1660	—	—	—	—	—	—
3300	10x20	0.16	882	12.5x20	0.14	1010	12.5x25	0.12	1200	16x25	0.10	1440	16x35.5	0.09	1780	18x35.5	0.08	1990	—	—	—	—	—	—
4700	12.5x20	0.12	1120	12.5x25	0.11	1250	16x25	0.09	1490	16x31.5	0.08	1880	18x35.5	0.07	2120	—	—	—	—	—	—	—	—	—
6800	12.5x25	0.09	1380	16x25	0.08	1570	16x35.5	0.07	1830	18x35.5	0.06	2330	—	—	—	—	—	—	—	—	—	—	—	—
10000	16x25	0.07	1750	16x35.5	0.07	1910	18x35.5	0.06	2220	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
15000	16x35.5	0.06	2040	18x35.5	0.06	2190	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
22000	18x40	0.05	2390	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Rated capacitance (µF)	160			200			250			315			350			400			450				
	Item			Item			Item			Item			Item			Item			Item				
	Case	ESR	Rated ripple current	Case	ESR	Rated ripple current	Case	ESR	Rated ripple current	Case	ESR	Rated ripple current	Case	ESR	Rated ripple current	Case	ESR	Rated ripple current	Case	ESR	Rated ripple current		
Rated voltage (V)	Case	ESR	Rated ripple current	Case	ESR	Rated ripple current	Case	ESR	Rated ripple current	Case	ESR	Rated ripple current	Case	ESR	Rated ripple current	Case	ESR	Rated ripple current	Case	ESR	Rated ripple current		
	φD x L (mm)	Ω	mArms	φD x L (mm)	Ω	mArms	φD x L (mm)	Ω	mArms	φD x L (mm)	Ω	mArms	φD x L (mm)	Ω	mArms	φD x L (mm)	Ω	mArms	φD x L (mm)	Ω	mArms		
0.47	6.3x11	706	11	6.3x11	706	11	6.3x11	706	11	6.3x11	847	11	6.3x11	847	11	6.3x11	847	11	8x11.5	847	13		
1	6.3x11	332	16	6.3x11	332	16	6.3x11	332	16	6.3x11	398	16	6.3x11	398	16	6.3x11	398	16	8x11.5	398	18		
2.2	6.3x11	151	23	6.3x11	151	23	6.3x11	151	23	8x11.5	181	27	8x11.5	181	27	8x11.5	181	27	10x12.5	181	31		
3.3	6.3x11	101	28	6.3x11	101	28	8x11.5	101	34	10x12.5	121	38	10x12.5	121	38	10x12.5	121	38	10x16	121	42		
4.7	6.3x11	70.6	34	8x11.5	70.6	40	8x11.5	70.6	40	10x12.5	84.7	45	10x12.5	84.7	45	10x16	84.7	50	10x20	84.7	54		
10	8x11.5	33.2	58	10x12.5	33.2	66	10x16	33.2	74	10x20	39.8	79	10x20	39.8	79	12.5x20	39.8	87	12.5x20	39.8	87		
22	10x16	15.1	107	10x20	15.1	120	12.5x20	15.1	130	12.5x20	18.1	129	12.5x25	18.1	140	12.5x25	18.1	140	16x25	18.1	160		
33	10x20	10.1	143	12.5x20	10.1	160	12.5x25	10.1	172	16x25	12.1	196	16x25	12.1	196	16x25	12.1	196	16x31.5	12.1	215		
47	12.5x20	7.06	188	12.5x20	7.06	188	12.5x25	7.06	205	16x25	8.47	234	16x25	8.47	234	16x31.5	8.47	256	16x35.5	8.47	269		
100	12.5x25	3.32	299	16x25	3.32	342	16x31.5	3.32	374	18x31.5	3.98	401	18x31.5	3.98	401	—	—	—	—	—	—	—	—
220	16x31.5	1.51	554	18x35.5	1.51	624	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
330	18x35.5	1.01	764	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

(Note) ESR : 20°C, 120Hz ; Rated ripple current : 105°C, 120Hz

105°C Use, High-Reliability Capacitors Series RJ3

• Guarantees 2000 hours at 105°C (ø5~8: 1000 hours).



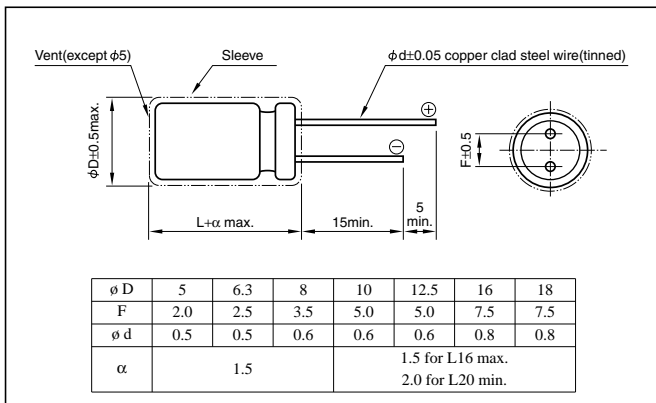
Marking color : White print on a black sleeve or White print on a brown sleeve

Specifications

Item	Performance																																					
Category temperature range (°C)	-55 to +105	-40 to +105																																				
Rated voltage (V)	6.3 to 100	160 to 450																																				
Tolerance at rated capacitance (%)	±20 (20°C, 120Hz)	±20 (20°C, 120Hz)																																				
Leakage current (µA)	Less than 0.01CV or 3 whichever is larger(after 2 minutes) (20°C) C: Rated capacitance(µF) V: Rated voltage(V)																																					
Tangent of loss angle (tanδ)	<table border="1"> <tr> <th>Rated voltage (V)</th> <td>6.3</td><td>10</td><td>16</td><td>25</td><td>35</td><td>50</td><td>63</td><td>100</td> </tr> <tr> <th>tanδ (max.)</th> <td>0.22</td><td>0.19</td><td>0.16</td><td>0.14</td><td>0.12</td><td>0.10</td><td>0.09</td><td>0.08</td> </tr> </table>	Rated voltage (V)	6.3	10	16	25	35	50	63	100	tanδ (max.)	0.22	0.19	0.16	0.14	0.12	0.10	0.09	0.08	<table border="1"> <tr> <th>Rated voltage (V)</th> <td>160</td><td>200</td><td>250</td><td>315</td><td>350</td><td>400</td> </tr> <tr> <th>tanδ (max.)</th> <td>0.15</td><td>0.15</td><td>0.15</td><td>0.20</td><td>0.20</td><td>0.20</td> </tr> </table>	Rated voltage (V)	160	200	250	315	350	400	tanδ (max.)	0.15	0.15	0.15	0.20	0.20	0.20				
	Rated voltage (V)	6.3	10	16	25	35	50	63	100																													
tanδ (max.)	0.22	0.19	0.16	0.14	0.12	0.10	0.09	0.08																														
Rated voltage (V)	160	200	250	315	350	400																																
tanδ (max.)	0.15	0.15	0.15	0.20	0.20	0.20																																
0.02 is added to every 1000µF increase over 1000µF (20°C, 120Hz)		(20°C, 120Hz)																																				
Characteristics at high and low temperature	<table border="1"> <tr> <th>Rated voltage (V)</th> <td>6.3</td><td>10</td><td>16</td><td>25</td><td>35</td><td>50</td><td>63</td><td>100</td> </tr> <tr> <th rowspan="2">Impedance ratio (max.)</th> <td>Z-25°C / Z+20°C</td> <td>5</td><td>4</td><td>3</td><td>2</td><td>2</td><td>2</td><td>2</td> </tr> <tr> <td>Z-55°C / Z+20°C</td> <td>10</td><td>8</td><td>6</td><td>4</td><td>3</td><td>3</td><td>3</td> </tr> </table>	Rated voltage (V)	6.3	10	16	25	35	50	63	100	Impedance ratio (max.)	Z-25°C / Z+20°C	5	4	3	2	2	2	2	Z-55°C / Z+20°C	10	8	6	4	3	3	3	<table border="1"> <tr> <th>Rated voltage (V)</th> <td>160 to 250</td><td>315 to 400</td> </tr> <tr> <th rowspan="2">Impedance ratio (max.)</th> <td>Z-25°C / Z+20°C</td> <td>3</td><td>3</td> </tr> <tr> <td>Z-40°C / Z+20°C</td> <td>8</td><td>6</td> </tr> </table>	Rated voltage (V)	160 to 250	315 to 400	Impedance ratio (max.)	Z-25°C / Z+20°C	3	3	Z-40°C / Z+20°C	8	6
	Rated voltage (V)	6.3	10	16	25	35	50	63	100																													
Impedance ratio (max.)	Z-25°C / Z+20°C	5	4	3	2	2	2	2																														
	Z-55°C / Z+20°C	10	8	6	4	3	3	3																														
Rated voltage (V)	160 to 250	315 to 400																																				
Impedance ratio (max.)	Z-25°C / Z+20°C	3	3																																			
	Z-40°C / Z+20°C	8	6																																			
		(120Hz) (120Hz)																																				
Endurance (105°C) (Applied ripple current)	Test time	2000 hours (ø5 to ø8: 1000 hours)																																				
	Leakage current	The initial specified value or less																																				
	Percentage of capacitance change	Within ±20% of initial value																																				
	Tangent of the loss angle	200% or less of the initial specified value																																				
Shelf life (105°C)	Test time : 1000 hours; other items are the same as those for the endurance. Voltage application treatment																																					
Applicable standards	JIS C5101-1, -4 1998 (IEC 60384-1 1992, -4 1985)																																					

Outline Drawing

Unit: mm



Coefficient of Frequency for Rated Ripple Current

Rated voltage(V)	Rated capacitance(µF)	Frequency(Hz)				
		50 · 60	120	1k	10k	100k
6.3 to 100	0.1 to 4.7	—	0.4	0.7	0.8	1
	10 to 47	—	0.5	0.8	0.9	1
	100 to 220	—	0.7	0.9	0.9	1
	330 to 1000	—	0.8	0.9	1.0	1
	2200 to 15000	—	0.9	1.0	1	1
160 to 400	0.47 to 220	0.8	1	1.3	1.4	1.6

Part numbering system (example: 63V1000µF)

Environmental item	RJ3	—	63	V	102	M	J7	#
	Series code		Rated voltage symbol		Rated capacitance symbol	Capacitance tolerance symbol	Casing symbol	
Former item	RJ3	—	63	V	102	M	*	
	Series code		Rated voltage symbol		Rated capacitance symbol	Capacitance tolerance symbol	Additional symbol	

*	Rated voltage	Additional symbol
	6.3 to 50V	BX
	63, 100V	AX
	160 to 400V	—

Casing symbol

Size ø DxL(mm)	Casing Symbol	Size ø DxL(mm)	Casing Symbol
5x11	E3	12.5x25	I 6
6.3x11	F3	16x25	J 6
8x11.5	G3	16x31.5	J 7
10x12.5	H3	16x35.5	J 8
10x16	H4	18x35.5	K 8
10x20	H5	18x40	K 9
12.5x20	I 5		

Standard Ratings

Rated voltage(V) Rated Capacitance(μF)	Item	6.3				10				16				25			
		Case	ESR	Impedance	Rated ripple current	Case	ESR	Impedance	Rated ripple current	Case	ESR	Impedance	Rated ripple current	Case	ESR	Impedance	Rated ripple current
		∅ DxL(mm)	Ω	Ω	mArms	∅ DxL(mm)	Ω	Ω	mArms	∅ DxL(mm)	Ω	Ω	mArms	∅ DxL(mm)	Ω	Ω	mArms
4.7	—	—	—	—	—	—	—	—	—	—	—	—	5x11	49.4	3.0	85	
10	—	—	—	—	—	—	—	—	—	5x11	26.5	2.5	92	5x11	23.2	2.5	92
22	—	—	—	—	5x11	14.3	2.5	92	5x11	12.1	1.9	105	5x11	10.6	1.9	105	
33	5x11	11.1	2.5	105	5x11	9.55	1.9	105	5x11	8.04	1.5	120	5x11	7.04	1.5	120	
47	5x11	7.77	1.5	120	5x11	6.71	1.5	120	5x11	5.65	1.2	130	5x11	4.94	1.2	130	
100	5x11	3.65	1.2	130	5x11	3.15	1.2	130	6.3x11	2.65	0.58	220	6.3x11	2.32	0.58	220	
220	6.3x11	1.66	0.87	180	6.3x11	1.43	0.58	220	8x11.5	1.21	0.47	290	8x11.5	1.06	0.39	315	
330	6.3x11	1.11	0.58	220	8x11.5	0.96	0.47	265	8x11.5	0.81	0.39	315	10x12.5	0.70	0.23	500	
470	8x11.5	0.78	0.39	315	8x11.5	0.67	0.39	315	10x12.5	0.57	0.23	500	10x16	0.50	0.18	615	
1000	10x12.5	0.37	0.23	500	10x16	0.32	0.18	615	10x20	0.27	0.12	825	12.5x20	0.23	0.090	1050	
2200	12.5x20	0.18	0.095	1000	12.5x20	0.16	0.090	1050	12.5x25	0.14	0.068	1300	16x25	0.12	0.056	1740	
3300	12.5x20	0.13	0.090	1050	12.5x25	0.12	0.068	1300	16x25	0.10	0.056	1740	16x31.5	0.09	0.045	2110	
4700	16x25	0.10	0.061	1670	16x25	0.09	0.056	1740	16x31.5	0.08	0.045	2110	18x35.5	0.07	0.036	2580	
6800	16x25	0.08	0.056	1740	16x31.5	0.07	0.045	2110	18x35.5	0.06	0.036	2580	—	—	—	—	
10000	16x31.5	0.06	0.045	2110	18x35.5	0.06	0.036	2580	—	—	—	—	—	—	—	—	
15000	18x35.5	0.05	0.036	2580	—	—	—	—	—	—	—	—	—	—	—	—	

Rated voltage(V) Rated Capacitance(μF)	Item	35				50				63				100			
		Case	ESR	Impedance	Rated ripple current	Case	ESR	Impedance	Rated ripple current	Case	ESR	Impedance	Rated ripple current	Case	ESR	Impedance	Rated ripple current
		∅ DxL(mm)	Ω	Ω	mArms	∅ DxL(mm)	Ω	Ω	mArms	∅ DxL(mm)	Ω	Ω	mArms	∅ DxL(mm)	Ω	Ω	mArms
0.1	—	—	—	—	5x11	1659	18	10	—	—	—	—	—	—	—	—	
0.22	—	—	—	—	5x11	754	13	15	—	—	—	—	—	—	—	—	
0.33	—	—	—	—	5x11	503	10	18	—	—	—	—	—	—	—	—	
0.47	—	—	—	—	5x11	353	7.0	23	—	—	—	—	5x11	282	13	30	
1	—	—	—	—	5x11	166	4.9	35	—	—	—	—	5x11	133	11	45	
2.2	—	—	—	—	5x11	75.4	4.2	53	—	—	—	—	5x11	60.3	9.2	60	
3.3	—	—	—	—	5x11	50.3	3.9	65	—	—	—	—	5x11	40.2	7.2	67	
4.7	5x11	42.4	2.5	92	5x11	35.3	3.6	82	5x11	31.8	5.8	74	5x11	28.2	6.3	75	
10	5x11	19.9	1.9	105	5x11	16.6	2.7	100	5x11	14.9	3.6	95	6.3x11	13.3	3.3	110	
22	5x11	9.05	1.5	120	5x11	7.54	1.9	125	6.3x11	6.79	2.1	130	8x11.5	6.03	1.4	165	
33	5x11	6.03	1.2	130	6.3x11	5.03	1.1	195	6.3x11	4.52	1.7	160	10x12.5	4.02	0.94	305	
47	6.3x11	4.24	0.58	220	6.3x11	3.53	0.90	245	8x11.5	3.18	1.2	305	10x16	2.82	0.68	320	
100	8x11.5	1.99	0.39	315	8x11.5	1.66	0.50	385	10x12.5	1.49	0.65	395	12.5x20	1.33	0.28	585	
220	10x12.5	0.91	0.23	500	10x16	0.75	0.27	505	10x20	0.68	0.32	505	16x25	0.60	0.16	1120	
330	10x16	0.60	0.18	615	10x20	0.50	0.18	675	12.5x20	0.45	0.22	660	16x25	0.40	0.13	1290	
470	10x20	0.42	0.12	825	12.5x20	0.35	0.12	895	12.5x25	0.32	0.16	850	16x31.5	0.28	0.11	1350	
1000	12.5x25	0.20	0.068	1300	16x25	0.17	0.076	1495	16x31.5	0.15	0.098	1430	—	—	—	—	
2200	16x31.5	0.11	0.045	2110	18x35.5	0.09	0.050	2190	—	—	—	—	—	—	—	—	
3300	18x35.5	0.08	0.036	2580	—	—	—	—	—	—	—	—	—	—	—	—	

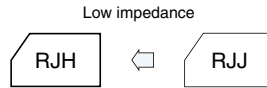
(Note) ESR : 20°C, 120Hz ; Impedance : 20°C, 100kHz ; Rated ripple current : 105°C, 100kHz

Rated voltage(V) Rated Capacitance(μF)	Item	160			200			250			315			350			400		
		Case	ESR	Rated ripple current	Case	ESR	Rated ripple current	Case	ESR	Rated ripple current	Case	ESR	Rated ripple current	Case	ESR	Rated ripple current	Case	ESR	Rated ripple current
		∅D x L (mm)	Ω	mArms	∅D x L (mm)	Ω	mArms	∅D x L (mm)	Ω	mArms	∅D x L (mm)	Ω	mArms	∅D x L (mm)	Ω	mArms	∅D x L (mm)	Ω	mArms
0.47	6.3x11	529	12	6.3x11	529	12	6.3x11	529	12	6.3x11	705	11	6.3x11	705	11	—	—	—	
1	6.3x11	248	18	6.3x11	248	18	6.3x11	248	18	6.3x11	331	16	6.3x11	331	18	8x11.5	331	18	
2.2	6.3x11	113	26	6.3x11	113	26	8x11.5	113	30	8x11.5	150	27	8x11.5	150	30	10x12.5	150	30	
3.3	8x11.5	75.4	37	8x11.5	75.4	37	10x12.5	75.4	43	10x12.5	100	36	10x12.5	100	36	10x16	100	40	
4.7	8x11.5	52.9	44	10x12.5	52.9	50	10x12.5	52.9	50	10x16	70.6	47	10x16	70.6	47	10x20	70.6	52	
10	10x12.5	24.9	75	10x12.5	24.9	80	10x20	24.9	90	10x20	33.2	75	12.5x20	33.2	79	12.5x20	33.2	79	
22	10x20	11.3	135	10x20	11.3	135	12.5x25	11.3	155	12.5x25	15.1	130	12.5x25	15.1	130	16x25	15.1	130	
33	12.5x20	7.54	175	12.5x25	7.54	190	12.5x25	7.54	190	16x25	10.1	160	16x25	10.1	160	16x31.5	10.1	175	
47	12.5x25	5.29	230	12.5x25	5.29	230	16x25	5.29	225	16x31.5	7.06	210	16x31.5	7.06	210	18x35.5	7.06	220	
100	16x25	2.49	330	16x31.5	2.49	360	18x35.5	2.49	340	18x40	3.32	335	18x40	3.32	335	—	—	—	
220	18x35.5	1.13	500	18x40	1.13	525	—	—	—	—	—	—	—	—	—	—	—	—	

(Note) ESR : 20°C, 120Hz ; Rated ripple current : 105°C, 120Hz

105°C Use, High-Reliability, Low Impedance Capacitors Series RJH

- The capacitor of this Series achieves high reliability under the environmental loading prevailing in a piece of equipment on which it is mounted.
- Guarantees 5000 hours at 105°C.
(ϕ 5 to 6.3: 2000 hours ; ϕ 8 to 10: 3000 hours)



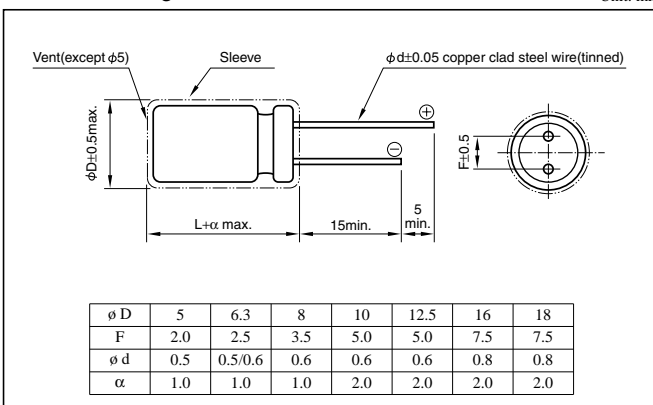
Marking color : White print on a black sleeve or Gold print on a brown sleeve

Specifications

Item	Performance									
Category temperature range (°C)	-55 to +105									
Tolerance at rated capacitance (%)	± 20 (20°C, 120Hz)									
Leakage current (μ A)	Less than $0.01CV + 2$ (after 2 minutes) C: Rated capacitance(μ F); V: Rated voltage(V) (20°C)									
Tangent of loss angle (tan δ)	Rated voltage (V)	6.3	10	16	25	35	50	63	100	
	tan δ (max.)	0.22	0.19	0.16	0.14	0.12	0.10	0.08	0.07	
0.02 is added to every 1000 μ F increase over 1000 μ F. (20°C, 120Hz)										
Characteristics at high and low temperature	Impedance ratio (max.)	Z-25°C / Z+20°C		2	2	2	2	2	2	2
		Z-55°C / Z+20°C		3	3	3	3	3	3	3
(120Hz)										
Endurance (105°C) (Applied ripple current)	Test time	5000 hours (ϕ 5 to 6.3: 2000 hours) (ϕ 8 to 10 : 3000 hours)								
	Leakage current	The initial specified value or less								
	Percentage of capacitance change	Within $\pm 20\%$ of initial value								
	Tangent of the loss angle	200% or less of the initial specified value								
Shelf life (105°C)	Test time	1000 hours								
	Leakage current	The initial specified value or less								
	Percentage of capacitance change	Within $\pm 15\%$ of initial value								
	Tangent of the loss angle	150% or less of the initial specified value								
Voltage application treatment										
Applicable standards	JIS C5101-1, -4 1998 (IEC 60384-1 1992, -4 1985)									

Outline Drawing

Unit: mm



- The electric characteristics are described on page 106.

Coefficient of Frequency for Rated Ripple Current

Rated capacitance(μ F)	Frequency(Hz)			
	120	1k	10k	100k
0.47 to 4.7	0.40	0.68	0.78	1
5.6 to 47	0.50	0.76	0.87	1
56 to 270	0.70	0.85	0.90	1
330 to 1000	0.80	0.93	0.98	1
1200 to 15000	0.90	0.95	1	1

Part numbering system (example: 10V5600 μ F)

Environmental item	RJH	—	10	V	562	M	J7	#
	Series code		Rated voltage symbol		Rated capacitance symbol	Capacitance tolerance symbol	Casing symbol	
Former item	RJH	—	10	V	562	M	J7	*
	Series code		Rated voltage symbol		Rated capacitance symbol	Capacitance tolerance symbol	Casing symbol	Additional symbol

*	Case (ϕ D)	Additional symbol
	5 to 12.5	—
	16 · 18	G

Standard Ratings

Rated voltage(V)		6.3					10					
Case ø DxL(mm)	Casing symbol	Item	Rated capacitance	ESR	Impedance Ω/100kHz		Rated ripple current	Rated capacitance	ESR	Impedance Ω/100kHz		Rated ripple current
			μF	Ω	20°C	-10°C	mArms	μF	Ω	20°C	-10°C	mArms
5x11.5	E3		100	3.65	0.65	1.46	175	82	3.84	0.65	1.46	175
5x15	E4		150	2.43	0.46	1.04	235	100	3.15	0.46	1.04	235
6.3x11.5	F3		220	1.66	0.31	0.70	290	180	1.75	0.31	0.70	290
6.3x15	F4		330	1.11	0.20	0.45	400	220	1.43	0.20	0.45	400
8x12	G3		470	0.777	0.17	0.38	488	330	0.956	0.17	0.38	488
8x15	G4		680	0.537	0.13	0.29	617	470	0.671	0.13	0.29	617
8x20	G5		1000	0.365	0.095	0.21	800	680	0.464	0.095	0.21	800
10x12.5	H3		680	0.537	0.1	0.23	625	470	0.671	0.10	0.23	625
10x16	H4		820	0.446	0.08	0.18	825	560	0.563	0.080	0.18	825
10x20	H5		1200	0.305	0.062	0.14	1010	1000	0.316	0.062	0.14	1010
10x25	H6		1500	0.244	0.052	0.12	1190	1200	0.263	0.052	0.12	1190
10x30	H7		2200	0.181	0.044	0.099	1440	1500	0.211	0.044	0.099	1440
12.5x15	I4	•	1200	0.305	0.062	0.14	1010	• 1000	0.316	0.062	0.14	1010
12.5x20	I5		2200	0.181	0.042	0.095	1400	1800	0.176	0.042	0.095	1400
12.5x25	I6		2700	0.148	0.034	0.076	1690	2200	0.159	0.034	0.076	1690
12.5x30	I7		3900	0.111	0.03	0.068	1950	2700	0.130	0.030	0.068	1950
12.5x35	I8		4700	0.099	0.024	0.054	2220	3300	0.116	0.024	0.054	2220
12.5x40	I9		5600	0.089	0.021	0.047	2390	3900	0.098	0.021	0.047	2390
16x16	J4	•	2700	0.148	0.046	0.10	1310	• 1800	0.176	0.046	0.10	1310
16x20	J5	•	4700	0.099	0.034	0.077	1660	• 3300	0.116	0.034	0.077	1660
16x25	J6		5600	0.089	0.028	0.063	2070	3900	0.098	0.028	0.063	2070
16x31.5	J7		6800	0.079	0.025	0.056	2350	5600	0.080	0.025	0.056	2350
16x35.5	J8		8200	0.073	0.022	0.050	2550	6800	0.071	0.022	0.050	2550
16x40	J9		12000	0.059	0.018	0.041	2970	8200	0.067	0.018	0.041	2970
18x16	K4	•	3300	0.131	0.043	0.097	1460	• 2200	0.159	0.043	0.097	1460
18x20	K5	•	5600	0.089	0.030	0.068	1850	• 3900	0.098	0.030	0.068	1850
18x25	K6	•	6800	0.079	0.027	0.061	2120	• 4700	0.089	0.027	0.061	2120
18x31.5	K7		10000	0.064	0.023	0.052	2410	6800	0.071	0.023	0.052	2410
18x35.5	K8		12000	0.059	0.019	0.043	2680	8200	0.067	0.019	0.043	2680
18x40	K9		15000	0.054	0.017	0.038	3010	10000	0.059	0.017	0.038	3010

Rated voltage(V)		16					25					
Case ø DxL(mm)	Casing symbol	Item	Rated capacitance	ESR	Impedance Ω/100kHz		Rated ripple current	Rated capacitance	ESR	Impedance Ω/100kHz		Rated ripple current
			μF	Ω	20°C	-10°C	mArms	μF	Ω	20°C	-10°C	mArms
5x11.5	E3		56	4.74	0.65	1.46	175	39	5.96	0.65	1.46	175
5x15	E4		82	3.24	0.46	1.04	235	56	4.15	0.46	1.04	235
6.3x11.5	F3		120	2.21	0.31	0.70	290	82	2.83	0.31	0.70	290
6.3x15	F4		180	1.48	0.20	0.45	400	120	1.94	0.20	0.45	400
8x12	G3		270	0.983	0.17	0.38	488	180	1.29	0.17	0.38	488
8x15	G4		330	0.805	0.13	0.29	617	220	1.06	0.13	0.29	617
8x20	G5		470	0.565	0.095	0.21	800	330	0.704	0.095	0.21	800
10x12.5	H3		330	0.805	0.10	0.23	625	220	1.06	0.10	0.23	625
10x16	H4		390	0.681	0.080	0.18	825	270	0.861	0.080	0.18	825
10x20	H5		680	0.391	0.062	0.14	1010	470	0.495	0.062	0.14	1010
10x25	H6		820	0.324	0.052	0.12	1190	560	0.415	0.052	0.12	1190
10x30	H7		1200	0.222	0.044	0.099	1440	680	0.284	0.044	0.099	1440
12.5x15	I4	•	680	0.391	0.062	0.14	1010	• 470	0.495	0.062	0.14	1010
12.5x20	I5		1200	0.222	0.042	0.095	1400	820	0.284	0.042	0.095	1400
12.5x25	I6		1500	0.177	0.034	0.076	1690	1000	0.233	0.034	0.076	1690
12.5x30	I7		2200	0.136	0.030	0.068	1950	1500	0.155	0.030	0.068	1950
12.5x35	I8		2700	0.111	0.024	0.054	2220	1800	0.130	0.024	0.054	2220
12.5x40	I9		3300	0.101	0.021	0.047	2390	2200	0.121	0.021	0.047	2390
16x16	J4	•	1500	0.177	0.046	0.10	1310	• 820	0.284	0.046	0.10	1310
16x20	J5	•	2200	0.136	0.034	0.077	1660	• 1500	0.155	0.034	0.077	1660
16x25	J6		2700	0.111	0.028	0.063	2070	1800	0.130	0.028	0.063	2070
16x31.5	J7		3900	0.086	0.025	0.056	2350	2700	0.099	0.025	0.056	2350
16x35.5	J8		4700	0.078	0.022	0.050	2550	3300	0.091	0.022	0.050	2550
16x40	J9		5600	0.072	0.018	0.041	2970	3900	0.077	0.018	0.041	2970
18x16	K4	•	1500	0.177	0.043	0.097	1460	• 1200	0.194	0.043	0.097	1460
18x20	K5	•	2700	0.111	0.030	0.068	1850	• 1800	0.130	0.030	0.068	1850
18x25	K6	•	3900	0.086	0.027	0.061	2120	• 2700	0.099	0.027	0.061	2120
18x31.5	K7		4700	0.078	0.023	0.052	2410	3300	0.091	0.023	0.052	2410
18x35.5	K8		6800	0.064	0.019	0.043	2680	3900	0.077	0.019	0.043	2680
18x40	K9		8200	0.061	0.017	0.038	3010	4700	0.071	0.017	0.038	3010

(Note) ESR : 20°C, 120Hz ; Rated ripple current : 105°C, 100kHz
 • : The black circles in the capacitance column denote semi-standard products.

• The standard ratings follow the next page.

NOTE
 Design, Specifications are subject to change without notice.
 Ask factory for technical specifications before purchase and/or use.

Standard Ratings

Rated voltage(V)			35					50				
Case φ DxL(mm)	Casing symbol	Item	Rated capacitance	ESR	Impedance Ω/100kHz		Rated ripple current	Rated capacitance	ESR	Impedance Ω/100kHz		Rated ripple current
			μF	Ω	20°C	-10°C	mArms	μF	Ω	20°C	-10°C	mArms
5x11.5	E3		—	—	—	—	—	0.47	353	3.9	7.8	22
5x11.5	E3		—	—	—	—	—	1	166	3.5	7.0	36
5x11.5	E3		—	—	—	—	—	2.2	75.4	3.0	6.0	54
5x11.5	E3		—	—	—	—	—	3.3	50.3	2.6	5.2	63
5x11.5	E3		—	—	—	—	—	4.7	35.3	2.2	4.4	75
5x11.5	E3		—	—	—	—	—	10	16.6	1.4	2.8	110
5x11.5	E3		27	7.37	0.65	1.46	175	18	9.22	0.95	1.9	120
5x15	E4		39	5.10	0.46	1.04	235	27	6.14	0.66	1.32	135
6.3x11.5	F3		56	3.56	0.31	0.70	290	39	4.25	0.43	0.86	148
6.3x15	F4		82	2.43	0.20	0.45	400	56	2.96	0.33	0.66	153
8x12	G3		120	1.66	0.17	0.38	488	68	2.44	0.20	0.40	360
8x15	G4		180	1.11	0.13	0.29	617	82	2.02	0.18	0.36	460
8x20	G5		220	0.905	0.095	0.21	800	120	1.38	0.13	0.26	670
10x12.5	H3		150	1.33	0.10	0.23	625	82	2.02	0.18	0.36	443
10x16	H4		180	1.11	0.080	0.18	825	100	1.66	0.15	0.30	553
10x20	H5		330	0.604	0.062	0.14	1010	180	0.922	0.085	0.17	676
10x25	H6		390	0.511	0.052	0.12	1190	220	0.754	0.075	0.15	876
10x30	H7		560	0.356	0.044	0.099	1440	330	0.503	0.055	0.110	1010
12.5x15	I4	•	330	0.604	0.062	0.140	1010	• 180	0.922	0.095	0.190	745
12.5x20	I5		560	0.356	0.042	0.095	1400	330	0.503	0.060	0.120	979
12.5x25	I6		680	0.293	0.034	0.076	1690	470	0.353	0.044	0.088	1180
12.5x30	I7		1000	0.200	0.030	0.068	1950	560	0.297	0.040	0.080	1310
12.5x35	I8		1200	0.166	0.024	0.054	2220	680	0.244	0.036	0.072	1470
12.5x40	I9		1500	0.133	0.021	0.047	2390	820	0.203	0.034	0.068	1590
16x16	J4	•	560	0.356	0.046	0.10	1310	• 330	0.503	0.065	0.130	982
16x20	J5	•	1000	0.200	0.034	0.077	1660	• 680	0.244	0.045	0.090	1210
16x25	J6		1200	0.166	0.028	0.063	2070	820	0.203	0.038	0.076	1490
16x31.5	J7		1800	0.111	0.025	0.056	2350	1000	0.166	0.032	0.064	1890
16x35.5	J8		2200	0.106	0.022	0.050	2550	1200	0.139	0.028	0.056	2140
16x40	J9		2700	0.087	0.018	0.041	2970	1500	0.111	0.026	0.052	2410
18x16	K4	•	680	0.293	0.043	0.097	1460	• 470	0.353	0.048	0.096	1180
18x20	K5	•	1200	0.166	0.030	0.068	1850	• 820	0.203	0.036	0.072	1450
18x25	K6	•	1800	0.111	0.027	0.061	2120	• 1000	0.166	0.032	0.064	1720
18x31.5	K7		2200	0.106	0.023	0.052	2410	1500	0.111	0.026	0.052	1970
18x35.5	K8		2700	0.087	0.019	0.043	2680	1800	0.074	0.025	0.050	2310
18x40	K9		3300	0.081	0.017	0.038	3010	2200	0.073	0.024	0.048	2530

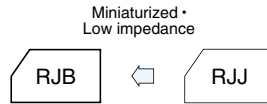
Rated voltage(V)			63					100				
Case φ DxL(mm)	Casing symbol	Item	Rated capacitance	ESR	Impedance Ω/100kHz		Rated ripple current	Rated capacitance	ESR	Impedance Ω/100kHz		Rated ripple current
			μF	Ω	20°C	-10°C	mArms	μF	Ω	20°C	-10°C	mArms
5x11.5	E3		12	11.1	1.2	3.6	120	5.6	20.7	1.9	7.6	57
5x15	E4		18	7.37	0.85	2.6	135	8.2	14.2	1.3	5.2	74
6.3x11.5	F3		27	4.92	0.55	1.7	148	12	9.68	1.1	4.4	78
6.3x15	F4		39	3.40	0.38	1.1	153	18	6.45	0.62	2.5	85
8x12	G3		47	2.82	0.32	0.96	360	22	5.28	0.53	2.1	275
8x15	G4		68	1.95	0.24	0.72	469	33	3.52	0.35	1.4	360
8x20	G5		82	1.62	0.17	0.51	682	39	2.98	0.27	1.1	490
10x12.5	H3		56	2.37	0.23	0.69	448	27	4.30	0.47	1.9	319
10x16	H4		68	1.95	0.17	0.51	553	33	3.52	0.32	1.3	424
10x20	H5		120	1.11	0.12	0.36	676	56	2.07	0.25	0.1	499
10x25	H6		150	0.885	0.10	0.30	876	68	1.71	0.18	0.72	634
10x30	H7		180	0.738	0.085	0.26	1020	100	1.16	0.15	0.60	739
12.5x15	I4	•	150	0.885	0.11	0.33	745	• 68	1.71	0.20	0.80	613
12.5x20	I5		220	0.604	0.075	0.23	979	100	1.16	0.13	0.52	805
12.5x25	I6		270	0.492	0.065	0.20	1180	120	0.968	0.11	0.44	857
12.5x30	I7		390	0.341	0.055	0.17	1310	180	0.646	0.090	0.36	1120
12.5x35	I8		470	0.283	0.048	0.14	1470	220	0.528	0.075	0.30	1240
12.5x40	I9		560	0.237	0.042	0.13	1590	270	0.431	0.060	0.24	1330
16x16	J4	•	220	0.604	0.080	0.24	982	• 120	0.968	0.130	0.52	706
16x20	J5	•	390	0.341	0.057	0.17	1210	• 180	0.646	0.11	0.44	916
16x25	J6		470	0.283	0.052	0.16	1490	220	0.528	0.081	0.32	1290
16x31.5	J7		680	0.196	0.042	0.13	1890	330	0.352	0.059	0.23	1630
16x35.5	J8		820	0.162	0.036	0.11	2140	390	0.298	0.052	0.21	1750
16x40	J9		1000	0.133	0.032	0.096	2410	470	0.248	0.045	0.18	1920
18x16	K4	•	330	0.403	0.065	0.20	1200	• 150	0.775	0.12	0.48	871
18x20	K5	•	560	0.237	0.058	0.17	1460	• 270	0.431	0.085	0.34	1170
18x25	K6	•	680	0.196	0.050	0.15	1740	• 330	0.352	0.071	0.28	1500
18x31.5	K7		820	0.162	0.042	0.13	1990	390	0.298	0.058	0.23	1630
18x35.5	K8		1000	0.133	0.035	0.11	2340	560	0.208	0.054	0.22	1920
18x40	K9		1200	0.111	0.032	0.096	2560	680	0.171	0.041	0.16	2100

(Note) ESR : 20°C, 120Hz ; Rated ripple current : 105°C, 100kHz

• : The black circles in the capacitance column denote semi-standard products.

105°C Use, Miniature, High-Reliability, Low Impedance Capacitors Series RJB

- Smaller and higher ripple current than RJJ and RJH Series.
- Guarantees 5000 hours at 105°C.
(ø 5 to 6.3: 2000 hours ; ø 8 to 10: 3000 hours)



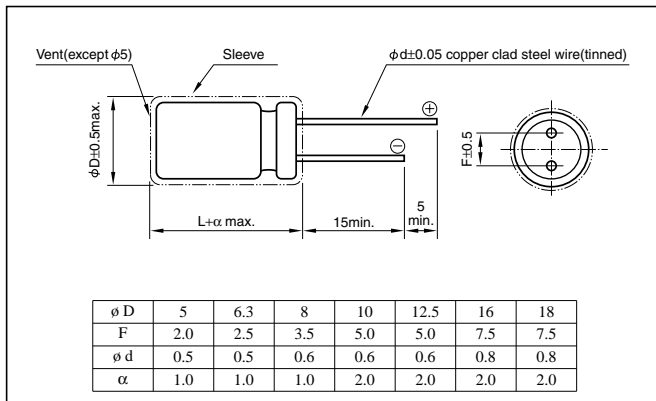
Marking color : White print on a black sleeve or
White print on a brown sleeve

Specifications

Item	Performance																		
Category temperature range (°C)	-55 to +105																		
Tolerance at rated capacitance (%)	±20 (20°C, 120Hz)																		
Leakage current (µA)	Less than 0.01CV + 2 (after 2 minutes) C: Rated capacitance(µF); V: Rated voltage(V) (20°C)																		
Tangent of loss angle (tanδ)	<table border="1"> <tr> <td>Rated voltage (V)</td> <td>6.3</td> <td>10</td> <td>16</td> <td>25</td> <td>35</td> <td>50</td> <td>63</td> <td>100</td> </tr> <tr> <td>tanδ (max.)</td> <td>0.22</td> <td>0.19</td> <td>0.16</td> <td>0.14</td> <td>0.12</td> <td>0.10</td> <td>0.08</td> <td>0.07</td> </tr> </table>	Rated voltage (V)	6.3	10	16	25	35	50	63	100	tanδ (max.)	0.22	0.19	0.16	0.14	0.12	0.10	0.08	0.07
	Rated voltage (V)	6.3	10	16	25	35	50	63	100										
tanδ (max.)	0.22	0.19	0.16	0.14	0.12	0.10	0.08	0.07											
0.02 is added to every 1000µF increase over 1000µF. (20°C, 120Hz)																			
Characteristics at high and low temperature	<table border="1"> <tr> <td>Rated voltage (V)</td> <td>6.3</td> <td>10</td> <td>16</td> <td>25</td> <td>35</td> <td>50</td> <td>63</td> <td>100</td> </tr> <tr> <td>Impedance ratio (max.)</td> <td>Z-55°C / Z+20°C</td> <td>3</td> <td>3</td> <td>3</td> <td>3</td> <td>3</td> <td>3</td> <td>3</td> </tr> </table>	Rated voltage (V)	6.3	10	16	25	35	50	63	100	Impedance ratio (max.)	Z-55°C / Z+20°C	3	3	3	3	3	3	3
	Rated voltage (V)	6.3	10	16	25	35	50	63	100										
Impedance ratio (max.)	Z-55°C / Z+20°C	3	3	3	3	3	3	3											
(120Hz)																			
Endurance (105°C) (Applied ripple current)	Test time	5000 hours (ø 5 to 6.3: 2000 hours) (ø 8 to 10 : 3000 hours)																	
	Leakage current	The initial specified value or less																	
	Percentage of capacitance change	Within ±20% of initial value																	
	Tangent of the loss angle	200% or less of the initial specified value																	
Shelf life (105°C)	Test time	1000 hours																	
	Leakage current	The initial specified value or less																	
	Percentage of capacitance change	Within ±15% of initial value																	
	Tangent of the loss angle	150% or less of the initial specified value																	
Voltage application treatment																			
Applicable standards	JIS C5101-1, -4 1998 (IEC 60384-1 1992, -4 1985)																		

Outline Drawing

Unit: mm



Coefficient of Frequency for Rated Ripple Current

Rated capacitance(µF)	Frequency(Hz)			
	120	1k	10k	100k
0.47 to 180	0.40	0.75	0.90	1
220 to 390	0.50	0.85	0.95	1
470 to 1800	0.60	0.88	0.96	1
2200 to 3900	0.75	0.90	0.98	1
4700 to 10000	0.85	0.95	1	1

Part numbering system (example: 10V1000µF)

Environmental item	RJB	—	10	V	102	M	H4	#
	Series code		Rated voltage symbol		Rated capacitance symbol	Capacitance tolerance symbol	Casing symbol	
Former item	RJB	—	10	V	102	M	H4	
	Series code		Rated voltage symbol		Rated capacitance symbol	Capacitance tolerance symbol	Casing symbol	

• The electric characteristics are described on page 106.

• The standard ratings are described on the next page.

Standard Ratings

Rated voltage(V)			6.3					10				
Case ø DxL(mm)	Casing symbol	Item	Rated capacitance	ESR	Impedance Ω/100kHz		Rated ripple current	Rated capacitance	ESR	Impedance Ω/100kHz		Rated ripple current
			μF	Ω	20°C	-10°C	mArms	μF	Ω	20°C	-10°C	mArms
5x11.5	E3	—	—	—	—	—	—	100	3.15	0.65	1.30	181
6.3x11.5	F3	330	1.11	0.32	0.64	290	220	1.43	0.32	0.64	290	290
8x12	G3	470	0.78	0.17	0.34	555	330	0.96	0.17	0.34	555	555
8x12	G3	680	0.54	0.17	0.34	555	470	0.67	0.17	0.34	555	555
10x12.5	H3	1000	0.36	0.12	0.24	760	680	0.46	0.12	0.24	760	760
10x16	H4	—	—	—	—	—	1000	0.32	0.080	0.16	1050	1050
10x25	H6	2200	0.18	0.052	0.104	1440	—	—	—	—	—	—
12.5x20	I5	3300	0.13	0.042	0.084	1690	2200	0.16	0.042	0.084	1690	1690
12.5x25	I6	—	—	—	—	—	3300	0.12	0.034	0.068	1950	1950
12.5x30	I7	4700	0.10	0.030	0.060	2310	—	—	—	—	—	—
16x25	J6	6800	0.08	0.028	0.056	2560	4700	0.09	0.028	0.056	2560	2560
16x31.5	J7	10000	0.06	0.025	0.050	3010	6800	0.07	0.025	0.050	3010	3010

Rated voltage(V)			16					25				
Case ø DxL(mm)	Casing symbol	Item	Rated capacitance	ESR	Impedance Ω/100kHz		Rated ripple current	Rated capacitance	ESR	Impedance Ω/100kHz		Rated ripple current
			μF	Ω	20°C	-10°C	mArms	μF	Ω	20°C	-10°C	mArms
5x11.5	E3	—	—	—	—	—	—	47	4.94	0.65	1.30	181
6.3x11.5	F3	—	—	—	—	—	—	100	2.32	0.32	0.64	290
8x12	G3	330	0.81	0.17	0.34	555	220	1.06	0.17	0.34	555	555
10x12.5	H3	470	0.57	0.12	0.24	760	330	0.70	0.12	0.24	760	760
10x16	H4	680	0.39	0.080	0.16	1050	470	0.50	0.080	0.16	1050	1050
10x20	H5	1000	0.27	0.062	0.124	1220	680	0.34	0.062	0.124	1220	1220
12.5x20	I5	—	—	—	—	—	1000	0.23	0.042	0.084	1690	1690
12.5x25	I6	2200	0.14	0.034	0.068	1950	—	—	—	—	—	—
16x25	J6	3300	0.10	0.028	0.056	2560	2200	0.12	0.028	0.056	2560	2560
16x31.5	J7	4700	0.08	0.025	0.050	3010	3300	0.09	0.025	0.050	3010	3010

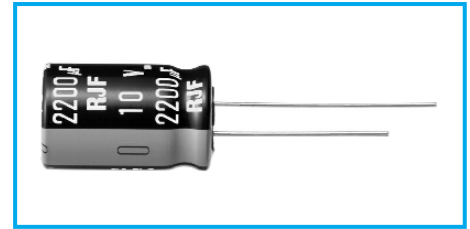
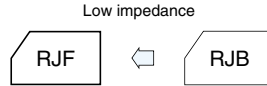
Rated voltage(V)			35					50				
Case ø DxL(mm)	Casing symbol	Item	Rated capacitance	ESR	Impedance Ω/100kHz		Rated ripple current	Rated capacitance	ESR	Impedance Ω/100kHz		Rated ripple current
			μF	Ω	20°C	-10°C	mArms	μF	Ω	20°C	-10°C	mArms
5x11.5	E3	33	6.03	0.65	1.30	181	22	7.54	0.95	1.9	170	170
6.3x11.5	F3	47	4.23	0.32	0.64	290	33	5.03	0.46	0.92	260	260
6.3x11.5	F3	—	—	—	—	—	47	3.53	0.46	0.92	260	260
8x12	G3	100	1.99	0.17	0.34	555	100	1.66	0.21	0.42	485	485
10x12.5	H3	220	0.91	0.12	0.24	760	150	1.11	0.19	0.38	615	615
10x16	H4	330	0.60	0.080	0.16	1050	220	0.75	0.16	0.32	850	850
10x20	H5	470	0.42	0.062	0.124	1220	330	0.50	0.085	0.17	1050	1050
12.5x20	I5	680	0.29	0.042	0.084	1690	470	0.35	0.060	0.12	1500	1500
12.5x25	I6	1000	0.20	0.034	0.068	1950	680	0.24	0.045	0.090	1832	1832
16x25	J6	—	—	—	—	—	1000	0.17	0.038	0.076	2240	2240
16x31.5	J7	2200	0.11	0.025	0.050	3010	—	—	—	—	—	—

Rated voltage(V)			63					100				
Case ø DxL(mm)	Casing symbol	Item	Rated capacitance	ESR	Impedance Ω/100kHz		Rated ripple current	Rated capacitance	ESR	Impedance Ω/100kHz		Rated ripple current
			μF	Ω	20°C	-10°C	mArms	μF	Ω	20°C	-10°C	mArms
5x11.5	E3	4.7	31.8	1.2	3.6	120	3.3	40.2	1.9	7.6	57	57
5x11.5	E3	10	14.9	1.2	3.6	120	4.7	28.2	1.9	7.6	57	57
6.3x11.5	F3	22	6.79	0.55	1.7	148	10	13.3	1.1	4.4	78	78
6.3x11.5	F3	33	4.52	0.55	1.7	148	—	—	—	—	—	—
8x12	G3	47	3.18	0.32	0.96	360	22	6.03	0.53	2.1	275	275
10x12.5	H3	100	1.49	0.23	0.69	448	33	4.02	0.47	1.9	319	319
10x16	H4	—	—	—	—	—	47	2.82	0.32	1.3	424	424
10x20	H5	220	0.68	0.12	0.36	676	—	—	—	—	—	—
12.5x20	I5	330	0.45	0.075	0.23	979	100	1.33	0.13	0.52	805	805
12.5x25	I6	470	0.32	0.065	0.20	1180	—	—	—	—	—	—
16x25	J6	—	—	—	—	—	220	0.60	0.081	0.32	1290	1290
16x25	J6	—	—	—	—	—	330	0.40	0.081	0.32	1290	1290
16x31.5	J7	1000	0.15	0.042	0.13	1890	470	0.28	0.059	0.23	1630	1630

(Note) ESR : 20°C, 120Hz ; Rated ripple current : 105°C, 100kHz

105°C Use, Miniature, High-Reliability, Extra Low Impedance Capacitors Series RJF

- Higher ripple current than RJB Series.
The addition of 5L and 7L.
- Guarantees 5000 hours at 105°C.
(5L, 7L: 1000 hours ; ø 5 to 6.3: 2000 hours ;
ø 8 to 10: 3000 hours)



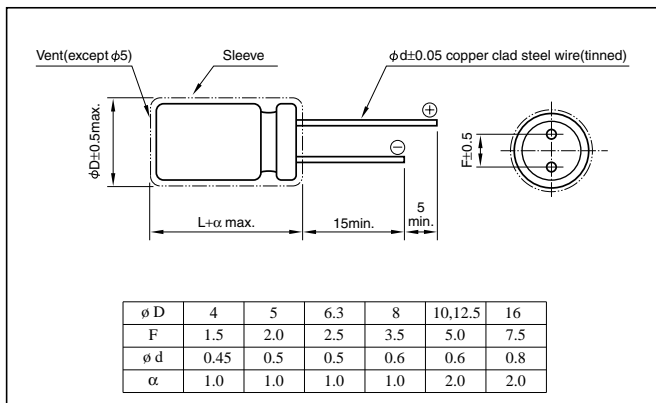
Marking color : White print on a black sleeve

Specifications

Item	Performance																				
Category temperature range (°C)	-40 to +105																				
Tolerance at rated capacitance (%)	±20 (20°C, 120Hz)																				
Leakage current (µA)	Less than 0.01CV or 3 whichever is larger (after 2 minutes) C: Rated capacitance(µF); V: Rated voltage(V) (20°C)																				
Tangent of loss angle (tanδ)	<table border="1"> <tr> <th>Rated voltage (V)</th> <td>6.3</td> <td>10</td> <td>16</td> <td>25</td> <td>35</td> <td>50</td> </tr> <tr> <th>tanδ (max.)</th> <td>0.22</td> <td>0.19</td> <td>0.16</td> <td>0.14</td> <td>0.12</td> <td>0.10</td> </tr> </table>	Rated voltage (V)	6.3	10	16	25	35	50	tanδ (max.)	0.22	0.19	0.16	0.14	0.12	0.10						
	Rated voltage (V)	6.3	10	16	25	35	50														
tanδ (max.)	0.22	0.19	0.16	0.14	0.12	0.10															
0.02 is added to every 1000µF increase over 1000µF. (20°C, 120Hz)																					
Characteristics at high and low temperature	<table border="1"> <tr> <th>Rated voltage (V)</th> <td>6.3</td> <td>10</td> <td>16</td> <td>25</td> <td>35</td> <td>50</td> </tr> <tr> <th rowspan="2">Impedance ratio (max.)</th> <td>Z-25°C / Z+20°C</td> <td>2</td> <td>2</td> <td>2</td> <td>2</td> <td>2</td> </tr> <tr> <td>Z-40°C / Z+20°C</td> <td>3</td> <td>3</td> <td>3</td> <td>3</td> <td>3</td> </tr> </table>	Rated voltage (V)	6.3	10	16	25	35	50	Impedance ratio (max.)	Z-25°C / Z+20°C	2	2	2	2	2	Z-40°C / Z+20°C	3	3	3	3	3
	Rated voltage (V)	6.3	10	16	25	35	50														
Impedance ratio (max.)	Z-25°C / Z+20°C	2	2	2	2	2															
	Z-40°C / Z+20°C	3	3	3	3	3															
(120Hz)																					
Endurance (105°C) (Applied ripple current)	Test time	5L & 7L : 1000 hours ø 5 & ø 6.3 : 2000 hours ø 8 & ø 10 : 3000 hours ø 12.5 & ø 16 : 5000 hours																			
	Leakage current	The initial specified value or less																			
	Percentage of capacitance change	Within ±25% of initial value																			
	Tangent of the loss angle	200% or less of the initial specified value																			
Shelf life (105°C)	Test time	1000 hours																			
	Leakage current	The initial specified value or less																			
	Percentage of capacitance change	Within ±25% of initial value																			
	Tangent of the loss angle	200% or less of the initial specified value																			
Voltage application treatment																					
Applicable standards	JIS C5101-1, -4 1998 (IEC 60384-1 1992, -4 1985)																				

Outline Drawing

Unit: mm



Coefficient of Frequency for Rated Ripple Current

Rated capacitance(µF)	Frequency(Hz)			
	120	1k	10k	100k
5.6 to 180	0.40	0.75	0.90	1
220 to 390	0.50	0.85	0.95	1
470 to 1800	0.60	0.88	0.96	1
2200 to 3900	0.75	0.90	0.98	1
4700 to 6800	0.85	0.95	1	1

Part numbering system (example: 10V1000µF)

Environmental item	RJF	—	10	V	102	M	H4	#
	Series code		Rated voltage symbol		Rated capacitance symbol	Capacitance tolerance symbol	Casing symbol	
Former item	RJF	—	10	V	102	M	H4	
	Series code		Rated voltage symbol		Rated capacitance symbol	Capacitance tolerance symbol	Casing symbol	

• The electric characteristics are described on page 106.

• The standard ratings are described on the next page.

Standard Ratings

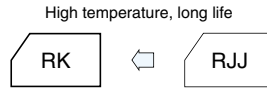
Rated voltage (V)	Item	6.3					10					16				
		Case øD x L (mm)	Casing symbol	Impedance (Ω)		Rated ripple current (mAmps)	Case øD x L (mm)	Casing symbol	Impedance (Ω)		Rated ripple current (mAmps)	Case øD x L (mm)	Casing symbol	Impedance (Ω)		Rated ripple current (mAmps)
				20°C	-10°C				20°C	-10°C				20°C	-10°C	
18	—	—	—	—	—	—	—	—	—	—	4x7	D1	0.85	2.6	130	
27	—	—	—	—	—	4x7	D1	0.85	2.6	130	—	—	—	—	—	
33	—	—	—	—	—	—	—	—	—	—	5x7	E1	0.45	1.4	210	
39	4x7	D1	0.85	2.6	130	—	—	—	—	—	6.3x5	F0	0.30	0.95	210	
47	—	—	—	—	—	6.3x5	F0	0.29	0.93	210	—	—	—	—	—	
56	—	—	—	—	—	5x7	E1	0.44	1.4	210	5x11.5	E3	0.30	1.0	250	
68	5x7	E1	0.43	1.3	210	—	—	—	—	—	6.3x7	F1	0.24	0.72	300	
100	6.3x5	F0	0.28	0.91	210	5x11.5	E3	0.30	1.0	250	—	—	—	—	—	
120	—	—	—	—	—	6.3x7	F1	0.23	0.69	300	8x7	G1	0.15	0.45	380	
150	5x11.5	E3	0.30	1.0	250	—	—	—	—	—	6.3x11.5	F2	0.13	0.41	405	
180	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
220	8x7	G1	0.15	0.45	380	6.3x11.5	F3	0.13	0.41	405	—	—	—	—	—	
330	6.3x11.5	F3	0.13	0.41	405	—	—	—	—	—	8x12	G3	0.072	0.22	760	
470	—	—	—	—	—	8x12	G3	0.072	0.22	760	8x15	G4	0.056	0.17	995	
560	8x12	G3	0.072	0.22	760	—	—	—	—	—	10x16	H4	0.038	0.12	1430	
680	—	—	—	—	—	10x12.5	H3	0.053	0.16	1030	—	—	—	—	—	
820	8x15	G4	0.056	0.17	995	—	—	—	—	—	—	—	—	—	—	
1000	10x12.5	H3	0.053	0.16	1030	10x16	H4	0.038	0.12	1430	10x20	H5	0.023	0.069	1820	
1200	10x16	H4	0.038	0.12	1430	10x20	H5	0.023	0.069	1820	10x25	H6	0.022	0.066	2150	
1500	10x20	H5	0.023	0.069	1820	10x25	H6	0.022	0.066	2150	12.5x20	I 5	0.021	0.053	2360	
2200	10x25	H6	0.022	0.066	2150	12.5x20	I 5	0.021	0.053	2360	12.5x25	I 6	0.018	0.045	2770	
2700	—	—	—	—	—	—	—	—	—	—	16x20	J 5	0.018	0.045	3140	
3300	12.5x20	I 5	0.021	0.053	2360	12.5x25	I 6	0.018	0.045	2770	16x25	J 6	0.016	0.043	3460	
3900	12.5x25	I 6	0.018	0.045	2770	16x20	J 5	0.018	0.045	3140	16x25	J 6	0.016	0.043	3460	
4700	12.5x30	I 7	0.016	0.041	3290	16x25	J 6	0.016	0.043	3460	—	—	—	—	—	
5600	16x20	J 5	0.018	0.045	3140	16x25	J 6	0.016	0.043	3460	—	—	—	—	—	
6800	16x25	J 6	0.016	0.043	3460	—	—	—	—	—	—	—	—	—	—	

Rated voltage (V)	Item	25					35					50				
		Case øD x L (mm)	Casing symbol	Impedance (Ω)		Rated ripple current (mAmps)	Case øD x L (mm)	Casing symbol	Impedance (Ω)		Rated ripple current (mAmps)	Case øD x L (mm)	Casing symbol	Impedance (Ω)		Rated ripple current (mAmps)
				20°C	-10°C				20°C	-10°C				20°C	-10°C	
5.6	—	—	—	—	—	—	—	—	—	—	4x7	D1	1.0	3.0	130	
10	—	—	—	—	—	4x7	D1	0.96	2.9	130	5x7	E1	0.50	1.5	210	
15	4x7	D1	0.94	2.9	130	—	—	—	—	—	—	—	—	—	—	
18	—	—	—	—	—	5x7	E1	0.47	1.5	210	—	—	—	—	—	
22	6.3x5	F0	0.31	0.97	210	6.3x5	F0	0.32	1.0	210	6.3x7	F1	0.26	0.78	300	
27	5x7	E1	0.46	1.4	210	—	—	—	—	—	5x11.5	E3	0.34	1.18	238	
33	—	—	—	—	—	5x11.5	E3	0.30	1.0	250	—	—	—	—	—	
39	—	—	—	—	—	6.3x7	F1	0.25	0.75	300	8x7	G1	0.17	0.51	380	
47	5x11.5	E3	0.30	1.0	250	—	—	—	—	—	—	—	—	—	—	
56	6.3x7	F1	0.24	0.72	300	8x7	G1	0.16	0.48	380	6.3x11.5	F3	0.14	0.50	385	
100	8x7	G1	0.15	0.45	380	6.3x11.5	F3	0.13	0.42	405	—	—	—	—	—	
120	—	—	—	—	—	—	—	—	—	—	8x12	G3	0.074	0.22	724	
150	—	—	—	—	—	—	—	—	—	—	8x15	G4	0.061	0.18	950	
180	—	—	—	—	—	8x12	G3	0.072	0.22	760	10x12.5	H3	0.061	0.18	979	
220	8x12	G3	0.072	0.22	760	10x12.5	H3	0.053	0.16	1030	10x16	H4	0.042	0.12	1370	
270	—	—	—	—	—	8x20	G5	0.041	0.13	1250	10x20	H5	0.030	0.090	1580	
330	10x12.5	H3	0.053	0.16	1030	10x16	H4	0.038	0.12	1430	10x25	H6	0.028	0.085	1870	
470	10x16	H4	0.038	0.12	1430	10x20	H5	0.023	0.069	1820	12.5x20	I 5	0.027	0.068	2050	
560	—	—	—	—	—	10x25	H6	0.022	0.066	2150	12.5x25	I 6	0.023	0.059	2410	
680	10x20	H5	0.023	0.069	1820	12.5x20	I 5	0.021	0.053	2360	16x20	J 5	0.023	0.059	2730	
820	10x25	H6	0.022	0.066	2150	—	—	—	—	—	16x25	J 6	0.021	0.056	3010	
1000	12.5x20	I 5	0.021	0.053	2360	12.5x25	I 6	0.018	0.045	2770	16x25	J 6	0.021	0.056	3010	
1200	—	—	—	—	—	16x20	J 5	0.018	0.045	3140	—	—	—	—	—	
1500	12.5x25	I 6	0.018	0.045	2770	16x25	J 6	0.016	0.043	3460	—	—	—	—	—	
1800	16x20	J 5	0.018	0.045	3140	16x25	J 6	0.016	0.043	3460	—	—	—	—	—	
2200	16x25	J 6	0.016	0.043	3460	—	—	—	—	—	—	—	—	—	—	
2700	16x25	J 6	0.016	0.043	3460	—	—	—	—	—	—	—	—	—	—	

(Note) Impedance : 20°C, 100kHz Rated ripple current : 105°C, 100kHz

125°C Use, Long Life Capacitors Series RK

- Guarantees 5000 hours at 125°C. (ø 8: 2000 hours, ø 10: 3000 hours).
- Best-suited to smoothing circuits and control circuits for industrial equipment power supplies of which long life and high reliability are required.



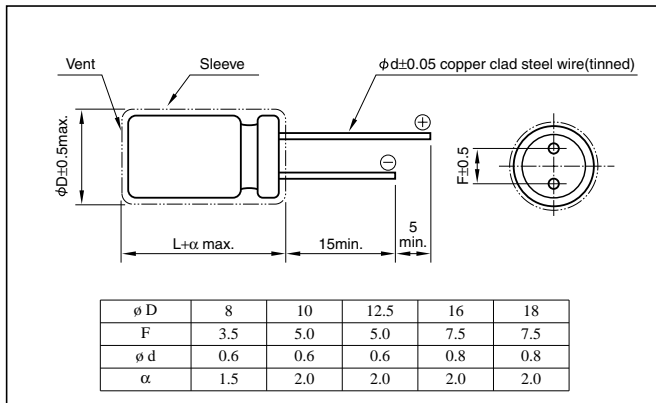
Marking color : White print on a black sleeve

Specifications

Item	Performance														
Category temperature range (°C)	-40 to +125														
Tolerance at rated capacitance (%)	±20 (20°C,120Hz)														
Leakage current (µA)	Less than 0.04CV (after 2 minutes) C: Rated capacitance(µF); V: Rated voltage(V) (20°C)														
Tangent of loss angle (tanδ)	<table border="1"> <tr> <th>Rated voltage (V)</th> <td>10</td> <td>16</td> <td>25</td> <td>35</td> <td>50</td> <td>63</td> </tr> <tr> <th>tanδ (max.)</th> <td>0.20</td> <td>0.16</td> <td>0.14</td> <td>0.12</td> <td>0.10</td> <td>0.09</td> </tr> </table>	Rated voltage (V)	10	16	25	35	50	63	tanδ (max.)	0.20	0.16	0.14	0.12	0.10	0.09
	Rated voltage (V)	10	16	25	35	50	63								
tanδ (max.)	0.20	0.16	0.14	0.12	0.10	0.09									
0.02 is added to every 1000µF increase over 1000µF. (20°C,120Hz)															
Characteristics at high and low temperature	<table border="1"> <tr> <th>Impedance ratio (max.)</th> <td>Z-40°C / Z+20°C</td> <td>3 or less</td> </tr> </table> (120Hz)	Impedance ratio (max.)	Z-40°C / Z+20°C	3 or less											
Impedance ratio (max.)	Z-40°C / Z+20°C	3 or less													
Endurance (125°C) (Applied ripple current)	<table border="1"> <tr> <th>Test time</th> <td>5000 hours (ø 10: 3000 hours, ø 8: 2000 hours)</td> </tr> <tr> <th>Leakage current</th> <td>The initial specified value or less</td> </tr> <tr> <th>Percentage of capacitance change</th> <td>Within ±30% of initial value</td> </tr> <tr> <th>Tangent of the loss angle</th> <td>300% or less of the initial specified value</td> </tr> </table>	Test time	5000 hours (ø 10: 3000 hours, ø 8: 2000 hours)	Leakage current	The initial specified value or less	Percentage of capacitance change	Within ±30% of initial value	Tangent of the loss angle	300% or less of the initial specified value						
	Test time	5000 hours (ø 10: 3000 hours, ø 8: 2000 hours)													
	Leakage current	The initial specified value or less													
	Percentage of capacitance change	Within ±30% of initial value													
Tangent of the loss angle	300% or less of the initial specified value														
Shelf life (125°C)	<table border="1"> <tr> <th>Test time</th> <td>1000 hours</td> </tr> <tr> <th>Leakage current</th> <td>The initial specified value or less</td> </tr> <tr> <th>Percentage of capacitance change</th> <td>Within ±30% of initial value</td> </tr> <tr> <th>Tangent of the loss angle</th> <td>300% or less of the initial specified value</td> </tr> </table>	Test time	1000 hours	Leakage current	The initial specified value or less	Percentage of capacitance change	Within ±30% of initial value	Tangent of the loss angle	300% or less of the initial specified value						
	Test time	1000 hours													
	Leakage current	The initial specified value or less													
	Percentage of capacitance change	Within ±30% of initial value													
Tangent of the loss angle	300% or less of the initial specified value														
Voltage application treatment															
Applicable standards	JIS C5101-1, -4 1998 (IEC 60384-1 1992, -4 1985)														

Outline Drawing

Unit: mm



- The electric characteristics are described on page 107.

Coefficient of Frequency for Rated Ripple Current

Rated capacitance(µF)	Frequency(Hz)			
	120	1k	10k	100k
47 to 100	0.40	0.75	0.90	1
220 to 330	0.50	0.85	0.95	1
470 to 1000	0.60	0.88	0.96	1
2200 to 10000	0.75	0.90	0.98	1

Part numbering system (example: 10V1000µF)

Environmental item	RK	—	10	V	102	M	H5	#
	Series code		Rated voltage symbol		Rated capacitance symbol	Capacitance tolerance symbol	Casing symbol	Additional symbol

- Lineup of only environmental item.

- The standard ratings are described on the next page.

Standard Ratings

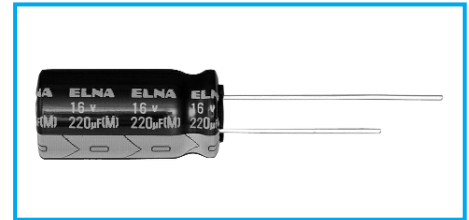
Rated voltage (V)	Item	10				16				25			
		Case øD x L (mm)	Casing symbol	Impedance (Ω)	Rated ripple current (mA _{rms})	Case øD x L (mm)	Casing symbol	Impedance (Ω)	Rated ripple current (mA _{rms})	Case øD x L (mm)	Casing symbol	Impedance (Ω)	Rated ripple current (mA _{rms})
220	—	—	—	—	8x12	G3	0.26	340	8x15	G4	0.19	480	
330	8x12	G3	0.26	340	10x12.5	H3	0.20	500	10x16	H4	0.15	630	
470	10x12.5	H3	0.20	500	10x16	H4	0.15	630	10x20	H5	0.10	770	
1000	10x20	H5	0.10	770	12.5x20	I 5	0.070	920	12.5x25	I 6	0.050	1250	
2200	12.5x25	I 6	0.050	1250	16x25	J 6	0.042	1380	16x25	J 6	0.042	1380	
3300	16x25	J 6	0.042	1380	18x25	K6	0.041	1450	18x31.5	K7	0.035	1720	
4700	18x25	K6	0.041	1450	18x35.5	K8	0.029	1980	18x35.5	K8	0.029	1980	
10000	18x35.5	K8	0.029	1980	—	—	—	—	—	—	—	—	

Rated voltage (V)	Item	35				50				63			
		Case øD x L (mm)	Casing symbol	Impedance (Ω)	Rated ripple current (mA _{rms})	Case øD x L (mm)	Casing symbol	Impedance (Ω)	Rated ripple current (mA _{rms})	Case øD x L (mm)	Casing symbol	Impedance (Ω)	Rated ripple current (mA _{rms})
47	—	—	—	—	—	—	—	—	8x12	G3	0.68	245	
100	8x12	G3	0.26	340	10x12.5	H3	0.36	415	10x16	H4	0.30	455	
220	10x16	H4	0.15	630	10x20	H5	0.18	655	12.5x20	I 5	0.18	665	
330	10x20	H5	0.10	770	12.5x20	I 5	0.12	780	12.5x25	I 6	0.14	995	
470	12.5x20	I 5	0.070	920	12.5x25	I 6	0.090	1060	16x25	J 6	0.10	1000	
1000	16x25	J 6	0.042	1380	16x25	J 6	0.078	1130	18x31.5	K7	0.084	1280	
2200	18x31.5	K7	0.035	1720	18x35.5	K7	0.051	1720	—	—	—	—	
3300	18x40	K9	0.025	2240	—	—	—	—	—	—	—	—	

(Note) Rated ripple current : 125°C, 100kHz; Impedance : 20°C, 100kHz

Low Leakage Current Capacitors Series RLB [RB (LL)]

- Low leakage current (after 1 minute) : 0.006CV or 0.5(μA).



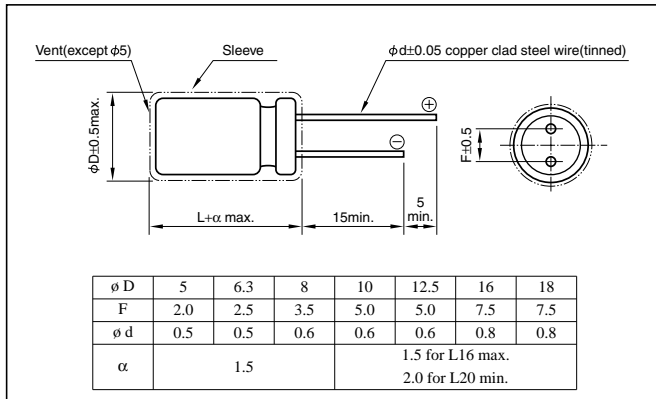
Marking color : White print on a blue sleeve or Blue print on an orange sleeve

Specifications

Item	Performance	
Category temperature range (°C)	-40 to +85	
Tolerance at rated capacitance (%)	±20 (20°C,120Hz)	
Leakage current (μA)	Less than 0.006CV or 0.5 whichever is larger (after 1 minute) Less than 0.002CV or 0.3 whichever is larger (after 2 minutes), C: Rated capacitance(μF); V: Rated voltage(V) (20°C)	
Tangent of loss angle (tanδ)	Rated voltage (V)	6.3 10 16 25 35 50
	tanδ (max.)	More than 1μF 0.20 0.17 0.13 0.10 0.10 0.08 1μF or less 0.06 0.06 0.06 0.06 0.06 0.06 (20°C,120Hz)
Characteristics at high and low temperature	Rated voltage (V)	6.3 10 16 25 35 50
	Impedance ratio (max.)	Z-25°C / Z+20°C 4 3 2 2 2 2 Z-40°C / Z+20°C 8 6 4 4 3 3 (120Hz)
Endurance (105°C) (Applied ripple current)	Test time	1000 hours
	Leakage current	The initial specified value or less
	Percentage of capacitance change	Within ±20% of initial value
	Tangent of the loss angle	150% or less of the initial specified value
Shelf life (105°C)	Test time : 1000 hours; other items are the same as those for the endurance. Voltage application treatment	
Applicable standards	JIS C5101-1, -4 1998 (IEC 60384-1 1992, -4 1985)	

Outline Drawing

Unit: mm



Coefficient of Frequency for Rated Ripple Current

Rated voltage(V)	Frequency(Hz) CV(μF×V)	50 · 60	120	1k	10k · 100k
		6.3 to 10	All CV value	0.8	1
16 to 25	≤ 1000	0.8	1	1.5	1.7
	1000 <	0.8	1	1.2	1.3
35 to 50	All CV value	0.8	1	1.6	1.9

Part numbering system (example: 10V1000μF)

Environmental item	RLB	—	10	V	102	M	16	#
	Series code		Rated voltage symbol		Rated capacitance symbol	Capacitance tolerance symbol	Casing symbol	
Former item	RLB	—	10	V	102	M	V2Z	
	Series code		Rated voltage symbol		Rated capacitance symbol	Capacitance tolerance symbol	Additional symbol	

(Note) "MV2" is not added for φ 5 unit.

Casing symbol

Case φ DxL(mm)	Casing Symbol	Case φ DxL(mm)	Casing Symbol	Case φ DxL(mm)	Casing Symbol	Case φ DxL(mm)	Casing Symbol
5x11	E3	10x12.5	H3	12.5x20	I5	16x31.5	J7
6.3x11	F3	10x16	H4	12.5x25	I6	16x35.5	J8
8x11.5	G3	10x20	H5	16x25	J6	18x35.5	K8
						18x40	K9

Standard Ratings

Rated capacitance(μF)	6.3		10		16		25		35		50	
	Case φ DxL(mm)	Rated ripple current mArms	Case φ DxL(mm)	Rated ripple current mArms	Case φ DxL(mm)	Rated ripple current mArms	Case φ DxL(mm)	Rated ripple current mArms	Case φ DxL(mm)	Rated ripple current mArms	Case φ DxL(mm)	Rated ripple current mArms
0.47	—	—	—	—	—	—	—	—	—	—	5x11	14
1	—	—	—	—	—	—	—	—	—	—	5x11	20
2.2	—	—	—	—	—	—	—	—	—	—	5x11	26
3.3	—	—	—	—	—	—	—	—	—	—	5x11	32
4.7	—	—	—	—	—	—	5x11	34	5x11	34	6.3x11	43
10	—	—	—	—	5x11	543	6.3x11	57	6.3x11	57	8x11.5	75
22	—	—	5x11	56	6.3x11	74	8x11.5	99	8x11.5	99	10x12.5	131
33	—	—	6.3x11	79	6.3x11	90	8x11.5	121	10x12.5	144	10x16	176
47	—	—	6.3x11	94	8x11.5	127	10x12.5	172	10x12.5	172	10x16	210
100	—	—	10x12.5	260	10x12.5	220	10x16	270	10x20	300	12.5x20	380
220	10x12.5	260	10x16	350	10x20	390	12.5x20	510	12.5x25	550	16x25	720
330	10x16	350	10x20	460	12.5x20	550	12.5x25	680	16x25	790	16x31.5	970
470	10x20	460	12.5x20	570	12.5x25	650	16x25	940	16x25	940	16x35.5	1210
1000	12.5x25	840	12.5x25	910	16x25	1210	16x35.5	1580	18x35.5	1690	—	—
2200	16x25	1440	16x31.5	1710	18x35.5	2200	—	—	—	—	—	—

(Note) Rated ripple current : 85°C, 120Hz

NOTE

Design, Specifications are subject to change without notice. Ask factory for technical specifications before purchase and/or use.

Printed Circuit Board Snap-In Ultra-Miniaturized Capacitors Series LA5

- 20mm-tall products for every diameter of $\phi 22$ to $\phi 35$ are now offered in series.
- As many as 4 case sizes available for the same rating.



Marking color : White print on a black sleeve

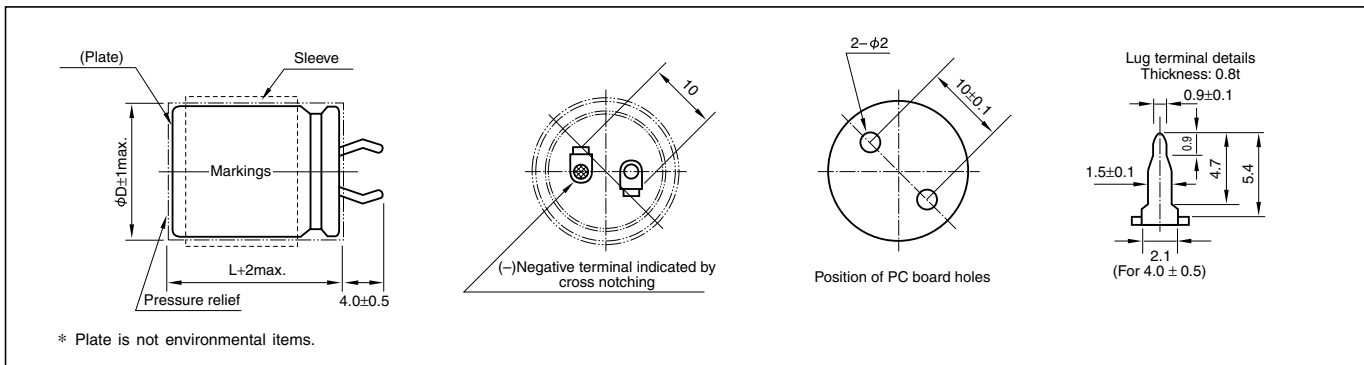


Specifications

Item	Performance							
Category temperature range (°C)	-40 to +85(450V is at -25 to +85)							
Tolerance at rated capacitance (%)	±20 (20°C,120Hz)							
Leakage current (µA)	Less than 0.01CV or 1.5mA whichever is smaller(after 5 minutes) C: Rated capacitance(µF); V: Rated voltage(V) (20°C)							
Tangent of loss angle	Rated voltage (V)		10	16	25	35	50	63 to 100
	tanδ (max.)		0.80	0.60	0.50	0.40	0.30	0.20
	tanδ (max.)	φ D	Rated voltage (V)		160 to 250	315 to 450		
22 to 30			0.10	0.15				
35			0.15	0.15				
Characteristics at high and low temperature	Rated voltage (V)		10	16 to 35	50 to 100	160 to 200	250 to 400	450
	Impedance ratio (max.)	Z-25°C / Z+20°C		5	4	3	3	4
Z-40°C / Z+20°C		18	15	10	6	8	—	
Endurance (85°C) (Applied ripple current)	Test time		2000 hours					
	Leakage current		The initial specified value or less					
	Percentage of capacitance change		Within ±20% of initial value					
	Tangent of the loss angle		200% or less of the initial specified value					
Shelf life (85°C)	Test time		1000 hours					
	Leakage current		The initial specified value or less					
	Percentage of capacitance change		Within ±15% of initial value					
	Tangent of the loss angle		150% or less of the initial specified value					
Voltage application treatment								
Applicable standards	JIS C5101-1, -4 1998 (IEC 60384-1 1992, -4 1985)							

Outline Drawing

Unit: mm



Part numbering system (example: 400V220µF)						
Environmental item	LA5	—	400	V	221	M S43 #
	Series code		Rated voltage symbol		Rated capacitance symbol	Capacitance tolerance symbol Casing symbol
Former item	LA5	—	400	V	221	M S43
	Series code		Rated voltage symbol		Rated capacitance symbol	Capacitance tolerance symbol Casing symbol

Coefficient of Frequency for Rated Ripple Current

Rated voltage(V)	Frequency(Hz)				
	50	120	1k	10k	20k
100 or less	0.95	1	1.10	1.15	1.15
160 to 250	0.87	1	1.11	1.18	1.20
315 or more	0.80	1	1.14	1.19	1.20

* There are overseas factory product only on this page.

Standard Ratings

Case Ø D x L (mm)	Casing symbol	Rated voltage (V)			10			16			25			35			50			63			80			100		
		Item	Rated capacitance	ESR	Rated ripple current	Rated capacitance	ESR	Rated ripple current	Rated capacitance	ESR	Rated ripple current	Rated capacitance	ESR	Rated ripple current	Rated capacitance	ESR	Rated ripple current	Rated capacitance	ESR	Rated ripple current	Rated capacitance	ESR	Rated ripple current	Rated capacitance	ESR	Rated ripple current		
			µF	Ω	Arms	µF	Ω	Arms	µF	Ω	Arms	µF	Ω	Arms	µF	Ω	Arms	µF	Ω	Arms	µF	Ω	Arms	µF	Ω	Arms	µF	Ω
22x20	S21	8200	0.101	2.0	5600	0.118	1.9	3900	0.128	1.8	2700	0.154	1.6	1800	0.184	1.6	1500	0.166	1.7	1000	0.249	1.5	560	0.444	1.3			
22x25	S22	12000	0.069	2.5	8200	0.081	2.4	5600	0.089	2.3	3900	0.106	2.1	2700	0.123	2.1	2200	0.113	2.2	1500	0.166	1.9	820	0.303	1.7			
22x30	S23	15000	0.055	3.0	12000	0.055	3.0	8200	0.061	2.8	4700	0.088	2.4	3900	0.085	2.6	2700	0.092	2.5	1800	0.138	2.2	1200	0.207	2.1			
22x35	S24	22000	0.038	3.7	15000	0.044	3.4	10000	0.050	3.2	6800	0.061	2.9	4700	0.071	3.1	3300	0.075	2.9	2200	0.113	2.5	1500	0.166	2.5			
22x40	S25	—	—	—	18000	0.037	3.9	12000	0.041	3.7	8200	0.051	3.3	5600	0.059	3.4	3900	0.064	3.3	2700	0.092	2.8	1800	0.138	2.8			
22x45	S26	27000	0.031	4.3	—	—	—	—	—	—	—	—	—	—	—	—	4700	0.053	3.7	3300	0.075	3.2	2200	0.113	3.2			
22x50	S27	33000	0.025	4.9	22000	0.030	4.5	15000	0.033	4.3	10000	0.041	3.9	6800	0.049	3.9	5600	0.044	4.1	3900	0.064	3.6	—	—	—			
25x20	S31	12000	0.069	2.5	8200	0.081	2.4	5600	0.089	2.2	3900	0.106	2.0	2700	0.123	2.1	1800	0.138	2.0	1200	0.207	1.7	820	0.303	1.7			
25x25	S32	18000	0.046	3.2	12000	0.055	2.9	8200	0.061	2.8	5600	0.074	2.6	3900	0.085	2.6	2700	0.092	2.0	1800	0.138	2.2	1200	0.207	2.1			
25x30	S33	22000	0.038	3.7	15000	0.044	3.4	10000	0.050	3.2	6800	0.061	2.9	4700	0.071	3.0	3900	0.064	3.2	2200	0.113	2.5	1500	0.166	2.5			
25x35	S34	27000	0.031	4.2	18000	0.037	3.9	12000	0.041	3.7	8200	0.051	3.3	5600	0.059	3.4	4700	0.053	3.6	3300	0.075	3.1	1800	0.138	2.8			
25x40	S35	33000	0.025	4.8	22000	0.030	4.4	15000	0.033	4.2	10000	0.041	3.8	6800	0.049	3.8	5600	0.044	4.0	3900	0.064	3.5	2200	0.113	3.2			
25x45	S36	39000	0.021	5.4	27000	0.021	5.0	18000	0.028	4.7	12000	0.035	4.3	8200	0.040	4.3	6800	0.037	4.6	—	—	—	2700	0.092	2.9			
25x50	S37	47000	0.018	6.0	—	—	—	22000	0.023	5.4	15000	0.028	4.9	10000	0.033	4.9	—	—	—	4700	0.053	4.0	3300	0.075	4.1			
30x20	S41	18000	0.046	3.3	12000	0.055	3.0	8200	0.061	2.9	5600	0.074	2.6	3900	0.085	2.7	2700	0.092	2.6	1800	0.138	2.2	1200	0.207	2.2			
30x25	S42	27000	0.031	4.2	18000	0.037	3.9	12000	0.041	3.7	8200	0.051	3.3	5600	0.059	3.3	3900	0.064	3.3	2700	0.092	2.9	1800	0.138	2.8			
30x30	S43	33000	0.025	4.9	22000	0.030	4.4	15000	0.033	4.3	10000	0.041	3.8	6800	0.049	3.9	5600	0.044	4.1	3900	0.064	3.6	2200	0.113	3.2			
30x35	S44	39000	0.021	5.5	27000	0.025	5.1	18000	0.028	4.8	12000	0.035	4.3	8200	0.040	4.4	6800	0.037	4.6	4700	0.053	4.0	2700	0.092	3.7			
30x40	S45	47000	0.018	6.1	33000	0.020	5.8	22000	0.023	5.5	15000	0.028	5.0	10000	0.033	5.0	8200	0.030	5.2	5600	0.044	4.5	3300	0.075	4.2			
30x45	S46	56000	0.015	6.9	39000	0.017	6.4	27000	0.021	6.2	18000	0.028	5.6	12000	0.028	5.6	10000	0.025	5.9	6800	0.037	5.1	3900	0.064	4.7			
30x50	S47	68000	0.012	7.7	47000	0.014	7.2	33000	0.015	7.0	22000	0.019	6.3	15000	0.022	6.4	—	—	—	—	—	—	4700	0.053	5.2			
35x20	S51	22000	0.038	3.9	15000	0.044	3.7	10000	0.050	3.5	6800	0.061	3.1	4700	0.071	3.2	3900	0.064	3.4	2700	0.092	3.0	1500	0.166	2.7			
35x25	S52	33000	0.025	5.0	22000	0.030	4.6	15000	0.033	4.4	10000	0.041	4.0	6800	0.049	4.0	5600	0.044	4.2	3900	0.064	3.7	2200	0.113	3.4			
35x30	S53	47000	0.018	6.2	33000	0.020	5.8	22000	0.023	5.5	15000	0.028	5.0	10000	0.033	5.0	6800	0.037	4.8	4700	0.053	4.2	3300	0.075	4.3			
35x35	S54	56000	0.015	7.0	39000	0.017	6.5	27000	0.021	6.2	18000	0.023	5.7	12000	0.028	5.7	8200	0.030	5.5	5600	0.044	4.7	3900	0.064	4.8			
35x40	S55	68000	0.012	7.9	47000	0.014	7.4	33000	0.015	7.2	22000	0.019	6.4	15000	0.022	6.5	10000	0.025	6.2	6800	0.037	5.3	4700	0.053	5.4			
35x45	S56	82000	0.010	8.9	56000	0.012	8.2	39000	0.013	8.0	—	—	—	18000	0.018	7.3	12000	0.021	6.9	8200	0.030	6.0	5600	0.044	6.0			
35x50	S57	—	—	—	—	—	—	—	—	—	27000	0.015	7.4	—	—	—	15000	0.017	7.9	10000	0.025	6.8	—	—	—			

Case Ø D x L (mm)	Casing symbol	Rated voltage (V)			160			180			200			250			315			350			400			450		
		Item	Rated capacitance	ESR	Rated ripple current	Rated capacitance	ESR	Rated ripple current	Rated capacitance	ESR	Rated ripple current	Rated capacitance	ESR	Rated ripple current	Rated capacitance	ESR	Rated ripple current	Rated capacitance	ESR	Rated ripple current	Rated capacitance	ESR	Rated ripple current	Rated capacitance	ESR	Rated ripple current		
			µF	Ω	Arms	µF	Ω	Arms	µF	Ω	Arms	µF	Ω	Arms	µF	Ω	Arms	µF	Ω	Arms	µF	Ω	Arms	µF	Ω	Arms	µF	Ω
22x20	S21	270	0.614	1.2	220	0.754	1.1	180	0.922	1.0	150	1.106	0.94	100	2.488	0.78	68	3.659	0.61	56	4.443	0.54	47	5.294	0.49			
22x25	S22	390	0.425	1.5	330	0.503	1.4	270	0.614	1.3	220	0.754	1.2	150	1.659	1.0	100	2.488	0.78	82	3.034	0.69	68	3.659	0.62			
22x30	S23	560	0.296	1.9	470	0.353	1.8	390	0.425	1.6	270	0.614	1.4	180	1.382	1.1	150	1.659	1.0	120	2.073	0.86	82	3.034	0.71			
22x35	S24	680	0.244	2.2	560	0.296	2.0	470	0.353	1.9	330	0.503	1.6	220	1.131	1.3	180	1.382	1.1	150	1.659	1.0	100	2.488	0.82			
22x40	S25	820	0.202	2.5	680	0.244	2.3	560	0.296	2.1	390	0.425	1.8	270	0.922	1.5	220	1.131	1.3	180	1.382	1.1	120	2.073	0.92			
22x45	S26	—	—	—	820	0.202	2.6	680	0.244	2.4	470	0.353	2.0	330	0.754	1.7	—	—	—	220	1.131	1.3	150	1.659	1.1			
22x50	S27	1000	0.166	2.9	—	—	—	820	0.202	2.6	560	0.296	2.2	—	—	—	270	0.922	1.5	—	—	—	180	1.382	1.2			
25x20	S31	390	0.425	1.5	330	0.503	1.4	270	0.614	1.3	180	0.922	1.1	120	2.073	0.88	100	2.488	0.77	82	3.034	0.69	56	4.443	0.57			
25x25	S32	560	0.296	1.9	470	0.353	1.8	390	0.425	1.6	270	0.614	1.4	180	1.382	1.1	150	1.659	0.99	120	2.073	0.87	82	3.034	0.72			
25x30	S33	680	0.244	2.2	560	0.296	2.0	560	0.296	2.0	390	0.425	1.7	270	0.922	1.4	180	1.382	1.1	150	1.659	1.0	120	2.073	0.91			
25x35	S34	820	0.202	2.5	680	0.244	2.3	680	0.244	2.3	470	0.353	2.0	330	0.754	1.7	220	1.131	1.3	180	1.382	1.1	150	1.659	1.0			
25x40	S35	1000	0.166	2.8	820	0.202	2.6	820	0.202	2.6	560	0.296	2.2	390	0.638	1.8	270	0.922	1.5	220	1.131	1.3	180	1.382	1.2			
25x45	S36	1200	0.138	3.2	1000	0.166	2.9	—	—	—	680	0.244	2.5	—	—	—	330	0.754	1.7	270	0.922	1.5	—	—	—			
25x50	S37	1500	0.111	3.6	1200	0.138	3.3	1000	0.166	3.0	—	—	—	470	0.529	2.1	390	0.638	1.9	330	0.754	1.7	220	1.131	1.4			
30x20	S41	560	0.296	2.0	470	0.353	1.8	390	0.425	1.7	270	0.614	1.4	180	1.382	1.2	150	1.659	1.0	120	2.073	0.93	82	3.034	0.77			
30x25	S42	820	0.202	2.5	680	0.244	2.3	560	0.296	2.1	390	0.425	1.8	270	0.922	1.5	220	1.131	1.3	180	1.382	1.2	120	2.073	0.97			
30x30	S43	1000	0.166	2.9	820	0.202	2.6	820	0.202	2.7	560	0.296	2.3	390	0.638	1.9	270	0.922	1.5	220	1.131	1.4	180	1.382	1.2			
30x35	S44	1200	0.138	3.3	1200	0.138	3.3	1000	0.166	3.0	680	0.244	2.6	470	0.529	2.1	330	0.754	1.7	270	0.922	1.6	220	1.131	1.4			
30x40	S45	1500	0.111	3.7	—	—	—	1200	0.138	3.4	820	0.202	2.9	560	0.444	2.4	390	0.638										

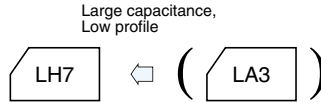
PCB Snap-In Type Capacitors Series LH7

Large capacitance low-profile capacitors

- Can be mounted directly on the printed circuit board without using a mounting clamp.



Marking color : White print on a black sleeve

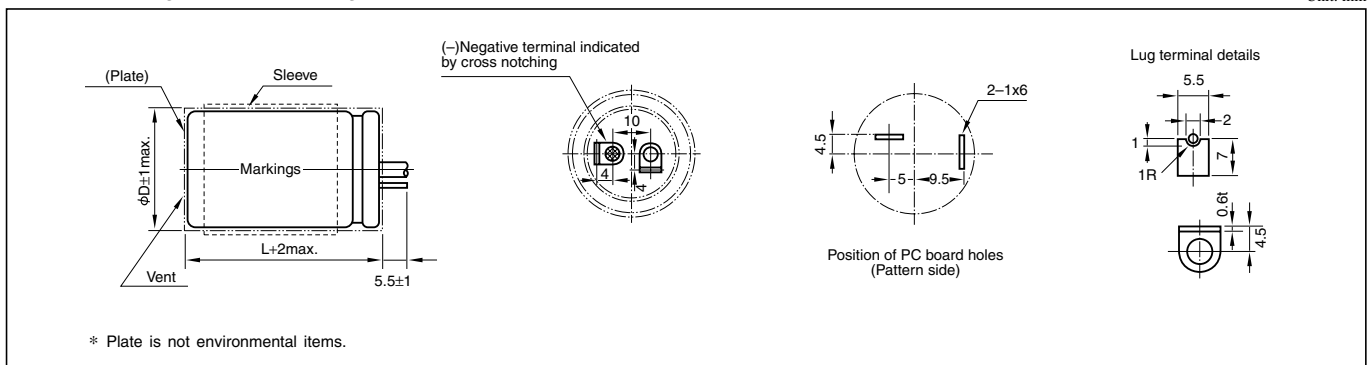


Specifications

Item	Performance											
Category temperature range (°C)	-40 to +85											
Tolerance at rated capacitance (%)	±20 (20°C,120Hz)											
Leakage current (µA)	Less than 0.02CV or 3mA whichever is smaller(after 5 minutes) C: Rated capacitance(µF); V: Rated voltage(V) (20°C)											
Tangent of loss angle (tanδ)	tanδ (max.)	Rated capacitance(µF)	Rated voltage (V)									
			16	25	35	50	63	80	100	160	180	200
		470, 560	—	—	—	—	—	—	—	—	0.10	0.10
		680, 820	—	—	—	—	—	—	—	0.10	—	—
		1000	—	—	—	—	—	—	—	—	—	—
		2200	—	—	—	—	—	0.10	0.10	—	—	—
		3300	—	—	—	—	0.08	0.12	—	—	—	—
		4700	—	—	—	0.10	0.12	—	—	—	—	—
		6800	—	—	0.15	0.15	—	—	—	—	—	—
		10000	—	0.18	—	—	—	—	—	—	—	—
15000	0.25	—	—	—	—	—	—	—	—	—		
(20°C,120Hz)												
Characteristics at high and low temperature	Rated voltage (V)		16	25	35	50	63	80	100	160	180	200
	Impedance ratio (max.)	Z-25°C / Z+20°C	6	3	3	3	3	3	3	2	2	2
		Z-40°C / Z+20°C	12	6	6	5	5	5	5	4	4	4
(120Hz)												
Endurance (85°C) (Applied ripple current)	Test time	1000 hours										
	Leakage current	The initial specified value or less										
	Percentage of capacitance change	Within ±20% of initial value										
	Tangent of the loss angle	200% or less of the initial specified value										
Shelf life (85°C)	Test time : 1000 hours; other items are the same as those for the endurance. Voltage application treatment											
Applicable standards	JIS C5101-1, -4 1998 (IEC 60384-1 1992, -4 1985)											

Outline Drawing, Terminal Configuration

Unit: mm



* There are overseas factory product only on this page.

Standard Ratings

Rated capacitance(μF)	16		25	
	Case	Rated ripple current	Case	Rated ripple current
	φ DxL(mm)	Arms	φ DxL(mm)	Arms
10000	—	—	35x30	4.6
15000	35x30	4.7	—	—

Rated capacitance(μF)	35		50		63		80	
	Case	Rated ripple current	Case	Rated ripple current	Case	Rated ripple current	Case	Rated ripple current
	φ DxL(mm)	Arms	φ DxL(mm)	Arms	φ DxL(mm)	Arms	φ DxL(mm)	Arms
2200	—	—	—	—	—	—	35x30	3.0
3300	—	—	—	—	35x30	4.0	35x35	3.4
4700	—	—	35x30	4.3	35x35	4.0	—	—
6800	35x30	4.2	35x35	4.3	—	—	—	—

Rated capacitance(μF)	100		160		180		200	
	Case	Rated ripple current	Case	Rated ripple current	Case	Rated ripple current	Case	Rated ripple current
	φ DxL(mm)	Arms	φ DxL(mm)	Arms	φ DxL(mm)	Arms	φ DxL(mm)	Arms
470	—	—	—	—	35x30	2.1	35x30	2.1
560	—	—	—	—	35x35	2.3	35x35	2.3
680	—	—	35x30	2.4	—	—	—	—
820	—	—	35x35	2.8	—	—	—	—
2200	35x35	3.1	—	—	—	—	—	—

(Note) Rated ripple current : 85°C, 120Hz

Coefficient of Frequency for Rated Ripple Current

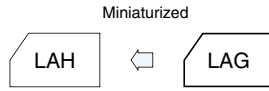
Rated voltage(V)	Frequency(Hz)				
	50	120	1k	10k	20k
50 or less	0.95	1	1.10	1.15	1.15
63 to 100	0.95	1	1.16	1.30	1.33
160 or more	0.90	1	1.20	1.50	1.55

Part numbering system (example: 50V6800μF)

Environmental item	LH7	—	50	V	682	M	□	#
	Series code		Rated voltage symbol		Rated capacitance symbol	Capacitance tolerance symbol	Additional symbol	
Former item	LH7	—	50	V	682	M	□	
	Series code		Rated voltage symbol		Rated capacitance symbol	Capacitance tolerance symbol	Additional symbol	

High-Reliability High-Ripple Capacitors Series LAG

- High-reliability, high-ripple capacitors.
- Guarantees 2000 hours at 105°C.



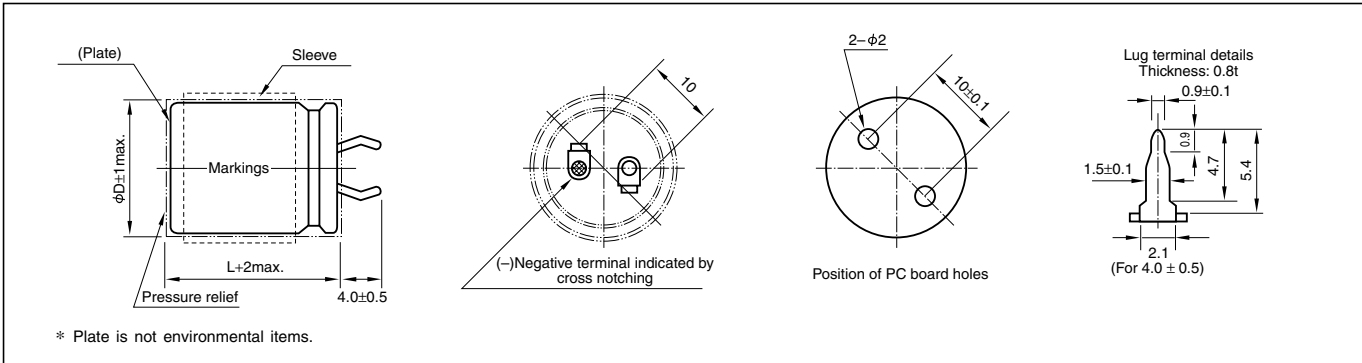
Marking color : White print on a black sleeve or
White print on a brown sleeve

Specifications

Item	Performance	
Category temperature range (°C)	-25 to +105	
Tolerance at rated capacitance (%)	±20 (20°C, 120Hz)	
Leakage current (µA)	Less than 0.02CV or 3mA whichever is smaller(after 5 minutes) C: Rated capacitance(µF), V: Rated voltage(V) (20°C)	
Tangent of loss angle (tanδ)	Rated voltage (V)	160 180 200 250 315 350 385 400
	tanδ (max.)	0.10 0.10 0.10 0.15 0.15 0.15 0.15 0.15
0.15 for capacitors with ø35 and a WV equal to or less than 200 (20°C, 120Hz)		
Characteristics at high and low temperature	Percentage of capacitance change (%)	-25°C Within ±30% of the value at 20°C
	Impedance ratio (max.)	Z-25°C / Z+20°C 4 (120Hz)
Endurance (105°C) (Applied ripple current)	Test time	2000 hours
	Leakage current	The initial specified value or less
	Percentage of capacitance change	Within ±20% of initial value
	Tangent of the loss angle	200% or less of the initial specified value
Shelf life (105°C)	Test time	1000 hours
	Leakage current	The initial specified value or less
	Percentage of capacitance change	Within ±15% of initial value
	Tangent of the loss angle	150% or less of the initial specified value
Voltage application treatment		
Applicable standards	JIS C5101-1, -4 1998 (IEC 60384-1 1992, -4 1985)	

Outline Drawing

Unit: mm



Part numbering system (example: 200V470µF)								
Environmental item	LAG	—	200	V	471	M	S3	#
	Series code		Rated voltage symbol		Rated capacitance symbol	Capacitance tolerance symbol	Casing symbol	
Former item	LAG	—	200	V	471	M	S3	
	Series code		Rated voltage symbol		Rated capacitance symbol	Capacitance tolerance symbol	Casing symbol	

Coefficient of Frequency for Rated Ripple Current

Frequency(Hz)	50	120	1k	10k	30k
Rated voltage(V)					
160 to 250	0.87	1	1.11	1.18	1.20
315 or more	0.80	1	1.14	1.19	1.20

• The electric characteristics are described on page 108.

* There are overseas factory product only on this page.

Standard Ratings

Rated voltage(V)		160				180				200				250			
Case ø DxL(mm)	Item Casing symbol	Rated capacitance	ESR	Impedance (max.)	Rated ripple current	Rated capacitance	ESR	Impedance (max.)	Rated ripple current	Rated capacitance	ESR	Impedance (max.)	Rated ripple current	Rated capacitance	ESR	Impedance (max.)	Rated ripple current
		μF	Ω	mΩ/100kHz	Arms	μF	Ω	mΩ/100kHz	Arms	μF	Ω	mΩ/100kHz	Arms	μF	Ω	mΩ/100kHz	Arms
22x25	S1	270	0.614	460	1.16	220	0.754	460	1.08	180	0.922	460	1.08	120	2.073	460	0.94
22x30	S2	330	0.503	420	1.43	270	0.614	420	1.30	270	0.614	420	1.30	180	1.382	420	1.10
22x35	S3	390	0.425	380	1.52	390	0.425	380	1.50	330	0.503	380	1.41	220	1.131	380	1.13
22x40	S4	470	0.353	340	1.62	470	0.353	340	1.62	390	0.425	340	1.50	270	0.922	340	1.20
22x45	S5	—	—	—	—	560	0.296	320	1.69	470	0.353	320	1.58	330	0.754	320	1.26
22x50	S6	680	0.244	290	1.81	—	—	—	—	560	0.296	290	1.68	390	0.638	290	1.37
25x25	S1	390	0.425	460	1.55	270	0.614	460	1.35	270	0.614	460	1.35	180	1.382	460	1.15
25x30	S2	470	0.353	360	1.73	390	0.425	360	1.62	330	0.503	360	1.47	220	1.131	360	1.30
25x35	S3	560	0.296	330	1.81	470	0.353	330	1.69	470	0.353	330	1.65	330	0.754	330	1.41
25x40	S4	680	0.244	290	1.98	560	0.296	290	1.72	560	0.296	290	1.80	390	0.638	290	1.52
25x45	S5	820	0.202	270	2.04	680	0.244	270	1.78	—	—	—	—	470	0.529	270	1.59
25x50	S6	—	—	—	—	820	0.202	230	1.91	680	0.244	270	1.78	—	—	—	—
30x25	S1	560	0.296	310	1.82	390	0.425	310	1.67	390	0.425	310	1.56	220	1.131	310	1.30
30x30	S2	680	0.244	280	1.98	560	0.296	280	1.74	560	0.296	280	1.82	330	0.754	280	1.36
30x35	S3	820	0.202	240	2.14	680	0.244	240	1.85	680	0.244	240	1.99	470	0.529	240	1.57
30x40	S4	1000	0.166	200	2.22	820	0.202	200	2.01	820	0.202	200	2.12	560	0.444	200	1.76
30x45	S5	1200	0.138	170	2.46	1000	0.166	170	2.19	—	—	—	—	—	—	—	—
30x50	S6	—	—	—	—	1200	0.138	150	2.36	1000	0.166	150	2.22	820	0.303	150	1.87
35x30	S1	820	0.303	180	2.40	820	0.303	180	2.16	680	0.366	180	2.07	470	0.529	180	1.56
35x35	S2	1000	0.249	150	2.53	1000	0.249	150	2.34	820	0.303	150	2.22	680	0.366	150	1.82
35x40	S3	1500	0.166	120	2.97	1200	0.207	120	2.56	1000	0.249	120	2.42	820	0.303	120	1.98
35x45	S4	—	—	—	—	—	—	—	—	—	—	—	—	1000	0.249	90	2.10
35x50	S5	1800	0.138	80	3.10	1500	0.166	80	2.75	1500	0.166	80	2.70	—	—	—	—

Rated voltage(V)		315				350				385				400			
Case ø DxL(mm)	Item Casing symbol	Rated capacitance	ESR	Impedance (max.)	Rated ripple current	Rated capacitance	ESR	Impedance (max.)	Rated ripple current	Rated capacitance	ESR	Impedance (max.)	Rated ripple current	Rated capacitance	ESR	Impedance (max.)	Rated ripple current
		μF	Ω	mΩ/100kHz	Arms	μF	Ω	mΩ/100kHz	Arms	μF	Ω	mΩ/100kHz	Arms	μF	Ω	mΩ/100kHz	Arms
22x25	S1	82	3.034	850	0.56	68	3.659	850	0.56	68	3.659	850	0.56	56	4.443	850	0.47
22x30	S2	120	2.073	800	0.70	100	2.488	800	0.70	82	3.034	800	0.63	68	3.659	800	0.56
22x35	S3	150	1.659	740	0.78	120	2.073	740	0.73	120	2.073	740	0.73	100	2.488	740	0.64
22x40	S4	180	1.382	700	0.89	150	1.659	700	0.79	150	1.659	700	0.79	120	2.073	700	0.70
22x45	S5	—	—	—	—	180	1.382	640	0.81	—	—	—	—	—	—	—	—
22x50	S6	220	1.131	600	0.93	220	1.131	600	0.93	180	1.382	600	0.84	150	1.659	600	0.78
25x25	S1	120	2.073	800	0.70	100	2.488	800	0.70	100	2.488	800	0.70	—	—	—	—
25x30	S2	150	1.659	720	0.82	150	1.659	720	0.82	120	2.073	720	0.73	100	2.488	720	0.70
25x35	S3	180	1.382	660	0.89	180	1.382	660	0.89	150	1.659	660	0.81	120	2.073	660	0.73
25x40	S4	220	1.131	600	0.97	220	1.131	600	0.97	180	1.382	600	0.88	150	1.659	600	0.82
25x45	S5	270	0.922	560	1.00	—	—	—	—	220	1.131	560	0.91	180	1.382	560	0.87
25x50	S6	330	0.754	500	1.16	270	0.922	500	1.01	270	0.922	500	1.01	220	1.131	500	0.94
30x25	S1	150	1.659	640	0.82	150	1.659	640	0.82	150	1.659	640	0.82	—	—	—	—
30x30	S2	220	1.131	580	1.01	180	1.382	580	0.90	180	1.382	580	0.90	150	1.659	580	0.83
30x35	S3	270	0.922	520	1.05	270	0.922	520	1.05	220	1.131	520	0.95	180	1.382	520	0.86
30x40	S4	330	0.754	440	1.21	—	—	—	—	270	0.922	440	1.09	220	1.131	440	0.95
30x45	S5	390	0.638	380	1.26	330	0.754	380	1.16	330	0.754	380	1.16	270	0.922	380	1.11
30x50	S6	470	0.529	340	1.32	390	0.638	340	1.26	390	0.638	340	1.26	—	—	—	—
35x30	S1	270	0.922	420	1.01	270	0.922	420	1.01	270	0.922	420	1.01	180	1.382	420	0.91
35x35	S2	390	0.638	340	1.26	330	0.754	340	1.16	330	0.754	340	1.16	270	0.922	340	1.13
35x40	S3	470	0.529	280	1.32	390	0.638	280	1.26	390	0.638	280	1.26	330	0.754	280	1.26
35x45	S4	—	—	—	—	470	0.529	260	1.35	470	0.529	260	1.35	—	—	—	—
35x50	S5	560	0.444	200	1.52	560	0.444	200	1.51	560	0.444	200	1.51	470	0.529	200	1.50

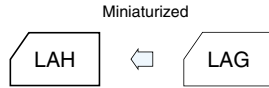
(Note) ESR : 20°C, 120Hz ; Rated ripple current : 105°C, 120Hz ; Impedance : 20°C

* There are overseas factory product only on this page.

NOTE
Design, Specifications are subject to change without notice.
Ask factory for technical specifications before purchase and/or use.

Miniaturized, High-Reliability, High-Ripple Capacitors Series LAH

- High-reliability, high-ripple capacitors.
- Guarantees 2000 hours at 105°C.



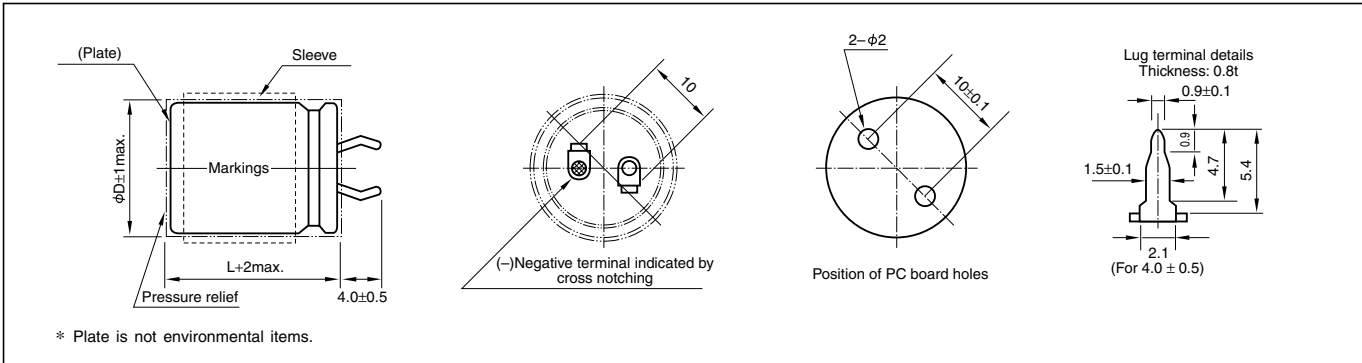
Marking color : White print on a black sleeve or
White print on a brown sleeve

Specifications

Item	Performance							
Category temperature range (°C)	-40 to +105(-25 to +105 at 160V or more)							
Tolerance at rated capacitance (%)	±20 (20°C, 120Hz)							
Leakage current (µA)	Less than 0.02CV or 3mA whichever is smaller(after 5 minutes) C: Rated capacitance(µF); V: Rated voltage(V) (20°C)							
Tangent of loss angle (tanδ)	Rated voltage (V)	16	25	35	50	63 to 100	160 to 250	400 to 450
	tanδ (max.)	0.50	0.40	0.35	0.30	0.20	0.15	0.20
Characteristics at high and low temperature	Rated voltage (V)	16 to 100		160 to 200		250 to 400		
	Impedance ratio (max.)	Z-25°C / Z+20°C		4		4		
Endurance (105°C) (Applied ripple current)	Test time	2000 hours						
	Leakage current	The initial specified value or less						
	Percentage of capacitance change	Within ±20% of initial value						
	Tangent of the loss angle	200% or less of the initial specified value						
Shelf life (105°C)	Test time	1000 hours						
	Leakage current	The initial specified value or less						
	Percentage of capacitance change	Within ±15% of initial value						
	Tangent of the loss angle	150% or less of the initial specified value						
Applicable standards	JIS C5101-1, -4 1998 (IEC 60384-1 1992, -4 1985)							

Outline Drawing

Unit: mm



Part numbering system (example: 200V470µF)					
Environmental item	LAH	—	200 V	471	M S2 #
	Series code		Rated voltage symbol	Rated capacitance symbol	Capacitance tolerance symbol Casing symbol
Former item	LAH	—	200 V	471	M S2
	Series code		Rated voltage symbol	Rated capacitance symbol	Capacitance tolerance symbol Casing symbol

Coefficient of Frequency for Rated Ripple Current

Rated voltage(V) \ Frequency(Hz)	50	120	1k	10k	30k
100 or less	0.95	1	1.10	1.15	1.15
160 to 250	0.87	1	1.11	1.18	1.20
315 or more	0.80	1	1.14	1.19	1.20

• The electric characteristics are described on page 108.

* There are overseas factory product only on this page.

Standard Ratings

Rated voltage(V)		16			25			35			50		
Case Ø DxL(mm)	Item Casing symbol	Rated capacitance	ESR	Rated ripple current	Rated capacitance	ESR	Rated ripple current	Rated capacitance	ESR	Rated ripple current	Rated capacitance	ESR	Rated ripple current
		µF	Ω	Arms	µF	Ω	Arms	µF	Ω	Arms	µF	Ω	Arms
22x25	S1	6800	0.122	1.60	4700	0.141	1.55	3300	0.176	1.43	1800	0.184	1.31
22x30	S2	10000	0.083	1.99	6800	0.098	1.91	3900	0.149	1.65	2700	0.123	1.70
22x35	S3	12000	0.069	2.28	8200	0.081	2.14	5600	0.104	2.02	3300	0.101	1.98
22x40	S4	15000	0.055	2.64	10000	0.066	2.40	6800	0.085	2.28	3900	0.085	2.25
22x45	S5	18000	0.046	2.98	12000	0.055	2.69	—	—	—	4700	0.071	2.56
22x50	S6	—	—	—	—	—	—	8200	0.071	2.67	5600	0.059	2.89
25x25	S1	10000	0.083	1.99	6800	0.098	1.91	4700	0.124	1.78	2700	0.123	1.70
25x30	S2	12000	0.069	2.30	8200	0.081	2.16	5600	0.104	2.04	3300	0.101	2.00
25x35	S3	15000	0.055	2.68	10000	0.066	2.44	6800	0.085	2.31	3900	0.085	2.28
25x40	S4	18000	0.046	3.04	12000	0.055	2.74	8200	0.071	2.60	5600	0.059	2.81
25x45	S5	22000	0.038	3.40	15000	0.044	3.15	10000	0.058	2.92	—	—	—
25x50	S6	27000	0.031	3.81	18000	0.037	3.54	12000	0.048	3.26	6800	0.049	3.37
30x25	S1	12000	0.069	2.38	8200	0.081	2.25	5600	0.104	2.12	3900	0.085	2.22
30x30	S2	18000	0.046	3.00	12000	0.055	2.70	8200	0.071	2.56	4700	0.071	2.58
30x35	S3	22000	0.038	3.39	15000	0.044	3.13	10000	0.058	2.92	5600	0.059	2.95
30x40	S4	27000	0.031	3.83	18000	0.037	3.54	12000	0.048	3.28	6800	0.049	3.39
30x45	S5	33000	0.025	4.30	22000	0.030	4.24	15000	0.039	3.74	8200	0.040	3.71
30x50	S6	39000	0.021	4.74	—	—	—	—	—	—	10000	0.033	4.09
35x25	S1	18000	0.046	3.10	12000	0.055	2.80	8200	0.071	2.78	4700	0.071	2.67
35x30	S2	27000	0.031	3.74	15000	0.044	3.22	12000	0.048	3.20	6800	0.049	3.31
35x35	S3	33000	0.025	4.24	22000	0.030	3.96	15000	0.039	3.69	8200	0.040	3.66
35x40	S4	39000	0.021	4.72	—	—	—	18000	0.032	4.16	10000	0.033	4.07
35x45	S5	47000	0.018	5.27	27000	0.025	4.75	—	—	—	12000	0.028	4.50
35x50	S6	—	—	—	33000	0.020	5.39	22000	0.026	4.92	—	—	—

Rated voltage(V)		63			80			100		
Case Ø DxL(mm)	Item Casing symbol	Rated capacitance	ESR	Rated ripple current	Rated capacitance	ESR	Rated ripple current	Rated capacitance	ESR	Rated ripple current
		µF	Ω	Arms	µF	Ω	Arms	µF	Ω	Arms
22x25	S1	1200	0.207	1.25	820	0.303	1.11	560	0.444	1.07
22x30	S2	1800	0.138	1.52	1200	0.207	1.39	820	0.303	1.35
22x35	S3	2200	0.113	1.73	1500	0.166	1.61	1000	0.249	1.54
22x40	S4	2700	0.092	1.97	1800	0.138	1.83	1200	0.207	1.74
22x45	S5	—	—	—	2200	0.113	2.09	1500	0.166	1.99
22x50	S6	3300	0.075	2.32	—	—	—	—	—	—
25x25	S1	1800	0.138	1.52	1200	0.207	1.39	820	0.303	1.35
25x30	S2	2200	0.113	1.75	1500	0.166	1.62	1000	0.249	1.56
25x35	S3	2700	0.092	1.99	2200	0.113	2.01	1200	0.207	1.76
25x40	S4	3300	0.075	2.27	—	—	—	1500	0.166	2.03
25x45	S5	3900	0.064	2.54	2700	0.092	2.43	1800	0.138	2.28
25x50	S6	4700	0.053	2.88	3300	0.075	2.76	2200	0.113	2.57
30x25	S1	2700	0.092	1.93	1800	0.138	1.81	1200	0.207	1.71
30x30	S2	3300	0.075	2.24	2200	0.113	2.10	1500	0.166	2.00
30x35	S3	3900	0.064	2.55	2700	0.092	2.43	1800	0.138	2.27
30x40	S4	4700	0.053	2.90	3300	0.075	2.78	2200	0.113	2.59
30x45	S5	5600	0.044	3.28	3900	0.064	3.12	2700	0.092	2.94
30x50	S6	6800	0.037	3.73	4700	0.053	3.56	3300	0.075	3.32
35x25	S1	3300	0.075	2.41	2200	0.113	2.17	1500	0.166	2.07
35x30	S2	4700	0.053	2.83	3300	0.075	2.71	2200	0.113	2.52
35x35	S3	5600	0.044	3.24	3900	0.064	3.07	2700	0.092	2.90
35x40	S4	6800	0.037	3.71	4700	0.053	3.50	3300	0.075	3.31
35x45	S5	8200	0.030	4.16	5600	0.044	3.87	3900	0.064	3.69
35x50	S6	10000	0.025	4.69	6800	0.037	4.19	4700	0.053	4.14

(Note) ESR : 20°C, 120Hz ; Rated ripple current : 105°C, 120Hz

• The standard ratings follow the next page.

* There are overseas factory product only on this page.

NOTE
Design, Specifications are subject to change without notice.
Ask factory for technical specifications before purchase and/or use.

Standard Ratings

Rated voltage(V)		160			180			200			
Case ø DxL(mm)	Casing symbol	Item	Rated capacitance	ESR	Rated ripple current	Rated capacitance	ESR	Rated ripple current	Rated capacitance	ESR	Rated ripple current
			μF	Ω	Arms	μF	Ω	Arms	μF	Ω	Arms
22x25	S1	S1	330	0.754	1.16	270	0.922	1.08	220	1.131	1.08
22x30	S2	S2	390	0.638	1.43	330	0.754	1.30	330	0.754	1.30
22x35	S3	S3	470	0.529	1.52	470	0.529	1.50	390	0.638	1.41
22x40	S4	S4	560	0.444	1.62	560	0.444	1.62	470	0.529	1.50
22x45	S5	S5	680	0.366	1.70	—	—	—	560	0.444	1.58
22x50	S6	S6	820	0.303	1.81	680	0.366	1.76	680	0.366	1.68
25x25	S1	S1	470	0.529	1.55	390	0.638	1.35	330	0.754	1.35
25x30	S2	S2	560	0.444	1.73	470	0.529	1.62	470	0.529	1.47
25x35	S3	S3	680	0.366	1.81	560	0.444	1.69	560	0.444	1.65
25x40	S4	S4	820	0.303	1.98	680	0.366	1.72	680	0.366	1.80
25x45	S5	S5	1000	0.249	2.04	820	0.303	1.78	—	—	—
25x50	S6	S6	1200	0.207	2.12	1000	0.249	1.91	820	0.303	1.87
30x25	S1	S1	680	0.366	1.82	560	0.444	1.67	470	0.529	1.56
30x30	S2	S2	820	0.303	1.98	680	0.366	1.74	680	0.366	1.82
30x35	S3	S3	1000	0.249	2.14	820	0.303	1.85	820	0.303	1.99
30x40	S4	S4	1200	0.207	2.22	1000	0.249	2.01	—	—	—
30x45	S5	S5	1500	0.166	2.46	1200	0.207	2.19	1000	0.249	2.17
30x50	S6	S6	—	—	—	1500	0.166	2.36	1200	0.207	2.22
35x25	S1	S1	820	0.303	1.93	680	0.366	1.92	680	0.366	1.96
35x30	S2	S2	1200	0.249	2.40	1000	0.249	2.16	820	0.303	2.07
35x35	S3	S3	1500	0.166	2.53	1200	0.207	2.34	1000	0.249	2.22
35x40	S4	S4	—	—	—	1500	0.166	2.56	1200	0.207	2.42
35x45	S5	S5	1800	0.138	2.98	1800	0.138	2.67	1500	0.166	2.59
35x50	S6	S6	2200	0.113	3.10	—	—	—	1800	0.138	2.70

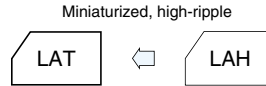
Rated voltage(V)		250			400			450			
Case ø DxL(mm)	Casing symbol	Item	Rated capacitance	ESR	Rated ripple current	Rated capacitance	ESR	Rated ripple current	Rated capacitance	ESR	Rated ripple current
			μF	Ω	Arms	μF	Ω	Arms	μF	Ω	Arms
22x25	S1	S1	180	1.382	0.94	68	4.879	0.47	56	5.924	0.47
22x30	S2	S2	220	1.131	1.10	82	4.046	0.56	68	4.879	0.56
22x35	S3	S3	270	0.922	1.13	120	2.765	0.64	82	4.046	0.64
22x40	S4	S4	330	0.754	1.20	150	2.212	0.70	100	3.317	0.70
22x45	S5	S5	390	0.638	1.26	—	—	—	120	2.765	0.73
22x50	S6	S6	470	0.529	1.37	180	1.843	0.78	150	2.212	0.78
25x25	S1	S1	220	1.131	1.15	82	4.046	0.65	68	4.879	0.65
25x30	S2	S2	330	0.754	1.30	120	2.765	0.70	100	3.317	0.70
25x35	S3	S3	390	0.638	1.41	150	2.212	0.73	120	2.765	0.73
25x40	S4	S4	470	0.529	1.52	180	1.843	0.82	150	2.212	0.82
25x45	S5	S5	560	0.444	1.59	220	1.508	0.87	180	1.843	0.87
25x50	S6	S6	680	0.366	1.66	270	1.229	0.94	220	1.508	0.94
30x25	S1	S1	330	0.754	1.30	120	2.765	0.78	100	3.317	0.78
30x30	S2	S2	470	0.529	1.36	180	1.843	0.83	150	2.212	0.83
30x35	S3	S3	560	0.444	1.57	220	1.508	0.86	180	1.843	0.83
30x40	S4	S4	680	0.366	1.76	270	1.229	0.95	220	1.508	0.95
30x45	S5	S5	820	0.303	1.83	330	1.005	1.11	270	1.229	1.11
30x50	S6	S6	1000	0.249	1.87	390	0.851	1.15	330	1.005	1.15
35x25	S1	S1	470	0.529	1.40	180	1.843	0.86	150	2.212	0.86
35x30	S2	S2	560	0.444	1.56	270	1.229	0.91	220	1.508	0.91
35x35	S3	S3	820	0.303	1.82	330	1.005	1.13	270	1.229	1.13
35x40	S4	S4	1000	0.249	1.99	390	0.851	1.26	330	1.005	1.26
35x45	S5	S5	1200	0.207	2.10	470	0.706	1.31	390	0.851	1.31
35x50	S6	S6	—	—	—	560	0.592	1.50	470	0.706	1.50

(Note) ESR : 20°C, 120Hz ; Rated ripple current : 105°C, 120Hz

* There are overseas factory product only on this page.

105°C, Miniaturized, High-Reliability, High-Ripple Capacitors Series LAT

- Best suited as input filters for various power supplies
- Guarantees 2000 hours at 105°C.



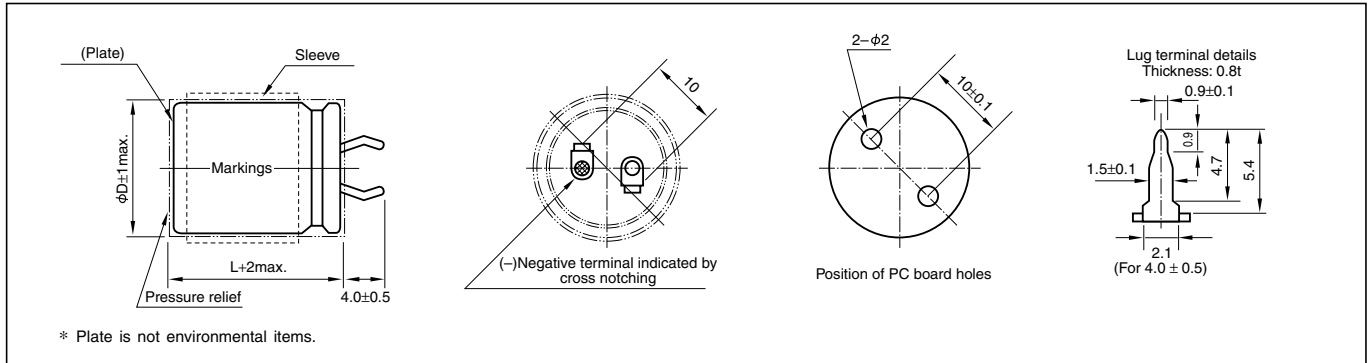
Marking color : White print on a black sleeve
White print on a brown sleeve

Specifications

Item	Performance	
Category temperature range (°C)	-25 to +105	
Tolerance at rated capacitance (%)	±20 (20°C, 120Hz)	
Leakage current (µA)	Less than 0.02CV or 3mA whichever is smaller(after 5 minutes) C: Rated capacitance(µF); V: Rated voltage(V) (20°C)	
Tangent of loss angle (tanδ)	Rated voltage (V)	160 180 200 250 315 400
	tanδ (max.)	0.15 0.15 0.15 0.15 0.20 0.20
Characteristics at high and low temperature	Percentage of capacitance change (%)	-25°C Within ±30% of the value at 20°C
	Impedance ratio (max.)	Z-25°C / Z+20°C 4 (120Hz)
Endurance (105°C) (Applied ripple current)	Test time	2000 hours
	Leakage current	The initial specified value or less
	Percentage of capacitance change	Within ±20% of initial value
	Tangent of the loss angle	200% or less of the initial specified value
Shelf life (105°C)	Test time	1000 hours
	Leakage current	The initial specified value or less
	Percentage of capacitance change	Within ±15% of initial value
	Tangent of the loss angle	150% or less of the initial specified value
Applicable standards	Voltage application treatment JIS C5101-1, -4 1998 (IEC 60384-1 1992, -4 1985)	

Outline Drawing

Unit: mm



Part numbering system (example: 200V470µF)						
Environmental item	LAT	—	200	V	471	M S24 #
	Series code		Rated voltage symbol		Rated capacitance symbol	Capacitance tolerance symbol Casing symbol
Former item	LAT	—	200	V	471	M S24
	Series code		Rated voltage symbol		Rated capacitance symbol	Capacitance tolerance symbol Casing symbol

Coefficient of Frequency for Rated Ripple Current

Rated voltage(V) \ Frequency(Hz)	50	120	1k	10k	30k
160 to 250	0.87	1	1.11	1.18	1.20
315 or more	0.80	1	1.14	1.19	1.20

• The standard ratings are described on the next page.

* There are overseas factory product only on this page.

NOTE
Design, Specifications are subject to change without notice.
Ask factory for technical specifications before purchase and/or use.

Standard Ratings

Rated voltage(V)		160			180			200			
Case ø DxL(mm)	Casing symbol	Item	Rated capacitance	ESR	Rated ripple current	Rated capacitance	ESR	Rated ripple current	Rated capacitance	ESR	Rated ripple current
			μF	Ω	Arms	μF	Ω	Arms	μF	Ω	Arms
22x25	S22		390	0.638	1.30	330	0.754	1.20	270	0.922	1.10
22x30	S23		470	0.529	1.47	390	0.638	1.30	390	0.638	1.31
22x35	S24		560	0.444	1.58	470	0.529	1.50	470	0.529	1.50
22x40	S25		680	0.366	1.71	560	0.444	1.62	560	0.444	1.56
22x45	S26		820	0.303	2.00	680	0.366	1.70	680	0.366	1.74
22x50	S27		1000	0.249	2.20	820	0.303	2.00	—	—	—
25x25	S32		470	0.529	1.55	390	0.638	1.35	390	0.638	1.35
25x30	S33		680	0.366	1.70	560	0.444	1.53	560	0.444	1.53
25x35	S34		820	0.303	2.00	680	0.366	1.74	680	0.366	1.74
25x40	S35		1000	0.249	2.20	820	0.303	2.00	—	—	—
25x45	S36		1200	0.207	2.45	1000	0.249	2.23	820	0.303	2.04
25x50	S37		—	—	—	1200	0.207	2.51	1000	0.249	2.30
30x25	S42		680	0.366	1.82	560	0.444	1.67	560	0.444	1.67
30x30	S43		1000	0.249	2.20	820	0.303	2.00	820	0.303	2.00
30x35	S44		1200	0.207	2.44	1000	0.249	2.24	1000	0.249	2.24
30x40	S45		1500	0.166	2.82	1200	0.207	2.52	1200	0.207	2.52
30x45	S46		1800	0.138	3.31	1500	0.166	2.89	—	—	—
30x50	S47		—	—	—	—	—	—	1500	0.166	3.03
35x25	S52		1000	0.249	2.20	820	0.303	2.00	820	0.303	2.00
35x30	S53		1500	0.166	2.50	1200	0.207	2.50	1000	0.249	2.30
35x35	S54		1800	0.138	2.92	1500	0.166	2.89	1200	0.207	2.65
35x40	S55		—	—	—	1800	0.138	3.05	1500	0.166	3.08
35x45	S56		2200	0.113	3.48	—	—	—	1800	0.138	3.47
35x50	S57		2700	0.092	3.97	2200	0.113	3.60	2200	0.113	3.78

Rated voltage(V)		250			315			400			
Case ø DxL(mm)	Casing symbol	Item	Rated capacitance	ESR	Rated ripple current	Rated capacitance	ESR	Rated ripple current	Rated capacitance	ESR	Rated ripple current
			μF	Ω	Arms	μF	Ω	Arms	μF	Ω	Arms
22x25	S22		220	1.131	1.00	120	2.765	0.75	82	4.046	0.64
22x30	S23		270	0.922	1.14	150	2.212	0.82	100	3.317	0.69
22x35	S24		330	0.754	1.26	180	1.843	0.91	120	2.765	0.75
22x40	S25		390	0.638	1.49	220	1.508	1.02	150	2.212	0.82
22x45	S26		470	0.529	1.57	270	1.229	1.16	180	1.843	0.90
22x50	S27		560	0.444	1.67	330	1.005	1.20	220	1.508	1.05
25x25	S32		270	0.922	1.18	180	1.843	0.90	120	2.765	0.75
25x30	S33		330	0.754	1.30	220	1.508	1.00	150	2.212	0.84
25x35	S34		470	0.529	1.57	270	1.229	1.10	180	1.843	0.94
25x40	S35		560	0.444	1.79	330	1.005	1.20	220	1.508	1.07
25x45	S36		—	—	—	390	0.851	1.30	270	1.229	1.20
25x50	S37		680	0.366	1.84	470	0.706	1.40	330	1.005	1.32
30x25	S42		390	0.638	1.31	270	1.229	1.10	150	2.212	0.82
30x30	S43		560	0.444	1.79	330	1.005	1.20	220	1.508	1.06
30x35	S44		680	0.366	2.00	390	0.851	1.30	270	1.229	1.21
30x40	S45		820	0.303	2.16	470	0.706	1.40	330	1.005	1.39
30x45	S46		—	—	—	560	0.592	1.50	390	0.851	1.55
30x50	S47		1000	0.249	2.47	680	0.488	1.70	470	0.706	1.69
35x25	S52		560	0.444	1.68	330	1.005	1.20	220	1.508	1.08
35x30	S53		680	0.366	1.75	470	0.706	1.40	330	1.005	1.20
35x35	S54		820	0.303	2.00	560	0.592	1.50	390	0.851	1.54
35x40	S55		1000	0.249	2.30	680	0.488	1.70	470	0.706	1.74
35x45	S56		1200	0.207	2.43	820	0.405	2.00	560	0.592	1.85
35x50	S57		1500	0.166	2.96	—	—	—	—	—	—

(Note) ESR : 20°C, 120Hz ; Rated ripple current : 105°C, 120Hz

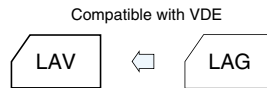
* There are overseas factory product only on this page.

High-Reliability, Compatible with VDE Series LAV

- Compatible with VDE (should be no detect when 360V DC is applied for 7 hours at 70°C).
- Guarantees 2000 hours at 105°C.



Marking color : White print on a black sleeve or White print on a brown sleeve

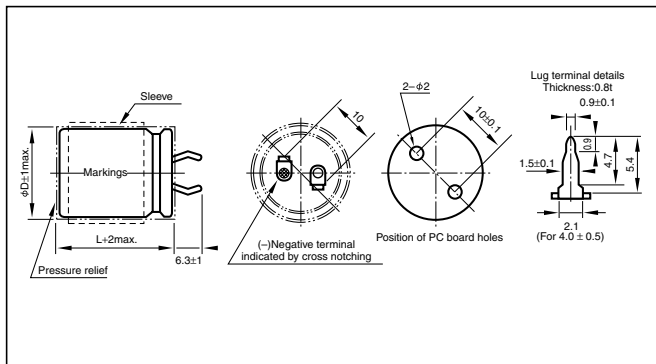


Specifications

Item	Performance
Category temperature range (°C)	-25 to +105
Rated voltage(V)	250
Tolerance at rated capacitance (%)	±20 (20°C, 120Hz)
Leakage current (μA)	Less than 0.02CV or 3mA whichever is smaller(after 5 minutes) C: Rated capacitance(μF); V: Rated voltage(V) (20°C)
Tangent of loss angle (tanδ)	0.2 or less (20°C, 120Hz)
Overvoltage characteristics	Should be no detect when 360V DC is applied for 7 hours at 70°C
Characteristics at high and low temperature	Percentage of capacitance change (%) -25°C Within ±30% of the value at 20°C
	Impedance ratio (max.) Z-25°C / Z+20°C 4 (120Hz)
Endurance (105°C) (Applied ripple current)	Test time 2000 hours
	Leakage current The initial specified value or less
	Percentage of capacitance change Within ±20% of initial value
	Tangent of the loss angle 200% or less of the initial specified value
Shelf life (105°C)	Test time 1000 hours
	Leakage current The initial specified value or less
	Percentage of capacitance change Within ±15% of initial value
	Tangent of the loss angle 150% or less of the initial specified value
Voltage application treatment	
Applicable standards	JIS C5101-1, -4 1998 (IEC 60384-1 1992, -4 1985)

Outline Drawing

Unit: mm



Coefficient of Frequency for Rated Ripple Current

Frequency(Hz)	50	120	1k	10k	30k
Coefficient	0.80	1	1.14	1.19	1.20

Part numbering system (example: 250V470μF)

Environmental item	LAV	—	250	V	471	M	S5	#
	Series code		Rated voltage symbol		Rated capacitance symbol	Capacitance tolerance symbol	Casing symbol	
Former item	LAV	—	250 <td>V <td>471 <td>M <td>S5 <td></td> </td></td></td></td>	V <td>471 <td>M <td>S5 <td></td> </td></td></td>	471 <td>M <td>S5 <td></td> </td></td>	M <td>S5 <td></td> </td>	S5 <td></td>	
	Series code		Rated voltage symbol		Rated capacitance symbol	Capacitance tolerance symbol	Casing symbol	

Standard Ratings

Case L(mm)	Casing symbol	Item	22		25		30		35	
			Rated capacitance	Rated ripple current	Rated capacitance	Rated ripple current	Rated capacitance	Rated ripple current	Rated capacitance	Rated ripple current
			μF	Arms	μF	Arms	μF	Arms	μF	Arms
20	S1	82	0.40	100	0.50	150	0.65	—	—	
25	S2	100	0.50	150	0.65	220	0.85	270	1.00	
30	S3	150	0.65	220	0.85	330	1.10	470	1.30	
35	S4	180	0.75	270	1.00	390	1.25	560	1.55	
40	S5	220	0.85	330	1.10	470	1.30	680	1.80	
45	S6	270	0.95	390	1.25	560	1.55	820	1.95	
50	S7	330	1.10	—	—	—	—	1000	2.10	

(Note) Rated ripple current : 105°C, 120Hz.

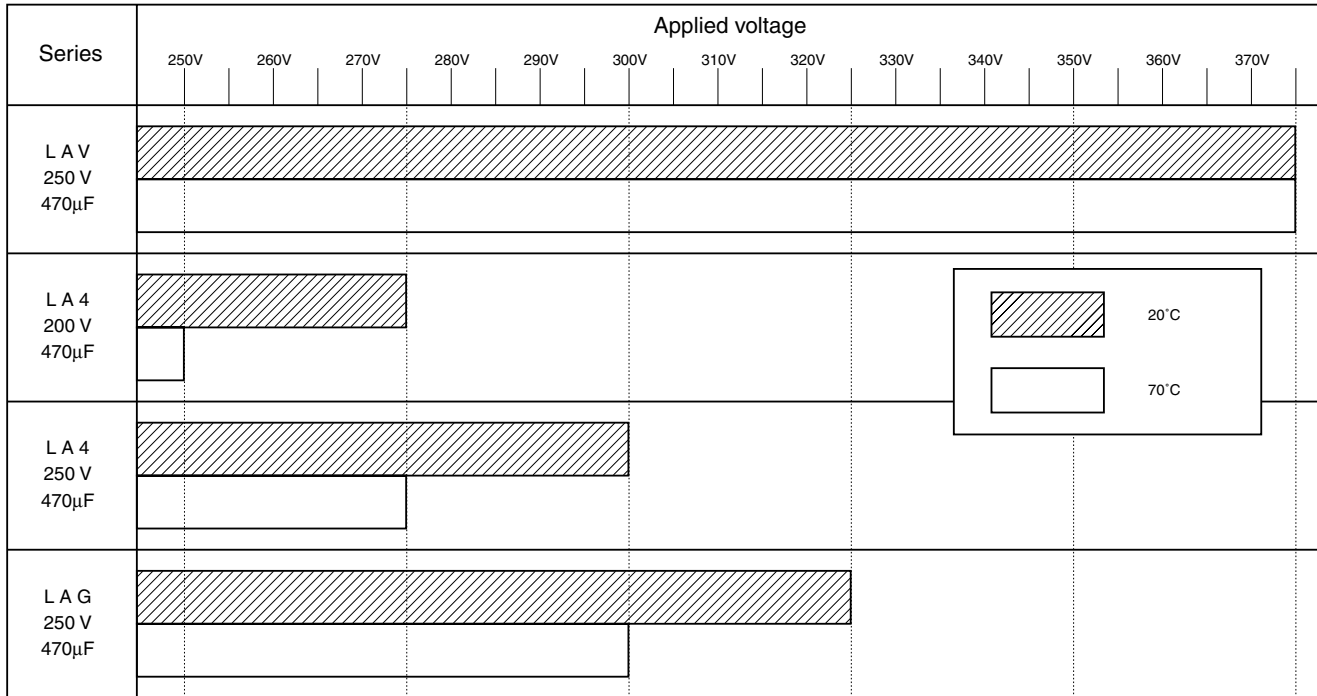
• Over voltage characteristics follow the next page.

* There are overseas factory product only on this page.

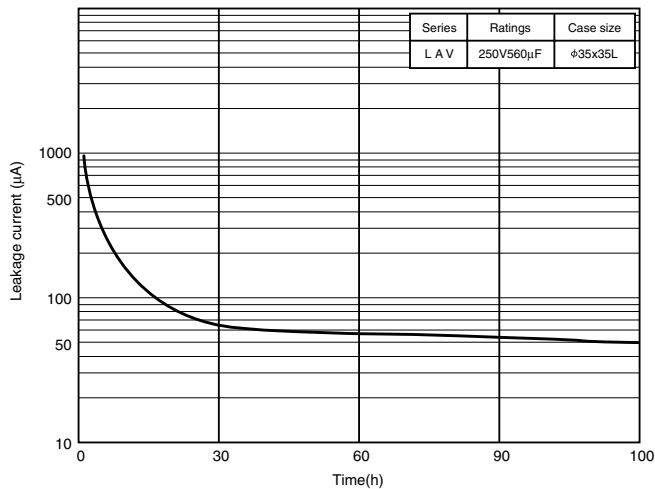
NOTE
Design, Specifications are subject to change without notice.
Ask factory for technical specifications before purchase and/or use.

Overvoltage characteristics

- Samples: 4 types chosen from the following 3 series: (1)Series LAV; (2)Series LAG; (3)Series LA4(for 85°C)
- Test temperature: 20°C, 70°C
- Test conditions: An overvoltage is applied to the samples without limiting the inrush current; the samples are held in this condition continuously for 30 minutes.(maximum inrush current: 10A)
- Criteria: Observation of change in the appearance of a capacitor does not reveal (1) actuation of the vent (2) short circuit are found by observing visual change of the capacitors.

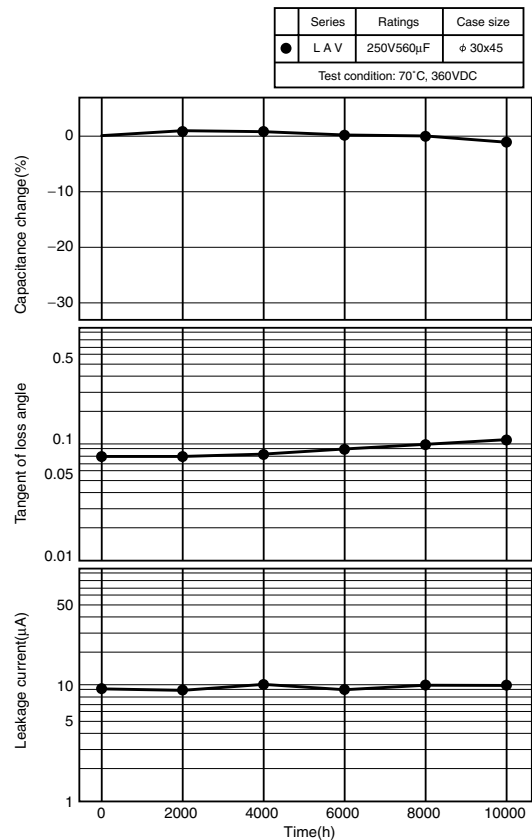


Overvoltage characteristics



The leakage current characteristics show that the electronic current domain is entered 30 minutes after the initiation of voltage application, exhibiting excellent overvoltage characteristics.

Overvoltage characteristics



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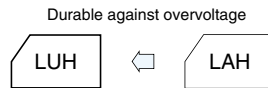
Notice: The mesurment values are not guaranteed values, but measurements.

High-Reliability, Durable against Overvoltage Series LUH

- High-Reliability, no short-circuiting under overvoltage (abnormal voltage) application.
- Guarantees 2000 hours at 105°C.



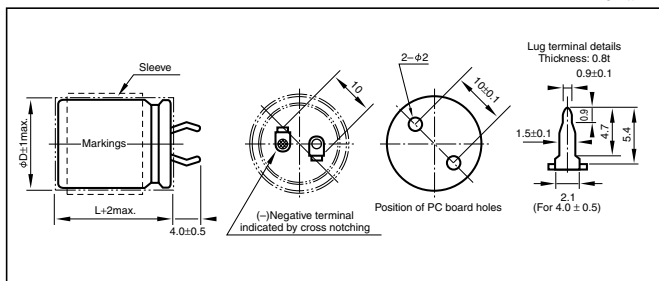
Marking color : White print on a black sleeve
White print on a brown sleeve



Specifications

Item	Performance																				
Category temperature range (°C)	-25 to +105																				
Rated voltage(V)	200, 400																				
Tolerance at rated capacitance (%)	±20 (20°C, 120Hz)																				
Leakage current (µA)	Less than 0.02CV or 3mA whichever is smaller(after 5 minutes) C: Rated capacitance(µF); V: Rated voltage(V) (20°C)																				
Tangent of loss angle (tanδ)	0.15 or less (20°C, 120Hz)																				
Overvoltage characteristics	<p>The pressure valve shall operate normally free from shorts and sparks under the following test conditions.</p> <table border="1"> <thead> <tr> <th>Rated Voltage</th> <th>Capacitance</th> <th>Limited DC current</th> <th>Test voltage</th> </tr> </thead> <tbody> <tr> <td rowspan="3">200V</td> <td>C < 330µF</td> <td>4A</td> <td rowspan="3">300/375V(DC)</td> </tr> <tr> <td>330µF ≤ C < 470µF</td> <td>5A</td> </tr> <tr> <td>470µF ≤ C</td> <td>7A</td> </tr> <tr> <td rowspan="3">400V</td> <td>C < 100µF</td> <td>2A</td> <td rowspan="3">500/600V(DC)</td> </tr> <tr> <td>100µF ≤ C < 220µF</td> <td>4A</td> </tr> <tr> <td>220µF ≤ C</td> <td>7A</td> </tr> </tbody> </table>	Rated Voltage	Capacitance	Limited DC current	Test voltage	200V	C < 330µF	4A	300/375V(DC)	330µF ≤ C < 470µF	5A	470µF ≤ C	7A	400V	C < 100µF	2A	500/600V(DC)	100µF ≤ C < 220µF	4A	220µF ≤ C	7A
Rated Voltage	Capacitance	Limited DC current	Test voltage																		
200V	C < 330µF	4A	300/375V(DC)																		
	330µF ≤ C < 470µF	5A																			
	470µF ≤ C	7A																			
400V	C < 100µF	2A	500/600V(DC)																		
	100µF ≤ C < 220µF	4A																			
	220µF ≤ C	7A																			
Characteristics at high and low temperature	<table border="1"> <thead> <tr> <th>Impedance ratio</th> <th>Z-25°C / Z+20°C</th> <th>4 or less</th> </tr> </thead> </table> <p>(120Hz)</p>	Impedance ratio	Z-25°C / Z+20°C	4 or less																	
Impedance ratio	Z-25°C / Z+20°C	4 or less																			
Endurance (105°C) (Applied ripple current)	<table border="1"> <thead> <tr> <th>Test time</th> <th>2000 hours</th> </tr> </thead> <tbody> <tr> <td>Leakage current</td> <td>The initial specified value or less</td> </tr> <tr> <td>Percentage of capacitance change</td> <td>Within ±20% of initial value</td> </tr> <tr> <td>Tangent of the loss angle</td> <td>200% or less of the initial specified value</td> </tr> </tbody> </table>	Test time	2000 hours	Leakage current	The initial specified value or less	Percentage of capacitance change	Within ±20% of initial value	Tangent of the loss angle	200% or less of the initial specified value												
Test time	2000 hours																				
Leakage current	The initial specified value or less																				
Percentage of capacitance change	Within ±20% of initial value																				
Tangent of the loss angle	200% or less of the initial specified value																				
Shelf life (105°C)	<table border="1"> <thead> <tr> <th>Test time</th> <th>1000 hours</th> </tr> </thead> <tbody> <tr> <td>Leakage current</td> <td>The initial specified value or less</td> </tr> <tr> <td>Percentage of capacitance change</td> <td>Within ±15% of initial value</td> </tr> <tr> <td>Tangent of the loss angle</td> <td>150% or less of the initial specified value</td> </tr> </tbody> </table> <p>Voltage application treatment</p>	Test time	1000 hours	Leakage current	The initial specified value or less	Percentage of capacitance change	Within ±15% of initial value	Tangent of the loss angle	150% or less of the initial specified value												
Test time	1000 hours																				
Leakage current	The initial specified value or less																				
Percentage of capacitance change	Within ±15% of initial value																				
Tangent of the loss angle	150% or less of the initial specified value																				
Applicable standards	JIS C5101-1, -4 1998 (IEC 60384-1 1992, -4 1985)																				

Outline Drawing



Coefficient of Frequency for Rated Ripple Current

Frequency(Hz)	50	120	1k	10k	30k
Correction coefficient	0.80	1	1.14	1.19	1.20

Part numbering system (example: 200V470µF)

Environmental item	LUH	—	200	V	471	M	S25	A#
	Series code		Rated voltage symbol		Rated capacitance symbol	Capacitance tolerance symbol		Casing symbol
Former item	LUH	—	200	V	471	M	S25	A
	Series code		Rated voltage symbol		Rated capacitance symbol	Capacitance tolerance symbol		Casing symbol

Casing symbol

φ	L	25	30	35	40	45	50
20		S22	S23	S24	S25	S26	S27
25		S32	S33	S34	S35	S36	S37
30		S42	S43	S44	S45	S46	S47
35		S52	S53	S54	S55	S56	S57

Standard Ratings

Rated capacitance (µF)	Item	200								400							
		22		25		30		35		22		25		30		35	
		Case	Rated ripple current	Case	Rated ripple current	Case	Rated ripple current	Case	Rated ripple current	Case	Rated ripple current	Case	Rated ripple current	Case	Rated ripple current	Case	Rated ripple current
68										22x25	0.51						
85										22x30	0.58	25x25	0.65				
100										22x35	0.70	25x25	0.68				
120										22x40	0.76	25x30	0.74	30x25	0.78		
150										22x45	0.86	25x35	0.85	30x25	0.85		
180										22x50	0.95	25x40	0.95	30x30	0.94	35x25	0.95
220		22x25	0.97									25x45	1.24	30x35	1.18	35x30	1.22
270		22x25	1.08									25x50	1.30	30x40	1.30	35x35	1.30
330		22x30	1.23	25x25	1.23									30x45	1.47	35x35	1.36
390		22x35	1.37	25x30	1.35									30x50	1.59	35x40	1.58
470		22x40	1.46	25x30	1.45	30x25	1.45									35x45	1.87
560		22x45	1.70	25x35	1.65	30x30	1.70										
680		22x50	1.84	25x40	1.80	30x35	1.88	35x25	1.81								
820				25x50	2.07	30x35	2.00	35x30	2.07								
1000						30x45	2.25	35x35	2.22								
1200						30x50	2.59	35x40	2.58								
1500								35x45	3.02								

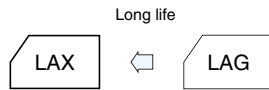
(Note) Rated ripple current : 105°C, 120Hz.

* There are overseas factory product only on this page.

NOTE
Design, Specifications are subject to change without notice.
Ask factory for technical specifications before purchase and/or use.

Miniaturized, Long Life, High-Reliability Capacitors Series LAX

- Long Life, high-reliability capacitors.
- Guarantees 5000 hours at 105°C.



Marking color : White print on a black sleeve or White print on a brown sleeve

Specifications

Item	Performance	
Category temperature range (°C)	-25 to +105	
Tolerance at rated capacitance (%)	±20 (20°C, 120Hz)	
Leakage current (µA)	Less than 0.02CV or 3mA whichever is smaller (after 5 minutes) C: Rated capacitance(µF); V: Rated voltage(V) (20°C)	
Tangent of loss angle (tanδ)	Rated voltage (V)	160 200 250 400
	tanδ (max.)	0.215 0.15 0.15 0.20
Characteristics at high and low temperature	Percentage of capacitance change (%)	-25°C Within ±30% of the value at 20°C
	Impedance ratio (max.)	Z-25°C / Z+20°C 4
Endurance (105°C) (Applied ripple current)	Test time	5000 hours
	Leakage current	The initial specified value or less
	Percentage of capacitance change	Within ±20% of initial value
	Tangent of the loss angle	200% or less of the initial specified value
Shelf life (105°C)	Test time	1000 hours
	Leakage current	The initial specified value or less
	Percentage of capacitance change	Within ±15% of initial value
	Tangent of the loss angle	150% or less of the initial specified value
Voltage application treatment		
Applicable standards	JIS C5101-1, -4 1998 (IEC 60384-1 1992, -4 1985)	

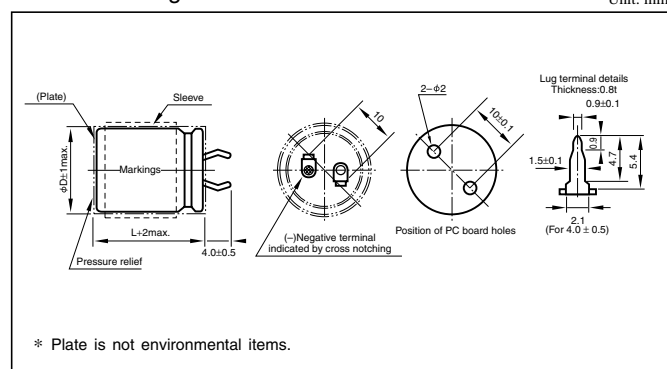
Standard Ratings

Case φ D x L (mm)	Item Casing symbol	160		200		250		400	
		Rated capacitance µF	Rated ripple current Arms	Rated capacitance µF	Rated ripple current Arms	Rated capacitance µF	Rated ripple current Arms	Rated capacitance µF	Rated ripple current Arms
22x25	S22	270	0.91	180	0.75	150	0.68	56	0.34
22x30	S23	330	1.09	270	0.99	180	0.81	68	0.40
22x35	S24	390	1.27	330	1.16	220	0.95	82	0.47
22x40	S25	470	1.36	390	1.24	270	1.03	120	0.56
22x50	S27	680	1.52	470	1.37	390	1.16	150	0.63
25x25	S32	390	1.15	270	0.96	180	0.78	68	0.39
25x30	S33	470	1.36	330	1.14	270	1.03	100	0.51
25x35	S34	560	1.54	470	1.45	330	1.21	120	0.60
25x40	S35	680	1.68	560	1.55	390	1.29	150	0.66
25x50	S37	820	1.81	680	1.72	470	1.43	220	0.80
30x25	S42	560	1.45	330	1.11	270	1.01	100	0.50
30x30	S43	680	1.68	470	1.43	330	1.16	150	0.66
30x35	S44	820	1.82	560	1.66	470	1.33	180	0.77
30x40	S45	1000	1.90	680	1.79	560	1.48	220	0.83
30x50	S47	1200	2.09	1000	2.00	680	1.59	270	0.92
35x30	S53	820	1.93	680	1.76	470	1.33	180	0.74
35x35	S54	1000	2.15	820	2.05	560	1.55	220	0.87
35x40	S55	1500	2.52	1000	2.22	680	1.69	270	0.94
35x50	S57	1800	2.63	1200	2.43	1000	2.22	330	1.04

(Note) Rated ripple current : 105°C, 120Hz.

Outline Drawing

Unit: mm



Coefficient of Frequency for Rated Ripple Current

Rated voltage(V)	Frequency(Hz)				
	50	120	1k	10k	30k
160 to 250	0.87	1	1.11	1.18	1.20
400	0.80	1	1.14	1.19	1.20

Part numbering system (example: 200V470µF)

Environmental item	LAX	—	200	V	471	M	S34	#
	Series code		Rated voltage symbol		Rated capacitance symbol	Capacitance tolerance symbol	Casing symbol	
Former item	LAX	—	200	V	471	M	S34	
	Series code		Rated voltage symbol		Rated capacitance symbol	Capacitance tolerance symbol	Casing symbol	

- The electric characteristics are described on page 109.

* There are overseas factory product only on this page.

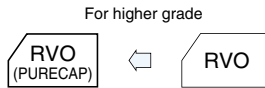
Aluminum Electrolytic Capacitors for Audio

Chip Type Audio Use Capacitors Series RVO (PURECAP)

- Audio grade surface mount product with completely new components using synthetic mica paper for the separator.
- Both quality sense and sound field that could not be realized by the surface mount products are reproducible.



Marking color : Black print (except height : 10mm)
White print on a brown sleeve (ø8x10L, ø10x10L)

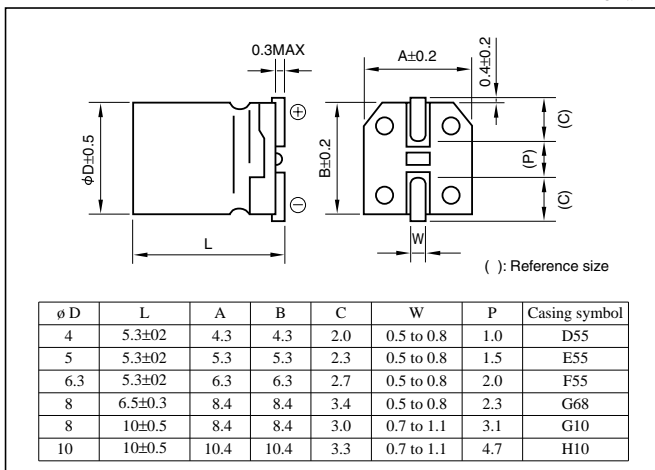


Specifications

Item	Performance							
Category temperature range (°C)	-40 to +85							
Tolerance at rated capacitance (%)	±20 (20°C, 120Hz)							
Leakage current (µA)	Less than 0.01CV or 3 whichever is larger(after 2 minutes) C: Rated capacitance(µF); V: Rated voltage(V) (20°C)							
Tangent of loss angle (tanδ)	Rated voltage (V)	6.3	10	16	25	35	50	
	tanδ (max.)	0.28	0.24	0.20	0.14	0.12	0.10	
Characteristics at high and low temperature	Impedance ratio (max.)	Z-25°C / Z+20°C	3	3	2	2	2	
		Z-40°C / Z+20°C	8	5	4	3	3	
	(120Hz)							
Endurance (85°C) (Applied ripple current)	Test time	2000 hours						
	Leakage current	The initial specified value or less						
	Percentage of capacitance change	Within ±20% of initial value						
	Tangent of the loss angle	200% or less of the initial specified value						
Shelf life (85°C)	Test time : 1000 hours; other items are the same as those for the endurance. Voltage application treatment							
Applicable standards	JIS C5101-1, -18 1998 (IEC 60384-1 1992, -18 1993)							

Outline Drawing

Unit: mm



Coefficient of Frequency for Rated Ripple Current

Rated voltage(V)	Frequency(Hz)			
	50	120	1k	10k · 100k
6.3 to 16	0.80	1	1.15	1.25
25 to 35	0.80	1	1.25	1.40
50	0.80	1	1.35	1.50

Part numbering system (example: 16V470µF)

Environmental item	RVO	16	V	471	M	H10	U	
	Series code	Rated voltage symbol	Rated capacitance symbol	Capacitance tolerance symbol	Casing symbol	Additional symbol	Taping symbol	
Former item	RVO	16	V	471	M	H10		
	Series code	Rated voltage symbol	Rated capacitance symbol	Capacitance tolerance symbol	Casing symbol	Additional symbol	Taping symbol	

- Soldering conditions and land size are described on page 14. The taping specifications are described on page 15.

Standard Ratings

Rated capacitance(µF)	Item	6.3		10		16		25		35		50	
		Case	Rated ripple current	Case	Rated ripple current	Case	Rated ripple current	Case	Rated ripple current	Case	Rated ripple current	Case	Rated ripple current
		φ DxL(mm)	mArms	φ DxL(mm)	mArms	φ DxL(mm)	mArms	φ DxL(mm)	mArms	φ DxL(mm)	mArms	φ DxL(mm)	mArms
0.1												4x5.3	3
0.22												4x5.3	5
0.33												4x5.3	6
0.47												4x5.3	7
1												4x5.3	10
2.2												4x5.3	15
3.3										4x5.3	17	4x5.3	19
4.7						4x5.3	18	4x5.3	19	4x5.3	20	5x5.3	26
10				4x5.3	23	4x5.3	26	5x5.3	32	5x5.3	34	6.3x5.3	44
22	4x5.3	31	5x5.3	40	5x5.3	44	6.3x5.3	55	6.3x5.3	59	8x6.5	124	
33	5x5.3	44	5x5.3	49	6.3x5.3	63	6.3x5.3	67	8x6.5	124	8x6.5	124	
47	5x5.3	53	6.3x5.3	68	6.3x5.3	76	8x6.5	124	8x6.5	124	8x10	200	
100	6.3x5.3	90	6.3x5.3	99	8x6.5	124	8x6.5	137	8x10	200	10x10	366	
220	8x6.5	149	8x6.5	149	8x10	200	8x10	235	10x10	366			
330	8x6.5	160	8x10	226	8x10	245	10x10	366					
470	8x10	251	10x10	366	10x10	366							
1000	10x10	423											

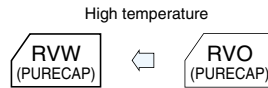
(Note) Rated ripple current : 85°C, 120Hz.

Chip Type Audio Use Capacitors Series RVW (PURECAP)

- Audio grade surface mount product with completely new components using synthetic mica paper for the separator.
- Both quality sense and sound field that could not be realized by the surface mount products are reproducible.



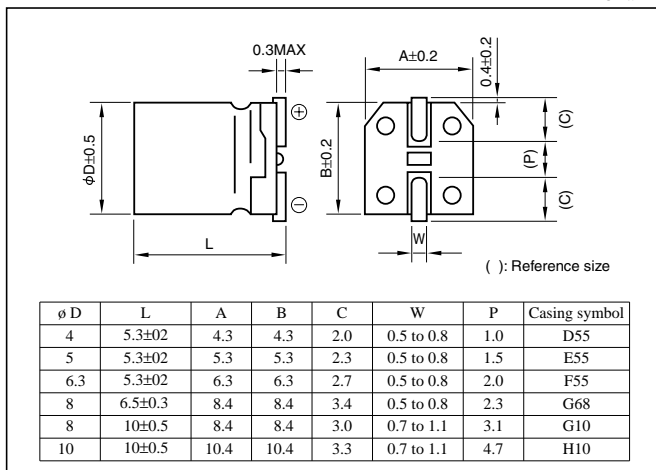
Marking color : Black print (except height : 10mm)
White print on a brown sleeve (ø8x10L, ø10x10L)



Specifications

Item	Performance						
Category temperature range (°C)	-55 to +105						
Tolerance at rated capacitance (%)	±20 (20°C,120Hz)						
Leakage current (µA)	Less than 0.01CV or 3 whichever is larger(after 2 minutes) C: Rated capacitance(µF); V: Rated voltage(V) (20°C)						
Tangent of loss angle (tanδ)	Rated voltage (V)	6.3	10	16	25	35	50
	tanδ (max.)	0.30	0.26	0.22	0.16	0.13	0.12
Characteristics at high and low temperature	Impedance ratio (max.)	Z-25°C / Z+20°C		Z-40°C / Z+20°C			
		4	3	2	2	2	2
Endurance (85°C) (Applied ripple current)	Test time	1000 hours					
	Leakage current	The initial specified value or less					
	Percentage of capacitance change	Within ±20% of initial value					
	Tangent of the loss angle	200% or less of the initial specified value					
Shelf life (85°C)	Test time : 1000 hours; other items are the same as those for the endurance. Voltage application treatment						
Applicable standards	JIS C5101-1, -18 1998 (IEC 60384-1 1992, -18 1993)						

Outline Drawing



Coefficient of Frequency for Rated Ripple Current

Rated voltage(V)	Frequency(Hz)			
	50	120	1k	10k · 100k
6.3 to 16	0.80	1	1.15	1.25
25 to 35	0.80	1	1.25	1.40
50	0.80	1	1.35	1.50

Part numbering system (example: 16V470µF)

Environmental item	RVW	16 V	471	M	H10	U	
Former item	RVW	16 V	471	M	H10		

- Soldering conditions and land size are described on page 14. The taping specifications are described on page 15.

Standard Ratings

Rated capacitance(µF)	6.3		10		16		25		35		50	
	Case	Rated ripple current	Case	Rated ripple current	Case	Rated ripple current	Case	Rated ripple current	Case	Rated ripple current	Case	Rated ripple current
0.1	—	—	—	—	—	—	—	—	—	—	4x5.3	2
0.22	—	—	—	—	—	—	—	—	—	—	4x5.3	3
0.33	—	—	—	—	—	—	—	—	—	—	4x5.3	4
0.47	—	—	—	—	—	—	—	—	—	—	4x5.3	5
1	—	—	—	—	—	—	—	—	—	—	4x5.3	7
2.2	—	—	—	—	—	—	—	—	—	—	4x5.3	10
3.3	—	—	—	—	—	—	—	—	—	—	4x5.3	12
4.7	—	—	—	—	—	—	4x5.3	12	4x5.3	14	5x5.3	17
10	—	—	4x5.3	15	4x5.3	16	5x5.3	21	5x5.3	23	6.3x5.3	26
22	4x5.3	21	5x5.3	25	5x5.3	28	6.3x5.3	36	6.3x5.3	50	8x6.5	110
33	5x5.3	30	5x5.3	31	6.3x5.3	40	6.3x5.3	44	8x6.5	110	8x10	178
47	5x5.3	36	6.3x5.3	43	6.3x5.3	47	8x6.5	110	8x10	178	8x10	178
100	6.3x5.3	61	8x6.5	110	8x10	178	8x10	178	10x10	324	10x10	324
220	8x10	178	8x10	178	10x10	324	10x10	324	10x10	324	—	—
330	8x10	178	10x10	324	10x10	324	—	—	—	—	—	—
470	10x10	324	10x10	324	10x10	324	—	—	—	—	—	—
1000	—	—	—	—	—	—	—	—	—	—	—	—

(Note) Rated ripple current : 105°C, 120Hz.

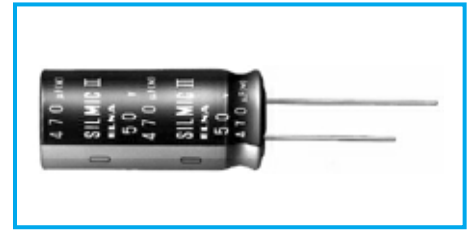
NOTE
Design, Specifications are subject to change without notice.
Ask factory for technical specifications before purchase and/or use.

■ SILMIC series Silk fiber using audio purpose capacitor

- ELNA developed new raw material for the separate paper which use a silk fibers. Therefore, this capacitor can give you high grade sound for your audio design.
- Due to the silk fiber's pliability, the capacitor makes a dream of the high quality sound.

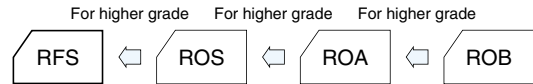
For examples;

- To relieve the music's vibration energy.
- To decrease the peak feeling sound at high compass and rough quality sound at middle compass.
- To increase massive sound at low compass.
- For bipolar capacitors, consult with us.



Miniature High Grade Capacitors for Audio(SILMIC II) Series RFS

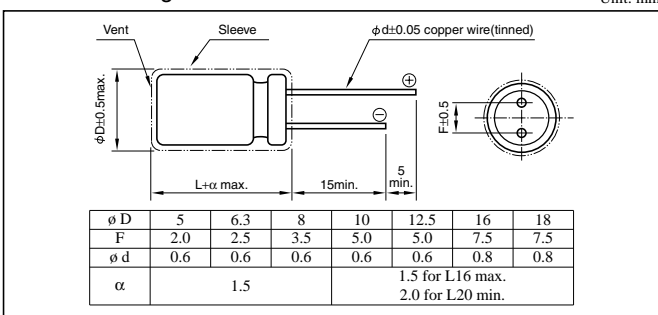
- All lead wires oxygen-free copper for extremely low distortion. (Third high frequency distortion 10kHz, 0.1A, -120dB or less)
- Vinyl sleeve is of brown finish gold "SILMIC II" mark.



Specifications

Item	Performance									
Category temperature range (°C)	-40 to +85									
Tolerance at rated capacitance (%)	±20 (20°C, 120Hz)									
Leakage current (µA)	Less than 0.01CV or 3 whichever is larger (after 5 minutes) C: Rated capacitance(µF); V: Rated voltage(V) (20°C)									
Tangent of loss angle (tanδ)	Rated voltage (V)	6.3	10	16	25	35	50	63	100	
	tanδ (max.)	0.20	0.17	0.13	0.10	0.10	0.08	0.08	0.08	
0.02 is added to every 1000µF increase over 1000µF (20°C, 120Hz)										
Endurance (85°C) (Applied ripple current)	Test time	1000 hours (with the polarity inverted every 250 hours)								
	Leakage current	The initial specified value or less								
	Percentage of capacitance change	Within ±20% of initial value								
	Tangent of the loss angle	150% or less of the initial specified value								
Shelf life (85°C)	Test time : 1000 hours. Other have same as endurance. Voltage application treatment									
Applicable standards	JIS C5101-1, -4 1998 (IEC 60384-1 1992, -4 1985)									

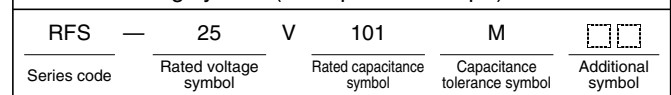
Outline Drawing



Coefficient of Frequency for Rated Ripple Current

Rated voltage(V)	Frequency(Hz)					
	CV(µF×VV)	50 · 60	120	1k	10k	100k
6.3 to 16	All CV value	0.8	1	1.1	1.2	1.2
25 to 35	≤ 1000	0.8	1	1.5	1.7	1.7
	1000 <	0.8	1	1.2	1.3	1.3
50 to 100	≤ 1000	0.8	1	1.6	1.9	1.9
	1000 <	0.8	1	1.2	1.3	1.3

Part numbering system (example: 25V100µF)



• The SILMIC series capacitors can be manufactured in larger sizes for power supply smoothing; consult with us.

Case symbol

Case	Casing Symbol	Case	Casing Symbol	Case	Casing Symbol	Case	Casing Symbol
φ DxL(mm)		φ DxL(mm)		φ DxL(mm)		φ DxL(mm)	
5x11	E3	10x12.5	H3	12.5x20	I5	16x31.5	J7
6.3x11	F3	10x16	H4	12.5x25	I6	16x35.5	J8
8x11.5	G3	10x20	H5	16x25	J6	18x35.5	K8
						18x40	K9

Standard Ratings

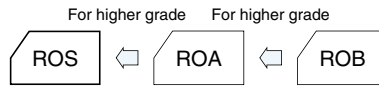
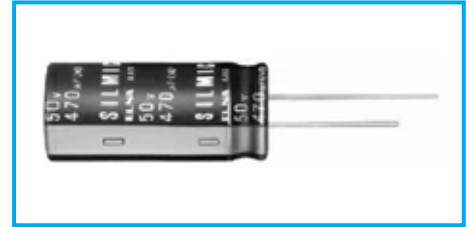
Rated capacitance(µF)	Item	6.3		10		16		25		35		50		63		100	
		Case	Rated ripple current	Case	Rated ripple current	Case	Rated ripple current	Case	Rated ripple current	Case	Rated ripple current	Case	Rated ripple current	Case	Rated ripple current	Case	Rated ripple current
		φ DxL(mm)	mArms	φ DxL(mm)	mArms	φ DxL(mm)	mArms	φ DxL(mm)	mArms	φ DxL(mm)	mArms	φ DxL(mm)	mArms	φ DxL(mm)	mArms	φ DxL(mm)	mArms
0.47																	
1																	
2.2																	
3.3																	
4.7																	
10																	
22																	
33																	
47																	
100																	
220																	
330																	
470																	
1000																	
2200																	
3300																	

(Note) Rated ripple current : 85°C, 120Hz

■ SILMIC series Silk fiber using audio purpose capacitor

High Grade Capacitors for Audio(SILMIC) Series ROS

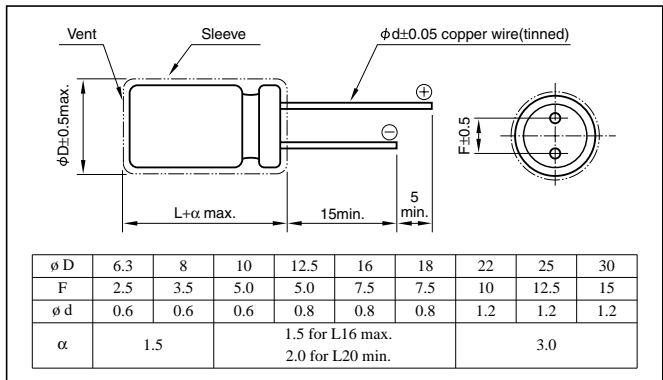
- All lead wires oxygen-free copper for extremely low distortion. (Third high frequency distortion 10kHz,0.1A,-120dB or less)
- Vinyl sleeve is of brown finish gold "SILMIC" mark.



Specifications

Item	Performance
Category temperature range (°C)	-40 to +85
Tolerance at rated capacitance (%)	±20 (20°C,120Hz)
Leakage current (µA)	Less than 0.01CV or 3 whichever is larger (after 5 minutes) C: Rated capacitance(µF); V: Rated voltage(V) (20°C)
Tangent of loss angle (tanδ)	Rated voltage (V)
	tanδ (max.)
Endurance (85°C) (Applied ripple current)	Test time
	Leakage current
	Percentage of capacitance change
	Tangent of the loss angle
Shelf life (85°C)	Test time : 1000 hours. Other have same as endurance. Voltage application treatment
Applicable standards	JIS C5101-1, -4 1998 (IEC 60384-1 1992, -4 1985)

Outline Drawing



• The SILMIC series capacitors can be manufactured in larger sizes for power supply smoothing ; consult with us.

Coefficient of Frequency for Rated Ripple Current

Rated voltage(V)	Frequency(Hz) CV(µFxVV)	50 · 60	120	1k	10k	100k
		16	All CV value	0.80	1	1.1
25 to 35	≤ 1000	0.80	1	1.5	1.7	1.7
	1000 <	0.80	1	1.2	1.3	1.3
50 to 100	≤ 1000	0.80	1	1.6	1.9	1.9
	1000 <	0.80	1	1.2	1.3	1.3

Part numbering system (example: 25V100µF)



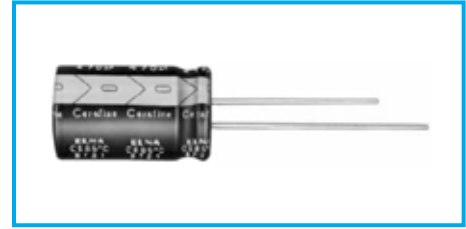
Standard Ratings

Rated voltage(V)	16		25		35		50		63		100	
	Case	Rated ripple current	Case	Rated ripple current	Case	Rated ripple current	Case	Rated ripple current	Case	Rated ripple current	Case	Rated ripple current
Rated capacitance(µF)	φ DxL(mm)	mArms	φ DxL(mm)	mArms	φ DxL(mm)	mArms	φ DxL(mm)	mArms	φ DxL(mm)	mArms	φ DxL(mm)	mArms
0.47	—	—	—	—	—	—	—	—	—	—	—	—
1	—	—	—	—	—	—	—	—	—	—	—	—
2.2	—	—	—	—	—	—	—	—	—	—	6.3x11	25
3.3	—	—	—	—	—	—	—	—	—	—	8x11.5	35
4.7	—	—	—	—	—	—	6.3x11	40	6.3x11	40	10x12.5	60
10	—	—	—	—	6.3x11	55	8x11.5	75	8x11.5	75	10x16	95
22	6.3x11	70	6.3x11	80	8x11.5	95	10x12.5	130	10x16	140	10x20	155
33	6.3x11	90	8x11.5	120	10x12.5	140	10x16	175	10x20	190	12.5x20	220
47	8x11.5	125	8x11.5	140	10x12.5	170	10x16	210	10x20	225	12.5x25	285
100	10x12.5	215	10x16	270	10x20	295	12.5x20	380	12.5x25	415	16x25	485
220	10x20	385	12.5x20	505	12.5x25	550	16x25	720	16x31.5	785	18x40	930
330	12.5x20	545	12.5x25	675	16x25	785	16x31.5	965	16x35.5	1010	—	—
470	12.5x25	710	16x25	940	16x31.5	1030	16x35.5	1210	18x35.5	1295	—	—
1000	16x31.5	1315	16x35.5	1575	18x35.5	1690	18x40	1985	—	—	—	—
2200	18x40	2150	—	—	—	—	—	—	—	—	—	—

(Note) Rated ripple current : 85°C, 120Hz.

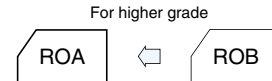
CERAFINE series Fine ceramic adopted electrolytic capacitor for audio

- This reproduces very clear sound with real concert-hall presence by depressing the generation of electrical noise due to external vibration.
- As the charging and discharging speed between the oxidized film of anode and field surface of electrolyte and the variation of potential due to unevenness of fibers of separating paper sheets are improved by the electro-chemical action of super fine particle ceramic, this product realize high grade audio tone with excellent sound resolution power, good rise in the low-pitched sound region and no distortion in the medium and high-pitched sound region.
- For bipolar capacitors, consult with us.



Standard Capacitors for Audio(Cerafine) Series ROA

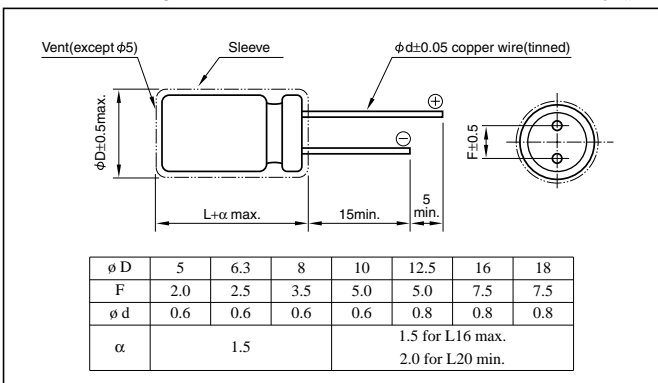
- All lead wires oxygen-free copper for extremely low distortion. (Third high frequency distortion 10kHz,0.1A,-120dB or less)
- Vinyl sleeve is of red finish gold "Cerafine" mark.



Specifications

Item	Performance	
Category temperature range (°C)	-40 to +85	
Tolerance at rated capacitance (%)	±20 (20°C,120Hz)	
Leakage current (µA)	Less than 0.01CV or 3 whichever is larger (after 5 minutes) C: Rated capacitance(µF); V: Rated voltage(V) (20°C)	
Tangent of loss angle (tanδ)	Rated voltage (V)	6.3 10 16 25 35 50 63 100
	tanδ (max.)	0.23 0.20 0.16 0.16 0.14 0.12 0.12 0.12
0.02 is added to every 1000µF increase over 1000µF (20°C,120Hz)		
Endurance (85°C) (Applied ripple current)	Test time	1000 hours
	Leakage current	The initial specified value or less
	Percentage of capacitance change	Within ±20% of initial value
	Tangent of the loss angle	150% or less of the initial specified value
Shelf life (85°C)	Test time : 1000 hours. Other have same as endurance. Voltage application treatment	
Applicable standards	JIS C5101-1, -4 1998 (IEC 60384-1 1992, -4 1985)	

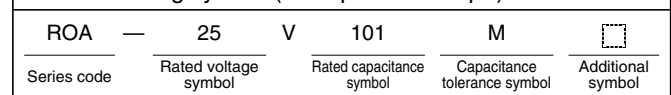
Outline Drawing



Coefficient of Frequency for Rated Ripple Current

Rated voltage(V)	Frequency(Hz) CV(µFxWV)	50 · 60	120	1k	10k	100k
		6.3 to 16	All CV value	0.8	1	1.1
25 to 35	≤ 1000	0.8	1	1.5	1.7	1.7
	1000 <	0.8	1	1.2	1.3	1.3
50 to 100	≤ 1000	0.8	1	1.6	1.9	1.9
	1000 <	0.8	1	1.2	1.3	1.3

Part numbering system (example: 25V100µF)



Standard Ratings

Rated capacitance(µF)	6.3		10		16		25		35		50		63		100	
	Case	Rated ripple current	Case	Rated ripple current	Case	Rated ripple current	Case	Rated ripple current	Case	Rated ripple current	Case	Rated ripple current	Case	Rated ripple current	Case	Rated ripple current
Item	φ DxL(mm)	mArms	φ DxL(mm)	mArms	φ DxL(mm)	mArms	φ DxL(mm)	mArms	φ DxL(mm)	mArms	φ DxL(mm)	mArms	φ DxL(mm)	mArms	φ DxL(mm)	mArms
0.47	—	—	—	—	—	—	—	—	—	—	5x11	9	—	—	5x11	9
1	—	—	—	—	—	—	—	—	—	—	5x11	14	—	—	5x11	14
2.2	—	—	—	—	—	—	—	—	—	—	5x11	20	5x11	20	6.3x11	20
3.3	—	—	—	—	—	—	—	—	—	—	5x11	25	5x11	25	8x11.5	30
4.7	—	—	—	—	—	—	5x11	25	5x11	25	6.3x11	35	6.3x11	35	8x11.5	40
10	—	—	—	—	5x11	35	5x11	35	6.3x11	45	6.3x11	50	8x11.5	60	10x12.5	70
22	—	—	5x11	50	6.3x11	65	6.3x11	65	8x11.5	80	10x12.5	105	10x12.5	105	10x20	125
33	5x11	55	6.3x11	70	6.3x11	80	8x11.5	95	10x12.5	120	10x12.5	130	10x16	140	12.5x20	175
47	6.3x11	80	6.3x11	85	8x11.5	110	8x11.5	110	10x12.5	140	10x16	170	10x20	185	12.5x25	230
100	8x11.5	135	8x11.5	145	10x12.5	195	10x16	215	10x20	250	12.5x20	310	12.5x20	310	16x25	395
220	10x12.5	240	10x12.5	260	10x16	320	10x20	350	12.5x25	465	16x25	585	16x31.5	640	18x40	760
330	10x12.5	290	10x16	350	10x20	425	12.5x20	490	16x25	665	16x31.5	785	16x35.5	825	—	—
470	10x16	390	10x20	455	12.5x20	585	12.5x25	640	16x25	795	16x35.5	985	18x35.5	1050	—	—
1000	12.5x20	710	12.5x25	835	16x25	1080	16x31.5	1180	18x35.5	1430	—	—	—	—	—	—
2200	16x25	1280	16x31.5	1500	18x35.5	1870	—	—	—	—	—	—	—	—	—	—
3300	16x31.5	1660	18x35.5	1980	—	—	—	—	—	—	—	—	—	—	—	—
4700	16x35.5	2000	—	—	—	—	—	—	—	—	—	—	—	—	—	—
6800	18x40	2550	—	—	—	—	—	—	—	—	—	—	—	—	—	—

(Note) Rated ripple current : 85°C, 120Hz

Miniature Standard Capacitors for Audio Series ROB

TONEREX

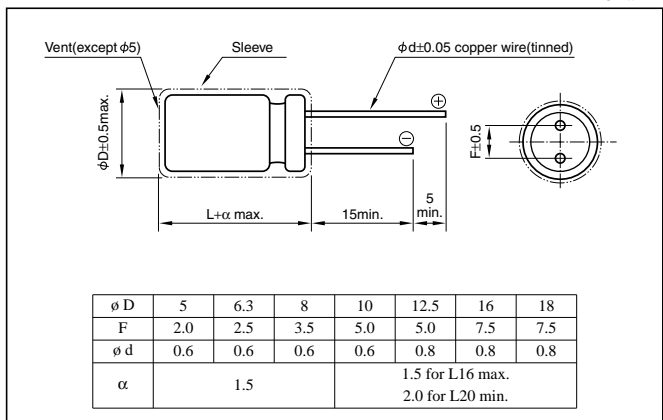
- Adopting the newly developed formation method and composite electrolytic paper for audio application has reduced distortion, achieving high-quality sound.
- Gold-printing on a black sleeve. (labeled "TONEREX")
- All lead wires are oxygen-free copper wires to reduce distortion.



Specifications

Item	Performance										
Category temperature range (°C)	-40 to +85										
Tolerance at rated capacitance (%)	±20 (20°C,120Hz)										
Leakage current (μA)	Less than 0.01CV or 4 whichever is larger (after 5 minutes) C: Rated capacitance(μF); V: Rated voltage(V) (20°C)										
Tangent of loss angle (tanδ)	Rated voltage (V)	6.3	10	16	25	35	50	63	100		
	tanδ (max.)	0.24	0.20	0.16	0.14	0.12	0.10	0.09	0.08		
0.02 is added to every 1000μF increase over 1000μF (20°C,120Hz)											
Endurance (85°C) (Applied ripple current)	Test time	1000 hours									
	Leakage current	The initial specified value or less									
	Percentage of capacitance change	WV(V)	φD			< φ6.3			> φ6.3		
			6.3 to 16			±20%			±20%		
	25 to 100			±20%			±20%				
Tangent of the loss angle	150% or less of the initial specified value										
Shelf life (85°C)	Test time : 1000 hours. Other have same as endurance. Voltage application treatment										
Applicable standards	JIS C5101-1, -4 1998 (IEC 60384-1 1992, -4 1985)										

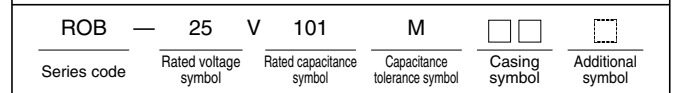
Outline Drawing



Coefficient of Frequency for Rated Ripple Current

Rated voltage(V)	Frequency(Hz) CV(μFxWV)	50 - 60	120	1k	10k	100k
		6.3 to 16	All CV value	0.80	1	1.1
25 to 35	≤ 1000	0.80	1	1.5	1.7	1.7
	1000 <	0.80	1	1.2	1.3	1.3
50 to 100	≤ 1000	0.80	1	1.6	1.9	1.9
	1000 <	0.80	1	1.2	1.3	1.3

Part numbering system (example: 25V100μF)



Case symbol

Case φ DxL(mm)	Casing Symbol	Case φ DxL(mm)	Casing Symbol	Case φ DxL(mm)	Casing Symbol	Case φ DxL(mm)	Casing Symbol
5x11	E3	10x12.5	H3	12.5x20	J5	16x31.5	J7
6.3x11	F3	10x16	H4	12.5x25	J6	16x35.5	J8
8x11.5	G3	10x20	H5	16x25	J6	18x35.5	K8
						18x40	K9

Standard Ratings

Rated capacitance(μF)	6.3		10		16		25		35		50		63		100	
	Case φ DxL(mm)	Rated ripple current mArms	Case φ DxL(mm)	Rated ripple current mArms	Case φ DxL(mm)	Rated ripple current mArms	Case φ DxL(mm)	Rated ripple current mArms	Case φ DxL(mm)	Rated ripple current mArms	Case φ DxL(mm)	Rated ripple current mArms	Case φ DxL(mm)	Rated ripple current mArms	Case φ DxL(mm)	Rated ripple current mArms
0.47	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2.2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
3.3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
4.7	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
10	—	—	—	—	5x11	35	5x11	40	5x11	45	5x11	50	6.3x11	60	8x11.5	70
22	—	—	5x11	50	5x11	60	5x11	60	6.3x11	75	6.3x11	80	8x11.5	100	10x12.5	120
33	5x11	55	5x11	65	5x11	70	6.3x11	80	6.3x11	90	8x11.5	110	8x11.5	115	10x16	160
47	5x11	65	5x11	75	6.3x11	95	6.3x11	100	8x11.5	120	8x11.5	130	10x12.5	165	10x20	210
100	6.3x11	110	6.3x11	120	8x11.5	150	8x11.5	165	10x12.5	210	10x16	250	10x20	285	12.5x20	340
220	8x11.5	185	8x11.5	200	10x12.5	265	10x16	310	10x20	365	12.5x20	440	12.5x20	470	16x25	620
330	10x12.5	265	10x12.5	200	10x16	350	10x20	410	12.5x20	500	12.5x20	540	12.5x25	620	16x31.5	820
470	10x12.5	315	10x16	380	10x20	460	12.5x20	550	12.5x25	640	16x25	800	16x25	840	18x35.5	1000
1000	10x20	550	12.5x20	670	12.5x25	810	16x25	1000	16x25	1050	16x31.5	1200	18x35.5	1500	—	—
2200	12.5x25	980	16x25	1200	16x25	1350	16x35.5	1650	18x35.5	1900	—	—	—	—	—	—
3300	16x25	1300	16x31.5	1600	16x35.5	1800	18x40	2100	—	—	—	—	—	—	—	—
4700	16x31.5	1700	16x35.5	1900	18x35.5	2400	—	—	—	—	—	—	—	—	—	—
6800	16x35.5	2100	18x40	2600	—	—	—	—	—	—	—	—	—	—	—	—
10000	18x40	2800	—	—	—	—	—	—	—	—	—	—	—	—	—	—

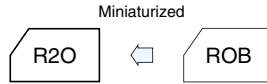
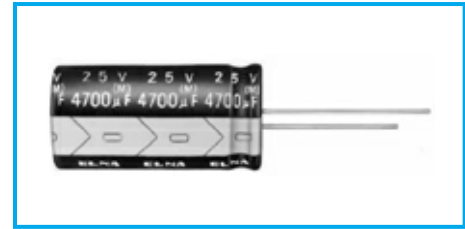
(Note) Rated ripple current : 85°C, 120Hz

NOTE

Design, Specifications are subject to change without notice. Ask factory for technical specifications before purchase and/or use.

Miniature Standard Capacitors for Audio (PURECAP) Series R20

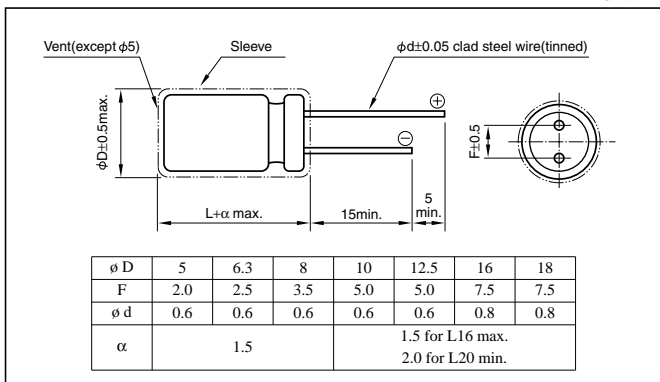
- A standard grade capacitor for excellent sound quality.
- A new foil and refined electrolyte allow improved tone quality.
- New type standard miniaturized capacitor for audio, using synthetic mica paper for the separator.



Specifications

Item	Performance	
Category temperature range (°C)	-40 to +85	
Tolerance at rated capacitance (%)	±20 (20°C, 120Hz)	
Leakage current (µA)	Less than 0.01CV or 3 whichever is larger (after 2 minutes) C: Rated capacitance(µF); V: Rated voltage(V) (20°C)	
Tangent of loss angle (tanδ)	Rated voltage (V)	6.3 10 16 25 35 50 63 100
	tanδ (max.)	0.30 0.25 0.19 0.16 0.14 0.12 0.10 0.10
0.02 is added to every 1000µF increase over 1000µF (20°C, 120Hz)		
Endurance (85°C) (Applied ripple current)	Test time	1000 hours
	Leakage current	The initial specified value or less
	Percentage of capacitance change	Within ±20% of initial value
	Tangent of the loss angle	200% or less of the initial specified value
Shelf life (85°C)	Test time : 500 hours. Other have same as endurance. Voltage application treatment	
Applicable standards	JIS C5101-1, -4 1998 (IEC 60384-1 1992, -4 1985)	

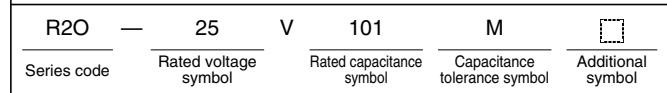
Outline Drawing



Coefficient of Frequency for Rated Ripple Current

Rated voltage(V)	Frequency(Hz) CV(µF×V)	50 · 60	120	1k	10k	100k
		6.3 to 16	All CV value	0.80	1	1.1
25 to 35	≤ 1000	0.80	1	1.5	1.7	1.7
	1000 <	0.80	1	1.2	1.3	1.3
50 to 100	≤ 1000	0.80	1	1.6	1.9	1.9
	1000 <	0.80	1	1.2	1.3	1.3

Part numbering system (example: 25V100µF)



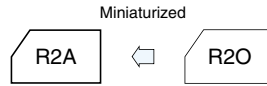
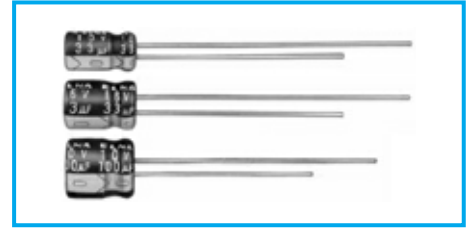
Standard Ratings

Rated capacitance(µF)	Rated voltage(V)		6.3		10		16		25		35		50		63		100	
	Case	Rated ripple current	Case	Rated ripple current	Case	Rated ripple current	Case	Rated ripple current	Case	Rated ripple current	Case	Rated ripple current	Case	Rated ripple current	Case	Rated ripple current	Case	Rated ripple current
Item	φ DxL(mm)	mArms	φ DxL(mm)	mArms	φ DxL(mm)	mArms	φ DxL(mm)	mArms	φ DxL(mm)	mArms	φ DxL(mm)	mArms	φ DxL(mm)	mArms	φ DxL(mm)	mArms	φ DxL(mm)	mArms
0.47	—	—	—	—	—	—	—	—	—	—	—	—	5x11	9	—	—	5x11	10
1	—	—	—	—	—	—	—	—	—	—	—	—	5x11	14	—	—	5x11	15
2.2	—	—	—	—	—	—	—	—	—	—	—	—	5x11	20	—	—	5x11	20
3.3	—	—	—	—	—	—	—	—	—	—	—	—	5x11	25	—	—	5x11	25
4.7	—	—	—	—	—	—	—	—	—	—	—	—	5x11	30	5x11	30	5x11	30
10	—	—	—	—	—	—	—	—	—	—	—	—	5x11	40	5x11	45	6.3x11	55
22	—	—	—	—	—	—	5x11	50	5x11	55	5x11	60	5x11	65	6.3x11	80	8x11.5	95
33	—	—	—	5x11	55	5x11	60	5x11	70	5x11	75	6.3x11	90	6.3x11	100	10x12.5	140	
47	—	—	—	5x11	65	5x11	75	5x11	80	6.3x11	100	6.3x11	110	8x11.5	140	10x16	180	
100	5x11	85	5x11	95	6.3x11	120	6.3x11	140	8x11.5	170	8x11.5	190	10x12.5	250	12.5x20	340		
220	6.3x11	150	6.3x11	165	8x11.5	220	8x11.5	240	10x12.5	310	10x16	370	10x20	440	16x25	640		
330	6.3x11	180	8x11.5	240	8x11.5	270	10x12.5	350	10x16	420	10x20	490	12.5x20	620	16x25	780		
470	8x11.5	260	8x11.5	280	10x12.5	390	10x16	460	10x20	540	12.5x20	670	12.5x25	810	16x31.5	1000		
1000	10x12.5	450	10x16	540	10x20	680	12.5x20	850	12.5x25	540	16x25	1250	16x31.5	1500	—	—	—	
2200	12.5x20	890	12.5x20	970	12.5x25	1200	16x25	1500	16x31.5	1750	16x35.5	2100	—	—	—	—	—	
3300	12.5x20	1050	12.5x25	1250	16x25	1600	16x31.5	1900	18x35.5	2250	—	—	—	—	—	—	—	
4700	16x25	1550	16x25	1650	16x31.5	2050	18x35.5	2450	—	—	—	—	—	—	—	—	—	
6800	16x25	1750	16x31.5	2050	18x35.5	2550	—	—	—	—	—	—	—	—	—	—	—	
10000	16x31.5	2150	18x35.5	2550	—	—	—	—	—	—	—	—	—	—	—	—	—	
15000	18x35.5	2700	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	

(Note) Rated ripple current : 85°C, 120Hz

For Audio, Ultra Miniaturized (PURECAP) Series R2A

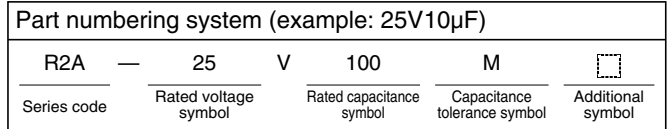
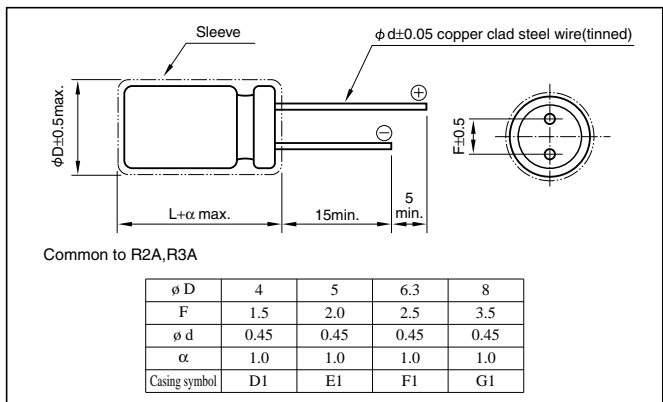
- A new foil and electrolyte makes powerful and clear sound.
- New type ultra miniaturized capacitor for audio, using synthetic mica paper for the separator.



Specifications

Item	Performance							
Category temperature range (°C)	-40 to +85							
Tolerance at rated capacitance (%)	±20 (20°C, 120Hz)							
Leakage current (µA)	Less than 0.01CV or 3 whichever is larger (after 2 minutes) C: Rated capacitance(µF); V: Rated voltage(V) (20°C)							
Tangent of loss angle (tanδ)	Rated voltage (V)	6.3	10	16	25	35	50	
	tanδ (max.)	0.24	0.20	0.16	0.14	0.12	0.10	(20°C, 120Hz)
Characteristics at high and low temperature	Rated voltage (V)	6.3	10	16	25	35	50	
	Impedance ratio (max.)	Z-25°C / Z+20°C	4	3	2	2	2	2
Endurance (105°C) (Applied ripple current)	Test time	1000 hours						
	Leakage current	The initial specified value or less						
	Percentage of capacitance change	Within ±20% of initial value						
	Tangent of the loss angle	200% or less of the initial specified value						
Shelf life (105°C)	Test time : 500 hours; other items are the same as those for the endurance. Voltage application treatment							
Applicable standards	JIS C5101-1, -4 1998 (IEC 60384-1 1992, -4 1985)							

Outline Drawing



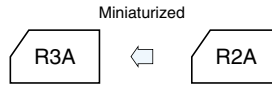
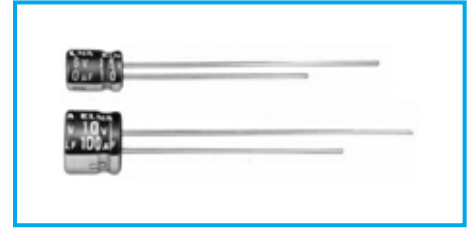
Standard Ratings

Rated voltage (V) \ Rated capacitance (µF)	6.3	10	16	25	35	50
0.1	—	—	—	—	—	4x7
0.22	—	—	—	—	—	4x7
0.33	—	—	—	—	—	4x7
0.47	—	—	—	—	—	4x7
1	—	—	—	—	—	4x7
2.2	—	—	—	—	—	4x7
3.3	—	—	—	—	—	4x7
4.7	—	—	—	→	→	5x7
10	—	—	→	→	→	6.3x7
22	→	→	→	→	→	6.3x7
33	→	→	→	→	→	8x7
47	→	→	→	→	→	—
100	→	→	→	→	→	—
220	→	→	→	→	→	—
330	→	→	→	→	→	—

(Note) "→" items are refer to the right.

For Audio, Ultra Miniaturized (PURECAP) Series R3A

- A new foil and electrolyte makes powerful and clear sound.
- New type ultra miniaturized capacitor for audio, using synthetic mica paper for the separator.

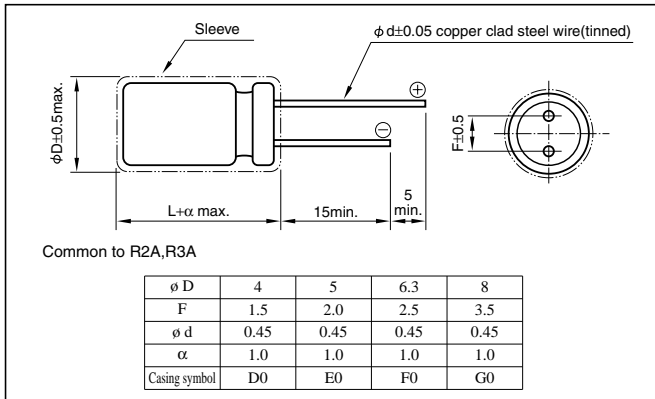


Specifications

Item	Performance							
Category temperature range (°C)	-40 to +85							
Tolerance at rated capacitance (%)	±20 (20°C, 120Hz)							
Leakage current (µA)	Less than 0.01CV or 3 whichever is larger (after 2 minutes) C: Rated capacitance(µF); V: Rated voltage(V) (20°C)							
Tangent of loss angle (tanδ)	Rated voltage (V)	4	6.3	10	16	25	35	50
	tanδ (max.)	0.49	0.32	0.28	0.22	0.18	0.14	0.10
Characteristics at high and low temperature	Rated voltage (V)	4	6.3	10	16	25	35	50
	Impedance ratio (max.)	Z-25°C / Z+20°C	6	4	3	2	2	2
		Z-40°C / Z+20°C	16	10	8	6	4	4
Endurance (105°C) (Applied ripple current)	Test time	1000 hours						
	Leakage current	The initial specified value or less						
	Percentage of capacitance change	Within ±20% of initial value						
	Tangent of the loss angle	200% or less of the initial specified value						
Shelf life (105°C)	Test time : 500 hours; other items are the same as those for the endurance. Voltage application treatment							
Applicable standards	JIS C5101-1, -4 1998 (IEC 60384-1 1992, -4 1985)							

Outline Drawing

Unit: mm



Part numbering system (example: 25V100µF)

R3A	—	25	V	100	M	□
Series code		Rated voltage symbol		Rated capacitance symbol	Capacitance tolerance symbol	Additional symbol

Standard Ratings

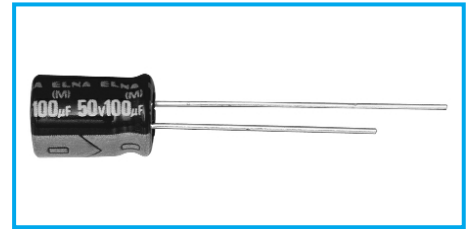
φ D x L (mm)

Rated voltage (V) / Rated capacitance (µF)	4	6.3	10	16	25	35	50
0.1	—	—	—	—	—	—	4x5
0.22	—	—	—	—	—	—	4x5
0.33	—	—	—	—	—	—	4x5
0.47	—	—	—	—	—	—	4x5
1	—	—	—	—	—	—	4x5
2.2	—	—	—	—	—	—	4x5
3.3	—	—	—	—	—	—	4x5
4.7	—	—	—	—	→	4x5	5x5
10	—	—	→	4x5	→	5x5	6.3x5
22	—	→	→	5x5	→	6.3x5	—
33	→	→	→	→	→	→	→
47	→	→	→	→	→	→	→
100	→	→	→	→	→	→	→
220	→	→	→	→	→	→	→

(Note) "→" items refer to the right.

Miniature Capacitors for Audio Series RFO (PURECAP)

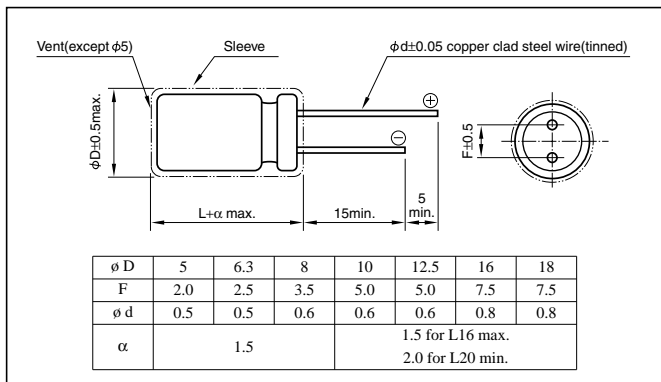
- A standard capacitor utilizing a newly developed material for a high grade of audio reproduction.
- Copper clad steel wire is used for leads.
- New type miniaturized capacitor for audio, using synthetic mica paper for the separator.



Specifications

Item	Performance																		
Category temperature range (°C)	-40 to +85																		
Tolerance at rated capacitance (%)	±20 (20°C,120Hz)																		
Leakage current (µA)	Less than 0.01CV or 3 whichever is larger (after 2 minutes) C: Rated capacitance(µF); V: Rated voltage(V) (20°C)																		
Tangent of loss angle (tanδ)	<table border="1"> <tr> <th>Rated voltage (V)</th> <td>6.3</td> <td>10</td> <td>16</td> <td>25</td> <td>35</td> <td>50</td> <td>63</td> <td>100</td> </tr> <tr> <th>tanδ (max.)</th> <td>0.22</td> <td>0.19</td> <td>0.16</td> <td>0.14</td> <td>0.12</td> <td>0.10</td> <td>0.09</td> <td>0.08</td> </tr> </table>	Rated voltage (V)	6.3	10	16	25	35	50	63	100	tanδ (max.)	0.22	0.19	0.16	0.14	0.12	0.10	0.09	0.08
	Rated voltage (V)	6.3	10	16	25	35	50	63	100										
tanδ (max.)	0.22	0.19	0.16	0.14	0.12	0.10	0.09	0.08											
0.02 is added to every 1000µF increase over 1000µF (20°C,120Hz)																			
Endurance (85°C) (Applied ripple current)	Test time	1000 hours																	
	Leakage current	The initial specified value or less																	
	Percentage of capacitance change	Within ±20% of initial value																	
	Tangent of the loss angle	150% or less of the initial specified value																	
Shelf life (85°C)	Test time : 1000 hours. Other have same as endurance. Voltage application treatment																		
Applicable standards	JIS C5101-1, -4 1998 (IEC 60384-1 1992, -4 1985)																		

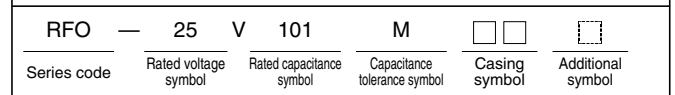
Outline Drawing



Coefficient of Frequency for Rated Ripple Current

Rated voltage(V)	Frequency(Hz)	CV(µFxV)				
		50 · 60	120	1k	10k	100k
6.3 to 16	All CV value	0.80	1	1.1	1.2	1.2
	≤ 1000	0.80	1	1.5	1.7	1.7
25 to 35	1000 <	0.80	1	1.2	1.3	1.3
	≤ 1000	0.80	1	1.6	1.9	1.9
50 to 100	1000 <	0.80	1	1.2	1.3	1.3

Part numbering system (example: 25V100µF)



Case symbol

Case Symbol	Casing Symbol	Case Symbol	Casing Symbol	Case Symbol	Casing Symbol	Case Symbol	Casing Symbol
5x11	E3	10x12.5	H3	12.5x20	I5	16x31.5	J7
6.3x11	F3	10x16	H4	12.5x25	I6	16x35.5	J8
8x11.5	G3	10x20	H5	16x25	J6	18x35.5	K8
						18x40	K9

Standard Ratings

Rated capacitance(µF)	6.3		10		16		25		35		50		63		100	
	Case	Rated ripple current	Case	Rated ripple current	Case	Rated ripple current	Case	Rated ripple current	Case	Rated ripple current	Case	Rated ripple current	Case	Rated ripple current	Case	Rated ripple current
0.47	—	—	—	—	—	—	—	—	—	—	5x11	10	—	—	5x11	10
1	—	—	—	—	—	—	—	—	—	—	5x11	15	—	—	5x11	15
2.2	—	—	—	—	—	—	—	—	—	—	5x11	20	—	—	5x11	25
3.3	—	—	—	—	—	—	—	—	—	—	5x11	25	—	—	5x11	30
4.7	—	—	—	—	—	—	—	—	5x11	30	5x11	30	5x11	35	5x11	35
10	—	—	—	—	—	—	—	—	5x11	45	5x11	45	5x11	50	6.3x11	60
22	—	—	—	—	5x11	50	5x11	55	5x11	60	5x11	70	6.3x11	85	8x11.5	110
33	—	—	5x11	55	5x11	60	5x11	70	5x11	80	6.3x11	100	6.3x11	100	10x12.5	160
47	—	—	5x11	65	5x11	75	5x11	85	6.3x11	110	6.3x11	120	8x11.5	150	10x16	210
100	5x11	85	5x11	95	6.3x11	120	6.3x11	140	8x11.5	190	8x11.5	210	10x12.5	260	12.5x20	380
220	6.3x11	150	6.3x11	165	8x11.5	220	8x11.5	250	10x12.5	330	10x16	400	10x20	460	16x25	720
330	6.3x11	180	8x11.5	240	8x11.5	270	10x12.5	370	10x16	450	10x20	540	12.5x20	650	16x25	880
470	8x11.5	260	8x11.5	280	10x12.5	390	10x16	480	10x20	590	12.5x20	740	12.5x25	850	16x31.5	1150
1000	10x12.5	450	10x16	540	10x20	680	12.5x20	880	12.5x25	1050	16x25	1350	16x31.5	1550	—	—
2200	12.5x20	890	12.5x20	970	12.5x25	1200	16x25	1550	16x31.5	1750	16x35.5	2100	—	—	—	—
3300	12.5x20	1050	12.5x25	1250	16x25	1600	16x31.5	1950	18x35.5	2250	—	—	—	—	—	—
4700	16x25	1550	16x25	1650	16x31.5	2050	18x35.5	2500	—	—	—	—	—	—	—	—
6800	16x25	1750	16x31.5	2050	18x35.5	2550	—	—	—	—	—	—	—	—	—	—
10000	16x31.5	2150	18x35.5	2550	—	—	—	—	—	—	—	—	—	—	—	—
15000	18x35.5	2700	—	—	—	—	—	—	—	—	—	—	—	—	—	—

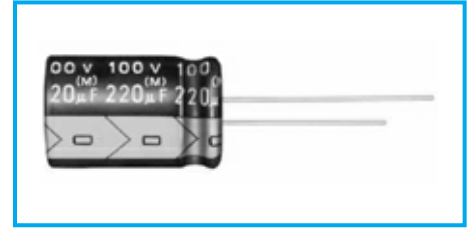
(Note) Rated ripple current : 85°C, 120Hz

NOTE

Design, Specifications are subject to change without notice. Ask factory for technical specifications before purchase and/or use.

Miniature Capacitors for Audio Series RA2

- A standard capacitor utilizing a newly developed material for a high grade of audio reproduction.
- Copper clad steel wire is used for leads.

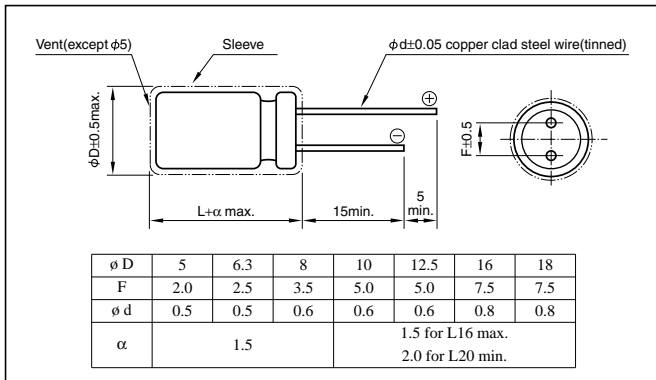


Specifications

Item	Performance								
Category temperature range (°C)	-40 to +85								
Tolerance at rated capacitance (%)	±20 (20°C, 120Hz)								
Leakage current (µA)	Less than 0.01CV or 4 whichever is larger (after 2 minutes) C: Rated capacitance(µF); V: Rated voltage(V) (20°C)								
Tangent of loss angle (tanδ)	Rated voltage (V)	6.3	10	16	25	35	50	63	100
	tanδ (max.)	0.22	0.19	0.16	0.14	0.12	0.10	0.09	0.08
0.02 is added to every 1000µF increase over 1000µF (20°C, 120Hz)									
Endurance (85°C) (Applied ripple current)	Test time	1000 hours							
	Leakage current	The initial specified value or less							
	Percentage of capacitance change	Within ±20% of initial value							
	Tangent of the loss angle	150% or less of the initial specified value							
Shelf life (85°C)	Test time : 1000 hours. Other have same as endurance. Voltage application treatment								
Applicable standards	JIS C5101-1, -4 1998 (IEC 60384-1 1992, -4 1985)								

Outline Drawing

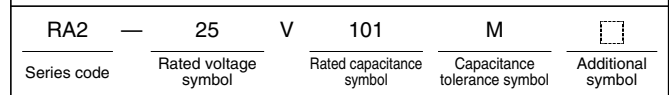
Unit: mm



Coefficient of Frequency for Rated Ripple Current

Rated voltage(V)	Frequency(Hz) CV(µFxVV)	Frequency(Hz)				
		50 · 60	120	1k	10k	100k
6.3 to 16	All CV value	0.80	1	1.1	1.2	1.2
	≤ 1000	0.80	1	1.5	1.7	1.7
25 to 35	1000 <	0.80	1	1.2	1.3	1.3
	≤ 1000	0.80	1	1.6	1.9	1.9
50 to 100	1000 <	0.80	1	1.2	1.3	1.3
	≤ 1000	0.80	1	1.2	1.3	1.3

Part numbering system (example: 25V100µF)



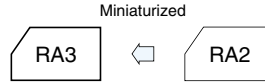
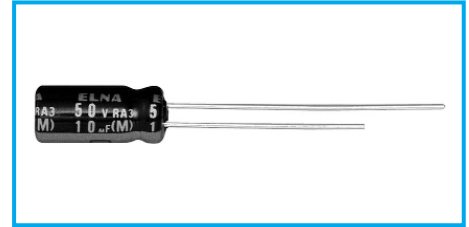
Standard Ratings

Rated voltage(V)	6.3		10		16		25		35		50		63		100	
	Case	Rated ripple current	Case	Rated ripple current	Case	Rated ripple current	Case	Rated ripple current	Case	Rated ripple current	Case	Rated ripple current	Case	Rated ripple current	Case	Rated ripple current
Rated capacitance(µF)	φ DxL(mm)	mArms	φ DxL(mm)	mArms	φ DxL(mm)	mArms	φ DxL(mm)	mArms	φ DxL(mm)	mArms	φ DxL(mm)	mArms	φ DxL(mm)	mArms	φ DxL(mm)	mArms
0.47	—	—	—	—	—	—	—	—	—	—	5x11	10	—	—	5x11	10
1	—	—	—	—	—	—	—	—	—	—	5x11	15	—	—	5x11	15
2.2	—	—	—	—	—	—	—	—	—	—	5x11	20	—	—	5x11	25
3.3	—	—	—	—	—	—	—	—	—	—	5x11	25	—	—	5x11	30
4.7	—	—	—	—	—	—	—	—	5x11	30	5x11	30	5x11	35	5x11	35
10	—	—	—	—	—	—	—	—	5x11	45	5x11	45	5x11	50	6.3x11	60
22	—	—	—	—	5x11	50	5x11	55	5x11	60	5x11	70	6.3x11	85	8x11.5	110
33	—	—	5x11	55	5x11	60	5x11	70	5x11	80	6.3x11	100	6.3x11	100	10x12.5	160
47	—	—	5x11	65	5x11	75	5x11	85	6.3x11	110	6.3x11	120	8x11.5	150	10x16	210
100	5x11	85	5x11	95	6.3x11	120	6.3x11	140	8x11.5	190	8x11.5	210	10x12.5	260	12.5x20	380
220	6.3x11	150	6.3x11	165	8x11.5	220	8x11.5	250	10x12.5	330	10x16	400	10x20	460	16x25	720
330	6.3x11	180	8x11.5	240	8x11.5	270	10x12.5	370	10x16	450	10x20	540	12.5x20	650	16x25	880
470	8x11.5	260	8x11.5	280	10x12.5	390	10x16	480	10x20	590	12.5x20	740	12.5x25	850	16x31.5	1150
1000	10x12.5	450	10x16	540	10x20	680	12.5x20	880	12.5x25	1050	16x25	1350	16x31.5	1550	—	—
2200	12.5x20	890	12.5x20	970	12.5x25	1200	16x25	1550	16x31.5	1750	16x35.5	2100	—	—	—	—
3300	12.5x20	1050	12.5x25	1250	16x25	1600	16x31.5	1950	18x35.5	2250	—	—	—	—	—	—
4700	16x25	1550	16x25	1650	16x31.5	2050	18x35.5	2500	—	—	—	—	—	—	—	—
6800	16x25	1750	16x31.5	2050	18x35.5	2550	—	—	—	—	—	—	—	—	—	—
10000	16x31.5	2150	18x35.5	2550	—	—	—	—	—	—	—	—	—	—	—	—
15000	18x35.5	2700	—	—	—	—	—	—	—	—	—	—	—	—	—	—

(Note) Rated ripple current : 85°C, 120Hz

Miniature Capacitors for Audio Series RA3

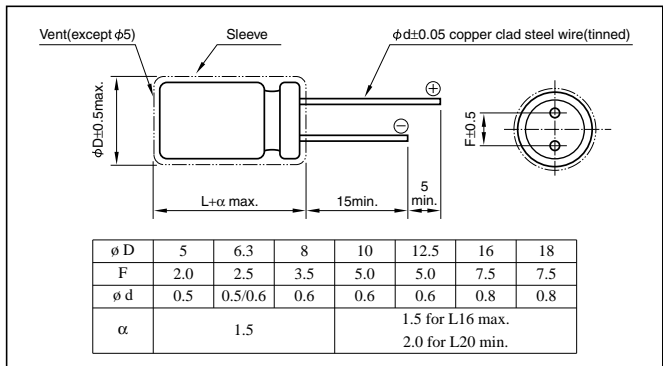
- With the same size as that for Series RE3 miniaturized standard capacitors, a high resolution sound quality grade has been realized.
- The newly developed audio use material makes clear sound a reality.
- All lead wires are copper clad steel.



Specifications

Item	Performance									
Category temperature range (°C)	-40 to +85									
Tolerance at rated capacitance (%)	±20 (20°C,120Hz)									
Leakage current (µA)	Less than 0.01CV or 3 whichever is larger (after 2 minutes) C: Rated capacitance(µF); V: Rated voltage(V) (20°C)									
Tangent of loss angle (tanδ)	Rated voltage (V)	6.3	10	16	25	35	50	63	100	
	tanδ (max.)	0.28	0.24	0.20	0.16	0.14	0.12	0.11	0.10	
0.02 is added to every 1000µF increase over 1000µF (20°C,120Hz)										
Endurance (85°C) (Applied ripple current)	Test time	2000 hours								
	Leakage current	The initial specified value or less								
	Percentage of capacitance change	Within ±20% of initial value								
	Tangent of the loss angle	200% or less of the initial specified value								
Shelf life (85°C)	Test time : 1000 hours. Other have same as endurance. Voltage application treatment									
Applicable standards	JIS C5101-1, -4 1998 (IEC 60384-1 1992, -4 1985)									

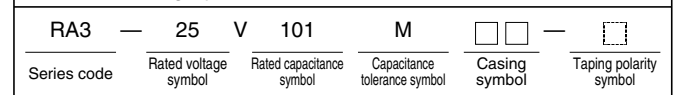
Outline Drawing



Coefficient of Frequency for Rated Ripple Current

Rated voltage(V)	Frequency(Hz) CV(µFxVV)	50 · 60	120	1k	10k	100k
		6.3 to 16	All CV value	0.80	1	1.1
25 to 35	≤ 1000	0.80	1	1.5	1.7	1.7
	1000 <	0.80	1	1.2	1.3	1.3
50 to 100	≤ 1000	0.80	1	1.6	1.9	1.9
	1000 <	0.80	1	1.2	1.3	1.3

Part numbering system (example: 25V100µF)



Case symbol

Case Symbol	Casing Symbol	Case Symbol	Casing Symbol	Case Symbol	Casing Symbol	Case Symbol	Casing Symbol
φ DxL(mm)	φ DxL(mm)	φ DxL(mm)	φ DxL(mm)	φ DxL(mm)	φ DxL(mm)	φ DxL(mm)	φ DxL(mm)
5x11	E3	10x12.5	H3	12.5x20	I5	16x31.5	J7
6.3x11	F3	10x16	H4	12.5x25	I6	18x35.5	K8
8x11.5	G3	10x20	H5	16x25	J6		

Standard Ratings

Rated capacitance(µF)	6.3		10		16		25		35		50		63		100	
	Case	Rated ripple current	Case	Rated ripple current	Case	Rated ripple current	Case	Rated ripple current	Case	Rated ripple current	Case	Rated ripple current	Case	Rated ripple current	Case	Rated ripple current
	φ DxL(mm)	mArms	φ DxL(mm)	mArms	φ DxL(mm)	mArms	φ DxL(mm)	mArms	φ DxL(mm)	mArms	φ DxL(mm)	mArms	φ DxL(mm)	mArms	φ DxL(mm)	mArms
0.1	—	—	—	—	—	—	—	—	—	—	5x11	3	—	—	—	
0.22	—	—	—	—	—	—	—	—	—	—	5x11	6	—	—	—	
0.33	—	—	—	—	—	—	—	—	—	—	5x11	9	—	—	—	
0.47	—	—	—	—	—	—	—	—	—	—	5x11	13	—	—	5x11 13	
1	—	—	—	—	—	—	—	—	—	—	5x11	21	—	—	5x11 21	
2.2	—	—	—	—	—	—	—	—	—	—	5x11	31	—	—	5x11 31	
3.3	—	—	—	—	—	—	—	—	—	—	5x11	38	—	—	5x11 40	
4.7	—	—	—	—	—	—	—	—	—	—	5x11	45	—	—	5x11 50	
10	—	—	—	—	5x11	50	5x11	55	5x11	60	5x11	66	5x11	70	5x11 70	
22	—	—	—	—	5x11	75	5x11	90	5x11	95	5x11	100	5x11	105	6.3x11 115	
33	—	—	—	—	5x11	110	5x11	110	5x11	110	5x11	110	6.3x11	130	8x11.5 158	
47	—	—	—	—	5x11	130	5x11	130	5x11	130	6.3x11	155	6.3x11	160	8x11.5 188	
100	5x11	130	5x11	150	5x11	180	6.3x11	199	6.3x11	214	8x11.5	250	8x11.5	270	10x16 358	
220	5x11	240	6.3x11	250	6.3x11	280	8x11.5	349	8x11.5	350	10x12.5	429	10x16	505	12.5x20 663	
330	6.3x11	300	6.3x11	330	8x11.5	383	8x11.5	383	10x12.5	542	10x16	595	10x20	676	12.5x25 886	
470	6.3x11	380	8x11.5	417	8x11.5	480	10x12.5	545	10x16	664	12.5x20	887	12.5x20	924	16x25 1230	
1000	8x11.5	580	10x12.5	650	10x16	791	10x20	996	12.5x20	1210	12.5x25	1400	16x25	1710	18x35.5 2210	
2200	10x16	939	10x20	1080	12.5x20	1350	12.5x25	1660	16x25	1950	16x31.5	2340	18x35.5	2870	—	
3300	16x20	1230	12.5x20	1430	12.5x25	1690	16x25	2030	16x31.5	2320	18x35.5	2810	—	—	—	
4700	12.5x20	1710	12.5x25	1780	16x25	2100	16x31.5	2650	18x35.5	2290	—	—	—	—	—	
6800	12.5x25	1930	16x25	2270	16x31.5	2480	18x35.5	3290	—	—	—	—	—	—	—	
10000	16x25	2450	16x31.5	2500	18x35.5	3130	—	—	—	—	—	—	—	—	—	
15000	16x31.5	2580	18x35.5	3100	—	—	—	—	—	—	—	—	—	—	—	
22000	18x35.5	3150	—	—	—	—	—	—	—	—	—	—	—	—	—	

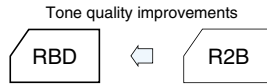
(Note) Rated ripple current : 85°C, 120Hz

NOTE

Design, Specifications are subject to change without notice. Ask factory for technical specifications before purchase and/or use.

Miniature Bipolar Capacitors for Audio Series RBD

- The newly developed audio use foil and special electrolyte makes clear and far-carrying sound a reality.
- All lead wires are copper clad steel.

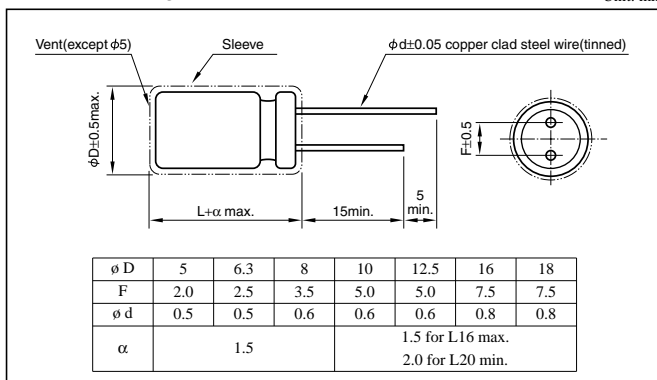


Specifications

Item	Performance								
Category temperature range (°C)	-40 to +85								
Tolerance at rated capacitance (%)	±20 (20°C, 120Hz)								
Leakage current (µA)	Less than 0.01CV or 4 whichever is larger (after 2 minutes) C: Rated capacitance(µF); V: Rated voltage(V) (20°C)								
Tangent of loss angle (tanδ)	Rated voltage (V)	6.3	10	16	25	35	50	63	100
	tanδ (max.)	0.24	0.20	0.16	0.15	0.14	0.12	0.10	0.09
0.02 is added to every 1000µF increase over 1000µF. (20°C, 120Hz)									
Characteristics at high and low temperature	Rated voltage (V)	6.3	10	16	25	35	50	63	100
	Impedance ratio (max.)	Z-25°C / Z+20°C	4	3	2	2	2	2	2
0.5 for -25°C, 1 for -40°C are added to every 1000µF increase over 1000µF. (120Hz)									
Endurance (85°C) (Applied ripple current)	Test time	250h x 8							
	Leakage current	The initial specified value or less							
	Percentage of capacitance change	Within ±20% of initial value							
	Tangent of the loss angle	150% or less of the initial specified value							
Applicable standards	JIS C5101-1, -4 1998 (IEC 60384-1 1992, -4 1985)								

Outline Drawing

Unit: mm



Coefficient of Frequency for Rated Ripple Current

Rated voltage(V)	Frequency(Hz)			
	50 · 60	120	1k	10k · 100k
6.3 to 16	0.8	1	1.1	1.2
25 to 35	0.8	1	1.5	1.7
50 to 100	0.8	1	1.6	1.9

Part numbering system (example: 10V1000µF)

RBD	—	10	V	102	M
Series code		Rated voltage symbol		Rated capacitance symbol	Capacitance tolerance symbol

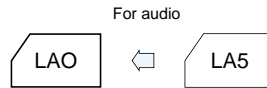
Standard Ratings

Rated capacitance(µF)	6.3		10		16		25		35		50		63		100	
	Case	Rated ripple current	Case	Rated ripple current	Case	Rated ripple current	Case	Rated ripple current	Case	Rated ripple current	Case	Rated ripple current	Case	Rated ripple current	Case	Rated ripple current
Item	φ DxL(mm)	mArms	φ DxL(mm)	mArms	φ DxL(mm)	mArms	φ DxL(mm)	mArms	φ DxL(mm)	mArms	φ DxL(mm)	mArms	φ DxL(mm)	mArms	φ DxL(mm)	mArms
0.1	—	—	—	—	—	—	—	—	—	—	5x11	4	—	—	5x11	5
0.22	—	—	—	—	—	—	—	—	—	—	5x11	7	—	—	5x11	8
0.33	—	—	—	—	—	—	—	—	—	—	5x11	8	—	—	5x11	9
0.47	—	—	—	—	—	—	—	—	—	—	5x11	10	—	—	5x11	11
1	—	—	—	—	—	—	—	—	—	—	5x11	14	—	—	5x11	16
2.2	—	—	—	—	—	—	—	—	—	—	5x11	21	5x11	23	5x11	24
3.3	—	—	—	—	—	—	—	—	—	—	5x11	26	5x11	28	6.3x11	34
4.7	—	—	—	—	—	—	5x11	28	5x11	28	5x11	31	5x11	34	6.3x11	41
10	—	—	—	—	5x11	39	5x11	40	5x11	42	5x11	45	6.3x11	57	8x11.5	70
22	—	—	5x11	52	5x11	58	5x11	60	6.3x11	71	6.3x11	77	8x11.5	89	10x16	136
33	5x11	58	5x11	63	5x11	71	6.3x11	84	6.3x11	87	8x11.5	111	10x12.5	144	10x20	181
47	5x11	69	5x11	75	6.3x11	97	6.3x11	100	8x11.5	122	10x12.5	157	10x16	188	12.5x20	248
100	6.3x11	115	6.3x11	126	8x11.5	167	10x12.5	204	10x12.5	212	10x20	273	12.5x20	343	16x25	458
220	8x11.5	202	8x11.5	221	10x12.5	294	10x16	332	10x20	375	12.5x25	506	16x25	645	18x35.5	837
330	8x11.5	247	10x12.5	322	10x16	394	10x20	444	12.5x20	526	12.5x25	620	—	—	—	—
470	10x12.5	350	10x16	420	10x20	513	12.5x20	607	12.5x25	685	16x25	861	—	—	—	—
1000	10x20	611	12.5x20	767	12.5x25	935	16x25	1120	16x31.5	1270	—	—	—	—	—	—
2200	12.5x25	1090	16x25	1380	16x31.5	1660	—	—	—	—	—	—	—	—	—	—
3300	16x25	1490	16x31.5	1760	—	—	—	—	—	—	—	—	—	—	—	—
4700	16x31.5	1880	18x35.5	2280	—	—	—	—	—	—	—	—	—	—	—	—

(Note) Rated ripple current : 85°C, 120Hz

Power Supply Smoothing Use, Standard Capacitors (Common name: TONEREX) Series LAO

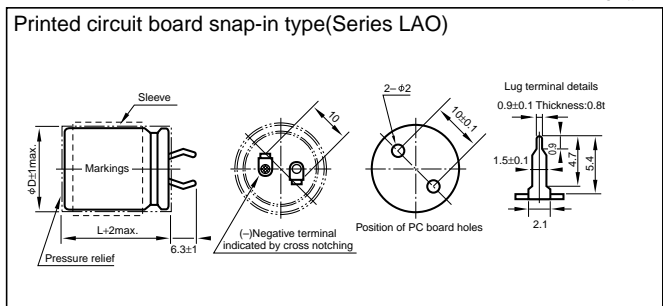
- Adopting the newly developed formation method and composite electrolytic paper for audio application has reduced distortion, achieving high-quality sound.
- Best suited as power supply filters for sound quality priority audio equipment.
- Printed circuit board terminal snap-in type.
- Gold-printing on a black sleeve. (labeled "TONEREX")



Specifications

Item	Performance					
Category temperature range (°C)	-40 to +85					
Tolerance at rated capacitance (%)	±20 (20°C, 120Hz)					
Leakage current (µA)	Less than 0.03CV or 5mA whichever is smaller(after 5 minutes) C: Rated capacitance(µF), V: Rated voltage(V) (20°C)					
Tangent of loss angle (tanδ)	Rated voltage (V)	16	25	35	50 to 100	
	tanδ (max.)	0.40	0.40	0.35	0.30	
Characteristics at high and low temperature	Rated voltage (V)	16 to 35		50 to 100		
	Impedance ratio (max.)	Z-25°C / Z+20°C	4		3	
		Z-40°C / Z+20°C	15		10	
Endurance (85°C) (Applied ripple current)	Test time	1000 hours				
	Leakage current	The initial specified value or less				
	Percentage of capacitance change	Within ±20% of initial value				
	Tangent of the loss angle	150% or less of the initial specified value				
Shelf life (85°C)	Test time : 1000 hours. Other have same as endurance. Voltage application treatment					
Applicable standards	JIS C5101-1, -4 1998 (IEC 60384-1 1992, -4 1985)					

Outline Drawing



Coefficient of Frequency for Rated Ripple Current

Frequency(Hz)	50	120	1k	10k	20k
Rated voltage(V)					
50 or less	0.95	1	1.10	1.15	1.15
63 to 100	0.95	1	1.16	1.30	1.33

Part numbering system (example: 63V6800µF)

Printed circuit board snap-in type	LAO	—	63V	682	MPD	S4	□
	Series code		Rated voltage symbol	Rated capacitance symbol		Casing symbol	Additional symbol

• The standard ratings are described on the next page.

* There are overseas factory product only on this page.

NOTE
Design, Specifications are subject to change without notice.
Ask factory for technical specifications before purchase and/or use.

Standard Ratings

Rated voltage(V) Item Casing symbol ø xL(mm)		16		25		35		50		63		80		100	
		Rated capacitance μF	Rated ripple current Arms	Rated capacitance μF	Rated ripple current Arms	Rated capacitance μF	Rated ripple current Arms	Rated capacitance μF	Rated ripple current Arms	Rated capacitance μF	Rated ripple current Arms	Rated capacitance μF	Rated ripple current Arms	Rated capacitance μF	Rated ripple current Arms
22x20	S1	3300	1.2	—	—	—	—	—	—	—	—	—	—	—	—
22x25	S1	4700	1.5	2200	1.0	1500	0.8	1000	0.8	680	0.7	—	—	—	—
22x30	S1	—	—	3300	1.3	2200	1.3	1500	1.1	1000	0.9	680	0.7	—	—
22x35	S1	6800	2.0	4700	1.7	3300	1.7	—	—	1500	1.2	1000	1.0	680	0.8
22x40	S1	—	—	—	—	—	—	2200	1.5	—	—	—	—	—	—
22x45	S1	10000	2.7	6800	2.2	4700	2.3	—	—	2200	1.6	—	—	—	—
22x50	S1	—	—	—	—	—	—	3300	2.0	—	—	1500	1.3	1000	1.2
25x25	S2	—	—	3300	1.7	2200	1.7	1500	1.4	1000	1.2	680	1.0	—	—
25x30	S2	6800	2.5	4700	2.1	3300	2.2	2200	1.8	1500	1.5	1000	1.2	680	1.1
25x35	S2	10000	3.2	—	—	—	—	—	—	—	—	—	—	—	—
25x40	S2	—	—	6800	2.7	4700	2.8	3300	2.3	2200	1.9	1500	1.6	1000	1.4
25x45	S2	—	—	—	—	—	—	—	—	—	—	—	—	—	—
25x50	S2	—	—	10000	3.0	6800	2.6	4700	2.4	3300	2.0	2200	2.0	1500	1.8
30x25	S3	6800	2.6	4700	2.2	3300	2.3	2200	1.9	1500	1.6	1000	1.3	680	1.1
30x30	S3	10000	3.3	6800	2.7	4700	2.8	3300	2.4	2200	1.9	1500	1.6	1000	1.4
30x35	S3	—	—	—	—	—	—	—	—	—	—	—	—	—	—
30x40	S3	—	—	10000	3.1	6800	2.7	4700	2.4	3300	2.1	2200	2.1	1500	1.8
30x45	S3	—	—	—	—	—	—	—	—	—	—	—	—	—	—
30x50	S3	—	—	—	—	10000	3.4	6800	3.1	4700	2.6	3300	2.2	2200	1.8
35x25	S4	10000	3.4	6800	2.8	4700	2.9	3300	2.4	2200	2.0	1500	1.7	1000	1.5
35x30	S4	—	—	10000	3.1	6800	2.7	4700	2.5	3300	2.1	2200	2.1	1500	1.8
35x35	S4	—	—	—	—	—	—	—	—	—	—	—	—	—	—
35x40	S4	—	—	—	—	10000	3.5	6800	3.1	4700	2.6	3300	2.2	2200	1.8
35x45	S4	—	—	—	—	—	—	—	—	—	—	—	—	—	—
35x50	S4	—	—	—	—	—	—	—	—	6800	3.3	4700	2.7	—	—

(Note) Rated ripple current : 85°C, 120Hz.

* There are overseas factory product only on this page.

1 General Description of Aluminum Electrolytic Capacitors

1-1 The Principle of Capacitor

The principle of capacitor can be presented by the principle drawing as in Fig.1-1.

When a voltage is applied between the metal electrodes placed opposite on both surfaces of a dielectric, electric charge can be stored proportional to the voltage.

$$Q=C \cdot V$$

Q : Quantity of electricity (C)

V : Voltage (V)

C : Capacitance (F)

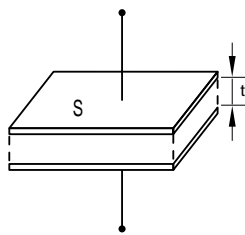


Fig.1-1

C, called the capacitance of capacitor, is expressed by the following expression with the electrode area S[m²], the electrode spacing t [m] and the dielectric constant of dielectric “ε”:

$$C[F] = \epsilon_0 \cdot \epsilon \cdot \frac{S}{t}$$

ε₀: Dielectric constant in vacuum (=8.85x10⁻¹²F/m)

The dielectric constant of an aluminum oxide film is 7 to 8. Larger capacitances can be obtained by enlarging the electrode area S or reducing t.

Table 1-1 shows the dielectric constants of typical dielectrics used in the capacitor. In many cases, capacitor names are determined by the dielectric material used, for example, aluminum electrolytic capacitor, tantalum capacitor, etc.

Table 1

Dielectric	Dielectric Constant	Dielectric	Dielectric Constant
Aluminum oxide film	7 to 8	Porcelain (ceramic)	10 to 120
Mylar	3.2	Polystyrene	2.5
Mica	6 to 8	Tantalum oxide film	10 to 20

Although the aluminum electrolytic capacitor is small, it has a large capacitance. It is because the electrode area is roughened by electrochemical etching, enlarging the electrode area and also because the dielectric is very thin.

The schematic cross section of the aluminum electrolytic capacitor is as in Fig.1-2.

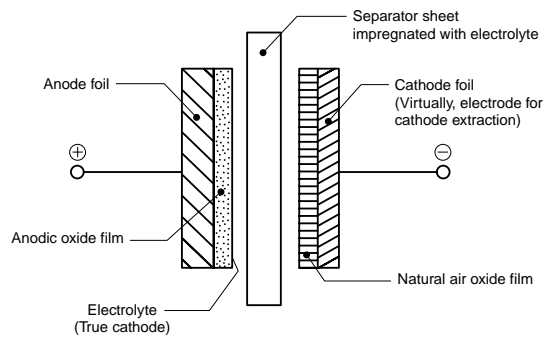
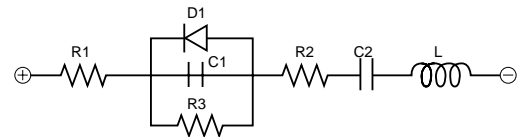


Fig.1-2

1-2 Equivalent Circuit of the Capacitor

The electrical equivalent circuit of the aluminum electrolytic capacitor is as presented in Fig. 2.



R1 : Resistance of terminal and electrode

R2 : Resistances of anodic oxide film and electrolyte

R3 : Insulation resistance because of defective anodic oxide film

D1 : Oxide semiconductor of anode foil

C1 : Capacity of anode foil

C2 : Capacity of cathode foil

L : Inductance caused by terminals, electrodes, etc.

2 About the Life of an Aluminum Electrolytic Capacitor

2-1 Estimation of life with minimal ripple current (negligible).

Generally, the life of an aluminum electrolytic capacitor is closely related with its ambient temperature and the life will be approximately the same as the one obtained by Arrhenius' equation.

$$L = L_0 \times 2^{\left(\frac{T_0 - T}{10}\right)} \dots\dots\dots(1)$$

Where L : Life at temperature T
L₀ : Life at temperature T₀

The effects to the life by derating of the applied voltage etc. are neglected because they are small compared to that by the temperature.

2-2 Estimation of life considering the ripple current.

The ripple current affects the life of a capacitor because the internal loss (ESR) generates heat. The generated heat will be:

$$P = I^2 R \dots\dots\dots(2)$$

Where I : Ripple current (Arms)

R : ESR (Ω)

With increase in the temperature of the capacitor:

$$\Delta T = \frac{I^2 \cdot R}{A \cdot H} \dots\dots\dots(3)$$

Where ΔT : Temperature increase in the capacitor core(deg.)

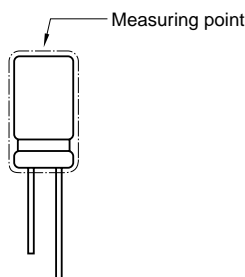
I : Ripple current (Arms)

R : ESR (Ω)

A : Surface area of the capacitor (cm^2)

H : Radiation coefficient (Approx. $1.5 \sim 2.0 \times 10^{-3} \text{ W/cm}^2 \times \text{C}$)

The above equation (3) shows that the temperature of a capacitor increases in proportion to the square of the applied ripple current and ESR, and in inverse proportion to the surface area. Therefore, the amount of the ripple current determines the heat generation, which affects the life. The value of ΔT varies depending on the capacitor types and operating conditions. The usage is generally desirable if ΔT remains less than 5°C . The measuring point for temperature increase due to ripple current is shown below;



Test results:

(1) The life equation considering the ambient temperature and the ripple current will be:

$$L = L_d \times 2^{\left(\frac{T_0 - T}{10}\right)} \times K^{\left(\frac{-\Delta T}{10}\right)} \dots\dots\dots(4)$$

Where L_d : Life at DC operation (h)

K: Ripple acceleration factor

(K=2, if with in allowable ripple current)

(K=4, if exceeding allowable ripple current)

T_0 : Maximum guaranteed temperature ($^\circ\text{C}$)

T: Operating temperature ($^\circ\text{C}$)

ΔT : Temperature increase at capacitor core (deg.)

(2) The life equation based on the life with the rated ripple current applied under the maximum guaranteed temperature will be a conversion of the above equation (4), as below:

$$L = L_r \times 2^{\left(\frac{T_0 - T}{10}\right)} \times K^{\left(\frac{\Delta T_0 - \Delta T}{10}\right)} \dots\dots\dots(5)$$

Where L_r : Life at the maximum guaranteed temperature with the rated ripple current (h)

ΔT_0 : Temperature increase at capacitor core, at the maximum guaranteed temperature (deg.)

(3) The life equation considering the ambient temperature and the ripple current will be a conversion of the above equation (5), as below:

$$L = L_r \times 2^{\left(\frac{T_0 - T}{10}\right)} \times K \left\{ 1 - \left(\frac{I}{I_0}\right)^2 \right\} \times \frac{\Delta T_0}{10} \dots\dots\dots(6)$$

Where I_0 : Rated ripple current at the maximum guaranteed temperature (Arms)

I : Applied ripple current (Arms)

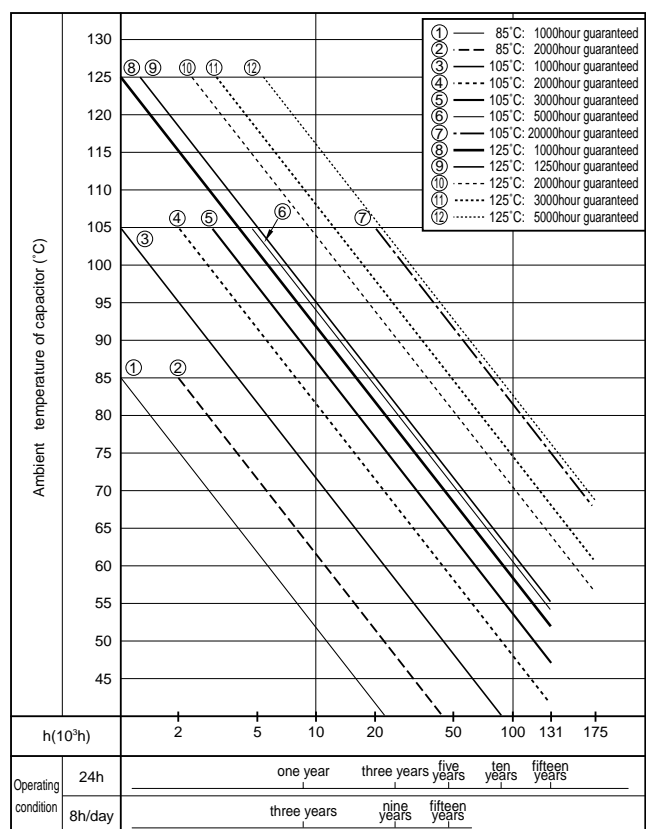
Since it is actually difficult to measure the temperature increase at the capacitor core, the following table is provided for conversion from the surface temperature increase to the core temperature increase.

Table 2-1

Case diameter	~10	12.5~16	18	22	25	30	35
Core / Surface	1.1	1.2	1.25	1.3	1.4	1.6	1.65

The life expectancy formula shall in principle be applied to the temperature range between the ambient temperature of $+40^\circ\text{C}$ and maximum allowable working temperature. The expected life time shall be about fifteen years at maximum as a guide in terms of deterioration of the sealant.

(Table 2-1 Life Expectancy Chart)



NOTE
Design, Specifications are subject to change without notice.
Ask factory for technical specifications before purchase and/or use.

2-2 Practical Examples of Life Expectancy

As practical examples of life expectancy, we introduce 250V 560 μ F in the LAG Series considering the effect of high-frequency component. Figures 2-1 to 2-3 show the simulated ripple current waveforms when the high-frequency component for switching is superimposed on the commercial frequency component.



Fig.2-1 Ripple Current Waveform of Capacitor

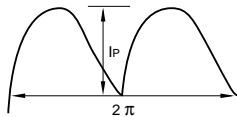


Fig.2-2 Low-frequency component

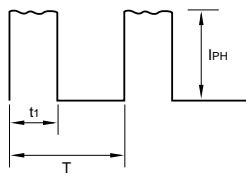


Fig.2-3 High-frequency component

Each of the above may be obtained as the effective ripple current value. Assuming that the ripple current waveform of the low-frequency component is generally approximated to the full-wave rectification waveform as shown in Fig.2-2, we obtain the effective ripple current value I_L as follows:

$$I_L = \frac{I_{PL}}{\sqrt{2}} = 0.707 \cdot I_{PL}$$

Since the ripple current waveform of the high-frequency component is approximated to the rectangular as shown in Fig.2-3, the effective current value of high-frequency component I_H is given by

$$I_H = \sqrt{\frac{1}{T} \int_0^{t_1} I_{PH}^2 dt} = I_{PH} \sqrt{\frac{t_1}{T}}$$

The reason why the ripple current affects the life is due to the heat generated by the ESR (R) of capacitor. That is, Δ T by heat generation can be expressed by Δ T ∝ I² • R from Expression (2).

Therefore, when ripple currents with different frequencies are handled, each current value must first be squared and then summed. That is:

$$I = \sqrt{(I_L)^2 + (I_H)^2}$$

Now, we proceed to specific examples assuming that the effective ripple current values of low-and high-frequencies have been obtained by the above methods.

Data A (Test piece and basic data)

Product name	: 250V 560 μF ø 30x40 L, Series LAG
L _r	=2000
K	= 4
T ₀	=105°C
ΔT ₀	= 5deg
I ₀	=1.74Arms at 105°C, 120 Hz

To verify the effect of the high-frequency component, the expected life will be calculated for each of three high-frequency ripple current conditions.

Data B

I _L	≈2.4Arms at 120Hz, T=45°C
I _{H1}	≈0.36Arms at 20kHz (corresponding to 15% of the commercial frequency component)
I _{H2}	≈0.72Arms at 20kHz (corresponding to 30% of the commercial frequency component)
I _{H3}	≈1.2Arms at 20kHz (corresponding to 50% of the commercial frequency component)

For Data B, the currents are converted to 120 Hz by the frequency conversion factor for the cases of ignorance of the high-frequency component, and each high-frequency component condition.

$$I = 2.4/1 = 2.4$$

$$I_1 = \sqrt{(2.4)^2 + (0.36/1.18)^2} \approx 2.42A$$

$$I_2 = \sqrt{(2.4)^2 + (0.72/1.18)^2} \approx 2.48A$$

$$I_3 = \sqrt{(2.4)^2 + (1.2/1.18)^2} \approx 2.61A$$

Explained here is about the frequency conversion factor. As described above, the heat generation (or temperature rise = Δ T) affecting the life is proportional to the ESR of capacitor. In addition, the fundamental frequency is 120 Hz in measurement of capacitor characteristics, and the ripple current is also specified with this frequency; it is thus more convenient to calculate by converting the current value to that with the same temperature rise at 120 Hz.

The ESR of aluminum electrolytic capacitor is frequency dependent.

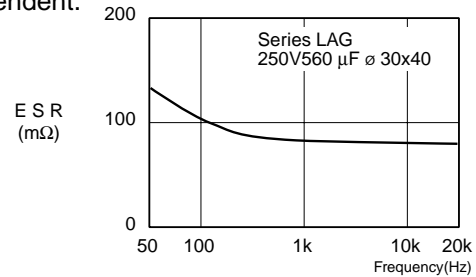


Fig.2-4 Frequency Characteristics of ESR

Figure 2-4 shows a typical example of frequency characteristics of ESR, indicating that the ESR decreases with increasing frequencies. Therefore, the high-frequency component has less effect on the heat generation of capacitor than low-frequency component. Next, we calculate the expected life according to each condition to compare with the case with no high-frequency component.

For the case with no high-frequency component:

$$L = 2000 \times 2 \left(\frac{105-45}{10} \right) \times 4 \left[1 - \left(\frac{2.4}{1.74} \right)^2 \right] \times \frac{5}{10} \approx 68,470 \text{ hours}$$

For the case with high-frequency component:

$$L_1 = 2000 \times 2 \left(\frac{105-45}{10} \right) \times 4 \left[1 - \left(\frac{2.48}{1.74} \right)^2 \right] \times \frac{5}{10} \approx 66,980 \text{ hours}$$

66,980/68,470 0.978, about a 2.2% reduction in life

$$L_2 = 2000 \times 2 \left(\frac{105-45}{10} \right) \times 4 \left[1 - \left(\frac{2.48}{1.74} \right)^2 \right] \times \frac{5}{10} \approx 62,620 \text{ hours}$$

62,620/68,470 0.914, about an 8.6% reduction in life

$$L_3 = 2000 \times 2 \left(\frac{105-45}{10} \right) \times 4 \left[1 - \left(\frac{2.61}{1.74} \right)^2 \right] \times \frac{5}{10} \approx 53,820 \text{ hours}$$

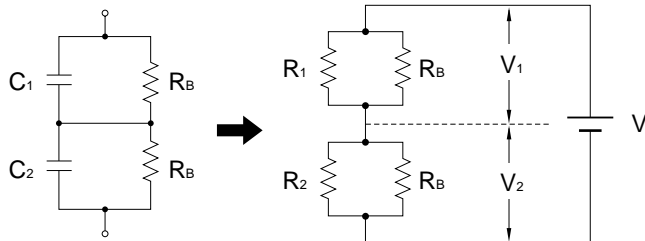
53,820/68,470 ≈ 0.786, about a 21.4% reduction in life

As described above, there may be cases where the effect of larger high-frequency component on the life cannot be ignored; thus high-frequency component exceeding 30% with respect to the current with fundamental frequency should be considered.

3 To calculate Balance when connecting in series

3-1 Circuit layout

Circuit for connecting two capacitors (C1, C2) in series and equivalent circuit can be illustrated as below figure. Formula to calculate a balance resistance R_B of below figure is shown as follows.



Following are the preconditions of the circuit.

- ① V_2 shall be the rated voltage ($=V_0$). ($V_1 < V_2$)
- ② V shall be a times $V_0 \times 2$. $V = 2aV_0$ ($a < 1$)
- ③ R_2 shall equal $R_1 \times b$. ($b < 1$) (1)

3-2 Formulas to calculate [R_B]

3-2-1 Following formula can be established from balanced condition.

$$V_1 \left[\frac{1}{R_1} + \frac{1}{R_B} \right] = V_2 \left[\frac{1}{R_1} + \frac{1}{R_B} \right] \quad (2)$$

3-2-2 Following formula can be established from preconditions.

$$V_2 \leq V_0 \quad (3)$$

$$V_1 = V - V_2 \quad (4)$$

$$= 2aV_0 - V_2 \quad (4')$$

3-2-3 Put formulas (1), (3) and (4') in formula (2).

$$(2aV_0 - V_2) \left[\frac{R_1 + R_B}{R_1 \cdot R_B} \right] = V_2 \left[\frac{bR_1 + R_B}{bR_1 \cdot R_B} \right]$$

$$2abV_0(R_1 + R_B) = V_2 \{ b(R_1 + R_B) + bR_1 + R_B \}$$

$$2ab(R_1 + R_B) \leq 2bR_1 + (1+b)R_B$$

Accordingly, balance resistance R_B shall be the following formula.

$$R_B \leq 2bR_1 \frac{(1-a)}{(2a-1) \cdot b-1} \quad (5)$$

3-3 Calculation Example.

Calculate the value of the balance resistance in the case of connecting two 400V 470 μ F (LC standard value : 1.88mA) capacitors in series.

$$R_1 = \frac{400(V)}{1.88(mA)} = 213(k\Omega)$$

If $a=0.8$, $400(V) \times 2 \times 0.8 = 640(V)$ as an impressed voltage.

If $b=2$, $R_2 = b R_1 = 426(k\Omega)$, $LC=0.94(mA)$.

Balance resistance R_B will be.

$$R_B \leq 2 \times 2 \times 213(k\Omega) \frac{(1-0.8)}{(2 \times 0.8) \times 2 - 1} = 852(k\Omega)$$

4 Regarding Recovery Voltage

• After charging and then discharging the aluminum electrolytic capacitor, and further causing short-circuit to the terminals and leave them alone, the voltage between the two terminals will rise again after some interval. Voltage caused in such case is called recovery voltage. Following is the process that causes this phenomenon:

• When the voltage is impressed on a dielectric, electrical transformation will be caused inside the dielectric due to dielectric action, and electrification will occur in positive-negative opposite to the voltage impressed on the surface of the dielectric. This phenomenon is called polarization action.

• After the voltage is impressed with this polarization action, and if the terminals are discharged till the terminal voltage reaches 0 and are left open for a while, an electric potential will arise between the two terminals and thus causes recovery voltage.

• Recovery voltage comes to a peak around 10 to 20 days after the two terminals are left open, and then gradually declines. Recovery voltage has a tendency to become bigger as the component (stand-alone base type) becomes bigger.

• If the two terminals are short-circuited after the recovery voltage is generated, a spark may scare the workers working in the assembly line, and may put low-voltage driven components (CPU, memory, etc.) in danger of being destroyed. Measures to prevent this is to discharge the accumulated electric charge with resistor of about 100 to 1k Ω before using, or ship out by making the terminals in short-circuit condition by covering them with an aluminum foil at the production stage. Please consult us for adequate procedures.

5 Electrode Foil Development Technology

5-1 Corrosion inhibition of cathode foil

Inactive treatment is implemented to ensure long life by inhibiting natural corrosion of the cathode foil. Fig. 3-1 shows its effects with values of the polarization resistance inversely proportional to the corrosion rate using the AC impedance method(FRA).This indicates that the cathode foil used in the “Safety’s” capacitors has the polarization resistance higher than that of the conventional capacitors owing to corrosion inhibition.

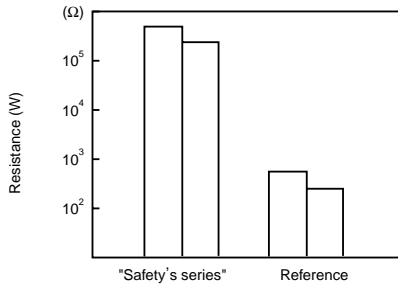


Fig. 3-1

5-2 Sealing material permeability of electrolyte

To ensure long life, a low permeable lactone solvent for the sealing material is used as the main solvent of the electrolyte of the “Safety’s” capacitor. Fig. 3-2 shows the test results on the permeability obtained by changing the weight of the capacitors produced with different types of electrolytes at a high temperature.

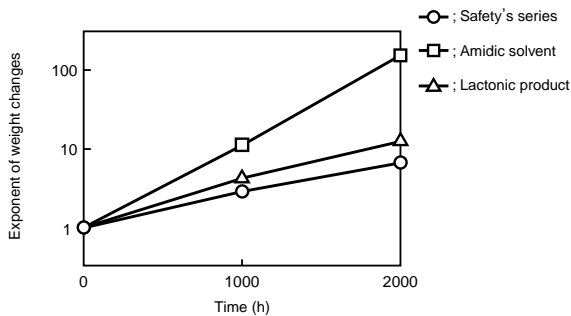


Fig. 3-2

5-3 Airtightness of sealing material

Since the electrolyte is stable for hours, the key element for capacitor’s life is the sealing material. By optimizing the crosslinking density of the sealing material polymer, the sealing material of the “Safety’s” capacitor attains its long life with electrolyte permeability less than that of the conventional capacitors.

Fig. 3-3 shows the test results on the airtightness of the sealing material obtained by changing the weight of the capacitors at a high temperature, producing capacitors with the conventional sealing material and improved one both containing the electrolyte used in the “Safety’s” capacitor.

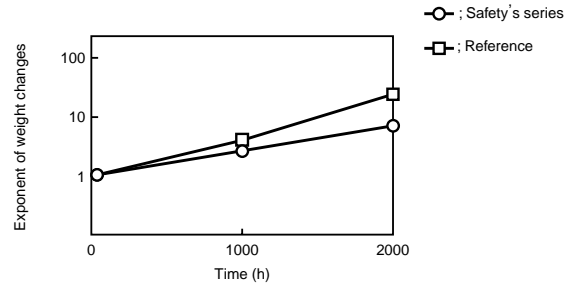


Fig. 3-3

5-4 Long-time stability of electrolyte

The electrolyte used in the “Safety’s” capacitor is stable with low initial resistivity and small secular changes at a high temperature. Fig. 3-4 shows change in resistivity at 105°C.

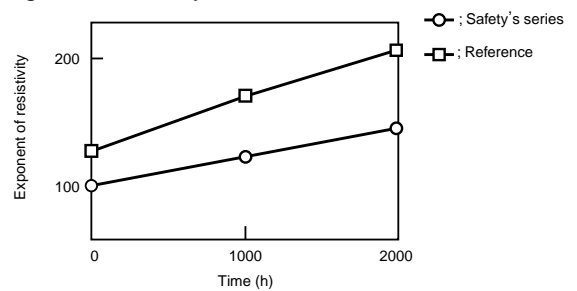


Fig. 3-4

5-5 Dielectric formation voltage and leakage current characteristics of anode foil

To increase the operating life by controlling the gas generation inside capacitor because of 1.5 to 2 times the rated voltage, while that of the previous capacitor is about 1.3 times the rated voltage.

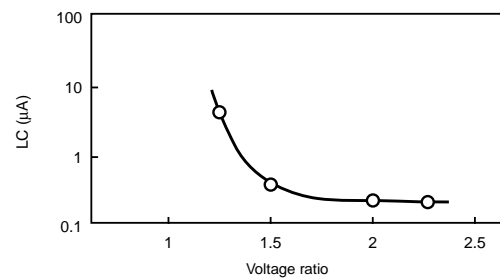


Fig. 3-5

5-6 Lowered ESR of Electrode Foil

To reduce the ESR of electrolytic capacitor, we have improved our chemical conversion technology for anode foil to develop lower ESR electrode foil compared to the conventional product as shown in Fig. 3-6

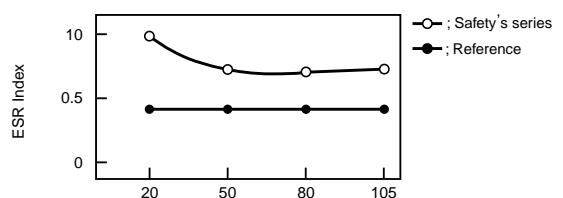
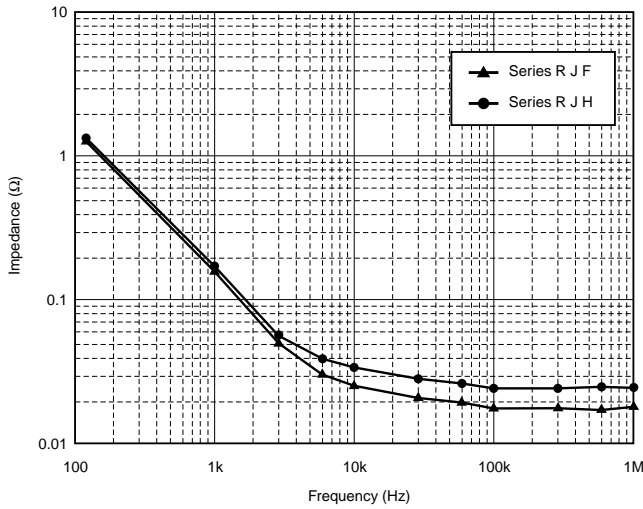


Fig. 3-6 ESR Index of Anode Foil

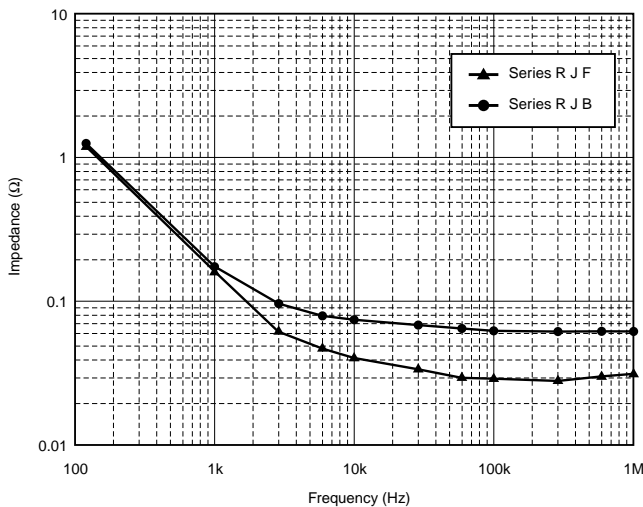
6. Electric Characteristics Data

6-1 Series RJF, RJB, RJH

Frequency characteristics at 20°C

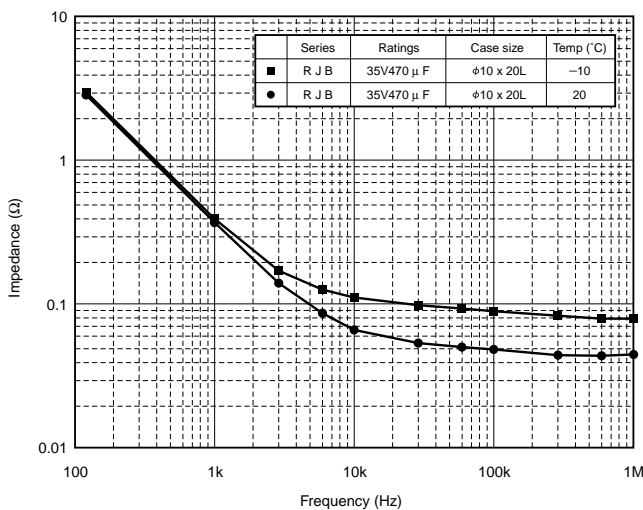


Performance \ Series	R J F	R J H
Rated Voltage	25V	25V
Capacitance	1000 μ F	1000 μ F
Size(ϕ x L)	12.5 x 20	12.5 x 25
Impedance Spec (20°C, 100kHz)	0.021 Ω	0.034 Ω

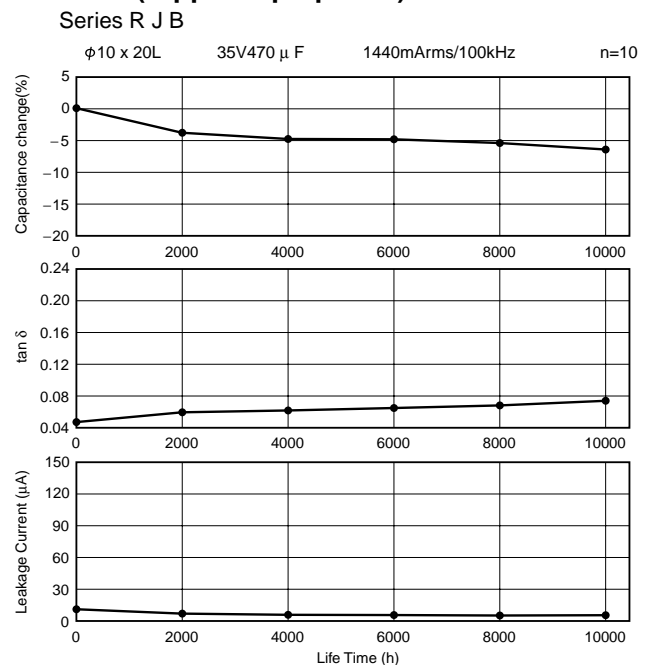


Performance \ Series	R J F	R J B
Rated Voltage	10V	10V
Capacitance	1000 μ F	1000 μ F
Size(ϕ x L)	10 x 16	10 x 16
Impedance Spec (20°C, 100kHz)	0.038 Ω	0.080 Ω

Frequency characteristics at 20°C, -10°C



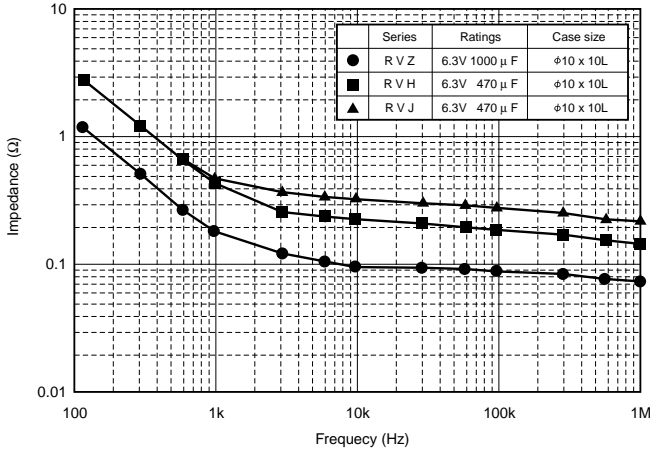
Endurance(Ripple superposed)at 105°C



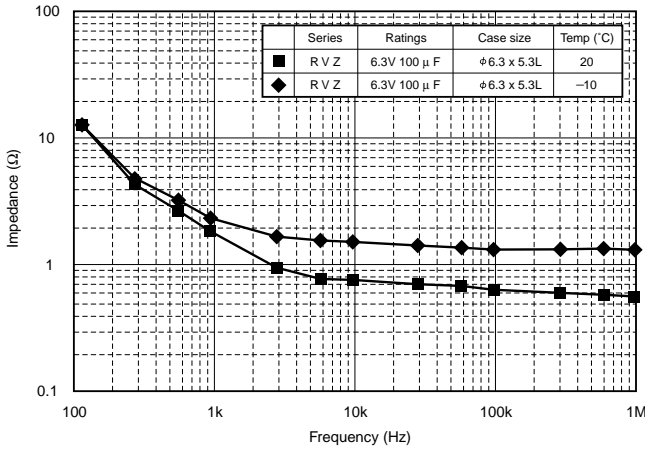
Notice: The mesurment values are not guaranteed values, but measurements.

6-2 Series RVZ

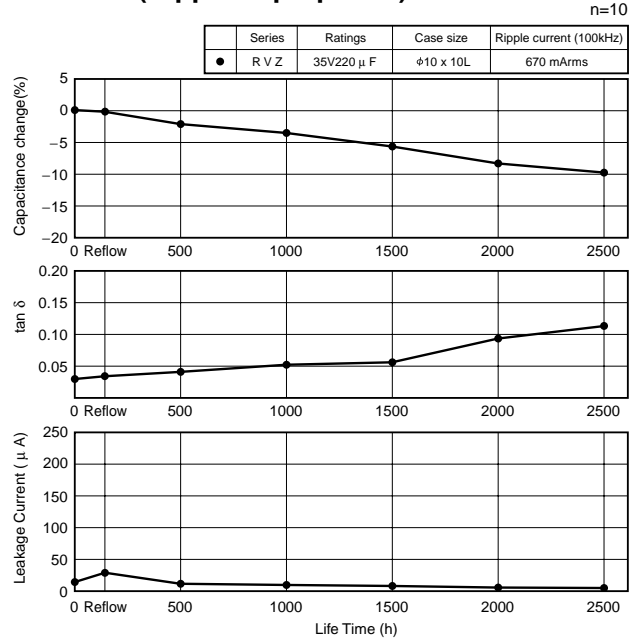
Frequency characteristics at 20°C



Frequency characteristics at 20°C, -10°C

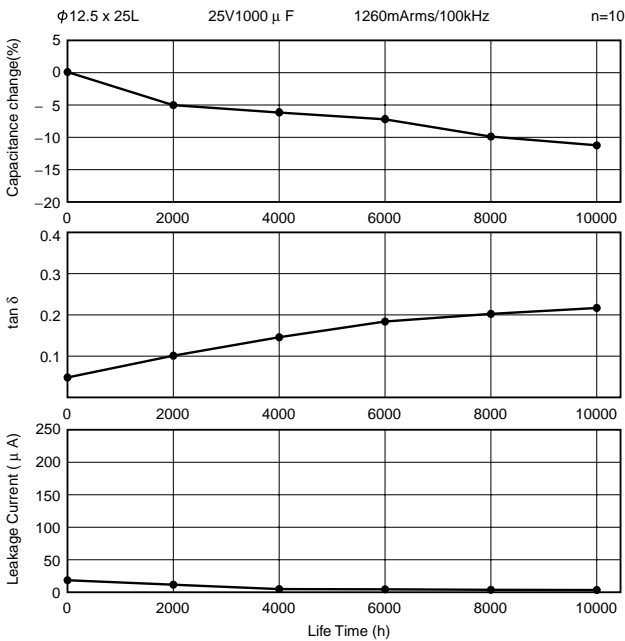


Endurance (Ripple superposed) at 105°C

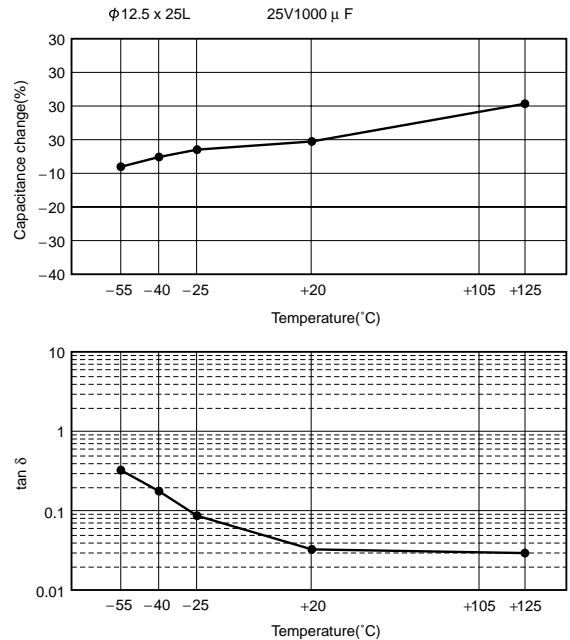


6-3 Series RK

Endurance Test (Ripple superposed) at 105°C



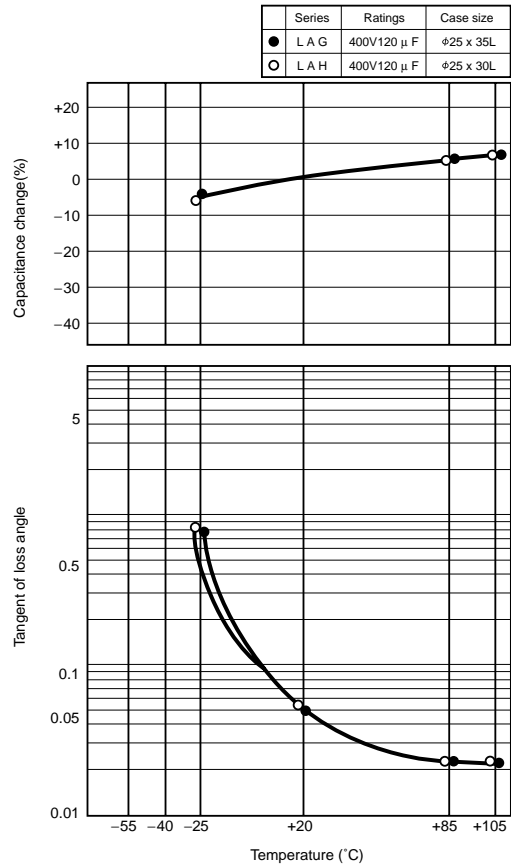
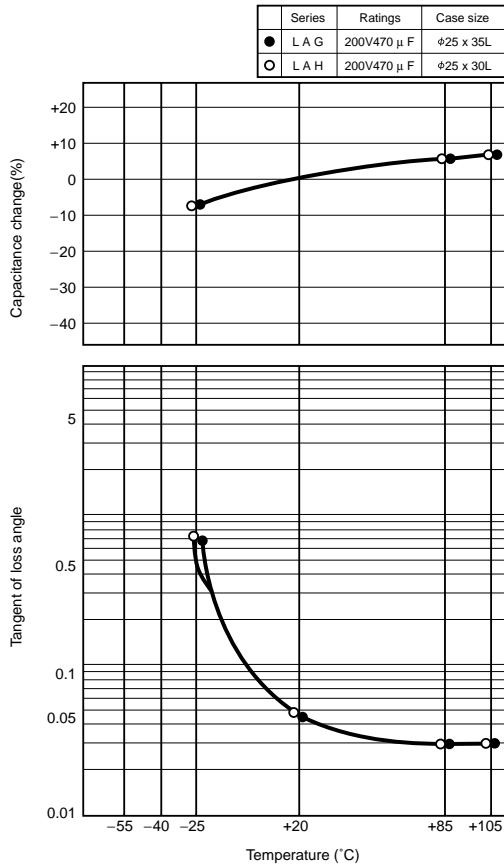
Temperature Characteristics



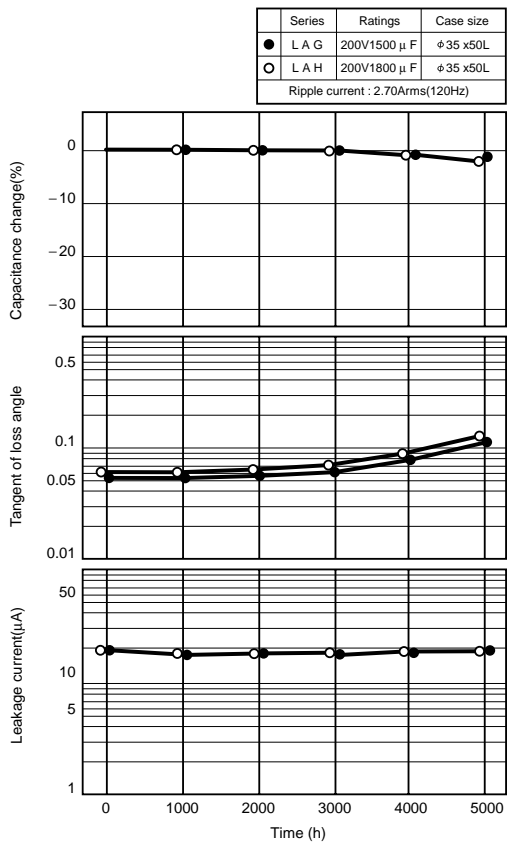
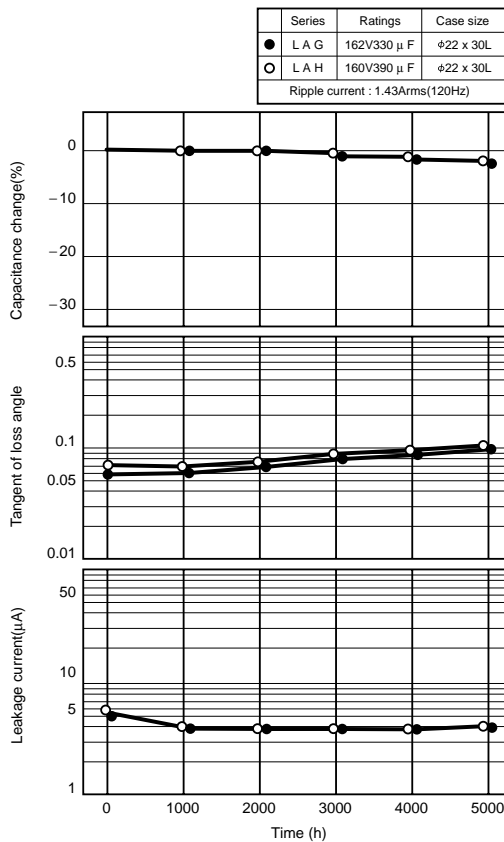
Notice: The measurement values are not guaranteed values, but measurements.

6-4 Series LAG • LAH

Temperature characteristics, Series LAG • LAH



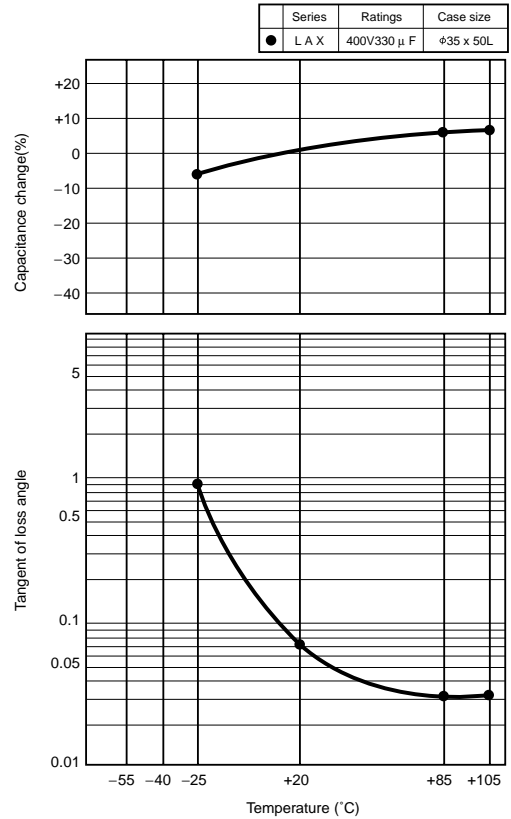
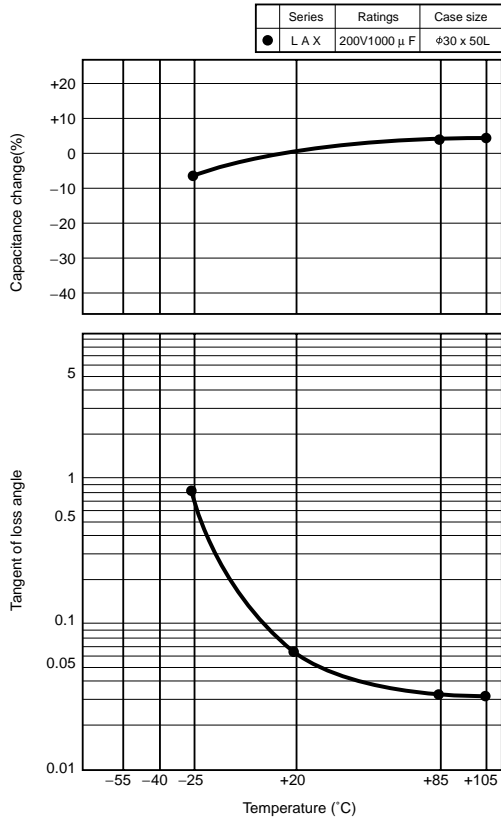
Endurance(Ripple superposed) at 105°C of Series LAG • LAH



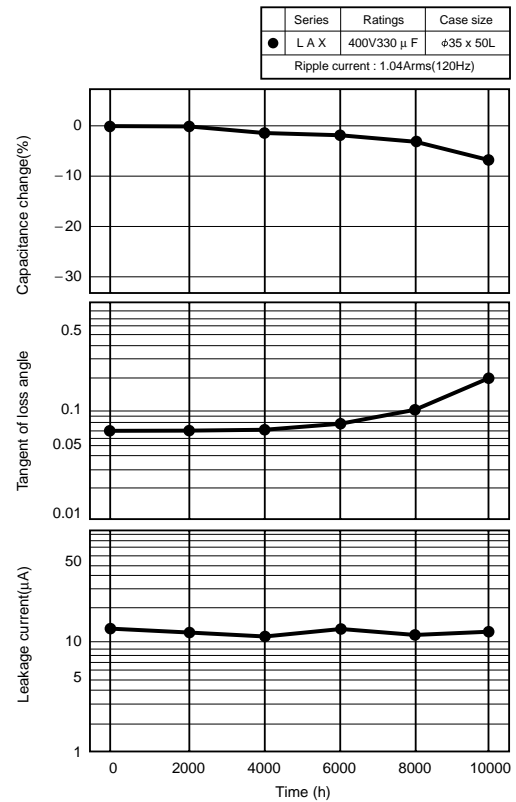
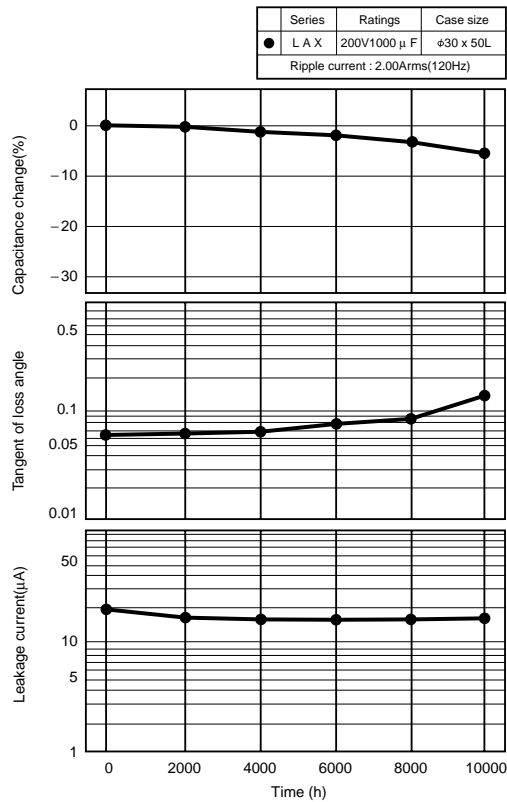
Notice: The measurement values are not guaranteed values, but measurements.

6-5 Series LAX

Temperature characteristics, Series LAX



Endurance (Ripple superposed) at 105°C of Series LAX



Notice: The measurement values are not guaranteed values, but measurements.