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Products Catalog

Aluminum Electrolytic Capacitors

Radial lead type



IN Your Future

2021.10

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Aluminum Electrolytic Capacitors (Radial lead type) INDEX

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Guidelines and precautions regarding the technical information and use of our products described in this online catalog.

- If you want to use our products described in this online catalog for applications requiring special qualities or reliability, or for applications where the failure or malfunction of the products may directly jeopardize human life or potentially cause personal injury (e.g. aircraft and aerospace equipment, traffic and transportation equipment, combustion equipment, medical equipment, accident prevention, anti-crime equipment, and/or safety equipment), it is necessary to verify whether the specifications of our products fit to such applications. Please ensure that you will ask and check with our inquiry desk as to whether the specifications of our products fit to such applications use before you use our products.

- The quality and performance of our products as described in this online catalog only apply to our products when used in isolation. Therefore, please ensure you evaluate and verify our products under the specific circumstances in which our products are assembled in your own products and in which our products will actually be used.

- If you use our products in equipment that requires a high degree of reliability, regardless of the application, it is recommended that you set up protection circuits and redundancy circuits in order to ensure safety of your equipment.

- The products and product specifications described in this online catalog are subject to change for improvement without prior notice. Therefore, please be sure to request and confirm the latest product specifications which explain the specifications of our products in detail, before you finalize the design of your applications, purchase, or use our products.

- The technical information in this online catalog provides examples of our products' typical operations and application circuits. We do not guarantee the non-infringement of third party's intellectual property rights and we do not grant any license, right, or interest in our intellectual property.

- If any of our products, product specifications and/or technical information in this online catalog is to be exported or provided to non-residents, the laws and regulations of the exporting country, especially with regard to security and export control, shall be observed.

<Regarding the Certificate of Compliance with the EU RoHS Directive/REACH Regulations>

- The switchover date for compliance with the RoHS Directive/REACH Regulations varies depending on the part number or series of our products.

- When you use the inventory of our products for which it is unclear whether those products are compliant with the RoHS Directive/REACH Regulation, please select "Sales Inquiry" in the website inquiry form and contact us.

We do not take any responsibility for the use of our products outside the scope of the specifications, descriptions, guidelines and precautions described in this online catalog.

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Notices

■ Applicable laws and regulations

・This product complies with the RoHS Directive (Restriction of the use of certain hazardous substances in electrical and electronic equipment (DIRECTIVE 2011/65/EU and (EU)2015/863)).
・No Ozone Depleting Chemicals(ODC's), controlled under the Montreal Protocol Agreement, are used in producing this product.
We do not use PBBs or PBDEs as brominated flame retardants.
・Export procedure which followed export related regulations, such as foreign exchange and a foreign trade method, on the occasion of export of this product.
・These products are not dangerous goods on the transportation as identified by UN(United Nations) numbers or UN classification.

■ Limited applications

・This capacitor is designed to be used for electronics circuits such as audio/visual equipment, home appliances, computers and other office equipment, optical equipment, measuring equipment.
・An advanced specification must be signed individually for high-reliability use that might threaten human life or property due to a malfunction of the capacitor.

■ Intellectual property rights and licenses

・The technical information in this specification provides examples of our products' typical operations and application circuits. We do not guarantee the non-infringement of third party's intellectual property rights and we do not grant any license, right, or interest in our intellectual property.

Items to be observed

■ For specification

・This specification guarantees the quality and performance of the product as individual components.
The durability differs depending on the environment and the conditions of usage.
Before use, check and evaluate their compatibility with actual conditions when installed in the products.
When safety requirements cannot be satisfied in your technical examination, inform us immediately.
・Do not use the products beyond the specifications described in this document.

■ Upon application to products where safety is regarded as important

Install the following systems for a failsafe design to ensure safety if these products are to be used in equipment where a defect in these products may cause the loss of human life or other signification damage, such as damage to vehicles (automobile, train, vessel), traffic lights, medical equipment, aerospace equipment, electric heating appliances, combustion/ gas equipment, rotating rotating equipment, and disaster/crime prevention equipment.

(1) The system is equipped with a protection circuit and protection device.
(2) The system is equipped with a redundant circuit or other system to prevent an unsafe status in the event of a single fault.

■ Conditions of use

・Before using the products, carefully check the effects on their quality and performance, and determined whether or not they can be used. These products are designed and manufactured for general-purpose and standard use in general electronic equipment. These products are not intended for use in the following special conditions.

(1) In liquid, such as Water, Oil, Chemicals, or Organic solvent.
(2) In direct sunlight, outdoors, or in dust.
(3) In vapor, such as dew condensation water of resistive element, or water leakage, salty air, or air with a high concentration corrosive gas, such as Cl_2, H_2S, NH_3, SO_2, or NOx.
(4) In an environment where strong static electricity or electromagnetic waves exist.
(5) Mounting or placing heat-generating components or inflammables, such as vinyl-coated wires, near these products.
(6) Sealing or coating of these products or a printed circuit board on which these products are mounted, with resin and other material.
(7) Using resolvent, water or water-soluble cleaner for flux cleaning agent after soldering. (In particular, when using water or a water-soluble cleaning agent, be careful not to leave water residues)
(8) Using in the atmosphere where strays acid or alkaline.
(9) Using in the atmosphere where there are excessive vibration and shock.
(10) Using in the atmosphere where there are low pressure or decompression.

・Please arrange circuit design for preventing impulse or transitional voltage.
Do not apply voltage, which exceeds the full rated voltage when the capacitors receive impulse voltage, instantaneous high voltage, high pulse voltage etc.
・Our products there is a product are using an electrolyte solution. Therefore, misuse can result in rapid deterioration of characteristics and functions of each product. Electrolyte leakage damages printed circuit and affects performance, characteristics, and functions of customer system.

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⚠Application guidelines（Radial lead Type)

1. Circuit design

1.1 Operating temperature and frequency

Electrical characteristics of the capacitor are likely to change due to variation in temperature and/or frequency. Circuit designers should take these changes into consideration.

(1) Effects of operating temperature on electrical parameters

At higher temperatures : leakage current and capacitance increase while equivalent series resistance (ESR) decreases.

At lower temperatures : leakage current and capacitance decrease while equivalent series resistance (ESR) increases.

(2) Effects of frequency on electrical parameters

At higher frequencies : capacitance and impedance decrease while tan d increases.

At lower frequencies : heat generated by ripple current will rise due to an increase in equivalent series resistance (ESR).

1.2 Operating temperature and life expectancy

(1) Expected life is affected by operating temperature. Generally, each 10 ℃ reduction in temperature will double the expected life. Use capacitors at the lowest possible temperature below the upper category temperature.

(2) If operating temperatures exceed the upper category limit, rapid deterioration of electrical parameter will occur and irreversible damage will result.
Measure not only the ambient temperature but also the surface temperature of the capacitor's case top, which has effects of ripple current and radiated heat from power transistors, IC's, and/or resistors.
Avoid placing components, which could conduct heat to the capacitor from the back side of the circuit board.

(3) A formula for calculating expected life is as follows ;

$$L_2 = L_1 \times 2^{\frac{T_1 - T_2}{10}} \quad \text{where } T_1 \geqq T_2$$

L_1 : Guaranteed life (h) at temperature, T_1 ℃

L_2 : Expected life (h) at temperature, T_2 ℃

T_1 : Upper category temperature (℃) for the series, GA-A, M-A, and SU-A
Upper category temperature + temperature rise due to rated ripple current (℃) for the other series

T_2 : Actual operating temperature, ambient temperature + temperature rise due to ripple current (℃)

(4) Using the capacitor beyond the rated lifetime will result in short circuit, electrolyte leak, vent open, and large deterioration of characteristics. The lifetime cannot exceed 15 years due to aging of sealing rubber.

1.3 Load conditions to avoid

The following load conditions will cause rapid deterioration of capacitor's electrical characteristics.
In addition, instantaneous heating and gas generation within the capacitor may cause an operation of pressure relief vent, and that results in electrolyte leaks, explosion and/or fire ignition.
The leaked electrolyte is combustible and electrically conductive.

(1) Reverse voltage
DC capacitors have polarity. Therefore, do not apply the reverse voltage. Find the correct polarity before insertion.

(2) Charge / Discharge applications
General purpose capacitors are not suitable for use in repeating charge/discharge applications.
For such applications, consult a sales representative with actual application condition. Rush current must not exceed 100 A.

(3) ON-OFF circuit
When using capacitors in circuit where ON-OFF switching is repeated more than 10,000 times a day, consult a sales representative with actual application condition for an appropriate choice of capacitors.

(4) Over voltage
Do not apply a voltage exceeding the rated voltage. The rated surge voltage can be applied only for a short time.
Make sure that a sum of the DC voltage and the superimposed AC ripple voltage does not exceed the rated voltage.

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(5) Ripple current

Do not apply ripple currents exceeding the rated value.

Make sure that rated ripple currents superimposed on low DC bias voltages do not cause reverse voltage conditions. Even if the current is below the rated ripple current, using the capacitor for longer than the rated lifetime will cause ESR increase and internal generation of heat, which may eventually lead to vent open, bulging of case/rubber, electrolyte leak, short circuit, explosion, or ignition in the worst case.

1.4 Connections in series or parallel

(1) Capacitors connected in parallel

Because the impedance of the capacitor and PCB's wiring are very close, various impedance values may cause unbalanced ripple current loads among parallel capacitors. Combine the same part number and wire them carefully to minimize the potential risk of an excessive ripple current concentrating to one capacitor of the smallest impedance.

(2) Capacitors connected in series

Voltage being applied to each capacitor must be smaller than the rated voltage. Unbalanced voltages to the series capacitors may exceed the rated voltage. Voltage-divider resistors considering leakage currents could prevent the over-voltage to the series capacitors. Conductive polymer hybrid aluminum electrolytic capacitors are not allowed to be connected in series.

1.5 Capacitor mounting considerations

(1) For double sided circuit boards, avoid wiring patterns passing between the mounted capacitor and the circuit board. When a radial lead type capacitor is dipped into a solder bath, an excess solder may deposit under the capacitor by capillary action, causing short circuit between anode and cathode terminals. Also, lead holes must be placed with special care for radial lead type capacitors because laminate on capacitor's surface may become damaged during flow process.

(2) The pitch between circuit board holes should match the lead wire pitch of the radial lead type capacitors within the specified tolerances. Unmatched pitch may cause an excessive stress on lead wires during the insertion process and result in short/open circuit, increased leakage current, or electrolyte leak.

(3) Clearance for case mounted pressure relief

Capacitors with case mounted pressure relief require sufficient clearance to allow for proper pressure relief operation. The minimum clearance are dependent on capacitor diameters as follows.

(Ø 10 mm to Ø 16 mm: 2 mm minimum, Ø 18 mm: 3 mm minimum)

(4) Wiring near the pressure relief

Avoid locating high voltage or high current wiring or circuit board paths above the pressure relief. Flammable, high temperature gas that exceeds 100 ℃ may be released which could dissolve the wire insulation and ignite.

(5) Circuit board patterns under the capacitor

Avoid circuit board runs under the capacitor, as an electrical short can occur due to an electrolyte leakage.

(6) Resonant vibration after circuit board's production may make a heavy load on the capacitor and cause rapid change in characteristics and/or capacitor's break.

1.6 Electrical isolation

Electrically isolate the capacitor's case from cathode terminals, as well as circuit patterns.

1.7 Capacitor sleeve and coating

The vinyl sleeve or laminate coating is intended for marking and identification purposes and is not meant to electrically insulate the capacitor.

The sleeve may split or crack if immersed into solvents such as toluene or xylene and then subsequently exposed to high temperatures.

2. Capacitor handling techniques

2.1 Considerations before using

(1) Capacitors have a finite life. Do not reuse or recycle capacitors from used equipment.

(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) Capacitors stored for a long period of time may exhibit an increase in leakage current.

This can be corrected by gradually applying rated voltage in series with a resistor of approximately 1 kΩ.

(4) If capacitors are dropped, they can be damaged mechanically or electrically. Avoid using dropped capacitors.

(5) Dented or crushed capacitors should not be used.

The seal integrity can be damaged and loss of electrolyte/ shortened life can result.

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2.2 Capacitor insertion

(1) Verify the correct capacitance and rated voltage of the capacitor.
(2) Verify the correct polarity of the capacitor before insertion.
(3) Verify the correct terminal dimension and land pattern size for surface mount type, or holes' pitch for radial lead type before mount to avoid short circuit, stress on the terminals, and/or lack of terminal strength.
(4) Excessive mounting pressure can cause high leakage current, short circuit, or disconnection.
(5) When using a mounter for radial lead type, avoid cutter wear and acute angle of lead-bending with respect to circuit board. That may create excessive stress and pull the lead to damage the capacitor.

2.3 Reflow soldering (for surface mount type)

(1) Surface-mount type capacitor are exclusively for reflow soldering.
When reflow solder is used an ambient heat condition system such as the simultaneous use of infrared and hot-air is recommended.
(2) Observe proper soldering conditions (temperature, time, etc.). Do not exceed the specified limits.
If the peak temperature is high or if the heating time is long, it may cause deterioration of the electrical characteristics and life characteristics.
Recommended soldering condition is a guideline for ensuring the basic characteristics of the components, but not for the stable soldering conditions. Conditions for proper soldering should be set up according to individual onditions.
・The Temperature on Capacitor top shall be measured by using thermal couple that is fixed firmly by epoxy glue.
(3) In case of use in 2 times reflow, 2nd reflow must be done when the capacitor's temperature return back to normal level.
(4) In our recommended reflow condition , the case discoloration and the case swelling might be slightly generated. But please acknowledge that these two phenomena do not influence the reliability of the product.
(5) The crack on top marking might be occurred by reflow heat stress.
But please acknowledge that it does not influence the reliability of the product.
(6) VPS (Vapor Phase Soldering) reflow can cause significant characteristics change and/ or mounting failure due to deformation by acute temperature rise.
VPS is acceptable provided that the process does not exceed recommended reflow profile and temperature rise is less than 3 ℃/sec.
Please contact Panasonic for detailed conditions.
(7) The vibration-proof capacitors of size ø6.3 has support terminals extending from the bottom side to the lead edge. Then, make sure to find appropriate soldering conditions to form fillet on the support terminals if required for appearance inspection. However, even if sufficient solder fillets are not observed, the reliability of vibration-proof will not be lowered because the support terminals on the bottom side enhance the solder joint to PCB.

2.4 Flow soldering

(1) Radial lead type capacitors cannot apply to reflow soldering.
(2) Do not immerse the capacitor body into the solder bath as excessive internal pressure could result.
(3) Apply proper soldering conditions (temperature, time, etc.). Do not exceed the specified limits.
(4) Do not allow other parts or components to touch the capacitor during soldering.

2.5 Manual soldering

(1) Apply soldering conditions (temperature and time) based on the specification, or do not exceed temperature of 350 ℃ for 3 seconds.
(2) If a soldered capacitor must be removed and reinserted, avoid excessive stress on the capacitor leads.
(3) Avoid physical contacts between the tip of the soldering iron and capacitors to prevent or capacitor failure.
(4) When bending lead wires of radial type capacitors to match the hole pitch on PCB, avoid applying excessive stress to the capacitor body.

2.6 Other soldering considerations

Rapid temperature rise during the preheat operation and resin bonding operation can cause cracking of the capacitor's vinyl sleeve. For heat curing, do not exceed 150 ℃ for the maximum time of 2 minutes.

2.7 Capacitor handling after soldering

(1) Avoid moving the capacitor after soldering to prevent excessive stress on the lead wires where they enter the seal. The capacitor may break from element portion due to a torque at outer rim, causing a large stress to terminals.
(2) Do not use the capacitor as a handle when moving the circuit board assembly. The total weight of the board would apply to element portion through terminals, and the capacitor may break.
(3) Avoid striking the capacitor after assembly to prevent failure due to excessive shock. The capacitor may break due to excessive shock or load above specified range.

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2.8 Circuit board cleaning

(1) Circuit boards can be immersed or ultrasonically cleaned using suitable cleaning solvents for up to 5 minutes and up to 60 ℃ maximum temperatures. The boards should be thoroughly rinsed and dried. The use of ozone depleting cleaning agents is not recommended for the purpose of protecting our environment.

【Target solvent】

Pine Alpha ST-100S, Aqua Cleaner 210SEP, Clean-thru 750H / 750L / 710M, Sunelec B-12, Sunelec B-12, Cold Cleaner P3-375, Techno Cleaner 219, DK Be-clear CW-5790, Telpene Cleaner EC-7R, Technocare FRW-17 / FRW-1 / FRV-1

(2) Avoid using the following solvent groups unless specifically allowed in the specification ;

(a) Halogenated based solvents : may permeate the seal and cause internal corrosion. Especially, 1-1-1 trichloroethane must not be used on any aluminum electrolytic capacitors.

(b) Alkaline based solvents : may dissolve and react to the aluminum case.

(c) Petroleum based solvents : may deteriorate the sealing rubber.

(d) Xylene : may deteriorate the sealing rubber.

(e) Acetone : may erase the markings.

(3) A thorough drying after cleaning is required to remove residual cleaning solvents that may be trapped between the capacitor and the circuit board. Avoid drying temperatures, which exceed the upper category temperature of the capacitor.

(4) Monitor the contamination levels of the cleaning solvents during use in terms of electrical conductivity, pH, specific gravity, and water content. Inside the capacitor may corrode with high density of chlorine. Control the flux density in the cleaning agent to be less than 2 mass%.

(5) Depending on the cleaning method, the marking on a capacitor may be erased or blurred.

※ Please consult us if you are not certain about acceptable cleaning solvents or cleaning methods.

2.9 Mounting adhesives and coating agents

When using mounting adhesives or coating agents to control humidity, avoid using materials containing halogenated solvents. Also, avoid the use of chloroprene based polymers.

Cure or dry out the coating agents thoroughly, and do not leave any solvents. Make sure to dry out cleaning agents completely immediately after washing the circuit board if the capacitors are mounted afterward, so that the solvents are not left under the capacitor body. Also, leave more than 1/3 of the sealing portion open, and do not cover that portion with any adhesives or coating.

2.10 Potting and molding

Potting and molding processes cannot be recommended. They have potential risks to change the capacitor's performance and reliability due to injection pressure, diffused material into the capacitor, as well as heat accumulation by covered resin. Also, evaporated electrolyte may remain inside the resin, then turn to liquid, and possibly short circuit PCB patterns.

2.11 Fumigation

In exporting electronic appliances with aluminum electrolytic capacitors, in some cases fumigation treatment using such halogen compound as methyl bromide is conducted for wooden boxes.

If such boxes are not dried well, the halogen left in the box is dispersed while transported and enters in the capacitors inside. This possibly causes electrical corrosion of the capacitors. Therefore, after performing fumigation and drying make sure that no halogen is left. Don't perform fumigation treatment to the whole electronic appliances packed in a box.

2.12 Flux

If you use a halogen type (Chlorine type, Bromine type, etc.) high-activity flux, please use it after confirmation in advance, as it may have an impact on performance and reliability of this product due to the residue of the flux.

3. Precautions for using capacitors

3.1 Environmental conditions

Capacitors should not be stored or used in the following environments.

(1) Exposure to temperatures above the upper category or below the lower category temperature of the capacitor.

(2) Direct contact with water, salt water, or oil.

(3) High humidity conditions where water could condense on the capacitor.

(4) Exposure to toxic gases such as hydrogen sulfide, sulfuric acid, nitric acid, chlorine, chlorine compound, bromine, bromine compound or ammonia.

(5) Exposure to ozone, radiation, or ultraviolet rays.

(6) Vibration and shock conditions exceeding specified requirements.

Even within the specified requirements, a large vibration acceleration may be applied due to resonance, so be sure to evaluate and confirm with the actual product.

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3.2 Electrical precautions

(1) Avoid touching the terminals of a capacitor as a possible electric shock could result. The exposed aluminum case is not insulated and could also cause electric shock if touched.
(2) Avoid short circuiting the area between the capacitor terminals with conductive materials including liquids such as acids or alkaline solutions.
(3) A low-molecular-weight-shiroxane which is included in a silicon material shall causes abnormal electrical characteristics.

4. Emergency procedures

(1) If the pressure relief of the capacitor operates, immediately turn off the equipment and disconnect from the power source.
This will minimize an additional damage caused by the vaporizing electrolyte.
(2) Avoid contact with the escaping electrolyte gas, which can exceed 100 ℃ temperatures.
If electrolyte or gas enters the eye, immediately flush the eye with large amounts of water.
If electrolyte or gas is ingested by mouth, gargle with water.
If electrolyte contacts the skin, wash with soap and water.

5. Long term storage

(1) Leakage current of a capacitor tends to increase after a long-term storage due to dielectric dissolution, and very high current may flow at the first voltage load. However, applying voltage will form the dielectric, and the leakage current will decrease. Expiration date is 42 months from outgoing inspection date for part numbers listed below, and it is 12 month for part numbers not listed below.

Series	Expiration date
FC-A, FK-A, HD-A, TA-A, TP-A	42 months from outgoing inspection date

Storage condition is to keep in room temperature (5 ℃ to 35 ℃) and humidity (45 % to 85 %) with no direct sunshine.

(2) Environmental Conditions
Do not store under condition outside the area described in the specification, and also under conditions listed below.
(a) Exposure to temperatures above the upper category or below the lower category temperature of the capacitor.
(b) Direct contact with water, salt water, or oil.
(c) High humidity conditions where water could condense on the capacitor.
(d) Exposure to toxic gases such as hydrogen sulfide, sulfuric acid, nitric acid, chlorine, Chlorine compound, Bromine, Bromine compound or ammonia.
(e) Exposure to ozone, radiation, or ultraviolet rays.
(f) Vibration and shock conditions exceeding specified requirements.

6. Capacitor disposal

When disposing capacitors, use one of the following methods.
(1) Incinerate after crushing the capacitor or puncturing the can wall (to prevent explosion due to internal pressure rise).
(2) Dispose as solid waste.

NOTE : Local laws may have specific disposal requirements which must be followed.

The precautions in using aluminum electrolytic capacitors follow the "Safety application guide for the use in fixedaluminum electrolytic capacitors for electronic equipment", RCR-2367D issued by JEITA in October 2017.
Please refer to the above application guide for details.

■ AEC-Q200 compliant

The products are tested based on all or part of the test conditions and methods defined in AEC-Q200.
Please consult with Panasonic for the details of the product specification and specific evaluation test results, etc., and please review and approve Panasonic's product specification before ordering.

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Diagram

⚠ This Series is no longer available for purchase in the country of Japan.

Radial lead type



Long life / High ripple

Low impedance

Miniaturized

	EE-A series 105 ℃ 8000 to 10000 h	**ED-A** series 105 ℃ 8000 to 10000 h	**TP-A** series 135 ℃ / 1000 to 2000 h 125 ℃ / 2000 to 5000 h			
FS-A series 105 ℃ 5000 to 10000 h		**EB-A** series 105 ℃ 5000 to 10000 h	**TA-A** series 125 ℃ 2000 h			
FR-A series 105 ℃ 5000 to 10000 h	**FM-A** series 105 ℃ 2000 to 7000 h	**FP-A** series 105 ℃ 4000 to 5000 h		**HD-A** series 105 ℃ 1000 to 2000 h		
	FK-A series 105 ℃ 3000 to 5000 h	**FC-A** series 105 ℃ 1000 to 5000 h	**NHG-A** series 105 ℃ 1000 to 2000 h	**GA-A** series (7L) 105 ℃ 1000 h	(Bi-polar) **GA-A** series 105 ℃ 1000 to 2000 h	
			M-A series 85 ℃ 2000 h	(Bi-polar) **SU-A** series 85 ℃ 2000 h		
			KS-A/KA-A series 85 ℃ 1000 h	(Bi-polar) **KS-A/KA-A** series 85 ℃ 1000 h		

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Explanation of part numbers

Part number system

◇ Type 1 (Series : FC-A, FK-A, FM-A, FR-A, FS-A, FP-A, EB-A, ED-A, EE-A, TA-A, TP-A, HD-A, GA-A)

EEU	FC	0J	272	□+B
Product classification 3 figures	Series code 2 figures	Voltage code 2 figures	Capacitance code 3 figures	Suffix+Taping of forming of terminal code 0 to 2 figures

Series	Code
FC-A (105 ℃ 1000 h to 5000 h)	FC
FK-A (105 ℃ 4000 h to 5000 h)	FK
FM-A (105 ℃ 4000 h to 7000 h)	FM
FR-A (105 ℃ 5000 h to 10000 h)	FR
FP-A (105 ℃ 4000 h to 5000 h)	FP
EB-A (105 ℃ 5000 h to 10000 h)	EB
ED-A (105 ℃ 8000 h to 10000 h)	ED
EE-A (105 ℃ 8000 h to 10000 h)	EE
TA-A (125 ℃ 2000 h)	TA
TP-A (125 ℃ 3000 h to 5000 h)	TP
HD-A (105 ℃ 2000 h)	HD
GA-A (105 ℃ 1000 h)	GA

R.voltage (V)	Code
6.3	0J
10	1A
16	1C
25	1E
35	1V
50	1H
63	1J
100	2A
160	2C
200	2D
250	2E
350	2V
400	2G
450	2W

Cap. (μF)	Code	Cap. (μF)	Code
1.5	1R5	390	391
2.2	2R2	470	471
3.3	3R3	510	511
4.7	4R7	560	561
5.6	5R6	680	681
6.8	6R8	820	821
10	100	1000	102
12	120	1200	122
15	150	1500	152
18	180	1600	162
22	220	1800	182
27	270	2000	202
33	330	2200	222
39	390	2700	272
47	470	3300	332
56	560	3900	392
68	680	4700	472
82	820	5100	512
100	101	5600	562
120	121	6800	682
150	151	8200	822
180	181	10000	103
220	221	12000	123
270	271	15000	153
330	331	22000	223

Taping of forming of terminal code
* Blank : Straight
* E : Lead forming
* B : Taping (Pitch 5.0, 7.5 mm)
* H : Taping (Pitch 2.5 mm)

◇ Type 2 (Series : NHG-A, GA-A Bipolar, M-A)

ECA	0J	HG	101	□+B
Product classification 3 figures	Voltage code 2 figures	Series code 1 to 2 figures	Capacitance code 3 figures	Suffix+Taping of forming of terminal code 0 to 3 figures

R.voltage (V)	Code
6.3	0J
10	1A
16	1C
25	1E
35	1V
50	1H
63	1J
100	2A
160	2C
200	2D
250	2E
350	2V
400	2G
450	2W

Series	Code
NHG-A (105℃ 1000 h to 2000 h)	HG
GA-A Bipolar (105℃ 1000 h to 2000	EN
M-A (85℃ 2000 h)	M

Cap. (μF)	Code	Cap. (μF)	Code
1.5	1R5	330	331
2.2	2R2	470	471
3.3	3R3	1000	102
4.7	4R7	2200	222
10	100	3300	332
22	220	4700	472
33	330	6800	682
47	470	12000	123
100	101	15000	153
220	221	22000	223

Taping of forming of terminal code
* Blank : Straight
* E : Lead forming
* B : Taping (Pitch 5.0, 7.5 mm)
* i : Taping (Pitch 2.5 mm)

◇ Type 3 (Series : KA-A, KA-A Bipolar, KS-A, KS-A Bipolar, SU-A Bipolar)

ECEA	0J	N	472	□+B
Product classification 4 figures	Voltage code 2 figures	Series code 1 to 2 figures	Capacitance code 3 figures	Suffix+Taping of forming of terminal code 0 to 1 figures

R.voltage (V)	Code
4	0D
6.3	0J
10	1A
16	1C
25	1E
35	1V
50	1H

Series	Code
KA-A (85℃ 1000 h)	KA
KA-A Bipolar (85℃ 1000 h)	KN
KS-A (85℃ 1000 h)	KS
KS-A Bipolar (85℃ 1000 h)	SN
SU-A Bipolar (85℃ 2000 h)	N

Cap. (μF)	Code	Cap. (μF)	Code
2.2	2R2	220	221
3.3	3R3	330	331
4.7	4R7	470	471
10	100	1000	102
22	220	2200	222
33	330	3300	332
47	470	4700	472
100	101	6800	682

Taping of forming of terminal code
* Blank : Straight
* E : Lead forming
* B : Taping (Pitch 5.0, 7.5 mm)
* i : Taping (Pitch 2.5 mm)

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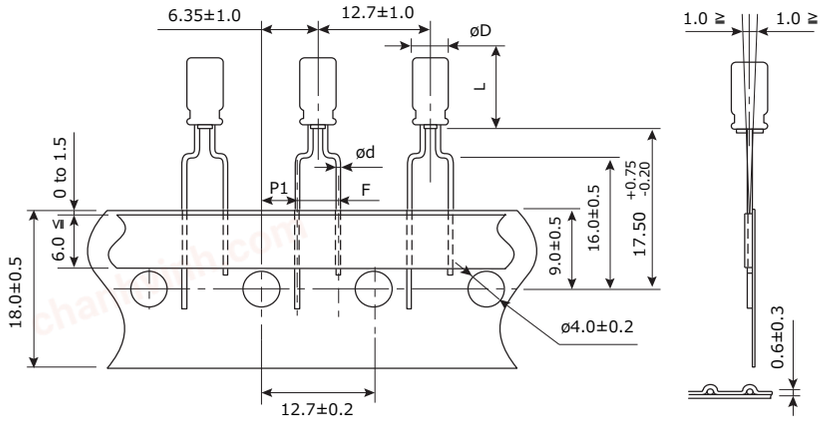
Lead taping radial lead type

● Dimensions

Case size(mm) øD × L \ Lead space	2.5 mm	5.0 mm	7.5 mm
	Figure	Figure	Figure
4 × 5, 7	B	A	–
5 × 5, 7	B	A	–
6.3 × 5, 7	C	A	–
8 × 5, 7	C	E	–
5 × 11	C	D	–
6.3 × 11.2, 15	C	D	–

Case size(mm) øD × L \ Lead space	2.5 mm	5.0 mm	7.5 mm
	Figure	Figure	Figure
8 × 11.5, 15, 20	–	E	–
10 × 12.5, 16, 20, 25	–	F	–
12.5 × 15, 20, 25	–	G	–
16 × 15, 20, 25	–	–	H
18 × 15, 20, 25	–	–	H

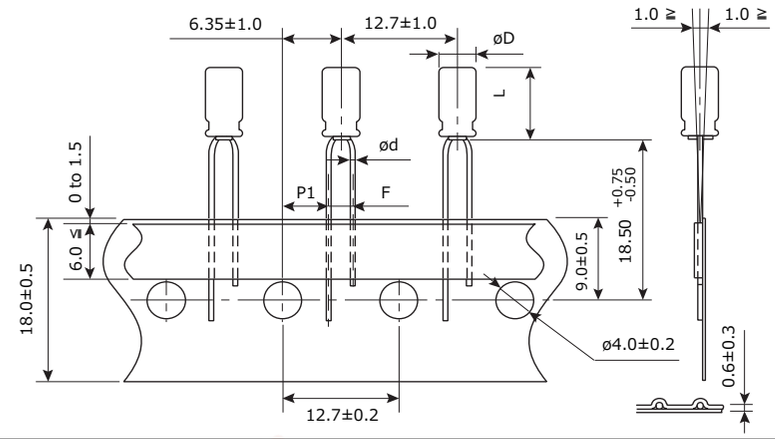
Figure A (Lead space : 5.0 mm / øD×L : ø4×5, 7, ø5×5, 7, ø6.3×5, 7)



Unit : mm

Dimensions	Nominal	Tolerance
ød	0.45	±0.05
F	5.00	+0.8 / -0.2
P1	3.85	±0.5

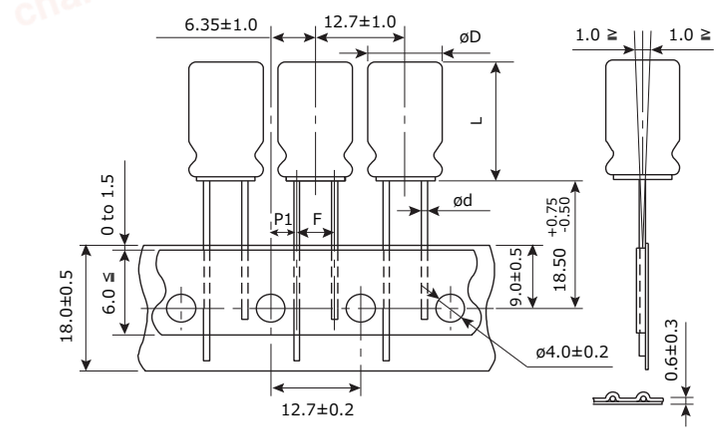
Figure B (Lead space : 2.5 mm / øD×L : ø4×5, 7, ø5×5, 7)



Unit : mm

Dimensions	Nominal	Tolerance
ød	0.45	±0.05
F	2.50	±0.5
P1	5.10	±0.5

Figure C (Lead space : 2.5 mm / øD×L : ø5×11, ø6.3×5, 7, 11.2, 15, ø8×5, 7)

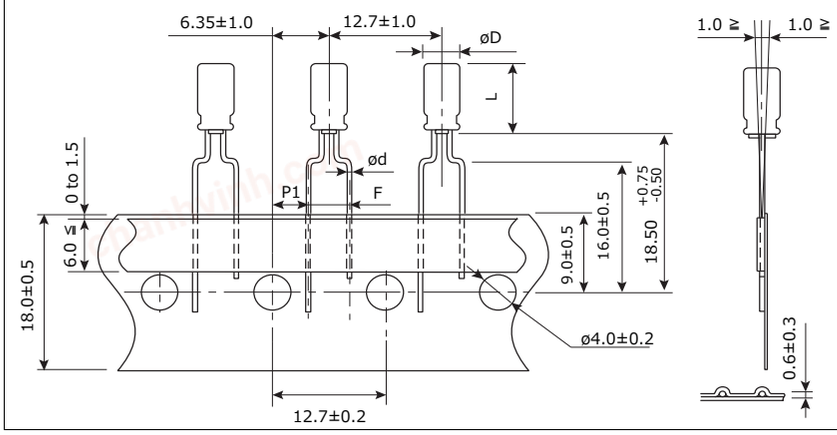


Unit : mm

Dimensions	Nominal	Tolerance
ød	0.45 0.50 : 5×11,6.3×11.2,15	±0.05
F	2.50	+0.5
P1	5.10	±0.5

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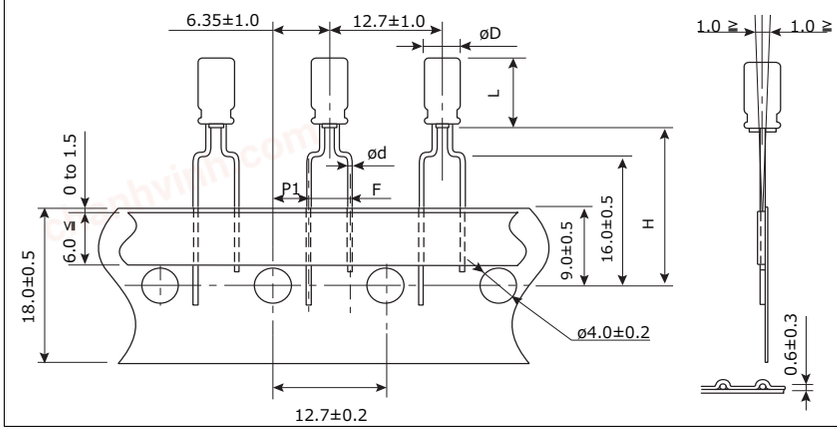
Figure D (Lead space : 5.0 mm / øD×L : ø5×11, ø6.3×11.2, 15)



Unit : mm

Dimensions	Nominal	Tolerance
ød	0.50	±0.05
F	5.00	+0.8 / -0.2
P1	3.85	±0.5

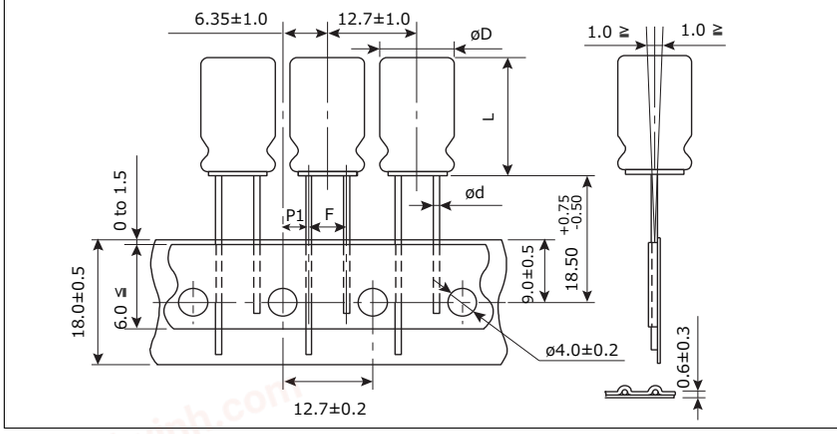
Figure E (Lead space : 5 mm / øD×L : ø8×5, 7, 11.5, 15, 20)



Unit : mm

Dimensions	Nominal		Tolerance
	ø8×11.5 to 20	ø8×5, 7	
Suffix code	B	BQ	
ød	0.60	0.45	±0.05
F	5.00		+0.8 / -02
P1	3.85		±0.5
H	20.00	18.50	+0.75 / -0.5

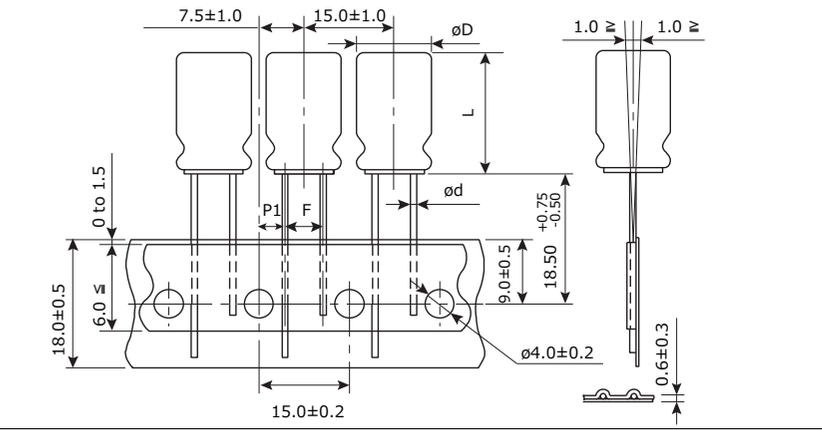
Figure F (Lead space : 5 mm / øD×L : ø10×12.5, 16, 20, 25)



Unit : mm

Dimensions	Nominal	Tolerance
ød	0.60	±0.05
F	5.00	+0.8 / -02
P1	3.85	±0.5

Figure G (Lead space : 5 mm / øD×L : ø12.5×15, 20, 25)

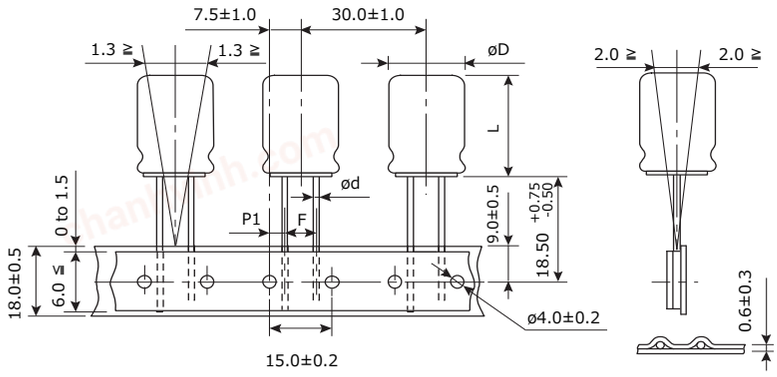


Unit : mm

Dimensions	Nominal	Tolerance
ød	0.60	±0.05
F	5.00	+0.8 / -02
P1	5.00	±0.5

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Figure H (Lead space : 7.5 mm / øD×L : ø16×15, 20, 25, ø18×15, 20, 25)

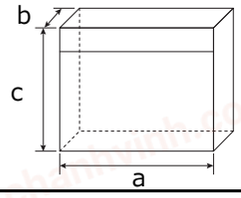


Unit : mm

Dimensions	Nominal	Tolerance
ød	0.80	±0.05
F	7.50	+0.5
P1	3.75	±0.5

Packaging Specifications

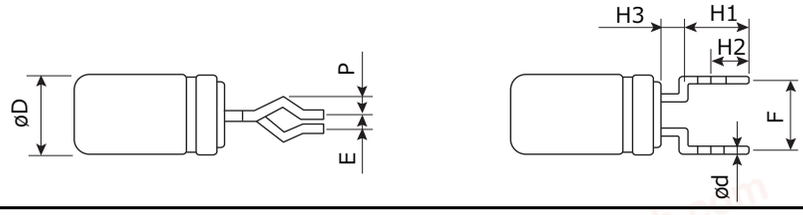
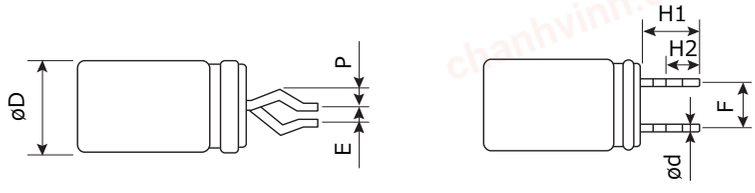
Unit : mm

Dimensions of outer carton box		Dimensions				
		ø4 to ø5	ø6.3	ø8	ø10, ø12.5	ø16, ø18
	a	340 max.	340 max.	340 max.	340 max.	340 max.
	b	to 55 max.	to 55 max.	to 55 max.	55 to 66 max.	62 to 75 max.
	c	170 to 210 max.	270 max.	230 max.	170 to 270 max.	225 to 310 max.
	Packaging Qty.	2000 pcs.	2000 pcs.	1000 pcs.	500 pcs.	250 pcs.

- Lead forming type (Snap-in)

Lead formed Aluminium Electrolytic Capacitor for self mounting, for rationalization and upgrade of soldering process.

Shape of lead wire

øD	Dimensions
4, 5, 6.3, 8	
10, 12.5, 16, 18	

Dimensions

Unit : mm

øD	H1±0.5	H2	H3	F±0.5	P	E max.	ød	for PWB	
								hole dia. ø	thick ness
5.0	4.5	2.7	2.5	5.0	1.0	1.0	0.5	0.9	1.6
6.3	4.5	2.7	2.5	5.0	1.0	1.0	0.5	1.0	1.6
8.0	4.5	2.7	2.5	5.0	1.0	1.0	0.6	1.0	1.6
10.0	4.5	2.7	–	5.0	1.0	1.0	0.6	1.0	1.6
12.5	4.5	2.7	–	5.0	1.0 / 0.9	1.0	0.6 / 0.8	1.0 / 1.1	1.6
16.0	4.5	2.7	–	7.5	0.9	1.0	0.8	1.1	1.6
18.0	4.5	2.7	–	7.5	0.9	1.0	0.8	1.1	1.6

Series KA/KS Dimensions

Unit : mm

øD	H1±0.5	H2	H3±0.3	F±0.5	P	E max.	ød	for PWB	
								hole dia. ø	thick ness
4.0	4.5	2.7	1.5	5.0	0.95	1.0	0.45	0.9	1.6
5.0	4.5	2.7	1.5	5.0	0.95	1.0	0.45	0.9	1.6
6.3	4.5	2.7	1.5	5.0	0.95	1.0	0.45	0.9	1.6
8.0	4.5	2.7	1.5	5.0	0.95	1.0	0.45	0.9	1.6

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Panasonic INDUSTRY

Aluminum Electrolytic Capacitors

Radial Lead Type

FR-A series



Features

- Endurance : 105 ℃ 5000 h to 10000 h
- Low ESR (Same as FM Series)
- RoHS compliant

Country of origin

- Malaysia

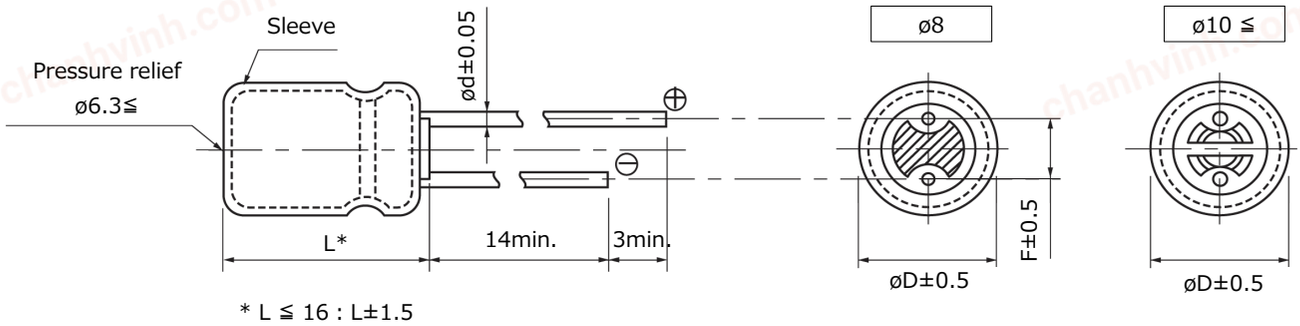
Specifications

Category temp. range	–40 ℃ to +105 ℃									
Rated voltage range	6.3 V to 100 V									
Capacitance range	4.7 μF to 8200 μF									
Capacitance tolerance	±20 % (120 Hz / +20℃)									
Leakage current	I ≦ 0.01 CV (μA) After 2 minutes									
Dissipation factor (tan δ)	Rated voltage (V)	6.3	10	16	25	35	50	63	100	(120 Hz /+20℃)
	Dissipation factor (tan δ)	0.22	0.19	0.16	0.14	0.12	0.10	0.09	0.08	
	For capacitance value ≧ 1000 μF, add 0.02 per every 1000 μF.									
Endurance	After following life test with DC voltage and +105 ℃±2 ℃ ripple current value applied (The sum of DC and ripple peak voltage shall not exceed the rated working voltage) when the capacitors are restored to 20 ℃, the capacitors shall meet the limits specified bellow. Duration ø5×11, ø6.3×11.2 : 5000 h ø8×11.5, ø10×12.5 : 6000 h (✻ Only EEUFR1V331U (ø10×12.5) 5000 h) ø8×15, ø10×16 : 8000 h, ø8×20 : 9000 h ø10×20 to ø10×25, ø12.5×20 to ø12.5×35, ø16×20 to ø16×25 : 10000 h									
	Capacitance change	Within ±25 % of the initial value (6.3 V to 10 V : ±30 %)								
	Dissipation factor (tan δ)	≦ 200 % of the initial limit								
	DC leakage current	Within the initial limit								
Shelf life	After storage for 1000 h at +105 ℃±2 ℃ with no voltage applied and then being stabilized at +20 °C, capacitors shall meet the limits specified in endurance. (With voltage treatment)									

Frequency correction factor for ripple current

Cap. (μF) \ Freq. (Hz)	60	120	1 k	10 k	100 k
4.7 to 33	0.45	0.55	0.75	0.90	1.00
47 to 330	0.60	0.70	0.85	0.95	1.00
390 to 1000	0.65	0.75	0.90	0.98	1.00
1200 to 8200	0.75	0.80	0.95	1.00	1.00

Dimensions



* L ≦ 16 : L±1.5
L ≧ 20 : L±2.0

Unit : mm

øD	5.0	6.3	8.0	10.0	12.5		16.0
L	—	—	—	—	12.5 to 25	30 to 35	—
ød	0.5	0.5	0.6	0.6	0.6	0.8	0.8
F	2.0	2.5	3.5	5.0	5.0	5.0	7.5

Design and specifications are each subject to change without notice. Ask factory for the current technical specifications before purchase and/or use.
Should a safety concern arise regarding this product, please be sure to contact us immediately.

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Case size/ Impedance/ Ripple current

R. voltage / Case size (mm) (øD×L)	6.3 V to 35 V			50 V		
	Impedance*1 (Ω)		Ripple current*1 (mA rms)	Impedance*1 (Ω)		Ripple current*1 (mA rms)
	+20 ℃	-10 ℃	+105 ℃	+20 ℃	-10 ℃	+105 ℃
5 × 11	0.300	1.000	280	0.340	1.130	250
6.3 × 11.2	0.130	0.430	455	0.140	0.460	405
8 × 11.5	0.056	0.168	950	0.061	0.183	870
8 × 15	0.041	0.123	1240	0.045	0.135	1140
8 × 20	0.030	0.090	1560	0.033	0.099	1430
10 × 12.5	0.043	0.114	1290	0.042	0.126	1170
10 × 16	0.028	0.078	1790	0.030	0.090	1650
10 × 20	0.020	0.057	2180	0.023	0.069	1890
10 × 25	0.018	0.054	2470	0.022	0.066	2150
12.5 × 20	0.018	0.045	2600	0.022	0.055	2260
12.5 × 25	0.015	0.038	3190	0.018	0.045	2660
12.5 × 30	0.013	0.033	3630	0.016	0.040	3160
12.5 × 35	0.012	0.030	3750	0.014	0.035	3270
16 × 20	0.017	0.043	3300	0.019	0.048	2870
16 × 25	0.014	0.035	3820	0.016	0.040	3320

R. voltage / Case size (mm) (øD×L)	63 V		
	Impedance*1 (Ω)		Ripple current*1 (mA rms)
	+20 ℃	-10 ℃	+105 ℃
5 × 11	0.510	2.040	175
6.3 × 11.2	0.210	0.840	284
8 × 11.5	0.092	0.368	566
8 × 15	0.068	0.272	741
8 × 20	0.050	0.200	930
10 × 12.5	0.063	0.252	761
10 × 16	0.045	0.180	1073
10 × 20	0.035	0.140	1229
10 × 25	0.033	0.132	1500
12.5 × 20	0.033	0.125	1582
12.5 × 25	0.027	0.092	1995
12.5 × 30	0.024	0.082	2528
12.5 × 35	0.021	0.071	2780
16 × 20	0.029	0.093	2153
16 × 25	0.024	0.074	2988

R. voltage / Case size (mm) (øD×L)	100 V		
	Impedance*1 (Ω)		Ripple current*1 (mA rms)
	+20 ℃	-10 ℃	+105 ℃
10 × 20	0.084	0.336	1500

*1: 100 kHz

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Characteristics list

Rated voltage (V)	Capacitance (±20 %) (μF)	Case size (mm)		Specification			Lead length (mm)				Part No.	Min. Packaging Q'ty (PCS)	
								Lead space					
		øD	L	Ripple current*1 (mA rms)	Impe-dance*2 (Ω)	Endu-rance (h)	Lead dia. (ød)	Straight	Taping ✻B	Taping ✻H		Straight leads	Taping
6.3	150	5.0	11.0	280	0.300	5000	0.5	2.0	5.0	2.5	EEUFR0J151( )	200	2000
	220	6.3	11.2	455	0.130	5000	0.5	2.5	5.0	2.5	EEUFR0J221( )	200	2000
	330	6.3	11.2	455	0.130	5000	0.5	2.5	5.0	2.5	EEUFR0J331( )	200	2000
	470	6.3	11.2	455	0.130	5000	0.5	2.5	5.0	2.5	EEUFR0J471( )	200	2000
	820	8.0	11.5	950	0.056	6000	0.6	3.5	5.0	—	EEUFR0J821( )	200	1000
	1000	8.0	11.5	950	0.056	6000	0.6	3.5	5.0	—	EEUFR0J102( )	200	1000
	1200	8.0	15.0	1240	0.041	8000	0.6	3.5	5.0	—	EEUFR0J122L( )	200	1000
		10.0	12.5	1290	0.043	6000	0.6	5.0	5.0	—	EEUFR0J122( )	200	500
	1500	8.0	20.0	1560	0.030	9000	0.6	3.5	5.0	—	EEUFR0J152L( )	200	1000
	1800	10.0	16.0	1790	0.028	8000	0.6	5.0	5.0	—	EEUFR0J182( )	200	500
	2200	10.0	20.0	2180	0.020	10000	0.6	5.0	5.0	—	EEUFR0J222( )	200	500
	2700	10.0	25.0	2470	0.018	10000	0.6	5.0	5.0	—	EEUFR0J272L( )	200	500
	3300	10.0	25.0	2470	0.018	10000	0.6	5.0	5.0	—	EEUFR0J332L( )	200	500
	3900	12.5	20.0	2600	0.018	10000	0.6	5.0	5.0	—	EEUFR0J392( )	200	500
	4700	12.5	25.0	3190	0.015	10000	0.6	5.0	5.0	—	EEUFR0J472( )	200	500
	5600	12.5	30.0	3630	0.013	10000	0.8	5.0	—	—	EEUFR0J562L	100	—
	6800	12.5	35.0	3750	0.012	10000	0.8	5.0	—	—	EEUFR0J682L	100	—
		16.0	20.0	3300	0.017	10000	0.8	7.5	7.5	—	EEUFR0J682S( )	100	250
	8200	16.0	25.0	3820	0.014	10000	0.8	7.5	7.5	—	EEUFR0J822( )	100	250
10	100	5.0	11.0	280	0.300	5000	0.5	2.0	5.0	2.5	EEUFR1A101( )	200	2000
	150	5.0	11.0	280	0.300	5000	0.5	2.0	5.0	2.5	EEUFR1A151( )	200	2000
	220	6.3	11.2	455	0.130	5000	0.5	2.5	5.0	2.5	EEUFR1A221( )	200	2000
	270	6.3	11.2	455	0.130	5000	0.5	2.5	5.0	2.5	EEUFR1A271( )	200	2000
	470	8.0	11.5	950	0.056	6000	0.6	3.5	5.0	—	EEUFR1A471( )	200	1000
	680	8.0	11.5	950	0.056	6000	0.6	3.5	5.0	—	EEUFR1A681( )	200	1000
	820	10.0	12.5	1290	0.043	6000	0.6	5.0	5.0	—	EEUFR1A821( )	200	500
	1000	10.0	16.0	1790	0.028	8000	0.6	5.0	5.0	—	EEUFR1A102( )	200	500
		8.0	15.0	1240	0.041	8000	0.6	3.5	5.0	—	EEUFR1A102L( )	200	1000
	1500	8.0	20.0	1560	0.030	9000	0.6	3.5	5.0	—	EEUFR1A152L( )	200	1000
		10.0	16.0	1790	0.028	8000	0.6	5.0	5.0	—	EEUFR1A152( )	200	500
	1800	10.0	20.0	2180	0.020	10000	0.6	5.0	5.0	—	EEUFR1A182( )	200	500
	2200	10.0	25.0	2470	0.018	10000	0.6	5.0	5.0	—	EEUFR1A222L( )	200	500
	3300	12.5	20.0	2600	0.018	10000	0.6	5.0	5.0	—	EEUFR1A332( )	200	500
	3900	12.5	25.0	3190	0.015	10000	0.6	5.0	5.0	—	EEUFR1A392( )	200	500
	4700	12.5	30.0	3630	0.013	10000	0.8	5.0	—	—	EEUFR1A472L	100	—
		16.0	20.0	3300	0.017	10000	0.8	7.5	7.5	—	EEUFR1A472S( )	100	250
	5600	12.5	35.0	3750	0.012	10000	0.8	5.0	—	—	EEUFR1A562L	100	—
	6800	12.5	35.0	3750	0.012	10000	0.8	5.0	—	—	EEUFR1A682L	100	—
		16.0	25.0	3820	0.014	10000	0.8	7.5	7.5	—	EEUFR1A682( )	100	250

*1: Ripple current (100 kHz / +105 ℃)
*2: Impedance (100 kHz / +20 ℃)
・When requesting taped product, please put the letter "B" or "H" be tween the "( )".
Lead wire pitch ✻B=5 mm, 7.5 mm, H=2.5 mm.
・Please refer to the page of “Taping dimensions”.

Design and specifications are each subject to change without notice. Ask factory for the current technical specifications before purchase and/or use.
Should a safety concern arise regarding this product, please be sure to contact us immediately.

28-Feb-20

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Characteristics list

Rated voltage (V)	Capacitance (±20 %) (μF)	Case size (mm)		Specification			Lead length (mm)				Part No.	Min. Packaging Q'ty (PCS)	
								Lead space					
		øD	L	Ripple current*1 (mA rms)	Impe-dance*2 (Ω)	Endu-rance (h)	Lead dia. (ød)	Straight	Taping ✻B	Taping ✻H		Straight leads	Taping
16	68	5.0	11.0	280	0.300	5000	0.5	2.0	5.0	2.5	EEUFR1C680( )	200	2000
	100	5.0	11.0	280	0.300	5000	0.5	2.0	5.0	2.5	EEUFR1C101( )	200	2000
	120	6.3	11.2	455	0.130	5000	0.5	2.5	5.0	2.5	EEUFR1C121( )	200	2000
	220	6.3	11.2	455	0.130	5000	0.5	2.5	5.0	2.5	EEUFR1C221( )	200	2000
	470	8.0	11.5	950	0.056	6000	0.6	3.5	5.0	—	EEUFR1C471( )	200	1000
	680	8.0	15.0	1240	0.041	8000	0.6	3.5	5.0	—	EEUFR1C681L( )	200	1000
		10.0	12.5	1290	0.043	6000	0.6	5.0	5.0	—	EEUFR1C681( )	200	500
	1000	8.0	20.0	1560	0.030	9000	0.6	3.5	5.0	—	EEUFR1C102L( )	200	1000
		10.0	16.0	1790	0.028	8000	0.6	5.0	5.0	—	EEUFR1C102( )	200	500
	1500	10.0	20.0	2180	0.020	10000	0.6	5.0	5.0	—	EEUFR1C152( )	200	500
		10.0	25.0	2470	0.018	10000	0.6	5.0	5.0	—	EEUFR1C152L( )	200	500
	1800	10.0	25.0	2470	0.018	10000	0.6	5.0	5.0	—	EEUFR1C182L( )	200	500
	2200	12.5	20.0	2600	0.018	10000	0.6	5.0	5.0	—	EEUFR1C222( )	200	500
	2700	12.5	25.0	3190	0.015	10000	0.6	5.0	5.0	—	EEUFR1C272( )	200	500
	3300	12.5	30.0	3630	0.013	10000	0.8	5.0	—	—	EEUFR1C332L	100	—
		16.0	20.0	3300	0.017	10000	0.8	7.5	7.5	—	EEUFR1C332S( )	100	250
	3900	12.5	35.0	3750	0.012	10000	0.8	5.0	—	—	EEUFR1C392L	100	—
		16.0	20.0	3300	0.017	10000	0.8	7.5	7.5	—	EEUFR1C392S( )	100	250
	4700	12.5	35.0	3750	0.012	10000	0.8	5.0	—	—	EEUFR1C472L	100	—
		16.0	25.0	3820	0.014	10000	0.8	7.5	7.5	—	EEUFR1C472( )	100	250
	5600	16.0	25.0	3820	0.014	10000	0.8	7.5	7.5	—	EEUFR1C562( )	100	250
25	47	5.0	11.0	280	0.300	5000	0.5	2.0	5.0	2.5	EEUFR1E470( )	200	2000
	68	5.0	11.0	280	0.300	5000	0.5	2.0	5.0	2.5	EEUFR1E680( )	200	2000
	100	6.3	11.2	455	0.130	5000	0.5	2.5	5.0	2.5	EEUFR1E101( )	200	2000
	150	6.3	11.2	455	0.130	5000	0.5	2.5	5.0	2.5	EEUFR1E151( )	200	2000
	220	8.0	11.5	950	0.056	6000	0.6	3.5	5.0	—	EEUFR1E221( )	200	1000
	330	8.0	11.5	950	0.056	6000	0.6	3.5	5.0	—	EEUFR1E331( )	200	1000
	390	8.0	15.0	1240	0.041	8000	0.6	3.5	5.0	—	EEUFR1E391L( )	200	1000
	470	8.0	15.0	1240	0.041	8000	0.6	3.5	5.0	—	EEUFR1E471Y( )	200	1000
		8.0	20.0	1560	0.030	9000	0.6	3.5	5.0	—	EEUFR1E471L( )	200	1000
		10.0	12.5	1290	0.043	6000	0.6	5.0	5.0	—	EEUFR1E471( )	200	500
	560	8.0	20.0	1560	0.030	9000	0.6	3.5	5.0	—	EEUFR1E561L( )	200	1000
	680	8.0	20.0	1560	0.030	9000	0.6	3.5	5.0	—	EEUFR1E681L( )	200	1000
		10.0	16.0	1790	0.028	8000	0.6	5.0	5.0	—	EEUFR1E681( )	200	500
	820	10.0	20.0	2180	0.020	10000	0.6	5.0	5.0	—	EEUFR1E821( )	200	500
	1000	10.0	20.0	2180	0.020	10000	0.6	5.0	5.0	—	EEUFR1E102( )	200	500
		10.0	25.0	2470	0.018	10000	0.6	5.0	5.0	—	EEUFR1E102L( )	200	500
	1200	10.0	25.0	2470	0.018	10000	0.6	5.0	5.0	—	EEUFR1E122L( )	200	500
	1500	12.5	20.0	2600	0.018	10000	0.6	5.0	5.0	—	EEUFR1E152( )	200	500
	1800	12.5	25.0	3190	0.015	10000	0.6	5.0	5.0	—	EEUFR1E182( )	200	500
		16.0	20.0	3300	0.017	10000	0.8	7.5	7.5	—	EEUFR1E182S( )	100	250
	2200	12.5	30.0	3630	0.013	10000	0.8	5.0	—	—	EEUFR1E222L	100	—
		16.0	20.0	3300	0.017	10000	0.8	7.5	7.5	—	EEUFR1E222S( )	100	250
	2700	12.5	35.0	3750	0.012	10000	0.8	5.0	—	—	EEUFR1E272L	100	—
		16.0	20.0	3300	0.017	10000	0.8	7.5	7.5	—	EEUFR1E272S( )	100	250
	3300	16.0	25.0	3820	0.014	10000	0.8	7.5	7.5	—	EEUFR1E332( )	100	250

*1: Ripple current (100 kHz / +105 ℃)
*2: Impedance (100 kHz / +20 ℃)
・When requesting taped product, please put the letter "B" or "H" be tween the "( )".
Lead wire pitch ✻B=5 mm, 7.5 mm, H=2.5 mm.
・Please refer to the page of “Taping dimensions”.

Design and specifications are each subject to change without notice. Ask factory for the current technical specifications before purchase and/or use.
Should a safety concern arise regarding this product, please be sure to contact us immediately.

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Characteristics list

Rated voltage (V)	Capacitance (±20 %) (μF)	Case size (mm)		Specification			Lead length (mm)				Part No.	Min. Packaging Q'ty (PCS)	
								Lead space					
		øD	L	Ripple current*1 (mA rms)	Impedance*2 (Ω)	Endurance (h)	Lead dia. (ød)	Straight	Taping ✻B	Taping ✻H		Straight leads	Taping
35	33	5.0	11.0	280	0.300	5000	0.5	2.0	5.0	2.5	EEUFR1V330( )	200	2000
	68	6.3	11.2	455	0.130	5000	0.5	2.5	5.0	2.5	EEUFR1V680( )	200	2000
	100	8.0	11.5	950	0.056	6000	0.6	3.5	5.0	—	EEUFR1V101( )	200	1000
	180	8.0	11.5	950	0.056	6000	0.6	3.5	5.0	—	EEUFR1V181( )	200	1000
	220	8.0	11.5	950	0.056	6000	0.6	3.5	5.0	—	EEUFR1V221( )	200	1000
	270	8.0	15.0	1240	0.041	8000	0.6	3.5	5.0	—	EEUFR1V271L( )	200	1000
		10.0	12.5	1290	0.043	6000	0.6	5.0	5.0	—	EEUFR1V271( )	200	500
	330	10.0	12.5	1330	0.043	5000	0.6	5.0	5.0	—	EEUFR1V331U( )	200	500
	390	8.0	20.0	1560	0.030	9000	0.6	3.5	5.0	—	EEUFR1V391L( )	200	1000
	470	8.0	20.0	1560	0.030	9000	0.6	3.5	5.0	—	EEUFR1V471L( )	200	1000
		10.0	16.0	1790	0.028	8000	0.6	5.0	5.0	—	EEUFR1V471( )	200	500
	560	10.0	20.0	2180	0.020	10000	0.6	5.0	5.0	—	EEUFR1V561( )	200	500
	680	10.0	20.0	2180	0.020	10000	0.6	5.0	5.0	—	EEUFR1V681( )	200	500
		10.0	25.0	2470	0.018	10000	0.6	5.0	5.0	—	EEUFR1V681L( )	200	500
	820	10.0	25.0	2470	0.018	10000	0.6	5.0	5.0	—	EEUFR1V821L( )	200	500
	1000	12.5	20.0	2600	0.018	10000	0.6	5.0	5.0	—	EEUFR1V102( )	200	500
	1200	12.5	25.0	3190	0.015	10000	0.6	5.0	5.0	—	EEUFR1V122( )	200	500
	1500	12.5	30.0	3630	0.013	10000	0.8	5.0	—	—	EEUFR1V152L	100	—
		16.0	20.0	3300	0.017	10000	0.8	7.5	7.5	—	EEUFR1V152S( )	100	250
	1800	12.5	35.0	3750	0.012	10000	0.8	5.0	—	—	EEUFR1V182L	100	—
		16.0	25.0	3820	0.014	10000	0.8	7.5	7.5	—	EEUFR1V182( )	100	250
	2200	12.5	35.0	3750	0.012	10000	0.8	5.0	—	—	EEUFR1V222L	100	—
		16.0	25.0	3820	0.014	10000	0.8	7.5	7.5	—	EEUFR1V222( )	100	250
50	4.7	5.0	11.0	185	0.620	5000	0.5	2.0	5.0	2.5	EEUFR1H4R7( )	200	2000
	10	5.0	11.0	250	0.340	5000	0.5	2.0	5.0	2.5	EEUFR1H100( )	200	2000
	22	5.0	11.0	250	0.340	5000	0.5	2.0	5.0	2.5	EEUFR1H220( )	200	2000
	47	6.3	11.2	405	0.140	5000	0.5	2.5	5.0	—	EEUFR1H470( )	200	2000
	56	6.3	11.2	405	0.140	5000	0.5	2.5	5.0	2.5	EEUFR1H560( )	200	2000
	100	8.0	11.5	870	0.061	6000	0.6	3.5	5.0	—	EEUFR1H101( )	200	1000
	120	8.0	15.0	1140	0.045	8000	0.6	3.5	5.0	—	EEUFR1H121L( )	200	1000
	150	10.0	12.5	1170	0.042	6000	0.6	5.0	5.0	—	EEUFR1H151( )	200	500
	180	8.0	20.0	1430	0.033	9000	0.6	3.5	5.0	—	EEUFR1H181L( )	200	1000
	220	10.0	16.0	1650	0.030	8000	0.6	5.0	5.0	—	EEUFR1H221( )	200	500
	270	10.0	20.0	1890	0.023	10000	0.6	5.0	5.0	—	EEUFR1H271( )	200	500
	330	10.0	25.0	2150	0.022	10000	0.6	5.0	5.0	—	EEUFR1H331L( )	200	500
	470	12.5	20.0	2260	0.022	10000	0.6	5.0	5.0	—	EEUFR1H471( )	200	500
	560	12.5	25.0	2660	0.018	10000	0.6	5.0	5.0	—	EEUFR1H561( )	200	500
	680	12.5	30.0	3160	0.016	10000	0.8	5.0	—	—	EEUFR1H681L	100	—
	820	12.5	35.0	3270	0.014	10000	0.8	5.0	—	—	EEUFR1H821L	100	—
		16.0	20.0	2870	0.019	10000	0.8	7.5	7.5	—	EEUFR1H821S( )	100	250
	1000	16.0	25.0	3320	0.016	10000	0.8	7.5	7.5	—	EEUFR1H102( )	100	250
63	18	5.0	11.0	175	0.510	5000	0.5	2.0	5.0	2.5	EEUFR1J180( )	200	2000
	47	6.3	11.2	284	0.210	5000	0.5	2.5	5.0	2.5	EEUFR1J470( )	200	2000
	82	8.0	11.5	566	0.092	6000	0.6	3.5	5.0	—	EEUFR1J820( )	200	1000
	100	8.0	15.0	741	0.068	8000	0.6	3.5	5.0	—	EEUFR1J101L( )	200	1000
		10.0	12.5	761	0.063	6000	0.6	5.0	5.0	—	EEUFR1J101( )	200	500
	120	8.0	20.0	930	0.050	9000	0.6	3.5	5.0	—	EEUFR1J121L( )	200	1000
		10.0	16.0	1073	0.045	8000	0.6	5.0	5.0	—	EEUFR1J121( )	200	500
	150	8.0	20.0	930	0.050	9000	0.6	3.5	5.0	—	EEUFR1J151L( )	200	1000
		10.0	16.0	1073	0.045	8000	0.6	5.0	5.0	—	EEUFR1J151( )	200	500
	180	10.0	20.0	1229	0.035	10000	0.6	5.0	5.0	—	EEUFR1J181( )	200	500
	220	10.0	25.0	1500	0.033	10000	0.6	5.0	5.0	—	EEUFR1J221L( )	200	500
	270	10.0	20.0	1229	0.035	10000	0.6	5.0	5.0	—	EEUFR1J271U( )	200	500
		10.0	25.0	1500	0.033	10000	0.6	5.0	5.0	—	EEUFR1J271L( )	200	500
		12.5	20.0	1582	0.033	10000	0.6	5.0	5.0	—	EEUFR1J271( )	200	500
	330	12.5	20.0	1582	0.033	10000	0.6	5.0	5.0	—	EEUFR1J331( )	200	500
	390	12.5	25.0	1995	0.027	10000	0.6	5.0	5.0	—	EEUFR1J391( )	200	500
	470	12.5	25.0	1995	0.027	10000	0.6	5.0	5.0	—	EEUFR1J471( )	200	500
	560	12.5	30.0	2528	0.024	10000	0.8	5.0	—	—	EEUFR1J561L	100	—
		16.0	20.0	2153	0.029	10000	0.8	7.5	7.5	—	EEUFR1J561S( )	100	250
	680	12.5	35.0	2780	0.021	10000	0.8	5.0	—	—	EEUFR1J681L	100	—
	820	16.0	25.0	2988	0.024	10000	0.8	7.5	7.5	—	EEUFR1J821( )	100	250
100	100	10.0	20.0	1500	0.084	10000	0.6	5.0	5.0	—	EEUFR2A101( )	200	500

*1: Ripple current (100 kHz / +105 ℃)

*2: Impedance (100 kHz / +20 ℃)

・When requesting taped product, please put the letter "B" or "H" be tween the "( )".
Lead wire pitch ✻B=5 mm, 7.5 mm, H=2.5 mm.

・Please refer to the page of “Taping dimensions”.

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Panasonic INDUSTRY

Aluminum Electrolytic Capacitors

Radial Lead Type

FS-A series



Features

- Endurance : 105 ℃ 5000 h to 10000 h
- Low ESR, Miniaturized (1 size smaller than series FR)
- RoHS compliant

Country of origin

- Malaysia

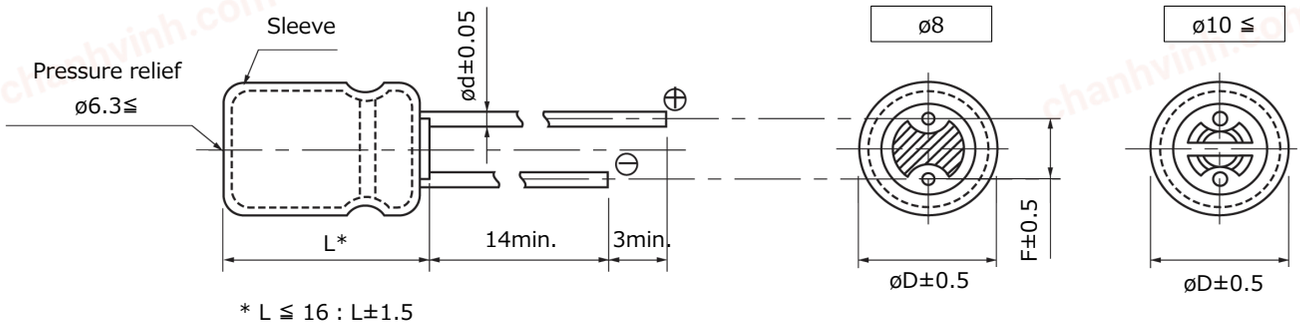
Specifications

Category temp. range	–40 ℃ to +105 ℃										
Rated voltage range	6.3 V to 100 V										
Capacitance range	27 μF to 10000 μF										
Capacitance tolerance	±20 % (120 Hz / +20℃)										
Leakage current	I ≦ 0.01 CV (μA) After 2 minutes										
Dissipation factor (tan δ)	Rated voltage (V)	6.3	10	16	25	35	50	63	80	100	(120 Hz /+20℃)
	Dissipation factor (tan δ)	0.22	0.19	0.16	0.14	0.12	0.10	0.09	0.08	0.08	
	For capacitance value ≧ 1000 μF, add 0.02 per every 1000 μF.										
Endurance	After following life test with DC voltage and +105 ℃±2 ℃ ripple current value applied (The sum of DC and ripple peak voltage shall not exceed the rated working voltage) when the capacitors are restored to 20 ℃, the capacitors shall meet the limits specified bellow. Duration ø5×11, ø6.3×11.2 : 5000 h ø8×11.5, ø10×12.5 : 6000 h ø8×15, ø10×16 : 8000 h, ø8×20 : 9000 h ø10×20 to ø10×25, ø12.5×20 to ø12.5×35, ø16×20 to ø16×25 : 10000 h										
	Capacitance change	Within ±25 % of the initial value (6.3 V to 10 V : ±30 %)									
	Dissipation factor (tan δ)	≦ 200 % of the initial limit									
	DC leakage current	Within the initial limit									
Shelf life	After storage for 1000 h at +105 ℃±2 ℃ with no voltage applied and then being stabilized at +20 ℃, capacitors shall meet the limits specified in endurance. (With voltage treatment)										

Frequency correction factor for ripple current

Cap. (μF) \ Freq. (Hz)	60	120	1 k	10 k	100 k to
27 to 33	0.45	0.55	0.75	0.90	1.00
47 to 330	0.60	0.70	0.85	0.95	1.00
390 to 1000	0.65	0.75	0.90	0.98	1.00
1200 to 10000	0.75	0.80	0.95	1.00	1.00

Dimensions



* L ≦ 16 : L±1.5
L ≧ 20 : L±2.0

Unit : mm

øD	5.0	6.3	8.0	10.0	12.5		16.0
L	—	—	—	—	12.5 to 25	30 to 35	—
ød	0.5	0.5	0.6	0.6	0.6	0.8	0.8
F	2.0	2.5	3.5	5.0	5.0	5.0	7.5

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Should a safety concern arise regarding this product, please be sure to contact us immediately.

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Case size/ Impedance/ Ripple current

R. voltage / Case size (mm) (øD×L)	6.3 V to 35 V			50 V		
	Impedance*1 (Ω)		Ripple current*1 (mA rms)	Impedance*1 (Ω)		Ripple current*1 (mA rms)
	+20 ℃	-10 ℃	+105 ℃	+20 ℃	-10 ℃	+105 ℃
5 × 11	0.300	1.000	280	0.340	1.130	250
6.3 × 11.2	0.130	0.430	455	—	—	—
8 × 11.5	0.056	0.168	950	—	—	—
8 × 15	0.041	0.123	1240	0.045	0.135	1140
8 × 20	0.030	0.090	1560	0.033	0.099	1430
10 × 12.5	0.043	0.114	1290	—	—	—
10 × 16	0.028	0.078	1790	—	—	—
10 × 20	0.020	0.057	2180	0.023	0.069	1890
10 × 25	0.018	0.054	2470	0.022	0.066	2150
12.5 × 20	0.018	0.045	2600	—	—	—
12.5 × 25	0.015	0.038	3190	0.018	0.045	2660
12.5 × 30	0.013	0.033	3630	0.016	0.040	3160
12.5 × 35	0.012	0.030	3750	0.014	0.035	3270
16 × 20	0.017	0.043	3300	—	—	—
16 × 25	0.014	0.035	3820	0.016	0.040	3320

R. voltage / Case size (mm) (øD×L)	63 V			80 V to 100 V		
	Impedance*1 (Ω)		Ripple current*1 (mA rms)	Impedance*1 (Ω)		Ripple current*1 (mA rms)
	+20 ℃	-10 ℃	+105 ℃	+20 ℃	-10 ℃	+105 ℃
5 × 11	0.510	2.040	175	—	—	—
6.3 × 11.2	—	—	—	—	—	—
8 × 11.5	—	—	—	0.160	0.720	490
8 × 15	0.068	0.272	741	0.112	0.504	590
8 × 20	0.050	0.200	930	0.096	0.432	810
10 × 12.5	0.063	0.252	761	0.112	0.448	600
10 × 16	0.045	0.180	1073	0.072	0.288	930
10 × 20	—	—	—	0.054	0.224	1120
10 × 25	0.033	0.132	1500	0.044	0.176	1200
12.5 × 20	0.033	0.125	1582	0.043	0.135	1400
12.5 × 25	0.027	0.092	1995	0.034	0.108	1800
12.5 × 30	—	—	—	0.030	0.099	2200
12.5 × 35	0.021	0.071	2780	0.023	0.070	2380
16 × 20	0.029	0.093	2153	0.032	0.108	1450
16 × 25	0.024	0.074	2988	0.025	0.076	2500

*1: 100 kHz

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Characteristics list

Rated voltage (V)	Capacitance (±20 %) (μF)	Case size (mm)		Specification			Lead length (mm)				Part No.	Min. Packaging Q'ty (PCS)	
								Lead space					
		øD	L	Ripple current*1 (mA rms)	Impe-dance*2 (Ω)	Endu-rance (h)	Lead dia. (ød)	Straight	Taping ✻B	Taping ✻H		Straight leads	Taping
6.3	220	5.0	11.0	280	0.300	5000	0.5	2.0	5.0	2.5	EEUFS0J221( )	200	2000
	1500	8.0	15.0	1240	0.041	8000	0.6	3.5	5.0	—	EEUFS0J152L( )	200	1000
		10.0	12.5	1290	0.043	6000	0.6	5.0	5.0	—	EEUFS0J152( )	200	500
	1800	8.0	20.0	1560	0.030	9000	0.6	3.5	5.0	—	EEUFS0J182L( )	200	1000
	2000	8.0	20.0	1560	0.030	9000	0.6	3.5	5.0	—	EEUFS0J202L( )	200	1000
		10.0	16.0	1790	0.028	8000	0.6	5.0	5.0	—	EEUFS0J202( )	200	500
	2200	10.0	16.0	1790	0.028	8000	0.6	5.0	5.0	—	EEUFS0J222( )	200	500
	2700	10.0	20.0	2180	0.020	10000	0.6	5.0	5.0	—	EEUFS0J272( )	200	500
	3300	10.0	20.0	2180	0.020	10000	0.6	5.0	5.0	—	EEUFS0J332( )	200	500
	3900	10.0	25.0	2470	0.018	10000	0.6	5.0	5.0	—	EEUFS0J392L( )	200	500
	4700	12.5	20.0	2600	0.018	10000	0.6	5.0	5.0	—	EEUFS0J472( )	200	500
	5100	12.5	25.0	3190	0.015	10000	0.6	5.0	5.0	—	EEUFS0J512( )	200	500
	5600	12.5	25.0	3190	0.015	10000	0.6	5.0	5.0	—	EEUFS0J562( )	200	500
	6200	12.5	30.0	3630	0.013	10000	0.8	5.0	—	—	EEUFS0J622L	100	—
	6800	12.5	30.0	3630	0.013	10000	0.8	5.0	—	—	EEUFS0J682L	100	—
	7500	12.5	35.0	3750	0.012	10000	0.8	5.0	—	—	EEUFS0J752L	100	—
		16.0	20.0	3300	0.017	10000	0.8	7.5	7.5	—	EEUFS0J752S( )	100	250
	8200	12.5	35.0	3750	0.012	10000	0.8	5.0	—	—	EEUFS0J822L	100	—
		16.0	20.0	3300	0.017	10000	0.8	7.5	7.5	—	EEUFS0J822S( )	100	250
	9100	16.0	25.0	3820	0.014	10000	0.8	7.5	7.5	—	EEUFS0J912( )	100	250
	10000	16.0	25.0	3820	0.014	10000	0.8	7.5	7.5	—	EEUFS0J103( )	100	250
10	180	5.0	11.0	280	0.300	5000	0.5	2.0	5.0	2.5	EEUFS1A181( )	200	2000
	330	6.3	11.2	455	0.130	5000	0.5	2.5	5.0	2.5	EEUFS1A331( )	200	2000
	820	8.0	11.5	950	0.056	6000	0.6	3.5	5.0	—	EEUFS1A821( )	200	1000
	1000	10.0	12.5	1290	0.043	6000	0.6	5.0	5.0	—	EEUFS1A102( )	200	500
	1200	8.0	15.0	1240	0.041	8000	0.6	3.5	5.0	—	EEUFS1A122L( )	200	1000
		10.0	12.5	1290	0.043	6000	0.6	5.0	5.0	—	EEUFS1A122( )	200	500
	1800	8.0	20.0	1560	0.030	9000	0.6	3.5	5.0	—	EEUFS1A182L( )	200	1000
		10.0	16.0	1790	0.028	8000	0.6	5.0	5.0	—	EEUFS1A182( )	200	500
	2000	10.0	20.0	2180	0.020	10000	0.6	5.0	5.0	—	EEUFS1A202( )	200	500
	2200	10.0	20.0	2180	0.020	10000	0.6	5.0	5.0	—	EEUFS1A222( )	200	500
	2700	10.0	25.0	2470	0.018	10000	0.6	5.0	5.0	—	EEUFS1A272L( )	200	500
	3600	12.5	20.0	2600	0.018	10000	0.6	5.0	5.0	—	EEUFS1A362( )	200	500
	4700	12.5	25.0	3190	0.015	10000	0.6	5.0	5.0	—	EEUFS1A472( )	200	500
	5100	12.5	30.0	3630	0.013	10000	0.8	5.0	—	—	EEUFS1A512L	100	—
	5600	12.5	30.0	3630	0.013	10000	0.8	5.0	—	—	EEUFS1A562L	100	—
		16.0	20.0	3300	0.017	10000	0.8	7.5	7.5	—	EEUFS1A562S( )	100	250
	7500	12.5	35.0	3750	0.012	10000	0.8	5.0	—	—	EEUFS1A752L	100	—
	8200	16.0	25.0	3820	0.014	10000	0.8	7.5	7.5	—	EEUFS1A822( )	100	250

*1: Ripple current (100 kHz / +105 ℃)
*2: Impedance (100 kHz / +20 ℃)
・When requesting taped product, please put the letter "B" or "H" be tween the "( )".
Lead wire pitch ✻B=5 mm, 7.5 mm, H=2.5 mm.
・Please refer to the page of “Taping dimensions”.

Design and specifications are each subject to change without notice. Ask factory for the current technical specifications before purchase and/or use.
Should a safety concern arise regarding this product, please be sure to contact us immediately.

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Characteristics list

Rated voltage (V)	Capacitance (±20 %) (μF)	Case size (mm)		Specification			Lead length (mm)				Part No.	Min. Packaging Q'ty (PCS)	
								Lead space					
		øD	L	Ripple current*1 (mA rms)	Impe-dance*2 (Ω)	Endu-rance (h)	Lead dia. (ød)	Straight	Taping ✻B	Taping ✻H		Straight leads	Taping
16	120	5.0	11.0	280	0.300	5000	0.5	2.0	5.0	2.5	EEUFS1C121( )	200	2000
	510	8.0	11.5	950	0.056	6000	0.6	3.5	5.0	—	EEUFS1C511( )	200	1000
	820	8.0	15.0	1240	0.041	8000	0.6	3.5	5.0	—	EEUFS1C821L( )	200	1000
		10.0	12.5	1290	0.043	6000	0.6	5.0	5.0	—	EEUFS1C821( )	200	500
	1200	8.0	20.0	1560	0.030	9000	0.6	3.5	5.0	—	EEUFS1C122L( )	200	1000
		10.0	16.0	1790	0.028	8000	0.6	5.0	5.0	—	EEUFS1C122( )	200	500
	1800	10.0	20.0	2180	0.020	10000	0.6	5.0	5.0	—	EEUFS1C182( )	200	500
	2200	10.0	25.0	2470	0.018	10000	0.6	5.0	5.0	—	EEUFS1C222L( )	200	500
	2400	12.5	20.0	2600	0.018	10000	0.6	5.0	5.0	—	EEUFS1C242( )	200	500
	3300	12.5	25.0	3190	0.015	10000	0.6	5.0	5.0	—	EEUFS1C332( )	200	500
	3600	12.5	30.0	3630	0.013	10000	0.8	5.0	—	—	EEUFS1C362L	100	—
	3900	12.5	30.0	3630	0.013	10000	0.8	5.0	—	—	EEUFS1C392L	100	—
	4700	16.0	20.0	3300	0.017	10000	0.8	7.5	7.5	—	EEUFS1C472S( )	100	250
	5100	12.5	35.0	3750	0.012	10000	0.8	5.0	—	—	EEUFS1C512L	100	—
	6200	16.0	25.0	3820	0.014	10000	0.8	7.5	7.5	—	EEUFS1C622( )	100	250
25	1200	10.0	20.0	2180	0.020	10000	0.6	5.0	5.0	—	EEUFS1E122( )	200	500
	2200	12.5	25.0	3190	0.015	10000	0.6	5.0	5.0	—	EEUFS1E222( )	200	500
	3300	12.5	35.0	3750	0.012	10000	0.8	5.0	—	—	EEUFS1E332L	100	—
	3900	16.0	25.0	3820	0.014	10000	0.8	7.5	7.5	—	EEUFS1E392( )	100	250
35	330	8.0	15.0	1240	0.041	8000	0.6	3.5	5.0	—	EEUFS1V331L( )	200	1000
	820	10.0	20.0	2180	0.020	10000	0.6	5.0	5.0	—	EEUFS1V821( )	200	500
	1000	10.0	25.0	2470	0.018	10000	0.6	5.0	5.0	—	EEUFS1V102L( )	200	500
	1500	12.5	25.0	3190	0.015	10000	0.6	5.0	5.0	—	EEUFS1V152( )	200	500
	1800	16.0	20.0	3300	0.017	10000	0.8	7.5	7.5	—	EEUFS1V182S( )	100	250
	2700	16.0	25.0	3820	0.014	10000	0.8	7.5	7.5	—	EEUFS1V272( )	100	250
50	27	5.0	11.0	250	0.340	5000	0.5	2.0	5.0	2.5	EEUFS1H270( )	200	2000
	150	8.0	15.0	1140	0.045	8000	0.6	3.5	5.0	—	EEUFS1H151L( )	200	1000
	220	8.0	20.0	1430	0.033	9000	0.6	3.5	5.0	—	EEUFS1H221L( )	200	1000
	330	10.0	20.0	1890	0.023	10000	0.6	5.0	5.0	—	EEUFS1H331( )	200	500
	390	10.0	25.0	2150	0.022	10000	0.6	5.0	5.0	—	EEUFS1H391L( )	200	500
	680	12.5	25.0	2660	0.018	10000	0.6	5.0	5.0	—	EEUFS1H681( )	200	500
	820	12.5	30.0	3160	0.016	10000	0.8	5.0	—	—	EEUFS1H821L	100	—
	1000	12.5	35.0	3270	0.014	10000	0.8	5.0	—	—	EEUFS1H102L	100	—
	1200	16.0	25.0	3320	0.016	10000	0.8	7.5	7.5	—	EEUFS1H122( )	100	250
63	27	5.0	11.0	175	0.510	5000	0.5	2.0	5.0	2.5	EEUFS1J270( )	200	2000
	120	8.0	15.0	741	0.068	8000	0.6	3.5	5.0	—	EEUFS1J121L( )	200	1000
		10.0	12.5	761	0.063	6000	0.6	5.0	5.0	—	EEUFS1J121( )	200	500
	180	8.0	20.0	930	0.050	9000	0.6	3.5	5.0	—	EEUFS1J181L( )	200	1000
		10.0	16.0	1073	0.045	8000	0.6	5.0	5.0	—	EEUFS1J181( )	200	500
	330	10.0	25.0	1500	0.033	10000	0.6	5.0	5.0	—	EEUFS1J331L( )	200	500
	390	12.5	20.0	1582	0.033	10000	0.6	5.0	5.0	—	EEUFS1J391( )	200	500
	560	12.5	25.0	1995	0.027	10000	0.6	5.0	5.0	—	EEUFS1J561( )	200	500
	680	16.0	20.0	2153	0.029	10000	0.8	7.5	7.5	—	EEUFS1J681S( )	100	250
	820	12.5	35.0	2780	0.021	10000	0.8	5.0	—	—	EEUFS1J821L	100	—
	1000	16.0	25.0	2988	0.024	10000	0.8	7.5	7.5	—	EEUFS1J102( )	100	250

*1: Ripple current (100 kHz / +105 ℃)
*2: Impedance (100 kHz / +20 ℃)
・When requesting taped product, please put the letter "B" or "H" be tween the "( )".
Lead wire pitch ✻B=5 mm, 7.5 mm, H=2.5 mm.
・Please refer to the page of “Taping dimensions”.

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Characteristics list

Rated voltage (V)	Capacitance (±20 %) (μF)	Case size (mm)		Specification			Lead length (mm)			Part No.	Min. Packaging Q'ty (PCS)	
								Lead space				
		øD	L	Ripple current*1 (mA rms)	Impe-dance*2 (Ω)	Endu-rance (h)	Lead dia. (ød)	Straight	Taping ✻B		Straight leads	Taping
80	47	8.0	11.5	490	0.160	6000	0.6	3.5	5.0	EEUFS1K470( )	200	1000
	56	8.0	11.5	490	0.160	6000	0.6	3.5	5.0	EEUFS1K560( )	200	1000
	68	8.0	15.0	590	0.112	8000	0.6	3.5	5.0	EEUFS1K680( )	200	1000
	82	8.0	15.0	590	0.112	8000	0.6	3.5	5.0	EEUFS1K820( )	200	1000
	100	8.0	20.0	810	0.096	9000	0.6	3.5	5.0	EEUFS1K101L( )	200	1000
		10.0	12.5	600	0.112	6000	0.6	5.0	5.0	EEUFS1K101( )	200	500
	120	8.0	20.0	810	0.096	9000	0.6	3.5	5.0	EEUFS1K121L( )	200	1000
	150	10.0	16.0	930	0.072	8000	0.6	5.0	5.0	EEUFS1K151( )	200	500
	180	10.0	20.0	1120	0.054	10000	0.6	5.0	5.0	EEUFS1K181( )	200	500
	220	10.0	20.0	1120	0.054	10000	0.6	5.0	5.0	EEUFS1K221( )	200	500
		10.0	25.0	1200	0.044	10000	0.6	5.0	5.0	EEUFS1K221L( )	200	500
	270	10.0	25.0	1200	0.044	10000	0.6	5.0	5.0	EEUFS1K271L( )	200	500
		12.5	20.0	1400	0.043	10000	0.6	5.0	5.0	EEUFS1K271( )	200	500
	390	12.5	25.0	1800	0.034	10000	0.6	5.0	5.0	EEUFS1K391( )	200	500
	470	12.5	30.0	2200	0.030	10000	0.8	5.0	—	EEUFS1K471L( )	100	—
		16.0	20.0	1450	0.032	10000	0.8	7.5	7.5	EEUFS1K471S( )	100	250
	560	12.5	35.0	2380	0.023	10000	0.8	5.0	—	EEUFS1K561L( )	100	—
	680	16.0	25.0	2500	0.025	10000	0.8	7.5	7.5	EEUFS1K681( )	100	250
100	27	8.0	11.5	490	0.160	6000	0.6	3.5	5.0	EEUFS2A270( )	200	1000
	33	8.0	11.5	490	0.160	6000	0.6	3.5	5.0	EEUFS2A330( )	200	1000
	39	8.0	15.0	590	0.112	8000	0.6	3.5	5.0	EEUFS2A390( )	200	1000
	47	8.0	15.0	590	0.112	8000	0.6	3.5	5.0	EEUFS2A470L( )	200	1000
		10.0	12.5	600	0.112	6000	0.6	5.0	5.0	EEUFS2A470( )	200	500
	56	8.0	20.0	810	0.096	9000	0.6	3.5	5.0	EEUFS2A560L( )	200	1000
	68	8.0	20.0	810	0.096	9000	0.6	3.5	5.0	EEUFS2A680L( )	200	1000
		10.0	16.0	930	0.072	8000	0.6	5.0	5.0	EEUFS2A680( )	200	500
	120	10.0	20.0	1120	0.054	10000	0.6	5.0	5.0	EEUFS2A121( )	200	500
		10.0	25.0	1200	0.044	10000	0.6	5.0	5.0	EEUFS2A121L( )	200	500
	150	10.0	25.0	1200	0.044	10000	0.6	5.0	5.0	EEUFS2A151L( )	200	500
		12.5	20.0	1400	0.043	10000	0.6	5.0	5.0	EEUFS2A151( )	200	500
	180	12.5	25.0	1800	0.034	10000	0.6	5.0	5.0	EEUFS2A181( )	200	500
	220	12.5	25.0	1800	0.034	10000	0.6	5.0	5.0	EEUFS2A221( )	200	500
	270	12.5	30.0	2200	0.030	10000	0.8	5.0	—	EEUFS2A271L( )	100	—
		16.0	20.0	1450	0.032	10000	0.8	7.5	7.5	EEUFS2A271S( )	100	250
	330	12.5	35.0	2380	0.023	10000	0.8	5.0	—	EEUFS2A331L( )	100	—
	390	16.0	25.0	2500	0.025	10000	0.8	7.5	7.5	EEUFS2A391( )	100	250

*1: Ripple current (100 kHz / +105 ℃)
*2: Impedance (100 kHz / +20 ℃)
・When requesting taped product, please put the letter "B" be tween the "( )".
Lead wire pitch ✻B=5 mm, 7.5 mm.
・Please refer to the page of “Taping dimensions”.

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Panasonic INDUSTRY

Aluminum Electrolytic Capacitors

Radial Lead Type

FP-A series



Features

- Endurance : 105 ℃ 4000 h to 5000 h
- High ripple current (2 to 2.5 times as high as FC series)
- Large capacitance (Up to 60 % larger than FC series)
- AEC-Q200 compliant
- RoHS compliant

Country of origin

- Malaysia

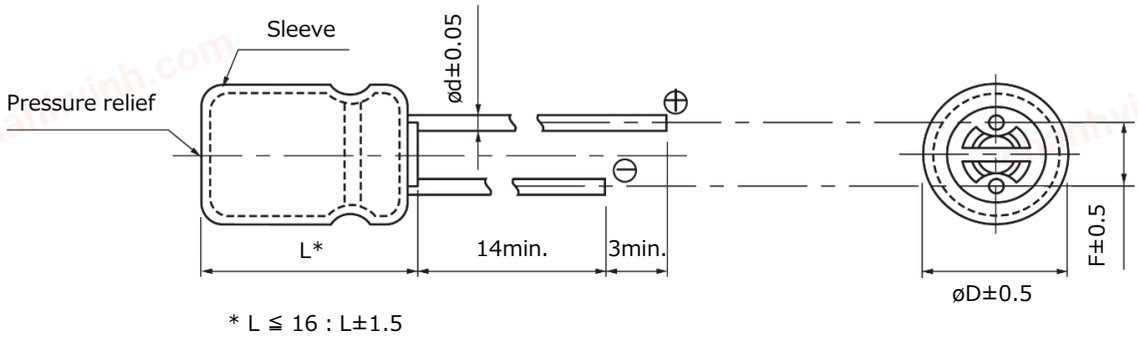
Specifications

Category temp. range	−55 ℃ to +105 ℃			
Rated voltage range	25 V to 35 V			
Capacitance range	510 μF to 2000 μF			
Capacitance tolerance	±20 % (120 Hz / +20℃)			
Leakage current	I ≦ 0.01 CV (μA) After 2 minutes			
Dissipation factor (tan δ)	Rated voltage (V)	25	35	(120 Hz /+20℃)
	Dissipation factor (tan δ)	0.14	0.12	
	For capacitance value ≧ 1000 μF, add 0.02 per every 1000 μF.			
Endurance	After following life test with DC voltage and +105 ℃±2 ℃ ripple current value applied (The sum of DC and ripple peak voltage shall not exceed the rated working voltage)when the capacitors are restored to 20 ℃, the capacitors shall meet the limits specified bellow. Duration ø10 : 4000 h, ø12.5 : 5000 h			
	Capacitance change	Within ±30 % of the initial value		
	Dissipation factor (tan δ)	≦ 300 % of the initial limit		
	DC leakage current	Within the initial limit		
Shelf life	After storage for 1000 h at +105 ℃±2 ℃ with no voltage applied and then being stabilized at +20 ℃, capacitors shall meet the limits specified in endurance. (With voltage treatment)			

Frequency correction factor for ripple current

Cap. (μF) \ Freq. (Hz)	120	1 k	10 k	100 k to
510 to 1000	0.65	0.75	0.95	1.00
1200 to 2000	0.75	0.80	1.00	1.00

Dimensions



* L ≦ 16 : L±1.5
  L ≧ 20 : L±2.0

Unit : mm

øD	10.0	12.5
L	16 to 20	20 to 25
ød	0.6	0.6
F	5.0	5.0

Design and specifications are each subject to change without notice. Ask factory for the current technical specifications before purchase and/or use.
Should a safety concern arise regarding this product, please be sure to contact us immediately.

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Case size/ Impedance/ Ripple current

R. voltage / Case size (mm) (øD×L)	25 V to 35 V		
	ESR (Ω) (100 kHz)		Ripple current (mA rms) (100 kHz)
	+20 ℃	-10 ℃	+105 ℃
10 × 16	0.068	0.136	2500
10 × 20	0.052	0.104	3000
12.5 × 20	0.038	0.076	3250
12.5 × 25	0.030	0..060	4000

Characteristics list

Rated voltage (V)	Capacitance (±20 %) (µF)	Case size (mm)		Specification			Lead length (mm)			Part No.	Min. Packaging Q'ty (PCS)	
		øD	L	Ripple current*1 (mA rms)	ESR*2 (Ω)	Endu-rance (h)	Lead dia. (ød)	Lead space			Straight leads	Taping
								Straight	Taping ✻B			
25	680	10.0	16.0	2500	0.068	4000	0.6	5.0	5.0	EEUFP1E681( )	200	500
	1000	10.0	20.0	3000	0.052	4000	0.6	5.0	5.0	EEUFP1E102( )	200	500
	1500	12.5	20.0	3250	0.038	5000	0.6	5.0	5.0	EEUFP1E152( )	200	500
	2000	12.5	25.0	4000	0.030	5000	0.6	5.0	5.0	EEUFP1E202( )	200	500
35	510	10.0	16.0	2500	0.068	4000	0.6	5.0	5.0	EEUFP1V511( )	200	500
	750	10.0	20.0	3000	0.052	4000	0.6	5.0	5.0	EEUFP1V751( )	200	500
	1000	12.5	20.0	3250	0.038	5000	0.6	5.0	5.0	EEUFP1V102( )	200	500
	1300	12.5	25.0	4000	0.030	5000	0.6	5.0	5.0	EEUFP1V132( )	200	500

*1: Ripple current (100 kHz / +105 ℃)
*2: ESR (100 kHz / +20 ℃)
・When requesting taped product, please put the letter "B". Lead wire pitch ✻B=5 mm.
・Please refer to the page of “Taping dimensions”.

Design and specifications are each subject to change without notice. Ask factory for the current technical specifications before purchase and/or use.
Should a safety concern arise regarding this product, please be sure to contact us immediately.

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Panasonic INDUSTRY

Aluminum Electrolytic Capacitors

Radial Lead Type

ED-A series

✻Propose EE series for New design



Features

- Endurance : 105 ℃ 8000 h to 10000 h
- High ripple current (at high frequency)
- Including low profile products (20 mm height)
- RoHS compliant

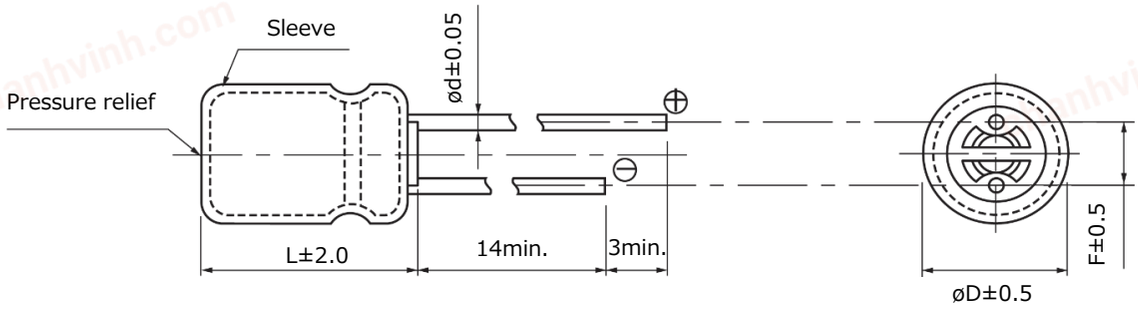
Specifications

Category temp. range	−25 ℃ to +105 ℃							
Rated voltage range	160 V to 450 V							
Capacitance range	10 μF to 330 μF							
Capacitance tolerance	±20 % (120 Hz / +20℃)							
Leakage current	I ≦ 0.06 CV +10 (μA) After 2 minutes application of rated working voltage at +20 ℃							
Dissipation factor (tan δ)	Please see the attached characteristics list							
Characteristics at low temperature	Rated voltage (V)	160	200	250	350	400	450	(Impedance ratio at 120 Hz)
	Z(−25 ℃) / Z(+20 ℃)	3	3	3	6	6	6	
Endurance	After following life test with DC voltage and +105 ℃±2 ℃ ripple current value applied (The sum of DC and ripple peak voltage shall not exceed the rated working voltage) when the capacitors are restored to 20 ℃, the capacitors shall meet the limits specified bellow. Duration ø10 : 8000 h ø12.5 to ø18 : 10000 h							
	Capacitance change	Within ±20 % of the initial value						
	Dissipation factor (tan δ)	≦ 200 % of the initial limit						
	DC leakage current	Within the initial limit						
Shelf life	After storage for 1000 h at +105 ℃±2 ℃ with no voltage applied and then being stabilized at +20 ℃, capacitors shall meet the limits specified in endurance. (With voltage treatment)							

Frequency correction factor for ripple current

Freq. (Hz) / Cap. (μF)	50	120	300	1 k	10 k	100 k to
10 to 82	0.30	0.40	0.55	0.70	0.90	1.00
100 to 330	0.35	0.45	0.60	0.75	0.90	1.00

Dimensions



Unit : mm

øD	10.0	12.5	16.0	18.0
ød	0.6	0.6	0.8	0.8
F	5.0	5.0	7.5	7.5

Design and specifications are each subject to change without notice. Ask factory for the current technical specifications before purchase and/or use.
Should a safety concern arise regarding this product, please be sure to contact us immediately.

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Characteristics list

Endurance : 105 ℃ 8000 h / ø10, 105 ℃ 10000 h / ø12.5 to ø18

Rated voltage (V)	Capacitance (±20 %) (μF)	Case size (mm)		Specification			Lead length (mm)			Part No.	Min. Packaging Q'ty (PCS)	
		øD	L	Ripple current*1 (mA rms)	tan δ*2	Endu-rance (h)	Lead dia. (ød)	Lead space Straight	Lead space Taping ✻B		Straight leads	Taping
160	22	10.0	20.0	500	0.15	8000	0.6	5.0	5.0	EEUED2C220( )	200	500
	33	10.0	20.0	580	0.15	8000	0.6	5.0	5.0	EEUED2C330( )	200	500
	47	10.0	20.0	750	0.15	8000	0.6	5.0	5.0	EEUED2C470( )	200	500
	68	12.5	20.0	950	0.15	10000	0.6	5.0	5.0	EEUED2C680( )	200	500
	82	12.5	25.0	1060	0.15	10000	0.6	5.0	5.0	EEUED2C820( )	200	500
	100	12.5	25.0	1170	0.15	10000	0.6	5.0	5.0	EEUED2C101( )	200	500
		16.0	20.0	1280	0.15	10000	0.8	7.5	7.5	EEUED2C101S( )	100	250
	150	16.0	25.0	1400	0.15	10000	0.8	7.5	7.5	EEUED2C151( )	100	250
		18.0	20.0	1400	0.15	10000	0.8	7.5	7.5	EEUED2C151S( )	100	250
	220	16.0	31.5	1700	0.15	10000	0.8	7.5	—	EEUED2C221	100	—
		18.0	25.0	1500	0.15	10000	0.8	7.5	7.5	EEUED2C221S( )	100	250
	330	18.0	31.5	2000	0.15	10000	0.8	7.5	—	EEUED2C331	50	—
200	22	10.0	20.0	600	0.15	8000	0.6	5.0	5.0	EEUED2D220( )	200	500
	33	10.0	20.0	650	0.15	8000	0.6	5.0	5.0	EEUED2D330( )	200	500
	47	12.5	20.0	790	0.15	10000	0.6	5.0	5.0	EEUED2D470( )	200	500
	68	12.5	25.0	950	0.15	10000	0.6	5.0	5.0	EEUED2D680( )	200	500
		16.0	20.0	1000	0.15	10000	0.8	7.5	7.5	EEUED2D680S( )	100	250
	82	16.0	20.0	1100	0.15	10000	0.8	7.5	7.5	EEUED2D820S( )	100	250
	100	16.0	25.0	1300	0.15	10000	0.8	7.5	7.5	EEUED2D101( )	100	250
		18.0	20.0	1280	0.15	10000	0.8	7.5	7.5	EEUED2D101S( )	100	250
	150	16.0	25.0	1400	0.15	10000	0.8	7.5	7.5	EEUED2D151( )	100	250
	220	18.0	31.5	2000	0.15	10000	0.8	7.5	—	EEUED2D221	50	—
	330	18.0	40.0	2400	0.15	10000	0.8	7.5	—	EEUED2D331	50	—
250	22	10.0	20.0	560	0.15	8000	0.6	5.0	5.0	EEUED2E220( )	200	500
	33	12.5	20.0	710	0.15	10000	0.6	5.0	5.0	EEUED2E330( )	200	500
	47	12.5	25.0	920	0.15	10000	0.6	5.0	5.0	EEUED2E470( )	200	500
		16.0	20.0	990	0.15	10000	0.8	7.5	7.5	EEUED2E470S( )	100	250
	68	16.0	20.0	1000	0.15	10000	0.8	7.5	7.5	EEUED2E680S( )	100	250
	82	16.0	25.0	1200	0.15	10000	0.8	7.5	7.5	EEUED2E820( )	100	250
		18.0	20.0	1200	0.15	10000	0.8	7.5	7.5	EEUED2E820S( )	100	250
	100	16.0	31.5	1500	0.15	10000	0.8	7.5	—	EEUED2E101	100	—
		18.0	25.0	1500	0.15	10000	0.8	7.5	7.5	EEUED2E101S( )	100	250
	150	18.0	31.5	1800	0.15	10000	0.8	7.5	—	EEUED2E151	50	—
	220	18.0	40.0	2100	0.15	10000	0.8	7.5	—	EEUED2E221	50	—
350	10	10.0	20.0	350	0.20	8000	0.6	5.0	5.0	EEUED2V100( )	200	500
	22	12.5	20.0	480	0.20	10000	0.6	5.0	5.0	EEUED2V220( )	200	500
	33	16.0	20.0	640	0.20	10000	0.8	7.5	7.5	EEUED2V330S( )	100	250
	47	16.0	25.0	800	0.20	10000	0.8	7.5	7.5	EEUED2V470( )	100	250
		18.0	20.0	800	0.20	10000	0.8	7.5	7.5	EEUED2V470S( )	100	250
	68	16.0	31.5	1100	0.20	10000	0.8	7.5	—	EEUED2V680	100	—
		18.0	25.0	1000	0.20	10000	0.8	7.5	7.5	EEUED2V680S( )	100	250
	82	18.0	25.0	1100	0.20	10000	0.8	7.5	7.5	EEUED2V820S( )	100	250
	100	18.0	31.5	1200	0.20	10000	0.8	7.5	—	EEUED2V101	50	—

*1: Ripple current (100 kHz / +105 ℃)
*2: tan δ (120 Hz / +20 ℃)
・When requesting taped product, please put the letter "B". Lead wire pitch ✻B=5 mm, 7.5 mm.
・Please refer to the page of “Taping dimensions”.

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Characteristics list

Endurance : 105 ℃ 8000 h / ø10, 105 ℃ 10000 h / ø12.5 to ø18

Rated voltage (V)	Capacitance (±20 %) (μF)	Case size (mm)		Specification			Lead length (mm)			Part No.	Min. Packaging Q'ty (PCS)	
		øD	L	Ripple current*1 (mA rms)	tan δ*2	Endu-rance (h)	Lead dia. (ød)	Lead space			Straight leads	Taping
								Straight	Taping ✻B			
400	10	10.0	20.0	300	0.24	8000	0.6	5.0	5.0	EEUED2G100( )	200	500
	15	12.5	20.0	410	0.24	10000	0.6	5.0	5.0	EEUED2G150( )	200	500
	22	12.5	25.0	500	0.24	10000	0.6	5.0	5.0	EEUED2G220( )	200	500
		16.0	20.0	600	0.24	10000	0.8	7.5	7.5	EEUED2G220S( )	100	250
	33	16.0	20.0	730	0.24	10000	0.8	7.5	7.5	EEUED2G330S( )	100	250
	47	16.0	25.0	840	0.24	10000	0.8	7.5	7.5	EEUED2G470( )	100	250
		18.0	20.0	840	0.24	10000	0.8	7.5	7.5	EEUED2G470S( )	100	250
	68	18.0	31.5	1200	0.24	10000	0.8	7.5	—	EEUED2G680	50	—
	82	18.0	40.0	1500	0.24	10000	0.8	7.5	—	EEUED2G820	50	—
450	10	12.5	20.0	350	0.24	10000	0.6	5.0	5.0	EEUED2W100( )	200	500
	15	12.5	25.0	560	0.24	10000	0.6	5.0	5.0	EEUED2W150( )	200	500
	22	16.0	20.0	680	0.24	10000	0.8	7.5	7.5	EEUED2W220S( )	100	250
	33	16.0	31.5	850	0.24	10000	0.8	7.5	—	EEUED2W330	100	—
		18.0	25.0	850	0.24	10000	0.8	7.5	7.5	EEUED2W330S( )	100	250
	47	18.0	31.5	1000	0.24	10000	0.8	7.5	—	EEUED2W470	50	—
	68	18.0	40.0	1300	0.24	10000	0.8	7.5	—	EEUED2W680	50	—

*1: Ripple current (100 kHz / +105 ℃)
*2: tan δ (120 Hz / +20 ℃)
・When requesting taped product, please put the letter "B". Lead wire pitch ✻B=5 mm, 7.5 mm.
・Please refer to the page of “Taping dimensions”.

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Panasonic INDUSTRY

Aluminum Electrolytic Capacitors

Radial Lead Type

GA-A series



Features

- Endurance : 105 ℃ 1000 h
- RoHS compliant

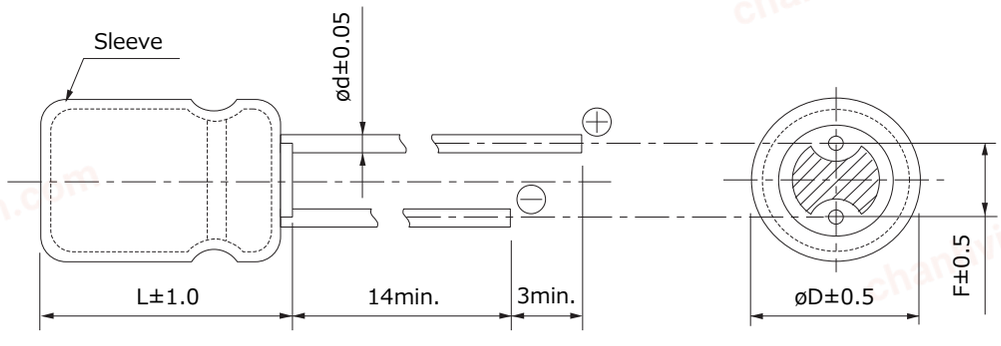
Specifications

Category temp. range	−55 ℃ to +105 ℃	
Rated voltage range	10 V to 50 V	
Capacitance range	1.5 μF to 220 μF	
Capacitance tolerance	±20 % (120 Hz / +20℃)	
Leakage current	I ≦ 0.01 CV or 3 (μA) After 2 minutes (Whichever is greater)	
Dissipation factor (tan δ)	Please see the attached characteristics list	
Endurance	After following life test with DC voltage and +105 ℃±2 ℃ ripple current value applied (The sum of DC and ripple peak voltage shall not exceed the rated working voltage), for 1000 hours, when the capacitors are restored to 20 ℃, the capacitors shall meet the limits specified bellow.	
	Capacitance change	Within ±20 % of the initial value
	Dissipation factor (tan δ)	≦ 200 % of the initial limit
	DC leakage current	Within the initial limit
Shelf life	After storage for 1000 h at +105 ℃±2 ℃ with no voltage applied and then being stabilized at +20 ℃, capacitors shall meet the limits specified in endurance. (With voltage treatment)	

Frequency correction factor for ripple current

Cap. (μF) \ Freq. (Hz)	60	120	1 k	10 k	100 k to
1.5 to 220	0.85	1.00	1.30	1.40	1.55

Dimensions



Unit : mm

øD	4.0	5.0	6.3	8.0
ød	0.45	0.45	0.45	0.45
F	1.5	2.0	2.5	2.5

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Characteristics list

Endurance : 105 ℃ 1000 h

Rated voltage (V)	Capacitance (±20 %) (μF)	Case size (mm)		Specification			Lead length (mm)				Part No.	Min. Packaging Q'ty (PCS)	
								Lead space					
		øD	L	Ripple current*1 (mA rms)	tan δ*2	Endu-rance (h)	Lead dia. (ød)	Straight	Taping ✻B	Taping ✻H		Straight leads	Taping
10	22	4.0	7.0	30	0.22	1000	0.45	1.5	5.0	2.5	EEAGA1A220( )	200	2000
	33	5.0	7.0	50	0.22	1000	0.45	2.0	5.0	2.5	EEAGA1A330( )	200	2000
	47	6.3	7.0	65	0.22	1000	0.45	2.5	5.0	2.5	EEAGA1A470( )	200	2000
	68	6.3	7.0	75	0.22	1000	0.45	2.5	5.0	2.5	EEAGA1A680( )	200	2000
	100	6.3	7.0	110	0.22	1000	0.45	2.5	5.0	2.5	EEAGA1A101( )	200	2000
	220	8.0	7.0	160	0.22	1000	0.45	2.5	5.0	2.5	EEAGA1A221( )	200	1000
16	10	4.0	7.0	30	0.18	1000	0.45	1.5	5.0	2.5	EEAGA1C100( )	200	2000
	15	4.0	7.0	33	0.18	1000	0.45	1.5	5.0	2.5	EEAGA1C150( )	200	2000
	22	5.0	7.0	50	0.18	1000	0.45	2.0	5.0	2.5	EEAGA1C220( )	200	2000
	33	6.3	7.0	65	0.18	1000	0.45	2.5	5.0	2.5	EEAGA1C330( )	200	2000
	47	6.3	7.0	77	0.18	1000	0.45	2.5	5.0	2.5	EEAGA1C470( )	200	2000
	100	8.0	7.0	120	0.18	1000	0.45	2.5	5.0	2.5	EEAGA1C101( )	200	1000
25	10	4.0	7.0	33	0.16	1000	0.45	1.5	5.0	2.5	EEAGA1E100( )	200	2000
	15	5.0	7.0	45	0.16	1000	0.45	2.0	5.0	2.5	EEAGA1E150( )	200	2000
	22	5.0	7.0	50	0.16	1000	0.45	2.0	5.0	2.5	EEAGA1E220( )	200	2000
	33	6.3	7.0	75	0.16	1000	0.45	2.5	5.0	2.5	EEAGA1E330( )	200	2000
	68	8.0	7.0	100	0.16	1000	0.45	2.5	5.0	2.5	EEAGA1E680( )	200	1000
35	6.8	4.0	7.0	33	0.13	1000	0.45	1.5	5.0	2.5	EEAGA1V6R8( )	200	2000
	10	5.0	7.0	35	0.13	1000	0.45	2.0	5.0	2.5	EEAGA1V100( )	200	2000
	15	6.3	7.0	50	0.13	1000	0.45	2.5	5.0	2.5	EEAGA1V150( )	200	2000
	22	6.3	7.0	70	0.13	1000	0.45	2.5	5.0	2.5	EEAGA1V220( )	200	2000
	47	8.0	7.0	96	0.13	1000	0.45	2.5	5.0	2.5	EEAGA1V470( )	200	1000
50	1.5	4.0	7.0	16	0.10	1000	0.45	1.5	5.0	2.5	EEAGA1H1R5( )	200	2000
	2.2	4.0	7.0	18	0.10	1000	0.45	1.5	5.0	2.5	EEAGA1H2R2( )	200	2000
	3.3	4.0	7.0	22	0.10	1000	0.45	1.5	5.0	2.5	EEAGA1H3R3( )	200	2000
	4.7	4.0	7.0	26	0.10	1000	0.45	1.5	5.0	2.5	EEAGA1H4R7( )	200	2000
	6.8	5.0	7.0	35	0.10	1000	0.45	2.0	5.0	2.5	EEAGA1H6R8( )	200	2000
	10	6.3	7.0	39	0.10	1000	0.45	2.5	5.0	2.5	EEAGA1H100( )	200	2000
	15	6.3	7.0	55	0.10	1000	0.45	2.5	5.0	2.5	EEAGA1H150( )	200	2000
	22	8.0	7.0	70	0.10	1000	0.45	2.5	5.0	2.5	EEAGA1H220( )	200	1000
	33	8.0	7.0	91	0.10	1000	0.45	2.5	5.0	2.5	EEAGA1H330( )	200	1000

*1: Ripple current (120 Hz / +105 ℃)
*2: tan δ (120 Hz / +20 ℃)
・When requesting taped product, please put the letter "B" or "H" between the "( )".
Lead wire pitch ✻B=5 mm, H=2.5 mm. Suffix "BQ" for ø8×7, 5 mm pitch products
・Please refer to the page of “Taping dimensions”.

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Panasonic INDUSTRY

Aluminum Electrolytic Capacitors

Radial Lead Type

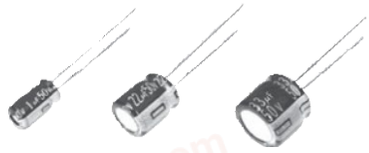
KA-A series

Low Profile

KA

7 mm heght

M



Features

- Endurance : 85 ℃ 1000 h
- 7 mm height
- RoHS compliant

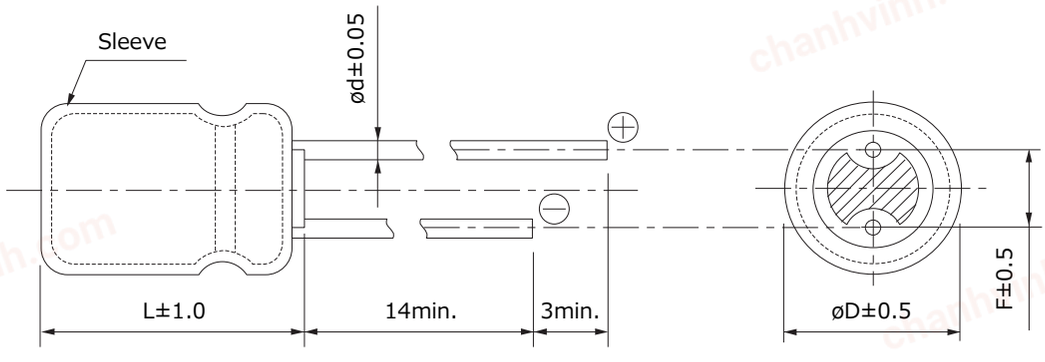
Specifications

Category temp. range	−40 ℃ to +85 ℃	
Rated voltage range	4 V to 50 V	
Capacitance range	2.2 μF to 470 μF	
Capacitance tolerance	±20 % (120 Hz / +20℃)	
Leakage current	I ≦ 0.01 CV or 3 (μA) After 2 minutes (Whichever is greater)	
Dissipation factor (tan δ)	Please see the attached characteristics list	
Endurance	After applying rated working voltage for 1000 h at +85 ℃±2 ℃ when the capacitors are restored to 20 ℃, capacitors shall meet the following limits.	
	Capacitance change	Within ±20 % of the initial value
	Dissipation factor (tan δ)	≦ 200 % of the initial limit
	DC leakage current	Within the initial limit
Shelf life	After storage for 1000 h at +85 ℃±2 ℃ with no voltage applied and then being stabilized at +20 ℃, capacitors shall meet the limits specified in endurance. (With voltage treatment)	

Frequency correction factor for ripple current

Cap. (μF) \ Freq. (Hz)	50, 60	120	1 k	10 k to
2.2 to 470	0.70	1.00	1.30	1.70

Dimensions



Unit : mm

øD	4.0	5.0	6.3	8.0
ød	0.45	0.45	0.45	0.45
F	1.5	2.0	2.5	2.5

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28-Feb-20

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Characteristics list

Endurance : 85 ℃ 1000 h

Rated voltage (V)	Capacitance (±20 %) (μF)	Case size (mm)		Specification		Lead length (mm)				Part No.	Min. Packaging Q'ty (PCS)	
							Lead space					
		øD	L	Ripple current*1 (mA rms)	tan δ*2	Lead dia. (ød)	Straight	Taping ✻B	Taping ✻i		Straight leads	Taping
4	47	4.0	7.0	34	0.35	0.45	1.5	5.0	2.5	ECEA0GKA470( )	200	2000
	100	5.0	7.0	61	0.35	0.45	2.0	5.0	2.5	ECEA0GKA101( )	200	2000
	220	6.3	7.0	82	0.35	0.45	2.5	5.0	2.5	ECEA0GKA221( )	200	2000
	330	8.0	7.0	110	0.35	0.45	2.5	—	2.5	ECEA0GKA331( )	200	1000
		8.0	7.0	110	0.35	0.45	—	5.0	—	ECEA0GKA331Q	—	1000
	470	8.0	7.0	140	0.35	0.45	2.5	—	2.5	ECEA0GKA471( )	200	1000
		8.0	7.0	140	0.35	0.45	—	5.0	—	ECEA0GKA471Q	—	1000
6.3	47	4.0	7.0	46	0.24	0.45	1.5	5.0	2.5	ECEA0JKA470( )	200	2000
	100	5.0	7.0	71	0.24	0.45	2.0	5.0	2.5	ECEA0JKA101( )	200	2000
	220	6.3	7.0	103	0.24	0.45	2.5	5.0	2.5	ECEA0JKA221( )	200	2000
	330	8.0	7.0	130	0.24	0.45	2.5	—	2.5	ECEA0JKA331( )	200	1000
		8.0	7.0	130	0.24	0.45	—	5.0	—	ECEA0JKA331Q	—	1000
10	33	4.0	7.0	43	0.20	0.45	1.5	5.0	2.5	ECEA1AKA330( )	200	2000
	100	6.3	7.0	80	0.20	0.45	2.5	5.0	2.5	ECEA1AKA101( )	200	2000
	220	8.0	7.0	120	0.20	0.45	2.5	—	2.5	ECEA1AKA221( )	200	1000
		8.0	7.0	120	0.20	0.45	—	5.0	—	ECEA1AKA221Q	—	1000
16	10	4.0	7.0	28	0.16	0.45	1.5	5.0	2.5	ECEA1CKA100( )	200	2000
	22	4.0	7.0	39	0.16	0.45	1.5	5.0	2.5	ECEA1CKA220( )	200	2000
	33	5.0	7.0	60	0.16	0.45	2.0	5.0	2.5	ECEA1CKA330( )	200	2000
	47	5.0	7.0	70	0.16	0.45	2.0	5.0	2.5	ECEA1CKA470( )	200	2000
	100	6.3	7.0	91	0.16	0.45	2.5	5.0	2.5	ECEA1CKA101( )	200	2000
25	10	4.0	7.0	28	0.14	0.45	1.5	5.0	2.5	ECEA1EKA100( )	200	2000
	22	5.0	7.0	55	0.14	0.45	2.0	5.0	2.5	ECEA1EKA220( )	200	2000
	33	6.3	7.0	65	0.14	0.45	2.5	5.0	2.5	ECEA1EKA330( )	200	2000
	47	6.3	7.0	70	0.14	0.45	2.5	5.0	2.5	ECEA1EKA470( )	200	2000
35	10	5.0	7.0	30	0.12	0.45	2.0	5.0	2.5	ECEA1VKA100( )	200	2000
	22	6.3	7.0	60	0.12	0.45	2.5	5.0	2.5	ECEA1VKA220( )	200	2000
	33	6.3	7.0	65	0.12	0.45	2.5	5.0	2.5	ECEA1VKA330( )	200	2000
	47	8.0	7.0	85	0.12	0.45	2.5	—	2.5	ECEA1VKA470( )	200	1000
		8.0	7.0	85	0.12	0.45	—	5.0	—	ECEA1VKA470Q	—	1000
50	2.2	4.0	7.0	16	0.10	0.45	1.5	5.0	2.5	ECEA1HKA2R2( )	200	2000
	3.3	4.0	7.0	18	0.10	0.45	1.5	5.0	2.5	ECEA1HKA3R3( )	200	2000
	4.7	4.0	7.0	23	0.10	0.45	1.5	5.0	2.5	ECEA1HKA4R7( )	200	2000
	10	5.0	7.0	35	0.10	0.45	2.0	5.0	2.5	ECEA1HKA100( )	200	2000
	22	6.3	7.0	60	0.10	0.45	2.5	5.0	2.5	ECEA1HKA220( )	200	2000
	33	8.0	7.0	75	0.10	0.45	2.5	—	2.5	ECEA1HKA330( )	200	1000
		8.0	7.0	75	0.10	0.45	—	5.0	—	ECEA1HKA330Q	—	1000

*1: Ripple current (120 Hz / +85 ℃)
*2: tan δ (120 Hz / +20 ℃)
・When requesting taped product, please put the letter "B" or "i" between the "( )".
Lead wire pitch ✻B=5 mm, i=2.5 mm.
・Please refer to the page of “Taping dimensions”.

Design and specifications are each subject to change without notice. Ask factory for the current technical specifications before purchase and/or use.
Should a safety concern arise regarding this product, please be sure to contact us immediately.

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Panasonic INDUSTRY

Aluminum Electrolytic Capacitors

Radial Lead Type

KA-A (Bi-polar) series



Features

- Endurance : 85 ℃ 1000 h
- 7 mm height
- RoHS compliant

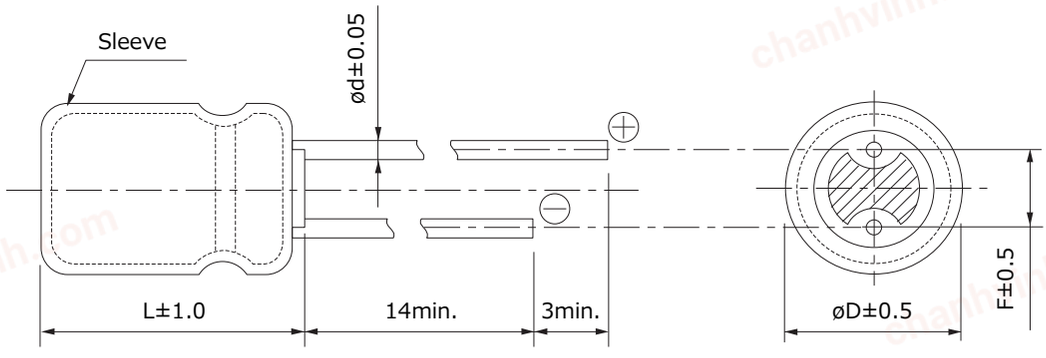
Specifications

Category temp. range	−40 ℃ to +85 ℃	
Rated voltage range	4 V to 50 V	
Capacitance range	2.2 μF to 100 μF	
Capacitance tolerance	±20 % (120 Hz / +20℃)	
Leakage current	I ≦ 0.05 CV or 10 (μA) After 2 minutes (Whichever is greater)	
Dissipation factor (tan δ)	Please see the attached characteristics list	
Endurance	After 1000 h application of DC working voltage (500 h for each polarity) at +85 ℃±2 ℃, when the capacitors are restored to 20 ℃, the capacitors shall meet the following limits.	
	Capacitance change	Within ±20 % of the initial value
	Dissipation factor (tan δ)	≦ 200 % of the initial limit
	DC leakage current	Within the initial limit
Shelf life	After storage for 1000 h at +85 ℃±2 ℃ with no voltage applied and then being stabilized at +20 ℃, capacitors shall meet the limits specified in endurance. (With voltage treatment)	

Frequency correction factor for ripple current

Freq. (Hz) / Cap. (μF)	50, 60	120	1 k	10 k to
2.2 to 100	0.70	1.00	1.30	1.70

Dimensions



Unit : mm

øD	4.0	5.0	6.3
ød	0.45	0.45	0.45
F	1.5	2.0	2.5

Design and specifications are each subject to change without notice. Ask factory for the current technical specifications before purchase and/or use.
Should a safety concern arise regarding this product, please be sure to contact us immediately.
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Characteristics list

Endurance : 85 ℃ 1000 h (500 h for each polarity)

Rated voltage (V)	Capacitance (±20 %) (μF)	Case size (mm)		Specification		Lead length (mm)				Part No.	Min. Packaging Q'ty (PCS)	
							Lead space					
		øD	L	Ripple current*1 (mA rms)	tan δ*2	Lead dia. (ød)	Straight	Taping ✻B	Taping ✻i		Straight leads	Taping
4	100	6.3	7.0	61	0.35	0.45	2.5	5.0	2.5	ECEA0GKN101( )	200	2000
6.3	22	5.0	7.0	29	0.24	0.45	2.0	5.0	2.5	ECEA0JKN220( )	200	2000
	33	5.0	7.0	38	0.24	0.45	2.0	5.0	2.5	ECEA0JKN330( )	200	2000
	47	6.3	7.0	46	0.24	0.45	2.5	5.0	2.5	ECEA0JKN470( )	200	2000
10	10	4.0	7.0	25	0.20	0.45	1.5	5.0	2.5	ECEA1AKN100( )	200	2000
	22	5.0	7.0	35	0.20	0.45	2.0	5.0	2.5	ECEA1AKN220( )	200	2000
	33	6.3	7.0	43	0.20	0.45	2.5	5.0	2.5	ECEA1AKN330( )	200	2000
	47	6.3	7.0	65	0.20	0.45	2.5	5.0	2.5	ECEA1AKN470( )	200	2000
16	4.7	4.0	7.0	20	0.16	0.45	1.5	5.0	2.5	ECEA1CKN4R7( )	200	2000
	10	5.0	7.0	25	0.16	0.45	2.0	5.0	2.5	ECEA1CKN100( )	200	2000
	22	6.3	7.0	39	0.16	0.45	2.5	5.0	2.5	ECEA1CKN220( )	200	2000
	33	6.3	7.0	60	0.16	0.45	2.5	5.0	2.5	ECEA1CKN330( )	200	2000
25	3.3	4.0	7.0	16	0.16	0.45	1.5	5.0	2.5	ECEA1EKN3R3( )	200	2000
	4.7	5.0	7.0	21	0.16	0.45	2.0	5.0	2.5	ECEA1EKN4R7( )	200	2000
	10	6.3	7.0	28	0.16	0.45	2.5	5.0	2.5	ECEA1EKN100( )	200	2000
	22	6.3	7.0	55	0.16	0.45	2.5	5.0	2.5	ECEA1EKN220( )	200	2000
35	2.2	4.0	7.0	12	0.14	0.45	1.5	5.0	2.5	ECEA1VKN2R2( )	200	2000
	3.3	5.0	7.0	16	0.14	0.45	2.0	5.0	2.5	ECEA1VKN3R3( )	200	2000
	4.7	5.0	7.0	22	0.14	0.45	2.0	5.0	2.5	ECEA1VKN4R7( )	200	2000
	10	6.3	7.0	30	0.14	0.45	2.5	5.0	2.5	ECEA1VKN100( )	200	2000
50	2.2	5.0	7.0	16	0.12	0.45	2.0	5.0	2.5	ECEA1HKN2R2( )	200	2000
	3.3	5.0	7.0	16	0.12	0.45	2.0	5.0	2.5	ECEA1HKN3R3( )	200	2000
	4.7	6.3	7.0	23	0.12	0.45	2.5	5.0	2.5	ECEA1HKN4R7( )	200	2000

*1: Ripple current (120 Hz / +85 ℃)
*2: tan δ (120 Hz / +20 ℃)
・When requesting taped product, please put the letter "B" or "i" between the "( )".
Lead wire pitch ✻B=5 mm, i=2.5 mm.
・Please refer to the page of “Taping dimensions”.

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Panasonic INDUSTRY

Aluminum Electrolytic Capacitors

Radial Lead Type

KS-A series

Low Profile

KS 5 mm hegiht

KA 7 mm hegiht

M



Features

- Endurance : 85 ℃ 1000 h
- 5 mm height
- RoHS compliant

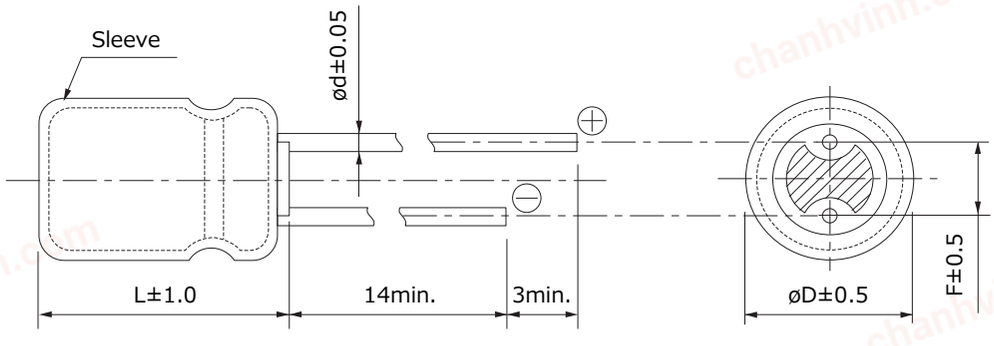
Specifications

Category temp. range	−40 ℃ to +85 ℃	
Rated voltage range	4 V to 50 V	
Capacitance range	2.2 μF to 330 μF	
Capacitance tolerance	±20 % (120 Hz / +20℃)	
Leakage current	I ≦ 0.01 CV or 3 (μA) After 2 minutes (Whichever is greater)	
Dissipation factor (tan δ)	Please see the attached characteristics list	
Endurance	After applying rated working voltage for 1000 h at +85 ℃±2 ℃ when the capacitors are restored to 20 ℃, capacitors shall meet the following limits.	
	Capacitance change	Within ±20 % of the initial value (4 V : ±30 %)
	Dissipation factor (tan δ)	≦ 200 % of the initial limit
	DC leakage current	Within the initial limit
Shelf life	After storage for 1000 h at +85 ℃±2 ℃ with no voltage applied and then being stabilized at +20 ℃, capacitors shall meet the limits specified in endurance. (With voltage treatment)	

Frequency correction factor for ripple current

Freq. (Hz) / Cap. (μF)	50, 60	120	1 k	10 k to
2.2 to 330	0.70	1.00	1.30	1.70

Dimensions



Unit : mm

øD	4.0	5.0	6.3	8.0
ød	0.45	0.45	0.45	0.45
F	1.5	2.0	2.5	2.5

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Characteristics list

Endurance : 85 ℃ 1000 h

Rated voltage (V)	Capacitance (±20 %) (μF)	Case size (mm)		Specification		Lead length (mm)				Part No.	Min. Packaging Q'ty (PCS)	
							Lead space					
		øD	L	Ripple current*1 (mA rms)	tan δ*2	Lead dia. (ød)	Straight	Taping ✻B	Taping ✻i		Strai-ght leads	Taping
4	33	4.0	5.0	26	0.35	0.45	1.5	5.0	2.5	ECEA0GKS330( )	200	2000
	47	4.0	5.0	34	0.35	0.45	1.5	5.0	2.5	ECEA0GKS470( )	200	2000
	100	5.0	5.0	61	0.35	0.45	2.0	5.0	2.5	ECEA0GKS101( )	200	2000
	220	6.3	5.0	82	0.35	0.45	2.5	5.0	2.5	ECEA0GKS221( )	200	2000
6.3	22	4.0	5.0	29	0.24	0.45	1.5	5.0	2.5	ECEA0JKS220( )	200	2000
	33	5.0	5.0	38	0.24	0.45	2.0	5.0	2.5	ECEA0JKS330( )	200	2000
	47	5.0	5.0	46	0.24	0.45	2.0	5.0	2.5	ECEA0JKS470( )	200	2000
	100	6.3	5.0	71	0.24	0.45	2.5	5.0	2.5	ECEA0JKS101( )	200	2000
	330	8.0	5.0	130	0.24	0.45	2.5	—	2.5	ECEA0JKS331( )	200	1000
		8.0	5.0	130	0.24	0.45	—	5.0	—	ECEA0JKS331Q	—	1000
10	22	5.0	5.0	35	0.20	0.45	2.0	5.0	2.5	ECEA1AKS220( )	200	2000
	33	5.0	5.0	43	0.20	0.45	2.0	5.0	2.5	ECEA1AKS330( )	200	2000
	47	6.3	5.0	65	0.20	0.45	2.5	5.0	2.5	ECEA1AKS470( )	200	2000
	100	6.3	5.0	80	0.20	0.45	2.5	5.0	2.5	ECEA1AKS101( )	200	2000
	220	8.0	5.0	120	0.20	0.45	2.5	—	2.5	ECEA1AKS221( )	200	1000
		8.0	5.0	120	0.20	0.45	—	5.0	—	ECEA1AKS221Q	—	1000
16	10	4.0	5.0	28	0.16	0.45	1.5	5.0	2.5	ECEA1CKS100( )	200	2000
	22	5.0	5.0	39	0.16	0.45	2.0	5.0	2.5	ECEA1CKS220( )	200	2000
	33	6.3	5.0	60	0.16	0.45	2.5	5.0	2.5	ECEA1CKS330( )	200	2000
	47	6.3	5.0	70	0.16	0.45	2.5	5.0	2.5	ECEA1CKS470( )	200	2000
	100	8.0	5.0	91	0.16	0.45	2.5	—	2.5	ECEA1CKS101( )	200	1000
		8.0	5.0	91	0.16	0.45	—	5.0	—	ECEA1CKS101Q	—	1000
25	4.7	4.0	5.0	22	0.14	0.45	1.5	5.0	2.5	ECEA1EKS4R7( )	200	2000
	10	5.0	5.0	28	0.14	0.45	2.0	5.0	2.5	ECEA1EKS100( )	200	2000
	22	6.3	5.0	55	0.14	0.45	2.5	5.0	2.5	ECEA1EKS220( )	200	2000
	33	6.3	5.0	65	0.14	0.45	2.5	5.0	2.5	ECEA1EKS330( )	200	2000
	100	8.0	5.0	85	0.14	0.45	2.5	—	2.5	ECEA1EKS101( )	200	1000
		8.0	5.0	85	0.14	0.45	—	5.0	—	ECEA1EKS101Q	—	1000
35	3.3	4.0	5.0	16	0.12	0.45	1.5	5.0	2.5	ECEA1VKS3R3( )	200	2000
	4.7	4.0	5.0	22	0.12	0.45	1.5	5.0	2.5	ECEA1VKS4R7( )	200	2000
	10	5.0	5.0	30	0.12	0.45	2.0	5.0	2.5	ECEA1VKS100( )	200	2000
	22	6.3	5.0	60	0.12	0.45	2.5	5.0	2.5	ECEA1VKS220( )	200	2000
	33	8.0	5.0	65	0.12	0.45	2.5	—	2.5	ECEA1VKS330( )	200	1000
		8.0	5.0	65	0.12	0.45	—	5.0	—	ECEA1VKS330Q	—	1000
	47	8.0	5.0	85	0.12	0.45	2.5		2.5	ECEA1VKS470( )	200	1000
		8.0	5.0	85	0.12	0.45	—	5.0	—	ECEA1VKS470Q	—	1000
50	2.2	4.0	5.0	16	0.10	0.45	1.5	5.0	2.5	ECEA1HKS2R2( )	200	2000
	3.3	4.0	5.0	16	0.10	0.45	1.5	5.0	2.5	ECEA1HKS3R3( )	200	2000
	4.7	5.0	5.0	23	0.10	0.45	2.0	5.0	2.5	ECEA1HKS4R7( )	200	2000
	10	6.3	5.0	35	0.10	0.45	2.5	5.0	2.5	ECEA1HKS100( )	200	2000
	22	8.0	5.0	60	0.10	0.45	2.5	—	2.5	ECEA1HKS220( )	200	1000
		8.0	5.0	60	0.10	0.45	—	5.0	—	ECEA1HKS220Q	—	1000

*1: Ripple current (120 Hz / +85 ℃)
*2: tan δ (120 Hz / +20 ℃)
・When requesting taped product, please put the letter "B" or "i" between the "( )".
Lead wire pitch ✻B=5 mm, i=2.5 mm.
・Please refer to the page of “Taping dimensions”.

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28-Feb-20

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Panasonic INDUSTRY

Aluminum Electrolytic Capacitors

Radial Lead Type

KS-A (Bi-polar) series

Low Profile

KS 5 mm hegiht

KA 7 mm hegiht

M



Features

- Endurance : 85 ℃ 1000 h
- 5 mm height
- RoHS compliant

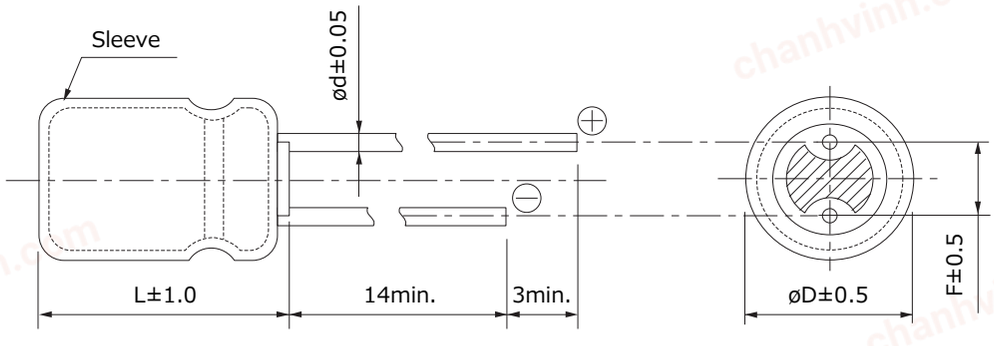
Specifications

Category temp. range	−40 ℃ to +85 ℃	
Rated voltage range	6.3 V to 50 V	
Capacitance range	2.2 μF to 47 μF	
Capacitance tolerance	±20 % (120 Hz / +20℃)	
Leakage current	I ≦ 0.05 CV or 10 (μA) After 2 minutes (Whichever is greater)	
Dissipation factor (tan δ)	Please see the attached characteristics list	
Endurance	After 1000 h application of DC working voltage (500 h for each polarity) at +85 ℃±2 ℃, when the capacitors are restored to 20 ℃, the capacitors shall meet the following limits.	
	Capacitance change	Within ±20 % of the initial value
	Dissipation factor (tan δ)	≦ 200 % of the initial limit
	DC leakage current	Within the initial limit
Shelf life	After storage for 1000 h at +85 ℃±2 ℃ with no voltage applied and then being stabilized at +20 ℃, capacitors shall meet the limits specified in endurance. (With voltage treatment)	

Frequency correction factor for ripple current

Freq. (Hz) / Cap. (μF)	50, 60	120	1 k	10 k to
2.2 to 47	0.70	1.00	1.30	1.70

Dimensions



Unit : mm

øD	4	5	6.3
ød	0.45	0.45	0.45
F	1.5	2.0	2.5

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KS-A (Bi-polar) series

Characteristics list

Endurance : 85 ℃ 1000 h (500 h for each polarity)

Rated voltage (V)	Capacitance (±20 %) (μF)	Case size (mm)		Specification		Lead length (mm)				Part No.	Min. Packaging Q'ty (PCS)	
							Lead space					
		øD	L	Ripple current*1 (mA rms)	tan δ*2	Lead dia. (ød)	Straight	Taping ✻B	Taping ✻i		Straight leads	Taping
6.3	22	5.0	5.0	29	0.24	0.45	2.0	5.0	2.5	ECEA0JSN220( )	200	2000
	33	6.3	5.0	38	0.24	0.45	2.5	5.0	2.5	ECEA0JSN330( )	200	2000
	47	6.3	5.0	46	0.24	0.45	2.5	5.0	2.5	ECEA0JSN470( )	200	2000
10	10	4.0	5.0	25	0.20	0.45	1.5	5.0	2.5	ECEA1ASN100( )	200	2000
	22	6.3	5.0	35	0.20	0.45	2.5	5.0	2.5	ECEA1ASN220( )	200	2000
	33	6.3	5.0	43	0.20	0.45	2.5	5.0	2.5	ECEA1ASN330( )	200	2000
16	4.7	4.0	5.0	20	0.20	0.45	1.5	5.0	2.5	ECEA1CSN4R7( )	200	2000
	10	5.0	5.0	25	0.20	0.45	2.0	5.0	2.5	ECEA1CSN100( )	200	2000
	22	6.3	5.0	39	0.20	0.45	2.5	5.0	2.5	ECEA1CSN220( )	200	2000
25	3.3	5.0	5.0	18	0.20	0.45	2.0	5.0	2.5	ECEA1ESN3R3( )	200	2000
	4.7	5.0	5.0	21	0.20	0.45	2.0	5.0	2.5	ECEA1ESN4R7( )	200	2000
	10	6.3	5.0	28	0.20	0.45	2.5	5.0	2.5	ECEA1ESN100( )	200	2000
35	2.2	4.0	5.0	12	0.20	0.45	1.5	5.0	2.5	ECEA1VSN2R2( )	200	2000
50	2.2	5.0	5.0	16	0.20	0.45	2.0	5.0	2.5	ECEA1HSN2R2( )	200	2000

*1: Ripple current (120 Hz / +85 ℃)
*2: tan δ (120 Hz / +20 ℃)
・When requesting taped product, please put the letter "B" or "i" between the "( )".
Lead wire pitch ✻B=5 mm, i=2.5 mm.
・Please refer to the page of “Taping dimensions”.

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Panasonic INDUSTRY

Aluminum Electrolytic Capacitors

This Series is no longer available for purchase in the country of Japan.

Radial Lead Type

FC-A series



Features

- Endurance : 105 ℃ 1000 h to 5000 h
- Low impedance
- AEC-Q200 compliant
- RoHS compliant

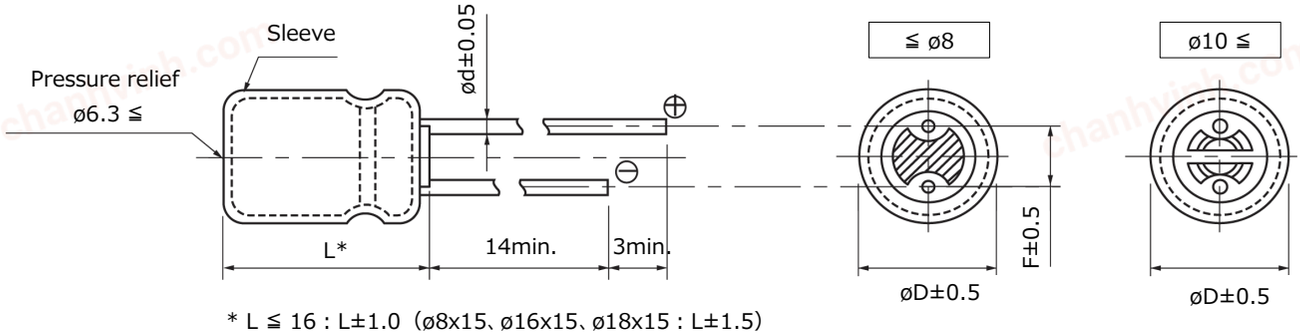
Specifications

Category temp. range	−55 ℃ to +105 ℃									
Rated voltage range	6.3 V to 100 V									
Capacitance range	2.2 μF to 15000 μF									
Capacitance tolerance	±20 % (120 Hz / +20℃)									
Leakage current	I ≦ 0.01 CV or 3 (μA) After 2 minutes (Whichever is greater)									
Dissipation factor (tan δ)	Rated voltage (V)	6.3	10	16	25	35	50	63	100	(120 Hz /+20℃)
	Dissipation factor (tan δ)	0.22	0.19	0.16	0.14	0.12	0.10	0.08	0.07	
	For capacitance value ≧ 1000 μF, add 0.02 per every 1000 μF.									
Endurance	After following life test with DC voltage and +105 ℃±2 ℃ ripple current value applied (The sum of DC and ripple peak voltage shall not exceed the rated working voltage)when the capacitors are restored to 20 ℃, the capacitors shall meet the limits specified bellow. Duration ø4 to ø6.3 : 1000 h, ø8 : 2000 h, ø10 : 3000 h, ø12.5 to ø18 : 5000 h									
	Capacitance change	Within ±20 % of the initial value								
	Dissipation factor (tan δ)	≦ 200 % of the initial limit								
	DC leakage current	Within the initial limit								
Shelf life	After storage for 1000 h at +105 ℃±2 ℃ with no voltage applied and then being stabilized at +20 °C, capacitors shall meet the limits specified in endurance. (With voltage treatment)									

Frequency correction factor for ripple current

Cap. (μF) \ Freq. (Hz)	60	120	1 k	10 k	100 k
2.2 to 330	0.55	0.65	0.85	0.90	1.00
390 to 1000	0.70	0.75	0.90	0.95	1.00
1200 to 2200	0.75	0.80	0.90	0.95	1.00
2700 to 15000	0.80	0.85	0.95	1.00	1.00

Dimensions



* L ≦ 16 : L±1.0 (ø8x15、ø16x15、ø18x15 : L±1.5)
L ≧ 20 : L±2.0

Unit : mm

	L≧11									L=7		
øD	4.0	5.0	6.3	8.0	10.0	12.5		16.0	18.0	4.0	5.0	6.3
L	—	—	—	—	—	15 to 25	30 to 40	—	—	—	—	—
ød	0.45	0.5	0.5	0.6	0.6	0.6	0.8	0.8	0.8	0.45	0.45	0.45
F	1.5	2.0	2.5	3.5	5.0	5.0	5.0	7.5	7.5	1.5	2.0	2.5

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Case size/ Impedance/ Ripple current

R. voltage / Case size (mm) (øD×L)	6.3 V to 35 V			50 V			63 V			100 V		
	Impedance*1 (Ω)		Ripple current*1 (mA rms)	Impedance*1 (Ω)		Ripple current*1 (mA rms)	Impedance*1 (Ω)		Ripple current*1 (mA rms)	Impedance*1 (Ω)		Ripple current*1 (mA rms)
	+20℃	-10℃		+20℃	-10℃		+20℃	-10℃		+20℃	-10℃	
4 × 7	2.00	5.00	65	—	—	—	—	—	—	—	—	—
5 × 7	0.950	2.40	120	—	—	—	—	—	—	—	—	—
6.3 × 7	0.450	1.20	200	—	—	—	—	—	—	—	—	—
5 × 11	0.800	1.60	175	*2	*2	*2	2.00	4.00	145	4.10	8.20	80
6.3 × 11.2	0.350	0.700	290	0.600	1.20	260	1.00	2.00	240	1.80	3.60	114
8 × 11.5	0.117	0.234	555	0.234	0.468	485	0.342	0.684	405	0.680	1.36	260
8 × 15	0.085	0.170	730	0.155	0.310	635	0.230	0.460	535	0.450	0.900	340
8 × 20	0.065	0.130	995	0.120	0.240	860	0.178	0.356	690	0.330	0.660	455
10 × 12.5	0.090	0.180	755	0.162	0.324	615	0.256	0.512	535	0.530	1.060	306
10 × 16	0.068	0.136	1050	0.119	0.238	850	0.194	0.388	600	0.360	0.720	400
10 × 20	0.052	0.104	1220	0.090	0.180	1030	0.147	0.294	885	0.240	0.480	463
10 × 25	0.045	0.090	1440	0.082	0.164	1200	0.130	0.260	1050	0.210	0.420	599
10 × 30	0.035	0.070	1815	0.060	0.120	1610	0.090	0.180	1300	0.150	0.300	698
12.5 × 15	0.065	0.130	1205	0.110	0.220	1150	0.150	0.300	1020	0.230	0.460	511
12.5 × 20	0.038	0.076	1655	0.063	0.126	1480	0.085	0.170	1285	0.180	0.360	671
12.5 × 25	0.030	0.060	1945	0.050	0.100	1832	0.070	0.140	1720	0.110	0.220	807
12.5 × 30	0.025	0.050	2310	0.040	0.080	2215	0.055	0.110	2090	0.098	0.196	937
12.5 × 35	0.022	0.044	2510	0.034	0.068	2285	0.047	0.094	2265	0.087	0.174	1040
12.5 × 40	0.018	0.036	2655	0.030	0.060	2590	0.042	0.084	2560	0.072	0.144	1130
16 × 15	0.043	0.086	1690	0.080	0.160	1610	0.090	0.180	1410	0.140	0.280	793
16 × 20	0.029	0.058	2205	0.048	0.096	1835	0.059	0.118	1765	0.110	0.220	995
16 × 25	0.022	0.044	2555	0.034	0.068	2235	0.050	0.100	2160	0.089	0.178	1170
16 × 31.5	0.018	0.036	3010	0.028	0.056	2700	0.043	0.086	2670	0.062	0.124	1520
16 × 35.5	0.016	0.032	3150	0.025	0.050	2790	0.036	0.072	2770	0.053	0.106	1730
16 × 40	0.015	0.030	3360	0.023	0.046	2845	0.030	0.060	2825	0.047	0.094	1920
18 × 15	0.038	0.076	2000	0.068	0.136	1900	0.086	0.172	1690	0.120	0.240	917
18 × 20	0.028	0.056	2490	0.042	0.084	2420	0.055	0.110	2290	0.080	0.160	1230
18 × 25	0.020	0.040	2740	0.029	0.058	2610	0.043	0.086	2585	0.070	0.140	1420
18 × 31.5	0.016	0.032	3635	0.025	0.050	3000	0.032	0.064	2950	0.062	0.124	1600
18 × 35.5	0.015	0.030	3680	0.023	0.046	3100	0.030	0.060	3095	0.041	0.082	1770
18 × 40	0.014	0.028	3735	—	—	—	0.025	0.050	3205	0.036	0.072	2300

*1: 100 kHz
*2

Case size (mm) (ø D×L)	Capacitance (μF)	Impedance (Ω) (100 kHz)		Ripple current (mA rms) (100 kHz)
		+20℃	-10℃	
5 × 11	2.2	1.80	3.60	45
	3.3	1.30	2.60	65
	4.7	1.30	2.60	95
	10	1.30	2.60	125
	12	1.30	2.60	135
	15	1.30	2.60	145
	18	1.30	2.60	155
	22	1.30	2.60	155

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Characteristics list

Endurance : 105 ℃ 1000 h / ø4 to ø6.3, 105 ℃ 2000 h / ø8, 105 ℃ 3000 h / ø10, 105 ℃ 5000 h / ø12.5 to ø18

Rated voltage (V)	Capacitance (±20 %) (μF)	Case size (mm)		Specification			Lead length (mm)				Part No.	Min. Packaging Q'ty (PCS)	
								Lead space					
		øD	L	Ripple current*1 (mA rms)	Impe-dance*2 (Ω)	Endu-rance (h)	Lead dia. (ød)	Straight	Taping ✻B	Taping ✻H		Straight leads	Taping
6.3	27	4.0	7.0	65	2.000	1000	0.45	1.5	5.0	2.5	EEAFC0J270( )	200	2000
	56	5.0	7.0	120	0.950	1000	0.45	2.0	5.0	2.5	EEAFC0J560( )	200	2000
	100	5.0	11.0	175	0.800	1000	0.50	2.0	5.0	2.5	EEUFC0J101( )	200	2000
	120	6.3	7.0	200	0.450	1000	0.45	2.5	5.0	2.5	EEAFC0J121( )	200	2000
	220	6.3	11.2	290	0.350	1000	0.50	2.5	5.0	2.5	EEUFC0J221( )	200	2000
	270	6.3	11.2	290	0.350	1000	0.50	2.5	5.0	2.5	EEUFC0J271( )	200	2000
	330	6.3	11.2	290	0.350	1000	0.50	2.5	5.0	2.5	EEUFC0J331S( )	200	2000
	390	8.0	11.5	555	0.117	2000	0.60	3.5	5.0	—	EEUFC0J391( )	200	1000
	470	8.0	11.5	555	0.117	2000	0.60	3.5	5.0	—	EEUFC0J471( )	200	1000
	560	8.0	11.5	555	0.117	2000	0.60	3.5	5.0	—	EEUFC0J561( )	200	1000
	820	8.0	15.0	730	0.085	2000	0.60	3.5	5.0	—	EEUFC0J821L( )	200	1000
		10.0	12.5	755	0.090	3000	0.60	5.0	5.0	—	EEUFC0J821( )	200	500
	1000	10.0	12.5	755	0.090	3000	0.60	5.0	5.0	—	EEUFC0J102( )	200	500
	1200	8.0	20.0	995	0.065	2000	0.60	3.5	5.0	—	EEUFC0J122L( )	200	1000
		10.0	16.0	1050	0.068	3000	0.60	5.0	5.0	—	EEUFC0J122( )	200	500
	1500	10.0	20.0	1220	0.052	3000	0.60	5.0	5.0	—	EEUFC0J152( )	200	500
		12.5	15.0	1205	0.065	5000	0.60	5.0	5.0	—	EEUFC0J152S( )	200	500
	1800	10.0	25.0	1440	0.045	3000	0.60	5.0	5.0	—	EEUFC0J182( )	200	500
	2200	10.0	25.0	1440	0.045	3000	0.60	5.0	5.0	—	EEUFC0J222( )	200	500
		16.0	15.0	1690	0.043	5000	0.80	7.5	7.5	—	EEUFC0J222S( )	100	250
	2700	10.0	30.0	1815	0.035	3000	0.60	5.0	—	—	EEUFC0J272L	100	—
		12.5	20.0	1655	0.038	5000	0.60	5.0	5.0	—	EEUFC0J272( )	200	500
		16.0	15.0	1690	0.043	5000	0.80	7.5	7.5	—	EEUFC0J272S( )	100	250
	3300	12.5	20.0	1655	0.038	5000	0.60	5.0	5.0	—	EEUFC0J332( )	200	500
		18.0	15.0	2000	0.038	5000	0.80	7.5	7.5	—	EEUFC0J332S( )	100	250
	3900	12.5	25.0	1945	0.030	5000	0.60	5.0	5.0	—	EEUFC0J392( )	200	500
	4700	12.5	30.0	2310	0.025	5000	0.80	5.0	—	—	EEUFC0J472	100	—
		16.0	20.0	2205	0.029	5000	0.80	7.5	7.5	—	EEUFC0J472S( )	100	250
	5600	12.5	35.0	2510	0.022	5000	0.80	5.0	—	—	EEUFC0J562L	100	—
		16.0	20.0	2205	0.029	5000	0.80	7.5	7.5	—	EEUFC0J562( )	100	250
	6800	12.5	40.0	2655	0.018	5000	0.80	5.0	—	—	EEUFC0J682L	100	—
		16.0	25.0	2555	0.022	5000	0.80	7.5	7.5	—	EEUFC0J682( )	100	250
		18.0	20.0	2490	0.028	5000	0.80	7.5	7.5	—	EEUFC0J682S( )	100	250
	8200	16.0	31.5	3010	0.018	5000	0.80	7.5	—	—	EEUFC0J822	100	—
	10000	16.0	35.5	3150	0.016	5000	0.80	7.5	—	—	EEUFC0J103	100	—
		18.0	25.0	2740	0.020	5000	0.80	7.5	7.5	—	EEUFC0J103S( )	100	250
	12000	16.0	40.0	3360	0.015	5000	0.80	7.5	—	—	EEUFC0J123L	100	—
		18.0	31.5	3635	0.016	5000	0.80	7.5	—	—	EEUFC0J123	50	—
	15000	18.0	35.5	3680	0.015	5000	0.80	7.5	—	—	EEUFC0J153	50	—

*1: Ripple current (100 kHz / +105 ℃)
*2: Impedance (100 kHz / +20 ℃)
・When requesting taped product, please put the letter "B" or "H" be tween the "( )".
Lead wire pitch ✻B=5 mm, 7.5 mm, H=2.5 mm.
・Please refer to the page of “Taping dimensions”.

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Characteristics list

Endurance : 105 ℃ 1000 h / ø4 to ø6.3, 105 ℃ 2000 h / ø8, 105 ℃ 3000 h / ø10, 105 ℃ 5000 h / ø12.5 to ø18

Rated voltage (V)	Capacitance (±20 %) (μF)	Case size (mm)		Specification			Lead length (mm)				Part No.	Min. Packaging Q'ty (PCS)	
								Lead space					
		øD	L	Ripple current*1 (mA rms)	Impe-dance*2 (Ω)	Endu-rance (h)	Lead dia. (ød)	Straight	Taping ✻B	Taping ✻H		Straight leads	Taping
10	22	4.0	7.0	65	2.000	1000	0.45	1.5	5.0	2.5	EEAFC1A220( )	200	2000
	39	5.0	7.0	120	0.950	1000	0.45	2.0	5.0	2.5	EEAFC1A390( )	200	2000
	82	5.0	11.0	175	0.800	1000	0.50	2.0	5.0	2.5	EEUFC1A820( )	200	2000
		6.3	7.0	200	0.450	1000	0.45	2.5	5.0	2.5	EEAFC1A820( )	200	2000
	100	5.0	11.0	175	0.800	1000	0.50	2.0	5.0	2.5	EEUFC1A101S( )	200	2000
	150	6.3	11.2	290	0.350	1000	0.50	2.5	5.0	2.5	EEUFC1A151( )	200	2000
	180	6.3	11.2	290	0.350	1000	0.50	2.5	5.0	2.5	EEUFC1A181( )	200	2000
	220	6.3	11.2	290	0.350	1000	0.50	2.5	5.0	2.5	EEUFC1A221S( )	200	2000
	330	8.0	11.5	555	0.117	2000	0.60	3.5	5.0	—	EEUFC1A331( )	200	1000
	390	8.0	11.5	555	0.117	2000	0.60	3.5	5.0	—	EEUFC1A391( )	200	1000
	470	8.0	11.5	555	0.117	2000	0.60	3.5	5.0	—	EEUFC1A471( )	200	1000
	560	10.0	12.5	755	0.090	3000	0.60	5.0	5.0	—	EEUFC1A561( )	200	500
	680	8.0	15.0	730	0.085	2000	0.60	3.5	5.0	—	EEUFC1A681L( )	200	1000
		10.0	12.5	755	0.090	3000	0.60	5.0	5.0	—	EEUFC1A681( )	200	500
	820	10.0	16.0	1050	0.068	3000	0.60	5.0	5.0	—	EEUFC1A821( )	200	500
	1000	8.0	20.0	995	0.065	2000	0.60	3.5	5.0	—	EEUFC1A102L( )	200	1000
		10.0	16.0	1050	0.068	3000	0.60	5.0	5.0	—	EEUFC1A102( )	200	500
	1200	10.0	20.0	1220	0.052	3000	0.60	5.0	5.0	—	EEUFC1A122( )	200	500
		12.5	15.0	1205	0.065	5000	0.60	5.0	5.0	—	EEUFC1A122S( )	200	500
	1500	10.0	25.0	1440	0.045	3000	0.60	5.0	5.0	—	EEUFC1A152( )	200	500
	1800	12.5	20.0	1655	0.038	5000	0.60	5.0	5.0	—	EEUFC1A182( )	200	500
		16.0	15.0	1690	0.043	5000	0.80	7.5	7.5	—	EEUFC1A182S( )	100	250
	2200	10.0	30.0	1815	0.035	3000	0.60	5.0	—	—	EEUFC1A222L	100	—
		12.5	20.0	1655	0.038	5000	0.60	5.0	5.0	—	EEUFC1A222( )	200	500
	2700	12.5	25.0	1945	0.030	5000	0.60	5.0	5.0	—	EEUFC1A272( )	200	500
		18.0	15.0	2000	0.038	5000	0.80	7.5	7.5	—	EEUFC1A272S( )	100	250
	3300	12.5	30.0	2310	0.025	5000	0.80	5.0	—	—	EEUFC1A332	100	—
		16.0	20.0	2205	0.029	5000	0.80	7.5	7.5	—	EEUFC1A332S( )	100	250
	3900	12.5	35.0	2510	0.022	5000	0.80	5.0	—	—	EEUFC1A392L	100	—
		16.0	20.0	2205	0.029	5000	0.80	7.5	7.5	—	EEUFC1A392( )	100	250
	4700	12.5	40.0	2655	0.018	5000	0.80	5.0	—	—	EEUFC1A472L	100	—
		16.0	25.0	2555	0.022	5000	0.80	7.5	7.5	—	EEUFC1A472( )	100	250
	5600	16.0	25.0	2555	0.022	5000	0.80	7.5	7.5	—	EEUFC1A562( )	100	250
		18.0	20.0	2490	0.028	5000	0.80	7.5	7.5	—	EEUFC1A562S( )	100	250
	6800	16.0	31.5	3010	0.018	5000	0.80	7.5	—	—	EEUFC1A682	100	—
		18.0	25.0	2740	0.020	5000	0.80	7.5	7.5	—	EEUFC1A682S( )	100	250
	8200	16.0	35.5	3150	0.016	5000	0.80	7.5	—	—	EEUFC1A822L	100	—
		18.0	31.5	3635	0.016	5000	0.80	7.5	—	—	EEUFC1A822	50	—
	10000	18.0	35.5	3680	0.015	5000	0.80	7.5	—	—	EEUFC1A103	50	—
	12000	18.0	40.0	3735	0.014	5000	0.80	7.5	—	—	EEUFC1A123	50	—

*1: Ripple current (100 kHz / +105 ℃)
*2: Impedance (100 kHz / +20 ℃)
・When requesting taped product, please put the letter "B" or "H" be tween the "( )".
Lead wire pitch ✻B=5 mm, 7.5 mm, H=2.5 mm.
・Please refer to the page of “Taping dimensions”.

Design and specifications are each subject to change without notice. Ask factory for the current technical specifications before purchase and/or use.
Should a safety concern arise regarding this product, please be sure to contact us immediately.

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Characteristics list

Endurance : 105 ℃ 1000 h / ø4 to ø6.3, 105 ℃ 2000 h / ø8, 105 ℃ 3000 h / ø10, 105 ℃ 5000 h / ø12.5 to ø18

Rated voltage (V)	Capacitance (±20 %) (μF)	Case size (mm)		Specification			Lead length (mm)				Part No.	Min. Packaging Q'ty (PCS)	
								Lead space					
		øD	L	Ripple current*1 (mA rms)	Impe-dance*2 (Ω)	Endu-rance (h)	Lead dia. (ød)	Straight	Taping ✻B	Taping ✻H		Straight leads	Taping
16	15	4.0	7.0	65	2.000	1000	0.45	1.5	5.0	2.5	EEAFC1C150( )	200	2000
	27	5.0	7.0	120	0.950	1000	0.45	2.0	5.0	2.5	EEAFC1C270( )	200	2000
	47	5.0	11.0	175	0.800	1000	0.50	2.0	5.0	2.5	EEUFC1C470( )	200	2000
	56	5.0	11.0	175	0.800	1000	0.50	2.0	5.0	2.5	EEUFC1C560( )	200	2000
		6.3	7.0	200	0.450	1000	0.45	2.5	5.0	2.5	EEAFC1C560( )	200	2000
	68	5.0	11.0	175	0.800	1000	0.50	2.0	5.0	2.5	EEUFC1C680( )	200	2000
	100	6.3	11.2	290	0.350	1000	0.50	2.5	5.0	2.5	EEUFC1C101( )	200	2000
	120	6.3	11.2	290	0.350	1000	0.50	2.5	5.0	2.5	EEUFC1C121( )	200	2000
	220	8.0	11.5	555	0.117	2000	0.60	3.5	5.0	—	EEUFC1C221( )	200	1000
	270	8.0	11.5	555	0.117	2000	0.60	3.5	5.0	—	EEUFC1C271( )	200	1000
	330	8.0	11.5	555	0.117	2000	0.60	3.5	5.0	—	EEUFC1C331( )	200	1000
	390	10.0	12.5	755	0.090	3000	0.60	5.0	5.0	—	EEUFC1C391( )	200	500
	470	8.0	15.0	730	0.085	2000	0.60	3.5	5.0	—	EEUFC1C471L( )	200	1000
		10.0	12.5	755	0.090	3000	0.60	5.0	5.0	—	EEUFC1C471( )	200	500
	560	10.0	16.0	1050	0.068	3000	0.60	5.0	5.0	—	EEUFC1C561( )	200	500
	680	8.0	20.0	995	0.065	2000	0.60	3.5	5.0	—	EEUFC1C681L( )	200	1000
		10.0	16.0	1050	0.068	3000	0.60	5.0	5.0	—	EEUFC1C681( )	200	500
	820	10.0	20.0	1220	0.052	3000	0.60	5.0	5.0	—	EEUFC1C821( )	200	500
		12.5	15.0	1205	0.065	5000	0.60	5.0	5.0	—	EEUFC1C821S( )	200	500
	1000	10.0	20.0	1220	0.052	3000	0.60	5.0	5.0	—	EEUFC1C102S( )	200	500
		10.0	25.0	1440	0.045	3000	0.60	5.0	5.0	—	EEUFC1C102( )	200	500
	1200	10.0	25.0	1440	0.045	3000	0.60	5.0	5.0	—	EEUFC1C122( )	200	500
		16.0	15.0	1690	0.043	5000	0.80	7.5	7.5	—	EEUFC1C122S( )	100	250
	1500	10.0	30.0	1815	0.035	3000	0.60	5.0	—	—	EEUFC1C152L	100	—
		12.5	20.0	1655	0.038	5000	0.60	5.0	5.0	—	EEUFC1C152( )	200	500
		16.0	15.0	1690	0.043	5000	0.80	7.5	7.5	—	EEUFC1C152S( )	100	250
	1800	12.5	25.0	1945	0.030	5000	0.60	5.0	5.0	—	EEUFC1C182( )	200	500
		18.0	15.0	2000	0.038	5000	0.80	7.5	7.5	—	EEUFC1C182S( )	100	250
	2200	12.5	25.0	1945	0.030	5000	0.60	5.0	5.0	—	EEUFC1C222( )	200	500
		16.0	20.0	2205	0.029	5000	0.80	7.5	7.5	—	EEUFC1C222S( )	100	250
	2700	12.5	30.0	2310	0.025	5000	0.80	5.0	—	—	EEUFC1C272L	100	—
		16.0	20.0	2205	0.029	5000	0.80	7.5	7.5	—	EEUFC1C272( )	100	250
	3300	12.5	35.0	2510	0.022	5000	0.80	5.0	—	—	EEUFC1C332	100	—
		18.0	20.0	2490	0.028	5000	0.80	7.5	7.5	—	EEUFC1C332S( )	100	250
	3900	16.0	25.0	2555	0.022	5000	0.80	7.5	7.5	—	EEUFC1C392( )	100	250
		18.0	20.0	2490	0.028	5000	0.80	7.5	7.5	—	EEUFC1C392S( )	100	250
	4700	16.0	31.5	3010	0.018	5000	0.80	7.5	—	—	EEUFC1C472	100	—
		18.0	25.0	2740	0.020	5000	0.80	7.5	7.5	—	EEUFC1C472S( )	100	250
	5600	16.0	35.5	3150	0.016	5000	0.80	7.5	—	—	EEUFC1C562L	100	—
		18.0	31.5	3635	0.016	5000	0.80	7.5	—	—	EEUFC1C562	50	—
	6800	16.0	40.0	3360	0.015	5000	0.80	7.5	—	—	EEUFC1C682	100	—
	8200	18.0	35.5	3680	0.015	5000	0.80	7.5	—	—	EEUFC1C822	50	—

*1: Ripple current (100 kHz / +105 ℃)
*2: Impedance (100 kHz / +20 ℃)

- When requesting taped product, please put the letter "B" or "H" be tween the "( )".
  Lead wire pitch ✻B=5 mm, 7.5 mm, H=2.5 mm.
- Please refer to the page of “Taping dimensions”.

Design and specifications are each subject to change without notice. Ask factory for the current technical specifications before purchase and/or use.
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Characteristics list

Endurance : 105 ℃ 1000 h / ø4 to ø6.3, 105 ℃ 2000 h / ø8, 105 ℃ 3000 h / ø10, 105 ℃ 5000 h / ø12.5 to ø18

Rated voltage (V)	Capacitance (±20 %) (μF)	Case size (mm)		Specification			Lead length (mm)				Part No.	Min. Packaging Q'ty (PCS)	
								Lead space					
		øD	L	Ripple current*1 (mA rms)	Impe-dance*2 (Ω)	Endu-rance (h)	Lead dia. (ød)	Straight	Taping ✻B	Taping ✻H		Straight leads	Taping
25	10	4.0	7.0	65	2.000	1000	0.45	1.5	5.0	2.5	EEAFC1E100( )	200	2000
	22	5.0	7.0	120	0.950	1000	0.45	2.0	5.0	2.5	EEAFC1E220( )	200	2000
	39	5.0	11.0	175	0.800	1000	0.50	2.0	5.0	2.5	EEUFC1E390( )	200	2000
		6.3	7.0	200	0.450	1000	0.45	2.5	5.0	2.5	EEAFC1E390( )	200	2000
	47	5.0	11.0	175	0.800	1000	0.50	2.0	5.0	2.5	EEUFC1E470( )	200	2000
	82	6.3	11.2	290	0.350	1000	0.50	2.5	5.0	2.5	EEUFC1E820( )	200	2000
	100	6.3	11.2	290	0.350	1000	0.50	2.5	5.0	2.5	EEUFC1E101S( )	200	2000
	180	8.0	11.5	555	0.117	2000	0.60	3.5	5.0	—	EEUFC1E181( )	200	1000
	220	8.0	11.5	555	0.117	2000	0.60	3.5	5.0	—	EEUFC1E221( )	200	1000
	270	10.0	12.5	755	0.090	3000	0.60	5.0	5.0	—	EEUFC1E271( )	200	500
	330	8.0	15.0	730	0.085	2000	0.60	3.5	5.0	—	EEUFC1E331L( )	200	1000
		10.0	12.5	755	0.090	3000	0.60	5.0	5.0	—	EEUFC1E331( )	200	500
	390	10.0	16.0	1050	0.068	3000	0.60	5.0	5.0	—	EEUFC1E391( )	200	500
	470	8.0	20.0	995	0.065	2000	0.60	3.5	5.0	—	EEUFC1E471L( )	200	1000
		10.0	16.0	1050	0.068	3000	0.60	5.0	5.0	—	EEUFC1E471( )	200	500
	560	10.0	20.0	1220	0.052	3000	0.60	5.0	5.0	—	EEUFC1E561( )	200	500
		12.5	15.0	1205	0.065	5000	0.60	5.0	5.0	—	EEUFC1E561S( )	200	500
	680	10.0	20.0	1220	0.052	3000	0.60	5.0	5.0	—	EEUFC1E681( )	200	500
	820	10.0	25.0	1440	0.045	3000	0.60	5.0	5.0	—	EEUFC1E821( )	200	500
		12.5	20.0	1655	0.038	5000	0.60	5.0	5.0	—	EEUFC1E821S( )	200	500
	1000	10.0	30.0	1815	0.035	3000	0.60	5.0	—	—	EEUFC1E102L	100	—
		12.5	20.0	1655	0.038	5000	0.60	5.0	5.0	—	EEUFC1E102( )	200	500
		16.0	15.0	1690	0.043	5000	0.80	7.5	7.5	—	EEUFC1E102S( )	100	250
	1200	12.5	25.0	1945	0.030	5000	0.60	5.0	5.0	—	EEUFC1E122( )	200	500
		18.0	15.0	2000	0.038	5000	0.80	7.5	7.5	—	EEUFC1E122S( )	100	250
	1500	12.5	25.0	1945	0.030	5000	0.60	5.0	5.0	—	EEUFC1E152( )	200	500
		16.0	20.0	2205	0.029	5000	0.80	7.5	7.5	—	EEUFC1E152S( )	100	250
	1800	12.5	30.0	2310	0.025	5000	0.80	5.0	—	—	EEUFC1E182L	100	—
		16.0	20.0	2205	0.029	5000	0.80	7.5	7.5	—	EEUFC1E182( )	100	250
	2200	12.5	35.0	2510	0.022	5000	0.80	5.0	—	—	EEUFC1E222	100	—
		18.0	20.0	2490	0.028	5000	0.80	7.5	7.5	—	EEUFC1E222S( )	100	250
	2700	16.0	25.0	2555	0.022	5000	0.80	7.5	7.5	—	EEUFC1E272( )	100	250
	3300	16.0	31.5	3010	0.018	5000	0.80	7.5	—	—	EEUFC1E332	100	—
		18.0	25.0	2740	0.020	5000	0.80	7.5	7.5	—	EEUFC1E332S( )	100	250
	3900	16.0	35.5	3150	0.016	5000	0.80	7.5	—	—	EEUFC1E392L	100	—
		18.0	31.5	3635	0.016	5000	0.80	7.5	—	—	EEUFC1E392	50	—
	4700	18.0	35.5	3680	0.015	5000	0.80	7.5	—	—	EEUFC1E472	50	—
	5600	18.0	40.0	3735	0.014	5000	0.80	7.5	—	—	EEUFC1E562	50	—

*1: Ripple current (100 kHz / +105 ℃)
*2: Impedance (100 kHz / +20 ℃)
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Characteristics list

Endurance : 105 ℃ 1000 h / ø4 to ø6.3, 105 ℃ 2000 h / ø8, 105 ℃ 3000 h / ø10, 105 ℃ 5000 h / ø12.5 to ø18

Rated voltage (V)	Capacitance (±20 %) (μF)	Case size (mm)		Specification			Lead length (mm)				Part No.	Min. Packaging Q'ty (PCS)	
								Lead space					
		øD	L	Ripple current*1 (mA rms)	Impe-dance*2 (Ω)	Endu-rance (h)	Lead dia. (ød)	Straight	Taping ✻B	Taping ✻H		Straight leads	Taping
35	6.8	4.0	7.0	65	2.000	1000	0.45	1.5	5.0	2.5	EEAFC1V6R8( )	200	2000
	12	5.0	7.0	120	0.950	1000	0.45	2.0	5.0	2.5	EEAFC1V120( )	200	2000
	22	5.0	11.0	175	0.800	1000	0.50	2.0	5.0	2.5	EEUFC1V220( )	200	2000
	27	5.0	11.0	175	0.800	1000	0.50	2.0	5.0	2.5	EEUFC1V270( )	200	2000
		6.3	7.0	200	0.450	1000	0.45	2.5	5.0	2.5	EEAFC1V270( )	200	2000
	33	5.0	11.0	175	0.800	1000	0.50	2.0	5.0	2.5	EEUFC1V330( )	200	2000
	47	6.3	11.2	290	0.350	1000	0.50	2.5	5.0	2.5	EEUFC1V470( )	200	2000
	56	6.3	11.2	290	0.350	1000	0.50	2.5	5.0	2.5	EEUFC1V560( )	200	2000
	68	6.3	11.2	290	0.350	1000	0.50	2.5	5.0	2.5	EEUFC1V680( )	200	2000
	100	8.0	11.5	555	0.117	2000	0.60	3.5	5.0	—	EEUFC1V101( )	200	1000
	120	8.0	11.5	555	0.117	2000	0.60	3.5	5.0	—	EEUFC1V121( )	200	1000
	150	8.0	11.5	555	0.117	2000	0.60	3.5	5.0	—	EEUFC1V151( )	200	1000
	180	10.0	12.5	755	0.090	3000	0.60	5.0	5.0	—	EEUFC1V181( )	200	500
	220	8.0	15.0	730	0.085	2000	0.60	3.5	5.0	—	EEUFC1V221L( )	200	1000
		10.0	12.5	755	0.090	3000	0.60	5.0	5.0	—	EEUFC1V221( )	200	500
	270	10.0	16.0	1050	0.068	3000	0.60	5.0	5.0	—	EEUFC1V271( )	200	500
	330	8.0	20.0	995	0.065	2000	0.60	3.5	5.0	—	EEUFC1V331L( )	200	1000
		10.0	16.0	1050	0.068	3000	0.60	5.0	5.0	—	EEUFC1V331( )	200	500
	390	10.0	20.0	1220	0.052	3000	0.60	5.0	5.0	—	EEUFC1V391( )	200	500
		12.5	15.0	1205	0.065	5000	0.60	5.0	5.0	—	EEUFC1V391S( )	200	500
	470	10.0	20.0	1220	0.052	3000	0.60	5.0	5.0	—	EEUFC1V471( )	200	500
	560	10.0	25.0	1440	0.045	3000	0.60	5.0	5.0	—	EEUFC1V561( )	200	500
		12.5	20.0	1655	0.038	5000	0.60	5.0	5.0	—	EEUFC1V561S( )	200	500
	680	10.0	30.0	1815	0.035	3000	0.60	5.0	—	—	EEUFC1V681L	100	—
		12.5	20.0	1655	0.038	5000	0.60	5.0	5.0	—	EEUFC1V681( )	200	500
		16.0	15.0	1690	0.043	5000	0.80	7.5	7.5	—	EEUFC1V681S( )	100	250
	820	12.5	25.0	1945	0.030	5000	0.60	5.0	5.0	—	EEUFC1V821L( )	200	500
		18.0	15.0	2000	0.038	5000	0.80	7.5	7.5	—	EEUFC1V821( )	100	250
	1000	12.5	25.0	1945	0.030	5000	0.60	5.0	5.0	—	EEUFC1V102( )	200	500
		16.0	20.0	2205	0.029	5000	0.80	7.5	7.5	—	EEUFC1V102S( )	100	250
	1200	12.5	30.0	2310	0.025	5000	0.80	5.0	—	—	EEUFC1V122L	100	—
		16.0	20.0	2205	0.029	5000	0.80	7.5	7.5	—	EEUFC1V122( )	100	250
	1500	12.5	35.0	2510	0.022	5000	0.80	5.0	—	—	EEUFC1V152L	100	—
		16.0	25.0	2555	0.022	5000	0.80	7.5	7.5	—	EEUFC1V152( )	100	250
		18.0	20.0	2490	0.028	5000	0.80	7.5	7.5	—	EEUFC1V152S( )	100	250
	1800	12.5	40.0	2655	0.018	5000	0.80	5.0	—	—	EEUFC1V182L	100	—
		16.0	25.0	2555	0.022	5000	0.80	7.5	7.5	—	EEUFC1V182( )	100	250
		18.0	20.0	2490	0.028	5000	0.80	7.5	7.5	—	EEUFC1V182S( )	100	250
	2200	16.0	31.5	3010	0.018	5000	0.80	7.5	—	—	EEUFC1V222	100	—
		18.0	25.0	2740	0.020	5000	0.80	7.5	7.5	—	EEUFC1V222S( )	100	250
	2700	16.0	35.5	3150	0.016	5000	0.80	7.5	—	—	EEUFC1V272L	100	—
		18.0	31.5	3635	0.016	5000	0.80	7.5	—	—	EEUFC1V272	50	—
	3300	18.0	35.5	3680	0.015	5000	0.80	7.5	—	—	EEUFC1V332	50	—
	3900	18.0	40.0	3735	0.014	5000	0.80	7.5	—	—	EEUFC1V392	50	—

*1: Ripple current (100 kHz / +105 ℃)

*2: Impedance (100 kHz / +20 ℃)

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Characteristics list

Endurance : 105 ℃ 1000 h / ø4 to ø6.3, 105 ℃ 2000 h / ø8, 105 ℃ 3000 h / ø10, 105 ℃ 5000 h / ø12.5 to ø18

Rated voltage (V)	Capacitance (±20 %) (μF)	Case size (mm)		Specification			Lead length (mm)				Part No.	Min. Packaging Q'ty (PCS)	
								Lead space					
		øD	L	Ripple current*1 (mA rms)	Impe-dance*2 (Ω)	Endu-rance (h)	Lead dia. (ød)	Straight	Taping ✻B	Taping ✻H		Straight leads	Taping
50	2.2	5.0	11.0	45	1.800	1000	0.50	2.0	5.0	2.5	EEUFC1H2R2( )	200	2000
	3.3	5.0	11.0	65	1.300	1000	0.50	2.0	5.0	2.5	EEUFC1H3R3( )	200	2000
	4.7	5.0	11.0	95	1.300	1000	0.50	2.0	5.0	2.5	EEUFC1H4R7( )	200	2000
	10	5.0	11.0	125	1.300	1000	0.50	2.0	5.0	2.5	EEUFC1H100L( )	200	2000
	12	5.0	11.0	135	1.300	1000	0.50	2.0	5.0	2.5	EEUFC1H120( )	200	2000
	15	5.0	11.0	145	1.300	1000	0.50	2.0	5.0	2.5	EEUFC1H150( )	200	2000
	18	5.0	11.0	155	1.300	1000	0.50	2.0	5.0	2.5	EEUFC1H180( )	200	2000
	22	5.0	11.0	155	1.300	1000	0.50	2.0	5.0	2.5	EEUFC1H220( )	200	2000
	33	6.3	11.2	260	0.600	1000	0.50	2.5	5.0	2.5	EEUFC1H330( )	200	2000
	39	6.3	11.2	260	0.600	1000	0.50	2.5	5.0	2.5	EEUFC1H390( )	200	2000
	47	6.3	11.2	260	0.600	1000	0.50	2.5	5.0	2.5	EEUFC1H470( )	200	2000
	68	8.0	11.5	485	0.234	2000	0.60	3.5	5.0	—	EEUFC1H680( )	200	1000
	82	8.0	11.5	485	0.234	2000	0.60	3.5	5.0	—	EEUFC1H820( )	200	1000
	100	10.0	12.5	615	0.162	3000	0.60	5.0	5.0	—	EEUFC1H101( )	200	500
	120	8.0	15.0	635	0.155	2000	0.60	3.5	5.0	—	EEUFC1H121L( )	200	1000
		10.0	12.5	615	0.162	3000	0.60	5.0	5.0	—	EEUFC1H121( )	200	500
	150	10.0	16.0	850	0.119	3000	0.60	5.0	5.0	—	EEUFC1H151( )	200	500
	180	8.0	20.0	860	0.120	2000	0.60	3.5	5.0	—	EEUFC1H181L( )	200	1000
		10.0	16.0	850	0.119	3000	0.60	5.0	5.0	—	EEUFC1H181( )	200	500
	220	10.0	20.0	1030	0.090	3000	0.60	5.0	5.0	—	EEUFC1H221( )	200	500
		12.5	15.0	1150	0.110	5000	0.60	5.0	5.0	—	EEUFC1H221S( )	200	500
	270	10.0	25.0	1200	0.082	3000	0.60	5.0	5.0	—	EEUFC1H271( )	200	500
	330	10.0	30.0	1610	0.060	3000	0.60	5.0	—	—	EEUFC1H331L	100	—
		12.5	20.0	1480	0.063	5000	0.60	5.0	5.0	—	EEUFC1H331( )	200	500
	390	12.5	20.0	1480	0.063	5000	0.60	5.0	5.0	—	EEUFC1H391( )	200	500
		16.0	15.0	1610	0.080	5000	0.80	7.5	7.5	—	EEUFC1H391S( )	100	250
	470	10.0	30.0	1610	0.060	3000	0.60	5.0	—	—	EEUFC1H471L	100	—
		12.5	25.0	1832	0.050	5000	0.60	5.0	5.0	—	EEUFC1H471( )	200	500
	560	12.5	25.0	1832	0.050	5000	0.60	5.0	5.0	—	EEUFC1H561( )	200	500
		18.0	15.0	1900	0.068	5000	0.80	7.5	7.5	—	EEUFC1H561S( )	100	250
	680	12.5	30.0	2215	0.040	5000	0.80	5.0	—	—	EEUFC1H681L	100	—
		16.0	20.0	1835	0.048	5000	0.80	7.5	7.5	—	EEUFC1H681( )	100	250
	820	12.5	35.0	2285	0.034	5000	0.80	5.0	—	—	EEUFC1H821L	100	—
		18.0	20.0	2420	0.042	5000	0.80	7.5	7.5	—	EEUFC1H821( )	100	250
	1000	12.5	40.0	2590	0.030	5000	0.80	5.0	—	—	EEUFC1H102L	100	—
		16.0	25.0	2235	0.034	5000	0.80	7.5	7.5	—	EEUFC1H102( )	100	250
	1200	16.0	31.5	2700	0.028	5000	0.80	7.5	—	—	EEUFC1H122	100	—
		18.0	25.0	2610	0.029	5000	0.80	7.5	7.5	—	EEUFC1H122S( )	100	250
	1500	16.0	35.5	2790	0.025	5000	0.80	7.5	—	—	EEUFC1H152L	100	—
	1800	16.0	40.0	2845	0.023	5000	0.80	7.5	—	—	EEUFC1H182L	100	—
		18.0	31.5	3000	0.025	5000	0.80	7.5	—	—	EEUFC1H182	50	—
	2200	18.0	35.5	3100	0.023	5000	0.80	7.5	—	—	EEUFC1H222	50	—

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・Please refer to the page of “Taping dimensions”.

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Characteristics list

Endurance : 105 ℃ 1000 h / ø4 to ø6.3, 105 ℃ 2000 h / ø8, 105 ℃ 3000 h / ø10, 105 ℃ 5000 h / ø12.5 to ø18

Rated voltage (V)	Capacitance (±20 %) (μF)	Case size (mm)		Specification			Lead length (mm)				Part No.	Min. Packaging Q'ty (PCS)	
								Lead space					
		øD	L	Ripple current*1 (mA rms)	Impe-dance*2 (Ω)	Endu-rance (h)	Lead dia. (ød)	Straight	Taping ✻B	Taping ✻H		Straight leads	Taping
63	12	5.0	11.0	145	2.000	1000	0.50	2.0	5.0	2.5	EEUFC1J120( )	200	2000
	22	6.3	11.2	240	1.000	1000	0.50	2.5	5.0	2.5	EEUFC1J220( )	200	2000
	33	6.3	11.2	240	1.000	1000	0.50	2.5	5.0	2.5	EEUFC1J330( )	200	2000
	47	8.0	11.5	405	0.342	2000	0.60	3.5	5.0	—	EEUFC1J470( )	200	1000
	56	8.0	11.5	405	0.342	2000	0.60	3.5	5.0	—	EEUFC1J560( )	200	1000
	68	8.0	11.5	405	0.342	2000	0.60	3.5	5.0	—	EEUFC1J680( )	200	1000
	82	10.0	12.5	535	0.256	3000	0.60	5.0	5.0	—	EEUFC1J820( )	200	500
	100	8.0	15.0	535	0.230	2000	0.60	3.5	5.0	—	EEUFC1J101L( )	200	1000
		10.0	12.5	535	0.256	3000	0.60	5.0	5.0	—	EEUFC1J101( )	200	500
	120	10.0	16.0	600	0.194	3000	0.60	5.0	5.0	—	EEUFC1J121( )	200	500
	150	8.0	20.0	690	0.178	2000	0.60	3.5	5.0	—	EEUFC1J151( )	200	1000
	180	10.0	20.0	885	0.147	3000	0.60	5.0	5.0	—	EEUFC1J181( )	200	500
		12.5	15.0	1020	0.150	5000	0.60	5.0	5.0	—	EEUFC1J181S( )	200	500
	220	10.0	20.0	885	0.147	3000	0.60	5.0	5.0	—	EEUFC1J221X( )	200	500
		10.0	25.0	1050	0.130	3000	0.60	5.0	5.0	—	EEUFC1J221( )	200	500
		12.5	20.0	1285	0.085	5000	0.60	5.0	5.0	—	EEUFC1J221S( )	200	500
	270	16.0	15.0	1410	0.090	5000	0.80	7.5	7.5	—	EEUFC1J271( )	100	250
	330	10.0	30.0	1300	0.090	3000	0.60	5.0	—	—	EEUFC1J331L	100	—
		12.5	20.0	1285	0.085	5000	0.60	5.0	5.0	—	EEUFC1J331( )	200	500
	390	12.5	25.0	1720	0.070	5000	0.60	5.0	5.0	—	EEUFC1J391( )	200	500
		18.0	15.0	1690	0.086	5000	0.80	7.5	7.5	—	EEUFC1J391S( )	100	250
	470	12.5	30.0	2090	0.055	5000	0.80	5.0	—	—	EEUFC1J471L	100	—
		16.0	20.0	1765	0.059	5000	0.80	7.5	7.5	—	EEUFC1J471( )	100	250
	560	16.0	25.0	2160	0.050	5000	0.80	7.5	7.5	—	EEUFC1J561( )	100	250
	680	12.5	35.0	2265	0.047	5000	0.80	5.0	—	—	EEUFC1J681L	100	—
		16.0	25.0	2160	0.050	5000	0.80	7.5	7.5	—	EEUFC1J681( )	100	250
		18.0	20.0	2290	0.055	5000	0.80	7.5	7.5	—	EEUFC1J681S( )	100	250
	820	12.5	40.0	2560	0.042	5000	0.80	5.0	—	—	EEUFC1J821L	100	—
		16.0	31.5	2670	0.043	5000	0.80	7.5	—	—	EEUFC1J821	100	—
		18.0	25.0	2585	0.043	5000	0.80	7.5	7.5	—	EEUFC1J821S( )	100	250
	1000	16.0	31.5	2670	0.043	5000	0.80	7.5	—	—	EEUFC1J102U	100	—
		16.0	35.5	2770	0.036	5000	0.80	7.5	—	—	EEUFC1J102	100	—
	1200	16.0	40.0	2825	0.030	5000	0.80	7.5	—	—	EEUFC1J122L	100	—
		18.0	31.5	2950	0.032	5000	0.80	7.5	—	—	EEUFC1J122	50	—
	1500	18.0	35.5	3095	0.030	5000	0.80	7.5	—	—	EEUFC1J152	50	—
	1800	18.0	40.0	3205	0.025	5000	0.80	7.5	—	—	EEUFC1J182	50	—

*1: Ripple current (100 kHz / +105 ℃)
*2: Impedance (100 kHz / +20 ℃)
・When requesting taped product, please put the letter "B" or "H" be tween the "( )".
Lead wire pitch ✻B=5 mm, 7.5 mm, H=2.5 mm.
・Please refer to the page of “Taping dimensions”.

Design and specifications are each subject to change without notice. Ask factory for the current technical specifications before purchase and/or use.
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Characteristics list

Endurance : 105 ℃ 1000 h / ø4 to ø6.3, 105 ℃ 2000 h / ø8, 105 ℃ 3000 h / ø10, 105 ℃ 5000 h / ø12.5 to ø18

Rated voltage (V)	Capacitance (±20 %) (μF)	Case size (mm)		Specification			Lead length (mm)				Part No.	Min. Packaging Q'ty (PCS)	
								Lead space					
		øD	L	Ripple current*1 (mA rms)	Impe-dance*2 (Ω)	Endu-rance (h)	Lead dia. (ød)	Straight	Taping ✻B	Taping ✻H		Straight leads	Taping
100	5.6	5.0	11.0	80	4.100	1000	0.5	2.0	5.0	2.5	EEUFC2A5R6( )	200	2000
	12	6.3	11.2	114	1.800	1000	0.5	2.5	5.0	2.5	EEUFC2A120( )	200	2000
	22	8.0	11.5	260	0.680	2000	0.6	3.5	5.0	—	EEUFC2A220( )	200	1000
	33	8.0	15.0	340	0.450	2000	0.6	3.5	5.0	—	EEUFC2A330L( )	200	1000
		10.0	12.5	306	0.530	3000	0.6	5.0	5.0	—	EEUFC2A330( )	200	500
	39	8.0	20.0	455	0.330	2000	0.6	5.0	5.0	—	EEUFC2A390L( )	200	1000
		10.0	16.0	400	0.360	3000	0.6	5.0	5.0	—	EEUFC2A390( )	200	500
	47	10.0	20.0	463	0.240	3000	0.6	5.0	5.0	—	EEUFC2A470( )	200	500
	56	10.0	20.0	463	0.240	3000	0.6	5.0	5.0	—	EEUFC2A560( )	200	500
	68	10.0	25.0	599	0.210	3000	0.6	5.0	5.0	—	EEUFC2A680L( )	200	500
		12.5	15.0	511	0.230	5000	0.6	5.0	5.0	—	EEUFC2A680( )	200	500
	100	10.0	30.0	698	0.150	3000	0.6	5.0	—	—	EEUFC2A101L	100	—
		12.5	20.0	671	0.180	5000	0.6	5.0	5.0	—	EEUFC2A101( )	200	500
	120	16.0	15.0	793	0.140	5000	0.8	7.5	7.5	—	EEUFC2A121S( )	100	250
	150	12.5	25.0	807	0.110	5000	0.6	5.0	5.0	—	EEUFC2A151( )	200	500
		18.0	15.0	917	0.120	5000	0.8	7.5	7.5	—	EEUFC2A151S( )	100	250
	180	12.5	30.0	937	0.098	5000	0.8	5.0	—	—	EEUFC2A181L	100	—
		16.0	20.0	995	0.110	5000	0.8	7.5	7.5	—	EEUFC2A181( )	100	250
	220	12.5	35.0	1040	0.087	5000	0.8	5.0	—	—	EEUFC2A221L	100	—
		16.0	25.0	1170	0.089	5000	0.8	7.5	7.5	—	EEUFC2A221( )	100	250
	270	12.5	40.0	1130	0.072	5000	0.8	5.0	—	—	EEUFC2A271L	100	—
		18.0	20.0	1230	0.080	5000	0.8	7.5	7.5	—	EEUFC2A271S( )	100	250
	330	16.0	31.5	1520	0.062	5000	0.8	7.5	—	—	EEUFC2A331	100	—
		18.0	25.0	1420	0.070	5000	0.8	7.5	7.5	—	EEUFC2A331S( )	100	250
	390	16.0	35.5	1730	0.053	5000	0.8	7.5	—	—	EEUFC2A391L	100	—
		18.0	31.5	1600	0.062	5000	0.8	7.5	—	—	EEUFC2A391	50	—
	470	16.0	40.0	1920	0.047	5000	0.8	7.5	—	—	EEUFC2A471	100	—
	560	18.0	35.5	1770	0.041	5000	0.8	7.5	—	—	EEUFC2A561	50	—
	680	18.0	40.0	2300	0.036	5000	0.8	7.5	—	—	EEUFC2A681	50	—

*1: Ripple current (100 kHz / +105 ℃)
*2: Impedance (100 kHz / +20 ℃)
・When requesting taped product, please put the letter "B" or "H" be tween the "( )".
Lead wire pitch ✻B=5 mm, 7.5 mm, H=2.5 mm.
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Panasonic INDUSTRY

Aluminum Electrolytic Capacitors

This Series is no longer available for purchase in the country of Japan.

Radial Lead Type

FK-A series



Features

- Endurance : 105 ℃ 3000 h to 5000 h
- Low impedance (10 % to 30 % less than FC Series)
- Miniaturization (30 % to 40 % less than FC Series)
- AEC-Q200 compliant
- RoHS compliant

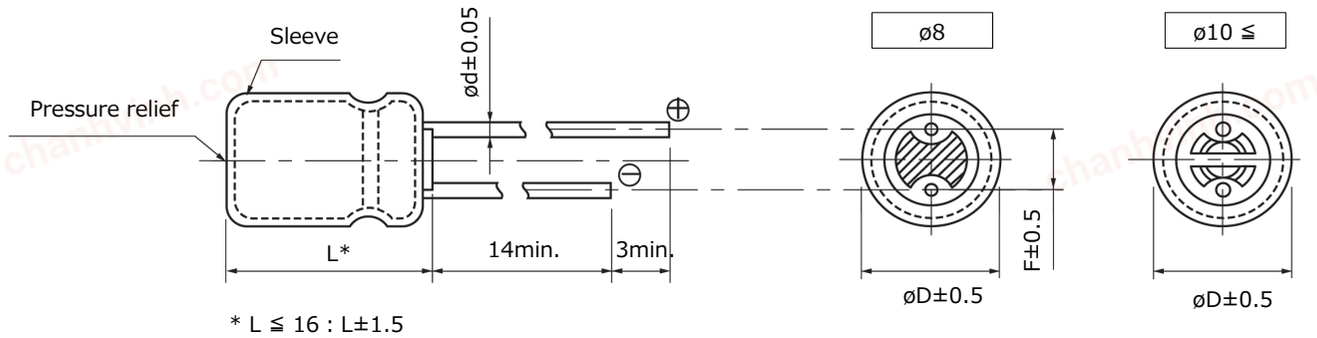
Specifications

Category temp. range	−55 ℃ to +105 ℃						
Rated voltage range	6.3 V to 35 V						
Capacitance range	180 µF to 12000 µF						
Capacitance tolerance	±20 % (120 Hz / +20℃)						
Leakage current	I ≦ 0.01 CV (µA) After 2 minutes						
Dissipation factor (tan δ)	Rated voltage (V)	6.3	10	16	25	35	(120 Hz /+20℃)
	Dissipation factor (tan δ)	0.22	0.19	0.16	0.14	0.12	
	For capacitance value ≧ 1000 µF , add 0.02 per every 1000 µF.						
Endurance	After following life test with DC voltage and +105 ℃±2 ℃ ripple current value applied (The sum of DC and ripple peak voltage shall not exceed the rated working voltage)when the capacitors are restored to 20 ℃, the capacitors shall meet the limits specified bellow. Duration ø8 : 3000 h, ø10 : 4000 h, ø12.5 to ø18 : 5000 h						
	Capacitance change	Within ±20 % of the initial value					
	Dissipation factor (tan δ)	≦ 200 % of the initial limit					
	DC leakage current	Within the initial limit					
Shelf life	After storage for 1000 h at +105 ℃±2 ℃ with no voltage applied and then being stabilized at +20 °C, capacitors shall meet the limits specified in endurance. (With voltage treatment)						

Frequency correction factor for ripple current

Cap. (µF) \ Freq. (Hz)	60	120	1 k	10 k	100 k
180 to 330	0.60	0.70	0.85	0.95	1.00
390 to 1000	0.65	0.75	0.90	0.98	1.00
1200 to 12000	0.75	0.80	0.95	1.00	1.00

Dimensions



* L ≦ 16 : L±1.5
L ≧ 20 : L±2.0

Unit : mm

øD	8.0	10.0	12.5		16.0	18.0
L	—	—	12.5 to 25	30 to 40	—	—
ød	0.6	0.6	0.6	0.8	0.8	0.8
F	3.5	5.0	5.0	5.0	7.5	7.5

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Case size/ Impedance/ Ripple current

Casecsize (mm) (øD×L)	Impedance (Ω) (100 kHz)		Ripple current (mA rms) (100 kHz)
	+20 ℃	-10 ℃	+105 ℃
8 × 11.5	0.090	0.180	630
8 × 15	0.062	0.124	860
8 × 20	0.044	0.088	1220
10 × 12.5	0.063	0.126	900
10 × 16	0.049	0.098	1240
10 × 20	0.035	0.070	1490
10 × 25	0.033	0.066	1680
10 × 30	0.025	0.050	2140
12.5 × 15	0.048	0.096	1400
12.5 × 20	0.029	0.058	1890
12.5 × 25	0.022	0.044	2280
12.5 × 30	0.018	0.036	2720
12.5 × 35	0.016	0.032	2940
12.5 × 40	0.014	0.028	3010
16 × 15	0.038	0.076	1800
16 × 20	0.026	0.052	2330
16 × 25	0.019	0.038	2760
18 × 15	0.036	0.072	2060
18 × 20	0.025	0.050	2640
18 × 25	0.018	0.036	2850

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Characteristics list

Endurance : 105 ℃ 3000 h / ø8, 105 ℃ 4000 h / ø10, 105 ℃ 5000 h / ø12.5 to ø18

Rated voltage (V)	Capacitance (±20 %) (μF)	Case size (mm)		Specification			Lead length (mm)			Part No.	Min. Packaging Q'ty (PCS)	
								Lead space				
		øD	L	Ripple current*1 (mA rms)	Impe-dance*2 (Ω)	Endu-rance (h)	Lead dia. (ød)	Straight	Taping ✻B		Straight leads	Taping
6.3	680	8.0	11.5	630	0.090	3000	0.6	3.5	5.0	EEUFK0J681( )	200	1000
	1000	8.0	15.0	860	0.062	3000	0.6	3.5	5.0	EEUFK0J102L( )	200	1000
		10.0	12.5	900	0.063	4000	0.6	5.0	5.0	EEUFK0J102( )	200	500
	1500	8.0	20.0	1220	0.044	3000	0.6	3.5	5.0	EEUFK0J152L( )	200	1000
		10.0	16.0	1240	0.049	4000	0.6	5.0	5.0	EEUFK0J152( )	200	500
	1800	12.5	15.0	1400	0.048	5000	0.6	5.0	5.0	EEUFK0J182S( )	200	500
	2200	10.0	20.0	1490	0.035	4000	0.6	5.0	5.0	EEUFK0J222( )	200	500
		10.0	25.0	1680	0.033	4000	0.6	5.0	5.0	EEUFK0J222L( )	200	500
	3300	10.0	30.0	2140	0.025	4000	0.6	5.0	—	EEUFK0J332L	100	—
		12.5	20.0	1890	0.029	5000	0.6	5.0	5.0	EEUFK0J332( )	200	500
		16.0	15.0	1800	0.038	5000	0.8	7.5	7.5	EEUFK0J332S( )	100	250
	4700	12.5	25.0	2280	0.022	5000	0.6	5.0	5.0	EEUFK0J472( )	200	500
		18.0	15.0	2060	0.036	5000	0.8	7.5	7.5	EEUFK0J472S( )	100	250
	5600	12.5	30.0	2720	0.018	5000	0.8	5.0	—	EEUFK0J562L	100	—
		16.0	20.0	2330	0.026	5000	0.8	7.5	7.5	EEUFK0J562S( )	100	250
	6800	12.5	35.0	2940	0.016	5000	0.8	5.0	—	EEUFK0J682L	100	—
	8200	12.5	40.0	3010	0.014	5000	0.8	5.0	—	EEUFK0J822L	100	—
		16.0	25.0	2760	0.019	5000	0.8	7.5	7.5	EEUFK0J822( )	100	250
		18.0	20.0	2640	0.025	5000	0.8	7.5	7.5	EEUFK0J822S( )	100	250
	12000	18.0	25.0	2850	0.018	5000	0.8	7.5	7.5	EEUFK0J123S( )	100	250
10	560	8.0	11.5	630	0.090	3000	0.6	3.5	5.0	EEUFK1A561( )	200	1000
	820	8.0	15.0	860	0.062	3000	0.6	3.5	5.0	EEUFK1A821L( )	200	1000
		10.0	12.5	900	0.063	4000	0.6	5.0	5.0	EEUFK1A821( )	200	500
	1200	8.0	20.0	1220	0.044	3000	0.6	3.5	5.0	EEUFK1A122L( )	200	1000
		10.0	16.0	1240	0.049	4000	0.6	5.0	5.0	EEUFK1A122( )	200	500
	1500	12.5	15.0	1400	0.048	5000	0.6	5.0	5.0	EEUFK1A152S( )	200	500
	1800	10.0	20.0	1490	0.035	4000	0.6	5.0	5.0	EEUFK1A182( )	200	500
		10.0	25.0	1680	0.033	4000	0.6	5.0	5.0	EEUFK1A182L( )	200	500
	2700	10.0	30.0	2140	0.025	4000	0.6	5.0	—	EEUFK1A272L	100	—
		12.5	20.0	1890	0.029	5000	0.6	5.0	5.0	EEUFK1A272( )	200	500
		16.0	15.0	1800	0.038	5000	0.8	7.5	7.5	EEUFK1A272S( )	100	250
	3900	12.5	25.0	2280	0.022	5000	0.6	5.0	5.0	EEUFK1A392( )	200	500
		18.0	15.0	2060	0.036	5000	0.8	7.5	7.5	EEUFK1A392S( )	100	250
	4700	12.5	30.0	2720	0.018	5000	0.8	5.0	—	EEUFK1A472L	100	—
		16.0	20.0	2330	0.026	5000	0.8	7.5	7.5	EEUFK1A472S( )	100	250
	5600	12.5	35.0	2940	0.016	5000	0.8	5.0	—	EEUFK1A562L	100	—
	6800	12.5	40.0	3010	0.014	5000	0.8	5.0	—	EEUFK1A682L	100	—
		16.0	25.0	2760	0.019	5000	0.8	7.5	7.5	EEUFK1A682( )	100	250
		18.0	20.0	2640	0.025	5000	0.8	7.5	7.5	EEUFK1A682S( )	100	250
	8200	18.0	25.0	2850	0.018	5000	0.8	7.5	7.5	EEUFK1A822S( )	100	250

*1: Ripple current (100 kHz / +105 ℃)
*2: Impedance (100 kHz / +20 ℃)
・When requesting taped product, please put the letter "B" be tween the "( )". Lead wire pitch ✻B=5 mm, 7.5 mm.
・Please refer to the page of “Taping dimensions”.

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Characteristics list

Endurance : 105 ℃ 3000 h / ø8, 105 ℃ 4000 h / ø10, 105 ℃ 5000 h / ø12.5 to ø18

Rated voltage (V)	Capacitance (±20 %) (μF)	Case size (mm)		Specification			Lead length (mm)			Part No.	Min. Packaging Q'ty (PCS)	
								Lead space				
		øD	L	Ripple current*1 (mA rms)	Impe-dance*2 (Ω)	Endu-rance (h)	Lead dia. (ød)	Straight	Taping ✻B		Straight leads	Taping
16	390	8.0	11.5	630	0.090	3000	0.6	3.5	5.0	EEUFK1C391( )	200	1000
	680	8.0	15.0	860	0.062	3000	0.6	3.5	5.0	EEUFK1C681L( )	200	1000
		10.0	12.5	900	0.063	4000	0.6	5.0	5.0	EEUFK1C681( )	200	500
	820	8.0	20.0	1220	0.044	3000	0.6	3.5	5.0	EEUFK1C821L( )	200	1000
	1000	10.0	16.0	1240	0.049	4000	0.6	5.0	5.0	EEUFK1C102( )	200	500
	1200	10.0	20.0	1490	0.035	4000	0.6	5.0	5.0	EEUFK1C122( )	200	500
		12.5	15.0	1400	0.048	5000	0.6	5.0	5.0	EEUFK1C122S( )	200	500
	1500	10.0	25.0	1680	0.033	4000	0.6	5.0	5.0	EEUFK1C152L( )	200	500
	2200	10.0	30.0	2140	0.025	4000	0.6	5.0	—	EEUFK1C222L	100	—
		12.5	20.0	1890	0.029	5000	0.6	5.0	5.0	EEUFK1C222( )	200	500
		16.0	15.0	1800	0.038	5000	0.8	7.5	7.5	EEUFK1C222S( )	100	250
	2700	12.5	25.0	2280	0.022	5000	0.6	5.0	5.0	EEUFK1C272( )	200	500
		18.0	15.0	2060	0.036	5000	0.8	7.5	7.5	EEUFK1C272S( )	100	250
	3300	12.5	30.0	2720	0.018	5000	0.8	5.0	—	EEUFK1C332L	100	—
	3900	12.5	35.0	2940	0.016	5000	0.8	5.0	—	EEUFK1C392L	100	—
		16.0	20.0	2330	0.026	5000	0.8	7.5	7.5	EEUFK1C392S( )	100	250
	4700	12.5	40.0	3010	0.014	5000	0.8	5.0	—	EEUFK1C472L	100	—
		18.0	20.0	2640	0.025	5000	0.8	7.5	7.5	EEUFK1C472S( )	100	250
	5600	16.0	25.0	2760	0.019	5000	0.8	7.5	7.5	EEUFK1C562( )	100	250
	6800	18.0	25.0	2850	0.018	5000	0.8	7.5	7.5	EEUFK1C682S( )	100	250
25	270	8.0	11.5	630	0.090	3000	0.6	3.5	5.0	EEUFK1E271( )	200	1000
	390	8.0	15.0	860	0.062	3000	0.6	3.5	5.0	EEUFK1E391L( )	200	1000
	470	10.0	12.5	900	0.063	4000	0.6	5.0	5.0	EEUFK1E471( )	200	500
	560	8.0	20.0	1220	0.044	3000	0.6	3.5	5.0	EEUFK1E561L( )	200	1000
		10.0	16.0	1240	0.049	4000	0.6	5.0	5.0	EEUFK1E561( )	200	500
	820	10.0	20.0	1490	0.035	4000	0.6	5.0	5.0	EEUFK1E821( )	200	500
		12.5	15.0	1400	0.048	5000	0.6	5.0	5.0	EEUFK1E821S( )	200	500
	1000	10.0	25.0	1680	0.033	4000	0.6	5.0	5.0	EEUFK1E102L( )	200	500
	1200	12.5	20.0	1890	0.029	5000	0.6	5.0	5.0	EEUFK1E122( )	200	500
	1500	10.0	30.0	2140	0.025	4000	0.6	5.0	—	EEUFK1E152L	100	—
		16.0	15.0	1800	0.038	5000	0.8	7.5	7.5	EEUFK1E152S( )	100	250
	1800	12.5	25.0	2280	0.022	5000	0.6	5.0	5.0	EEUFK1E182( )	200	500
		18.0	15.0	2060	0.036	5000	0.8	7.5	7.5	EEUFK1E182S( )	100	250
	2200	12.5	30.0	2720	0.018	5000	0.8	5.0	—	EEUFK1E222L	100	—
		16.0	20.0	2330	0.026	5000	0.8	7.5	7.5	EEUFK1E222S( )	100	250
	2700	12.5	35.0	2940	0.016	5000	0.8	5.0	—	EEUFK1E272L	100	—
	3300	12.5	40.0	3010	0.014	5000	0.8	5.0	—	EEUFK1E332L	100	—
		16.0	25.0	2760	0.019	5000	0.8	7.5	7.5	EEUFK1E332( )	100	250
		18.0	20.0	2640	0.025	5000	0.8	7.5	7.5	EEUFK1E332S( )	100	250
	4700	18.0	25.0	2850	0.018	5000	0.8	7.5	7.5	EEUFK1E472S( )	100	250

*1: Ripple current (100 kHz / +105 ℃)
*2: Impedance (100 kHz / +20 ℃)
・When requesting taped product, please put the letter "B" be tween the "( )". Lead wire pitch ✻B=5 mm, 7.5 mm.
・Please refer to the page of “Taping dimensions”.

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Should a safety concern arise regarding this product, please be sure to contact us immediately.

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Characteristics list

Endurance : 105 ℃ 3000 h / ø8, 105 ℃ 4000 h / ø10, 105 ℃ 5000 h / ø12.5 to ø18

Rated voltage (V)	Capacitance (±20 %) (μF)	Case size (mm)		Specification			Lead length (mm)			Part No.	Min. Packaging Q'ty (PCS)	
								Lead space				
		øD	L	Ripple current*1 (mA rms)	Impe-dance*2 (Ω)	Endu-rance (h)	Lead dia. (ød)	Straight	Taping ✻B		Straight leads	Taping
35	180	8.0	11.5	630	0.090	3000	0.6	3.5	5.0	EEUFK1V181( )	200	1000
	270	8.0	15.0	860	0.062	3000	0.6	3.5	5.0	EEUFK1V271L( )	200	1000
		10.0	12.5	900	0.063	4000	0.6	5.0	5.0	EEUFK1V271( )	200	500
	390	8.0	20.0	1220	0.044	3000	0.6	3.5	5.0	EEUFK1V391L( )	200	1000
		10.0	16.0	1240	0.049	4000	0.6	5.0	5.0	EEUFK1V391( )	200	500
	560	10.0	20.0	1490	0.035	4000	0.6	5.0	5.0	EEUFK1V561( )	200	500
		12.5	15.0	1400	0.048	5000	0.6	5.0	5.0	EEUFK1V561S( )	200	500
	680	10.0	25.0	1680	0.033	4000	0.6	5.0	5.0	EEUFK1V681L( )	200	500
	820	12.5	20.0	1890	0.029	5000	0.6	5.0	5.0	EEUFK1V821( )	200	500
	1000	10.0	30.0	2140	0.025	4000	0.6	5.0	—	EEUFK1V102L	100	—
		16.0	15.0	1800	0.038	5000	0.8	7.5	7.5	EEUFK1V102S( )	100	250
	1200	12.5	25.0	2280	0.022	5000	0.6	5.0	5.0	EEUFK1V122( )	200	500
		18.0	15.0	2060	0.036	5000	0.8	7.5	7.5	EEUFK1V122S( )	100	250
	1500	12.5	30.0	2720	0.018	5000	0.8	5.0	—	EEUFK1V152L	100	—
	1800	12.5	35.0	2940	0.016	5000	0.8	5.0	—	EEUFK1V182L	100	—
		16.0	20.0	2330	0.026	5000	0.8	7.5	7.5	EEUFK1V182S( )	100	250
	2200	12.5	40.0	3010	0.014	5000	0.8	5.0	—	EEUFK1V222L	100	—
		16.0	25.0	2760	0.019	5000	0.8	7.5	7.5	EEUFK1V222( )	100	250
		18.0	20.0	2640	0.025	5000	0.8	7.5	7.5	EEUFK1V222S( )	100	250
	3300	18.0	25.0	2850	0.018	5000	0.8	7.5	7.5	EEUFK1V332S( )	100	250

*1: Ripple current (100 kHz / +105 ℃)
*2: Impedance (100 kHz / +20 ℃)
・When requesting taped product, please put the letter "B" be tween the "( )". Lead wire pitch ✻B=5 mm, 7.5 mm.
・Please refer to the page of “Taping dimensions”.

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Panasonic INDUSTRY

Aluminum Electrolytic Capacitors

This Series is no longer available for purchase in the country of Japan.



Radial Lead Type

FM-A series

Features

- Endurance : 105 ℃ 2000 h to 7000 h
- Low impedance (40 % to 70 % less than FC series)
- RoHS compliant

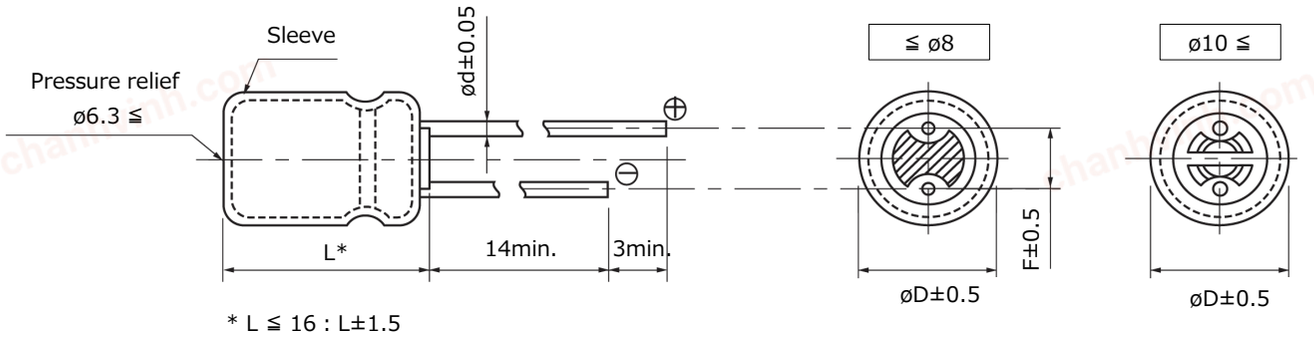
Specifications

Category temp. range	−40 ℃ to +105 ℃							
Rated voltage range	6.3 V to 50 V							
Capacitance range	22 μF to 6800 μF							
Capacitance tolerance	±20 % (120 Hz / +20℃)							
Leakage current	I ≦ 0.01 CV (μA) After 2 minutes							
Dissipation factor (tan δ)	Rated voltage (V)	6.3	10	16	25	35	50	(120 Hz /+20℃)
	Dissipation factor (tan δ)	0.22	0.19	0.16	0.14	0.12	0.10	
	For capacitance value ≧ 1000 μF, add 0.02 per every 1000 μF.							
Endurance	After following life test with DC voltage and +105 ℃±2 ℃ ripple current value applied (The sum of DC and ripple peak voltage shall not exceed the rated working voltage)when the capacitors are restored to 20 ℃, the capacitors shall meet the limits specified bellow. Duration ø5 to ø6.3 : 2000 h, ø8×11.5 to ø8×15: 3000 h ø8×20 to ø10×16 : 4000 h, ø10×20 to ø12.5×20/ ø16×20 : 5000 h ø12.5×25 to ø12.5×35/ ø16×25 : 7000 h							
	Capacitance change	Within ±25 % of the initial value (6.3 V to 10 V : ±30 %)						
	Dissipation factor (tan δ)	≦ 200 % of the initial limit						
	DC leakage current	Within the initial limit						
Shelf life	After storage for 1000 h at +105 ℃±2 ℃ with no voltage applied and then being stabilized at +20 °C, capacitors shall meet the limits specified in endurance. (With voltage treatment)							

Frequency correction factor for ripple current

Cap. (μF) \ Freq. (Hz)	60	120	1 k	10 k	100 k
2.2 to 33	0.45	0.55	0.75	0.90	1.00
47 to 330	0.60	0.70	0.85	0.95	1.00
390 to 1000	0.65	0.75	0.90	0.98	1.00
1200 to 6800	0.75	0.80	0.95	1.00	1.00

Dimensions



* L ≦ 16 : L±1.5
L ≧ 20 : L±2.0

Unit : mm

øD	5.0	6.3	8.0	10.0	12.5		16.0
L	—	—	—	—	12.5 to 25	30 to 40	—
ød	0.5	0.5	0.6	0.6	0.6	0.8	0.8
F	2.0	2.5	3.5	5.0	5.0	5.0	7.5

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Case size/ Impedance/ Ripple current

R. voltage (V) / Case size (mm) (øD×L)	6.3 to 35			50		
	Impedance*1 (Ω)		Ripple current*1 (mA rms)	Impedance*1 (Ω)		Ripple current*1 (mA rms)
	+20 ℃	-10 ℃	+105 ℃	+20 ℃	-10 ℃	+105 ℃
5 × 11	0.300	1.000	280	0.340	1.130	250
6.3 × 11.2	0.130	0.430	455	0.140	0.460	405
8 × 11.5	0.056	0.168	950	0.061	0.183	870
8 × 15	0.041	0.123	1240	0.045	0.135	1140
8 × 20	0.030	0.090	1560	0.033	0.099	1430
10 × 12.5	0.038	0.114	1290	0.042	0.126	1170
10 × 16	0.026	0.078	1790	0.030	0.090	1650
10 × 20	0.019	0.057	2180	0.023	0.069	1890
10 × 25	0.018	0.054	2470	0.022	0.066	2150
12.5 × 20	0.018	0.045	2600	0.022	0.055	2260
12.5 × 25	0.015	0.038	3190	0.018	0.045	2660
12.5 × 30	0.013	0.033	3630	0.016	0.040	3160
12.5 × 35	0.012	0.030	3750	0.014	0.035	3270
16 × 20	0.017	0.043	3300	0.019	0.048	2870
16 × 25	0.014	0.035	3820	0.016	0.040	3320

*1: 100 kHz

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Characteristics list

Rated voltage (V)	Capacitance (±20 %) (μF)	Case size (mm)		Specification			Lead length (mm)				Part No.	Min. Packaging Q'ty (PCS)	
								Lead space					
		øD	L	Ripple current*1 (mA rms)	Impe-dance*2 (Ω)	Endu-rance (h)	Lead dia. (ød)	Straight	Taping ✻B	Taping ✻H		Straight leads	Taping
6.3	150	5.0	11.0	280	0.300	2000	0.5	2.0	5.0	2.5	EEUFM0J151( )	200	2000
	330	6.3	11.2	455	0.130	2000	0.5	2.5	5.0	2.5	EEUFM0J331( )	200	2000
	560	8.0	11.5	950	0.056	3000	0.6	3.5	5.0	—	EEUFM0J561( )	200	1000
	820	8.0	15.0	1240	0.041	3000	0.6	3.5	5.0	—	EEUFM0J821L( )	200	1000
	1000	10.0	12.5	1290	0.038	4000	0.6	5.0	5.0	—	EEUFM0J102( )	200	500
	1200	8.0	20.0	1560	0.030	4000	0.6	3.5	5.0	—	EEUFM0J122L( )	200	1000
		10.0	16.0	1790	0.026	4000	0.6	5.0	5.0	—	EEUFM0J122( )	200	500
	1500	10.0	20.0	2180	0.019	5000	0.6	5.0	5.0	—	EEUFM0J152( )	200	500
	2200	10.0	25.0	2470	0.018	5000	0.6	5.0	5.0	—	EEUFM0J222L( )	200	500
	3300	12.5	20.0	2600	0.018	5000	0.6	5.0	5.0	—	EEUFM0J332( )	200	500
	3900	12.5	25.0	3190	0.015	7000	0.6	5.0	5.0	—	EEUFM0J392( )	200	500
	4700	12.5	30.0	3630	0.013	7000	0.8	5.0	—	—	EEUFM0J472L	100	—
	5600	12.5	35.0	3750	0.012	7000	0.8	5.0	—	—	EEUFM0J562L	100	—
		16.0	20.0	3300	0.017	5000	0.8	7.5	7.5	—	EEUFM0J562S( )	100	250
	6800	16.0	25.0	3820	0.014	7000	0.8	7.5	7.5	—	EEUFM0J682( )	100	250
10	100	5.0	11.0	280	0.300	2000	0.5	2.0	5.0	2.5	EEUFM1A101( )	200	2000
	220	6.3	11.2	455	0.130	2000	0.5	2.5	5.0	2.5	EEUFM1A221( )	200	2000
	470	8.0	11.5	950	0.056	3000	0.6	3.5	5.0	—	EEUFM1A471( )	200	1000
	680	8.0	15.0	1240	0.041	3000	0.6	3.5	5.0	—	EEUFM1A681L( )	200	1000
		10.0	12.5	1290	0.038	4000	0.6	5.0	5.0	—	EEUFM1A681( )	200	500
	1000	8.0	20.0	1560	0.030	4000	0.6	3.5	5.0	—	EEUFM1A102L( )	200	1000
		10.0	16.0	1790	0.026	4000	0.6	5.0	5.0	—	EEUFM1A102( )	200	500
	1200	10.0	20.0	2180	0.019	5000	0.6	5.0	5.0	—	EEUFM1A122( )	200	500
	1500	10.0	25.0	2470	0.018	5000	0.6	5.0	5.0	—	EEUFM1A152L( )	200	500
	2200	12.5	20.0	2600	0.018	5000	0.6	5.0	5.0	—	EEUFM1A222( )	200	500
	3300	12.5	25.0	3190	0.015	7000	0.6	5.0	5.0	—	EEUFM1A332( )	200	500
	3900	12.5	30.0	3630	0.013	7000	0.8	5.0	—	—	EEUFM1A392L	100	—
		16.0	20.0	3300	0.017	5000	0.8	7.5	7.5	—	EEUFM1A392S( )	100	250
	4700	12.5	35.0	3750	0.012	7000	0.8	5.0	—	—	EEUFM1A472L	100	—
	5600	16.0	25.0	3820	0.014	7000	0.8	7.5	7.5	—	EEUFM1A562( )	100	250
16	68	5.0	11.0	280	0.300	2000	0.5	2.0	5.0	2.5	EEUFM1C680( )	200	2000
	120	6.3	11.2	455	0.130	2000	0.5	2.5	5.0	2.5	EEUFM1C121( )	200	2000
	330	8.0	11.5	950	0.056	3000	0.6	3.5	5.0	—	EEUFM1C331( )	200	1000
	470	8.0	15.0	1240	0.041	3000	0.6	3.5	5.0	—	EEUFM1C471L( )	200	1000
		10.0	12.5	1290	0.038	4000	0.6	5.0	5.0	—	EEUFM1C471( )	200	500
	680	8.0	20.0	1560	0.030	4000	0.6	3.5	5.0	—	EEUFM1C681L( )	200	1000
		10.0	16.0	1790	0.026	4000	0.6	5.0	5.0	—	EEUFM1C681( )	200	500
	1000	10.0	20.0	2180	0.019	5000	0.6	5.0	5.0	—	EEUFM1C102( )	200	500
	1200	10.0	25.0	2470	0.018	5000	0.6	5.0	5.0	—	EEUFM1C122L( )	200	500
	1500	12.5	20.0	2600	0.018	5000	0.6	5.0	5.0	—	EEUFM1C152( )	200	500
	2200	12.5	25.0	3190	0.015	7000	0.6	5.0	5.0	—	EEUFM1C222( )	200	500
	2700	12.5	30.0	3630	0.013	7000	0.8	5.0	—	—	EEUFM1C272L	100	—
		16.0	20.0	3300	0.017	5000	0.8	7.5	7.5	—	EEUFM1C272S( )	100	250
	3300	12.5	35.0	3750	0.012	7000	0.8	5.0	—	—	EEUFM1C332L	100	—
	3900	16.0	25.0	3820	0.014	7000	0.8	7.5	7.5	—	EEUFM1C392( )	100	250

*1: Ripple current (100 kHz / +105 ℃)
*2: Impedance (100 kHz / +20 ℃)
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Characteristics list

Rated voltage (V)	Capacitance (±20 %) (μF)	Case size (mm)		Specification			Lead length (mm)				Part No.	Min. Packaging Q'ty (PCS)	
								Lead space					
		øD	L	Ripple current*1 (mA rms)	Impe-dance*2 (Ω)	Endu-rance (h)	Lead dia. (ød)	Straight	Taping ✻B	Taping ✻H		Straight leads	Taping
25	47	5.0	11.0	280	0.300	2000	0.5	2.0	5.0	2.5	EEUFM1E470( )	200	2000
	100	6.3	11.2	455	0.130	2000	0.5	2.5	5.0	2.5	EEUFM1E101( )	200	2000
	220	8.0	11.5	950	0.056	3000	0.6	3.5	5.0	—	EEUFM1E221( )	200	1000
	330	8.0	15.0	1240	0.041	3000	0.6	3.5	5.0	—	EEUFM1E331L( )	200	1000
		10.0	12.5	1290	0.038	4000	0.6	5.0	5.0	—	EEUFM1E331( )	200	500
	470	8.0	20.0	1560	0.030	4000	0.6	3.5	5.0	—	EEUFM1E471L( )	200	1000
		10.0	16.0	1790	0.026	4000	0.6	5.0	5.0	—	EEUFM1E471( )	200	500
	680	10.0	20.0	2180	0.019	5000	0.6	5.0	5.0	—	EEUFM1E681( )	200	500
	820	10.0	25.0	2470	0.018	5000	0.6	5.0	5.0	—	EEUFM1E821L( )	200	500
	1000	12.5	20.0	2600	0.018	5000	0.6	5.0	5.0	—	EEUFM1E102( )	200	500
	1500	12.5	25.0	3190	0.015	7000	0.6	5.0	5.0	—	EEUFM1E152( )	200	500
	1800	12.5	30.0	3630	0.013	7000	0.8	5.0	—	—	EEUFM1E182L	100	—
		16.0	20.0	3300	0.017	5000	0.8	7.5	7.5	—	EEUFM1E182S( )	100	250
	2200	12.5	35.0	3750	0.012	7000	0.8	5.0	—	—	EEUFM1E222L	100	—
	2700	16.0	25.0	3820	0.014	7000	0.8	7.5	7.5	—	EEUFM1E272( )	100	250
35	33	5.0	11.0	280	0.300	2000	0.5	2.0	5.0	2.5	EEUFM1V330( )	200	2000
	68	6.3	11.2	455	0.130	2000	0.5	2.5	5.0	2.5	EEUFM1V680( )	200	2000
	150	8.0	11.5	950	0.056	3000	0.6	3.5	5.0	—	EEUFM1V151( )	200	1000
	220	8.0	15.0	1240	0.041	3000	0.6	3.5	5.0	—	EEUFM1V221L( )	200	1000
		10.0	12.5	1290	0.038	4000	0.6	5.0	5.0	—	EEUFM1V221( )	200	500
	330	8.0	20.0	1560	0.030	4000	0.6	3.5	5.0	—	EEUFM1V331L( )	200	1000
		10.0	16.0	1790	0.026	4000	0.6	5.0	5.0	—	EEUFM1V331( )	200	500
	470	10.0	20.0	2180	0.019	5000	0.6	5.0	5.0	—	EEUFM1V471( )	200	500
	560	10.0	25.0	2470	0.018	5000	0.6	5.0	5.0	—	EEUFM1V561L( )	200	500
	680	12.5	20.0	2600	0.018	5000	0.6	5.0	5.0	—	EEUFM1V681( )	200	500
	1000	12.5	25.0	3190	0.015	7000	0.6	5.0	5.0	—	EEUFM1V102( )	200	500
	1200	12.5	30.0	3630	0.013	7000	0.8	5.0	—	—	EEUFM1V122L	100	—
		16.0	20.0	3300	0.017	5000	0.8	7.5	7.5	—	EEUFM1V122S( )	100	250
	1500	12.5	35.0	3750	0.012	7000	0.8	5.0	—	—	EEUFM1V152L	100	—
	1800	16.0	25.0	3820	0.014	7000	0.8	7.5	7.5	—	EEUFM1V182( )	100	250
50	22	5.0	11.0	250	0.340	2000	0.5	2.0	5.0	2.5	EEUFM1H220( )	200	2000
	56	6.3	11.2	405	0.140	2000	0.5	2.5	5.0	2.5	EEUFM1H560( )	200	2000
	100	8.0	11.5	870	0.061	3000	0.6	3.5	5.0	—	EEUFM1H101( )	200	1000
	120	8.0	15.0	1140	0.045	3000	0.6	3.5	5.0	—	EEUFM1H121L( )	200	1000
	150	10.0	12.5	1170	0.042	4000	0.6	5.0	5.0	—	EEUFM1H151( )	200	500
	180	8.0	20.0	1430	0.033	4000	0.6	3.5	5.0	—	EEUFM1H181L( )	200	1000
	220	10.0	16.0	1650	0.030	4000	0.6	5.0	5.0	—	EEUFM1H221( )	200	500
	270	10.0	20.0	1890	0.023	5000	0.6	5.0	5.0	—	EEUFM1H271( )	200	500
	330	10.0	25.0	2150	0.022	5000	0.6	5.0	5.0	—	EEUFM1H331L( )	200	500
	470	12.5	20.0	2260	0.022	5000	0.6	5.0	5.0	—	EEUFM1H471( )	200	500
	560	12.5	25.0	2660	0.018	7000	0.6	5.0	5.0	—	EEUFM1H561( )	200	500
	680	12.5	30.0	3160	0.016	7000	0.8	5.0	—	—	EEUFM1H681L	100	—
	820	12.5	35.0	3270	0.014	7000	0.8	5.0	—	—	EEUFM1H821L	100	—
		16.0	20.0	2870	0.019	5000	0.8	7.5	7.5	—	EEUFM1H821S( )	100	250
	1000	16.0	25.0	3320	0.016	7000	0.8	7.5	7.5	—	EEUFM1H102( )	100	250

*1: Ripple current (100 kHz / +105 ℃)
*2: Impedance (100 kHz / +20 ℃)
・When requesting taped product, please put the letter "B" or "H" be tween the "( )".
Lead wire pitch ✻B=5 mm, 7.5 mm, H=2.5 mm.
・Please refer to the page of “Taping dimensions”.

Design and specifications are each subject to change without notice. Ask factory for the current technical specifications before purchase and/or use.
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Panasonic INDUSTRY

Aluminum Electrolytic Capacitors

⚠ **This Series is no longer available for purchase in the country of Japan.**

Radial Lead Type

EB-A series



Features

- Endurance : 105 ℃ 5000 h to 10000 h
- Hight ripple hight frequency (Hight voltage)
- RoHS compliant

Specifications

Category temp. range	−40 ℃ to +105 ℃	−25 ℃ to +105 ℃
Rated voltage range	10 V to 63 V	160 V to 450 V
Capacitance range	2.2 μF to 3300 μF	10 μF to 330 μF
Capacitance tolerance	±20 % (120 Hz / +20℃)	
Leakage current	I ≦ 0.01 CV or 3 (μA) After 2 minutes (Whichever is greater)	I ≦ 0.06 CV + 10 (μA) After 2 minutes
Dissipation factor (tan δ)	Please see the attached characteristics list	
Endurance	After following life test with DC voltage and +105 ℃±2 ℃ ripple current value applied (The sum of DC and ripple peak voltage shall not exceed the rated working voltage), when the capacitors are restored to 20 ℃, the capacitors shall meet the limits specified bellow.	
	(10 V to 63 V) Duration : ø5×11 to ø8×11.5 : 5000 h, ø8×15 to ø12.5×25 : 10000 h	
	Capacitance change	Within ±30 % of the initial value
	Dissipation factor (tan δ)	≦ 300 % of the initial limit
	DC leakage current	Within the initial limit
	(160 V to 450 V) Duration : 5000 h	
	Capacitance change	Within ±20 % of the initial value
	Dissipation factor (tan δ)	≦ 200 % of the initial limit
	DC leakage current	Within the initial limit
Shelf life	After storage for 1000 h at +105 ℃±2 ℃ with no voltage applied and then being stabilized at +20 ℃, capacitors shall meet the limits specified in endurance. (With voltage treatment)	

Frequency correction factor for ripple current

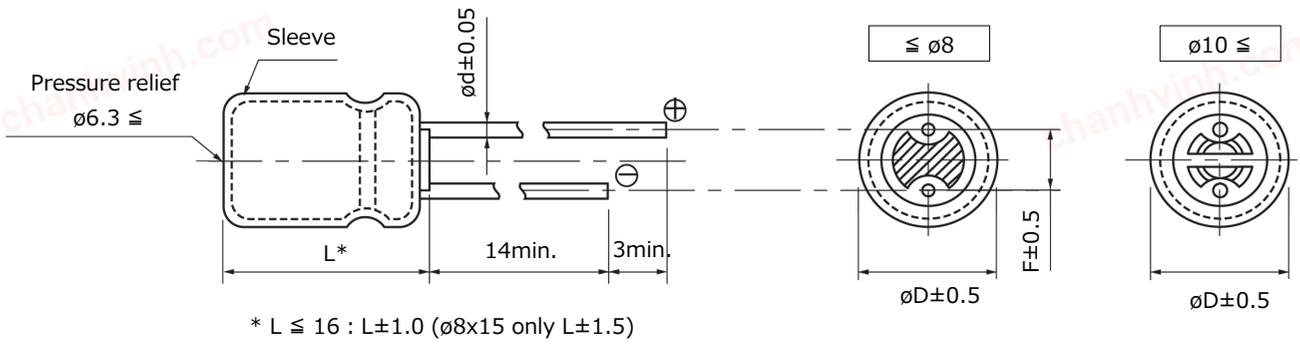
■ 10 V to 63 V

Cap.(μF) \ Freq.(Hz)	60	120	1 k	10 k	100 k
2.2 to 10	0.75	1.00	1.40	1.55	1.65
22 to 470	0.85	1.00	1.20	1.25	1.30
1000 to 3300	0.95	1.00	1.05	1.10	1.15

■ 160 V to 450 V

R. volt.(V) \ Freq.(Hz)	120	1 k	10k to 30k	30k to 100k
160 to 250	0.55	0.85	0.90	1.00
350 to 450	0.50	0.80	0.90	1.00

Dimensions



* L ≦ 16 : L±1.0 (ø8x15 only L±1.5)
L ≧ 20 : L±2.0

Unit : mm

øD	5.0	6.3	8.0	10.0	12.5	16.0	18.0
ød	0.5	0.5	0.6	0.6	0.6	0.8	0.8
F	2.0	2.5	3.5	5.0	5.0	7.5	7.5

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Characteristics list

Endurance : 105 ℃ 5000 h / ø5×11 to ø8×11.5, 105 ℃ 10000 h / ø8×15 to ø12.5×25

Rated voltage (V)	Capacitance (±20 %) (μF)	Case size (mm)		Specification			Lead length (mm)				Part No.	Min. Packaging Q'ty (PCS)	
								Lead space					
		øD	L	Ripple current*1 (mA rms)	tan δ*2	Endu-rance (h)	Lead dia. (ød)	Straight	Taping ✻B	Taping ✻H		Straight leads	Taping
10	100	5.0	11.0	66	0.30	5000	0.5	2.0	5.0	2.5	EEUEB1A101S( )	200	2000
	220	6.3	11.2	100	0.30	5000	0.5	2.5	5.0	2.5	EEUEB1A221S( )	200	2000
	470	8.0	15.0	278	0.30	10000	0.6	3.5	5.0	—	EEUEB1A471( )	200	1000
		8.0	11.5	180	0.30	5000	0.6	3.5	5.0	—	EEUEB1A471S( )	200	1000
	2200	12.5	20.0	540	0.32	10000	0.6	5.0	5.0	—	EEUEB1A222( )	200	500
	3300	12.5	25.0	802	0.34	10000	0.6	5.0	5.0	—	EEUEB1A332( )	200	500
16	1000	10.0	20.0	430	0.25	10000	0.6	5.0	5.0	—	EEUEB1C102( )	200	500
	2200	12.5	25.0	706	0.27	10000	0.6	5.0	5.0	—	EEUEB1C222( )	200	500
25	47	5.0	11.0	55	0.22	5000	0.5	2.0	5.0	2.5	EEUEB1E470S( )	200	2000
	100	6.3	11.2	95	0.22	5000	0.5	2.5	5.0	2.5	EEUEB1E101S( )	200	2000
	220	8.0	11.5	125	0.22	5000	0.6	3.5	5.0	—	EEUEB1E221S( )	200	1000
	330	8.0	15.0	255	0.22	10000	0.6	3.5	5.0	—	EEUEB1E331( )	200	1000
	470	10.0	16.0	321	0.22	10000	0.6	5.0	5.0	—	EEUEB1E471( )	200	500
	1000	12.5	20.0	498	0.22	10000	0.6	5.0	5.0	—	EEUEB1E102( )	200	500
35	33	5.0	11.0	46	0.18	5000	0.5	2.0	5.0	2.5	EEUEB1V330S( )	200	2000
	220	8.0	15.0	197	0.18	10000	0.6	3.5	5.0	—	EEUEB1V221( )	200	1000
	330	10.0	16.0	278	0.18	10000	0.6	5.0	5.0	—	EEUEB1V331( )	200	500
	470	10.0	20.0	349	0.18	10000	0.6	5.0	5.0	—	EEUEB1V471( )	200	500
	1000	12.5	25.0	586	0.18	10000	0.6	5.0	5.0	—	EEUEB1V102( )	200	500
50	2.2	5.0	11.0	15	0.15	5000	0.5	2.0	5.0	2.5	EEUEB1H2R2S( )	200	2000
	3.3	5.0	11.0	18	0.15	5000	0.5	2.0	5.0	2.5	EEUEB1H3R3S( )	200	2000
	4.7	5.0	11.0	18	0.15	5000	0.5	2.0	5.0	2.5	EEUEB1H4R7S( )	200	2000
	10	5.0	11.0	27	0.15	5000	0.5	2.0	5.0	2.5	EEUEB1H100S( )	200	2000
	22	5.0	11.0	39	0.15	5000	0.5	2.0	5.0	2.5	EEUEB1H220S( )	200	2000
	47	6.3	11.2	61	0.15	5000	0.5	2.5	5.0	2.5	EEUEB1H470S( )	200	2000
	100	8.0	11.5	99	0.15	5000	0.6	3.5	5.0	—	EEUEB1H101S( )	200	1000
	220	10.0	16.0	234	0.15	10000	0.6	5.0	5.0	—	EEUEB1H221( )	200	500
	330	10.0	20.0	293	0.15	10000	0.6	5.0	5.0	—	EEUEB1H331( )	200	500
	470	12.5	20.0	370	0.15	10000	0.6	5.0	5.0	—	EEUEB1H471( )	200	500
63	2.2	5.0	11.0	16.5	0.12	5000	0.5	2.0	5.0	2.5	EEUEB1J2R2S( )	200	2000
	3.3	5.0	11.0	20	0.12	5000	0.5	2.0	5.0	2.5	EEUEB1J3R3S( )	200	2000
	4.7	5.0	11.0	23	0.12	5000	0.5	2.0	5.0	2.5	EEUEB1J4R7S( )	200	2000
	10	5.0	11.0	30	0.12	5000	0.5	2.0	5.0	2.5	EEUEB1J100S( )	200	2000
	22	6.3	11.2	40	0.12	5000	0.5	2.5	5.0	2.5	EEUEB1J220S( )	200	2000
	33	6.3	11.2	50	0.12	5000	0.5	2.5	5.0	2.5	EEUEB1J330S( )	200	2000
	47	8.0	15.0	94	0.12	10000	0.6	3.5	5.0	—	EEUEB1J470( )	200	1000
		8.0	11.5	80	0.12	5000	0.6	3.5	5.0	—	EEUEB1J470S( )	200	1000
	100	8.0	15.0	180	0.12	10000	0.6	3.5	5.0	—	EEUEB1J101( )	200	1000
	220	10.0	20.0	292	0.12	10000	0.6	5.0	5.0	—	EEUEB1J221( )	200	500
	330	12.5	20.0	381	0.12	10000	0.6	5.0	5.0	—	EEUEB1J331( )	200	500
	470	12.5	25.0	454	0.12	10000	0.6	5.0	5.0	—	EEUEB1J471( )	200	500

*1: Ripple current (120 Hz / +105 ℃)
*2: tan δ (120 Hz / +20 ℃)
・When requesting taped product, please put the letter "B" or "H" be tween the "( )".
Lead wire pitch ✻B=5 mm, H=2.5 mm.
・Please refer to the page of “Taping dimensions”.

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Characteristics list

Endurance : 105 ℃ 5000 h

Rated voltage (V)	Capacitance (±20 %) (μF)	Case size (mm)		Specification			Lead length (mm)			Part No.	Min. Packaging Q'ty (PCS)	
								Lead space				
		øD	L	Ripple current*1 (mA rms)	tan δ*2	Endu-rance (h)	Lead dia. (ød)	Straight	Taping ✻B		Straight leads	Taping
160	22	10.0	20.0	470	0.15	5000	0.6	5.0	5.0	EEUEB2C220( )	200	500
	33	10.0	20.0	470	0.15	5000	0.6	5.0	5.0	EEUEB2C330( )	200	500
	47	12.5	20.0	600	0.15	5000	0.6	5.0	5.0	EEUEB2C470( )	200	500
	68	12.5	25.0	750	0.15	5000	0.6	5.0	5.0	EEUEB2C680( )	200	500
		16.0	20.0	750	0.15	5000	0.8	7.5	7.5	EEUEB2C680S( )	100	250
	100	16.0	25.0	1060	0.15	5000	0.8	7.5	7.5	EEUEB2C101( )	100	250
		18.0	20.0	1060	0.15	5000	0.8	7.5	7.5	EEUEB2C101S( )	100	250
	150	16.0	31.5	1280	0.15	5000	0.8	7.5	—	EEUEB2C151	100	—
		18.0	25.0	1280	0.15	5000	0.8	7.5	7.5	EEUEB2C151S( )	100	250
	220	16.0	31.5	1280	0.15	5000	0.8	7.5	—	EEUEB2C221	100	—
		18.0	25.0	1280	0.15	5000	0.8	7.5	7.5	EEUEB2C221S( )	100	250
	330	18.0	31.5	1690	0.15	5000	0.8	7.5	—	EEUEB2C331	50	—
200	22	10.0	20.0	470	0.15	5000	0.6	5.0	5.0	EEUEB2D220( )	200	500
	33	12.5	20.0	600	0.15	5000	0.6	5.0	5.0	EEUEB2D330( )	200	500
	47	12.5	20.0	600	0.15	5000	0.6	5.0	5.0	EEUEB2D470( )	200	500
	68	12.5	25.0	750	0.15	5000	0.6	5.0	5.0	EEUEB2D680( )	200	500
		16.0	20.0	750	0.15	5000	0.8	7.5	7.5	EEUEB2D680S( )	100	250
	100	16.0	25.0	1060	0.15	5000	0.8	7.5	7.5	EEUEB2D101( )	100	250
		18.0	20.0	1060	0.15	5000	0.8	7.5	7.5	EEUEB2D101S( )	100	250
	150	16.0	31.5	1280	0.15	5000	0.8	7.5	—	EEUEB2D151	100	—
		18.0	25.0	1280	0.15	5000	0.8	7.5	7.5	EEUEB2D151S( )	100	250
	220	18.0	31.5	1690	0.15	5000	0.8	7.5	—	EEUEB2D221	50	—
250	22	12.5	20.0	560	0.15	5000	0.6	5.0	5.0	EEUEB2E220( )	200	500
	33	12.5	20.0	560	0.15	5000	0.6	5.0	5.0	EEUEB2E330( )	200	500
	47	12.5	25.0	710	0.15	5000	0.6	5.0	5.0	EEUEB2E470( )	200	500
		16.0	20.0	710	0.15	5000	0.8	7.5	7.5	EEUEB2E470S( )	100	250
	68	16.0	25.0	990	0.15	5000	0.8	7.5	7.5	EEUEB2E680( )	100	250
		18.0	20.0	990	0.15	5000	0.8	7.5	7.5	EEUEB2E680S( )	100	250
	100	16.0	31.5	1200	0.15	5000	0.8	7.5	—	EEUEB2E101	100	—
		18.0	25.0	1200	0.15	5000	0.8	7.5	7.5	EEUEB2E101S( )	100	250
	150	18.0	31.5	1470	0.15	5000	0.8	7.5	—	EEUEB2E151	50	—
350	10	10.0	20.0	270	0.20	5000	0.6	5.0	5.0	EEUEB2V100( )	200	500
	22	12.5	20.0	350	0.20	5000	0.6	5.0	5.0	EEUEB2V220( )	200	500
	33	16.0	20.0	480	0.20	5000	0.8	7.5	7.5	EEUEB2V330S( )	100	250
	47	16.0	25.0	640	0.20	5000	0.8	7.5	7.5	EEUEB2V470( )	100	250
		18.0	20.0	640	0.20	5000	0.8	7.5	7.5	EEUEB2V470S( )	100	250
	68	16.0	31.5	780	0.20	5000	0.8	7.5	—	EEUEB2V680	100	—
		18.0	25.0	780	0.20	5000	0.8	7.5	7.5	EEUEB2V680S( )	100	250
	100	18.0	31.5	970	0.20	5000	0.8	7.5	—	EEUEB2V101	50	—
400	10	10.0	20.0	250	0.24	5000	0.6	5.0	5.0	EEUEB2G100( )	200	500
	22	12.5	25.0	410	0.24	5000	0.6	5.0	5.0	EEUEB2G220( )	200	500
		16.0	20.0	410	0.24	5000	0.8	7.5	7.5	EEUEB2G220S( )	100	250
	33	16.0	25.0	600	0.24	5000	0.8	7.5	7.5	EEUEB2G330( )	100	250
		18.0	20.0	600	0.24	5000	0.8	7.5	7.5	EEUEB2G330S( )	100	250
	47	16.0	31.5	730	0.24	5000	0.8	7.5	—	EEUEB2G470	100	—
		18.0	25.0	730	0.24	5000	0.8	7.5	7.5	EEUEB2G470S( )	100	250
450	10	12.5	20.0	310	0.24	5000	0.6	5.0	5.0	EEUEB2W100( )	200	500
	22	16.0	25.0	560	0.24	5000	0.8	7.5	7.5	EEUEB2W220( )	100	250
		18.0	20.0	560	0.24	5000	0.8	7.5	7.5	EEUEB2W220S( )	100	250
	33	16.0	31.5	680	0.24	5000	0.8	7.5	—	EEUEB2W330( )	100	—
		18.0	25.0	680	0.24	5000	0.8	7.5	7.5	EEUEB2W330S( )	100	250
	47	18.0	31.5	850	0.24	5000	0.8	7.5	—	EEUEB2W470	50	—

*1: Ripple current (100 kHz / +105 ℃)

*2: tan δ (120 Hz / +20 ℃)

・When requesting taped product, please put the letter "B" be tween the "( )".
Lead wire pitch ✻B=5 mm.

・Please refer to the page of “Taping dimensions”.

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Panasonic INDUSTRY

Aluminum Electrolytic Capacitors

This Series is no longer available for purchase in the country of Japan.

Radial Lead Type

EE-A series



Features

- Endurance : 105 ℃ 8000 h to 10000 h
- High ripple current (at high frequency) : 40 % higher than ED series
- RoHS compliant

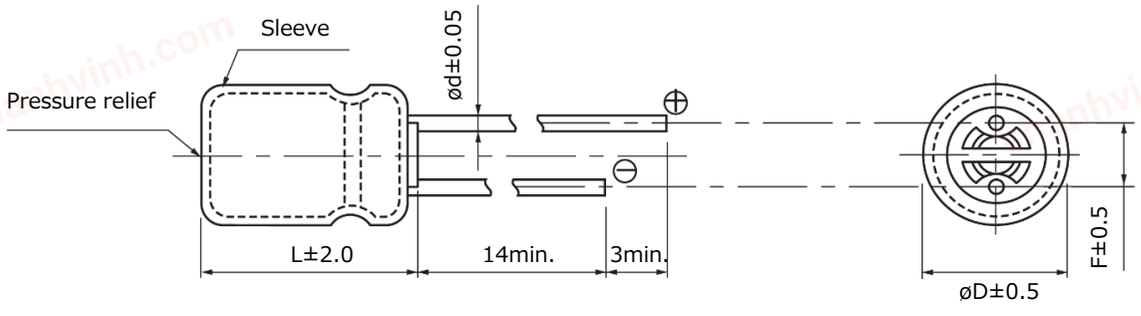
Specifications

Category temp. range	−25 ℃ to +105 ℃							
Rated voltage range	160 V to 450 V							
Capacitance range	10 μF to 330 μF							
Capacitance tolerance	±20 % (120 Hz / +20℃)							
Leakage current	I ≦ 0.06 CV +10 (μA) After 2 minutes							
Dissipation factor (tan δ)	Rated voltage (V)	160	200	250	350	400	450	(120 Hz /+20℃)
	Dissipation factor (tan δ)	0.15	0.15	0.15	0.20	0.24	0.24	
Endurance	After following life test with DC voltage and +105 ℃±2 ℃ ripple current value applied (The sum of DC and ripple peak voltage shall not exceed the rated working voltage), when the capacitors are restored to 20 ℃, the capacitors shall meet the limits specified bellow. ø10 : 8000 h ø12.5 to ø18 : 10000 h							
	Capacitance change	Within ±20 % of the initial value						
	Dissipation factor (tan δ)	≦ 200 % of the initial limit						
	DC leakage current	Within the initial limit						
Shelf life	After storage for 1000 h at +105 ℃±2 ℃ with no voltage applied and then being stabilized at +20 ℃, capacitors shall meet the limits specified in endurance. (With voltage treatment)							

Frequency correction factor for ripple current

Freq.(Hz) / Capacitance(μF)	60	120	300	1 k	10 k	100 k
10 to 82	0.25	0.35	0.50	0.65	0.90	1.00
100 to 330	0.30	0.40	0.55	0.70	0.90	1.00

Dimensions



Unit : mm

øD	10.0	12.5	16.0	18.0
ød	0.6	0.6	0.8	0.8
F	5.0	5.0	7.5	7.5

Design and specifications are each subject to change without notice. Ask factory for the current technical specifications before purchase and/or use.
Should a safety concern arise regarding this product, please be sure to contact us immediately.

28-Feb-20

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Case size/Ripple current

Capacitance (μF)	160 V			200 V		
	Case size (mm) (øD×L)	Ripple current (mA rms) (105 ℃)		Case size (mm) (øD×L)	Ripple current (mA rms) (105 ℃)	
		120 Hz	100 kHz		120 Hz	100 kHz
22	10 × 20	245	700	10 × 20	300	850
33	10 × 20	280	810	10 × 20	320	920
47	10 × 20	370	1065	12.5 × 20	385	1100
68	12.5 × 20	470	1350	12.5 × 25	465	1330
				16 × 20S	465	1330
82	12.5 × 25	520	1480	16 × 20S	510	1460
100	12.5 × 25	660	1660	16 × 25	690	1730
	16 × 20S	680	1700	18 × 20S	670	1665
150	16 × 25	755	1890	16 × 25	740	1860
	18 × 20S	730	1820			
220	16 × 31.5	910	2280	18 × 31.5	1175	2600
	18 × 25S	780	1950			
330	18 × 31.5	1040	2600	18 × 40	1250	3120

Capacitance (μF)	250 V			350 V		
	Case size (mm) (øD×L)	Ripple current (mA rms) (105 ℃)		Case size (mm) (øD×L)	Ripple current (mA rms) (105 ℃)	
		120 Hz	100 kHz		120 Hz	100 kHz
15	—			10 × 20	170	480
22	10 × 20	275	785	12.5 × 20	230	660
33	12.5 × 20	350	995	12.5 × 25	275	790
				16 × 20S	315	900
47	12.5 × 25	450	1290	16 × 25	375	1070
	16 × 20S	490	1400	18 × 20S	375	1070
68	16 × 20S	490	1400	16 × 31.5	535	1530
				18 × 25S	465	1330
82	16 × 25	590	1680	18 × 25S	535	1530
	18 × 20S	590	1680			
100	16 × 31.5	840	2100	18 × 31.5	640	1600
	18 × 25S	840	2100			
150	18 × 31.5	1010	2520	—	—	—
220	18 × 40	1175	2940	—	—	—

Capacitance (μF)	400 V			450 V		
	Case size (mm) (øD×L)	Ripple current (mA rms) (105 ℃)		Case size (mm) (øD×L)	Ripple current (mA rms) (105 ℃)	
		120 Hz	100 kHz		120 Hz	100 kHz
10	10 × 20	150	430	10 × 20U	115	330
				12.5 × 20	170	490
15	12.5 × 20	205	590	12.5 × 25	270	780
22	12.5 × 25	265	760	16 × 20S	330	945
	16 × 20S	300	860			
33	16 × 20S	355	1020	16 × 25	350	1000
				18 × 20S	350	1000
47	16 × 25	410	1180	16 × 31.5	420	1200
	18 × 20S	410	1180	18 × 25S	420	1200
56	—	—	—	18 × 31.5	480	1380
68	18 × 25	515	1470	18 × 40	630	1800
82	18 × 31.5	575	1645	—	—	—
100	18 × 40	825	2060	—	—	—

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Characteristics list

Endurance : 105 ℃ 8000 h / ø10, 105 ℃ 10000 h / ø12.5 to ø18

Rated voltage (V)	Capacitance (±20 %) (μF)	Case size (mm)		Specification			Lead length (mm)			Part No.	Min. Packaging Q'ty (PCS)	
								Lead space				
		øD	L	Ripple current*1 (mA rms)	tan δ*2	Endu-rance (h)	Lead dia. (ød)	Straight	Taping ✻B		Straight leads	Taping
160	22	10.0	20.0	700	0.15	8000	0.6	5.0	5.0	EEUEE2C220( )	200	500
	33	10.0	20.0	810	0.15	8000	0.6	5.0	5.0	EEUEE2C330( )	200	500
	47	10.0	20.0	1065	0.15	8000	0.6	5.0	5.0	EEUEE2C470( )	200	500
	68	12.5	20.0	1350	0.15	10000	0.6	5.0	5.0	EEUEE2C680( )	200	500
	82	12.5	25.0	1480	0.15	10000	0.6	5.0	5.0	EEUEE2C820( )	200	500
	100	12.5	25.0	1660	0.15	10000	0.6	5.0	5.0	EEUEE2C101( )	200	500
		16.0	20.0	1700	0.15	10000	0.8	7.5	7.5	EEUEE2C101S( )	100	250
	150	16.0	25.0	1890	0.15	10000	0.8	7.5	7.5	EEUEE2C151( )	100	250
		18.0	20.0	1820	0.15	10000	0.8	7.5	7.5	EEUEE2C151S( )	100	250
	220	16.0	31.5	2280	0.15	10000	0.8	7.5	—	EEUEE2C221	100	—
		18.0	25.0	1950	0.15	10000	0.8	7.5	7.5	EEUEE2C221S( )	100	250
	330	18.0	31.5	2600	0.15	10000	0.8	7.5	—	EEUEE2C331	50	—
200	22	10.0	20.0	850	0.15	8000	0.6	5.0	5.0	EEUEE2D220( )	200	500
	33	10.0	20.0	920	0.15	8000	0.6	5.0	5.0	EEUEE2D330( )	200	500
	47	12.5	20.0	1100	0.15	10000	0.6	5.0	5.0	EEUEE2D470( )	200	500
	68	12.5	25.0	1330	0.15	10000	0.6	5.0	5.0	EEUEE2D680( )	200	500
		16.0	20.0	1330	0.15	10000	0.8	7.5	7.5	EEUEE2D680S( )	100	250
	82	16.0	20.0	1460	0.15	10000	0.8	7.5	7.5	EEUEE2D820S( )	100	250
	100	16.0	25.0	1730	0.15	10000	0.8	7.5	7.5	EEUEE2D101( )	100	250
		18.0	20.0	1665	0.15	10000	0.8	7.5	7.5	EEUEE2D101S( )	100	250
	150	16.0	25.0	1860	0.15	10000	0.8	7.5	7.5	EEUEE2D151( )	100	250
	220	18.0	31.5	2600	0.15	10000	0.8	7.5	—	EEUEE2D221	50	—
	330	18.0	40.0	3120	0.15	10000	0.8	7.5	—	EEUEE2D331	50	—
250	22	10.0	20.0	785	0.15	8000	0.6	5.0	5.0	EEUEE2E220( )	200	500
	33	12.5	20.0	995	0.15	10000	0.6	5.0	5.0	EEUEE2E330( )	200	500
	47	12.5	25.0	1290	0.15	10000	0.6	5.0	5.0	EEUEE2E470( )	200	500
		16.0	20.0	1400	0.15	10000	0.8	7.5	7.5	EEUEE2E470S( )	100	250
	68	16.0	20.0	1400	0.15	10000	0.8	7.5	7.5	EEUEE2E680S( )	100	250
	82	16.0	25.0	1680	0.15	10000	0.8	7.5	7.5	EEUEE2E820( )	100	250
		18.0	20.0	1680	0.15	10000	0.8	7.5	7.5	EEUEE2E820S( )	100	250
	100	16.0	31.5	2100	0.15	10000	0.8	7.5	—	EEUEE2E101	100	—
		18.0	25.0	2100	0.15	10000	0.8	7.5	7.5	EEUEE2E101S( )	100	250
	150	18.0	31.5	2520	0.15	10000	0.8	7.5	—	EEUEE2E151	50	—
	220	18.0	40.0	2940	0.15	10000	0.8	7.5	—	EEUEE2E221	50	—
350	15	10.0	20.0	480	0.20	8000	0.6	5.0	5.0	EEUEE2V150( )	200	500
	22	12.5	20.0	660	0.20	10000	0.6	5.0	5.0	EEUEE2V220( )	200	500
	33	12.5	25.0	790	0.20	10000	0.6	5.0	5.0	EEUEE2V330( )	200	500
		16.0	20.0	900	0.20	10000	0.8	7.5	7.5	EEUEE2V330S( )	100	250
	47	16.0	25.0	1070	0.20	10000	0.8	7.5	7.5	EEUEE2V470( )	100	250
		18.0	20.0	1070	0.20	10000	0.8	7.5	7.5	EEUEE2V470S( )	100	250
	68	16.0	31.5	1530	0.20	10000	0.8	7.5	—	EEUEE2V680	100	—
		18.0	25.0	1330	0.20	10000	0.8	7.5	7.5	EEUEE2V680S( )	100	250
	82	18.0	25.0	1530	0.20	10000	0.8	7.5	7.5	EEUEE2V820S( )	100	250
	100	18.0	31.5	1600	0.20	10000	0.8	7.5	—	EEUEE2V101	50	—

*1: Ripple current (100 kHz / +105 ℃)
*2: tan δ (120 Hz / +20 ℃)
・When requesting taped product, please put the letter "B" be tween the "( )".
Lead wire pitch ✻B=5 mm, 7.5 mm.
・Please refer to the page of “Taping dimensions”.

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Characteristics list

Endurance : 105 ℃ 8000 h / ø10, 105 ℃ 10000 h / ø12.5 to ø18

Rated voltage (V)	Capacitance (±20 %) (μF)	Case size (mm)		Specification			Lead length (mm)			Part No.	Min. Packaging Q'ty (PCS)	
								Lead space				
		øD	L	Ripple current*1 (mA rms)	tan δ*2	Endu-rance (h)	Lead dia. (ød)	Straight	Taping ✻B		Straight leads	Taping
400	10	10.0	20.0	430	0.24	8000	0.6	5.0	5.0	EEUEE2G100( )	200	500
	15	12.5	20.0	590	0.24	10000	0.6	5.0	5.0	EEUEE2G150( )	200	500
	22	12.5	25.0	760	0.24	10000	0.6	5.0	5.0	EEUEE2G220( )	200	500
		16.0	20.0	860	0.24	10000	0.8	7.5	7.5	EEUEE2G220S( )	100	250
	33	16.0	20.0	1020	0.24	10000	0.8	7.5	7.5	EEUEE2G330S( )	100	250
	47	16.0	25.0	1180	0.24	10000	0.8	7.5	7.5	EEUEE2G470( )	100	250
		18.0	20.0	1180	0.24	10000	0.8	7.5	7.5	EEUEE2G470S( )	100	250
	68	18.0	25.0	1470	0.24	10000	0.8	7.5	7.5	EEUEE2G680( )	100	250
	82	18.0	31.5	1645	0.24	10000	0.8	7.5	—	EEUEE2G820	50	—
	100	18.0	40.0	2060	0.24	10000	0.8	7.5	—	EEUEE2G101	50	—
450	10	10.0	20.0	330	0.24	8000	0.6	5.0	5.0	EEUEE2W100U( )	200	500
		12.5	20.0	490	0.24	10000	0.6	5.0	5.0	EEUEE2W100( )	200	500
	15	12.5	25.0	780	0.24	10000	0.6	5.0	5.0	EEUEE2W150( )	200	500
	22	16.0	20.0	945	0.24	10000	0.8	7.5	7.5	EEUEE2W220S( )	100	250
	33	16.0	25.0	1000	0.24	10000	0.8	7.5	7.5	EEUEE2W330( )	100	250
		18.0	20.0	1000	0.24	10000	0.8	7.5	7.5	EEUEE2W330S( )	100	250
	47	16.0	31.5	1200	0.24	10000	0.8	7.5	—	EEUEE2W470	100	—
		18.0	25.0	1200	0.24	10000	0.8	7.5	7.5	EEUEE2W470S( )	100	250
	56	18.0	31.5	1380	0.24	10000	0.8	7.5	—	EEUEE2W560	50	—
	68	18.0	40.0	1800	0.24	10000	0.8	7.5	—	EEUEE2W680	50	—

*1: Ripple current (100 kHz / +105 ℃)
*2: tan δ (120 Hz / +20 ℃)
・When requesting taped product, please put the letter "B" be tween the "( )".
Lead wire pitch ✻B=5 mm, 7.5 mm.
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Panasonic INDUSTRY

Aluminum Electrolytic Capacitors

This Series is no longer available for purchase in the country of Japan.



Radial Lead Type

TA-A series

Features

- Endurance : 125 ℃ 2000 h
- Heat cycle: 1000 cycle −40 ℃ to +125 ℃
- AEC-Q200 compliant
- RoHS compliant

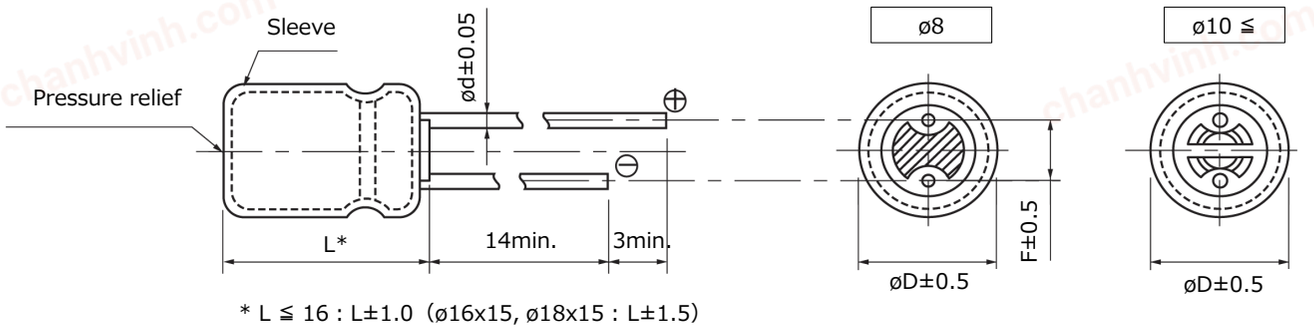
Specifications

Category temp. range	−40 ℃ to +125 ℃							
Rated voltage range	10 V to 63 V							
Capacitance range	2.2 μF to 4700 μF							
Capacitance tolerance	±20 % (120 Hz / +20℃)							
Leakage current	I ≦ 0.01 CV or 3 (μA) After 2 minutes (Whichever is greater)							
Dissipation factor (tan δ)	Rated voltage (V)	10	16	25	35	50	63	(120 Hz /+20℃)
	Dissipation factor (tan δ)	0.20	0.16	0.14	0.12	0.10	0.09	
	For capacitance value ≧ 1000 μF , add 0.02 per every 1000 μF.							
Endurance	After following life test with DC voltage and +125 ℃±2 ℃ ripple current value applied (The sum of DC and ripple peak voltage shall not exceed the rated working voltage) for 2000 h, when the capacitors are restored to 20 ℃, the capacitors shall meet the limits specified bellow.							
	Capacitance change	Within ±30 % of the initial value						
	Dissipation factor (tan δ)	≦ 300 % of the initial limit						
	DC leakage current	Within the initial limit						
Shelf life	After storage for 1000 h at +125 ℃±2 ℃ with no voltage applied and then being stabilized at +20 ℃, capacitors shall meet the limits specified in endurance. (With voltage treatment)							

Frequency correction factor for ripple current

Cap. (μF) \ Freq. (Hz)	60	120	1 k	10 k	100 k
2.2 to 330	0.55	0.65	0.85	0.90	1.00
470 to 1000	0.70	0.75	0.90	0.95	1.00
2200 to 4700	0.75	0.80	0.90	0.95	1.00

Dimensions



* L ≦ 16 : L±1.0 (ø16x15, ø18x15 : L±1.5)
L ≧ 20 : L±2.0

Unit : mm

øD	8.0	10.0	12.5	16.0	18.0
ød	0.6	0.6	0.6	0.8	0.8
F	3.5	5.0	5.0	7.5	7.5

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Characteristics list

Endurance : 125 ℃ 2000 h

Rated voltage (V)	Capacitance (±20 %) (μF)	Case size (mm)		Specification		Lead length (mm)			Part No.	Min. Packaging Q'ty (PCS)	
							Lead space				
		øD	L	Ripple current*1 (mA rms)	Impe-dance*2 (Ω)	Lead dia. (ød)	Straight	Taping ✻B		Strai-ght leads	Taping
10	330	8.0	11.5	500	0.130	0.6	3.5	5.0	EEUTA1A331( )	200	1000
	470	10.0	12.5	680	0.100	0.6	5.0	5.0	EEUTA1A471( )	200	500
	1000	10.0	20.0	1100	0.057	0.6	5.0	5.0	EEUTA1A102( )	200	500
		12.5	15.0	1085	0.070	0.6	5.0	5.0	EEUTA1A102S( )	200	500
	2200	12.5	25.0	1750	0.033	0.6	5.0	5.0	EEUTA1A222L( )	200	500
		16.0	20.0	1985	0.032	0.8	7.5	7.5	EEUTA1A222( )	100	250
		18.0	15.0	1800	0.042	0.8	7.5	7.5	EEUTA1A222S( )	100	250
	3300	16.0	25.0	2300	0.024	0.8	7.5	7.5	EEUTA1A332( )	100	250
		18.0	20.0	2250	0.031	0.8	7.5	7.5	EEUTA1A332S( )	100	250
	4700	16.0	31.5	2710	0.020	0.8	7.5	—	EEUTA1A472	100	—
		18.0	25.0	2470	0.022	0.8	7.5	7.5	EEUTA1A472S( )	100	250
16	220	8.0	11.5	500	0.130	0.6	3.5	5.0	EEUTA1C221( )	200	1000
	330	10.0	12.5	680	0.100	0.6	5.0	5.0	EEUTA1C331( )	200	500
	470	10.0	16.0	945	0.075	0.6	5.0	5.0	EEUTA1C471( )	200	500
	1000	12.5	20.0	1490	0.042	0.6	5.0	5.0	EEUTA1C102( )	200	500
		16.0	15.0	1520	0.047	0.8	7.5	7.5	EEUTA1C102S( )	100	250
	2200	16.0	25.0	2300	0.024	0.8	7.5	7.5	EEUTA1C222( )	100	250
		18.0	20.0	2250	0.031	0.8	7.5	7.5	EEUTA1C222S( )	100	250
	3300	16.0	31.5	2710	0.020	0.8	7.5	—	EEUTA1C332	100	—
		18.0	25.0	2470	0.022	0.8	7.5	7.5	EEUTA1C332S( )	100	250
	4700	18.0	31.5	3270	0.018	0.8	7.5	—	EEUTA1C472	50	—
25	100	8.0	11.5	500	0.130	0.6	3.5	5.0	EEUTA1E101( )	200	1000
	220	10.0	12.5	680	0.100	0.6	5.0	5.0	EEUTA1E221( )	200	500
	330	10.0	16.0	945	0.075	0.6	5.0	5.0	EEUTA1E331( )	200	500
	470	10.0	20.0	1100	0.057	0.6	5.0	5.0	EEUTA1E471( )	200	500
		12.5	15.0	1085	0.070	0.6	5.0	5.0	EEUTA1E471S( )	200	500
	1000	12.5	25.0	1750	0.033	0.6	5.0	5.0	EEUTA1E102L( )	200	500
		16.0	20.0	1985	0.032	0.8	7.5	7.5	EEUTA1E102( )	100	250
		18.0	15.0	1800	0.042	0.8	7.5	7.5	EEUTA1E102S( )	100	250
	2200	16.0	31.5	2710	0.020	0.8	7.5	—	EEUTA1E222	100	—
		18.0	25.0	2470	0.022	0.8	7.5	7.5	EEUTA1E222S( )	100	250
	3300	18.0	35.5	3310	0.017	0.8	7.5	—	EEUTA1E332	50	—
35	100	10.0	12.5	555	0.180	0.6	5.0	5.0	EEUTA1V101( )	200	500
	220	10.0	16.0	765	0.130	0.6	5.0	5.0	EEUTA1V221( )	200	500
	330	10.0	20.0	930	0.100	0.6	5.0	5.0	EEUTA1V331( )	200	500
	470	12.5	20.0	1330	0.070	0.6	5.0	5.0	EEUTA1V471( )	200	500
		16.0	15.0	1450	0.088	0.8	7.5	7.5	EEUTA1V471S( )	100	250
	1000	16.0	25.0	2010	0.037	0.8	7.5	7.5	EEUTA1V102( )	100	250
		18.0	20.0	2180	0.046	0.8	7.5	7.5	EEUTA1V102S( )	100	250
	2200	18.0	35.5	2790	0.025	0.8	7.5	—	EEUTA1V222	50	—

*1: Ripple current (100 kHz / +125 ℃)
*2: Impedance (100 kHz / +20 ℃)
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Lead wire pitch ✻B=5 mm, 7.5 mm.
・Please refer to the page of “Taping dimensions”.

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Characteristics list

Endurance : 125 ℃ 2000 h

Rated voltage (V)	Capacitance (±20 %) (μF)	Case size (mm)		Specification		Lead length (mm)			Part No.	Min. Packaging Q'ty (PCS)	
							Lead space				
		øD	L	Ripple current*1 (mA rms)	Impe-dance*2 (Ω)	Lead dia. (ød)	Straight	Taping ✻B		Strai-ght leads	Taping
50	10	8.0	11.5	180	0.950	0.6	3.5	5.0	EEUTA1H100( )	200	1000
	22	8.0	11.5	250	0.650	0.6	3.5	5.0	EEUTA1H220( )	200	1000
	33	8.0	11.5	300	0.450	0.6	3.5	5.0	EEUTA1H330( )	200	1000
	47	8.0	11.5	440	0.350	0.6	3.5	5.0	EEUTA1H470S( )	200	1000
	100	10.0	12.5	555	0.180	0.6	5.0	5.0	EEUTA1H101( )	200	500
	220	10.0	20.0	930	0.100	0.6	5.0	5.0	EEUTA1H221( )	200	500
	330	12.5	20.0	1330	0.070	0.6	5.0	5.0	EEUTA1H331( )	200	500
		16.0	15.0	1450	0.088	0.8	7.5	7.5	EEUTA1H331S( )	100	250
	470	12.5	25.0	1650	0.055	0.6	5.0	5.0	EEUTA1H471L( )	200	500
		16.0	20.0	1650	0.053	0.8	7.5	7.5	EEUTA1H471( )	100	250
		18.0	15.0	1710	0.075	0.8	7.5	7.5	EEUTA1H471S( )	100	250
	1000	16.0	31.5	2430	0.031	0.8	7.5	—	EEUTA1H102	100	—
		18.0	25.0	2350	0.032	0.8	7.5	7.5	EEUTA1H102S( )	100	250
63	22	8.0	11.5	310	0.470	0.6	3.5	5.0	EEUTA1J220( )	200	1000
	33	10.0	12.5	410	0.360	0.6	5.0	5.0	EEUTA1J330( )	200	500
	47	10.0	16.0	460	0.270	0.6	5.0	5.0	EEUTA1J470( )	200	500
	100	10.0	20.0	680	0.205	0.6	5.0	5.0	EEUTA1J101( )	200	500
	220	12.5	25.0	1325	0.100	0.6	5.0	5.0	EEUTA1J221L( )	200	500
		16.0	20.0	1360	0.085	0.8	7.5	7.5	EEUTA1J221( )	100	250
		18.0	15.0	1300	0.120	0.8	7.5	7.5	EEUTA1J221S( )	100	250
	330	16.0	25.0	1660	0.070	0.8	7.5	7.5	EEUTA1J331( )	100	250
		18.0	20.0	1760	0.077	0.8	7.5	7.5	EEUTA1J331S( )	100	250
	470	16.0	31.5	2055	0.060	0.8	7.5	—	EEUTA1J471	100	—
		18.0	25.0	1990	0.060	0.8	7.5	7.5	EEUTA1J471S( )	100	250

*1: Ripple current (100 kHz / +125 ℃)
*2: Impedance (100 kHz / +20 ℃)
・When requesting taped product, please put the letter "B" be tween the "( )".
Lead wire pitch ✻B=5 mm, 7.5 mm.
・Please refer to the page of “Taping dimensions”.

Design and specifications are each subject to change without notice. Ask factory for the current technical specifications before purchase and/or use.
Should a safety concern arise regarding this product, please be sure to contact us immediately.

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Panasonic INDUSTRY

Aluminum Electrolytic Capacitors

This Series is no longer available for purchase in the country of Japan.

Radial Lead Type

TP-A series



Features

- Endurance : 125 ℃ 2000 h to 5000 h or 135 ℃ 1000 h to 2000 h
- Smaller than series TA
- High ripple current (at high frequency) : 20 to 40% higher than TA series
- AEC-Q200 compliant
- RoHS compliant

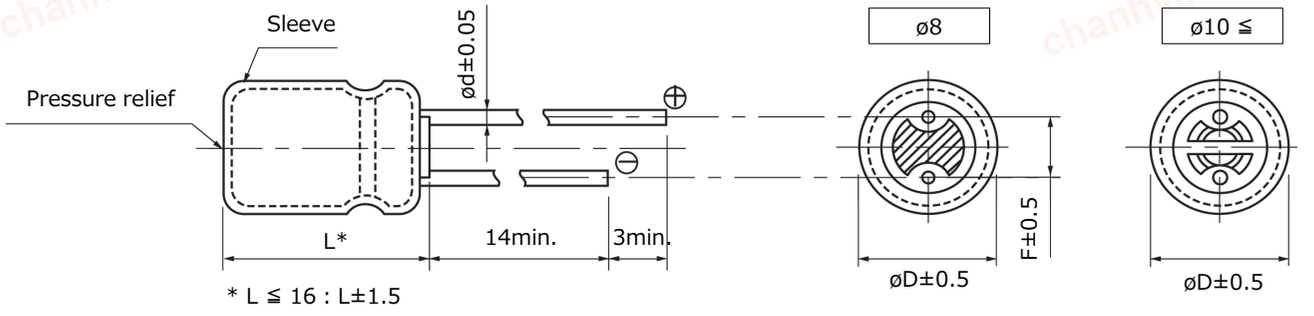
Specifications

Category temp. range	–40 ℃ to +135 ℃			
Rated voltage range	25 V to 35 V			
Capacitance range	100 μF to 5100 μF			
Capacitance tolerance	±20 % (120 Hz / +20℃)			
Leakage current	I ≦ 0.01 CV (μA) After 2 minutes			
Dissipation factor (tan δ)	Rated voltage (V)	25	35	(120 Hz /+20℃)
	Dissipation factor (tan δ)	0.14	0.12	
	For capacitance value ≧ 1000 μF , add 0.02 per every 1000 μF.			
Endurance 1	After following life test with DC voltage and +125 ℃±2 ℃ ripple current value applied (The sum of DC and ripple peak voltage shall not exceed the rated working voltage)when the capacitors are restored to 20 ℃, the capacitors shall meet the limits specified bellow. Duration ø8 : 2000 h, ø10 : 3000 h, ø12.5 : 4000 h, ø16 to ø18 : 5000 h			
	Capacitance change	Within ±30 % of the initial value		
	Dissipation factor (tan δ)	≦ 300 % of the initial limit		
	DC leakage current	Within the initial limit		
Endurance 2	After following life test with DC voltage and +135 ℃±2 ℃ ripple current value applied (The sum of DC and ripple peak voltage shall not exceed the rated working voltage)when the capacitors are restored to 20 ℃, the capacitors shall meet the limits specified bellow. Duration ø8: 1000 h, ø10 to ø18: 2000 h			
	Capacitance change	Within ±30 % of the initial value		
	Dissipation factor (tan δ)	≦ 300 % of the initial limit		
	DC leakage current	Within the initial limit		
Shelf life 1	After storage for 1000 h at +125 ℃±2 ℃ with no voltage applied and then being stabilized at +20 ℃, capacitors shall meet the limits specified in endurance. (With voltage treatment)			
Shelf life 2	After storage for 1000 h at +135 ℃±2 ℃ with no voltage applied and then being stabilized at +20 ℃, capacitors shall meet the limits specified in endurance. (With voltage treatment)			

Frequency correction factor for ripple current

Cap. (μF) \ Freq. (Hz)	60	120	1 k	10 k	100 k
100 to 330	0.55	0.65	0.85	0.90	1.00
390 to 1000	0.70	0.75	0.90	0.95	1.00
1200 to 5100	0.75	0.80	0.90	0.95	1.00

Dimensions



* L ≦ 16 : L±1.5
L ≧ 20 : L±2.0

Unit : mm

øD	8.0	10.0	12.5	16.0	18.0
ød	0.6	0.6	0.6	0.8	0.8
F	3.5	5.0	5.0	7.5	7.5

Design and specifications are each subject to change without notice. Ask factory for the current technical specifications before purchase and/or use.
Should a safety concern arise regarding this product, please be sure to contact us immediately.

20-Dec-19

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Characteristics list

Endurance : 125℃ 2000 h / ø8, 125℃ 3000 h / ø10, 125℃ 4000 h / ø12.5, 125℃ 5000 h / ø16 to ø18

Rated voltage (V)	Capacitance (±20 %) (μF)	Case size (mm)		Specification						Lead length (mm)			Part No. ★:Substandard (E24 series numbers)	Min. Packaging Q'ty (PCS)	
				Ripple current*1 (mA rms)		ESR*2 (Ω)	tan δ*3	Endurance (h)		Lead dia. (ød)	Lead space				
		øD	L	125℃	135℃			125℃	135℃		Straight	Taping ✻B		Straight leads	Taping
25	220	10.0	12.5	580	500	0.190	0.14	3000	2000	0.6	5.0	5.0	EEUTP1E221( )	200	500
	330	10.0	16.0	1100	945	0.130	0.14	3000	2000	0.6	5.0	5.0	EEUTP1E331( )	200	500
	470	8.0	20.0	1060	760	0.067	0.14	2000	1000	0.6	3.5	5.0	EEUTP1E471L( )	200	1000
		10.0	16.0	1100	945	0.130	0.14	3000	2000	0.6	5.0	5.0	EEUTP1E471( )	200	500
	510	10.0	16.0	1100	945	0.130	0.14	3000	2000	0.6	5.0	5.0	EEUTP1E511( )★	200	500
	820	10.0	20.0	1540	1100	0.052	0.14	3000	2000	0.6	5.0	5.0	EEUTP1E821( )	200	500
	1000	12.5	20.0	1860	1490	0.038	0.14	4000	2000	0.6	5.0	5.0	EEUTP1E102( )	200	500
	1200	12.5	20.0	1860	1490	0.038	0.14	4000	2000	0.6	5.0	5.0	EEUTP1E122( )	200	500
	1800	12.5	25.0	2180	1750	0.030	0.14	4000	2000	0.6	5.0	5.0	EEUTP1E182( )	200	500
		16.0	20.0	2380	1985	0.029	0.14	5000	2000	0.8	7.5	7.5	EEUTP1E182S( )	100	250
	2000	16.0	20.0	2380	1985	0.029	0.16	5000	2000	0.8	7.5	7.5	EEUTP1E202S( )★	100	250
	2200	16.0	25.0	2760	2300	0.022	0.16	5000	2000	0.8	7.5	7.5	EEUTP1E222( )	100	250
		18.0	20.0	2700	2250	0.028	0.16	5000	2000	0.8	7.5	7.5	EEUTP1E222S( )	100	250
	2700	16.0	25.0	2760	2300	0.022	0.16	5000	2000	0.8	7.5	7.5	EEUTP1E272( )	100	250
		18.0	20.0	2700	2250	0.028	0.16	5000	2000	0.8	7.5	7.5	EEUTP1E272S( )	100	250
	3300	16.0	31.5	3250	2710	0.018	0.18	5000	2000	0.8	7.5	—	EEUTP1E332	100	—
		18.0	25.0	2960	2470	0.020	0.18	5000	2000	0.8	7.5	7.5	EEUTP1E332S( )	100	250
	3900	16.0	31.5	3250	2710	0.018	0.18	5000	2000	0.8	7.5	—	EEUTP1E392	100	—
		18.0	25.0	2960	2470	0.020	0.18	5000	2000	0.8	7.5	7.5	EEUTP1E392S( )	100	250
	4700	18.0	31.5	3480	2900	0.016	0.20	5000	2000	0.8	7.5	—	EEUTP1E472	50	—
	5100	18.0	31.5	3480	2900	0.016	0.22	5000	2000	0.8	7.5	—	EEUTP1E512★	50	—
35	100	10.0	12.5	580	500	0.190	0.12	3000	2000	0.6	5.0	5.0	EEUTP1V101( )	200	500
	120	10.0	12.5	580	500	0.190	0.12	3000	2000	0.6	5.0	5.0	EEUTP1V121( )	200	500
	220	8.0	20.0	1060	760	0.067	0.12	2000	1000	0.6	3.5	5.0	EEUTP1V221L( )	200	1000
		10.0	16.0	1100	945	0.130	0.12	3000	2000	0.6	5.0	5.0	EEUTP1V221( )	200	500
	270	8.0	16.0	1060	760	0.067	0.12	2000	1000	0.6	3.5	5.0	EEUTP1V271L( )	200	1000
		10.0	16.0	1100	945	0.130	0.12	3000	2000	0.6	5.0	5.0	EEUTP1V271( )	200	500
	330	10.0	20.0	1540	1100	0.052	0.12	3000	2000	0.6	5.0	5.0	EEUTP1V331( )	200	500
	390	10.0	20.0	1540	1100	0.052	0.12	3000	2000	0.6	5.0	5.0	EEUTP1V391( )	200	500
	470	12.5	20.0	1860	1490	0.038	0.12	4000	2000	0.6	5.0	5.0	EEUTP1V471( )	200	500
	560	12.5	20.0	1860	1490	0.038	0.12	4000	2000	0.6	5.0	5.0	EEUTP1V561( )	200	500
	620	12.5	20.0	1860	1490	0.038	0.12	4000	2000	0.6	5.0	5.0	EEUTP1V621( )★	200	500
	820	12.5	25.0	2180	1750	0.030	0.12	4000	2000	0.6	5.0	5.0	EEUTP1V821( )	200	500
	1000	16.0	20.0	2380	1985	0.029	0.12	5000	2000	0.8	7.5	7.5	EEUTP1V102( )	100	250
	1200	16.0	20.0	2380	1985	0.029	0.12	5000	2000	0.8	7.5	7.5	EEUTP1V122( )	100	250
	1500	16.0	25.0	2760	2300	0.022	0.12	5000	2000	0.8	7.5	7.5	EEUTP1V152( )	100	250
		18.0	20.0	2700	2250	0.028	0.12	5000	2000	0.8	7.5	7.5	EEUTP1V152S( )	100	250
	1600	16.0	25.0	2760	2300	0.022	0.12	5000	2000	0.8	7.5	7.5	EEUTP1V162( )★	100	250
	1800	16.0	31.5	3250	2710	0.018	0.12	5000	2000	0.8	7.5	—	EEUTP1V182	100	—
		18.0	25.0	2960	2470	0.020	0.12	5000	2000	0.8	7.5	7.5	EEUTP1V182S( )	100	250
	2000	16.0	31.5	3250	2710	0.018	0.14	5000	2000	0.8	7.5	—	EEUTP1V202★	100	
		18.0	25.0	2960	2470	0.020	0.14	5000	2000	0.8	7.5	7.5	EEUTP1V202S( )★	100	250
	2200	18.0	31.5	3480	2900	0.016	0.14	5000	2000	0.8	7.5	—	EEUTP1V222	50	—
	2700	18.0	31.5	3480	2900	0.016	0.14	5000	2000	0.8	7.5	—	EEUTP1V272	50	—

*1: Ripple current (100 kHz / +125 ℃ or 135 ℃)
*2: ESR (100 kHz / +20 ℃)
*3: tan δ (120 Hz / +20 ℃)

・When requesting taped product, please put the letter "B" be tween the "( )".
Lead wire pitch ✻B=5 mm, 7.5 mm.
・Please refer to the page of “Taping dimensions”.

Design and specifications are each subject to change without notice. Ask factory for the current technical specifications before purchase and/or use.
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Aluminum Electrolytic Capacitors

This Series is no longer available for purchase in the country of Japan.

Radial Lead Type

HD-A series



Features

- Endurance : 105 ℃ 1000 h to 2000 h
- Minaturize, Higher Capacitance : 1 Size miniturized product of current A-NHG
- AEC-Q200 compliant
- RoHS compliant

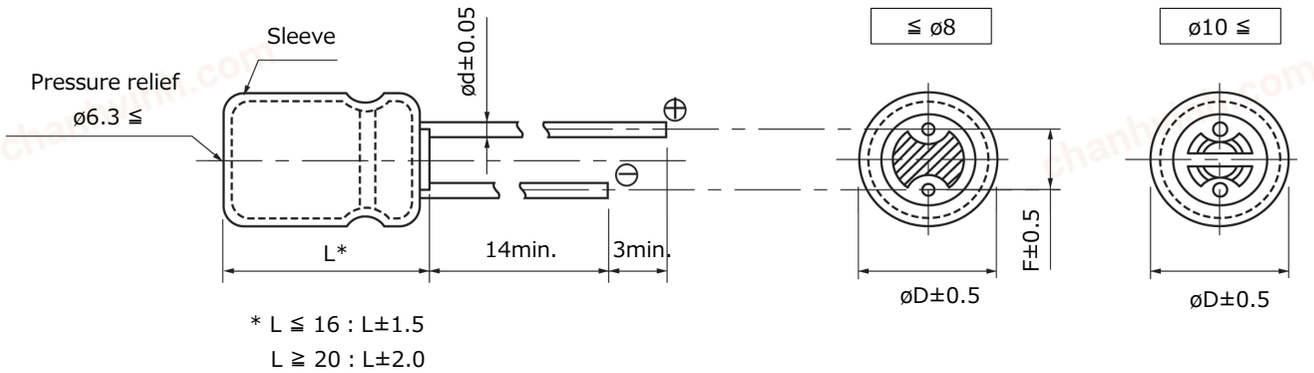
Specifications

Category temp. range	−55 ℃ to +105 ℃	
Rated voltage range	10 V to 50 V	
Capacitance range	2.2 μF to 22000 μF	
Capacitance tolerance	±20 % (120 Hz / +20℃)	
Leakage current	I ≦ 0.01 CV or 3 (μA) After 2 minutes (Whichever is greater)	
Dissipation factor (tan δ)	Please see the attached characteristics list	
Endurance	After following life test with DC voltage and +105 ℃±2 ℃ ripple current value applied (The sum of DC and ripple peak voltage shall not exceed the rated working voltage)when the capacitors are restored to 20 ℃, the capacitors shall meet the limits specified bellow. Duration ø5 to ø8 : 1000 h, ø10 to ø18 : 2000 h	
	Capacitance change	Within ±20 % of the initial value
	Dissipation factor (tan δ)	≦ 200 % of the initial limit
	DC leakage current	Within the initial limit
Shelf life	After storage for 1000 h at +105 ℃±2 ℃ with no voltage applied and then being stabilized at +20 °C, capacitors shall meet the limits specified in endurance. (With voltage treatment)	

Frequency correction factor for ripple current

Cap. (μF) \ Freq. (Hz)	60	120	1 k	10 k	100 k
2.2 to 33	0.75	1.00	1.55	1.80	2.00
47 to 470	0.80	1.00	1.35	1.50	1.50
1000 to 22000	0.85	1.00	1.10	1.15	1.15

Dimensions



* L ≦ 16 : L±1.5
L ≧ 20 : L±2.0

Unit : mm

øD	5.0	6.3	8.0	10.0	12.5	16.0	18.0
ød	0.5	0.5	0.6	0.6	0.6	0.8	0.8
F	2.0	2.5	3.5	5.0	5.0	7.5	7.5

Design and specifications are each subject to change without notice. Ask factory for the current technical specifications before purchase and/or use.
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Characteristics list

Endurance : 105 ℃ 1000 h / ø5 to ø8, 105 ℃ 2000 h / ø10 to ø18

Rated voltage (V)	Capacitance (±20 %) (μF)	Case size (mm)		Specification			Lead length (mm)				Part No.	Min. Packaging Q'ty (PCS)	
								Lead space					
		øD	L	Ripple current*1 (mA rms)	tan δ*2	Endu-rance (h)	Lead dia. (ød)	Straight	Taping ✻B	Taping ✻H		Straight leads	Taping
10	330	6.3	11.2	200	0.24	1000	0.5	2.5	5.0	2.5	EEUHD1A331( )	200	2000
	470	8.0	11.5	250	0.24	1000	0.6	3.5	5.0	—	EEUHD1A471( )	200	1000
	1000	10.0	12.5	460	0.24	2000	0.6	5.0	5.0	—	EEUHD1A102( )	200	500
	2200	10.0	16.0	760	0.26	2000	0.6	5.0	5.0	—	EEUHD1A222( )	200	500
	4700	12.5	20.0	1260	0.30	2000	0.6	5.0	5.0	—	EEUHD1A472( )	200	500
	6800	12.5	25.0	1570	0.34	2000	0.6	5.0	5.0	—	EEUHD1A682( )	200	500
	10000	16.0	25.0	1890	0.42	2000	0.8	7.5	7.5	—	EEUHD1A103( )	100	250
	15000	16.0	31.5	2180	0.52	2000	0.8	7.5	—	—	EEUHD1A153	100	—
	22000	18.0	35.5	2400	0.66	2000	0.8	7.5	—	—	EEUHD1A223	50	—
16	100	5.0	11.0	110	0.20	1000	0.5	2.0	5.0	2.5	EEUHD1C101( )	200	2000
	220	6.3	11.2	180	0.20	1000	0.5	2.5	5.0	2.5	EEUHD1C221( )	200	2000
	330	8.0	11.5	260	0.20	1000	0.6	3.5	5.0	—	EEUHD1C331( )	200	1000
	470	8.0	11.5	310	0.20	1000	0.6	3.5	5.0	—	EEUHD1C471( )	200	1000
	3300	12.5	20.0	1170	0.24	2000	0.6	5.0	5.0	—	EEUHD1C332( )	200	500
	4700	12.5	25.0	1480	0.26	2000	0.6	5.0	5.0	—	EEUHD1C472( )	200	500
	6800	16.0	25.0	1780	0.30	2000	0.8	7.5	7.5	—	EEUHD1C682( )	100	250
	8200	16.0	25.0	1780	0.34	2000	0.8	7.5	7.5	—	EEUHD1C822( )	100	250
	10000	16.0	31.5	2060	0.38	2000	0.8	7.5	—	—	EEUHD1C103	100	—
	15000	18.0	35.5	2210	0.48	2000	0.8	7.5	—	—	EEUHD1C153	50	—
25	47	5.0	11.0	91	0.16	1000	0.5	2.0	5.0	2.5	EEUHD1E470( )	200	2000
	68	5.0	11.0	91	0.16	1000	0.5	2.0	5.0	2.5	EEUHD1E680( )	200	2000
	100	6.3	11.2	130	0.16	1000	0.5	2.5	5.0	2.5	EEUHD1E101( )	200	2000
	220	8.0	11.5	230	0.16	1000	0.6	3.5	5.0	—	EEUHD1E221( )	200	1000
	330	8.0	11.5	310	0.16	1000	0.6	3.5	5.0	—	EEUHD1E331( )	200	1000
	470	10.0	12.5	380	0.16	2000	0.6	5.0	5.0	—	EEUHD1E471( )	200	500
	1000	10.0	16.0	680	0.16	2000	0.6	5.0	5.0	—	EEUHD1E102( )	200	500
	2200	12.5	20.0	1090	0.18	2000	0.6	5.0	5.0	—	EEUHD1E222( )	200	500
	3300	12.5	25.0	1400	0.20	2000	0.6	5.0	5.0	—	EEUHD1E332( )	200	500
	4700	16.0	25.0	1750	0.22	2000	0.8	7.5	7.5	—	EEUHD1E472( )	100	250
	5600	16.0	25.0	1750	0.24	2000	0.8	7.5	7.5	—	EEUHD1E562( )	100	250
	6800	16.0	31.5	2040	0.26	2000	0.8	7.5	—	—	EEUHD1E682	100	—
	10000	18.0	35.5	2200	0.34	2000	0.8	7.5	—	—	EEUHD1E103	50	—
35	47	5.0	11.0	90	0.14	1000	0.5	2.0	5.0	2.5	EEUHD1V470( )	200	2000
	100	6.3	11.2	150	0.14	1000	0.5	2.5	5.0	2.5	EEUHD1V101( )	200	2000
	220	8.0	11.5	270	0.14	1000	0.6	3.5	5.0	—	EEUHD1V221( )	200	1000
	330	10.0	12.5	350	0.14	2000	0.6	5.0	5.0	—	EEUHD1V331( )	200	500
	470	10.0	16.0	460	0.14	2000	0.6	5.0	5.0	—	EEUHD1V471( )	200	500
	680	10.0	16.0	460	0.14	2000	0.6	5.0	5.0	—	EEUHD1V681( )	200	500
	2200	12.5	25.0	1260	0.16	2000	0.6	5.0	5.0	—	EEUHD1V222( )	200	500
	3300	16.0	25.0	1610	0.18	2000	0.8	7.5	7.5	—	EEUHD1V332( )	100	250
	4700	16.0	31.5	1910	0.20	2000	0.8	7.5	—	—	EEUHD1V472	100	—
	6800	18.0	35.5	2050	0.24	2000	0.8	7.5	—	—	EEUHD1V682	50	—

*1: Ripple current (120 Hz / +105 ℃)

*2: tan δ (120 Hz / +20 ℃)

・When requesting taped product, please put the letter "B" or "H" be tween the "( )".
Lead wire pitch ✻B=5 mm, 7.5 mm, H=2.5 mm.

・Please refer to the page of “Taping dimensions”.

Design and specifications are each subject to change without notice. Ask factory for the current technical specifications before purchase and/or use.
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Characteristics list

Endurance : 105 ℃ 1000 h / ø5 to ø8, 105 ℃ 2000 h / ø10 to ø18

Rated voltage (V)	Capacitance (±20 %) (μF)	Case size (mm)		Specification			Lead length (mm)				Part No.	Min. Packaging Q'ty (PCS)	
								Lead space					
		øD	L	Ripple current*1 (mA rms)	tan δ*2	Endu-rance (h)	Lead dia. (ød)	Straight	Taping ✻B	Taping ✻H		Straight leads	Taping
50	2.2	5.0	11.0	18	0.12	1000	0.5	2.0	5.0	2.5	EEUHD1H2R2( )	200	2000
	3.3	5.0	11.0	22	0.12	1000	0.5	2.0	5.0	2.5	EEUHD1H3R3( )	200	2000
	4.7	5.0	11.0	26	0.12	1000	0.5	2.0	5.0	2.5	EEUHD1H4R7( )	200	2000
	10	5.0	11.0	39	0.12	1000	0.5	2.0	5.0	2.5	EEUHD1H100( )	200	2000
	22	5.0	11.0	65	0.12	1000	0.5	2.0	5.0	2.5	EEUHD1H220( )	200	2000
	33	5.0	11.0	90	0.12	1000	0.5	2.0	5.0	2.5	EEUHD1H330( )	200	2000
	47	6.3	11.2	110	0.12	1000	0.5	2.5	5.0	2.5	EEUHD1H470( )	200	2000
	68	6.3	11.2	110	0.12	1000	0.5	2.5	5.0	2.5	EEUHD1H680( )	200	2000
	100	8.0	11.5	180	0.12	1000	0.6	3.5	5.0	—	EEUHD1H101( )	200	1000
	220	10.0	12.5	300	0.12	2000	0.6	5.0	5.0	—	EEUHD1H221( )	200	500
	330	10.0	16.0	410	0.12	2000	0.6	5.0	5.0	—	EEUHD1H331( )	200	500
	470	10.0	20.0	530	0.12	2000	0.6	5.0	5.0	—	EEUHD1H471( )	200	500
	560	16.0	15.0	650	0.12	2000	0.8	7.5	7.5	—	EEUHD1H561S( )	100	250
	680	16.0	15.0	650	0.12	2000	0.8	7.5	7.5	—	EEUHD1H681S( )	100	250
	1000	12.5	25.0	950	0.12	2000	0.6	5.0	5.0	—	EEUHD1H102( )	200	500
	2200	16.0	31.5	1470	0.14	2000	0.8	7.5	—	—	EEUHD1H222	100	—
	3300	18.0	35.5	1770	0.16	2000	0.8	7.5	—	—	EEUHD1H332	50	—

*1: Ripple current (120 Hz / +105 ℃)
*2: tan δ (120 Hz / +20 ℃)
・When requesting taped product, please put the letter "B" or "H" be tween the "( )".
Lead wire pitch ✻B=5 mm, 7.5 mm, H=2.5 mm.
・Please refer to the page of “Taping dimensions”.

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Panasonic INDUSTRY

Aluminum Electrolytic Capacitors

⚠ **This Series is no longer available for purchase in the country of Japan.**

Radial Lead Type

NHG-A series



Features

- Endurance : 105 ℃ 1000 h to 2000 h
- AEC-Q200 compliant (6.3 V to 100 V)
- RoHS compliant

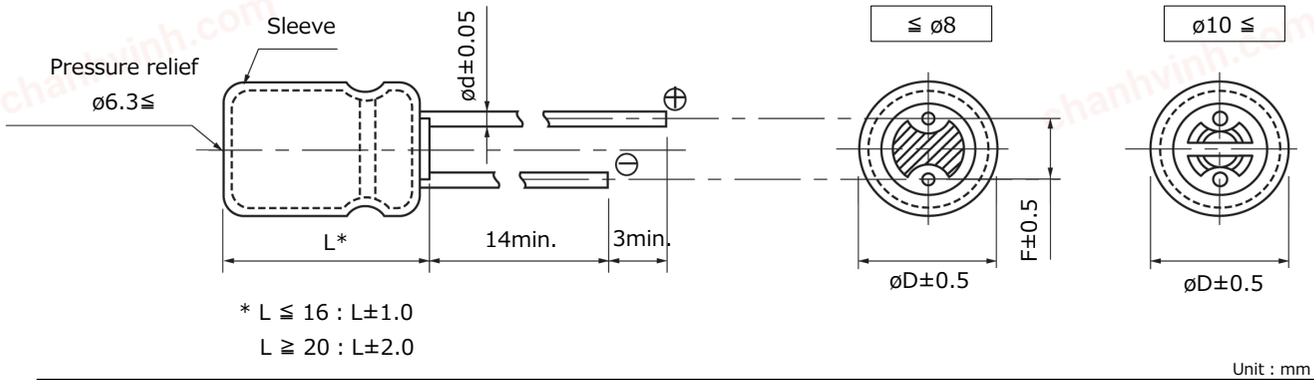
Specifications

Category temp. range	−55 ℃ to +105 ℃	−25 ℃ to +105 ℃
Rated voltage range	6.3 V to 100 V	160 V to 450 V
Capacitance range	2.2 µF to 22000 µF	2.2 µF to 330 µF
Capacitance tolerance	±20 % (120 Hz / +20℃)	
Leakage current	I ≦ 0.01 CV or 3 (µA) After 2 minutes (Which is greater)	I ≦ 0.06 CV + 10 (µA) After 2 minutes
Dissipation factor (tan δ)	Please see the attached characteristics list	
Endurance	After following life test with DC voltage and +105 ℃±2 ℃ ripple current value applied (The sum of DC and ripple peak voltage shall not exceed the rated working voltage) for 2000 h, when the capacitors are restored to 20 ℃, the capacitors shall meet the limits specified bellow. Duration 6.3 V to 100 V (ø5 to ø8) : 1000 h, (ø10 to ø18) : 2000 h 160 V to 450 V : 2000 h	
	Capacitance change	Within ±20 % of the initial value
	Dissipation factor (tan δ)	≦ 200 % of the initial limit
	DC leakage current	Within the initial limit
Shelf life	After storage for 1000 h at +105 ℃±2 ℃ with no voltage applied and then being stabilized at +20 ℃, capacitors shall meet the limits specified in endurance. (With voltage treatment)	

Frequency correction factor for ripple current

Rated voltage (V)	Capacitance (µF)	Frequency (Hz)				
		60	120	1 k	10 k	100 k
6.3 to 100	2.2 to 33	0.75	1.00	1.55	1.80	2.00
	47 to 470	0.80	1.00	1.35	1.50	1.50
	1000 to 22000	0.85	1.00	1.10	1.15	1.15
160 to 450	2.2 to 330	0.80	1.00	1.35	1.50	1.50

Dimensions



* L ≦ 16 : L±1.0
L ≧ 20 : L±2.0

Unit : mm

øD	5.0	6.3	8.0	10.0	12.5	16.0	18.0
ød	0.5	0.5	0.6	0.6	0.6	0.8	0.8
F	2.0	2.5	3.5	5.0	5.0	7.5	7.5

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Characteristics list

Endurance : 105 ℃ 1000 h to 2000 h

Rated voltage (V)	Capacitance (±20 %) (μF)	Case size (mm)		Specification			Lead length (mm)				Part No.	Min. Packaging Q'ty (PCS)	
								Lead space					
		øD	L	Ripple current*1 (mA rms)	tan δ*2	Endu-rance (h)	Lead dia. (ød)	Straight	Taping ✻B	Taping ✻i		Straight leads	Taping
6.3	100	5.0	11.0	91	0.28	1000	0.5	2.0	5.0	2.5	ECA0JHG101( )	200	2000
	220	5.0	11.0	140	0.28	1000	0.5	2.0	5.0	2.5	ECA0JHG221( )	200	2000
	470	6.3	11.2	230	0.28	1000	0.5	2.5	5.0	2.5	ECA0JHG471( )	200	2000
	1000	8.0	11.5	380	0.28	1000	0.6	3.5	5.0	—	ECA0JHG102( )	200	1000
	2200	10.0	16.0	710	0.30	2000	0.6	5.0	5.0	—	ECA0JHG222( )	200	500
	3300	10.0	20.0	840	0.32	2000	0.6	5.0	5.0	—	ECA0JHG332( )	200	500
	4700	12.5	20.0	1090	0.34	2000	0.6	5.0	5.0	—	ECA0JHG472( )	200	500
	6800	12.5	25.0	1350	0.38	2000	0.6	5.0	5.0	—	ECA0JHG682( )	200	500
	10000	16.0	25.0	1650	0.46	2000	0.8	7.5	7.5	—	ECA0JHG103( )	100	250
	15000	16.0	31.5	2010	0.56	2000	0.8	7.5	—	—	ECA0JHG153	100	—
	22000	18.0	35.5	2350	0.70	2000	0.8	7.5	—	—	ECA0JHG223	50	—
10	330	6.3	11.2	200	0.24	1000	0.5	2.5	5.0	2.5	ECA1AHG331( )	200	2000
	470	8.0	11.5	250	0.24	1000	0.6	3.5	5.0	—	ECA1AHG471( )	200	1000
	1000	10.0	12.5	460	0.24	2000	0.6	5.0	5.0	—	ECA1AHG102( )	200	500
	2200	10.0	20.0	760	0.26	2000	0.6	5.0	5.0	—	ECA1AHG222( )	200	500
	3300	12.5	20.0	1000	0.28	2000	0.6	5.0	5.0	—	ECA1AHG332( )	200	500
	4700	12.5	25.0	1260	0.30	2000	0.6	5.0	5.0	—	ECA1AHG472( )	200	500
	6800	16.0	25.0	1570	0.34	2000	0.8	7.5	7.5	—	ECA1AHG682( )	100	250
	10000	16.0	31.5	1890	0.42	2000	0.8	7.5	—	—	ECA1AHG103	100	—
	15000	18.0	35.5	2180	0.52	2000	0.8	7.5	—	—	ECA1AHG153	50	—
16	100	5.0	11.0	110	0.20	1000	0.5	2.0	5.0	2.5	ECA1CHG101( )	200	2000
	220	6.3	11.2	180	0.20	1000	0.5	2.5	5.0	2.5	ECA1CHG221( )	200	2000
	330	8.0	11.5	260	0.20	1000	0.6	3.5	5.0	—	ECA1CHG331( )	200	1000
	470	8.0	11.5	310	0.20	1000	0.6	3.5	5.0	—	ECA1CHG471( )	200	1000
	1000	10.0	16.0	560	0.20	2000	0.6	5.0	5.0	—	ECA1CHG102( )	200	500
	2200	12.5	20.0	920	0.22	2000	0.6	5.0	5.0	—	ECA1CHG222( )	200	500
	3300	12.5	25.0	1170	0.24	2000	0.6	5.0	5.0	—	ECA1CHG332( )	200	500
	4700	16.0	25.0	1480	0.26	2000	0.8	7.5	7.5	—	ECA1CHG472( )	100	250
	6800	16.0	31.5	1780	0.30	2000	0.8	7.5	—	—	ECA1CHG682	100	—
	10000	18.0	35.5	2060	0.38	2000	0.8	7.5	—	—	ECA1CHG103	50	—
25	47	5.0	11.0	91	0.16	1000	0.5	2.0	5.0	2.5	ECA1EHG470( )	200	2000
	100	6.3	11.2	130	0.16	1000	0.5	2.5	5.0	2.5	ECA1EHG101( )	200	2000
	220	8.0	11.5	230	0.16	1000	0.6	3.5	5.0	—	ECA1EHG221( )	200	1000
	330	8.0	11.5	310	0.16	1000	0.6	3.5	5.0	—	ECA1EHG331( )	200	1000
	470	10.0	12.5	380	0.16	2000	0.6	5.0	5.0	—	ECA1EHG471( )	200	500
	1000	10.0	20.0	680	0.16	2000	0.6	5.0	5.0	—	ECA1EHG102( )	200	500
	2200	12.5	25.0	1090	0.18	2000	0.6	5.0	5.0	—	ECA1EHG222( )	200	500
	3300	16.0	25.0	1400	0.20	2000	0.8	7.5	7.5	—	ECA1EHG332( )	100	250
	4700	16.0	31.5	1750	0.22	2000	0.8	7.5	—	—	ECA1EHG472	100	—
	6800	18.0	35.5	2040	0.26	2000	0.8	7.5	—	—	ECA1EHG682	50	—
35	47	5.0	11.0	90	0.14	1000	0.5	2.0	5.0	2.5	ECA1VHG470( )	200	2000
	100	6.3	11.2	150	0.14	1000	0.5	2.5	5.0	2.5	ECA1VHG101( )	200	2000
	220	8.0	11.5	270	0.14	1000	0.6	3.5	5.0	—	ECA1VHG221( )	200	1000
	330	10.0	12.5	350	0.14	2000	0.6	5.0	5.0	—	ECA1VHG331( )	200	500
	470	10.0	16.0	460	0.14	2000	0.6	5.0	5.0	—	ECA1VHG471( )	200	500
	1000	12.5	20.0	810	0.14	2000	0.6	5.0	5.0	—	ECA1VHG102( )	200	500
	2200	16.0	25.0	1260	0.16	2000	0.8	7.5	7.5	—	ECA1VHG222( )	100	250
	3300	16.0	31.5	1610	0.18	2000	0.8	7.5	—	—	ECA1VHG332	100	—
	4700	18.0	35.5	1910	0.20	2000	0.8	7.5	—	—	ECA1VHG472	50	—

*1: Ripple current (120 Hz / +105 ℃)
*2: tan δ (120 Hz / +20 ℃)
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Lead wire pitch ✻B=5 mm, 7.5 mm, i=2.5 mm.
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Characteristics list

Endurance : 105 ℃ 1000 h to 2000 h

Rated voltage (V)	Capacitance (±20 %) (μF)	Case size (mm)		Specification			Lead length (mm)				Part No.	Min. Packaging Q'ty (PCS)	
								Lead space					
		øD	L	Ripple current*1 (mA rms)	tan δ*2	Endu-rance (h)	Lead dia. (ød)	Straight	Taping ✻B	Taping ✻i		Straight leads	Taping
50	2.2	5.0	11.0	18	0.12	1000	0.5	2.0	5.0	2.5	ECA1HHG2R2( )	200	2000
	3.3	5.0	11.0	22	0.12	1000	0.5	2.0	5.0	2.5	ECA1HHG3R3( )	200	2000
	4.7	5.0	11.0	26	0.12	1000	0.5	2.0	5.0	2.5	ECA1HHG4R7( )	200	2000
	10	5.0	11.0	39	0.12	1000	0.5	2.0	5.0	2.5	ECA1HHG100( )	200	2000
	22	5.0	11.0	65	0.12	1000	0.5	2.0	5.0	2.5	ECA1HHG220( )	200	2000
	33	5.0	11.0	90	0.12	1000	0.5	2.0	5.0	2.5	ECA1HHG330( )	200	2000
	47	6.3	11.2	110	0.12	1000	0.5	2.5	5.0	2.5	ECA1HHG470( )	200	2000
	100	8.0	11.5	180	0.12	1000	0.6	3.5	5.0	—	ECA1HHG101( )	200	1000
	220	10.0	12.5	300	0.12	2000	0.6	5.0	5.0	—	ECA1HHG221( )	200	500
	330	10.0	16.0	410	0.12	2000	0.6	5.0	5.0	—	ECA1HHG331( )	200	500
	470	10.0	20.0	530	0.12	2000	0.6	5.0	5.0	—	ECA1HHG471( )	200	500
	1000	12.5	25.0	950	0.12	2000	0.6	5.0	5.0	—	ECA1HHG102( )	200	500
	2200	16.0	31.5	1470	0.14	2000	0.8	7.5	—	—	ECA1HHG222	100	—
	3300	18.0	35.5	1770	0.16	2000	0.8	7.5	—	—	ECA1HHG332	50	—
63	10	5.0	11.0	46	0.10	1000	0.5	2.0	5.0	2.5	ECA1JHG100( )	200	2000
	22	5.0	11.0	71	0.10	1000	0.5	2.0	5.0	2.5	ECA1JHG220( )	200	2000
	33	6.3	11.2	100	0.10	1000	0.5	2.5	5.0	2.5	ECA1JHG330( )	200	2000
	47	6.3	11.2	120	0.10	1000	0.5	2.5	5.0	2.5	ECA1JHG470( )	200	2000
	100	10.0	12.5	215	0.10	2000	0.6	5.0	5.0	—	ECA1JHG101( )	200	500
	220	10.0	16.0	335	0.10	2000	0.6	5.0	5.0	—	ECA1JHG221( )	200	500
	330	10.0	20.0	510	0.10	2000	0.6	5.0	5.0	—	ECA1JHG331( )	200	500
	470	12.5	20.0	640	0.10	2000	0.6	5.0	5.0	—	ECA1JHG471( )	200	500
	1000	16.0	25.0	930	0.10	2000	0.8	7.5	7.5	—	ECA1JHG102( )	100	250
	2200	18.0	35.5	1610	0.12	2000	0.8	7.5	—	—	ECA1JHG222	50	—
100	2.2	5.0	11.0	21	0.08	1000	0.5	2.0	5.0	2.5	ECA2AHG2R2( )	200	2000
	3.3	5.0	11.0	31	0.08	1000	0.5	2.0	5.0	2.5	ECA2AHG3R3( )	200	2000
	4.7	5.0	11.0	38	0.08	1000	0.5	2.0	5.0	2.5	ECA2AHG4R7( )	200	2000
	10	6.3	11.2	54	0.08	1000	0.5	2.5	5.0	2.5	ECA2AHG100( )	200	2000
	22	6.3	11.2	93	0.08	1000	0.5	2.5	5.0	2.5	ECA2AHG220( )	200	2000
	33	8.0	11.5	130	0.08	1000	0.6	3.5	5.0	—	ECA2AHG330( )	200	1000
	47	10.0	12.5	165	0.08	2000	0.6	5.0	5.0	—	ECA2AHG470( )	200	500
	100	10.0	20.0	265	0.08	2000	0.6	5.0	5.0	—	ECA2AHG101( )	200	500
	220	12.5	25.0	440	0.08	2000	0.6	5.0	5.0	—	ECA2AHG221( )	200	500
	330	16.0	25.0	540	0.08	2000	0.8	7.5	7.5	—	ECA2AHG331( )	100	250
	470	16.0	25.0	715	0.08	2000	0.8	7.5	7.5	—	ECA2AHG471( )	100	250
	1000	18.0	35.5	985	0.08	2000	0.8	7.5	—	—	ECA2AHG102	50	—

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*2: tan δ (120 Hz / +20 ℃)
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Characteristics list

Endurance : 105 ℃ 2000 h

Rated voltage (V)	Capacitance (±20 %) (μF)	Case size (mm)		Specification			Lead length (mm)				Part No.	Min. Packaging Q'ty (PCS)	
								Lead space					
		øD	L	Ripple current*1 (mA rms)	tan δ*2	Endu-rance (h)	Lead dia. (ød)	Straight	Taping ✻B	Taping ✻i		Straight leads	Taping
160	2.2	6.3	11.2	25	0.15	2000	0.5	2.5	5.0	2.5	ECA2CHG2R2( )	200	2000
	3.3	6.3	11.2	36	0.15	2000	0.5	2.5	5.0	2.5	ECA2CHG3R3( )	200	2000
	4.7	6.3	11.2	43	0.15	2000	0.5	2.5	5.0	2.5	ECA2CHG4R7( )	200	2000
	10	10.0	12.5	70	0.15	2000	0.6	5.0	5.0	—	ECA2CHG100( )	200	500
	22	10.0	20.0	130	0.15	2000	0.6	5.0	5.0	—	ECA2CHG220( )	200	500
	33	10.0	20.0	180	0.15	2000	0.6	5.0	5.0	—	ECA2CHG330( )	200	500
	47	12.5	20.0	220	0.15	2000	0.6	5.0	5.0	—	ECA2CHG470( )	200	500
	100	16.0	25.0	335	0.15	2000	0.8	7.5	7.5	—	ECA2CHG101( )	100	250
	220	16.0	31.5	540	0.15	2000	0.8	7.5	—	—	ECA2CHG221	100	—
	330	18.0	31.5	705	0.15	2000	0.8	7.5	—	—	ECA2CHG331	50	—
200	2.2	6.3	11.2	25	0.15	2000	0.5	2.5	5.0	2.5	ECA2DHG2R2( )	200	2000
	3.3	6.3	11.2	36	0.15	2000	0.5	2.5	5.0	2.5	ECA2DHG3R3( )	200	2000
	4.7	8.0	11.5	50	0.15	2000	0.6	3.5	5.0	—	ECA2DHG4R7( )	200	1000
	10	10.0	16.0	80	0.15	2000	0.6	5.0	5.0	—	ECA2DHG100( )	200	500
	22	10.0	20.0	140	0.15	2000	0.6	5.0	5.0	—	ECA2DHG220( )	200	500
	33	12.5	20.0	190	0.15	2000	0.6	5.0	5.0	—	ECA2DHG330( )	200	500
	47	12.5	20.0	220	0.15	2000	0.6	5.0	5.0	—	ECA2DHG470( )	200	500
	100	16.0	25.0	335	0.15	2000	0.8	7.5	7.5	—	ECA2DHG101( )	100	250
	220	18.0	31.5	575	0.15	2000	0.8	7.5	—	—	ECA2DHG221	50	—
250	2.2	6.3	11.2	29	0.15	2000	0.5	2.5	5.0	2.5	ECA2EHG2R2( )	200	2000
	3.3	8.0	11.5	42	0.15	2000	0.6	3.5	5.0	—	ECA2EHG3R3	200	1000
	4.7	8.0	11.5	50	0.15	2000	0.6	3.5	5.0	—	ECA2EHG4R7( )	200	1000
	10	10.0	16.0	88	0.15	2000	0.6	5.0	5.0	—	ECA2EHG100( )	200	500
	22	12.5	20.0	155	0.15	2000	0.6	5.0	5.0	—	ECA2EHG220( )	200	500
	33	12.5	20.0	190	0.15	2000	0.6	5.0	5.0	—	ECA2EHG330( )	200	500
	47	12.5	25.0	230	0.15	2000	0.6	5.0	5.0	—	ECA2EHG470( )	200	500
	100	16.0	31.5	365	0.15	2000	0.8	7.5	—	—	ECA2EHG101	100	—
350	2.2	8.0	11.5	31	0.20	2000	0.6	3.5	5.0	—	ECA2VHG2R2( )	200	1000
	3.3	10.0	12.5	38	0.20	2000	0.6	5.0	5.0	—	ECA2VHG3R3( )	200	500
	4.7	10.0	16.0	50	0.20	2000	0.6	5.0	5.0	—	ECA2VHG4R7( )	200	500
	10	10.0	20.0	82	0.20	2000	0.6	5.0	5.0	—	ECA2VHG100( )	200	500
	22	12.5	20.0	130	0.20	2000	0.6	5.0	5.0	—	ECA2VHG220( )	200	500
	33	16.0	25.0	195	0.20	2000	0.8	7.5	7.5	—	ECA2VHG330( )	100	250
	47	16.0	25.0	230	0.20	2000	0.8	7.5	7.5	—	ECA2VHG470( )	100	250
	100	18.0	31.5	375	0.20	2000	0.8	7.5	—	—	ECA2VHG101	50	—

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Characteristics list

Endurance : 105 ℃ 2000 h

Rated voltage (V)	Capacitance (±20 %) (μF)	Case size (mm)		Specification			Lead length (mm)				Part No.	Min. Packaging Q'ty (PCS)	
								Lead space					
		øD	L	Ripple current*1 (mA rms)	tan δ*2	Endu-rance (h)	Lead dia. (ød)	Straight	Taping ✻B	Taping ✻i		Straight leads	Taping
400	2.2	8.0	11.5	30	0.24	2000	0.6	3.5	5.0	—	ECA2GHG2R2( )	200	1000
	3.3	10.0	12.5	40	0.24	2000	0.6	5.0	5.0	—	ECA2GHG3R3( )	200	500
	4.7	10.0	16.0	50	0.24	2000	0.6	5.0	5.0	—	ECA2GHG4R7( )	200	500
	10	10.0	20.0	80	0.24	2000	0.6	5.0	5.0	—	ECA2GHG100( )	200	500
	22	12.5	25.0	145	0.24	2000	0.6	5.0	5.0	—	ECA2GHG220( )	200	500
	33	16.0	25.0	195	0.24	2000	0.8	7.5	7.5	—	ECA2GHG330( )	100	250
	47	16.0	31.5	250	0.24	2000	0.8	7.5	—	—	ECA2GHG470	100	—
450	2.2	10.0	12.5	29	0.24	2000	0.6	5.0	5.0	—	ECA2WHG2R2( )	200	500
	3.3	10.0	16.0	41	0.24	2000	0.6	5.0	5.0	—	ECA2WHG3R3( )	200	500
	4.7	10.0	20.0	49	0.24	2000	0.6	5.0	5.0	—	ECA2WHG4R7( )	200	500
	10	12.5	20.0	75	0.24	2000	0.6	5.0	5.0	—	ECA2WHG100( )	200	500
	22	16.0	25.0	115	0.24	2000	0.8	7.5	7.5	—	ECA2WHG220( )	100	250
	33	16.0	31.5	155	0.24	2000	0.8	7.5	—	—	ECA2WHG330	100	—

*1: Ripple current (120 Hz / +105 ℃)
*2: tan δ (120 Hz / +20 ℃)
・When requesting taped product, please put the letter “B” or “i” between the “( )”.
Lead wire pitch ✻B=5 mm, 7.5 mm, i=2.5 mm.
・Please refer to the page of “Taping dimensions”.

Design and specifications are each subject to change without notice. Ask factory for the current technical specifications before purchase and/or use.
Should a safety concern arise regarding this product, please be sure to contact us immediately.
20-Dec-19

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Panasonic INDUSTRY

Aluminum Electrolytic Capacitors

⚠ **This Series is no longer available for purchase in the country of Japan.**

Radial Lead Type

GA-A (Bi-polar) series



Features

- Endurance : 105 ℃ 1000 h to 2000 h
- RoHS compliant

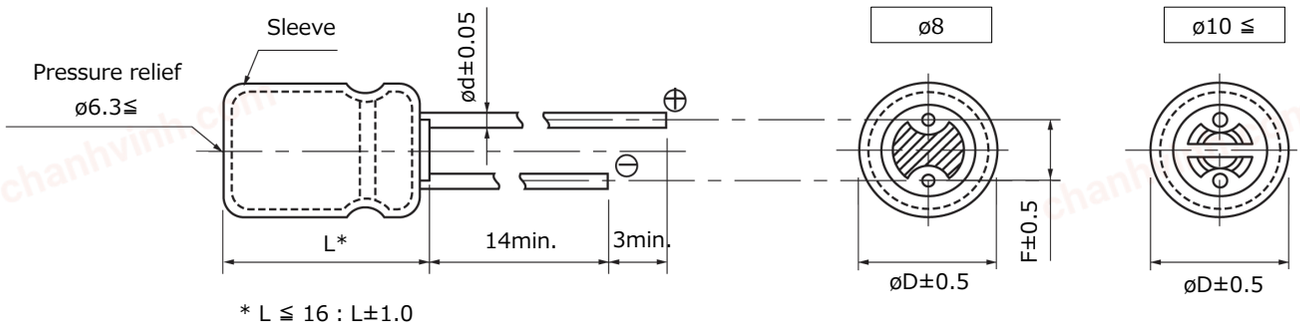
Specifications

Category temp. range	–40 ℃ to +105 ℃	
Rated voltage range	6.3 V to 50 V	
Capacitance range	2.2 μF to 330 μF	
Capacitance tolerance	±20 % (120 Hz / +20℃)	
Leakage current	I ≦ 0.03 CV + 3 (μA) After 2 minutes or I ≦ 0.03 CV or 3 (μA) After 5 minutes (Whichever is greater)	
Dissipation factor (tan δ)	Please see the attached characteristics list	
Endurance	After following life test of DC working voltage at +105 ℃±2 ℃ when the capacitors are restored to 20 ℃, the capacitors shall meet the following limits. Duration ø5 to ø8 : 1000 h (500 h for each polarity) ø10 : 2000 h (1000 h for each polarity)	
	Capacitance change	Within ±20 % of the initial value
	Dissipation factor (tan δ)	≦ 200 % of the initial limit
	DC leakage current	Within the initial limit
Shelf life	After storage for 1000 h at +105 ℃±2 ℃ with no voltage applied and then being stabilized at +20 ℃, capacitors shall meet the limits specified in endurance. (With voltage treatment)	

Frequency correction factor for ripple current

Freq.(Hz) / Capacitance (μF)	50, 60	120	1 k	10 k to
2.2 to 330	0.70	1.00	1.30	1.70

Dimensions



* L ≦ 16 : L±1.0
L ≧ 20 : L±2.0

Unit : mm

øD	5.0	6.3	8.0	10.0
ød	0.5	0.5	0.6	0.6
F	2.0	2.5	3.5	5.0

Design and specifications are each subject to change without notice. Ask factory for the current technical specifications before purchase and/or use.
Should a safety concern arise regarding this product, please be sure to contact us immediately.

28-Feb-20

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Characteristics list

Endurance : 105 ℃ 1000 h / ø5 to ø8 (500 h for each polarity), 105 ℃ 2000 h / ø10 (1000 h for each polarity)

Rated voltage (V)	Capacitance (±20 %) (μF)	Case size (mm)		Specification		Lead length (mm)				Part No.	Min. Packaging Q'ty (PCS)	
							Lead space					
		øD	L	Ripple current*1 (mA rms)	tan δ*2	Lead dia. (ød)	Straight	Taping ✻B	Taping ✻i		Strai-ght leads	Taping
6.3	100	6.3	11.2	130	0.30	0.5	2.5	5.0	2.5	ECA0JEN101( )	200	2000
	330	8.0	11.5	250	0.30	0.6	3.5	5.0	—	ECA0JEN331( )	200	1000
10	47	5.0	11.0	90	0.24	0.5	2.0	5.0	2.5	ECA1AEN470( )	200	2000
16	10	5.0	11.0	40	0.20	0.5	2.0	5.0	2.5	ECA1CEN100( )	200	2000
	22	5.0	11.0	60	0.20	0.5	2.0	5.0	2.5	ECA1CEN220( )	200	2000
	33	5.0	11.0	80	0.20	0.5	2.0	5.0	2.5	ECA1CEN330( )	200	2000
	47	6.3	11.2	100	0.20	0.5	2.5	5.0	2.5	ECA1CEN470( )	200	2000
25	10	5.0	11.0	45	0.15	0.5	2.0	5.0	2.5	ECA1EEN100( )	200	2000
	22	6.3	11.2	60	0.15	0.5	2.5	5.0	2.5	ECA1EEN220( )	200	2000
	33	6.3	11.2	90	0.15	0.5	2.5	5.0	2.5	ECA1EEN330( )	200	2000
	47	6.3	11.2	110	0.15	0.5	2.5	5.0	2.5	ECA1EEN470( )	200	2000
	100	8.0	11.5	180	0.15	0.6	3.5	5.0	—	ECA1EEN101( )	200	1000
35	33	8.0	11.5	100	0.15	0.6	3.5	5.0	—	ECA1VEN330( )	200	1000
	100	10.0	16.0	230	0.15	0.6	5.0	5.0	—	ECA1VEN101( )	200	500
50	2.2	5.0	11.0	18	0.15	0.5	2.0	5.0	2.5	ECA1HEN2R2( )	200	2000
	3.3	5.0	11.0	25	0.15	0.5	2.0	5.0	2.5	ECA1HEN3R3( )	200	2000
	4.7	5.0	11.0	30	0.15	0.5	2.0	5.0	2.5	ECA1HEN4R7( )	200	2000
	10	6.3	11.2	50	0.15	0.5	2.5	5.0	2.5	ECA1HEN100( )	200	2000
	22	8.0	11.5	90	0.15	0.6	3.5	5.0	—	ECA1HEN220( )	200	1000
	33	8.0	11.5	110	0.15	0.6	3.5	5.0	—	ECA1HEN330( )	200	1000
	47	10.0	12.5	140	0.15	0.6	5.0	5.0	—	ECA1HEN470( )	200	500
	100	10.0	20.0	250	0.15	0.6	5.0	5.0	—	ECA1HEN101( )	200	500

*1: Ripple current (120 Hz / +105 ℃)
*2: tan δ (120 Hz / +20 ℃)
・When requesting taped product, please put the letter “B” or “i” between the "( )".
Lead wire pitch ✻B=5 mm, i=2.5mm.
・Please refer to the page of “Taping dimensions”.

Design and specifications are each subject to change without notice. Ask factory for the current technical specifications before purchase and/or use.
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Panasonic INDUSTRY

Aluminum Electrolytic Capacitors

This Series is no longer available for purchase in the country of Japan.



Radial Lead Type

M-A series

Features

- Endurance : 85 ℃ 2000 h
- Smaller than series SU
- RoHS compliant

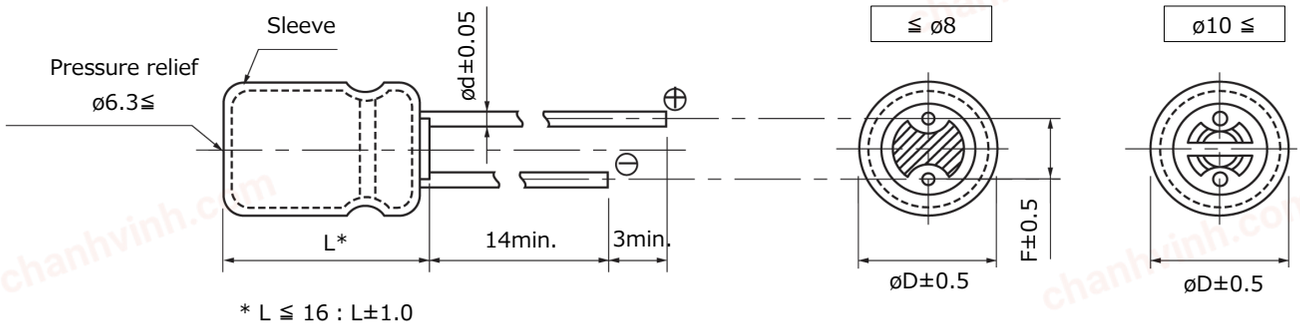
Specifications

Category temp. range	−40 ℃ to +85 ℃	−25 ℃ to +85 ℃
Rated voltage range	6.3 V to 100 V	160 V to 450 V
Capacitance range	2.2 μF to 22000 μF	2.2 μF to 470 μF
Capacitance tolerance	±20 % (120 Hz / +20℃)	
Leakage current	I ≦ 0.01 CV or 3 (μA) After 2 minutes (Which is greater)	I ≦ 0.06 CV + 10 (μA) After 2 minutes
Dissipation factor (tan δ)	Please see the attached characteristics list	
Endurance	After applying rated working voltage for 2000 hours at +85 °C±2 ℃, when the capacitors are restored to 20℃, capacitors shall meet the following limits.	
	Capacitance change	Within ±20 % of the initial value
	Dissipation factor (tan δ)	≦ 150 % of the initial limit
	DC leakage current	Within the initial limit
Shelf life	After storage for 1000 h at +85 ℃±2 ℃ with no voltage applied and then being stabilized at +20 °C, capacitors shall meet the limits specified in endurance. (With voltage treatment)	

Frequency correction factor for ripple current

Cap. (μF) \ Freq. (Hz)	50, 60	120	1 k	10 k to
2.2 to 22000	0.70	1.00	1.30	1.70

Dimensions



* L ≦ 16 : L±1.0
L ≧ 20 : L±2.0

Unit : mm

øD	5.0	6.3	8.0	10.0	12.5	16.0	18.0
ød	0.5	0.5	0.6	0.6	0.6	0.8	0.8
F	2.0	2.5	3.5	5.0	5.0	7.5	7.5

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Characteristics list

Endurance : 85 ℃ 2000 h

Rated voltage (V)	Capacitance (±20 %) (μF)	Case size (mm)		Specification		Lead length (mm)				Part No.	Min. Packaging Q'ty (PCS)	
							Lead space					
		øD	L	Ripple current*1 (mA rms)	tan δ*2	Lead dia. (ød)	Straight	Taping ✻B	Taping ✻i		Strai-ght leads	Taping
6.3	220	5.0	11.0	240	0.28	0.5	2.0	5.0	2.5	ECA0JM221( )	200	2000
	470	6.3	11.2	380	0.28	0.5	2.5	5.0	2.5	ECA0JM471( )	200	2000
	1000	8.0	11.5	580	0.28	0.6	3.5	5.0	—	ECA0JM102( )	200	1000
	2200	10.0	16.0	890	0.30	0.6	5.0	5.0	—	ECA0JM222( )	200	500
	3300	10.0	20.0	1020	0.32	0.6	5.0	5.0	—	ECA0JM332( )	200	500
	4700	12.5	20.0	1170	0.34	0.6	5.0	5.0	—	ECA0JM472( )	200	500
	6800	12.5	25.0	1270	0.38	0.6	5.0	5.0	—	ECA0JM682( )	200	500
	10000	16.0	25.0	1450	0.46	0.8	7.5	7.5	—	ECA0JM103( )	100	250
	15000	16.0	31.5	1700	0.56	0.8	7.5	—	—	ECA0JM153	100	—
	22000	18.0	35.5	1900	0.70	0.8	7.5	—	—	ECA0JM223	50	—
10	330	6.3	11.2	330	0.24	0.5	2.5	5.0	2.5	ECA1AM331( )	200	2000
	1000	10.0	12.5	630	0.24	0.6	5.0	5.0	—	ECA1AM102( )	200	500
	2200	10.0	20.0	920	0.26	0.6	5.0	5.0	—	ECA1AM222( )	200	500
	3300	12.5	20.0	1090	0.28	0.6	5.0	5.0	—	ECA1AM332( )	200	500
	4700	12.5	25.0	1200	0.30	0.6	5.0	5.0	—	ECA1AM472( )	200	500
	6800	16.0	25.0	1400	0.34	0.8	7.5	7.5	—	ECA1AM682( )	100	250
	10000	16.0	31.5	1600	0.42	0.8	7.5	—	—	ECA1AM103	100	—
	15000	18.0	35.5	1850	0.52	0.8	7.5	—	—	ECA1AM153	50	—
16	10	5.0	11.0	30	0.20	0.5	2.0	5.0	2.5	ECA1CM100( )	200	2000
	22	5.0	11.0	75	0.20	0.5	2.0	5.0	2.5	ECA1CM220( )	200	2000
	33	5.0	11.0	110	0.20	0.5	2.0	5.0	2.5	ECA1CM330( )	200	2000
	47	5.0	11.0	130	0.20	0.5	2.0	5.0	2.5	ECA1CM470( )	200	2000
	100	5.0	11.0	180	0.20	0.5	2.0	5.0	2.5	ECA1CM101( )	200	2000
	220	6.3	11.2	280	0.20	0.5	2.5	5.0	2.5	ECA1CM221( )	200	2000
	470	8.0	11.5	440	0.20	0.6	3.5	5.0	—	ECA1CM471( )	200	1000
	1000	10.0	16.0	680	0.20	0.6	5.0	5.0	—	ECA1CM102( )	200	500
	2200	12.5	20.0	1000	0.22	0.6	5.0	5.0	—	ECA1CM222( )	200	500
	3300	12.5	25.0	1200	0.24	0.6	5.0	5.0	—	ECA1CM332( )	200	500
	4700	16.0	25.0	1360	0.26	0.8	7.5	7.5	—	ECA1CM472( )	100	250
	6800	16.0	31.5	1600	0.30	0.8	7.5	—	—	ECA1CM682	100	—
	10000	18.0	35.5	1800	0.38	0.8	7.5	—	—	ECA1CM103	50	—
25	100	6.3	11.2	180	0.16	0.5	2.5	5.0	2.5	ECA1EM101( )	200	2000
	330	8.0	11.5	390	0.16	0.6	3.5	5.0	—	ECA1EM331( )	200	1000
	470	10.0	12.5	480	0.16	0.6	5.0	5.0	—	ECA1EM471( )	200	500
	1000	10.0	20.0	850	0.16	0.6	5.0	5.0	—	ECA1EM102( )	200	500
	2200	12.5	25.0	1200	0.18	0.6	5.0	5.0	—	ECA1EM222( )	200	500
	3300	16.0	25.0	1300	0.20	0.8	7.5	7.5	—	ECA1EM332( )	100	250
	4700	16.0	31.5	1500	0.22	0.8	7.5	—	—	ECA1EM472	100	—
	6800	18.0	35.5	1750	0.26	0.8	7.5	—	—	ECA1EM682	50	—

*1: Ripple current (120 Hz / +85 ℃)

*2: tan δ (120 Hz / +20 ℃)

・When requesting taped product, please put the letter “B” or “i” between the “( )”.
Lead wire pitch ✻B=5 mm, 7.5 mm, i=2.5 mm

・Please refer to the page of “Taping dimensions”.

Design and specifications are each subject to change without notice. Ask factory for the current technical specifications before purchase and/or use.
Should a safety concern arise regarding this product, please be sure to contact us immediately.

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Characteristics list

Endurance : 85 ℃ 2000 h

Rated voltage (V)	Capacitance (±20 %) (μF)	Case size (mm)		Specification		Lead length (mm)				Part No.	Min. Packaging Q'ty (PCS)	
							Lead space					
		øD	L	Ripple current*1 (mA rms)	tan δ*2	Lead dia. (ød)	Straight	Taping ✻B	Taping ✻i		Strai-ght leads	Taping
35	10	5.0	11.0	60	0.12	0.5	2.0	5.0	2.5	ECA1VM100( )	200	2000
	47	5.0	11.0	130	0.14	0.5	2.0	5.0	2.5	ECA1VM470( )	200	2000
	100	6.3	11.2	210	0.14	0.5	2.5	5.0	2.5	ECA1VM101( )	200	2000
	220	8.0	11.5	350	0.14	0.6	3.5	5.0	—	ECA1VM221( )	200	1000
	330	10.0	12.5	440	0.14	0.6	5.0	5.0	—	ECA1VM331( )	200	500
	470	10.0	16.0	550	0.14	0.6	5.0	5.0	—	ECA1VM471( )	200	500
	1000	12.5	20.0	900	0.14	0.6	5.0	5.0	—	ECA1VM102( )	200	500
	2200	16.0	25.0	1250	0.16	0.8	7.5	7.5	—	ECA1VM222( )	100	250
	3300	16.0	31.5	1400	0.18	0.8	7.5	—	—	ECA1VM332	100	—
	4700	18.0	35.5	1600	0.20	0.8	7.5	—	—	ECA1VM472	50	—
50	2.2	5.0	11.0	20	0.12	0.5	2.0	5.0	2.5	ECA1HM2R2( )	200	2000
	3.3	5.0	11.0	35	0.12	0.5	2.0	5.0	2.5	ECA1HM3R3( )	200	2000
	4.7	5.0	11.0	45	0.12	0.5	2.0	5.0	2.5	ECA1HM4R7( )	200	2000
	10	5.0	11.0	65	0.12	0.5	2.0	5.0	2.5	ECA1HM100( )	200	2000
	22	5.0	11.0	100	0.12	0.5	2.0	5.0	2.5	ECA1HM220( )	200	2000
	33	5.0	11.0	110	0.12	0.5	2.0	5.0	2.5	ECA1HM330( )	200	2000
	47	6.3	11.2	130	0.12	0.5	2.5	5.0	2.5	ECA1HM470( )	200	2000
	100	8.0	11.5	250	0.12	0.6	3.5	5.0	—	ECA1HM101( )	200	1000
	220	10.0	12.5	400	0.12	0.6	5.0	5.0	—	ECA1HM221( )	200	500
	330	10.0	16.0	500	0.12	0.6	5.0	5.0	—	ECA1HM331( )	200	500
	470	10.0	20.0	650	0.12	0.6	5.0	5.0	—	ECA1HM471( )	200	500
	1000	12.5	25.0	1050	0.12	0.6	5.0	5.0	—	ECA1HM102( )	200	500
	2200	16.0	31.5	1300	0.14	0.8	7.5	—	—	ECA1HM222	100	—
	3300	18.0	35.5	1500	0.16	0.8	7.5	—	—	ECA1HM332	50	—
63	10	5.0	11.0	70	0.11	0.5	2.0	5.0	2.5	ECA1JM100( )	200	2000
	22	5.0	11.0	105	0.11	0.5	2.0	5.0	2.5	ECA1JM220( )	200	2000
	33	6.3	11.2	130	0.11	0.5	2.5	5.0	2.5	ECA1JM330( )	200	2000
	47	6.3	11.2	160	0.11	0.5	2.5	5.0	2.5	ECA1JM470( )	200	2000
	100	8.0	11.5	270	0.11	0.6	3.5	5.0	—	ECA1JM101( )	200	1000
	220	10.0	16.0	450	0.11	0.6	5.0	5.0	—	ECA1JM221( )	200	500
	330	10.0	20.0	550	0.11	0.6	5.0	5.0	—	ECA1JM331( )	200	500
	470	12.5	20.0	750	0.11	0.6	5.0	5.0	—	ECA1JM471( )	200	500
	1000	16.0	25.0	1100	0.11	0.8	7.5	7.5	—	ECA1JM102( )	100	250
	2200	18.0	35.5	1400	0.13	0.8	7.5	—	—	ECA1JM222	50	—

*1: Ripple current (120 Hz / +85 ℃)
*2: tan δ (120 Hz / +20 ℃)
・When requesting taped product, please put the letter “B” or “i” between the “( )”.
Lead wire pitch ✻B=5 mm, 7.5 mm, i=2.5 mm
・Please refer to the page of “Taping dimensions”.

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Characteristics list

Endurance : 85 ℃ 2000 h

Rated voltage (V)	Capacitance (±20 %) (μF)	Case size (mm)		Specification		Lead length (mm)				Part No.	Min. Packaging Q'ty (PCS)	
							Lead space					
		øD	L	Ripple current*1 (mA rms)	tan δ*2	Lead dia. (ød)	Straight	Taping ✻B	Taping ✻i		Strai-ght leads	Taping
100	2.2	5.0	11.0	30	0.10	0.5	2.0	5.0	2.5	ECA2AM2R2( )	200	2000
	3.3	5.0	11.0	40	0.10	0.5	2.0	5.0	2.5	ECA2AM3R3( )	200	2000
	4.7	5.0	11.0	50	0.10	0.5	2.0	5.0	2.5	ECA2AM4R7( )	200	2000
	10	5.0	11.0	70	0.10	0.5	2.0	5.0	2.5	ECA2AM100( )	200	2000
	22	6.3	11.2	115	0.10	0.5	2.5	5.0	2.5	ECA2AM220( )	200	2000
	33	8.0	11.5	145	0.10	0.6	3.5	5.0	—	ECA2AM330( )	200	1000
	47	8.0	11.5	180	0.10	0.6	3.5	5.0	—	ECA2AM470( )	200	1000
	100	10.0	16.0	350	0.10	0.6	5.0	5.0	—	ECA2AM101( )	200	500
	220	12.5	20.0	550	0.10	0.6	5.0	5.0	—	ECA2AM221( )	200	500
	330	12.5	25.0	700	0.10	0.6	5.0	5.0	—	ECA2AM331( )	200	500
	470	16.0	25.0	900	0.10	0.8	7.5	7.5	—	ECA2AM471( )	100	250
	1000	18.0	35.5	1300	0.10	0.8	7.5	—	—	ECA2AM102	50	—
160	2.2	6.3	11.2	53	0.16	0.5	2.5	5.0	2.5	ECA2CM2R2( )	200	2000
	3.3	6.3	11.2	66	0.16	0.5	2.5	5.0	2.5	ECA2CM3R3( )	200	2000
	4.7	6.3	11.2	78	0.16	0.5	2.5	5.0	2.5	ECA2CM4R7( )	200	2000
	10	10.0	12.5	105	0.16	0.6	5.0	5.0	—	ECA2CM100( )	200	500
	22	10.0	16.0	175	0.16	0.6	5.0	5.0	—	ECA2CM220( )	200	500
	33	10.0	20.0	235	0.16	0.6	5.0	5.0	—	ECA2CM330( )	200	500
	47	12.5	20.0	320	0.16	0.6	5.0	5.0	—	ECA2CM470( )	200	500
	100	12.5	25.0	515	0.16	0.6	5.0	5.0	—	ECA2CM101( )	200	500
	220	16.0	31.5	830	0.16	0.8	7.5	—	—	ECA2CM221	100	—
	330	18.0	31.5	1090	0.16	0.8	7.5	—	—	ECA2CM331	50	—
	470	18.0	40.0	1440	0.16	0.8	7.5	—	—	ECA2CM471	50	—
200	2.2	6.3	11.2	50	0.18	0.5	2.5	5.0	2.5	ECA2DM2R2( )	200	2000
	3.3	6.3	11.2	62	0.18	0.5	2.5	5.0	2.5	ECA2DM3R3( )	200	2000
	4.7	8.0	11.5	86	0.18	0.6	3.5	5.0	—	ECA2DM4R7( )	200	1000
	10	10.0	12.5	100	0.18	0.6	5.0	5.0	—	ECA2DM100( )	200	500
	22	10.0	20.0	180	0.18	0.6	5.0	5.0	—	ECA2DM220( )	200	500
	33	10.0	20.0	220	0.18	0.6	5.0	5.0	—	ECA2DM330( )	200	500
	47	12.5	20.0	300	0.18	0.6	5.0	5.0	—	ECA2DM470( )	200	500
	100	16.0	25.0	475	0.18	0.8	7.5	7.5	—	ECA2DM101( )	100	250
	220	18.0	31.5	835	0.18	0.8	7.5	—	—	ECA2DM221	50	—
	330	18.0	40.0	1140	0.18	0.8	7.5	—	—	ECA2DM331	50	—

*1: Ripple current (120 Hz / +85 ℃)
*2: tan δ (120 Hz / +20 ℃)
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Lead wire pitch ✻B=5 mm, 7.5 mm, i=2.5 mm
・Please refer to the page of “Taping dimensions”.

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Characteristics list

Endurance : 85 ℃ 2000 h

Rated voltage (V)	Capacitance (±20 %) (μF)	Case size (mm)		Specification		Lead length (mm)				Part No.	Min. Packaging Q'ty (PCS)	
							Lead space					
		øD	L	Ripple current*1 (mA rms)	tan δ*2	Lead dia. (ød)	Straight	Taping ✻B	Taping ✻i		Strai-ght leads	Taping
250	2.2	6.3	11.2	50	0.18	0.5	2.5	5.0	2.5	ECA2EM2R2( )	200	2000
	3.3	8.0	11.5	72	0.18	0.6	3.5	5.0	—	ECA2EM3R3( )	200	1000
	4.7	8.0	11.5	86	0.18	0.6	3.5	5.0	—	ECA2EM4R7( )	200	1000
	10	10.0	16.0	110	0.18	0.6	5.0	5.0	—	ECA2EM100( )	200	500
	22	10.0	20.0	180	0.18	0.6	5.0	5.0	—	ECA2EM220( )	200	500
	33	12.5	20.0	250	0.18	0.6	5.0	5.0	—	ECA2EM330( )	200	500
	47	12.5	25.0	330	0.18	0.6	5.0	5.0	—	ECA2EM470( )	200	500
	100	16.0	31.5	530	0.18	0.8	7.5	—	—	ECA2EM101	100	—
	220	18.0	40.0	930	0.18	0.8	7.5	—	—	ECA2EM221	50	—
350	2.2	8.0	11.5	55	0.20	0.6	3.5	5.0	—	ECA2VM2R2( )	200	1000
	3.3	8.0	11.5	60	0.20	0.6	3.5	5.0	—	ECA2VM3R3( )	200	1000
	4.7	10.0	12.5	65	0.20	0.6	5.0	5.0	—	ECA2VM4R7( )	200	500
	10	10.0	20.0	115	0.20	0.6	5.0	5.0	—	ECA2VM100( )	200	500
	22	12.5	20.0	195	0.20	0.6	5.0	5.0	—	ECA2VM220( )	200	500
	33	16.0	25.0	300	0.20	0.8	7.5	7.5	—	ECA2VM330( )	100	250
	47	16.0	25.0	325	0.20	0.8	7.5	7.5	—	ECA2VM470( )	100	250
	100	18.0	31.5	535	0.20	0.8	7.5	—	—	ECA2VM101	50	—
400	2.2	8.0	11.5	50	0.20	0.6	3.5	5.0	—	ECA2GM2R2( )	200	1000
	3.3	10.0	12.5	54	0.20	0.6	5.0	5.0	—	ECA2GM3R3( )	200	500
	4.7	10.0	16.0	72	0.20	0.6	5.0	5.0	—	ECA2GM4R7( )	200	500
	10	10.0	20.0	115	0.20	0.6	5.0	5.0	—	ECA2GM100( )	200	500
	22	12.5	25.0	215	0.20	0.6	5.0	5.0	—	ECA2GM220( )	200	500
	33	16.0	25.0	275	0.20	0.8	7.5	7.5	—	ECA2GM330( )	100	250
	47	16.0	31.5	350	0.20	0.8	7.5	—	—	ECA2GM470	100	—
	100	18.0	40.0	600	0.20	0.8	7.5	—	—	ECA2GM101	50	—
450	2.2	10.0	12.5	44	0.20	0.6	5.0	5.0	—	ECA2WM2R2( )	200	500
	3.3	10.0	16.0	60	0.20	0.6	5.0	5.0	—	ECA2WM3R3( )	200	500
	4.7	10.0	20.0	79	0.20	0.6	5.0	5.0	—	ECA2WM4R7( )	200	500
	10	12.5	20.0	130	0.20	0.6	5.0	5.0	—	ECA2WM100( )	200	500
	22	16.0	25.0	210	0.20	0.8	7.5	7.5	—	ECA2WM220( )	100	250
	33	16.0	31.5	285	0.20	0.8	7.5	—	—	ECA2WM330	100	—

*1: Ripple current (120 Hz / +85 ℃)
*2: tan δ (120 Hz / +20 ℃)
・When requesting taped product, please put the letter “B” or “i” between the “( )”.
Lead wire pitch ✻B=5 mm, 7.5 mm, i=2.5 mm
・Please refer to the page of “Taping dimensions”.

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Should a safety concern arise regarding this product, please be sure to contact us immediately.

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Panasonic INDUSTRY

Aluminum Electrolytic Capacitors

This Series is no longer available for purchase in the country of Japan.

Radial Lead Type

SU-A (Bi-polar) series



Features

- Endurance : 85 ℃ 2000 h
- RoHS compliant

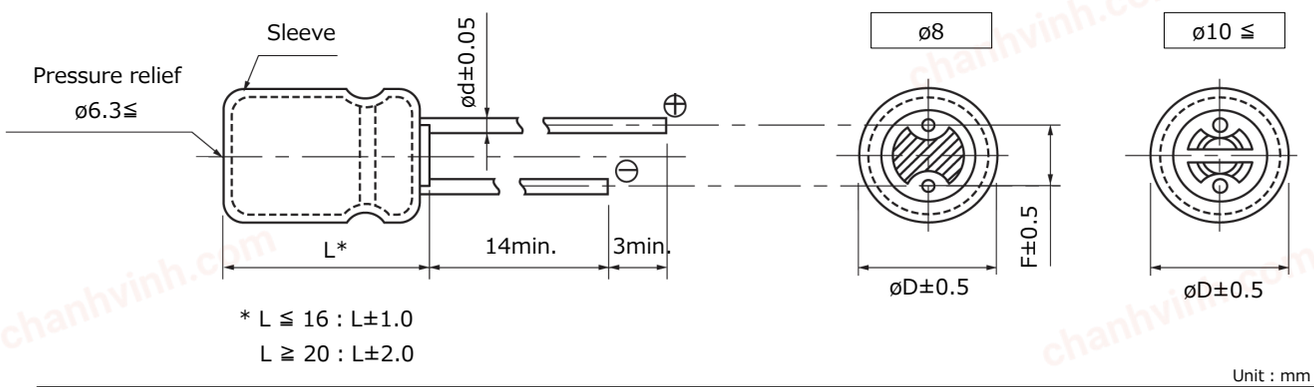
Specifications

Category temp. range	–40 ℃ to +85 ℃	
Rated voltage range	6.3 V to 50 V	
Capacitance range	2.2 μF to 6800 μF	
Capacitance tolerance	±20 % (120 Hz / +20℃)	
Leakage current	I ≦ 0.03 CV + 3 (μA) After 5 minutes	
Dissipation factor (tan δ)	Please see the attached characteristics list	
Endurance	After 2000 h application of DC working voltage (1000 h for each polarity) at +85 ℃ ± 2 ℃, when the capacitors are restored to 20 ℃, the capacitors shall meet the following limits.	
	Capacitance change	Within ±20 % of the initial value
	Dissipation factor (tan δ)	≦ 150 % of the initial limit
	DC leakage current	Within the initial limit
Shelf life	After storage for 1000 h at +85 ℃ ± 2 ℃ with no voltage applied and then being stabilized at +20 ℃, capacitors shall meet the limits specified in endurance. (With voltage treatment)	

Frequency correction factor for ripple current

Freq.(Hz) / Capacitance (μF)	50, 60	120	1 k	10 k to
2.2 to 6800	0.70	1.00	1.30	1.70

Dimensions



* L ≦ 16 : L±1.0
L ≧ 20 : L±2.0

Unit : mm

øD	5.0	6.3	8.0	10.0	12.5	16.0	18.0
ød	0.5	0.5	0.6	0.6	0.6	0.8	0.8
F	2.0	2.5	3.5	5.0	5.0	7.5	7.5

Design and specifications are each subject to change without notice. Ask factory for the current technical specifications before purchase and/or use.
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Characteristics list

Endurance : 85 ℃ 2000 h (1000 h for each polarity)

Rated voltage (V)	Capacitance (±20 %) (μF)	Case size (mm)		Specification		Lead length (mm)				Part No.	Min. Packaging Q'ty (PCS)	
							Lead space					
		øD	L	Ripple current*1 (mA rms)	tan δ*2	Lead dia. (ød)	Straight	Taping ✻B	Taping ✻i		Strai-ght leads	Taping
6.3	330	8.0	11.5	250	0.30	0.6	3.5	5.0	—	ECEA0JN331U( )	200	1000
	470	10.0	12.5	310	0.30	0.6	5.0	5.0	—	ECEA0JN471X( )	200	500
	1000	10.0	20.0	430	0.30	0.6	5.0	5.0	—	ECEA0JN102U( )	200	500
	2200	12.5	25.0	660	0.32	0.6	5.0	5.0	—	ECEA0JN222U( )	200	500
	3300	16.0	25.0	760	0.34	0.8	7.5	7.5	—	ECEA0JN332U( )	100	250
	4700	16.0	31.5	1170	0.36	0.8	7.5	—	—	ECEA0JN472U	100	—
	6800	18.0	35.5	1450	0.40	0.8	7.5	—	—	ECEA0JN682U	50	—
10	47	5.0	11.0	90	0.25	0.5	2.0	5.0	2.5	ECEA1AN470U( )	200	2000
	100	6.3	11.2	130	0.25	0.5	2.5	5.0	2.5	ECEA1AN101X( )	200	2000
	220	8.0	11.5	200	0.25	0.6	3.5	5.0	—	ECEA1AN221U( )	200	1000
	330	10.0	16.0	280	0.25	0.6	5.0	5.0	—	ECEA1AN331U( )	200	500
	470	10.0	16.0	340	0.25	0.6	5.0	5.0	—	ECEA1AN471U( )	200	500
	1000	12.5	20.0	470	0.25	0.6	5.0	5.0	—	ECEA1AN102X( )	200	500
	2200	16.0	25.0	690	0.27	0.8	7.5	7.5	—	ECEA1AN222U( )	100	250
	3300	16.0	31.5	1090	0.29	0.8	7.5	—	—	ECEA1AN332U	100	—
	4700	18.0	35.5	1200	0.31	0.8	7.5	—	—	ECEA1AN472U	50	—
16	10	5.0	11.0	40	0.20	0.5	2.0	5.0	2.5	ECEA1CN100U( )	200	2000
	22	5.0	11.0	60	0.20	0.5	2.0	5.0	2.5	ECEA1CN220U( )	200	2000
	33	5.0	11.0	80	0.20	0.5	2.0	5.0	2.5	ECEA1CN330U( )	200	2000
	47	6.3	11.2	100	0.20	0.5	2.5	5.0	2.5	ECEA1CN470U( )	200	2000
	220	10.0	12.5	260	0.20	0.6	5.0	5.0	—	ECEA1CN221X( )	200	500
	330	10.0	16.0	330	0.20	0.6	5.0	5.0	—	ECEA1CN331U( )	200	500
	470	10.0	20.0	380	0.20	0.6	5.0	5.0	—	ECEA1CN471U( )	200	500
	1000	12.5	25.0	560	0.20	0.6	5.0	5.0	—	ECEA1CN102U( )	200	500
	2200	16.0	31.5	750	0.22	0.8	7.5	—	—	ECEA1CN222U	100	—
	3300	18.0	35.5	900	0.24	0.8	7.5	—	—	ECEA1CN332U	50	—
25	10	5.0	11.0	45	0.15	0.5	2.0	5.0	2.5	ECEA1EN100U( )	200	2000
	22	5.0	11.0	60	0.15	0.5	2.0	5.0	2.5	ECEA1EN220X( )	200	2000
	33	6.3	11.2	90	0.15	0.5	2.5	5.0	2.5	ECEA1EN330U( )	200	2000
	47	6.3	11.2	110	0.15	0.5	2.5	5.0	2.5	ECEA1EN470U( )	200	2000
	100	8.0	11.5	180	0.15	0.6	3.5	5.0	—	ECEA1EN101U( )	200	1000
	220	10.0	16.0	320	0.15	0.6	5.0	5.0	—	ECEA1EN221U( )	200	500
	330	12.5	20.0	350	0.15	0.6	5.0	5.0	—	ECEA1EN331U( )	200	500
	470	12.5	20.0	430	0.15	0.6	5.0	5.0	—	ECEA1EN471U( )	200	500
	1000	16.0	25.0	680	0.15	0.8	7.5	7.5	—	ECEA1EN102U( )	100	250
	2200	18.0	35.5	900	0.17	0.8	7.5	—	—	ECEA1EN222U	50	—
35	10	5.0	11.0	43	0.15	0.5	2.0	5.0	2.5	ECEA1VN100U( )	200	2000
	22	6.3	11.2	80	0.15	0.5	2.5	5.0	2.5	ECEA1VN220U( )	200	2000
	33	8.0	11.5	100	0.15	0.6	3.5	5.0	—	ECEA1VN330U( )	200	1000
	47	8.0	11.5	120	0.15	0.6	3.5	5.0	—	ECEA1VN470U( )	200	1000
	100	10.0	16.0	230	0.15	0.6	5.0	5.0	—	ECEA1VN101U( )	200	500
	220	12.5	20.0	360	0.15	0.6	5.0	5.0	—	ECEA1VN221U( )	200	500
	330	12.5	20.0	450	0.15	0.6	5.0	5.0	—	ECEA1VN331U( )	200	500
	470	12.5	25.0	590	0.15	0.6	5.0	5.0	—	ECEA1VN471U( )	200	500

*1: Ripple current (120 Hz / +85 ℃)
*2: tan δ (120 Hz / +20 ℃)
・When requesting taped product, please put the letter “B” or “i” between the "( )".
Lead wire pitch ✻B=5 mm, 7.5 mm, i=2.5 mm.
・Please refer to the page of “Taping dimensions”.

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Characteristics list

Endurance : 85 ℃ 2000 h (1000 h for each polarity)

Rated voltage (V)	Capacitance (±20 %) (μF)	Case size (mm)		Specification		Lead length (mm)				Part No.	Min. Packaging Q'ty (PCS)	
							Lead space					
		øD	L	Ripple current*1 (mA rms)	tan δ*2	Lead dia. (ød)	Straight	Taping ✻B	Taping ✻i		Straight leads	Taping
50	2.2	5.0	11.0	18	0.15	0.5	2.0	5.0	2.5	ECEA1HN2R2U( )	200	2000
	3.3	5.0	11.0	25	0.15	0.5	2.0	5.0	2.5	ECEA1HN3R3U( )	200	2000
	4.7	5.0	11.0	30	0.15	0.5	2.0	5.0	2.5	ECEA1HN4R7U( )	200	2000
	10	6.3	11.2	50	0.15	0.5	2.5	5.0	2.5	ECEA1HN100U( )	200	2000
	22	8.0	11.5	90	0.15	0.6	3.5	5.0	—	ECEA1HN220U( )	200	1000
	33	8.0	11.5	110	0.15	0.6	3.5	5.0	—	ECEA1HN330U( )	200	1000
	47	10.0	12.5	140	0.15	0.6	5.0	5.0	—	ECEA1HN470U( )	200	500
	100	10.0	20.0	250	0.15	0.6	5.0	5.0	—	ECEA1HN101U( )	200	500
	220	12.5	25.0	360	0.15	0.6	5.0	5.0	—	ECEA1HN221U( )	200	500
	330	16.0	25.0	450	0.15	0.8	7.5	7.5	—	ECEA1HN331U( )	100	250
	470	16.0	31.5	590	0.15	0.8	7.5	—	—	ECEA1HN471U	100	—

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*2: tan δ (120 Hz / +20 ℃)
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Lead wire pitch ✻B=5 mm, 7.5 mm, i=2.5 mm.
・Please refer to the page of “Taping dimensions”.

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Safty Precautions

When using our products, no matter what sort of equipment they might be used for,
be sure to confirm the applications and environmental conditions with our specifications in advance.

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