ELNA

Electronic Components

High Quality

CAPACITORS

CONDUCTIVE POLYMER HYBRID ALUMINUM ELECTROLYTIC CAPACITORS

ALUMINUM ELECTROLYTIC CAPACITORS

ELECTRIC DOUBLE LAYER CAPACITORS "DYNACAP™"

ELNA CO., LTD.

CAT.No.2023/2024E

Notice for ELNA products 1

ELNA

Please read this notice before using the ELNA products.

⚠ REMINDERS

Product Information in this Catalog

Product information in this catalog is as of December 2022. All of the contents specified herein and production status of the products listed in this catalog are subject to change without notice due to technical improvement of our products, etc. Therefore, please check for the latest information carefully before practical application or use of our products.

Please note that ELNA shall not be in any way responsible for any damages and defects in products or equipment incorporating our products, which are caused under the conditions other than those specified in this catalog or individual product specification sheets.

Approval of Product Specifications

Please contact ELNA for further details of product specifications as the individual product specification sheets are available. When using our products, please be sure to approve our product specifications or make a written agreement on the product specification with ELNA in advance.

Pre-Evaluation in the Actual Equipment and Conditions

Please conduct validation and verification of our products in actual conditions of mounting and operating environment before using our products.

Limited Application

1. Equipment Intended for Use

The products listed in this catalog are intended for general-purpose and standard use in general electronic equipment (e.g., AV equipment, OA equipment, home electric appliances, office equipment, information and communication equipment including, without limitation, mobile phone, and PC) and other equipment specified in this catalog or the individual product specification sheets.

ELNA has the line-up of the products intended for use in automotive electronic equipment, telecommunications infrastructure and industrial equipment, or medical devices classified as GHTF Classes A to C (Japan Classes I to III). Therefore, when using our products for these equipment, please check available applications specified in this catalog or the individual product specification sheets and use the corresponding products.

2. Equipment Requiring Inquiry

Please be sure to contact ELNA for further information before using the products listed in this catalog for the following equipment (excluding intended equipment as specified in this catalog or the individual product specification sheets) which may cause loss of human life, bodily injury, serious property damage and/or serious public impact due to a failure or defect of the products and/or malfunction attributed thereto.

(1) Transportation equipment (automotive powertrain control system, train control system, and ship control system, etc.)
(2) Traffic signal equipment
(3) Disaster prevention equipment, crime prevention equipment
(4) Medical devices classified as GHTF Class C (Japan Class III)
(5) Highly public information network equipment, data- processing equipment (telephone exchange, and base station, etc.)
(6) Any other equipment requiring high levels of quality and/or reliability equal to the equipment listed above

3. Equipment Prohibited for Use

Please do not incorporate our products into the following equipment requiring extremely high levels of safety and/or reliability.

(1) Aerospace equipment (artificial satellite, rocket, etc.)
(2) Aviation equipment *1
(3) Medical devices classified as GHTF Class D (Japan Class IV), implantable medical devices *2
(4) Power generation control equipment (nuclear power, hydroelectric power, thermal power plant control system, etc.)
(5) Undersea equipment (submarine repeating equipment, underwater work equipment, etc.)
(6) Military equipment
(7) Any other equipment requiring extremely high levels of safety and/or reliability equal to the equipment listed above

*Notes:
1. There is a possibility that our products can be used only for aviation equipment that does not directly affect the safe operation of aircraft (e.g., in-flight entertainment, cabin light, electric seat, cooking equipment) if such use meets requirements specified separately by ELNA. Please be sure to contact ELNA for further information before using our products for such aviation equipment.
2. Implantable medical devices contain not only internal unit which is implanted in a body, but also external unit which is connected to the internal unit.

4. Limitation of Liability

Please note that unless you obtain prior written consent of ELNA, ELNA shall not be in any way responsible for any damages incurred by you or third parties arising from use of the products listed in this catalog for any equipment that is not intended for use by ELNA, or any equipment requiring inquiry to ELNA or prohibited for use by ELNA as described above.

Safety Design

When using our products for high safety and/or reliability-required equipment or circuits, please fully perform safety and/or reliability evaluation. In addition, please install (i) systems equipped with a protection circuit and a protection device and/or (ii) systems equipped with a redundant circuit or other system to prevent an unsafe status in the event of a single fault for a failsafe design to ensure safety.

Intellectual Property Rights

Information contained in this catalog is intended to convey examples of typical performances and/or applications of our products and is not intended to make any warranty with respect to the intellectual property rights or any other related rights of ELNA or any third parties nor grant any license under such rights.

Limited Warranty

Please note that the scope of warranty for our products is limited to the delivered our products themselves and ELNA shall not be in any way responsible for any damages resulting from a failure or defect in our products. Notwithstanding the foregoing, if there is a written agreement (e.g., supply and purchase agreement, quality assurance agreement) signed by ELNA and your company, ELNA will warrant our products in accordance with such agreement.

ELNA's Official Sales Channel

The contents of this catalog are applicable to our products which are purchased from our sales offices or authorized distributors (hereinafter "ELNA's official sales channel"). Please note that the contents of this catalog are not applicable to our products purchased from any seller other than ELNA's official sales channel.

Caution for Export

Some of our products listed in this catalog may require specific procedures for export according to"U.S. Export Administration Regulations","Foreign Exchange and Foreign Trade Control Law" of Japan, and other applicable regulations. Should you have any questions on this matter, please contact our sales staff.

Notice for ELNA products 2

ELNA

Equipment intended for use and product categories

Application	Product Group	
	Equipment *1	Category (Part Number Code *2)
Automotive	Automotive Electronic Equipment (POWERTRAIN, SAFETY)	A
	Automotive Electronic Equipment (BODY & CHASSIS, INFOTAINMENT)	C
Medical	Medical Devices classi ed as GHTF Class C (Japan Class III)	M
	Medical Devices classi ed as GHTF Classes A or B (Japan Classes I or II)	L
Consumer	General Electronic Equipment	S

*Notes :
1. Based on the general speci cations required for electronic components for such equipment, which are recognized by ELNA, the use of each product group for the equipment is recommended. Please be sure to contact ELNA before using our products for equipment other than those covered by the product group.
2. On each of our part number, the 2nd code from the left is a code indicating the "Category" as shown in the above table. For details, please check the explanatory materials regarding the part numbering system of each of our products.

Automotive Application Guide

We classify automotive electronic equipment into the following four purpose of use and set usable product purpose of use for each of our products. Therefore, we have the corresponding product category code (the part number code of 2nd digit from the left side is "A" or "C").
When using our products for automotive electronic equipment, please be sure to check such application categories and use the corresponding product series accordingly. Should you have any questions on this matter, please contact us.

Product category (Part Number Code of 2nd digit from the Left Side)	Purpose of use	Automotive Electronic Equipment (Typical Example)
A	POWERTRAIN	・Engine ECU (Electronically Controlled Fuel Injector) ・Cruise Control Unit ・4WS (4 Wheel Steering) ・Transmission ・Power Steering ・HEV/PHV/EV Core Control (Battery, Inverter, DC-DC) ・Automotive Locator (Car location information providing device), etc.
	SAFETY	・ABS (Anti-Lock Brake System) ・ESC (Electronic Stability Control) ・Airbag ・ADAS (Equipment that directly controls running, turning and stopping), etc.
C	BODY & CHASSIS	・Wiper ・Automatic Door ・Power Window ・Keyless Entry System ・Electric Door Mirror ・Automobile Digital Mirror ・Interior Lighting ・Automobile Air Conditioning System ・TPMS (Tire Pressure Monitoring System) ・Anti-Theft Device (Immobilizer), etc.
	INFO-TAINMENT	・Car Infotainment System ・ITS/Telematics System ・Instrument Cluster ・ADAS (Sensor, Equipment that is not interlocked with safety equipment or powertrain) ・Dashcam (genuine products for automotive manufacturer), etc.

NOTE : Design, Specifications are subject to change without notice.
It is recommended that you shall obtain technical specifications from ELNA to ensure that the component is suitable for your use.

■ "GREEN CAP™"

"GREEN CAP", ELNA considers the global environment and it is a product that doesn't use the hazardous substance and "Lead Free" in the plating of terminals and outer Sleeves.
The product in this catalog is 'GREEN CAP'.

The hazardous substance is
Cadmium and its compounds, Lead and its compounds
Hexavalent chromium compounds, Mercury and its compounds
PBB, PBDE : Specified bromine-based flame retardants
DEHP : Di(2-ethylhexyl)phthalate, BBP : Bis(butylbenzyl) phthalate
DBP : Dibutyl phthalate, DIBP : Diisobutyl phthalate

■Regarding to various environmental Regulations

It suits with the following EU regulations.

- End-of-Life Vehicle Directive
- Restriction of the Use of Certain Hazardous Substances In Electrical and Electronic Equipment.
- Waste Electrical and Electronic Equipment,

etc.

For details, please check our website.（https://www.elna.co.jp/en/sustainability/environment/regulation/）
If you need "Halogen-Free" products, please consult with us.

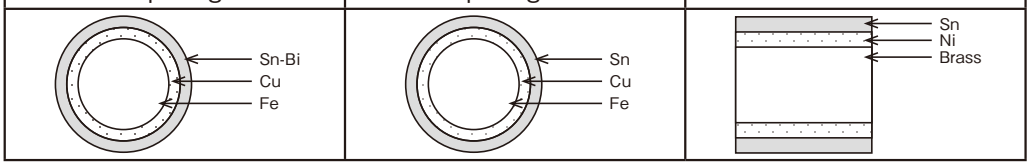
Terminal area plating material and sleeve material

- (Conductive polymer hybrid) Aluminum electrolytic capacitors
- Electric double layer capacitors (Cylindrical type)

Product type	Size	Terminal plating	Sleeve
SMD (Chip type)	φ 10 or less	Sn-Bi	Sleeve less
	φ 12.5 or more	Sn 100%	Sleeve less
	For Vibration resistance Dummy terminal	Sn 100%	—
Lead terminal type	All size	Sn 100%	PET (or Sleeve less)

Terminal plating structure overview

Terminal plating : Sn-Bi	Terminal plating : Sn 100%	For Vibration resistance Dummy terminal



Sn : Tin　Bi : bismuth　Fe : Iron　Cu : Cupper　Ni : Nickel　Brass : Brass

Please contact us for the following.
- Excluding the above-mentioned, terminal plating and sleeve.
- Electric double layer capacitors (coin type) .

NOTE : Design, Specifications are subject to change without notice.
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from ELNA to ensure that the component is suitable for your use.

■ About the Sn whisker

1. Sn whisker-generating mechanism on the lead wire

   On the surface of the lead wire, Sn and aluminum will get mixed instead of getting dissolved.
   The surface condition is complex, aluminum will expand due to the heat and humid causing the oxidation and hydration. This reaction will cause the inner stress and influence the development of the whisker.

2. Generation control of the Sn whisker

   In the past, Sn whisker was reduced by adding a lead(Pb). Aluminum electrolytic capacitor was also using the Sn-plate with Pb on the lead wire.
   But due to environmental regulation such as the “ELV” and “RoHS”, Pb was strictly prohibited since 2000.
   Lead wire not containing the Pb was used, which caused the Sn whisker problem to happen again.
   Since Sn whisker is influenced by the mixture of aluminum, method of reducing the aluminum on the welding surface was to clean the lead terminal using the alkali.
   However since the welding area of the large case size is larger compared to the small ones, whisker will generate even if it is cleaned by alkali. This whisker will scatter outside of the capacitor and potentially cause the short-circuit. Countermeasure of keeping the whisker inside the capacitor is being discussed.

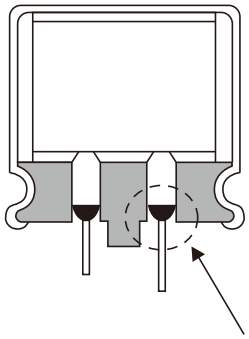
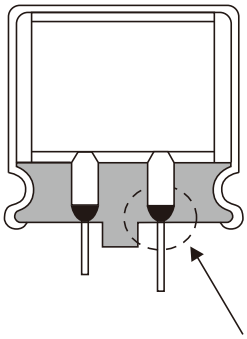
3. Prevention of scattering of Sn whisker

   In the past Sn-plate with Pb was used and recently plate with Bi is being introduced to prevent the whisker from generating. However the whisker will still generate under the temperature and moisture condition.
   Therefore, the current method of preventing the whisker will not completely prevent the whisker from generating.

   In our company, we are developing and supplying products with design of preventing the whisker from scattering outside the capacitor.

   This design corresponds to series such as the RJD and RJE for 105°C use, RJK, RKD and RPK for 125°C use.

   If it is required for the other series, please feel free to make an inquiry.

Sectional view of capacitor	
Standard type	Whisker proof type
 Rubber hole Not covered	 Rubber hole covered

■ Ordering Information

Please order by the multiples of the minimum order quantity (MOQ).

Aluminum Electrolytic Capacitors

Classification		Case Size φD×L (mm)	Quantity (PCS.)						
			Long lead		Forming lead		Taping (04 Type)	Taping (Chip Type)	
			(Q'ty/Bag)	MOQ/Box	(Q'ty/Bag)	MOQ/Box	MOQ/Box	MOQ/Reel	(Q'ty/Box)
Conductive Polymer Hybrid Aluminum Electrolytic Capacitors	Chip Type	φ5 to φ6.3	–	–	–	–	–	1,000	5,000
		φ8,φ10×8.7 to 10	–	–	–	–	–	500	2,000
		φ10×12.5	–	–	–	–	–	400	1,600
		φ12.5×13.5	–	–	–	–	–	200	1,000
	04 Type	φ10	–	–	–	–	500	–	–
Chip Type		φ4	–	–	–	–	–	2,000	10,000
		φ5,φ6.3,φ8×6.5	–	–	–	–	–	1,000	5,000
		φ8 ×10,10.5,φ10	–	–	–	–	–	500	2,000
		φ12.5×13.5	–	–	–	–	–	200	1,000
		φ16×16.5,φ18×16.5	–	–	–	–	–	125	250
		φ16×21.5,φ18×21.5	–	–	–	–	–	75	150
04 Type		φ4,φ5,φ6.3	200	2,000	200	2,000	2,000	–	–
		φ8×5 to 12	200	2,000	200	2,000	1,000	–	–
		φ8×15,20	200	1,000	200	1,000	1,000 (2,000)	–	–
		φ10×12.5	200	1,000	200 (400)	1,000 (4,000)	500	–	–
		φ10×16	200	1,000	200	1,000	500	–	–
		φ10×20	200	1,000	200 (100)	1,000 (500)	500	–	–
		φ10×25 to 30	200	1,000	100 (200)	500 (1,000)	500	–	–
		φ12.5×15 to 20	100	1,000	100	1,000 (500)	500	–	–
		φ12.5×25	100	500 (1,000)	100	1,000 (500)	500	–	–
		φ12.5×30,35	100	500	200 (100)	2,000 (500)	500	–	–
		φ12.5×40	100	500 (100)	200 (100)	2,000 (500)	–	–	–
		φ16×16 to 25	100	500	100	1,000 (100)	–	–	–
		φ16×31.5 to 35.5	50	200 (400)	100	1,000 (100)	–	–	–
		φ16×40	50 (100)	100	100	800 (100)	–	–	–
		φ18×16	50	100	100	1,000 (100)	–	–	–
		φ18×20	50 (100)	100 (500)	100	1,000 (100)	–	–	–
		φ18×25	50 (100)	100 (400)	100	1,000 (100)	–	–	–
		φ18×31.5 to 35.5	50	100	100	1,000 (100)	–	–	–
		φ18×40 to 42.5	50	250 (100)	100	800 (100)	–	–	–

(Note) It may become the numerical value in ( ).

Electric Double Layer Capacitors

Type	Case size φD×L(mm)	Quantity (PCS.)						
		Long lead		Standard lead		Taping (04 Type)	Taping (Chip Type)	
		(Q'ty/Bag)	MOQ/Box	(Q'ty/Bag)	MOQ/Box	MOQ/Box	MOQ/Reel	(Q'ty/Box)
Coin	φ11.5	–	–	200	2,000	–	–	–
	φ13.5	–	–	200	1,000	–	–	–
	φ21.5	–	–	100	500	–	–	–
	φ6.8	–	–	–	–	–	1,500 to 2,000*	6,000 to 8,000*
	φ12.5×8.5	–	–	–	–	–	300	1,500
	φ12.5×10.5	–	–	–	–	–	250	1,250

Type	Case size φD×L(mm)	Quantity (PCS.)						
		Long lead		Forming lead		Taping (04 Type)	Taping (Chip Type)	
		(Q'ty/Bag)	MOQ/Box	(Q'ty/Bag)	MOQ/Box	MOQ/Box	MOQ/Reel	(Q'ty/Box)
Cylindrical	φ6.3	200	2,000	200	2,000	2,000	–	–
	φ8×12	200	2,000	200	2,000	1,000	–	–
	φ8×15 to 22	200	1,000	200	1,000	1,000	–	–
	φ10×20 to 25	200	1,000	100	500	500	–	–
	φ10×30 to 35	200	1,000	100	500	500	–	–
	φ12.5×25	100	500	100	1,000	500	–	–
	φ12.5×35	100	500	200	2,000	–	–	–
	φ16×20 to 25	100	500	100	1,000	–	–	–
	φ16×31.5 to 35.5	50	200	100	1,000	–	–	–
	φ16×40	50	100	100	800	–	–	–
	φ18×35	50	100	100	1,000	–	–	–
	φ18×40	50	250	100	800	–	–	–

* Please inquire.

NOTE : Design, Specifications are subject to change without notice.
It is recommended that you shall obtain technical specifications
from ELNA to ensure that the component is suitable for your use.

■ Type List for Aluminum Electrolytic Capacitors

★ : New series
☆ : Upgrade

● Conductive Polymer Hybrid Aluminum Electrolytic Capacitors

Category	Series	Application	Category Temp. Range (℃)		Life time Range (hours)		Rated Voltage Range (V.DC)		Rated Capacitance Range (μF)		Size range φD x L (mm)		Outside color	JIS Configurati	Note
			Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.			
Hybrid	HV1	105 deg C, low ESR, long ife, chip type	−55	+105	10000		6.3	100	10	820	5×5.8	12.5×13.5	Silver	32	☆
	HT1	105 deg C, low ESR, long ife, chip type, vibration resistance	−55	+105	10000		6.3	100	10	820	6.3×5.8	12.5×13.5	Silver	32	☆
	HVK	125 deg C, low ESR, long ife, chip type	−55	+125	4000	6000	6.3	100	10	820	5×5.8	12.5×13.5	Silver	32	☆
	HTK	125 deg C, low ESR, long ife, chip type, vibration resistance	−55	+125	4000	6000	6.3	100	10	820	6.3×5.8	12.5×13.5	Silver	32	☆
	HVL	125 deg C, low ESR, long ife, chip type	−55	+125	8000		25	63	33	1000	8×10	12.5×13.5	Silver	32	★
	HTL	125 deg C, low ESR, long ife, chip type, vibration resistance	−55	+125	8000		25	63	33	1000	8×10	12.5×13.5	Silver	32	★
	HVX	135 deg C, low ESR, chip type	−55	+135	2000	4000	16	63	10	560	6.3×5.8	10×12.5	Silver	32	
	HTX	135 deg C, low ESR, chip type, vibration resistance	−55	+135	2000	4000	16	63	10	560	6.3×5.8	10×12.5	Silver	32	
	HVQ	150 deg C, high temperature, low ESR, chip type	−55	+150	1000		16	63	33	470	8×10	10×10	Silver	32	
	HTQ	150 deg C, high temperature, low ESR, chip type, vibration resistance	−55	+150	1000		16	63	33	470	8×10	10×10	Silver	32	
	HVY	150 deg C, high temperature, low ESR, chip type	−55	+150	2000		16	63	33	470	8×10	10×10	Silver	32	★
	HTY	150 deg C, high temperature, low ESR, chip type, vibration resistance	−55	+150	2000		16	63	33	470	8×10	10×10	Silver	32	★
	BR1	105 deg C, low ESR, long life, lead terminal type	−55	+105	10000		25	100	15	560	10×10	10×12.5	Silver	04	
	BRK	125 deg C, low ESR, long life, lead terminal type	−55	+125	4000	6000	25	100	15	560	10×10	10×12.5	Silver	04	

● Chip Type Aluminum Electrolytic Capacitors

Category	Series	Application	Category Temp. Range (℃)		Life time Range (hours)		Rated Voltage Range (V.DC)		Rated Capacitance Range (μF)		Size range φD x L (mm)		Outside color	JIS Configurati	Note
			Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.			
Standard	VV5	85 deg C, standard	−40	+85	2000		4	100	1	2200	4×5.3	12.5×13.5	Silver	32	
	VVS	105 deg C, standard	−55	+105	1000		6.3	50	1	1500	4×5.3	10×10.5	Silver	32	
	VVR	105 deg C, standard	−40	+105	2000		4	50	1	1500	4×5.3	10×10.5	Silver	32	
	VV9	105 deg C, bipolar standard	−40	+105	2000		6.3	50	1	47	4×5.8	6.3×5.8	Silver	32	
High Reliability	VVC	105 deg C, Long life	−40	+105	3000	5000	6.3	50	1	1000	4×5.8	10×10	Silver	32	
	VZH	105 deg C, Long life	−55	+105	5000	7000	6.3	35	22	1000	6.3×5.8	10×10	Silver	32	
	VMH	VZH series, for vibration resistance type													
Low Impedance, Low ESR, High Reliability	VVZ	105 deg C, low ESR	−55	+105	1000	5000	6.3	35	4.7	2700	4×5.3	12.5×13.5	Silver	32	
	VVD	105 deg C, low ESR, long life	−55	+105	2000	5000	6.3	100	4.7	2200	4×5.8	12.5×13.5	Silver	32	
	VVV	105 deg C, low ESR	−55	+105	2000		6.3	50	33	1500	6.3×5.8	10×10	Silver	32	
	VTV	VVV series, for vibration resistance type													
	VZD	105 deg C, low ESR, high CV	−55	+105	2000		6.3	50	22	2200	6.3×5.8	10×10	Silver	32	
	VMD	VZD series, for vibration resistance type													
	VZK	105 deg C, low ESR, high CV	−55	+105	2000		25	35	470	1000	8×10	10×10	Silver	32	
	VVT	125 deg C, low ESR	−40	+125	1000	5000	10	100	4.7	1000	4×5.8	12.5×13.5	Silver	32	
	VZJ	125 deg C, low ESR, long life. Specify ESR after endurance test.	−40	+125	2000	3000	10	50	22	470	6.3×7.7	10×10	Silver	32	
	VMJ	VZJ series, for vibration resistance type													
	VZF	125 deg C, low ESR, high CV, long life	−40	+125	1000	4000	10	50	22	680	6.3×5.8	10×10	Silver	32	
	VMF	VZF series, for vibration resistance type													
	VZE	125 deg C, low ESR, high CV, long life. Specify ESR after endurance test.	−40	+125	2000		35		47	100	6.3×7.7		Silver	32	
	VME	VZE series, for vibration resistance type													
	VVX	125 deg C, high temperature	−40	+135	1000		25	35	22	330	8×10	10×10	Silver	32	
	VTX	VVX series, for vibration resistance type													
For Vibration Resistance	VTZ	105 deg C, low ESR, 30G vibration resistance	−55	+105	1000	5000	6.3	35	33	8200	6.3×5.8	18×21.5	Silver	32	
	VTD	105 deg C, low ESR , long life, 30G vibration resistance	−55	+105	2000	4000	6.3	100	10	8200	6.3×5.8	18×21.5	Silver	32	
	VTT	125 deg C, low ESR, 30G vibration resistance	−40	+125	1000	5000	10	100	10	4700	6.3×5.8	18×21.5	Silver	32	
	VTQ	150 deg C, high temperature, 30G vibration resistance	−40	+150	1000		10	35	33	470	8×10	10×10	Silver	32	

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

NOTE : Design, Specifications are subject to change without notice.
It is recommended that you shall obtain technical specifications
from ELNA to ensure that the component is suitable for your use.

■ Type List for Aluminum Electrolytic Capacitors

★ : New series
☆ : Upgrade

● Miniature Aluminum Electrolytic Capacitors

Category	Series	Application	Category Temp. Range (℃)		Life time Range (hours)		Rated Voltage Range (V.DC)		Rated Capacitance Range (μF)		Size range φD x L (mm)		Outside color	JIS Configurati	Note
			Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.			
Low Impedance, Low ESR, High Reliability	RJB	105 deg C, miniature, low impedance	−55	+105	2000	5000	6.3	100	3.3	10000	5×11.5	16×31.5	Black	04	
	RJH	105 deg C, low impedance	−55	+105	2000	5000	6.3	100	1	15000	5×11.5	18×40	Black	04	
	RJF	105 deg C, miniature, extra low impedance	−40	+105	1000	10000	6.3	100	5.6	6800	4×7	18×40	Black	04	
	RJM	105 deg C, miniature, long life, extra low impedance	−40	+105	6000	10000	6.3	50	27	8200	5×11.5	16×25	Black	04	
	RJD	105 deg C, miniature, low ESR	−55	+105	2000	8000	6.3	100	10	18000	5×11.5	18×40	Black	04	
	RKD	125 deg C, miniature, low ESR	−40	+125	2000	5000	10	80	100	8200	8×12	18×40	Black	04	
	RKB	135 deg C, miniature, low ESR	−40	+135	2000	3000	10	80	220	6800	10×12.5	18×40	Silver	04	
	RKC	135 deg C, high CV, low ESR, high ripple current	−40	+135	2000	3000	25	80	270	12000	12.5×20	18×40	Silver	04	
	RQA	150 deg C, high temperature	−40	+150	1000		10	35	220	4700	10×14.5	18×42.5	Silver	04	
	RQB	150 deg C, high temperature, high ripple current	−40	+150	2000		35	50	1300	4700	16×26.5	18×42.5	Silver	04	
For Air bag	RJE	105 deg C, capacitor for SRS airbag	−55	+105	5000		25	35	830	11000	12.5×15	18×40	Black	04	
	RJK	105 deg C, high CV capacitor for SRS airbag	−55	+105	5000		25	35	2500	17000	16×20	18×40	Black	04	
For Vibration Resistance	RPK	125 deg C, NC terminal 30G vibration resistance	−40	+125	4000	5000	10	80	220	8200	12.5×15	18×40	Black	04	
	RKE	125 deg C, 40G vibration resistance	−40	+125	5000		25	50	1200	8200	16×31.5	18×40	Silver	04	
	RKF	135 deg C, 40G vibration resistance	−40	+135	2000	3000	25	80	290	10000	12.5×25	18×40	Silver	04	
	RKG	140 deg C, 40G vibration resistance	−40	+150	1000	2000	25	80	800	4700	18×42		Silver	04	

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

● Some of the series listed in the below table have been removed from the catalogue (discontinued series). Please select from the new series for a designing your(new) application.

Category	Series	Application	Category Temp. Range (℃)		Life time Range (hours)		Rated Voltage Range (V.DC)		Rated Capacitance Range (μF)		Size range φD x L (mm)		Substitute series to recomend
			Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	
Polymer	PRM	Ultra Low ESR Conductive Polymer Chip	−55	+105	2000		2.5	6.3	120	1200	5×5.7	10×7.7	—
	PVX	Ultra Low ESR Conductive Polymer Chip	−55	+105	2000		2.5	10	100	1200	5×5.7	6.3×5.7	—
	PVM	Super Low ESR Conductive Polymer Chip	−55	+105	2000		2.5	16	33	1200	5×5.7	6.3×5.7	—
	PVK	Super Low ESR, High Temp. Conductive Polymer Chip	−55	+125	1000		2.5	16	33	1000	6.3×5.7		—
Chip	VV2	85 deg C, 5.3mm L	−40	+85	2000		4	50	1	220	3×5.3	6.3×5.3	VV5
	VV3	85 deg C, Standard	−40	+85	2000		6.3	50	4.7	330	4×5.3	6.3×7.7	VV5
	VV1	85 deg C, Large Capacitance	−40	+85	2000		6.3	100	10	2200	8×6.5	12.5×13.5	VV5
	VV4	85 deg C, 4.5mm L	−40	+85	2000		6.3	50	10	100	6.3×4.5		—
	VVB	85 deg C, bipolar standard	−40	+85	2000		6.3	50	1	47	4×5.3	6.3×5.3	VV9
	VVL	105 deg C , 5.7mm L	−55	+105	2000		6.3	50	1	100	4×5.7	6.3×5.7	VVZ
	VVJ	105 deg C, Large Capacitance	−55	+105	2000	5000	6.3	100	10	1000	8×6.5	12.5×13.5	VVD
	VVE	105 deg C, 4.5mm L	−55	+105	2000	5000	6.3	100	10	1000	6.3×4.5		—
Miniature	RC3	85 deg C , 5mmL	−40	+85	1000		4	50	1	470	4×5	8×5	—
	R3S	105 deg C , 5mmL	−55	+105	1000		6.3	50	1	100	4×5	6.3×5	—
	RB3	85 deg C , 5mmL, Bipolar	−40	+85	1000		6.3	50	0.33	47	4×5	6.3×5	—
	RC2	85 deg C , 7mmL	−40	+85	1000		4	100	1	330	4×7	8×7	—
	R2S	105 deg C, 7mmL	−55	+105	1000		6.3	50	1	100	4×7	6.3×7	—
	RB2	85 deg C , 7mmL, Bipolar	−40	+85	1000		6.3	50	0.33	47	4×7	6.3×7	—
	RE3	85 deg C , Standard	−40	+85	2000		6.3	450	0.47	22000	5×11	18×40	—
	R2B	85 deg C , Bipolar	−40	+85	2000		6.3	100	1	4700	5×11	18×35.5	—
	RJP	105 deg C , Bipolar	−40	+105	1000	2000	6.3	50	1	6800	5×11	18×35.5	—
	RJ5	105 deg C , Standard	−55	+105	1000		6.3	100	1	22000	5×11	18×40	—
	RJ4	105 deg C , Standard	−55	+105	1000	2000	6.3	100	1	22000	5×11	18×40	—
	RJ3	105 deg C , Standard	−55	+105	1000	2000	6.3	100	1	15000	5×11	18×35.5	—
	RLB	85 deg C , Low leakage current	−40	+85	1000		6.3	50	1	2200	5×11	18×35.5	—

NOTE : Design, Specifications are subject to change without notice.
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from ELNA to ensure that the component is suitable for your use.

■ Type List for Aluminum Electrolytic Capacitors

★ : New series
☆ : Upgrade

● Aluminum Electrolytic Capacitors for Audio

Category	Series	Application	Category Temp. Range (℃)		Life time Range (hours)	Rated Voltage Range (V.DC)		Rated Capacitance Range (μF)		Size range φD x L (mm)		Outside color	JIS Configurati	Note
			Min.	Max.		Min.	Max.	Min.	Max.	Min.	Max.			
For Audio	VVM	105 deg C, chip type capacitor for audio.	−55	+105	2000	6.3	50	1	470	4×5.8	10×10.5	Silver	32	
	VVG	85 deg C, chip type capacitor for audio.	−40	+85	2000	6.3	35	3.3	470	4×5.3	10×10	Silver	32	
	RF0	85 deg C, miniature capacitor for audio(PURECAP).	−40	+85	1000	6.3	63	1	15000	5×11	18×35.5	Black	04	
	RW5	105 deg C, miniature capacitor for audio.	−55	+105	1000	16	25	100	15000	5×11.5	18×40	Black	04	

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● Some of the series listed in the below table have been removed from the catalogue (discontinued series). Please select from the new series for a designing your(new) application.

Category	Series	Application	Category Temp. Range (℃)		Life time Range (hours)	Rated Voltage Range (V.DC)		Rated Capacitance Range (μF)		Size range φD x L (mm)		Substitute series to recommend
			Min.	Max.		Min.	Max.	Min.	Max.	Min.	Max.	
For Audio	VVF	Chip Type (SILMIC)	−40	+85	2000	10	50	1	100	4×5.3	8×10	−
	RFS	High Grade (SILMIC Ⅱ)	−40	+85	1000	6.3	100	3.3	3300	5×11	18×40	−
	R0S	High Grade (SILMIC)	−40	+85	1000	16	100	10	2200	6.3×11	18×40	−
	VV0	Chip Type (PURECAP)	−40	+85	2000	6.3	50	0.33	1000	4×5.3	10×10	−
	R0B	Miniaturized Standard (TONEREX)	−40	+85	1000	6.3	100	1	10000	5×11	18×40	−
	RA3	Miniaturized Standard	−40	+85	2000	6.3	100	1	22000	5×11	18×35.5	−
	RBD	Miniaturized Bipolar	−40	+85	2000	6.3	100	1	4700	5×11	18×35.5	−

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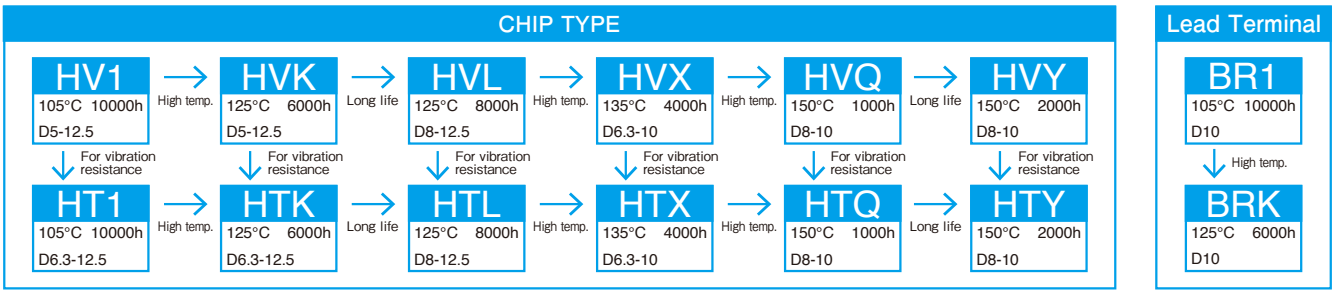
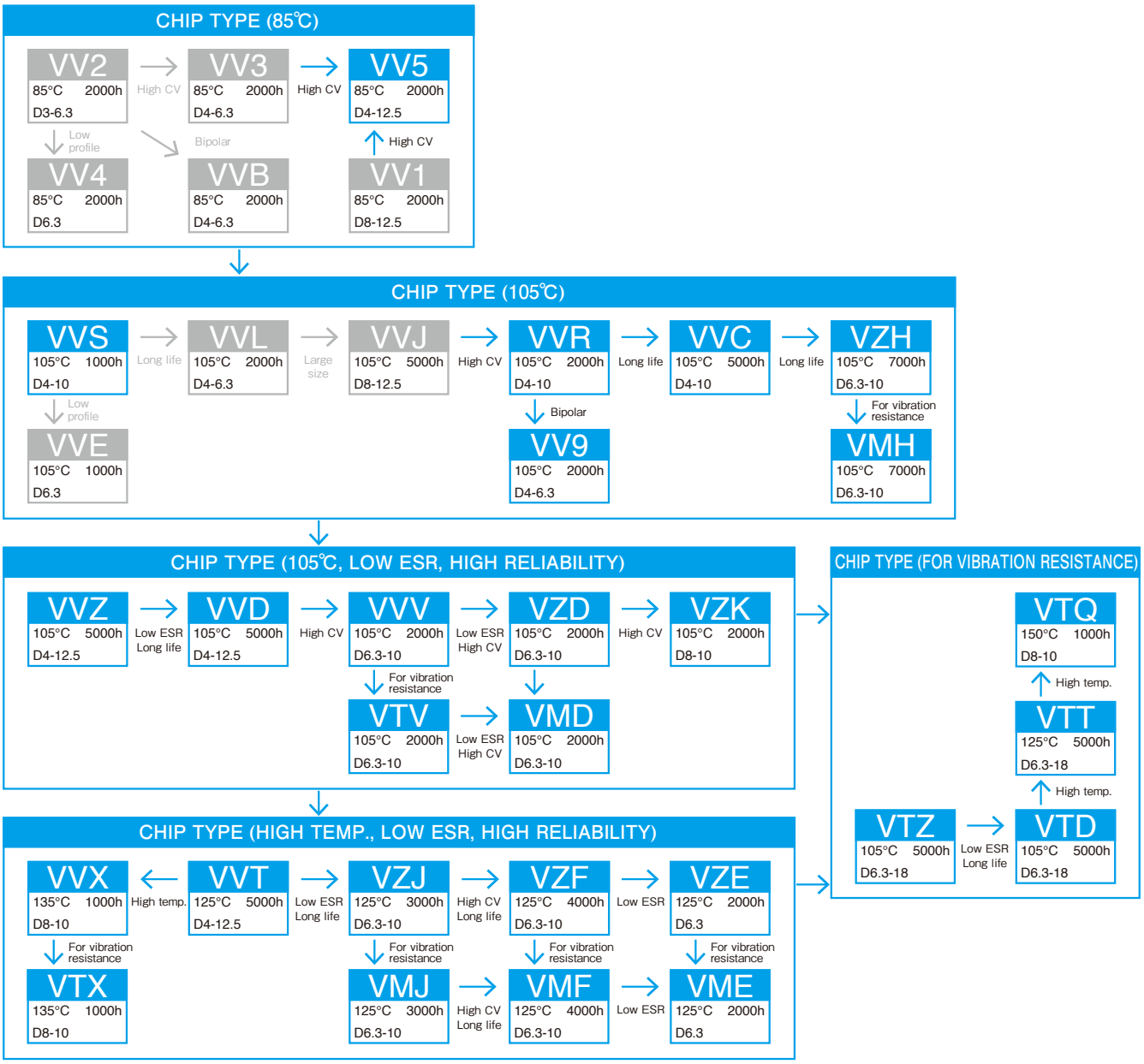
■ Systematized Classification of Aluminum Electrolytic Capacitors

● Conductive Polymer Hybrid Aluminum Electrolytic Capacitors



● Chip Type Aluminum Electrolytic Capacitors



NOTE : Design, Specifications are subject to change without notice.
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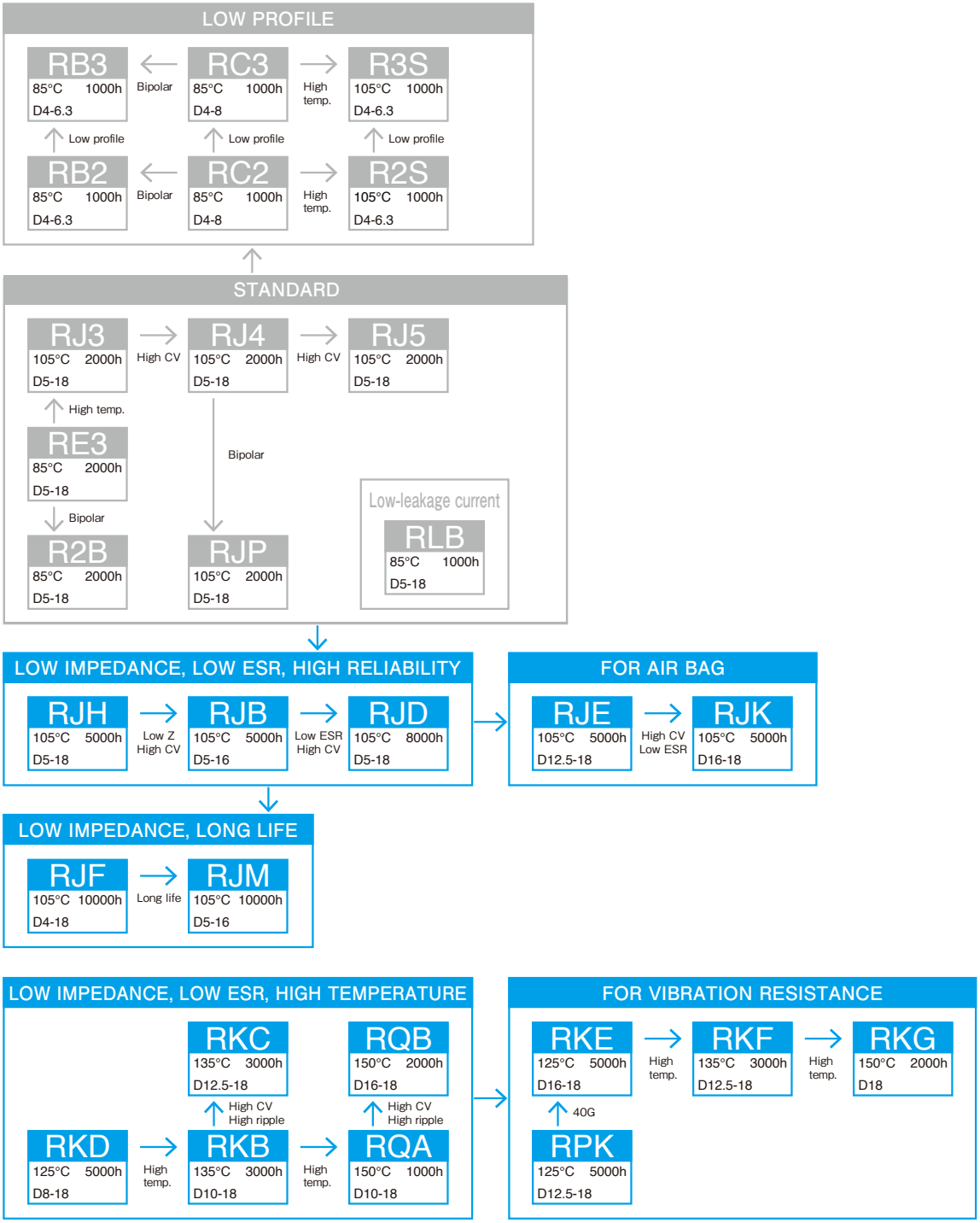
■ Systematized Classification of Aluminum Electrolytic Capacitors

● Miniature Aluminum Electrolytic Capacitors



NOTE : Design, Specifications are subject to change without notice.
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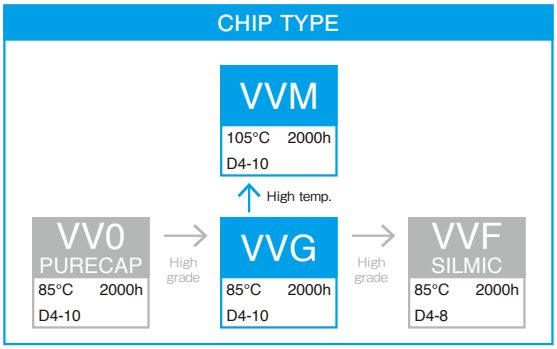
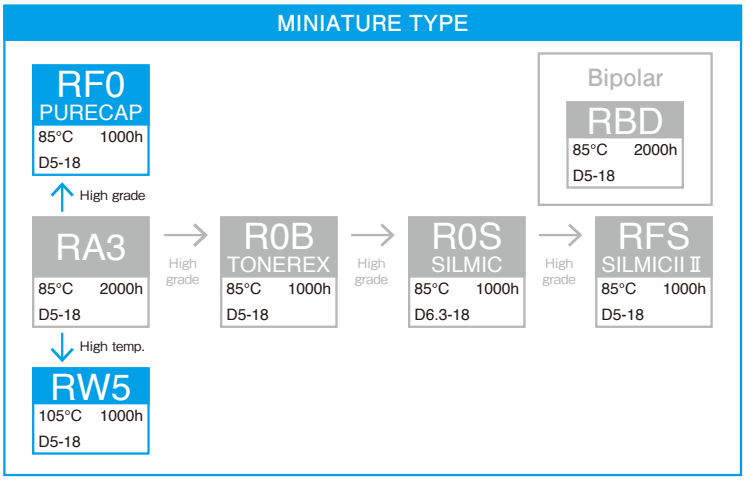
from ELNA to ensure that the component is suitable for your use.

■ Systematized Classification of Aluminum Electrolytic Capacitors

● Aluminum Electrolytic Capacitors For Audio





NOTE : Design, Specifications are subject to change without notice.
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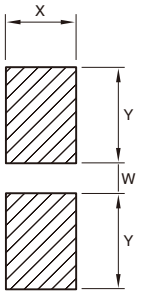
■ Recommended land pattern and size

(Vertical chip type)

● Standard type



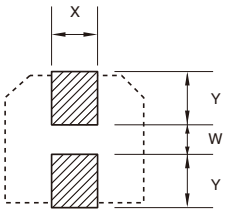
(Unit : mm)

Case Size φD×L	Land Size			Thickness of Solder paste
	X	Y	W	
4×5.3, 5.8	1.6	2.6	1.0	0.15
5×5.3, 5.8	1.6	3.0	1.4	0.15
6.3×5.3, 5.8, 7.7	1.6	3.6	1.9	0.15
8×6.5, 8.7	1.6	＊4.0	＊2.1	0.15
8×10, 10.5	2.5	＊3.5	＊3.0	0.15
10×8.7.10,10.5,12.5	2.5	＊4.0	＊4.0	0.15
12.5×13.5	3.2	6.0	4.0	0.15

＊For Vibration resistance use
φ8×6.5 Y=4.5 W=1.0
φ8×10, φ8×10.5 Y=4.0 W=2.5
φ10×10, φ10×10.5 Y=4.5 W=3.0
φ10×12.5 Y=4.5 W=3.0

● For vibration resistance type

VTZ, VTD, VTT, VTQ, VTV, VTX, VMH, VMD, VMJ, VMF, VME, HT1, HTK, HTL, HTX, HTQ ,HTY series



(Unit : mm)

Case Size φD	Land Size			Thickness of Solder paste
	X	Y	W	
6.3	3.0	4.0	1.6	0.20
8	5.0	4.0	2.5	0.20
10	5.0	4.8	3.6	0.20
12.5	7.0	6.6	3.2	0.20
16	10.5	7.8	5.0	0.20
18	10.5	8.8	5.0	0.20

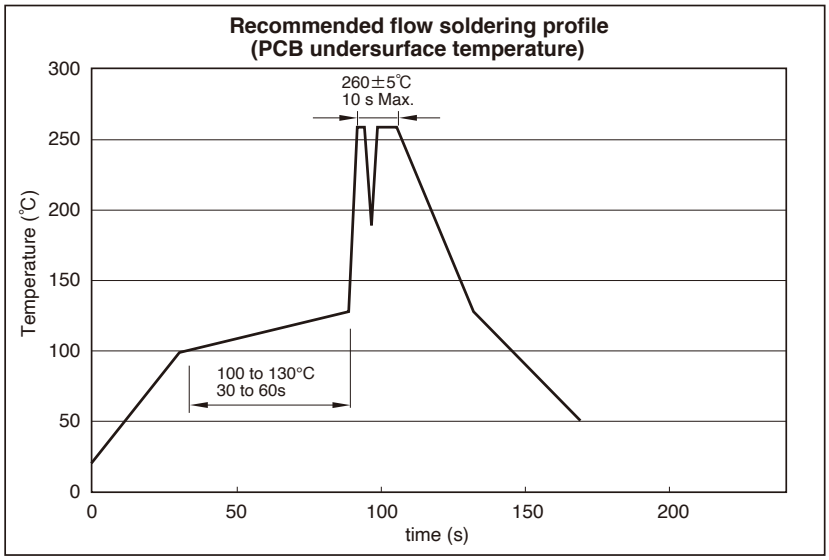
NOTE : Design, Specifications are subject to change without notice.
It is recommended that you shall obtain technical specifications
from ELNA to ensure that the component is suitable for your use.

■ Recommended soldering conditions (Lead free)

● Lead terminal type (conductive polymer hybrid) aluminum electrolytic capacitors

(1) Soldering iron conditions
Iron tip temperature shall be 400°C±5°C within the duration of 3^{+1}_{0} seconds.

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



Caution for Using aluminum Electrolytic Capacitors

(1) Do not dip the capacitor into melted solder.

(2) Do not flux other part than the terminals.

(3) If there is a direct contact between the sleeve of the capacitor and the printed circuit pattern or a metal part of another component such as a lead wire, it may cause shrinkage of crack.

(4) If the application is for extended use, understand and manage the soldering characteristics to avoid abnormal current caused by a contact failure between the capacitor and the PCB.

(5) Please refer to cautions for using on page and product specifications about other notes.

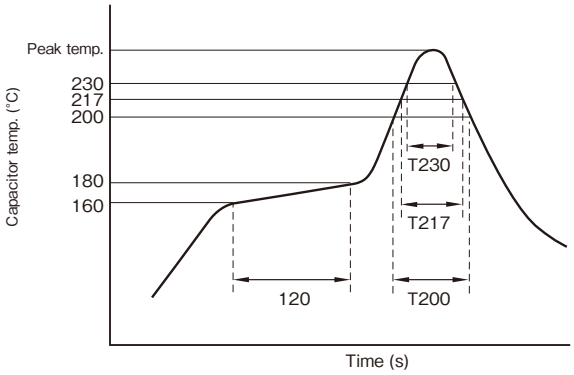
■ Recommended soldering conditions (Lead free)

● Chip type (conductive polymer hybrid) aluminum electrolytic capacitors

(1) Soldering iron conditions
Iron tip temperature shall be 400°C±5°C within the duration of 3^{+1}_{0} seconds.

(2) Reflow soldering conditions

Profile



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

T200 : Duration while capacitor head temperature exceeds 200°C (s)
T217 : Duration while capacitor head temperature exceeds 217°C (s)
T230 : Duration while capacitor head temperature exceeds 230°C (s)
The measurement temperature point is the case top.

● Chip type conductive polymer hybrid aluminum electrolytic capacitors

Series	Size	Peak temp. (5sec or less)	T230	T217	T200	Reflow cycle
HV1, HVK, HVX, HVQ, HT1, HTK, HTX, HTQ, HVY, HVL HTY, HTL	φ5 to φ6.3	250℃ Max.	40 sec. max.	50 sec. max.	60 sec. max.	2 times or less
	φ8 to φ10	240℃ Max.	40 sec. max.	50 sec. max.	60 sec. max.	2 times or less
	φ12.5	240℃ Max.	20 sec. max.	30 sec. max.	50 sec. max.	2 times or less

● Chip type aluminum electrolytic capacitors

Series	Size	Peak temp. (5sec or less)	T230	T217	T200	Reflow cycle
VV5, VVB, VVS, VVR, VVC, VZH, VVZ, VVD, VVV, VZD, VZK, VVT, VZJ, VZF, VZE, VVX, VV9, VVM, VVG	φ4 to φ6.3	250℃ Max.	40 sec. max.	50 sec. max.	60 sec. max.	2 times or less
	φ8 to φ10	240℃ Max.	40 sec. max.	50 sec. max.	60 sec. max.	2 times or less
	φ12.5	240℃ Max.	20 sec. max.	30 sec. max.	50 sec. max.	2 times or less
VZA, VZB, VZC	φ4 to φ6.3	260℃ Max.	40 sec. max.	90 sec. max.	—	2 times or less
	φ8 to φ10	250℃ Max.	40 sec. max.	90 sec. max.	—	2 times or less
VTZ, VTD, VTT, VTQ, VTV, VMH, VMD, VMJ, VMF, VME, VTX	φ6.3	250℃ Max.	40 sec. max.	60 sec. max.	80 sec. max.	2 times or less
	φ8 to φ10	250℃ Max.	30 sec. max.	60 sec. max.	80 sec. max.	2 times or less
	φ12.5 to φ18	240℃ Max.	20 sec. max.	30 sec. max.	50 sec. max.	2 times or less

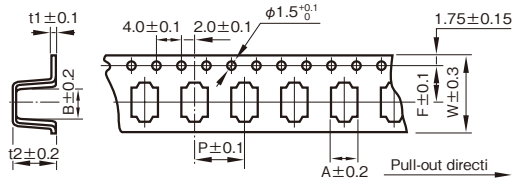
*Please ensure that the capacitor became cold enough to the room temperature (5 to 35℃) before the second reflow.

■ Taping

■ Carrier tape dimension (taping polarity R)

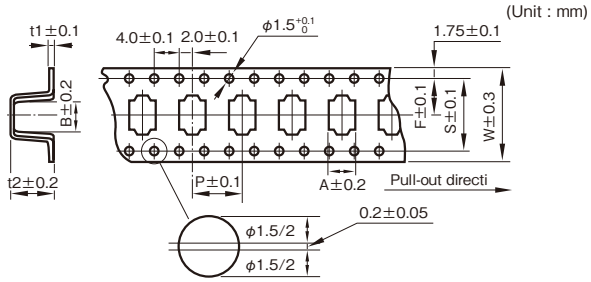
● ϕ4 to ϕ10

(Unit : mm)



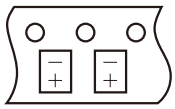
● ϕ12.5 to 18

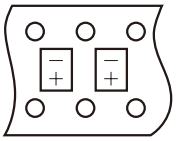
(Unit : mm)



■ Taping polarity

(The all series except bypolar type)



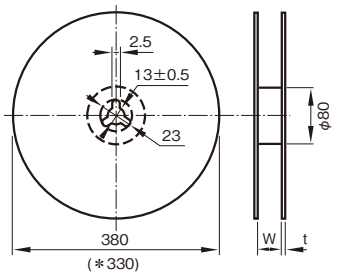


(Unit : mm)

	Outside size φD×L	W	A	B	P	t2	F	t1	S
	4×5.3	12	4.7	4.7	8.0	5.8	5.5	0.4	—
	4×5.8	12	4.7	4.7	8.0	6.2	5.5	0.4	—
	5×5.3	12	5.7	5.7	12	5.8	5.5	0.4	—
	5×5.8	12	5.7	5.7	12	6.2	5.5	0.4	—
	6.3×5.3	16	7.0	7.0	12	5.8	7.5	0.4	—
	6.3×5.8	16	7.0	7.0	12	6.2	7.5	0.4	—
	6.3×7.7	16	7.0	7.0	12	8.3	7.5	0.4	—
	8×6.5	16	8.7	8.7	12	6.8	7.5	0.4	—
	8×8.7	24	8.7	8.7	16	9.5	11.5	0.4	—
	8×10	24	8.7	8.7	16	11	11.5	0.4	—
	8×10.5	24	8.7	8.7	16	11.5	11.5	0.4	—
	10×8.7	24	10.7	10.7	16	9.5	11.5	0.4	—
	10×10	24	10.7	10.7	16	11	11.5	0.4	—
	10×10.5	24	10.7	10.7	16	11.5	11.5	0.4	—
	10×12.5	24	10.7	10.7	16	13.0	11.5	0.4	—
*	12.5×13.5	32	13.4	13.4	24	14.5	14.2	0.5	28.4
*	16×16.5	44	17	17	28	17.5	20.2	0.5	40.4
*	16×21.5	44	17	17	28	22.5	20.2	0.5	40.4
*	18×16.5	44	19	19	32	17.5	20.2	0.5	40.4
*	18×21.5	44	19	19	32	22.5	20.2	0.5	40.4

■ Reel dimension

(Unit : mm)



(Unit : mm)

	Outside size φD×L	Reel dimension W	Reel dimension t
	4	14	3
	5	14	3
	6.3	18	3
	8×6.5	18	3
	8, 10	26	3
*	12.5	34	3
*	16	46	3
*	18	46	3

■ Packing quantity (Reel)

	Outside size φD×L	Quatity (PCS.)
	4	2000
	5, 6.3	1000
	8×6.5	1000
	8×8.7 to 10.5	500
	10×8.7 to 10.5	500
	10×12.5	400
*	12.5×13.5	200
*	16×16.5	125
*	16×21.5	75
*	18×16.5	125
*	18×21.5	75

■ Reel material

The details is refer to "Product Code System" pages.

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from ELNA to ensure that the component is suitable for your use.

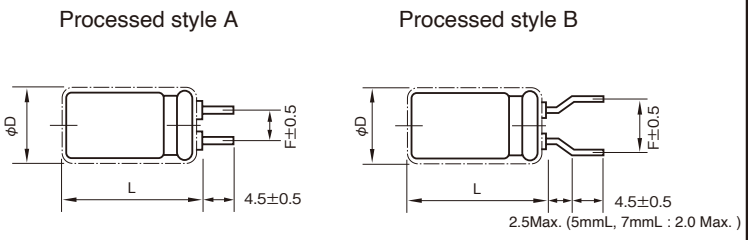
■ Lead Forming

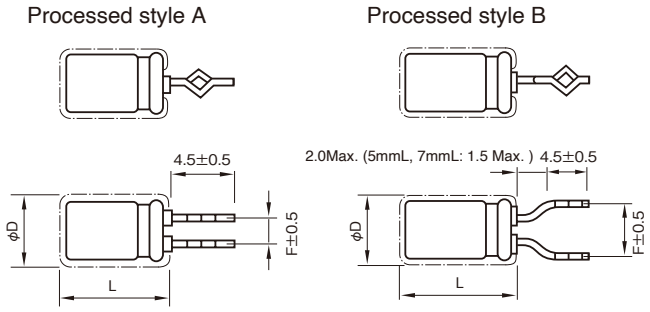
• In order to facilitate insertion into printed circuit board, lead wires are cut or formed.

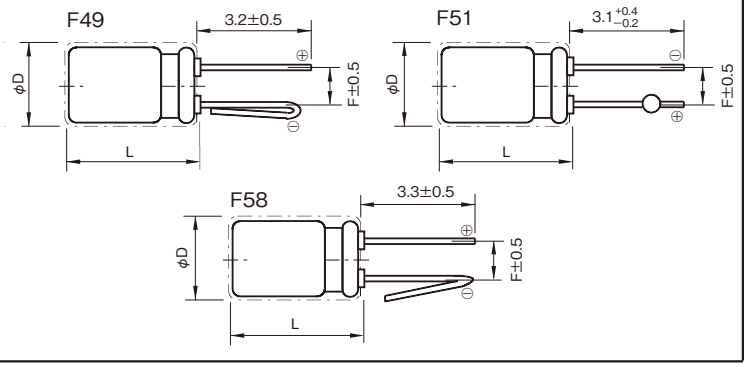
Product Size Table

Unit: mm

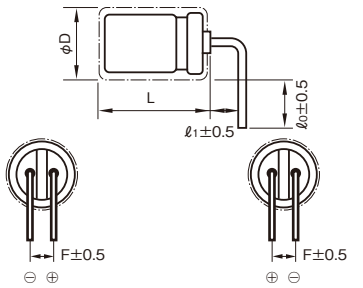
Forming name	Dimension F (Lead pitch)	Dimension φD (Case diameter)	Style	Lead forming symbol	Forming& packing code*	Outline drawing
Forming cut	2.0	4	B	F10	A22	
		5	A	F1	A04	
	2.5	4 to 5	B	F12	A26	
		6.3	A	F1	A04	
	3.5	8	B	F1	A04	
		4 to 8	A	F4	A10	
	5.0	4 to 8	B	F	A00	
		10	A	F	A00	
		12.5	A	F	A01	
	7.5	16 to 18	A	F	A01	
Snap-in	5.0	4 to 8	B	S1	202	
		10	A	S1	202	
		12.5	A	S1	203	
	7.5	16 to 18	A	S1	203	
Forming cut (restrict series)	5.0	10		F49	A0A	
		12.5		F49	A0B	
		10		F51	A0E	
		12.5		F51	A0F	
		10		F58	A0U	
	7.5	16 to 18		F49	A0B	
		16 to 18		F51	A0F	







Forming name	Dimension F (Lead pitch)	Dimension φD (Case diameter)	Dimension ℓ0	Dimension ℓ1	Lead forming symbol	Forming& packing code*
For 90° side mount of case	3.5	8	5.5	1.0	G9, G10	M16, M18
		8	3.6	1.0	G59, G60	M0S, M0U
	5.0	10	5.5	1.0	G9, G10	M16, M18
		12.5	5.5	1.0	G9, G10	M17, M19
		12.5	7.5	2.5	G55, G56	M0K, M0M
		10	3.6	1.0	G59, G60	M0S, M0U
		12.5	3.6	1.0	G59, G60	M0T, M0V
		12.5	0.96	4.9	G95, G96	M4B, M4D
		10	1.0	1.9	G99, GA0	M4J, M4L
		10	4.5	1.0	GAS, GAT	M7A, M7C
		12.5	4.5	1.0	GAS, GAT	M7B, M7C
	7.5	16 to 18	5.5	1.0	G9, G10	M17, M19
		16 to 18	4.5	1.0	GAS, GAT	M7B, M7D



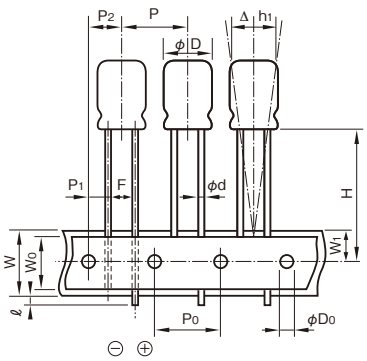
*Forming and packing code: Packing is standard packing. Please refer to "PACKING" page.
Other lead forming and optional packing code: please contact us.

NOTE : Design, Specifications are subject to change without notice.
It is recommended that you shall obtain technical specifications from ELNA to ensure that the component is suitable for your use.

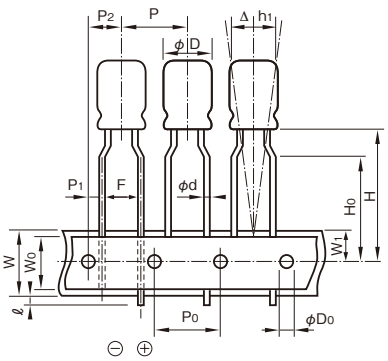
■ Taping

• For automatic insertion (radial lead type)

Processed style A



Processed style B



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

Product Size Table

Unit: mm

Item	Symbol	Tolerance	5L to 8L		
			φ4 to φ8(except φ8×7L)		φ4 to φ8
Lead forming symbol (Taping packing coed)	—	—	T36 (110)	T58 (119)	T2 (100)
Style	—	—	A or B		B
Lead-wire diameter	φd	±0.05	0.4 or 0.45		
Lead to lead distance	F	+0.8 −0.2	2.5		5.0
Height of component from tape center	H	+0.75 −0.5	18.5	17.5	
Lead-wire clinch height	H_0	±0.5	—	16.0 (φ4)	16.0
Pitch of component	P	±1.0	12.7		
Feed hole pitch	P_0	±0.3	12.7		
Hole center to lead	P_1	±0.5	5.1		3.85
Hole center to component	P_2	±1.0	6.35		
Tape width	W	±0.5	18.0		
Hold down tape width	W_0	Min.	6.0		
Feed hole position	W_1	±0.5	9.0		
Max. lead protrusion	ℓ	Max.	1.0		
Feed hole diameter	ϕD_0	±0.2	4.0		
Alignment of component to center	Δh	±1.0	0		
Alignment of component to center	Δh_1	±1.0	0		
Total tape thickness	t	±0.2	0.7		

Please contact us for lead forming and packing code in regards to the product code.

NOTE : Design, Specifications are subject to change without notice.
It is recommended that you shall obtain technical specifications
from ELNA to ensure that the component is suitable for your use.

■Taping

• For automatic insertion (radial lead type)

Product Size Table

Unit: mm

Item	Symbol	Tolerance	11L to 25L					
			φ5, φ6.3			φ8	φ10	φ12.5
Lead forming symbol (Taping packing coed)	—	—	T36 (110)	T58 (119)	T2 (100)	T2 (100)	T2 (100)	T4 (101)
Style	—	—	A or B		B		A	
Lead-wire diameter	φd	±0.05	0.5 or 0.6			0.6		
Lead to lead distance	F	+0.8 −0.2	2.5		5.0			
Height of component from tape center	H	+0.75 −0.5	18.5	17.5	18.5	20.0	18.5	
Lead-wire clinch height	H_0	±0.5	—		16.0		—	
Pitch of component	P	±1.0	12.7					15.0
Feed hole pitch	P_0	±0.3	12.7					15.0
Hole center to lead	P_1	+0.5 (10 to φ18 ±0.7)	5.1		3.85			5.0
Hole center to component	P_2	±1.0	6.35					7.5
Tape width	W	±0.5	18.0					
Hold down tape width	W_0	Min.	6.0					
Feed hole position	W_1	±0.5	9.0					
Max. lead protrusion	ℓ	Max.	1.0					
Feed hole diameter	$φD_0$	±0.2	4.0					
Alignment of component to center	Δh	±1.0	0					
Alignment of component to center	$Δh_1$	±1.0	0					
Total tape thickness	t	±0.2	0.7					

Please contact us for lead forming and packing code in regards to the product code.

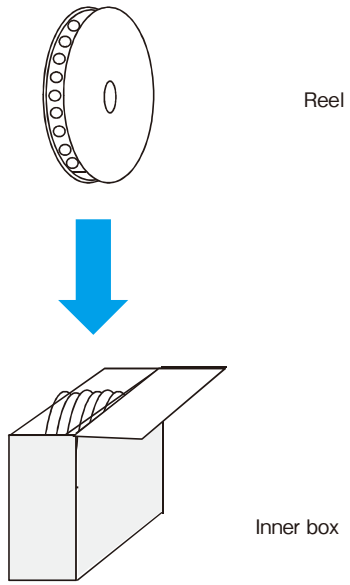
NOTE : Design, Specifications are subject to change without notice.
It is recommended that you shall obtain technical specifications
from ELNA to ensure that the component is suitable for your use.

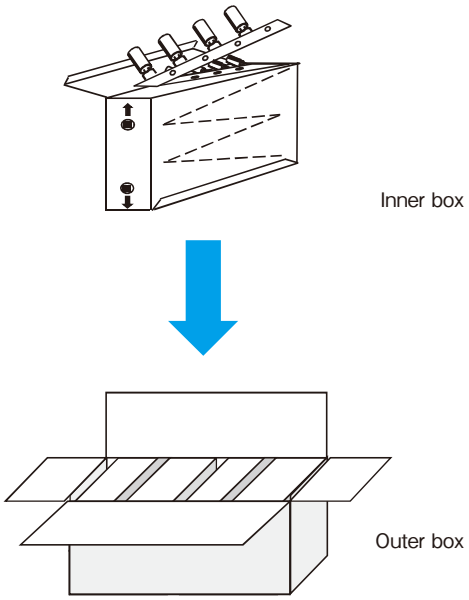
PACKING (CONDUCTIVE POLYMER HYBRID) ALUMINUM ELECTROLYTIC CAPACITORS

ELNA

■ [taping article]

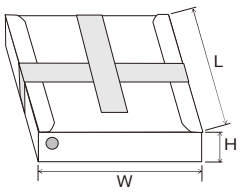
Standard packing specification of (conductive polymer hybrid) aluminum electrolytic capacitors

Classification	Chip type
Packing style	

Classification	Lead terminal type	
Packing style		Packing size and quantity

Packing size and quantity

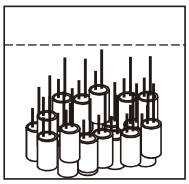
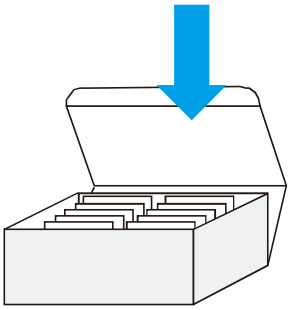
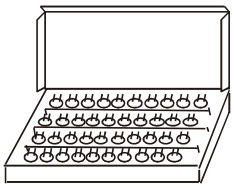
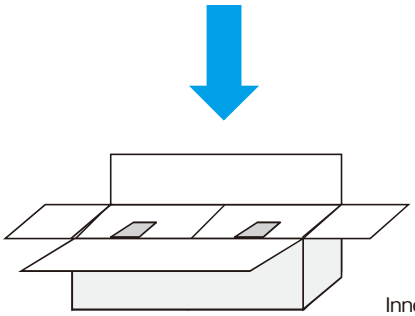
Case size	Size (mm max.)			Quantity (pcs)
	W	L	H	
φ4×5, φ4×7	210	340	55	2,000
φ5×5, φ5×7	270	340	55	2,000
φ5×11, φ5×11.5	265	340	55	2,000
φ6.3×5, φ6.3×7	300	340	55	2,000
φ6.3×11, φ6.3×11.5	300	340	60	2,000
φ8×5, φ8×7	270	340	55	1,000
φ8×11.5, φ8×12	265	340	55	1,000
φ8×15, φ8×20	255	345	65	1,000
φ10×10, φ10×12.5	215	340	55	500
φ10×16	210	340	60	500
φ10×20	210	340	65	500
φ12.5×15	290	340	65	500
φ12.5×20	290	340	65	500
φ12.5×25	290	340	70	500

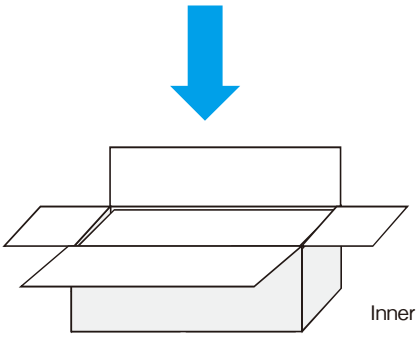


Please inquire for details.

NOTE : Design, Specifications are subject to change without notice.
It is recommended that you shall obtain technical specifications
from ELNA to ensure that the component is suitable for your use.

■ [long lead, lead forming]
Standard packing specification of aluminum electrolytic capacitors

Classification	Long lead, Lead forming of ϕ10 or less (Standard packing)	Lead forming of ϕ12.5 or more (Standard packing)
Packing style	 Plastic bag  Inner box	 Small box  Inner box

Classification	ϕ10 to ϕ18 (Optional packing)
Packing style	 Tray  Inner box

Please inquire for details.

NOTE : Design, Specifications are subject to change without notice.
It is recommended that you shall obtain technical specifications
from ELNA to ensure that the component is suitable for your use.

Conductive Polymer Hybrid Aluminum Electrolytic Capacitors

CAT.No.2023/2024E

■ Cautions for Using Conductive Polymer Hybrid Aluminum Electrolytic Capacitors

Please be sure to read this specification before using this product.
Before placing an order, please inquire about the Specification to check details.

■Cautions for Usage

1. Conductive Polymer Hybrid Aluminum Electrolytic Capacitors are polarized.

- Using a capacitor with reversed polarity causes abnormal current flow, resulting in a short circuit.
- Cannot use for the circuit to which the polarity reverses by ripple voltage.

2. Prohibited Circuits

- Since leakage current problem may arise, capacitors cannot be used in the following circuits.
  ①Coupling circuits
  ②Circuits greatly affected by leakage current

3. Use capacitors within the rated voltage.

- The application of voltages exceeding the rated voltage can significantly increase leakage current, resulting in a short failure. Please do not apply a voltage exceeding the rated voltage.

4. Be careful of excessive rush current.

- Using capacitors in the circuit where excessive rush current passes may cause characteristic deterioration or a short. When the rush current exceeds 10 A, we recommend use of protection circuits to ensure high reliability.

5. Use the allowable ripple voltage and the rated ripple current below the specified values.

- When superimposing a ripple voltage on a DC bias voltage, exercise care that the peak voltage value does not exceed the rated voltage and does not reverse the polarity.
- The rated ripple current shall be below the specified value.

6. Changes in characteristics due to operating temperature

- The characteristics of conductive polymer hybrid aluminum electrolytic capacitors vary by temperature as follows. These variations are temporary and recover when the temperature goes back (except for the case of characteristic deterioration because of high temperatures over a long time).
  Note that using capacitors over the upper category temperature increases leakage current, resulting in a short and destruction.
  Be careful of the capacitor temperature considering not only the ambient temperature where the equipment is placed and the temperature inside the equipment but also radiation heat from the heating element inside the equipment, and self-heat generation by ripple current.
  ①Capacitance expressed in the value at 20°C, 120 Hz increases with increased temperature and decreases with decreasing temperature.
  ②Tangent of loss angle (tanδ) expressed in the value at 20°C, 120 Hz is temperature-independent.
  ③Equivalent series resistance (ESR) expressed in the value at 20°C, 100 kHz is temperature independent.
  ④Leakage current increases with increased temperature and decreases with decreasing temperature.

7. Changes in characteristics due to frequency

- The characteristics of conductive polymer hybrid aluminum electrolytic capacitors, solid conductive polymer aluminum electrolytic capacitors vary by operating frequency as follows.
  ①Capacitance expressed in the value at 20°C, 120 Hz decreases with increased frequency.
  ②Tangent of loss angle (tanδ) expressed in the value at 20°C, 120 Hz increases with increased frequency.
  ③Equivalent series resistance (ESR) expressed in the value at 20°C, 100 kHz increases with decreasing frequency.

8. Operating environments

- Do not use capacitors in an environment directly exposed to water, saltwater spray, oil spill or condensation.
- Do not use capacitors in an environment filled with toxic gas such as hydrogen sulfide, sulfurous acid, nitrous acid, chlorine, ammonia, etc.
- Do not use capacitors in a place exposed to ozone, ultraviolet rays, or radiation.

9 . Fumigation Process

- Before transportation of electronic equipment to overseas, fumigation process may be subjected to wooden packing material with a halogen (compound) gas such as methyl bromide. Exercise care that this halogen gas may corrode capacitors. Also, be careful of epidemic preventive agent as corrosive component such as halogen may be contained.

10. The case of Conductive Polymer Hybrid Aluminum Electrolytic Capacitors and the cathode terminal are not insulated.

- The case and the cathode terminal are not insulated as being connected through inconstant resistance.

11. Double-sided PCB's

- When using capacitors on a double-sided PCB, exercise care that the wiring pattern does not touch the area where the capacitors are mounted. Failure to do so may cause a short to occur to the PCB depending on the mounting conditions.

12. Regarding Connection of Conductive Polymer Hybrid Aluminum Electrolytic Capacitors

- When connecting more than one capacitor in parallel, consider the current balance.

13. Use at a high altitude

- The use of capacitors at high altitudes such as on an airplane causes a large difference between the internal pressure of the capacitors and the atmospheric pressure. However, there is no problem in use under atmospheric pressure up to about an altitude of 10,000 meters.
  If the condition is severe like space, please contact us.

14. Other Notes

- Do not use capacitors on a circuit where rapid charge and discharge are repeated.
- Electrical characteristics of capacitors vary by variations in temperature and frequency. Please consider these variations when designing a circuit.

■Cautions for Mounting

1. Cautions for Mounting

- Do not reuse capacitors that have been assembled in a set and energized. Capacitors cannot be reused except for those which have been measured on electrical performance during periodic inspection.
- Before mounting, confirm the capacitor ratings (rated capacitance and rated voltage).
- Capacitors may generate transient recovery voltage. In this case, discharge through a resistor of about 1 kΩ.
- Before mounting, confirm the polarity of capacitor.
- Do not drop capacitors onto a floor nor use them.
- Do not mount deformed capacitors.
- Do not mount heating parts around capacitors and on the back of the PCB under or back of capacitors).

2. Do not apply excessive pressure to the capa-ci-tor or its terminals

- Be careful of the shock force that can be produced by absorbers, product checkers, and centering on automatic inserters and installers.

3. Soldering

- SMD type have no capability to with stand such dip or wave soldering immersing components into a solder bath.
- Reflow soldering
  Reflow the capacitors within recommended reflow soldering conditions. Verify there is no temperature stress to the capacitors because the following differences might degrade capacitors electrically and mechanically.
- Caution for reflow soldering
  1) Location of components : Temperature increases at the edge of PC board more than the center.
  2) Population of PC board : The lower the compo-nent population is, the more temperature rises.
  3) Material of PC board : A ceramic-made board needs more heat than a glass epoxy-made board. The heat increase may cause damage to the capacitors.
  4) Thickness of PC board : A thicker board needs more heat than a thinner board. The heat may damage the capacitors.
  5) Size of PC board : A larger board needs more heat than a smaller board. The heat may damage the capacitors.
  6) Solder paste thickness
  If thin solder paste is to be used compared recommend solder paste thickness, please consult with us.
  7) Location of infrared ray lamps : IR reflow as well as hot plate reflow heats only on the reverse side of the PC board to lessen heat stress to the capacitors.
  8) Case leakage current will increase (about several mA at the maximum) after the reflow process, the leakage current which rose gradually decreases when voltage is applied.
  9) Please consult us about vapor phase soldering (VPS).
- Rework of soldering
  Use a soldering iron for rework. Do not exceed an iron tip temperature of 400±5°C and an exposure time of 3^{+1}_{0} seconds.

4. Handling after Soldering

- Do not pick up or move PCB by holding a capacitor.
- Do not bump capacitors against objects. When stacking PCB's, make sure that capacitors do not touch the PCB's or other components.
- Do not subject capacitors to excessive stress.

NOTE : Design, Specifications are subject to change without notice.
It is recommended that you shall obtain technical specifications from ELNA to ensure that the component is suitable for your use.

5. Cleaning after Soldering

- Recommended cleaning method
  ①Cleaning solutions:
  (a) CLEANTHROUGH 710M, 750H, 750L
  (b) PINEALPHA ST-100S
  ②Cleaning conditions:
  (a) The temperature of cleaning solution shall be less than 60°C.
  (b) Use immersion or ultrasonic waves within two minutes.
  (c) After cleaning, capacitors and PCB's shall thoroughly be rinsed and dried with hot blast for more than 10 minutes. The temperature of such breeze should be less than the upper category temperature.
  (d) After cleaning, do not keep capacitors in cleaning solution atmosphere or airtight containers.
- During cleaning, control the cleaning solution against contamination.

6. Fixing adhesives and coating materials.

- Do not use halogenated fixatives and coatings.
- Before using a fixative or coating, remove flux residues and contaminants from between the PCB and the sealing section of capacitors.
- Dry the cleaning solution before using the adhesive or coating.
- Do not cover up all the sealing sections (terminal side) of capacitors with the adhesive or coating.
- Heat curing conditions of fixative and coating.
- Please contact us when using a capacitor molded with resin.

■Other Cautions

1. Do not directly touch the terminals of Conductive Polymer Hybrid Aluminum Electrolytic Capacitors.

Failure to do so can cause electric shock or burns. Before use, allow capacitors to discharge through a 1kΩ resistor (with a sufficient margin to the heat generation capacity) as needed.

2. Do not short-circuit between the terminals of the Conductive Polymer Hybrid Aluminum Electrolytic Capacitors. Do not subject capacitors to conductive solutions such as acid and alkaline water solutions.

3. Periodic inspection should be performed on the capacitors for the industrial equipment application.

Check the following checkpoints.

- Visual inspection to check for significant defects.
- Electrical performance: leakage current, rated capacitance, tangent of loss angle, ESR, and items specified in the catalog or the specification.

4. Be careful of the following cases of emergency.

- In case of a short during use of capacitors in sets, producing gas, turn off the main power of the set or unplug the power cord from the outlet.
- In case of a short, producing gas, it may take a few seconds to a few minutes depending on the conditions. Therefore, ensure that the protective circuit of the power supply works during this time.
- If the gas gets in your eyes, rinse them immediately. Gargle if the gas is inhaled.
- Do not lick the electrolyte of capacitors. When the electrolyte gets on your skin, wash it off with soap immediately.

5. Storage Conditions.

- Do not store at high temperature and high humidity. Store at a temperature of 5 to 35°C and a relative humidity of less than 75%, keeping free from direct sunlight.
- There may have increased leakage current when unused or stored for a long time after mounted on equipment. This phenomenon often occurs at high ambient temperatures; however, leakage current will decrease through voltage treatment. If leakage current still increases after a lapse of more than one year at ambient temperature (shorter time at high temperatures), treat with voltage as needed. In design of equipment, consider the effect of increase in initial current, and install protective circuits as needed.

Please check that recommended voltage treatment conditions are provided for each series.

- Do not store capacitors in an environment directly exposed to water, saltwater spray, oil spill or condensation.
- Do not store capacitors in an environment filled with toxic gas such as hydrogen sulfide, sulfurous acid, nitrous acid, chlorine, ammonia, etc.
- Do not store capacitors in a place exposed to ozone, ultraviolet rays, or radiation.

6. Please take the following actions when disposing of Conductive Polymer Hybrid Aluminum Electrolytic Capacitors.

- Entrust to specialists of industrial waste treatment for incineration.

7. Others

- Before using capacitors, check the details of the specification and catalog as well as the following.

Technical Report of Japan Electronics and Information Technology Industries Association
EIAJ RCR-2367
Guideline of notabilia for fixed aluminum electrolytic capacitors for use in electronic equipment

NOTE : Design, Specifications are subject to change without notice.
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■ Product Code System

H, B

The Elna product code is Max.20 digits.

Example) HV1 series 6.3V 220μF φ6.3x5.8L

New product code
RSHV1221M1JDC8002E

Old product code
HV-6V221MF61E-R2

1 2	3 4 5	6 7 8	9	10 11	12	13 14	15 16 17	18 19 20
R S	H V 1	2 2 1	M	1 J	D	C 8	0 0 2	E
Product category code	Series code	Rated capacitance code	Capacitance tolerance code	Rated voltage code	Case size code		Packing code	Additional code

1 Product group
R : Energy devices
(Electrolytic capacitor)

2 Category
S : For general
*A : For automotive (powertrain, safety)
*C : For automotive (entertainment, audio)
M : For medical
(international classification Ⅲ)
L : For medical
(international classification Ⅰ, Ⅱ)

* AEC-Q200 Qualified.

3-5 Series code
Please refer to each series page.
The following changes the series code.

old code	New code
HV	HV1
HT	HT1
HR	BR1
HRK	BRK

9 Capacitance tolerance code
Example

Tolerance (%)	Code
±10	K
±20	M
0 to +30	A
-10 to +30	Q
-10 to +50	T

10-11 Rated voltage code

voltage (V)	Code
2.5	1P
4	1A
6.3	1J
10	1L
16	1E
25	1T
35	1G
50	1U
63	4E
80	1R
100	1H

12 Diameter code
SMD type

D (mm)	Code
5	C
6.3	D
8	E
10	F
12.5	G

04 type

D (mm)	Code
10	F

13-14 Length code
SMD type

L (mm)	Code
5.7	C7
5.8	C8
7.7	E7
8.7	F7
10	H0
12.5	K5
13.5	L5

04 type

L (mm)	Code
10	10
12.5	12

6-8 Rated capacitance code
The code denoting nominal capacitance shall consist of three numerals.
The first and second numerals shall represent the significant figures of nominal capacitance in the unit of microfarad (μF), And the third numeral shall represent the number of zeros following the significant figures.

Example

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

15-17 Packing code (SMD type: Reel taping)

Old code	New code	Case size	Reel material
	Hybrid	φD (mm)	
R2	002	φ10 or less	Polystyrene
R5	005	φ12.5 or more	Polystyrene

Please contact us for special packaging.

Packing code (04 type)

Lead long	Standard packing	Old code	New code
	Taping	T2	100

18-20 Additional code
Example

Code	Contents
T	Sn 100% plated

Please contact us for details.

NOTE : Design, Specifications are subject to change without notice.
It is recommended that you shall obtain technical specifications from ELNA to ensure that the component is suitable for your use.

Return to Type List

ELNA Conductive Polymer Hybrid Aluminum Electrolytic Capacitors HV1,HT1 series

Code in front of series have been extracted from product code, which describes the segment of products, such as type and features.

☆UPGRADE

- Low ESR and high ripple current are realized.
- HT1 is resist to vibration. (30G guaranteed)
- Equivalent to conductive polymer type Aluminum Electrolytic Capacitor. (There are little characteristics change by temperature and frequency)
- Guaranteed 105℃, 10000 hours.
- Environmental : GREEN CAP™ , RoHS compliance.

Vibration resistance

HT1 ⇦ HV1

Marking color : Blue print

Specifications

Item	Performance
Category temperature range (℃)	−55 to +105
Tolerance at rated capacitance (%)	±20 (20℃, 120Hz)
Leakage current (μA) (max.)	6.3V to 80V : 0.01CV or 3 whichever is larger (after 2 minutes) 100V : 0.05CV or 15 whichever is larger (after 2 minutes), : Rated capacitance (μF) ; V : Rated voltage (V) (20℃)
Tangent of loss angle (tanδ)	

Rated voltage (V)	6.3	10	16	25	35	50	63	80	100
tanδ (max.)	0.20	0.18	0.16	0.14	0.12	0.10	0.08	0.08	0.08

(20℃, 120Hz)

Characteristics at high and low temperature

Impedance ratio (max.)	
Z−25℃/Z+20℃	1.5
Z−55℃/Z+20℃	2.0

(100kHz)

Endurance (105℃) (Applied ripple current)

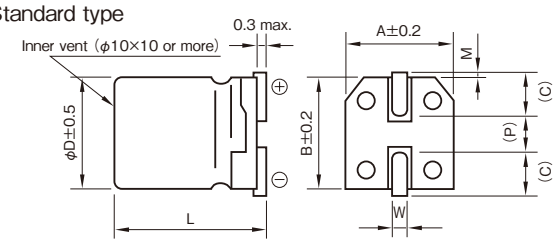
Test time	10000 hours
Leakage current	The initial specified value or less
Percentage of capacitance change	Within ±30% of initial value
Tangent of the loss angle	200% or less of the initial specified value
ESR change	200% or less of the initial specified value

Shelf life (105℃)	Test time : 1000hours ; other items are same as the endurance. Voltage application treatment : According to JIS C5101-4 4.1.

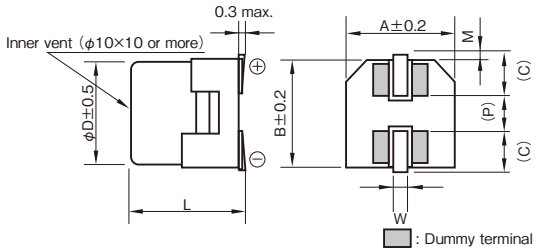
Outline Drawing

Unit : mm

Standard type



For vibration resistance type



: Dummy terminal

( ) : Reference size

φD	L	A	B	C	W	P	M	Size code
5	5.8±0.3	5.3	5.3	2.3	0.5 to 0.8	1.5	0.4±0.2	CC8
6.3	5.8±0.3	6.6	6.6	2.7	0.5 to 0.8	2.0	0.4±0.2	DC8◆
6.3	7.7±0.3	6.6	6.6	2.7	0.5 to 0.8	2.0	0.4±0.2	DE7◆
8	8.7±0.3	8.4	8.4	3.0	0.5 to 0.8	3.1	0.4±0.2	EF7
8	10±0.5	8.4	8.4	3.0	0.7 to 1.1	3.1	0.4±0.2	EH0◆
10	8.7±0.3	10.4	10.4	3.3	0.7 to 1.1	4.7	0.4±0.2	FF7
10	10±0.5	10.4	10.4	3.3	0.7 to 1.1	4.7	0.4±0.2	FH0◆
10	12.5±0.5	10.4	10.4	3.3	0.7 to 1.1	4.7	0.4±0.2	FK5◆
12.5	13.5±0.5	13.0	13.0	4.9	1.0 to 1.4	4.6	0.7±0.3	GL5◆

◆ mark size also deals with vibration resistant type.

Refer to individual page.
(Soldering conditions, Land pattern size, The taping specifications)

Coefficient of Frequency for Rated Ripple Current

Rated voltage (V) \ Frequency (Hz)	120	1k	10k	100k or more
6.3 to 100	0.10	0.30	0.60	1

Product code system (*For general product)

φ10x8.7L or less (example : 35V150μF, Standard type)

RS*	HV1	151	M	1G	EH0	002	E
Category code	Series code	capacitance code	Cap tol. code	Voltage code	Size code	Taping and packing code	Additional code

φ10x10L, φ10x12.5L (example : 35V270μF, Standard type)

RS*	HV1	271	M	1G	FH0	002	EX
Category code	Series code	capacitance code	Cap tol. code	Voltage code	Size code	Taping and packing code	Additional code

φ12.5 (example : 35V560μF, Standard type)

RS*	HV1	561	M	1G	GL5	005	E
Category code	Series code	capacitance code	Cap tol. code	Voltage code	Size code	Taping and packing code	Additional code

・For vibration resistance type should change Series code "HV1" into "HT1".
・For details, refer to the various "Product Code System" pages.

NOTE : Design, Specifications are subject to change without notice.
It is recommended that you shall obtain technical specifications from ELNA to ensure that the component is suitable for your use.

ELNA Conductive Polymer Hybrid Aluminum Electrolytic Capacitors HV1,HT1 series

Code in front of series have been extracted from product code, which describes the segment of products, such as type and features.

Standard ratings (◆Marked: It supports vibration resistance type)

Rated voltage (V) / Item / Rated capacitance (μF)	6.3 (1J)			10 (1L)			16 (1E)			25 (1T)		
	Case φD×L(mm)	ESR (mΩ max.)	Rated ripple current (mArms)	Case φD×L(mm)	ESR (mΩ max.)	Rated ripple current (mArms)	Case φD×L(mm)	ESR (mΩ max.)	Rated ripple current (mArms)	Case φD×L(mm)	ESR (mΩ max.)	Rated ripple current (mArms)
33	—	—	—	—	—	—	—	—	—	5×5.8	80	900
47	—	—	—	—	—	—	5×5.8	80	900	—	—	—
56	—	—	—	—	—	—	—	—	—	◆ 6.3×5.8	50	1300
82	—	—	—	—	—	—	◆ 6.3×5.8	45	1600	—	—	—
100	—	—	—	◆ 6.3×5.8	45	1600	—	—	—	◆ 6.3×7.7	30	2000
150	—	—	—	—	—	—	◆ 6.3×7.7	27	2200	8×8.7	27	2100
220	◆ 6.3×5.8	45	1600	◆ 6.3×7.7	24	2300	—	—	—	◆ 8×10	27	2300
270	—	—	—	—	—	—	◆ 8×10	22	2500	10×8.7	25	2400
330	◆ 6.3×7.7	24	2300	◆ 8×10	22	2500	—	—	—	◆ 10×10	20	2500
470	—	—	—	◆ 10×10	18	2600	◆ 10×10	18	2600	—	—	—
560	◆ 8×10	22	2500	—	—	—	—	—	—	◆ 10×12.5	18	3500
820	◆ 10×10	18	2600	—	—	—	—	—	—	◆12.5×13.5	15	4500

Rated voltage (V) / Item / Rated capacitance (μF)	35 (1G)			50 (1U)			63 (4E)			80 (1R)		
	Case φD×L(mm)	ESR (mΩ max.)	Rated ripple current (mArms)	Case φD×L(mm)	ESR (mΩ max.)	Rated ripple current (mArms)	Case φD×L(mm)	ESR (mΩ max.)	Rated ripple current (mArms)	Case φD×L(mm)	ESR (mΩ max.)	Rated ripple current (mArms)
10	—	—	—	5×5.8	120	750	◆ 6.3×5.8	120	1000	—	—	—
22	5×5.8	100	900	◆ 6.3×5.8	80	1100	◆ 6.3×7.7	80	1500	◆ 8×10	45	1550
27	—	—	—	—	—	—	8×8.7	50	1600	—	—	—
33	—	—	—	◆ 6.3×7.7	40	1600	◆ 8×10	40	1600	◆ 10×10	36	1700
47	◆ 6.3×5.8	60	1300	8×8.7	35	1700	10×8.7	35	1700	—	—	—
56	—	—	—	—	—	—	◆ 10×10	30	1800	—	—	—
68	◆ 6.3×7.7	35	2000	◆ 8×10	30	1800	—	—	—	—	—	—
82	—	—	—	10×8.7	28	1900	—	—	—	—	—	—
100	8×8.7	30	2100	◆ 10×10	28	2000	◆ 10×12.5	26	2500	—	—	—
120	—	—	—	—	—	—	◆12.5×13.5	22	3500	—	—	—
150	◆ 8×10	27	2300	◆ 10×12.5	24	3000	—	—	—	—	—	—
220	10×8.7	25	2400	—	—	—	—	—	—	—	—	—
270	◆ 10×10	20	2500	—	—	—	—	—	—	—	—	—
330	—	—	—	◆12.5×13.5	20	4000	—	—	—	—	—	—
390	◆ 10×12.5	18	3500	—	—	—	—	—	—	—	—	—
560	◆12.5×13.5	15	4500	—	—	—	—	—	—	—	—	—

Rated voltage (V) / Item / Rated capacitance (μF)	100 (1H)		
	Case φD×L(mm)	ESR (mΩ max.)	Rated ripple current (mArms)
15	◆ 10×10	45	1600

(Note) Rated ripple current : 105℃, 100kHz ; ESR : 20℃, 100kHz

NOTE : Design, Specifications are subject to change without notice.
It is recommended that you shall obtain technical specifications
from ELNA to ensure that the component is suitable for your use.

Return to Type List

ELNA Conductive Polymer Hybrid Aluminum Electrolytic Capacitors HVK,HTK series

Code in front of series have been extracted from product code, which describes the segment of products, such as type and features.

☆UPGRADE

- Low ESR and high ripple current are realized.
- HTK is resist to vibration. (30G guaranteed)
- Equivalent to conductive polymer type Aluminum Electrolytic Capacitor. (There are little characteristics change by temperature and frequency)
- Environmental : GREEN CAP™ , RoHS compliance.

Marking color : Blue print

Guaranteed 4000h

Vibration resistance High temperature

HTK ⇦ HVK ⇦ HV1

Guaranteed 6000h

Long life

HVK-B HTK-B ⇦ HVK HTK

Specifications

Item	Performance
Category temperature range (℃)	−55 to +125
Tolerance at rated capacitance (%)	±20 (20℃, 120Hz)
Leakage current (μA) (max.)	6.3V to 80V : 0.01CV or 3 whichever is larger (after 2 minutes) 100V : 0.05CV or 15 whichever is larger (after 2 minutes), : Rated capacitance (μF) ; V : Rated voltage (V) (20℃)
Tangent of loss angle (tanδ)	(20℃, 120Hz)
Characteristics at high and low temperature	(100kHz)
Endurance (125℃) (Applied ripple current)	
Shelf life (125℃)	Test time : 1000hours ; other items are same as the endurance. Voltage application treatment : According to JIS C5101-4 4.1.

Tangent of loss angle (tanδ):

Rated voltage (V)	6.3	10	16	25	35	50	63	80	100
tanδ (max.)	0.20	0.18	0.16	0.14	0.12	0.10	0.08	0.08	0.08

Characteristics at high and low temperature:

Impedance ratio (max.)	
Z−25℃/Z+20℃	1.5
Z−55℃/Z+20℃	2.0

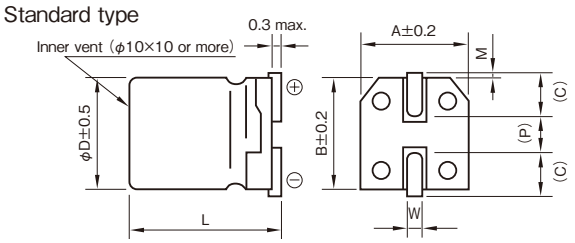
Endurance (125℃) (Applied ripple current):

Test time	4000 hours	6000 hours (25V～63V : φ6.3 or more)
Leakage current	The initial specified value or less	The initial specified value or less
Percentage of capacitance change	Within ±30% of initial value	Within ±30% of initial value
Tangent of the loss angle	200% or less of the initial specified value	200% or less of the initial specified value
ESR change	200% or less of the initial specified value	200% or less of the initial specified value

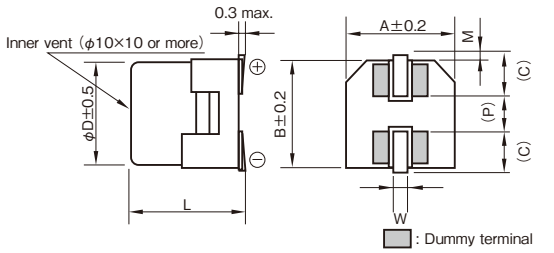
Outline Drawing

Unit : mm

Standard type



For vibration resistance type



( ) : Reference size

φD	L	A	B	C	W	P	M	Size code
5	5.8±0.3	5.3	5.3	2.3	0.5 to 0.8	1.5	0.4±0.2	CC8
6.3	5.8±0.3	6.6	6.6	2.7	0.5 to 0.8	2.0	0.4±0.2	DC8◆
6.3	7.7±0.3	6.6	6.6	2.7	0.5 to 0.8	2.0	0.4±0.2	DE7◆
8	8.7±0.3	8.4	8.4	3.0	0.5 to 0.8	3.1	0.4±0.2	EF7
8	10±0.5	8.4	8.4	3.0	0.7 to 1.1	3.1	0.4±0.2	EH0◆
10	8.7±0.3	10.4	10.4	3.3	0.7 to 1.1	4.7	0.4±0.2	FF7
10	10±0.5	10.4	10.4	3.3	0.7 to 1.1	4.7	0.4±0.2	FH0◆
10	12.5±0.5	10.4	10.4	3.3	0.7 to 1.1	4.7	0.4±0.2	FK5◆
12.5	13.5±0.5	13.0	13.0	4.9	1.0 to 1.4	4.6	0.7±0.3	GL5◆

◆ mark size also deals with vibration resistant type.

Refer to individual page.
(Soldering conditions, Land pattern size, The taping specifications)

Coefficient of Frequency for Rated Ripple Current

Rated voltage (V) \ Frequency (Hz)	120	1k	10k	100k or more
6.3 to 100	0.10	0.30	0.60	1

Product code system (*For general product)

φ10x8.7L or less (example : 35V150μF, Standard type)

RS*	HVK	151	M	1G	EH0	002	E
Category code	Series code	capacitance code	Cap tol. code	Voltage code	Size code	Taping and packing code	Additional code

φ10x10L, φ10x12.5L (example : 35V270μF, Standard type)

RS*	HVK	271	M	1G	FH0	002	EX
Category code	Series code	capacitance code	Cap tol. code	Voltage code	Size code	Taping and packing code	Additional code

φ12.5 (example : 35V560μF, Standard type)

RS*	HVK	561	M	1G	GL5	005	E
Category code	Series code	capacitance code	Cap tol. code	Voltage code	Size code	Taping and packing code	Additional code

- For vibration resistance type should change Series code "HVK" into "HTK".
- 6000 hours guaranteed product should change additional code "E" into "B".
- For details, refer to the various "Product Code System" pages.

NOTE : Design, Specifications are subject to change without notice.
It is recommended that you shall obtain technical specifications from ELNA to ensure that the component is suitable for your use.

ELNA Conductive Polymer Hybrid Aluminum Electrolytic Capacitors HVK,HTK series

Code in front of series have been extracted from product code, which describes the segment of products, such as type and features.

Standard ratings (◆Marked: It supports vibration resistance type / ●Marked: It also supports 6000 hours guaranteed)

Rated voltage (V) / Item / Rated capacitance (μF)	6.3 (1J)			10 (1L)			16 (1E)			25 (1T)		
	Case φD×L(mm)	ESR (mΩ max.)	Rated ripple current (mArms)	Case φD×L(mm)	ESR (mΩ max.)	Rated ripple current (mArms)	Case φD×L(mm)	ESR (mΩ max.)	Rated ripple current (mArms)	Case φD×L(mm)	ESR (mΩ max.)	Rated ripple current (mArms)
33	—	—	—	—	—	—	—	—	—	5×5.8	80	550
47	—	—	—	—	—	—	5×5.8	70	600	—	—	—
56	—	—	—	—	—	—	—	—	—	◆● 6.3×5.8	50	900
82	—	—	—	—	—	—	◆ 6.3×5.8	45	950	—	—	—
100	—	—	—	◆ 6.3×5.8	45	950	—	—	—	◆● 6.3×7.7	30	1400
150	—	—	—	—	—	—	◆ 6.3×7.7	27	1450	● 8×8.7	27	1500
220	◆ 6.3×5.8	45	950	◆ 6.3×7.7	24	1450	—	—	—	◆● 8×10	27	1600
270	—	—	—	—	—	—	◆ 8×10	22	1700	● 10×8.7	25	1700
330	◆ 6.3×7.7	24	1450	◆ 8×10	22	1700	—	—	—	◆● 10×10	20	2000
470	—	—	—	◆ 10×10	18	2100	◆ 10×10	18	2100	—	—	—
560	◆ 8×10	22	1700	—	—	—	—	—	—	◆● 10×12.5	18	3000
820	◆ 10×10	18	2100	—	—	—	—	—	—	◆● 12.5×13.5	15	4000

Rated voltage (V) / Item / Rated capacitance (μF)	35 (1G)			50 (1U)			63 (4E)			80 (1R)		
	Case φD×L(mm)	ESR (mΩ max.)	Rated ripple current (mArms)	Case φD×L(mm)	ESR (mΩ max.)	Rated ripple current (mArms)	Case φD×L(mm)	ESR (mΩ max.)	Rated ripple current (mArms)	Case φD×L(mm)	ESR (mΩ max.)	Rated ripple current (mArms)
10	—	—	—	5×5.8	120	500	◆● 6.3×5.8	120	700	—	—	—
22	5×5.8	100	550	◆● 6.3×5.8	80	750	◆● 6.3×7.7	80	900	◆ 8×10	45	1100
27	—	—	—	—	—	—	● 8×8.7	50	1000	—	—	—
33	—	—	—	◆● 6.3×7.7	40	1100	◆● 8×10	40	1100	◆ 10×10	36	1200
47	◆● 6.3×5.8	60	900	● 8×8.7	35	1200	● 10×8.7	35	1200	—	—	—
56	—	—	—	—	—	—	◆● 10×10	30	1400	—	—	—
68	◆● 6.3×7.7	35	1400	◆● 8×10	30	1250	—	—	—	—	—	—
82	—	—	—	● 10×8.7	28	1400	—	—	—	—	—	—
100	● 8×8.7	30	1500	◆● 10×10	28	1600	◆● 10×12.5	26	2000	—	—	—
120	—	—	—	—	—	—	◆● 12.5×13.5	22	3000	—	—	—
150	◆● 8×10	27	1600	◆● 10×12.5	24	2500	—	—	—	—	—	—
220	● 10×8.7	25	1700	—	—	—	—	—	—	—	—	—
270	◆● 10×10	20	2000	—	—	—	—	—	—	—	—	—
330	—	—	—	◆● 12.5×13.5	20	3500	—	—	—	—	—	—
390	◆● 10×12.5	18	3000	—	—	—	—	—	—	—	—	—
560	◆● 12.5×13.5	15	4000	—	—	—	—	—	—	—	—	—

Rated voltage (V) / Item / Rated capacitance (μF)	100 (1H)		
	Case φD×L(mm)	ESR (mΩ max.)	Rated ripple current (mArms)
15	◆ 10×10	45	1000

(Note) Rated ripple current : 125℃ , 100kHz ; ESR : 20℃ , 100kHz

NOTE : Design, Specifications are subject to change without notice.
It is recommended that you shall obtain technical specifications
from ELNA to ensure that the component is suitable for your use.

Return to Type List

ELNA Conductive Polymer Hybrid Aluminum Electrolytic Capacitors HVL,HTL series

Code in front of series have been extracted from product code, which describes the segment of products, such as type and features.

★NEW

- Low ESR and high ripple current are realized.
- HTL is resist to vibration. (30G guaranteed)
- Equivalent to conductive polymer type Aluminum Electrolytic Capacitor.
  (There are little characteristics change by temperature and frequency)
- Guaranteed 125° C, 8000 hours.
- Environmental : GREEN CAP™ , RoHS compliance.

Vibration resistance ⇦ Long life time

HTL ⇦ HVL ⇦ HVK

Marking color : Blue print

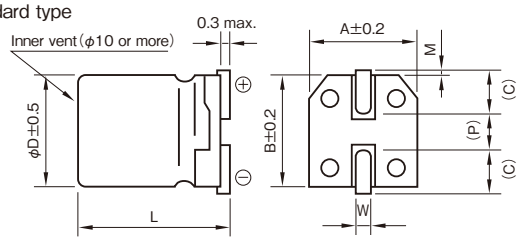
Specifications

Item	Performance
Category temperature range (℃)	−55 to +125
Tolerance at rated capacitance (%)	±20 (20℃, 120Hz)
Leakage current (μA) (max.)	0.01CV or 3 whichever is larger (after 2 minutes) C : Rated capacitance (μF) ; V : Rated voltage (V) (20℃)
Tangent of loss angle (tanδ)	Rated voltage (V): 25 / 35 / 50 / 63 tanδ (max.): 0.14 / 0.12 / 0.10 / 0.08 (20℃, 120Hz)
Characteristics at high and low temperature	Impedance ratio (max.) Z−25℃/Z+20℃: 1.5 Z−55℃/Z+20℃: 2.0 (100kHz)
Endurance (125℃) (Applied ripple current)	Test time: 8000 hours Leakage current: The initial specified value or less Percentage of capacitance change: Within ±30% of initial value Tangent of the loss angle: 200% or less of the initial specified value ESR change: 200% or less of the initial specified value
Shelf life (125℃)	Test time : 1000hours ; other items are same as the endurance. Voltage application treatment : According to JIS C5101-4 4.1.

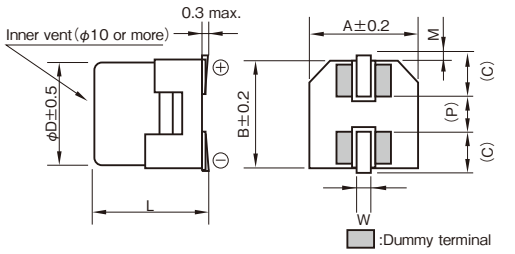
Outline Drawing

Unit : mm

Standard type



For vibration resistance type



( ) : Reference size

φD	L	A	B	C	W	P	M	Size code
8	10±0.5	8.4	8.4	3.0	0.7 to 1.1	3.1	0.4±0.2	EH0
10	10±0.5	10.4	10.4	3.3	0.7 to 1.1	4.7	0.4±0.2	FH0
10	12.5±0.5	10.4	10.4	3.3	0.7 to 1.1	4.7	0.4±0.2	FK5
12.5	13.5±0.5	13.0	13.0	4.9	1.0 to 1.4	4.6	0.7±0.3	GL5

Refer to individual page.
(Soldering conditions, Land pattern size, The taping specifications)

Coefficient of Frequency for Rated Ripple Current

Rated voltage (V) \ Frequency (Hz)	50・60	120	1k	100k or more
6.3 to 100	0.50	0.50	0.75	1

Product code system (*For general product)

φ8, φ10 (example : 25V220μF, Standard type)

RS*	HVL	221	M	1T	EH0	002	⬚
Category code	Series code	capacitance code	Cap tol. code	Voltage code	Size code	Taping and packing code	Additional code

φ12.5 (example : 25V820μF, Standard type)

RS*	HVL	821	M	1T	GL5	005	⬚
Category code	Series code	capacitance code	Cap tol. code	Voltage code	Size code	Taping and packing code	Additional code

・For vibration resistance type should change Series code "HVL" into "HTL".
・For details, refer to the various "Product Code System" pages.

NOTE : Design, Specifications are subject to change without notice.
It is recommended that you shall obtain technical specifications
from ELNA to ensure that the component is suitable for your use.

Code in front of series have been extracted from product code, which describes the segment of products, such as type and features.

Standard Ratings

Rated voltage (V) / Item / Rated capacitance (μF)	25 (1T)			35 (1G)			50 (1U)			63 (4E))		
	Case φD×L (mm)	ESR (mΩ max.)	Rated ripple current (mArms)	Case φD×L (mm)	ESR (mΩ max.)	Rated ripple current (mArms)	Case φD×L (mm)	ESR (mΩ max.)	Rated ripple current (mArms)	Case φD×L (mm)	ESR (mΩ max.)	Rated ripple current (mArms)
33	—	—	—	—	—	—	—	—	—	8×10	40	1100
56	—	—	—	—	—	—	—	—	—	10×10	30	1400
68	—	—	—	—	—	—	8×10	30	1250	—	—	—
100	—	—	—	—	—	—	10×10	28	1600	10×12.5	26	2000
120	—	—	—	—	—	—	—	—	—	12.5×13.5	22	2500
150	—	—	—	8×10	22	1600	10×12.5	24	2500	—	—	—
220	8×10	22	1600	—	—	—	—	—	—	—	—	—
270	—	—	—	10×10	20	2000	—	—	—	—	—	—
330	10×10	20	2000	—	—	—	12.5×13.5	20	3000	—	—	—
390	—	—	—	10×12.5	18	3000	—	—	—	—	—	—
560	10×12.5	18	3000	12.5×13.5	15	3500	—	—	—	—	—	—
820	12.5×13.5	15	3500	—	—	—	—	—	—	—	—	—
1000	12.5×13.5	15	3500	—	—	—	—	—	—	—	—	—

(Note) Rated ripple current : 125℃ , 100kHz ; ESR : 20℃ , 100kHz

NOTE : Design, Specifications are subject to change without notice.
It is recommended that you shall obtain technical specifications
from ELNA to ensure that the component is suitable for your use.

Return to Type List

ELNA Conductive Polymer Hybrid Aluminum Electrolytic Capacitors HVX,HTX series

Code in front of series have been extracted from product code, which describes the segment of products, such as type and features.

- Low ESR and high ripple current are realized.
- HTX is resist to vibration. (30G guaranteed)
- Equivalent to conductive polymer type Aluminum Electrolytic Capacitor.
  (There are little characteristics change by temperature and frequency)
- Guaranteed 135℃, 4000 hours.(φ6.3: 2000 hours)
- Environmental : GREEN CAP™ , RoHS compliance.

Vibration resistance High temperature

HTX ⇦ HVX ⇦ HVK

Marking color : Blue print

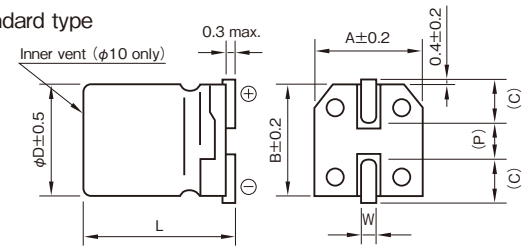
Specifications

Item	Performance
Category temperature range (℃)	−55 to +135
Tolerance at rated capacitance (%)	±20 (20℃, 120Hz)
Leakage current (μA) (max.)	0.01CV or 3 whichever is larger (after 2 minutes) C : Rated capacitance (μF) , V : Rated voltage (V) (20℃)
Tangent of loss angle (tanδ)	Rated voltage (V): 16, 25, 35, 50, 63 tanδ (max.): 0.16, 0.14, 0.12, 0.10, 0.08 (20℃, 120Hz)
Characteristics at high and low temperature	Impedance ratio (max.) Z−25℃/Z+20℃: 1.5 Z−55℃/Z+20℃: 2.0 (100kHz)
Endurance (135℃) (Applied ripple current)	Test time: 4000 hours(φ6.3: 2000 hours) Leakage current: The initial specified value or less Percentage of capacitance change: Within ±30% of initial value Tangent of the loss angle: 200% or less of the initial specified value ESR change: 200% or less of the initial specified value
Shelf life (135℃)	Test time : 1000hours ; other items are same as the endurance. Voltage application treatment : According to JIS C5101-4 4.1.

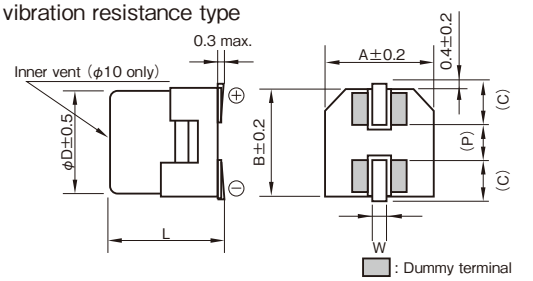
Outline Drawing

Unit : mm

Standard type



For vibration resistance type



( ) : Reference size

φD	L	A	B	C	W	P	Size code
6.3	5.8±0.3	6.6	6.6	2.7	0.5 to 0.8	2.0	DC8
6.3	7.7±0.3	6.6	6.6	2.7	0.5 to 0.8	2.0	DE7
8	10±0.5	8.4	8.4	3.0	0.7 to 1.1	3.1	EH0
10	10±0.5	10.4	10.4	3.3	0.7 to 1.1	4.7	FH0
10	12.5±0.5	10.4	10.4	3.3	0.7 to 1.1	4.7	FK5

Refer to individual page.
(Soldering conditions, Land pattern size, The taping specifications)

Coefficient of Frequency for Rated Ripple Current

Rated voltage (V) \ Frequency (Hz)	120	1k	10k	100k or more
16 to 63	0.10	0.30	0.60	1

Product code system (*For general product)

φ6.3, φ8 (example : 16V270μF, Standard type)

RS*	HVX	271	M	1E	EH0	002	☐
Category code	Series code	capacitance code	Cap tol. code	Voltage code	Size code	Taping and packing code	Additional code

φ10 (example : 16V470μF, Standard type)

RS*	HVX	471	M	1E	FH0	002	X
Category code	Series code	capacitance code	Cap tol. code	Voltage code	Size code	Taping and packing code	Additional code

・For vibration resistance type should change Series code "HVX" into "HTX".
・For details, refer to the various "Product Code System" pages.

NOTE : Design, Specifications are subject to change without notice.
It is recommended that you shall obtain technical specifications
from ELNA to ensure that the component is suitable for your use.

Code in front of series have been extracted from product code, which describes the segment of products, such as type and features.

Standard Ratings (●Marked: 2000 hours guaranteed)

Rated voltage (V) / Item / Rated capacitance (μF)	16 (1E)			25 (1T)			35 (1G)			50 (1U)		
	Case φD×L (mm)	ESR (mΩ max.)	Rated ripple current (mArms)	Case φD×L (mm)	ESR (mΩ max.)	Rated ripple current (mArms)	Case φD×L (mm)	ESR (mΩ max.)	Rated ripple current (mArms)	Case φD×L (mm)	ESR (mΩ max.)	Rated ripple current (mArms)
22	—	—	—	—	—	—	—	—	—	● 6.3×5.8	80	750
33	—	—	—	—	—	—	—	—	—	● 6.3×7.7	40	1100
47	—	—	—	—	—	—	● 6.3×5.8	60	900	—	—	—
56	—	—	—	● 6.3×5.8	50	900	—	—	—	—	—	—
68	—	—	—	—	—	—	● 6.3×7.7	35	1400	8×10	30	1250
82	● 6.3×5.8	45	950	—	—	—	—	—	—	—	—	—
100	—	—	—	● 6.3×7.7	30	1400	—	—	—	10×10	28	1600
150	● 6.3×7.7	27	1450	—	—	—	8×10	22	1600	10×12.5	24	2500
220	—	—	—	8×10	22	1600	—	—	—	—	—	—
270	8×10	20	1700	—	—	—	10×10	20	2000	—	—	—
330	—	—	—	10×10	20	2000	—	—	—	—	—	—
390	—	—	—	—	—	—	10×12.5	18	3000	—	—	—
470	10×10	18	2100	—	—	—	—	—	—	—	—	—
560	—	—	—	10×12.5	18	3000	—	—	—	—	—	—

Rated voltage (V) / Item / Rated capacitance (μF)	63 (4E)		
	Case φD×L (mm)	ESR (mΩ max.)	Rated ripple current (mArms)
10	● 6.3×5.8	120	700
22	● 6.3×7.7	80	900
33	8×10	40	1100
56	10×10	30	1400
100	10×12.5	26	2000

(Note) Rated ripple current : 135℃ , 100kHz ; ESR : 20℃ , 100kHz

NOTE : Design, Specifications are subject to change without notice.
It is recommended that you shall obtain technical specifications
from ELNA to ensure that the component is suitable for your use.

Return to Type List

ELNA Conductive Polymer Hybrid Aluminum Electrolytic Capacitors HVQ,HTQ series

Code in front of series have been extracted from product code, which describes the segment of products, such as type and features.

- Low ESR and high ripple current are realized.
- HTQ is resist to vibration. (30G guaranteed)
- Equivalent to conductive polymer type Aluminum Electrolytic Capacitor.
  (There are little characteristics change by temperature and frequency)
- Guaranteed 150° C, 1000 hours.
- Environmental : GREEN CAP™ , RoHS compliance.

Marking color : Blue print

Vibration resistance High temperature

HTQ ⇦ HVQ ⇦ HVX

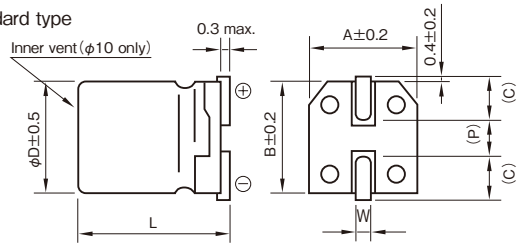
Specifications

Item	Performance
Category temperature range (℃)	−55 to +150
Tolerance at rated capacitance (%)	±20 (20℃, 120Hz)
Leakage current (μA) (max.)	0.01CV or 3 whichever is larger (after 2 minutes) C : Rated capacitance (μF) ; V : Rated voltage (V) (20℃)
Tangent of loss angle (tanδ)	Rated voltage (V): 16, 25, 35, 50, 63 tanδ (max.): 0.16, 0.14, 0.12, 0.10, 0.08 (20℃, 120Hz)
Characteristics at high and low temperature	Impedance ratio (max.) Z−25℃/Z+20℃: 1.5 Z−55℃/Z+20℃: 2.0 (100kHz)
Endurance (150℃) (Applied ripple current)	Test time: 1000 hours Leakage current: The initial specified value or less Percentage of capacitance change: Within ±30% of initial value Tangent of the loss angle: 200% or less of the initial specified value ESR change: 200% or less of the initial specified value
Shelf life (150℃)	Test time : 1000hours ; other items are same as the endurance. Voltage application treatment : According to JIS C5101-4 4.1.

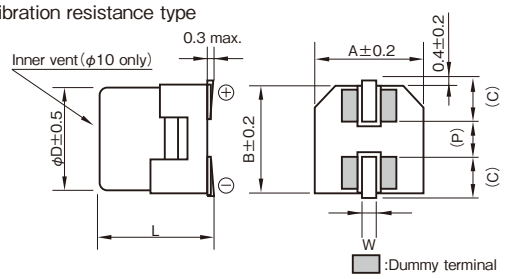
Outline Drawing

Unit : mm

Standard type



For vibration resistance type



( ) : Reference size

φD	L	A	B	C	W	P	Size code
8	10±0.5	8.4	8.4	3.0	0.7 to 1.1	3.1	EH0
10	10±0.5	10.4	10.4	3.3	0.7 to 1.1	4.7	FH0

Refer to individual page.
(Soldering conditions, Land pattern size, The taping specifications)

Coefficient of Frequency for Rated Ripple Current

Rated voltage (V) \ Frequency (Hz)	120	1k	10k	100k or more
16 to 63	0.10	0.30	0.60	1

Product code system (*For general product)

φ8 (example : 16V270μF, Standard type)

RS*	HVQ	271	M	1E	EH0	002	⬚
Category code	Series code	capacitance code	Cap tol. code	Voltage code	Size code	Taping and packing code	Additional code

φ10 (example : 16V470μF, Standard type)

RS*	HVQ	471	M	1E	FH0	002	X
Category code	Series code	capacitance code	Cap tol. code	Voltage code	Size code	Taping and packing code	Additional code

・For vibration resistance type should change Series code "HVQ" into "HTQ".
・For details, refer to the various "Product Code System" pages.

NOTE : Design, Specifications are subject to change without notice.
It is recommended that you shall obtain technical specifications
from ELNA to ensure that the component is suitable for your use.

Code in front of series have been extracted from product code, which describes the segment of products, such as type and features.

Standard Ratings

Rated voltage (V) / Item / Rated capacitance (μF)	16 (1L)			25 (1T)			35 (1G)			50 (1U)		
	Case φD×L (mm)	ESR (mΩ max.)	Rated ripple current (mArms)	Case φD×L (mm)	ESR (mΩ max.)	Rated ripple current (mArms)	Case φD×L (mm)	ESR (mΩ max.)	Rated ripple current (mArms)	Case φD×L (mm)	ESR (mΩ max.)	Rated ripple current (mArms)
68	—	—	—	—	—	—	—	—	—	8×10	30	660
100	—	—	—	—	—	—	—	—	—	10×10	28	800
150	—	—	—	—	—	—	8×10	22	710	—	—	—
220	—	—	—	8×10	22	740	—	—	—	—	—	—
270	8×10	20	740	—	—	—	10×10	20	830	—	—	—
330	—	—	—	10×10	20	850	—	—	—	—	—	—
470	10×10	18	850	—	—	—	—	—	—	—	—	—

Rated voltage (V) / Item / Rated capacitance (μF)	63 (4E)		
	Case φD×L (mm)	ESR (mΩ max.)	Rated ripple current (mArms)
33	8×10	30	610
56	10×10	28	710

(Note) Rated ripple current : 150℃ , 100kHz ; ESR : 20℃ , 100kHz

NOTE : Design, Specifications are subject to change without notice.
It is recommended that you shall obtain technical specifications
from ELNA to ensure that the component is suitable for your use.

Return to Type List

ELNA Conductive Polymer Hybrid Aluminum Electrolytic Capacitors HVY,HTY series

Code in front of series have been extracted from product code, which describes the segment of products, such as type and features.

★NEW

- 150° C, High temperature and long life are realized.
- HTY is resist to vibration. (30G guaranteed)
- Equivalent to conductive polymer type Aluminum Electrolytic Capacitor. (There are little characteristics change by temperature and frequency)
- Guaranteed 150° C, 2000 hours.
- Environmental : GREEN CAP™ , RoHS compliance.

Vibration resistance ⇦ Long life

HTY ⇦ HVY ⇦ HVQ

Marking color : Blue print

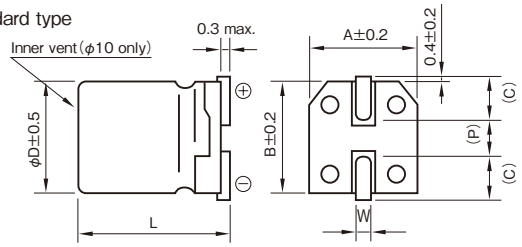
Specifications

Item	Performance
Category temperature range (℃)	−55 to +150
Tolerance at rated capacitance (%)	±20 (20℃, 120Hz)
Leakage current (μA) (max.)	0.01CV or 3 whichever is larger (after 2 minutes) C : Rated capacitance (μF) ; V : Rated voltage (V) (20℃)
Tangent of loss angle (tanδ)	Rated voltage (V): 16, 25, 35, 50, 63 tanδ (max.): 0.16, 0.14, 0.12, 0.10, 0.08 (20℃, 120Hz)
Characteristics at high and low temperature	Impedance ratio (max.) Z−25℃/Z+20℃: 1.5 Z−55℃/Z+20℃: 2.0 (100kHz)
Endurance (150℃) (Applied ripple current)	Test time: 2000 hours Leakage current: The initial specified value or less Percentage of capacitance change: Within ±30% of initial value Tangent of the loss angle: 200% or less of the initial specified value ESR change: 200% or less of the initial specified value
Shelf life (150℃)	Test time : 1000hours ; other items are same as the endurance. Voltage application treatment : According to JIS C5101-4 4.1.

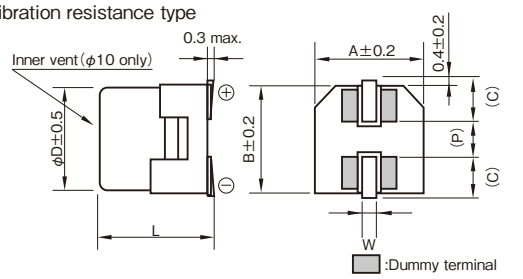
Outline Drawing

Unit : mm

Standard type



For vibration resistance type



( ) : Reference size

φD	L	A	B	C	W	P	Size code
8	10±0.5	8.4	8.4	3.0	0.7 to 1.1	3.1	EH0
10	10±0.5	10.4	10.4	3.3	0.7 to 1.1	4.7	FH0

Refer to individual page.
(Soldering conditions, Land pattern size, The taping specifications)

Coefficient of Frequency for Rated Ripple Current

Rated voltage (V) \ Frequency (Hz)	120	1k	10k	100k or more
16 to 63	0.10	0.30	0.60	1

Product code system (*For general product)

φ8 , φ10(example : 25V220μF, Standard type)

RS*	HVY	221	M	1T	EH0	002	⬚
Category code	Series code	capacitance code	Cap tol. code	Voltage code	Size code	Taping and packing code	Additional code

・For vibration resistance type should change Series code "HVY" into "HTY".
・For details, refer to the various "Product Code System" pages.

NOTE : Design, Specifications are subject to change without notice.
It is recommended that you shall obtain technical specifications from ELNA to ensure that the component is suitable for your use.

Code in front of series have been extracted from product code, which describes the segment of products, such as type and features.

Standard Ratings

Rated voltage (V) / Item / Rated capacitance (μF)	16 (1L)			25 (1T)			35 (1G)			50 (1U)		
	Case φD×L (mm)	ESR (mΩ max.)	Rated ripple current (mArms)	Case φD×L (mm)	ESR (mΩ max.)	Rated ripple current (mArms)	Case φD×L (mm)	ESR (mΩ max.)	Rated ripple current (mArms)	Case φD×L (mm)	ESR (mΩ max.)	Rated ripple current (mArms)
68	—	—	—	—	—	—	—	—	—	8×10	30	660
100	—	—	—	—	—	—	—	—	—	10×10	28	800
150	—	—	—	—	—	—	8×10	22	710	—	—	—
220	—	—	—	8×10	22	740	—	—	—	—	—	—
270	8×10	20	740	—	—	—	10×10	20	830	—	—	—
330	—	—	—	10×10	20	850	—	—	—	—	—	—
470	10×10	18	850	—	—	—	—	—	—	—	—	—

Rated voltage (V) / Item / Rated capacitance (μF)	63 (4E)		
	Case φD×L (mm)	ESR (mΩ max.)	Rated ripple current (mArms)
33	8×10	30	610
56	10×10	28	710

(Note) Rated ripple current : 150℃ , 100kHz ; ESR : 20℃ , 100kHz

NOTE : Design, Specifications are subject to change without notice.
It is recommended that you shall obtain technical specifications
from ELNA to ensure that the component is suitable for your use.

Return to Type List

ELNA Conductive Polymer Hybrid Aluminum Electrolytic Capacitors BR1,BRK series

Code in front of series have been extracted from product code, which describes the segment of products, such as type and features.

- Hybrid capacitors radial lead type. Low ESR and high ripple current are realized.
- Equivalent to conductive polymer type Aluminum Electrolytic Capacitor.
- BR1 series : Guaranteed 105℃, 10000 hours.
- BRK series: Guaranteed 125℃, 6000 hours (4000 hours: 80V or more).
- Environmental：GREEN CAP™ , RoHS compliance.

High temperature

BRK ⇦ BR1

Marking color : Blue print

Specifications

Item	Performance
Category temperature range (℃)	BR1 series: — 55 to +105 BRK series: — 55 to +125
Tolerance at rated capacitance (%)	±20 (20℃, 120Hz)
Leakage current (μA) (max.)	25V to 80V: 0.01CV or 3 whichever is larger (after 2 minutes) 100V: 0.05CV or 15 whichever is larger (after 2 minutes), : Rated capacitance (μF) ; V : Rated voltage (V) (20℃)
Tangent of loss angle (tanδ)	(20℃, 120Hz)
Characteristics at high and low temperature	Impedance ratio (max.) (100kHz)
Endurance (Applied ripple current)	
Shelf life	Test time and temperature : 1000hours (BR1 series 105°C), 1000hours (BRK series 125°C) Voltage application treatment : According to JIS C5101-4 4.1.

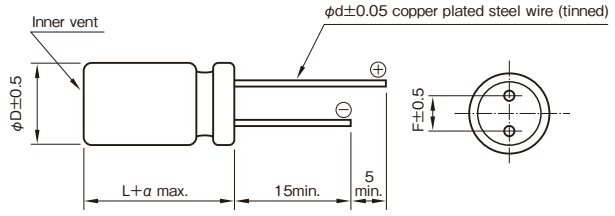
Rated voltage (V)	25	35	50	63	80	100
tanδ (max.)	0.14	0.12	0.10	0.08	0.08	0.08

Z−25℃/Z+20℃	1.5
Z−55℃/Z+20℃	2.0

	BR1 series	BRK series
Test temperature and time	105°C, 10000 hours	125°C, 6000 hours (80V or more: 4000 hours)
Leakage current	The initial specified value or less	The initial specified value or less
Percentage of capacitance change	Within ±30% of initial value	Within ±30% of initial value
Tangent of the loss angle	200% or less of the initial specified value	200% or less of the initial specified value
ESR change	200% or less of the initial specified value	200% or less of the initial specified value

Outline Drawing

Unit : mm



Size code	φD	L	F	α	d
F10	10	10	5.0	1.5	0.6
F12	10	12.5	5.0	1.5	0.6

Coefficient of Frequency for Rated Ripple Current

Rated voltage (V) \ Frequency (Hz)	120	1k	10k	100k
25 to 100	0.10	0.30	0.60	1

Product code system (*1For general product)

10000hours guaranteed: BR1 series (example : 35V270μF)

RS*1	BR1	271	M	1G	F10	100*2	EX
Category code	Series code	capacitance code	Cap tol. code	Voltage code	Size code	Taping and packing code	Additional code

4000hours guaranteed: BRK series (example : 63V56μF)

RS*1	BRK	560	M	4E	F10	100*2	EX
Category code	Series code	capacitance code	Cap tol. code	Voltage code	Size code	Taping and packing code	Additional code

6000hours guaranteed: BRK-B series (example : 35V270μF)

RS*1	BRK	271	M	1G	F10	100*2	BX
Category code	Series code	capacitance code	Cap tol. code	Voltage code	Size code	Taping and packing code	Additional code

*2 "100" : "T2" taping and packing code.
"T2" is the standard packing for BR1 and BRK.
・For details, refer to the various "Product Code System" pages.

NOTE : Design, Specifications are subject to change without notice.
It is recommended that you shall obtain technical specifications from ELNA to ensure that the component is suitable for your use.

Code in front of series have been extracted from product code, which describes the segment of products, such as type and features.

BR1 series: Standard Ratings

Rated voltage (V) / Item / Rated capacitance (μF)	25 (1T)			35 (1G)			50 (1U)			63 (4E)		
	Case φD×L (mm)	ESR (mΩ max.)	Rated ripple current (mArms)	Case φD×L (mm)	ESR (mΩ max.)	Rated ripple current (mArms)	Case φD×L (mm)	ESR (mΩ max.)	Rated ripple current (mArms)	Case φD×L (mm)	ESR (mΩ max.)	Rated ripple current (mArms)
56	—	—	—	—	—	—	—	—	—	10×10	30	1800
100	—	—	—	—	—	—	10×10	28	2000	10×12.5	26	2500
150	—	—	—	—	—	—	10×12.5	24	3000	—	—	—
270	—	—	—	10×10	20	2500	—	—	—	—	—	—
330	10×10	20	2500	—	—	—	—	—	—	—	—	—
390	—	—	—	10×12.5	18	3500	—	—	—	—	—	—
560	10×12.5	18	3500	—	—	—	—	—	—	—	—	—

Rated voltage (V) / Item / Rated capacitance (μF)	80 (1R)			100 (1H)		
	Case φD×L (mm)	ESR (mΩ max.)	Rated ripple current (mArms)	Case φD×L (mm)	ESR (mΩ max.)	Rated ripple current (mArms)
15	—	—	—	10×10	45	1600
33	10×10	36	1700	—	—	—

(Note) Rated ripple current : 105℃ , 100kHz ; ESR : 20℃ , 100kHz

BRK series: Standard Ratings (●Marked: It also supports 6000 hours guaranteed)

Rated voltage (V) / Item / Rated capacitance (μF)	25 (1T)			35 (1G)			50 (1U)			63 (4E)		
	Case φD×L (mm)	ESR (mΩ max.)	Rated ripple current (mArms)	Case φD×L (mm)	ESR (mΩ max.)	Rated ripple current (mArms)	Case φD×L (mm)	ESR (mΩ max.)	Rated ripple current (mArms)	Case φD×L (mm)	ESR (mΩ max.)	Rated ripple current (mArms)
56	—	—	—	—	—	—	—	—	—	● 10×10	30	1400
100	—	—	—	—	—	—	● 10×10	28	1600	● 10×12.5	26	2000
150	—	—	—	—	—	—	● 10×12.5	24	2500	—	—	—
270	—	—	—	● 10×10	20	2000	—	—	—	—	—	—
330	● 10×10	20	2000	—	—	—	—	—	—	—	—	—
390	—	—	—	● 10×12.5	18	3000	—	—	—	—	—	—
560	● 10×12.5	18	3000	—	—	—	—	—	—	—	—	—

Rated voltage (V) / Item / Rated capacitance (μF)	80 (1R)			100 (1H)		
	Case φD×L (mm)	ESR (mΩ max.)	Rated ripple current (mArms)	Case φD×L (mm)	ESR (mΩ max.)	Rated ripple current (mArms)
15	—	—	—	10×10	45	1000
33	10×10	36	1200	—	—	—

(Note) Rated ripple current : 125℃ , 100kHz ; ESR : 20℃ , 100kHz

NOTE : Design, Specifications are subject to change without notice.
It is recommended that you shall obtain technical specifications
from ELNA to ensure that the component is suitable for your use.

Aluminum Electrolytic Capacitors
(Chip Type, Miniature Type, For Audio)

CAT.No.2023/2024E

■ Cautions for Using Aluminum Electrolytic Capacitors

Please read the specification before using ELNA products.

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

■Cautions for usage

1. DC electrolytic capacitors are polarized.

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

2. Use within the rated voltage.

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

3. Using for power supply circuit.

- While aluminum electrolytic capacitors are operated electrolyte liquid inside dries up and E.S.R. (Equivalent Series Resistance) of the capacitor increases. In case operated longer than rated life time, the capacitance much decreases, tangent of loss angle and E.S.R. much increases. Therefore for some case the sum of bias direct voltage and the peak of ripple voltage is over the rated voltage of the capacitor.
- For any type of circuit, in case the sum of bias direct voltage and the peak of ripple voltage is over the rated voltage of the capacitors or in case the minimum voltage is lower than 0 (zero) volt, the voltage control for the capacitors shall be provided.

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

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

5. Use within the rated ripple current.

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

6. Changes in characteristics due to operating temperature.

- The characteristics of an electrolytic capacitor will change with a change in the temperature. Such changes are temporary and the original characteristics will be restored at the original temperature (if the characteristics are not deteriorated by remaining at a high temperature for a long time). If used at a temperature exceeding the guaranteed temperature range, the capacitor may be damaged due to the increased leakage current. Pay attention to the capacitor temperature being affected by the ambient temperature of the unit, the temperature inside the appliance, the heat radiated by another hot component in the unit and the heat inside the capacitor itself due to the ripple current.
  (1)The electrostatic capacitance is normally shown as the value at 20°C-120Hz. It increases as the temperature raises and decreases as it lowers.
  (2)The tangent of loss angle (tanδ) is normally shown as the value at 20°C-120Hz. It decreases as the ambient temperature gets high and increases as it gets low.
  (3)The leakage current increases as the temperature gets high and decreases as it gets low.

7. Changes in the characteristics due to frequency.

- The characteristics of an electrolytic capacitor will change according to the change in the operating frequency.
  (1)The electrostatic capacity is normally shown as the value at 20°C-120Hz. It decreases as the frequency increases.
  (2)The tangent of loss angle (tanδ) is normally shown as the value at 20°C-120Hz. It increases as the frequency gets high.
  (3)The impedance is normally shown as the value at 100kHz 20°C. It increases as the frequency lowers.

8. Aluminum electrolytic capacitor life.

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

9. Changes in aluminum electrolytic capacitors during storage.

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

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

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

11. NC terminal (the supplemental terminal) (series RPK)

- Since NC terminal is not insulated. It should be mounted at a position electronically independent from all other parts of the circuit.

12. External sleeve

- During a preheating or a hardening of mounting adhesive may cause a sleeve cracked.
  The capacitors are usually sleeved with poly vinyl chloride or poly ethylene terephthalate for the indication purpose only. Please do not consider it as an insulation.

13. Fumigation Process

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

14. Specific Operating Environments

- Capacitors may corrode when stored or used in a place filled with acidic toxic gases (such as hydrogen sulfide, sulfurous acid, nitrous acid, chlorine, bromine, methyl bromide, etc.)
  If capacitors are used or stored in such environments, please let us know.

15. Use at a high altitude

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

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

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

17. Capacitors with pressure valves.

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

Diameter of the capacitor (mm)	18 or less
Required space above the valve (mm)	2.0 or more

18. Double-sided PCB's

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

19. Regarding to connection of capacitors

- Aluminum electrolytic capacitor has electrolyte liquid so that the most portion of electric loss characteristics came from E.S.R(Equivalent Series Resistance) of electrolyte liquid. Therefore the capacitor is an electronic devise which can flow high ripple current in case the temperature increases and it decreases E.S.R.
  In case connecting two capacitors or more, E.S.R. of the capacitors is close to the resistance of the circuit. Therefore in case current is unbalanced and some capacitors has high ripple current, temperature increase, it makes more high current and finally it is over the rated ripple current.
  For parallel connection of capacitors the proper design of electric circuit such as balancing of each capacitors resistance or control of total ripple current shall be provided to avoid excess ripple current and voltage.
- When two or more capacitors are arranged in series, the voltage given to each capacitors shall be kept below the rated voltage level, by also giving consideration to the balance of the voltage impressed on the capacitors. Further, partial pressure resistor which considers leakage current shall be provided parallel to each condenser not to have over-voltage impressed on.
  Balance resistance are explained on p.106 of our Catalog.

■ Cautions for usage

1. Cautions for mounting.

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

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

- Make sure that the contact path of the capacitor meets the hole pitch of the PCB before mounting.
- Do not set the automatic insertion machine to clinch the capacitor lead wires too strong.
- Pay attention to the impact given by the component receptacles of the automatic insertion/mounting machines and the product checker, and from the centering operation.

3. Soldering.

- Do not dip the capacitor into melted solder.
- The soldering conditions
  About detail conditions are described in the catalog or product specification.
- Do not flux other part than the terminals.
- If there is a direct contact between the sleeve of the capacitor and the printed circuit pattern or a metal part of another component such as a lead wire, it may cause shrinkage of crack.
- When you use the capacitor with its sleeve touching directly to the PCB, excessive solder temperature or excessive soldering time may cause the sleeve to shrink or crack during the heat.
- If the application is for extended use, understand and manage the soldering characteristics to avoid abnormal current caused by a contact failure between the capacitor and the PCB.

4. Handling after soldering

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

5. Cleaning after Soldering

- Recommended cleaning method
  (1)cleaning solutions:
  (a) CLEANTHROUGH 710M, 750H, 750L
  (b) PINEALPHA ST-100S

  (2)Cleaning conditions:
  (a) The temperature of cleaning solution shall be less than 60°C.
  (b) Use immersion or ultrasonic waves within two minutes.
  (c) After cleaning, capacitors and PCB's shall thoroughly be rinsed and dried with hot blast for more than 10 minutes. The temperature of such breeze should be less than the upper category temperature.
  (d) After cleaning, do not keep capacitors in cleaning solution atmosphere or airtight containers.

- During cleaning, control the cleaning solution against contamination.

6. Fixing adhesives and coating materials.

- Do not use fixing adhesive or coating material containing halogen-based solvent.
- Before applying the fixing adhesive or the coating material, make sure that there is no remaining flux or stains between the PCB and the sealed part of the capacitor.
- Before applying the fixing adhesive or the coating material, make sure that the detergent etc. has dried up.
- Do not cover the whole surface of the sealed part (terminal side) of the capacitor with the fixing adhesive or the coating material.
- Observe the description in the catalog or the product specifications concerning the thermal stiffening conditions of the fixing adhesive or the coating material. (If there is no such description, contact us.) When both discrete and SMT components are on the same PCB, the fixing material for the SMT components may cause crack, tear or shrinkage on the external sleeve depending on the thermal stiffening condition.
- Recommended fixing adhesives and coating materials
  Fixing adhesives : Cemedine 1500, Diabond DN83K, Bond G103
  Coating materials : Taffy TF1159, HumiSeal 1B66NS, 1A27NS

■ Other Cautions

1. Do not touch capacitor terminals with bare hands.

You may get electric shock or your hand may be burnt. Discharge it with a 1 KΩ resistance before use if necessary.

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

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

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

- The following items should be checked:
  (1)Appearance : Check if there is any open valve or leakage.
  (2)Electronic performance : Check the leakage current, the electrostatic capacitance, the tangent of loss angle and other items described in the catalog or the product specifications.

4. Take the following measures in case of emergency.

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

5. Storing conditions.

- Avoid high temperature or high humidity when storing capacitors. Keep the storing temperature at 5°C to 35°C and the relative humidity not more than 75%.
- The leakage current of an aluminum electrolytic capacitor tends to increase when stored for a long time. This tendency becomes more prominent if the ambient temperature is high. The leakage current will be decreased by voltage application. If necessary, treatment by voltage application should be made on the capacitors which have been stored for a long period (more than 2 years after production).
- Do not store capacitors at a place where there is a possibility that they may get water, salt or oil spill.
- Do not store capacitors at a place where the air contains dense hazardous gas (hydrogen sulfide, sulfurous acid, nitrous acid, chlorine, ammonia, etc.).
- Fumigation treatment with toxic gas covering the whole wooden container frames as moth proofing during shipment may leave residual toxic gas.
- Do not store capacitors at a place where it gets ultraviolet or radioactive rays.

6. Disposing of capacitors.

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

7. Other notes.

- Please refer to the following literature for anything not described in the specification or the catalog.

(Technical report of Japan Electronics and Information Technology Industries Association, EIAJ RCR-2367 “Guideline of notabilia for fixed aluminum electrolytic capacitors for use in electronic equipment”)

Chip Type Aluminum Electrolytic Capacitors

CAT.No.2023/2024E

■ Product Code System

V

The Elna product code is Max.20 digits.

Example) VVD series 10V 470μF φ 8x10L

New product code
RSVVD471M1LEH0002U

Old product code
RVD-10V471MG10U-R2

1 2	3 4 5	6 7 8	9	10 11	12	13 14	15 16 17	18 19 20
R S	V V D	4 7 1	M	1 L	E	H 0	0 0 2	U
Product category code	Series code	Rated capacitance code	Capacitance tolerance code	Rated voltage code	Case size code		Packing code	Additional code

1 Product group
R : Energy devices
(Electrolytic capacitor)

2 Category
S : For general
*A : For automotive (powertrain, safety)
*C : For automotive (entertainment, audio)
M : For medical
(international classification Ⅲ)
L : For medical
(international classification Ⅰ, Ⅱ)

* AEC-Q200 Qualified.

3-5 Series code

old code	New code
RV5	VV5
RVS	VVS
RVR	VVR
RVI	VV9 *
RVC	VVC
RZH	VZH
RMH	VMH
RVZ	VVZ
RVD	VVD
RVV	VVV
RTV	VTV
RZD	VZD
RMD	VMD
RZK	VZK
RVT	VVT
RZJ	VZJ
RMJ	VMJ
RZF	VZF
RMF	VMF
RZE	VZE
RME	VME
RVX	VVX
RTX	VTX
RTZ	VTZ
RTD	VTD
RTT	VTT
RTQ	VTQ

For Audio

old code	New code
RVM	VVM
RVG	VVG

*Change alphabet "I" into nine "9".

6-8 Rated capacitance code
The code denoting nominal capacitance shall consist of three numerals.
The first and second numerals shall represent the significant figures of nominal capacitance in the unit of microfarad (μF), And the third numeral shall represent the number of zeros following the significant figures.

Example

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

12 Diameter code

D(mm)	Code
4	B
5	C
6.3	D
8	E
10	F
12.5	G
16	J
18	K

13-14 Length code

L(mm)	Code
5.3	C3
5.8	C8
6.5	D5
7.7	E7
10	H0
10.5	H5
12.5	K5
13.5	L5
16.5	P5
21.5	U5

9 Capacitance tolerance code
Example

tolerance (%)	Code
± 10	K
± 20	M
0 to +30	A
-10 to +30	Q
-10 to +50	T

10-11 Rated voltage code

voltage (V)	Code
4	1A
6.3	1J
10	1L
16	1E
25	1T
35	1G
50	1U
63	4E
80	1R
100	1H

15-17 Packing code (Reel taping)

Old code	New code	Case size φ D (mm)	Reel material
R2	002	φ 10 or less	Polystyrene
R5	005	φ 12.5 or more	Polystyrene

Please contact us for special packaging.

18-20 Additional code
Example

Code	Contents
U	Sn-Bi plated
T	Sn 100% plated

Please contact us for details.

NOTE : Design, Specifications are subject to change without notice.
It is recommended that you shall obtain technical specifications from ELNA to ensure that the component is suitable for your use.

Return to Type List

ELNA Vertical Chip Type Aluminum Electrolytic Capacitors VV5 series

Code in front of series have been extracted from product code, which describes the segment of products, such as type and features.

- Compatible with surface mounting.
- Environmental : GREEN CAP™ , RoHS compliance.
- Supplied with carrier taping.
- Guaranteed 2000 hours at 85°C.

High CV

VV5 ⇦ VV3

Marking color : Black print

Specifications

Item	Performance
Category temperature range (℃)	−40 to +85
Tolerance at rated capacitance (%)	±20 (20℃,120Hz)
Leakage current (μA) (max.)	0.01CV or 3 whichever is larger (after 2 minutes) C : Rated capacitance (μF) ; V : Rated voltage (V) (20℃)
Tangent of loss angle (tanδ)	

Rated voltage (V)	4	6.3	10	16	25	35	50	63	100
tanδ (max.)	Refer to following page.								

(20℃,120Hz)

Characteristics at high and low temperature

Rated voltage (V)		4	6.3	10	16	25	35	50	63	100
Impedance ratio (max.)	Z−25℃/Z+20℃	7	4	3	2	2	2	2	2	2
	Z−40℃/Z+20℃	17	10	8	6	4	3	3	3	3

(120Hz)

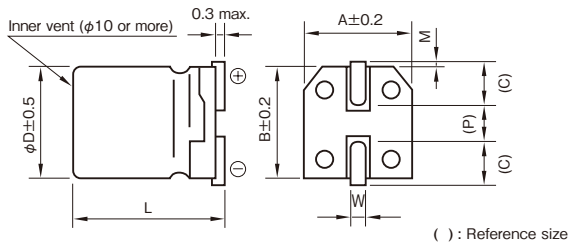
Endurance (85℃) (Applied ripple current)

Test time	2000 hours
Leakage current	The initial specified value or less
Percentage of capacitance change	Within ±30% of initial value
Tangent of the loss angle	200% or less of the initial specified value

Shelf life (85℃)	Test time : 1000hours ; other items are same as the endurance. Voltage application treatment : According to JIS C5101-4 4.1
Applicable standards	JIS C5101 - 1, - 18 (IEC 60384 - 1, - 18)

Outline Drawing

Unit : mm



φD	L	A	B	C	M	W	P	Size code
4	5.3±0.2	4.3	4.3	2.0	0.4±0.2	0.5 to 0.8	1.0	BC3
5	5.3±0.2	5.3	5.3	2.3	0.4±0.2	0.5 to 0.8	1.5	CC3
6.3	5.3±0.2	6.6	6.6	2.7	0.4±0.2	0.5 to 0.8	2.0	DC3
6.3	7.7±0.3	6.6	6.6	2.7	0.4±0.2	0.5 to 0.8	2.0	DE7
8	6.5±0.3	8.4	8.4	3.4	0.4±0.2	0.5 to 0.8	2.3	ED5
8	10±0.5	8.4	8.4	3.0	0.4±0.2	0.7 to 1.1	3.1	EH0
10	10±0.5	10.4	10.4	3.3	0.4±0.2	0.7 to 1.1	4.7	FH0
12.5	13.5±0.5	13.0	13.0	4.9	0.7±0.3	1.0 to 1.4	4.6	GL5

Refer to individual page.
(Soldering conditions, Land pattern size, The taping specifications)

Coefficient of Frequency for Rated Ripple Current

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

Product code system (*For general product)

φ8 or less (example : 16V470μF)

RS*	VV5	471	M	1E	EH0	002	U
Category code	Series code	capacitance code	Cap tol. code	Voltage code	Size code	Taping and packing code	Additional code

φ10 (example : 16V470μF)

RS*	VV5	471	M	1E	FH0	002	EU
Category code	Series code	capacitance code	Cap tol. code	Voltage code	Size code	Taping and packing code	Additional code

φ12.5 (example : 10V1500μF)

RS*	VV5	152	M	1L	GL5	005	T
Category code	Series code	capacitance code	Cap tol. code	Voltage code	Size code	Taping and packing code	Additional code

For details, refer to the various "Product Code System" pages.

NOTE : Design, Specifications are subject to change without notice.
It is recommended that you shall obtain technical specifications
from ELNA to ensure that the component is suitable for your use.

Code in front of series have been extracted from product code, which describes the segment of products, such as type and features.

Standard Ratings

Rated voltage(V) / Item / Rated capacitance(μF)	4 (1A)				6.3 (1J)				10 (1L)				16 (1E)				25 (1T)			
	Case φD×L (mm)	Size code	tan δ	Rated ripple current (mArms)	Case φD×L (mm)	Size code	tan δ	Rated ripple current (mArms)	Case φD×L (mm)	Size code	tan δ	Rated ripple current (mArms)	Case φD×L (mm)	Size code	tan δ	Rated ripple current (mArms)	Case φD×L (mm)	Size code	tan δ	Rated ripple current (mArms)
10	–	–	–	–	–	–	–	–	4×5.3	BC3	0.24	23	4×5.3	BC3	0.20	26	4×5.3	BC3	0.18	23
22	–	–	–	–	4×5.3	BC3	0.28	31	4×5.3	BC3	0.24	26	4×5.3	BC3	0.28	30	4×5.3	BC3	0.18	24
													5×5.3	CC3	0.20	44	5×5.3	CC3	0.18	43
33	4×5.3	BC3	0.42	31	4×5.3	BC3	0.35	28	4×5.3	BC3	0.32	32	4×5.3	BC3	0.28	32	5×5.3	CC3	0.18	54
					5×5.3	CC3	0.28	44	5×5.3	CC3	0.24	48	5×5.3	CC3	0.28	44	6.3×5.3	DC3	0.14	67
47	4×5.3	BC3	0.42	37	4×5.3	BC3	0.35	34	4×5.3	BC3	0.32	33	5×5.3	CC3	0.28	52	6.3×5.3	DC3	0.18	75
					5×5.3	CC3	0.28	52	5×5.3	CC3	0.32	54	6.3×5.3	DC3	0.20	75				
100	5×5.3	CC3	0.42	63	5×5.3	CC3	0.35	58	5×5.3	CC3	0.32	54	6.3×5.3	DC3	0.20	70	6.3×7.7	DE7	0.18	124
					6.3×5.3	DC3	0.28	89	6.3×5.3	DC3	0.24	98					8×6.5	ED5	0.18	118
150	–	–	–	–	6.3×5.3	DC3	0.35	83	6.3×5.3	DC3	0.32	79	6.3×7.7	DE7	0.28	109	–	–	–	–
									6.3×7.7	DE7	0.32	98								
220	6.3×5.3	DC3	0.42	110	6.3×5.3	DC3	0.35	88	6.3×7.7	DE7	0.32	173	6.3×7.7	DE7	0.28	162	8×10	EH0	0.14	252
					6.3×7.7	DE7	0.35	113	8×6.5	ED5	0.32	175	8×10	EH0	0.20	220				
330	–	–	–	–	6.3×7.7	DE7	0.35	188	8×10	EH0	0.24	230	8×10	EH0	0.20	260	8×10	EH0	0.18	300
					8×6.5	ED5	0.35	190									10×10	FH0	0.14	458
470	–	–	–	–	8×10	EH0	0.28	262	8×10	EH0	0.32	310	8×10	EH0	0.28	307	10×10	FH0	0.14	458
													10×10	FH0	0.20	458				
680	–	–	–	–	–	–	–	–	–	–	–	–	10×10	FH0	0.28	380	–	–	–	–
820	–	–	–	–	8×10	EH0	0.35	320	–	–	–	–	–	–	–	–	12.5×13.5	GL5	0.14	552
1000	–	–	–	–	10×10	FH0	0.28	458	10×10	FH0	0.24	454	12.5×13.5	GL5	0.20	521	–	–	–	–
1500	–	–	–	–	10×10	FH0	0.35	489	12.5×13.5	GL5	0.24	560	–	–	–	–	–	–	–	–
2200	–	–	–	–	12.5×13.5	GL5	0.30	651	–	–	–	–	–	–	–	–	–	–	–	–

Rated voltage(V) / Item / Rated capacitance(μF)	35 (1G)				50 (1U)				63 (4E)				100 (1H)			
	Case φD×L (mm)	Size code	tan δ	Rated ripple current (mArms)	Case φD×L (mm)	Size code	tan δ	Rated ripple current (mArms)	Case φD×L (mm)	Size code	tan δ	Rated ripple current (mArms)	Case φD×L (mm)	Size code	tan δ	Rated ripple current (mArms)
1	–	–	–	–	4×5.3	BC3	0.10	10	–	–	–	–	–	–	–	–
2.2	–	–	–	–	4×5.3	BC3	0.10	15	–	–	–	–	–	–	–	–
3.3	–	–	–	–	4×5.3	BC3	0.10	19	4×5.3	BC3	0.12	12	–	–	–	–
4.7	4×5.3	BC3	0.12	20	4×5.3	BC3	0.12	20	5×5.3	CC3	0.12	20	–	–	–	–
					5×5.3	CC3	0.10	26								
10	4×5.3	BC3	0.14	27	5×5.3	CC3	0.12	34	6.3×5.3	DC3	0.12	32	8×10	EH0	0.10	94
	5×5.3	CC3	0.12	34	6.3×5.3	DC3	0.10	44								
22	5×5.3	CC3	0.14	47	6.3×5.3	DC3	0.12	47	6.3×7.7	DE7	0.12	60	8×10	EH0	0.12	94
	6.3×5.3	DC3	0.12	59					8×6.5	ED5	0.12	62				
33	6.3×5.3	DC3	0.14	67	6.3×7.7	DE7	0.12	82	8×10	EH0	0.10	139	8×10	EH0	0.12	94
					8×6.5	ED5	0.12	83					10×10	FH0	0.10	189
47	6.3×5.3	DC3	0.14	54	6.3×7.7	DE7	0.12	85	8×10	EH0	0.10	139	10×10	FH0	0.12	189
	6.3×7.7	DE7	0.14	90	8×10	EH0	0.10	252	10×10	FH0	0.12	226				
100	6.3×7.7	DE7	0.14	120	8×10	EH0	0.12	252	10×10	FH0	0.10	226	12.5×13.5	GL5	0.10	242
					10×10	FH0	0.10	458								
220	8×10	EH0	0.14	260	–	–	–	–	12.5×13.5	GL5	0.10	343	–	–	–	–
	10×10	FH0	0.12	458												
330	10×10	FH0	0.14	360	12.5×13.5	GL5	0.10	451	–	–	–	–	–	–	–	–
470	12.5×13.5	GL5	0.12	451	–	–	–	–	–	–	–	–	–	–	–	–

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

NOTE : Design, Specifications are subject to change without notice.
It is recommended that you shall obtain technical specifications
from ELNA to ensure that the component is suitable for your use.

Return to Type List

ELNA Vertical Chip Type Aluminum Electrolytic Capacitors VVS series

Code in front of series have been extracted from product code, which describes the segment of products, such as type and features.

- Compatible with surface mounting.
- Supplied with carrier taping.
- Guaranteed 1000 hours at 105°C.
- Environmental : GREEN CAP™ , RoHS compliance.

High temperature

VVS ⇦ VV2

Marking color : Black print

Specifications

Item	Performance
Category temperature range (℃)	−55 to +105
Tolerance at rated capacitance (%)	±20 (20℃,120Hz)
Leakage current (μA) (max.)	0.01CV or 3 whichever is larger (after 2 minutes) C : Rated capacitance (μF) ; V : Rated voltage (V) (20℃)

Tangent of loss angle (tanδ) (20℃,120Hz)

Rated voltage (V)	6.3	10	16	25	35	50
tanδ (max.)	0.30	0.26	0.22	0.16	0.13	0.12

Characteristics at high and low temperature (120Hz)

Rated voltage (V)		6.3	10	16	25	35	50
Impedance ratio (max.)	Z−25℃/Z+20℃	4	3	2	2	2	2
	Z−40℃/Z+20℃	8	5	4	3	3	3

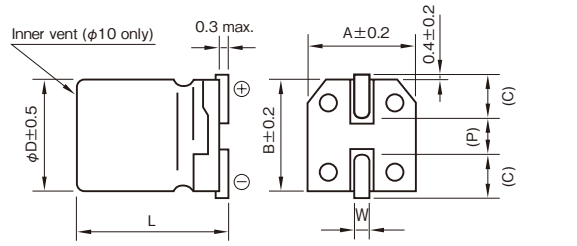
Endurance (105℃) (Applied ripple current)

Test time	1000 hours
Leakage current	The initial specified value or less
Percentage of capacitance change	Within ±20% of initial value
Tangent of the loss angle	200% or less of the initial specified value

Shelf life (105℃)	Test time : 1000hours ; other items are same as the endurance. Voltage application treatment : According to JIS C5101-4 4.1
Applicable standards	JIS C5101 - 1, - 18 (IEC 60384 - 1, - 18)

Outline Drawing

Unit : mm



( ) : Reference size

ϕD	L	A	B	C	W	P	Size code
4	5.3±0.2	4.3	4.3	2.0	0.5 to 0.8	1.0	BC3
5	5.3±0.2	5.3	5.3	2.3	0.5 to 0.8	1.5	CC3
6.3	5.3±0.2	6.6	6.6	2.7	0.5 to 0.8	2.0	DC3
6.3	7.7±0.3	6.6	6.6	2.7	0.5 to 0.8	2.0	DE7
8	6.5±0.3	8.4	8.4	3.4	0.5 to 0.8	2.3	ED5
8	10±0.5	8.4	8.4	3.0	0.7 to 1.1	3.1	EH0
10	10±0.5	10.4	10.4	3.3	0.7 to 1.1	4.7	FH0
10	10.5±0.5	10.4	10.4	3.3	0.7 to 1.1	4.7	FH5

Refer to individual page.
(Soldering conditions, Land pattern size, The taping specifications)

Coefficient of Frequency for Rated Ripple Current

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

Product code system : 16V47μF (*For general product)

RS*	VVS	470	M	1E	DC3	002	U
Category code	Series code	capacitance code	Cap tol. code	Voltage code	Size code	Taping and packing code	Additional code

For details, refer to the various "Product Code System" pages.

NOTE : Design, Specifications are subject to change without notice.
It is recommended that you shall obtain technical specifications
from ELNA to ensure that the component is suitable for your use.

Code in front of series have been extracted from product code, which describes the segment of products, such as type and features.

Standard Ratings

Rated voltage (V) / Item / Rated capacitance (μF)	6.3 (1J)			10 (1L)			16 (1E)			25 (1T)			35 (1G)			50 (1U)		
	Case φD × L(mm)	ESR (Ω)	Rated ripple current (mArms)	Case φD × L(mm)	ESR (Ω)	Rated ripple current (mArms)	Case φD × L(mm)	ESR (Ω)	Rated ripple current (mArms)	Case φD × L(mm)	ESR (Ω)	Rated ripple current (mArms)	Case φD × L(mm)	ESR (Ω)	Rated ripple current (mArms)	Case φD × L(mm)	ESR (Ω)	Rated ripple current (mArms)
1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	4 × 5.3	199	7
2.2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	4 × 5.3	91	10
3.3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	4 × 5.3	60	12
4.7	—	—	—	—	—	—	—	—	—	4 × 5.3	57	12	4 × 5.3	46	14	5 × 5.3	42	17
10	—	—	—	4 × 5.3	43	15	4 × 5.3	36	16	5 × 5.3	27	21	5 × 5.3	22	23	6.3 × 5.3	20	26
22	4 × 5.3	23	21	5 × 5.3	20	25	5 × 5.3	17	28	6.3 × 5.3	12	36	6.3 × 5.3	10	50	8 × 6.5	9.0	51
33	5 × 5.3	15	30	5 × 5.3	13	31	6.3 × 5.3	11	40	6.3 × 5.3	8.0	44	8 × 6.5	6.5	59	6.3 × 7.7	6.0	60
47	5 × 5.3	11	36	6.3 × 5.3	9.2	43	6.3 × 5.3	7.8	47	8 × 6.5	5.6	66	—	—	—	6.3 × 7.7	4.2	63
100	6.3 × 5.3	5.0	61	6.3 × 5.3	4.3	60	6.3 × 5.3	3.6	60	6.3 × 7.7	2.7	91	6.3 × 7.7	2.2	84	8 × 10	2.0	140
150	—	—	—	—	—	—	6.3 × 7.7	2.4	105	8 × 10	1.8	140	8 × 10	1.4	155	10 × 10	1.3	180
220	8 × 6.5	2.3	102	6.3 × 7.7	2.0	105	6.3 × 7.7	1.7	105	8 × 10	1.2	155	8 × 10	0.98	190	10 × 10.5	0.91	220
330	6.3 × 7.7	1.5	105	8 × 10	1.3	195	8 × 10	1.1	195	8 × 10	0.80	190	10 × 10.5	0.65	300	—	—	—
470	8 × 10	1.1	210	8 × 10	0.92	210	8 × 10	0.78	230	10 × 10	0.57	300	—	—	—	—	—	—
680	8 × 10	0.73	210	10 × 10	0.63	310	10 × 10	0.54	310	—	—	—	—	—	—	—	—	—
1000	8 × 10	0.50	210	10 × 10	0.43	310	—	—	—	—	—	—	—	—	—	—	—	—
1500	10 × 10	0.33	310	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

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

NOTE : Design, Specifications are subject to change without notice.
It is recommended that you shall obtain technical specifications
from ELNA to ensure that the component is suitable for your use.

Return to Type List

ELNA Vertical Chip Type Aluminum Electrolytic Capacitors VVR series

Code in front of series have been extracted from product code, which describes the segment of products, such as type and features.

- Compatible with surface mounting.
- Environmental : GREEN CAP™ , RoHS compliance.
- Supplied with carrier taping.
- Guaranteed 2000 hours 105℃.

High CV

VVR ⇦ VVL

Marking color : Black print

Specifications

Item	Performance
Category temperature range (℃)	−40 to +105
Tolerance at rated capacitance (%)	±20 (20℃,120Hz)
Leakage current (μA) (max.)	0.01CV or 3 whichever is larger (after 2 minutes) C : Rated capacitance (μF), V : Rated voltage (V) (20℃)
Tangent of loss angle (tanδ)	

Rated voltage (V)	4	6.3	10	16	25	35	50
tanδ (max.)	0.50	0.30	0.22	0.16	0.14	0.12	0.12

(20℃,120Hz)

Characteristics at high and low temperature

Rated voltage (V)		4	6.3	10	16	25	35	50
Impedance ratio (max.)	Z−25℃/Z+20℃	7	4	3	2	2	2	2
	Z−40℃/Z+20℃	15	8	6	4	4	3	3

(120Hz)

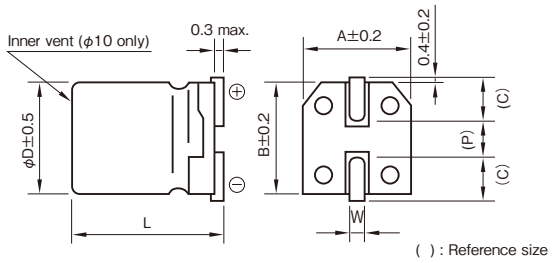
Endurance (105℃) (Applied ripple current)

Test time	2000 hours
Leakage current	The initial specified value or less
Percentage of capacitance change	Within ±20% of initial value (φ5 or less & 16V or less:±30%)
Tangent of loss angle	200% or less of the initial specified value

Shelf life (105℃)	Test time : 1000hours ; other items are same as the endurance. Voltage application treatment : According to JIS C5101-4 4.1
Applicable standards	JIS C5101 - 1,- 18 (IEC 60384 - 1,- 18)

Outline Drawing

Unit : mm



φD	L	A	B	C	W	P	Size code
4	5.3±0.2	4.3	4.3	2.0	0.5 to 0.8	1.0	BC3
4	5.8±0.3	4.3	4.3	2.0	0.5 to 0.8	1.0	BC8
5	5.3±0.2	5.3	5.3	2.3	0.5 to 0.8	1.5	CC3
5	5.8±0.3	5.3	5.3	2.3	0.5 to 0.8	1.5	CC8
6.3	5.3±0.2	6.6	6.6	2.7	0.5 to 0.8	2.0	DC3
6.3	5.8±0.3	6.6	6.6	2.7	0.5 to 0.8	2.0	DC8
6.3	7.7±0.3	6.6	6.6	2.7	0.5 to 0.8	2.0	DE7
8	6.5±0.3	8.4	8.4	3.4	0.5 to 0.8	2.3	ED5
8	10±0.5	8.4	8.4	3.0	0.7 to 1.1	3.1	EH0
8	10.5±0.5	8.4	8.4	3.0	0.7 to 1.1	3.1	EH5
10	10±0.5	10.4	10.4	3.3	0.7 to 1.1	4.7	FH0
10	10.5±0.5	10.4	10.4	3.3	0.7 to 1.1	4.7	FH5

Refer to individual page.
(Soldering conditions, Land pattern size, The taping specifications)

Coefficient of Frequency for Rated Ripple Current

Rated voltage (V) \ Frequency (Hz)	50・60	120	1k	10k・100k
6.3 to 16	0.80	1	1.15	1.25
25 to 35	0.80	1	1.25	1.40
50	0.50	1	1.35	1.50

Product code system : 16V100F (*For general product)

RS*	VVR	101	M	1E	DC8	002	U
Category code	Series code	capacitance code	Cap tol. code	Voltage code	Size code	Taping and packing code	Additional code

For details, refer to the various "Product Code System" pages.

NOTE : Design, Specifications are subject to change without notice.
It is recommended that you shall obtain technical specifications from ELNA to ensure that the component is suitable for your use.

Code in front of series have been extracted from product code, which describes the segment of products, such as type and features.

Standard Ratings

Rated voltage(V) / Item / Rated capacitance(μF)	4 (1A)			6.3 (1J)			10 (1L)			16 (1E)			25 (1T)		
	Case φD×L (mm)	Size code	Rated ripple current (mArms)	Case φD×L (mm)	Size code	Rated ripple current (mArms)	Case φD×L (mm)	Size code	Rated ripple current (mArms)	Case φD×L (mm)	Size code	Rated ripple current (mArms)	Case φD×L (mm)	Size code	Rated ripple current (mArms)
4.7	–	–	–	–	–	–	–	–	–	–	–	–	4×5.3	BC3	22
6.8	–	–	–	–	–	–	–	–	–	–	–	–	4×5.3	BC3	25
10	–	–	–	–	–	–	–	–	–	4×5.3	BC3	25	4×5.8	BC8	36
										4×5.8	BC8	27			
22	–	–	–	4×5.3	BC3	26	4×5.8	BC8	33	4×5.8	BC8	39	5×5.8	CC8	48
				4×5.8	BC8	28				5×5.3	CC3	39			
										5×5.8	CC8	46			
33	–	–	–	5×5.8	CC8	40	4×5.8	BC8	41	5×5.8	CC8	55	5×5.8	CC8	59
							5×5.3	CC3	43	6.3×5.8	DC8	66	6.3×5.3	DC3	65
							5×5.8	CC8	47				6.3×5.8	DC8	69
47	4×5.8	BC8	42	4×5.8	BC8	42	6.3×5.8	DC8	74	5×5.8	CC8	66	6.3×5.8	DC8	82
				5×5.3	CC3	46				6.3×5.3	DC3	70			
				5×5.8	CC8	48				6.3×5.8	DC8	78			
100	5×5.8	CC8	70	5×5.8	CC8	70	6.3×5.8	DC8	95	6.3×5.8	DC8	112	6.3×7.7	DE7	132
				6.3×5.3	DC3	71							8×6.5	ED5	146
				6.3×5.8	DC8	99									
150	–	–	–	–	–	–	6.3×5.8	DC8	117	8×6.5	ED5	151	–	–	–
220	6.3×5.8	DC8	121	6.3×5.8	DC8	121	6.3×7.7	DE7	156	6.3×7.7	DE7	183	8×10	EH0	320
							8×6.5	ED5	173	8×6.5	ED5	157	8×10.5	EH5	320
330	6.3×7.7	DE7	163	6.3×7.7	DE7	163	8×10	EH0	296	8×10	EH0	291	8×10.5	EH5	340
	8×6.5	ED5	181	8×6.5	ED5	181	8×10.5	EH5	296						
470	–	–	–	8×10	EH0	320	8×10	EH0	326	8×10	EH0	348	10×10.5	FH5	490
				8×10.5	EH5	320	8×10.5	EH5	326	8×10.5	EH5	348			
680	–	–	–	8×10.5	EH5	340	10×10	FH0	440	10×10	FH0	484	–	–	–
							10×10.5	FH5	440						
820	–	–	–	–	–	–	–	–	–	10×10.5	FH5	484	–	–	–
1000	–	–	–	8×10.5	EH5	370	10×10.5	FH5	500	–	–	–	–	–	–
				10×10	FH0	495									
				10×10.5	FH5	495									
1200	–	–	–	–	–	–	10×10.5	FH5	500	–	–	–	–	–	–
1500	–	–	–	10×10.5	FH5	550	–	–	–	–	–	–	–	–	–

Rated voltage(V) / Item / Rated capacitance(μF)	35 (1G)			50 (1U)		
	Case φD×L (mm)	Size code	Rated ripple current (mArms)	Case φD×L (mm)	Size code	Rated ripple current (mArms)
1	–	–	–	4×5.3	BC3	10
				4×5.8	BC8	12
2.2	–	–	–	4×5.3	BC3	16
				4×5.8	BC8	19
3.3	–	–	–	4×5.3	BC3	16
				4×5.8	BC8	22
4.7	4×5.8	BC8	23	4×5.8	BC8	26
				5×5.3	CC3	23
				5×5.8	CC8	29
6.8	–	–	–	5×5.3	CC3	23
10	4×5.8	BC8	30	5×5.8	CC8	35
	5×5.3	CC3	28	6.3×5.3	DC3	35
	5×5.8	CC8	39	6.3×5.8	DC8	47
22	5×5.8	CC8	52	6.3×5.8	DC8	61
	6.3×5.3	DC3	55			
33	6.3×5.8	DC8	74	6.3×7.7	DE7	82
				8×6.5	ED5	91
47	6.3×5.8	DC8	89	6.3×7.7	DE7	97
				8×6.5	ED5	108
68	6.3×7.7	DE7	117	–	–	–
	8×6.5	ED5	130			
100	6.3×7.7	DE7	142	8×10.5	EH5	230
	8×6.5	ED5	158			
	8×10	EH0	283	10×10.5	FH5	262
	8×10.5	EH5	283			
150	8×10	EH0	293	10×10.5	FH5	300
	8×10.5	EH5	293			
220	8×10.5	EH5	302	10×10.5	FH5	375
	10×10	FH0	450			
330	10×10.5	FH5	450	–	–	–

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

NOTE : Design, Specifications are subject to change without notice.
It is recommended that you shall obtain technical specifications
from ELNA to ensure that the component is suitable for your use.

Return to Type List

ELNA Vertical Chip Type Aluminum Electrolytic Capacitors VVC series

Code in front of series have been extracted from product code, which describes the segment of products, such as type and features.

- Compatible with surface mounting, long life capacitors.
- Environmental : GREEN CAP™ , RoHS compliance.
- Supplied with carrier taping.
- Guaranteed 3000 hours at 105℃.
  (10L:5000 hours).

Long life

VVC ⇦ VVL

Marking color : Black print

Specifications

Item	Performance
Category temperature range (℃)	−40 to +105
Tolerance at rated capacitance (%)	±20 (20℃,120Hz)
Leakage current (μA) (max.)	0.01CV or 3 whichever is larger (after 2 minutes) C : Rated capacitance (μF), V : Rated voltage (V) (20℃)
Tangent of loss angle (tanδ)	

Rated voltage (V)	6.3	10	16	25	35	50
tanδ (max.)	0.28	0.24	0.20	0.16	0.13	0.12

(20℃,120Hz)

Characteristics at high and low temperature

Rated voltage (V)		6.3	10	16	25	35	50
Impedance ratio (max.)	Z−25℃/Z+20℃	4	3	2	2	2	2
	Z−40℃/Z+20℃	10	7	5	3	3	3

(120Hz)

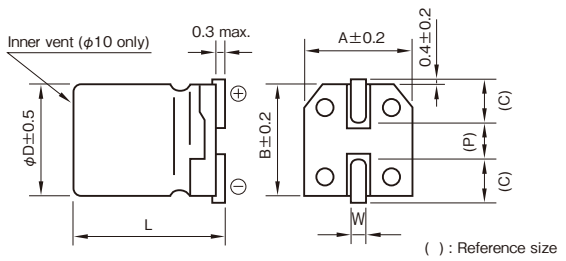
Endurance (105℃) (Applied ripple current)

Test time	3000 hours (10L : 5000 hours)
Leakage current	The initial specified value or less
Percentage of capacitance change	Within ±30% of initial value
Tangent of the loss angle	300% or less of initial specified value

Shelf life (105℃)	Test time : 1000hours ; other items are same as the endurance. Voltage application treatment : According to JIS C5101-4 4.1
Applicable standards	JIS C5101 - 1,- 18 (IEC 60384 - 1,- 18)

Outline Drawing

Unit : mm



( ) : Reference size

φD	L	A	B	C	W	P	Size code
4	5.8±0.3	4.3	4.3	2.0	0.5 to 0.8	1.0	BC8
5	5.8±0.3	5.3	5.3	2.3	0.5 to 0.8	1.5	CC8
6.3	5.8±0.3	6.6	6.6	2.7	0.5 to 0.8	2.0	DC8
6.3	7.7±0.3	6.6	6.6	2.7	0.5 to 0.8	2.0	DE7
8	10.0±0.5	8.4	8.4	3.0	0.7 to 1.1	3.1	EH0
10	10.0±0.5	10.4	10.4	3.3	0.7 to 1.1	4.7	FH0

Refer to individual page.
(Soldering conditions, Land pattern size, The taping specifications)

Coefficient of Frequency for Rated Ripple Current

Rated voltage (V) \ Frequency (Hz)		50・60	120	1k	10k・100k
6.3 to 16		0.80	1	1.15	1.25
25 to 35		0.80	1	1.25	1.40
50	1 to 3.3μF	0.50	1	1.35	1.50
	4.7 or more	0.70	1	1.35	1.50

Product code system : 16V47μF (*For general product)

RS*	VVC	470	M	1E	DC8	002	U
Category code	Series code	capacitance code	Cap tol. code	Voltage code	Size code	Taping and packing code	Additional code

For details, refer to the various "Product Code System" pages.

NOTE : Design, Specifications are subject to change without notice.
It is recommended that you shall obtain technical specifications from ELNA to ensure that the component is suitable for your use.

Code in front of series have been extracted from product code, which describes the segment of products, such as type and features.

Standard Ratings

Rated voltage (V) / Item / Rated capacitance (μF)	6.3 (1J)			10 (1L)			16 (1E)			25 (1T)			35 (1G)			50 (1U)		
	Case φD×L(mm)	Size code	Rated ripple current (mArms)	Case φD×L(mm)	Size code	Rated ripple current (mArms)	Case φD×L(mm)	Size code	Rated ripple current (mArms)	Case φD×L(mm)	Size code	Rated ripple current (mArms)	Case φD×L(mm)	Size code	Rated ripple current (mArms)	Case φD×L(mm)	Size code	Rated ripple current (mArms)
1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	4×5.8	BC8	10
2.2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	4×5.8	BC8	16
3.3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	4×5.8	BC8	17
4.7	—	—	—	—	—	—	—	—	—	—	—	—	4×5.8	BC8	16	5×5.8	CC8	23
10	—	—	—	—	—	—	4×5.8	BC8	28	—	—	—	5×5.8	CC8	28	6.3×5.8	DC8	35
22	4×5.8	BC8	26	—	—	—	5×5.8	CC8	39	—	—	—	6.3×5.8	DC8	55	6.3×7.7	DE7	58
33	—	—	—	5×5.8	CC8	43	—	—	—	6.3×5.8	DC8	60	6.3×7.7	DE7	57	8×10	EH0	91
47	5×5.8	CC8	46	—	—	—	6.3×5.8	DC8	70	6.3×7.7	DE7	65	—	—	—	8×10	EH0	100
100	6.3×5.8	DC8	71	—	—	—	6.3×7.7	DE7	81	8×10	EH0	130	—	—	—	10×10	FH0	160
220	6.3×7.7	DE7	101	8×10	EH0	160	—	—	—	—	—	—	10×10	FH0	220	—	—	—
330	8×10	EH0	230	—	—	—	—	—	—	10×10	FH0	238	—	—	—	—	—	—
470	—	—	—	—	—	—	10×10	FH0	340	—	—	—	—	—	—	—	—	—
1000	10×10	FH0	313	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

(Note) Rated ripple current : 105℃, 120Hz

NOTE : Design, Specifications are subject to change without notice.
It is recommended that you shall obtain technical specifications
from ELNA to ensure that the component is suitable for your use.

Return to Type List

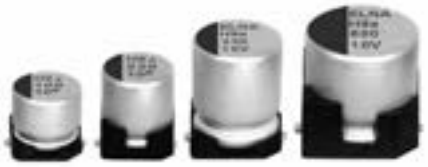
ELNA Vertical Chip Type Aluminum Electrolytic Capacitors VZH, VMH series

Code in front of series have been extracted from product code, which describes the segment of products, such as type and features.

- Compatible with surface mounting, long life capacitors.
- Environmental : GREEN CAP™ , RoHS compliance.
- Supplied with carrier taping.
- Guaranteed 7000 hours at 105°C.
  (φ6.3X5.8L: 5000 hours)

Vibration resistance ⇦ Long life

VMH ⇦ VZH ⇦ VVC



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Specifications

Item	Performance
Category temperature range (℃)	−55 to +105
Tolerance at rated capacitance (%)	±20 (20℃,120Hz)
Leakage current (μA) (max.)	0.01CV or 3 whichever is larger (after 2 minutes) C : Rated capacitance (μF) ; V : Rated voltage (V) (20℃)
Tangent of loss angle (tanδ)	
Characteristics at high and low temperature	
Endurance (105℃) (Applied ripple current)	
Shelf life (105℃)	Test time : 1000hours ; other items are the same as those for the endurance. Voltage application treatment : According to JIS C5101-4 4.1
Applicable standards	JIS C5101 - 1,- 18 (IEC 60384 - 1,- 18)

Tangent of loss angle (tanδ):

Rated voltage (V)	6.3	10	16	25	35
tanδ (max.)	0.32	0.28	0.26	0.16	0.14

(20℃,120Hz)

Characteristics at high and low temperature:

Rated voltage (V)		6.3	10	16	25	35
Impedance ratio (max.)	Z−25℃/Z+20℃	2	2	2	2	2
	Z−40℃/Z+20℃	3	3	3	3	3
	Z−55℃/Z+20℃	4	4	4	4	4

(120Hz)

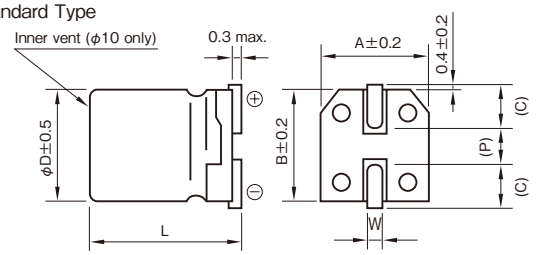
Endurance (105℃) (Applied ripple current):

Test time	7000 hours (φ6.3×5.8L:5000hours)
Leakage current	The initial specified value or less
Percentage of capacitance change	Within ±30% of initial value
Tangent of the loss angle	300% or less of the initial specified value

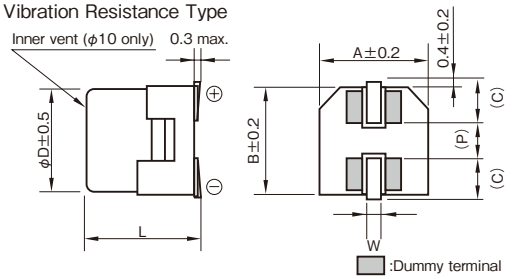
Outline Drawing

Unit : mm

Standard Type



For Vibration Resistance Type



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φD	L	A	B	C	W	P	Size code
6.3	5.8±0.3	6.6	6.6	2.7	0.5~0.8	2.0	DC8
6.3	7.7±0.3	6.6	6.6	2.7	0.5~0.8	2.0	DE7
8	10±0.5	8.4	8.4	3.0	0.7~1.1	3.1	EH0
10	10±0.5	10.4	10.4	3.3	0.7~1.1	4.7	FH0

Refer to individual page.
(Soldering conditions, Land pattern size, The taping specifications)

Coefficient of Frequency for Rated Ripple Current

Rated voltage (V) \ Frequency (Hz)	120	1k	10k	100k
6.3 to 35	0.50	0.80	0.95	1

Product code system (*For general product)

Standard Type (example : 35V100μF)

RS*	VZH	101	M	1G	DE7	002	U
Category code	Series code	capacitance code	Cap tol. code	Voltage code	Size code	Taping and packing code	Additional code

For Vibration Resistance Type (example : 35V330μF)

RS*	VMH	331	M	1G	FH0	002	U
Category code	Series code	capacitance code	Cap tol. code	Voltage code	Size code	Taping and packing code	Additional code

For details, refer to the various "Product Code System" pages.

NOTE : Design, Specifications are subject to change without notice.
It is recommended that you shall obtain technical specifications from ELNA to ensure that the component is suitable for your use.

Code in front of series have been extracted from product code, which describes the segment of products, such as type and features.

Standard Ratings

Rated voltag(V) / Item / Rated capacitance(μF)	6.3 (1J)				10 (1L)				16 (1E)				25 (1T)			
	Case φD×L (mm)	Size code	ESR (Ω max.)	Rated ripple current (mArms)	Case φD×L (mm)	Size code	ESR (Ω max.)	Rated ripple current (mArms)	Case φD×L (mm)	Size code	ESR (Ω max.)	Rated ripple current (mArms)	Case φD×L (mm)	Size code	ESR (Ω max.)	Rated ripple current (mArms)
33	—	—	—	—	—	—	—	—	—	—	—	—	6.3×5.8	DC8	1.10	140
47	—	—	—	—	—	—	—	—	6.3×5.8	DC8	1.10	140	6.3×5.8	DC8	1.10	140
100	6.3×5.8	DC8	1.10	140	6.3×5.8	DC8	1.10	140	6.3×5.8	DC8	1.10	140	6.3×7.7	DE7	1.00	230
150	6.3×5.8	DC8	1.10	140	6.3×5.8	DC8	1.10	140	6.3×5.8	DC8	1.10	140	8×10	EH0	0.22	600
220	6.3×7.7	DE7	1.00	230	6.3×7.7	DE7	1.00	230	6.3×7.7	DE7	1.00	230	8×10	EH0	0.22	600
330	6.3×7.7	DE7	1.00	230	8×10	EH0	0.22	600	8×10	EH0	0.22	600	8×10	EH0	0.22	600
470	8×10	EH0	0.22	600	8×10	EH0	0.22	600	8×10	EH0	0.22	600	10×10	FH0	0.16	850
									10×10	FH0	0.16	850				
680	10×10	FH0	0.16	850	10×10	FH0	0.16	850	10×10	FH0	0.16	850	—	—	—	—
1000	10×10	FH0	0.16	850	—	—	—	—	—	—	—	—	—	—	—	—

Rated voltag(V) / Item / Rated capacitance(μF)	35 (1G)			
	Case φD×L (mm)	Size code	ESR (Ω max.)	Rated ripple current (mArms)
22	6.3×5.8	DC8	1.10	140
33	6.3×5.8	DC8	1.10	140
	6.3×7.7	DE7	1.00	230
47	6.3×7.7	DE7	1.00	230
100	6.3×7.7	DE7	1.00	230
150	8×10	EH0	0.22	600
220	8×10	EH0	0.22	600
330	10×10	FH0	0.16	850

(Note) Rated ripple current : 105℃ , 100kHz ; ESR : 20℃ , 100kHz

NOTE : Design, Specifications are subject to change without notice.
It is recommended that you shall obtain technical specifications
from ELNA to ensure that the component is suitable for your use.

Return to Type List

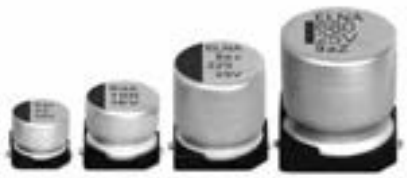
ELNA Vertical Chip Type Aluminum Electrolytic Capacitors VVZ series

Code in front of series have been extracted from product code, which describes the segment of products, such as type and features.

- Compatible with surface mounting, low ESR capacitors.
- Environmental : GREEN CAP™ , RoHS compliance.
- Supplied with carrier taping.
- Guaranteed 5000 hours at 105℃.
  (φ8×6.5L or less: 1000hours)
  (φ8×10L to φ10 : 2000hours)

Miniaturized
Low ESR

VVZ ⇦ VVJ



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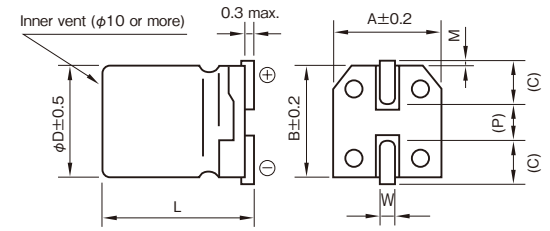
Specifications

Item	Performance
Category temperature range (℃)	−55 to +105
Tolerance at rated capacitance (%)	±20 (20℃,120Hz)
Leakage current (μA) (max.)	0.01CV or 3 whichever is larger (after 2 minutes) C : Rated capacitance (μF) ; V : Rated voltage (V) (20℃)
Tangent of loss angle (tanδ)	Rated voltage (V): 6.3 / 10 / 16 / 25 / 35 tanδ (max.): 0.28 / 0.24 / 0.20 / 0.16 / 0.14 0.02 is added to every 1000μF increase over 1000μF. (20℃,120Hz)
Characteristics at high and low temperature	Rated voltage (V): 6.3 / 10 / 16 / 25 / 35 Impedance ratio (max.) Z−25℃/Z+20℃: 4 / 3 / 2 / 2 / 2 Impedance ratio (max.) Z−55℃/Z+20℃: 8 / 5 / 4 / 3 / 3 (120Hz)
Endurance (105℃) (Applied ripple current)	Test time: 1000 hours (φ8×6.5L or less) 2000 hours (φ8×10L to φ10) 5000 hours (φ12.5) Leakage current: The initial specified value or less Percentage of capacitance change: Within ±25% of initial value Tangent of the loss angle: 200% or less of initial specified value
Shelf life (105℃)	Test time : 1000hours ; other items are same as the endurance. Voltage application treatment : According to JIS C5101-4 4.1
Applicable standards	JIS C5101 - 1,- 18 (IEC 60384 - 1,- 18)

Outline Drawing

Unit : mm



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φD	L	A	B	C	M	W	P	Size code
4	5.3±0.2	4.3	4.3	2.0	0.4±0.2	0.5 to 0.8	1.0	BC3
4	5.8±0.3	4.3	4.3	2.0	0.4±0.2	0.5 to 0.8	1.0	BC8
5	5.3±0.2	5.3	5.3	2.3	0.4±0.2	0.5 to 0.8	1.5	CC3
5	5.8±0.3	5.3	5.3	2.3	0.4±0.2	0.5 to 0.8	1.5	CC8
6.3	5.3±0.2	6.6	6.6	2.7	0.4±0.2	0.5 to 0.8	2.0	DC3
6.3	5.8±0.3	6.6	6.6	2.7	0.4±0.2	0.5 to 0.8	2.0	DC8
6.3	7.7±0.3	6.6	6.6	2.7	0.4±0.2	0.5 to 0.8	2.0	DE7
8	6.5±0.3	8.4	8.4	3.4	0.4±0.2	0.5 to 0.8	2.3	ED5
8	10.0±0.5	8.4	8.4	3.0	0.4±0.2	0.7 to 1.1	3.1	EH0
8	10.5±0.5	8.4	8.4	3.0	0.4±0.2	0.7 to 1.1	3.1	EH5
10	10.0±0.5	10.4	10.4	3.3	0.4±0.2	0.7 to 1.1	4.7	FH0
10	10.5±0.5	10.4	10.4	3.3	0.4±0.2	0.7 to 1.1	4.7	FH5
12.5	13.5±0.5	13.0	13.0	4.9	0.7±0.3	1.0 to 1.4	4.6	GL5

Refer to individual page.
(Soldering conditions, Land pattern size, The taping specifications)

Coefficient of Frequency for Rated Ripple Current

Rated voltage (V) \ Frequency (Hz)	120	1k	10k	100k
6.3 to 35	0.50	0.75	0.90	1

Product code system (*For general product)

φ8×6.5L and φ6.3 or less (example : 6.3V330μF)

RS*	VVZ	331	M	1J	ED5	002	U
Category code	Series code	capacitance code	Cap tol. code	Voltage code	Size code	Taping and packing code	Additional code

φ8×10L, φ8×10.5L (example : 10V220μF)

RS*	VVZ	221	M	1L	EH0	002	Y1U
Category code	Series code	capacitance code	Cap tol. code	Voltage code	Size code	Taping and packing code	Additional code

φ10 (example : 16V330μF)

RS*	VVZ	331	M	1E	FH0	002	EU
Category code	Series code	capacitance code	Cap tol. code	Voltage code	Size code	Taping and packing code	Additional code

φ12.5 (example : 25V680μF)

RS*	VVZ	681	M	1T	GL5	005	T
Category code	Series code	capacitance code	Cap tol. code	Voltage code	Size code	Taping and packing code	Additional code

・If "For Vibration Resistance" type is required, please see the series VTZ.
・For details, refer to the various "Product Code System" pages.

NOTE : Design, Specifications are subject to change without notice.
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from ELNA to ensure that the component is suitable for your use.

Code in front of series have been extracted from product code, which describes the segment of products, such as type and features.

Standard Ratings

Rated voltage (V) / Item / Rated capacitance (μF)	6.3 (1J)				10 (1L)				16 (1E)				25 (1T)				35 (1G)			
	Case φD×L (mm)	Size code	ESR (Ω max.)	Rated ripple current (mArms)	Case φD×L (mm)	Size code	ESR (Ω max.)	Rated ripple current (mArms)	Case φD×L (mm)	Size code	ESR (Ω max.)	Rated ripple current (mArms)	Case φD×L (mm)	Size code	ESR (Ω max.)	Rated ripple current (mArms)	Case φD×L (mm)	Size code	ESR (Ω max.)	Rated ripple current (mArms)
4.7	—	—	—	—	—	—	—	—	—	—	—	—	4×5.3	BC3	3.20	65	4×5.3	BC3	3.20	65
10	—	—	—	—	4×5.3	BC3	3.20	65	4×5.3	BC3	3.20	65	4×5.8	BC8	1.80	80	5×5.3	CC3	1.50	110
													5×5.3	CC3	1.50	110	5×5.8	CC8	0.76	150
15	—	—	—	—	—	—	—	—	4×5.8	BC8	1.80	80	5×5.8	CC8	0.76	150	5×5.8	CC8	0.76	150
22	4×5.3	BC3	3.20	65	4×5.8	BC8	1.80	80	5×5.3	CC3	1.50	110	5×5.8	CC8	0.76	150	5×5.8	CC8	0.76	150
	4×5.8	BC8	1.80	80	5×5.3	CC3	1.50	110	5×5.8	CC8	0.76	150	6.3×5.3	DC3	0.85	170	6.3×5.3	DC3	0.85	170
33	5×5.3	CC3	1.50	110	5×5.3	CC3	1.50	110	6.3×5.3	DC3	0.85	170	6.3×5.3	DC3	0.85	170	6.3×5.3	DC3	0.85	170
	5×5.8	CC8	0.76	150	5×5.8	CC8	0.76	150	6.3×5.8	DC8	0.44	230	6.3×5.8	DC8	0.44	230	6.3×5.8	DC8	0.44	230
47	5×5.3	CC3	1.50	110	6.3×5.3	DC3	0.85	170	6.3×5.3	DC3	0.85	170	6.3×5.3	DC3	0.85	170	6.3×5.8	DC8	0.44	230
																	6.3×7.7	DE7	0.34	280
	5×5.8	CC8	0.76	150	6.3×5.8	DC8	0.44	230	6.3×5.8	DC8	0.44	230	6.3×5.8	DC8	0.44	230	8×6.5	ED5	0.34	280
68	6.3×5.8	DC8	0.44	230	6.3×5.8	DC8	0.44	230	6.3×5.8	DC8	0.44	230	6.3×5.8	DC8	0.44	230	6.3×7.7	DE7	0.34	280
																	8×6.5	ED5	0.34	280
100	6.3×5.3	DC3	0.85	170	6.3×5.3	DC3	0.85	170	6.3×5.3	DC3	0.85	170	6.3×7.7	DE7	0.34	280	8×10	EH0	0.20	450
									6.3×5.8	DC8	0.44	230								
	6.3×5.8	DC8	0.44	230	6.3×5.8	DC8	0.44	230	8×6.5	ED5	0.34	280	8×6.5	ED5	0.34	280	8×10.5	EH5	0.17	450
150	6.3×5.8	DC8	0.44	230	6.3×5.8	DC8	0.44	230	6.3×7.7	DE7	0.34	280	8×10	EH0	0.20	450	8×10.5	EH5	0.17	450
									8×6.5	ED5	0.34	280	8×10.5	EH5	0.17	450	10×10	FH0	0.10	670
220	6.3×5.8	DC8	0.44	230	6.3×7.7	DE7	0.34	280	6.3×7.7	DE7	0.34	280	8×10.5	EH5	0.17	450	8×10.5	EH5	0.17	450
					8×6.5	ED5	0.34	280												
	6.3×7.7	DE7	0.34	280	8×10	EH0	0.20	450	8×10	EH0	0.20	450	10×10	FH0	0.10	670	10×10	FH0	0.10	670
330	6.3×7.7	DE7	0.34	280	8×10.5	EH5	0.17	450	8×10.5	EH5	0.17	450	8×10.5	EH5	0.17	450	10×10.5	FH5	0.09	670
	8×6.5	ED5	0.34	280																
	8×10	EH0	0.20	450	10×10	FH0	0.10	670	10×10	FH0	0.10	670	10×10	FH0	0.10	670				
470	8×10.5	EH5	0.17	450	8×10.5	EH5	0.17	450	8×10.5	EH5	0.17	450	10×10.5	FH5	0.09	670	12.5×13.5	GL5	0.06	1100
	10×10	FH0	0.10	670	10×10	FH0	0.10	670	10×10	FH0	0.10	670								
680	8×10.5	EH5	0.17	450	10×10.5	FH5	0.09	670	10×10.5	FH5	0.09	670	12.5×13.5	GL5	0.06	1100	12.5×13.5	GL5	0.06	1100
1000	8×10.5	EH5	0.17	450	10×10.5	FH5	0.09	670	12.5×13.5	GL5	0.06	1100	12.5×13.5	GL5	0.06	1100	—	—	—	—
	10×10	FH0	0.10	670																
1500	10×10.5	FH5	0.09	670	12.5×13.5	GL5	0.06	1100	12.5×13.5	GL5	0.06	1100	—	—	—	—	—	—	—	—
2200	12.5×13.5	GL5	0.06	1100	12.5×13.5	GL5	0.06	1100	—	—	—	—	—	—	—	—	—	—	—	—
2700	12.5×13.5	GL5	0.06	1100	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

(Note) Rated ripple current : 105℃, 100kHz ; ESR : 20℃, 100kHz

NOTE : Design, Specifications are subject to change without notice.
It is recommended that you shall obtain technical specifications
from ELNA to ensure that the component is suitable for your use.

Return to Type List

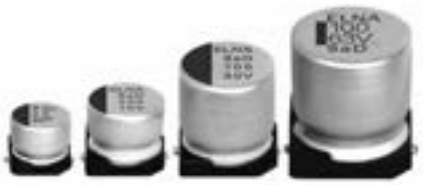
ELNA Vertical Chip Type Aluminum Electrolytic Capacitors VVD series

Code in front of series have been extracted from product code, which describes the segment of products, such as type and features.

- Compatible with surface mounting, low ESR, long life capacitors.
- Environmental : GREEN CAP™ , RoHS compliance.
- Supplied with carrier taping.
- Guaranteed 2000 hours at 105℃.
  (6.3V to 50V 10.0L,10.5L:5000 hours)
  (φ12.5 : 5000 hours)

Low ESR, Long life

VVD ⇦ VVZ



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Specifications

Item	Performance
Category temperature range (℃)	−55 to +105
Tolerance at rated capacitance (%)	±20 (20℃,120Hz)
Leakage current (μA) (max.)	0.01CV or 3 whichever is larger (after 2 minutes) C : Rated capacitance (μF) , V : Rated voltage (V) (20℃)
Tangent of loss angle (tanδ)	

Rated voltage (V)	6.3	10	16	25	35	50	63	80	100
tanδ (max.)	0.26	0.19	0.16	0.14	0.12	0.10	0.08	0.08	0.07

0.02 is added to every 1000μF increase over 1000μF. (20℃,120Hz)

Characteristics at high and low temperature

Rated voltage (V)		6.3	10	16	25	35	50	63	80	100
Impedance ratio (max.)	Z−25℃/Z+20℃	2	2	2	2	2	2	2	2	2
	Z−40℃/Z+20℃	3	3	3	3	3	3	3	3	3
	Z−55℃/Z+20℃	8	4	4	3	3	3	3	3	3

(120Hz)

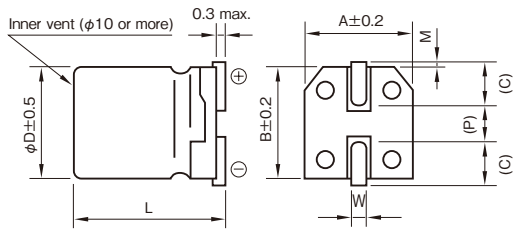
Endurance (105℃) (Applied ripple current)

Test time	2000 hours (φ12.5, 6.3V to 50V 10.0L,10.5L : 5000 hours)
Leakage current	The initial specified value or less
Percentage of capacitance change	Within ±30% of initial value
Tangent of the loss angle	200% or less of the initial specified value (φ12.5, 6.3V to 50V 10.0L,10.5L : 300% or less)

Shelf life (105℃)	Test time : 1000hours ; other items are same as the endurance. Voltage application treatment : According to JIS C5101-4 4.1
Applicable standards	JIS C5101 - 1,- 18 (IEC 60384 - 1,- 18)

Outline Drawing

Unit : mm



( ): Reference size

φD	L	A	B	C	M	W	P	Size code
4	5.8±0.3	4.3	4.3	2.0	0.4±0.2	0.5 to 0.8	1.0	BC8
5	5.8±0.3	5.3	5.3	2.3	0.4±0.2	0.5 to 0.8	1.5	CC8
6.3	5.8±0.3	6.6	6.6	2.7	0.4±0.2	0.5 to 0.8	2.0	DC8
6.3	7.7±0.3	6.6	6.6	2.7	0.4±0.2	0.5 to 0.8	2.0	DE7
8	6.5±0.3	8.4	8.4	3.4	0.4±0.2	0.5 to 0.8	2.3	ED5
8	10±0.5	8.4	8.4	3.0	0.4±0.2	0.7 to 1.1	3.1	EH0
8	10.5±0.5	8.4	8.4	3.0	0.4±0.2	0.7 to 1.1	3.1	EH5
10	10±0.5	10.4	10.4	3.3	0.4±0.2	0.7 to 1.1	4.7	FH0
10	10.5±0.5	10.4	10.4	3.3	0.4±0.2	0.7 to 1.1	4.7	FH5
12.5	13.5±0.5	13.0	13.0	4.9	0.7±0.3	1.0 to 1.4	4.6	GL5

Refer to individual page.
(Soldering conditions, Land pattern size, The taping specifications)

Coefficient of Frequency for Rated Ripple Current

Rated voltage (V) \ Frequency (Hz)	50・60	120	1k	10k・100k
6.3 to 100	0.50	0.50	0.75	1

Product code system (*For general product)

φ10 or less (example : 16V100μF)

RS*	VVD	101	M	1E	DC8	002	U
Category code	Series code	capacitance code	Cap tol. code	Voltage code	Size code	Taping and packing code	Additional code

φ12.5 (example : 16V1000μF)

RS*	VVD	102	M	1E	GL5	005	T
Category code	Series code	capacitance code	Cap tol. code	Voltage code	Size code	Taping and packing code	Additional code

・If "For Vibration Resistance" type is required, please see the series VTD.
・For details, refer to the various "Product Code System" pages.

NOTE : Design, Specifications are subject to change without notice.
It is recommended that you shall obtain technical specifications from ELNA to ensure that the component is suitable for your use.

Code in front of series have been extracted from product code, which describes the segment of products, such as type and features.

Standard Ratings

Rated voltage (V) / Item / Rated capacitance (μF)	6.3 (1J)				10 (1L)				16 (1E)			
	Case φD×L (mm)	Size code	ESR (Ω max.)	Rated ripple current (mArms)	Case φD×L (mm)	Size code	ESR (Ω max.)	Rated ripple current (mArms)	Case φD×L (mm)	Size code	ESR (Ω max.)	Rated ripple current (mArms)
10	—	—	—	—	—	—	—	—	4×5.8	BC8	1.35	90
22	4×5.8	BC8	1.35	90	4×5.8	BC8	1.35	90	4×5.8	BC8	1.35	90
									5×5.8	CC8	0.70	170
33	—	—	—	—	4×5.8	BC8	1.35	90	—	—	—	—
					5×5.8	CC8	0.70	170				
47	4×5.8	BC8	1.35	90	—	—	—	—	5×5.8	CC8	0.70	170
	5×5.8	CC8	0.70	170					6.3×5.8	DC8	0.36	250
100	5×5.8	CC8	0.70	170	—	—	—	—	6.3×5.8	DC8	0.36	250
	6.3×5.8	DC8	0.36	250								
220	6.3×5.8	DC8	0.36	250	6.3×7.7	DE7	0.30	300	6.3×7.7	DE7	0.30	300
					8×6.5	ED5	0.30	300	8×6.5	ED5	0.30	300
330	6.3×7.7	DE7	0.30	300	8×10	EH0	0.16	600	8×10	EH0	0.16	600
	8×6.5	ED5	0.30	300								
470	8×10	EH0	0.16	600	8×10	EH0	0.16	600	8×10	EH0	0.16	600
680	—	—	—	—	8×10	EH0	0.16	600	10×10	FH0	0.090	850
									10×10.5	FH5	0.080	850
1000	8×10	EH0	0.16	600	10×10	FH0	0.090	850	12.5×13.5	GL5	0.054	1160
					10×10.5	FH5	0.080	850				
1500	10×10	FH0	0.090	850	12.5×13.5	GL5	0.054	1160	12.5×13.5	GL5	0.054	1160
	10×10.5	FH5	0.080	850								
2200	12.5×13.5	GL5	0.054	1160	12.5×13.5	GL5	0.054	1160	—	—	—	—

Rated voltage (V) / Item / Rated capacitance (μF)	25 (1T)				35 (1G)				50 (1U)			
	Case φD×L (mm)	Size code	ESR (Ω max.)	Rated ripple current (mArms)	Case φD×L (mm)	Size code	ESR (Ω max.)	Rated ripple current (mArms)	Case φD×L (mm)	Size code	ESR (Ω max.)	Rated ripple current (mArms)
4.7	—	—	—	—	4×5.8	BC8	1.35	90	4×5.8	BC8	2.7	60
10	4×5.8	BC8	1.35	90	4×5.8	BC8	1.35	90	5×5.8	CC8	1.5	90
					5×5.8	CC8	0.70	170	6.3×5.8	DC8	0.86	170
22	5×5.8	CC8	0.70	170	5×5.8	CC8	0.70	170	6.3×5.8	DC8	0.86	170
33	5×5.8	CC8	0.70	170	6.3×5.8	DC8	0.36	250	6.3×7.7	DE7	0.66	195
	6.3×5.8	DC8	0.36	250					8×6.5	ED5	0.63	200
47	6.3×5.8	DC8	0.36	250	6.3×5.8	DC8	0.36	250	6.3×7.7	DE7	0.66	195
									8×6.5	ED5	0.63	200
100	6.3×7.7	DE7	0.30	300	6.3×7.7	DE7	0.30	300	8×10	EH0	0.34	350
	8×6.5	ED5	0.30	300	8×10	EH0	0.16	600	8×10.5	EH5	0.32	350
220	8×10	EH0	0.16	600	8×10	EH0	0.16	600	10×10	FH0	0.20	700
									10×10.5	FH5	0.18	700
330	8×10	EH0	0.16	600	10×10	FH0	0.090	850	12.5×13.5	GL5	0.12	900
					10×10.5	FH5	0.080	850				
470	10×10	FH0	0.090	850	12.5×13.5	GL5	0.054	1160	—	—	—	—
	10×10.5	FH5	0.080	850								
680	12.5×13.5	GL5	0.054	1160	12.5×13.5	GL5	0.054	1160	—	—	—	—
1000	12.5×13.5	GL5	0.054	1160	—	—	—	—	—	—	—	—

Rated voltage (V) / Item / Rated capacitance (μF)	63 (4E)				80 (1R)				100 (1H)			
	Case φD×L (mm)	Size code	ESR (Ω max.)	Rated ripple current (mArms)	Case φD×L (mm)	Size code	ESR (Ω max.)	Rated ripple current (mArms)	Case φD×L (mm)	Size code	ESR (Ω max.)	Rated ripple current (mArms)
4.7	5×5.8	CC8	3.0	50	—	—	—	—	—	—	—	—
10	6.3×5.8	DC8	1.5	80	6.3×7.7	DE7	2.4	60	—	—	—	—
22	6.3×7.7	DE7	1.2	120	8×10	EH0	0.90	130	8×10	EH0	1.30	130
33	8×10	EH0	0.65	250	8×10	EH0	0.90	130	10×10	FH0	0.70	200
47	8×10	EH0	0.65	250	10×10	FH0	0.50	200	—	—	—	—
68	8×10	EH0	0.65	250	—	—	—	—	—	—	—	—
100	10×10	FH0	0.35	400	12.5×13.5	GL5	0.18	550	—	—	—	—
	12.5×13.5	GL5	0.16	600								
220	12.5×13.5	GL5	0.16	600	—	—	—	—	—	—	—	—

(Note) Rated ripple current : 105℃, 100kHz
ESR : 20℃, 100kHz

NOTE : Design, Specifications are subject to change without notice.
It is recommended that you shall obtain technical specifications
from ELNA to ensure that the component is suitable for your use.

Return to Type List

ELNA Vertical Chip Type Aluminum Electrolytic Capacitors VVV, VTV series

Code in front of series have been extracted from product code, which describes the segment of products, such as type and features.

- Compatible with surface mounting, low ESR capacitors.
- Environmental : GREEN CAP™ , RoHS compliance.
- Supplied with carrier taping.
- Guaranteed 2000 hours at 105℃.

Vibration resistance ⇦ Low ESR

VTV ⇦ VVV ⇦ VVD

Marking color : Black print

Specifications

Item	Performance
Category temperature range (℃)	−55 to +105
Tolerance at rated capacitance (%)	±20 (20℃,120Hz)
Leakage current (μA) (max.)	0.01CV or 3 whichever is larger (after 2 minutes) C : Rated capacitance (μF) , V : Rated voltage (V) (20℃)
Tangent of loss angle (tanδ)	
Characteristics at high and low temperature	
Endurance (105℃) (Applied ripple current)	
Shelf life (105℃)	Test time : 1000hours ; other items are same as the endurance. Voltage application treatment : According to JIS C5101-4 4.1
Applicable standards	JIS C5101 - 1,- 18 (IEC 60384 - 1,- 18)

Tangent of loss angle (tanδ):

Rated voltage (V)	6.3	10	16	25	35	50
tanδ (max.)	0.26	0.19	0.16	0.14	0.12	0.10

(20℃,120Hz)

Characteristics at high and low temperature:

Rated voltage (V)		6.3	10	16	25	35	50
Impedance ratio (max.)	Z−25℃/Z+20℃	2	2	2	2	2	2
	Z−40℃/Z+20℃	3	3	3	3	3	3
	Z−55℃/Z+20℃	4	4	4	3	3	3

(120Hz)

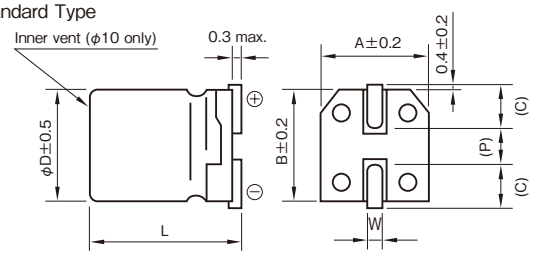
Endurance (105℃) (Applied ripple current):

Test time	2000 hours
Leakage current	The initial specified value or less
Percentage of capacitance change	Within ±30% of initial value
Tangent of the loss angle	200% or less of initial specified value

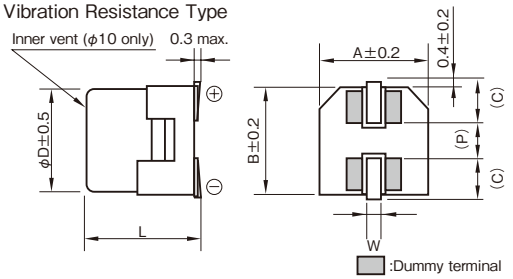
Outline Drawing

Unit : mm

Standard Type



For Vibration Resistance Type



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φD	L	A	B	C	W	P	Size code
6.3	5.8±0.3	6.6	6.6	2.7	0.5 to 0.8	2.0	DC8
6.3	7.7±0.3	6.6	6.6	2.7	0.5 to 0.8	2.0	DE7
8	10±0.5	8.4	8.4	3.0	0.7 to 1.1	3.1	EH0
10	10±0.5	10.4	10.4	3.3	0.7 to 1.1	4.7	FH0

Refer to individual page.
(Soldering conditions, Land pattern size, The taping specifications)

Coefficient of Frequency for Rated Ripple Current

Rated voltage (V) \ Frequency (Hz)	50・60	120	1k	10k・100k
6.3 to 50	0.50	0.50	0.75	1

Product code system (*For general product)

Standard Type (example : 16V100μF)

RS*	VVV	101	M	1E	DC8	002	U
Category code	Series code	capacitance code	Cap tol. code	Voltage code	Size code	Taping and packing code	Additional code

For Vibration Resistance Type (example : 25V470μF)

RS*	VTV	471	M	1T	FH0	002	U
Category code	Series code	capacitance code	Cap tol. code	Voltage code	Size code	Taping and packing code	Additional code

For details, refer to the various "Product Code System" pages.

NOTE : Design, Specifications are subject to change without notice.
It is recommended that you shall obtain technical specifications
from ELNA to ensure that the component is suitable for your use.

Code in front of series have been extracted from product code, which describes the segment of products, such as type and features.

Standard Ratings

Rated voltage (V) / Item / Rated capacitance (μF)	6.3 (1J)				10 (1L)				16 (1E)			
	Case φD × L (mm)	Size code	ESR (Ω max.)	Rated ripple current (mArms)	Case φD × L (mm)	Size code	ESR (Ω max.)	Rated ripple current (mArms)	Case φD × L (mm)	Size code	ESR (Ω max.)	Rated ripple current (mArms)
47	—	—	—	—	—	—	—	—	6.3 × 5.8	DC8	0.26	300
100	6.3 × 5.8	DC8	0.26	300	—	—	—	—	6.3 × 5.8	DC8	0.26	300
									6.3 × 7.7	DE7	0.16	600
220	6.3 × 5.8	DC8	0.26	300	6.3 × 7.7	DE7	0.16	600	6.3 × 7.7	DE7	0.16	600
330	6.3 × 7.7	DE7	0.16	600	8 × 10	EH0	0.09	850	8 × 10	EH0	0.09	850
470	8 × 10	EH0	0.09	850	8 × 10	EH0	0.09	850	8 × 10	EH0	0.09	850
680	—	—	—	—	8 × 10	EH0	0.09	850	10 × 10	FH0	0.07	1190
1000	8 × 10	EH0	0.09	850	10 × 10	FH0	0.07	1190	—	—	—	—
1500	10 × 10	FH0	0.07	1190	—	—	—	—	—	—	—	—

Rated voltage (V) / Item / Rated capacitance (μF)	25 (1T)				35 (1G)				50 (1U)			
	Case φD × L (mm)	Size code	ESR (Ω max.)	Rated ripple current (mArms)	Case φD × L (mm)	Size code	ESR (Ω max.)	Rated ripple current (mArms)	Case φD × L (mm)	Size code	ESR (Ω max.)	Rated ripple current (mArms)
33	6.3 × 5.8	DC8	0.26	300	6.3 × 5.8	DC8	0.26	300	—	—	—	—
47	6.3 × 5.8	DC8	0.26	300	6.3 × 5.8	DC8	0.26	300	—	—	—	—
100	6.3 × 7.7	DE7	0.16	600	6.3 × 7.7	DE7	0.16	600	8 × 10	EH0	0.18	670
					8 × 10	EH0	0.09	850				
220	8 × 10	EH0	0.09	850	8 × 10	EH0	0.09	850	10 × 10	FH0	0.12	900
330	8 × 10	EH0	0.09	850	10 × 10	FH0	0.07	1190	—	—	—	—
470	10 × 10	FH0	0.07	1190	—	—	—	—	—	—	—	—

(Note) Rated ripple current : 105℃ , 100kHz
ESR : 20℃ , 100kHz

NOTE : Design, Specifications are subject to change without notice.
It is recommended that you shall obtain technical specifications
from ELNA to ensure that the component is suitable for your use.

Return to Type List

ELNA Vertical Chip Type Aluminum Electrolytic Capacitors VZD, VMD series

Code in front of series have been extracted from product code, which describes the segment of products, such as type and features.

- Compatible with surface mounting, low ESR, high CV capacitors.
- Environmental : GREEN CAP™ , RoHS compliance.
- Supplied with carrier taping.
- Guaranteed 2000 hours at 105°C.

Vibration resistance ⇦ High CV

VMD ⇦ VZD ⇦ VVV

Marking color : Black print

Specifications

Item	Performance
Category temperature range (℃)	−55 to +105
Tolerance at rated capacitance (%)	±20 (20℃,120Hz)
Leakage current (μA) (max.)	0.01CV or 3 whichever is larger (after 2 minutes) C : Rated capacitance (μF) , V : Rated voltage (V) (20℃)
Tangent of loss angle (tanδ)	
Characteristics at high and low temperature	
Endurance (105℃) (Applied ripple current)	
Shelf life (105℃)	Test time : 1000hours ; other items are same as the endurance. Voltage application treatment : According to JIS C5101-4 4.1
Applicable standards	JIS C5101 - 1,- 18 (IEC 60384 - 1,- 18)

Tangent of loss angle (tanδ):

Rated voltage (V)	6.3	10	16	25	35	50
tanδ (max.)	0.26	0.19	0.16	0.14	0.12	0.10

0.02 is added to every 1000μF increase over 1000μF. (20℃,120Hz)

Characteristics at high and low temperature:

Rated voltage (V)		6.3	10	16	25	35	50
Impedance ratio (max.)	Z−25℃/Z+20℃	2	2	2	2	2	2
	Z−40℃/Z+20℃	3	3	3	3	3	3
	Z−55℃/Z+20℃	4	4	4	3	3	3

(120Hz)

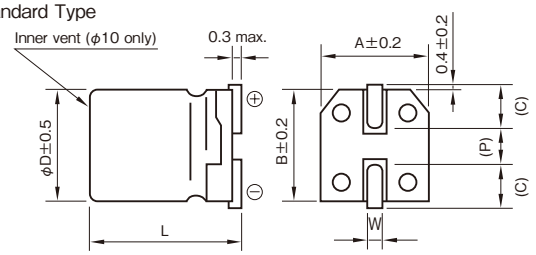
Endurance (105℃) (Applied ripple current):

Test time	2000 hours
Leakage current	The initial specified value or less
Percentage of capacitance change	Within ±30% of initial value
Tangent of the loss angle	200% or less of the initial specified value

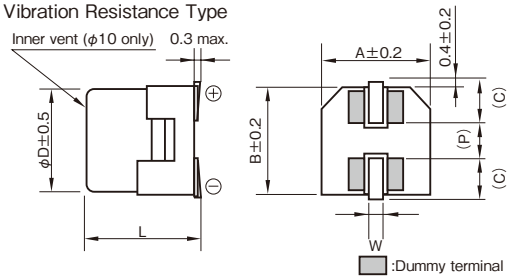
Outline Drawing

Unit : mm

Standard Type



For Vibration Resistance Type



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φD	L	A	B	C	W	P	Size code
6.3	5.8±0.3	6.6	6.6	2.7	0.5 to 0.8	2.0	DC8
6.3	7.7±0.3	6.6	6.6	2.7	0.5 to 0.8	2.0	DE7
8	10±0.5	8.4	8.4	3.0	0.7 to 1.1	3.1	EH0
10	10±0.5	10.4	10.4	3.3	0.7 to 1.1	4.7	FH0

Refer to individual page.
(Soldering conditions, Land pattern size, The taping specifications)

Coefficient of Frequency for Rated Ripple Current

Rated voltage (V) \ Frequency (Hz)	50・60	120	1k	10k・100k
6.3 to 50	0.50	0.50	0.75	1

Product code system (*For general product)

Standard Type (example : 35V150μF)

RS*	VZD	151	M	1G	DE7	002	U
Category code	Series code	capacitance code	Cap tol. code	Voltage code	Size code	Taping and packing code	Additional code

For Vibration Resistance Type (example : 25V820μF)

RS*	VMD	821	M	1T	FH0	002	U
Category code	Series code	capacitance code	Cap tol. code	Voltage code	Size code	Taping and packing code	Additional code

For details, refer to the various "Product Code System" pages.

NOTE : Design, Specifications are subject to change without notice.
It is recommended that you shall obtain technical specifications
from ELNA to ensure that the component is suitable for your use.

Code in front of series have been extracted from product code, which describes the segment of products, such as type and features.

Standard Ratings

Rated voltage (V) / Item / Rated capacitance (μF)	6.3 (1J)				10 (1L)				16 (1E)			
	Case φD × L (mm)	Size code	ESR (Ω max.)	Rated ripple current (mArms)	Case φD × L (mm)	Size code	ESR (Ω max.)	Rated ripple current (mArms)	Case φD × L (mm)	Size code	ESR (Ω max.)	Rated ripple current (mArms)
150	—	—	—	—	—	—	—	—	6.3 × 5.8	DC8	0.26	300
220	—	—	—	—	6.3 × 5.8	DC8	0.26	300	6.3 × 5.8	DC8	0.26	300
330	6.3 × 5.8	DC8	0.26	300	6.3 × 7.7	DE7	0.16	600	6.3 × 7.7	DE7	0.16	600
470	6.3 × 7.7	DE7	0.16	600	6.3 × 7.7	DE7	0.16	600	—	—	—	—
680	6.3 × 7.7	DE7	0.16	600	—	—	—	—	8 × 10	EH0	0.08	850
1000	—	—	—	—	8 × 10	EH0	0.08	850	10 × 10	FH0	0.06	1190
1500	8 × 10	EH0	0.08	850	10 × 10	FH0	0.06	1190	—	—	—	—
2200	10 × 10	FH0	0.06	1190	—	—	—	—	—	—	—	—

Rated voltage (V) / Item / Rated capacitance (μF)	25 (1T)				35 (1G)				50 (1U)			
	Case φD × L (mm)	Size code	ESR (Ω max.)	Rated ripple current (mArms)	Case φD × L (mm)	Size code	ESR (Ω max.)	Rated ripple current (mArms)	Case φD × L (mm)	Size code	ESR (Ω max.)	Rated ripple current (mArms)
47	—	—	—	—	—	—	—	—	6.3 × 5.8	DC8	0.68	195
100	—	—	—	—	6.3 × 5.8	DC8	0.26	300	6.3 × 7.7	DE7	0.34	350
150	6.3 × 5.8	DC8	0.26	300	6.3 × 7.7	DE7	0.16	600	—	—	—	—
220	6.3 × 7.7	DE7	0.16	600	—	—	—	—	8 × 10	EH0	0.18	670
330	—	—	—	—	8 × 10	EH0	0.08	850	10 × 10	FH0	0.12	900
470	8 × 10	EH0	0.08	850	—	—	—	—	—	—	—	—
560	—	—	—	—	10 × 10	FH0	0.06	1190	—	—	—	—
820	10 × 10	FH0	0.06	1190	—	—	—	—	—	—	—	—

(Note) Rated ripple current : 105℃ , 100kHz
ESR : 20℃ , 100kHz

NOTE : Design, Specifications are subject to change without notice.
It is recommended that you shall obtain technical specifications
from ELNA to ensure that the component is suitable for your use.

Return to Type List

ELNA Vertical Chip Type Aluminum Electrolytic Capacitors VZK series

Code in front of series have been extracted from product code, which describes the segment of products, such as type and features.

- Compatible with surface mounting, low ESR, high CV capacitors.
- Environmental : GREEN CAP™ , RoHS compliance
- Supplied with carrier taping.
- Guaranteed 2000 hours at 105℃ .

High CV

VZK ⇦ VZD

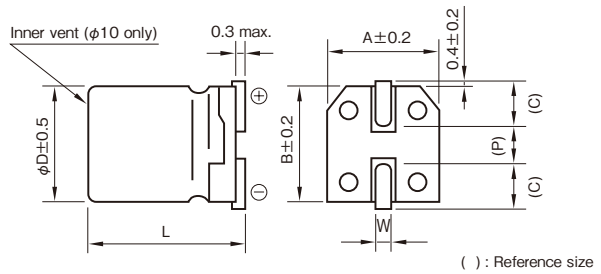
Marking color : Black print

Specifications

Item	Performance
Category temperature range (℃)	− 55 to + 105
Tolerance at rated capacitance (%)	± 20 (20℃ , 120Hz)
Leakage current (μA) (max.)	0.01CV or 3 whichever is larger (after 2 minutes) C : Rated capacitance (μF) ; V : Rated voltage (V) (20℃)
Tangent of loss angle (tanδ)	Rated voltage (V): 25 / 35 tanδ (max.): 0.14 / 0.12 0.02 is added to every 1000μF increase over 1000μF (20℃ , 120Hz)
Characteristics at high and low temperature	Rated voltage (V): 25 / 35 Impedance ratio (max.) Z− 25℃ / Z+ 20℃: 2 / 2 Impedance ratio (max.) Z− 40℃ / Z+ 20℃: 3 / 3 Impedance ratio (max.) Z− 55℃ / Z+ 20℃: 3 / 3 (120Hz)
Endurance (105℃) (Applied ripple current)	Test time: 2000 hours Leakage current: The initial specified value or less Percentage of capacitance change: Within ± 30% of initial value Tangent of the loss angle: 200% or less of the initial specified value
Shelf life (105℃)	Test time : 1000hours ; other items are same as the endurance. Voltage application treatment : According to JIS C5101-4 4.1
Applicable standards	JIS C5101-1, -18 (IEC 60384-1, -18)

Outline Drawing

Unit : mm



( ) : Reference size

φD	L	A	B	C	W	P	Size code
8	10 ± 0.5	8.4	8.4	3.0	0.7 to 1.1	3.1	EH0
10	10 ± 0.5	10.4	10.4	3.3	0.7 to 1.1	4.7	FH0

Refer to individual page.
(Soldering conditions, Land pattern size, The taping specifications)

Coefficient of Frequency for Rated Ripple Current

Rated voltage (V) \ Frequency (Hz)	50・60	120	1k	10k・100k
25 to 35	0.50	0.50	0.75	1

Product code system : 35V680μF (*For general product)

RS*	VZK	681	M	1G	FH0	002	U
Category code	Series code	capacitance code	Cap tol. code	Voltage code	Size code	Taping and packing code	Additional code

For details, refer to the various "Product Code System" pages.

Standard Ratings

Rated voltage (V) / Item / Rated capacitance (μF)	25 (1T)				35 (1G)			
	Case φD × L (mm)	Size code	ESR (Ω max.)	Rated ripple current (mArms)	Case φD × L (mm)	Size code	ESR (Ω max.)	Rated ripple current (mArms)
470	—	—	—	—	8 × 10	EH0	0.08	850
560	8 × 10	EH0	0.08	850	—	—	—	—
680	—	—	—	—	10 × 10	FH0	0.06	1190
1000	10 × 10	FH0	0.06	1190	—	—	—	—

(Note) Rated ripple current : 105℃ , 100kHz
ESR : 20℃ , 100kHz

NOTE : Design, Specifications are subject to change without notice.
It is recommended that you shall obtain technical specifications from ELNA to ensure that the component is suitable for your use.

Return to Type List

ELNA Vertical Chip Type Aluminum Electrolytic Capacitors VVT series

Code in front of series have been extracted from product code, which describes the segment of products, such as type and features.

- Compatible with surface mounting, low ESR capacitors.
- Environmental : GREEN CAP™ , RoHS compliance.
- Supplied with carrier taping.
- Guaranteed 1000 to 5000 hours at 125°C.
  (See table below)

Low ESR, Long Life

VVT ⇦ VVK

Marking color : Black print

Specifications

Item	Performance
Category temperature range (℃)	−40 to +125
Tolerance at rated capacitance (%)	±20 (20℃,120Hz)
Leakage current (μA) (max.)	0.01CV or 3 whichever is larger (after 2 minutes) C : Rated capacitance (μF) ; V : Rated voltage (V) (20℃)
Tangent of loss angle (tanδ)	
Characteristics at high and low temperature	
Endurance (125℃) (Applied ripple current)	
Shelf life (125℃)	Test time : 1000hours ; other items are same as the endurance. Voltage application treatment : According to JIS C5101-4 4.1
Applicable standards	JIS C5101 - 1,- 18 (IEC 60384 - 1,- 18)

Tangent of loss angle (tanδ):

Rated voltage (V)	10	16	25	35	50	63	80	100
tanδ (max.)	0.24	0.20	0.16	0.14	0.14	0.12	0.12	0.10

(20℃,120Hz)

Characteristics at high and low temperature:

Rated voltage (V)		10	16	25	35	50	63	80	100
Impedance Ratio (max.)	Z−25℃/Z+20℃	3	2	2	2	2	2	2	2
	Z−40℃/Z+20℃	4	3	3	3	3	3	3	3

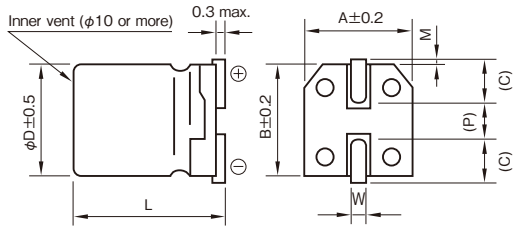
(120Hz)

Endurance (125℃) (Applied ripple current):

Test time	1000 hours (φ8x6.5L or less) 2000 hours (φ8x10L,φ10X10L) 3000 hours (63V to 100V : φ12.5) 5000 hours (50V or less : φ12.5)
Leakage current	The initial specified value or less
Capacitance change	Within ±30% of initial value
Tangent of loss angle	300% or less of the initial specified value

Outline Drawing

Unit : mm



( ) : Reference size

φD	L	A	B	C	M	W	P	Size code
4	5.8±0.3	4.3	4.3	2.0	0.4±0.2	0.5 to 0.8	1.0	BC8
5	5.8±0.3	5.3	5.3	2.3	0.4±0.2	0.5 to 0.8	1.5	CC8
6.3	5.8±0.3	6.6	6.6	2.7	0.4±0.2	0.5 to 0.8	2.0	DC8
6.3	7.7±0.3	6.6	6.6	2.7	0.4±0.2	0.5 to 0.8	2.0	DE7
8	6.5±0.3	8.4	8.4	3.4	0.4±0.2	0.5 to 0.8	2.3	ED5
8	10±0.5	8.4	8.4	3.0	0.4±0.2	0.7 to 1.1	3.1	EH0
10	10±0.5	10.4	10.4	3.3	0.4±0.2	0.7 to 1.1	4.7	FH0
12.5	13.5±0.5	13.0	13.0	4.9	0.7±0.3	1.0 to 1.4	4.6	GL5

Refer to individual page.
(Soldering conditions, Land pattern size, The taping specifications)

Coefficient of Frequency for Rated Ripple Current

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

Product code system (*For general product)

φ10 or less (example : 16V100μF)

RS*	VVT	101	M	1E	FH0	002	U
Category code	Series code	capacitance code	Cap tol. code	Voltage code	Size code	Taping and packing code	Additional code

50V or less : φ12.5 (example : 35V330μF)

RS*	VVT	331	M	1G	GL5	005	T
Category code	Series code	capacitance code	Cap tol. code	Voltage code	Size code	Taping and packing code	Additional code

63V to 100V : φ12.5 (example : 63V100μF)

RS*	VVT	101	M	4E	GL5	005	KT
Category code	Series code	capacitance code	Cap tol. code	Voltage code	Size code	Taping and packing code	Additional code

・If "For Vibration Resistance" type is required, please see the series VTT.
・For details, refer to the various "Product Code System" pages.

NOTE : Design, Specifications are subject to change without notice.
It is recommended that you shall obtain technical specifications
from ELNA to ensure that the component is suitable for your use.

Code in front of series have been extracted from product code, which describes the segment of products, such as type and features.

Standard Ratings

Rated voltage(V) / Item / Rated capacitance(μF)	10 (1L)				16 (1E)				25 (1T)			
	Case	ESR(Ω max.)		Rated ripple current	Case	ESR(Ω max.)		Rated ripple current	Case	ESR(Ω max.)		Rated ripple current
	φD×L(mm)	20℃	−40℃	(mArms)	φD×L(mm)	20℃	−40℃	(mArms)	φD×L(mm)	20℃	−40℃	(mArms)
10	—	—	—	—	4×5.8	3.0	45	50	5×5.8	1.5	23	81
22	4×5.8	3.0	45	50	5×5.8	1.5	23	81	6.3×5.8	1.0	15	114
33	5×5.8	1.5	23	81	6.3×5.8	1.0	15	114	6.3×5.8	1.0	15	114
47	—	—	—	—	6.3×5.8	1.0	15	114	6.3×7.7	0.60	9.0	165
									8×6.5	0.60	9.0	180
100	—	—	—	—	—	—	—	—	6.3×7.7	0.60	9.0	165
									8×6.5	0.60	9.0	180
									8×10	0.20	2.0	340
220	6.3×7.7	0.60	9.0	165	8×10	0.20	2.0	340	8×10	0.20	2.0	340
	8×6.5	0.60	9.0	180	10×10	0.15	1.5	500	10×10	0.15	1.5	500
330	8×10	0.20	2.0	340	10×10	0.15	1.5	500	10×10	0.15	1.5	500
	10×10	0.15	1.5	500					12.5×13.5	0.086	1.29	750
470	10×10	0.15	1.5	500	12.5×13.5	0.086	1.29	750	12.5×13.5	0.086	1.29	750
680	12.5×13.5	0.086	1.29	750	12.5×13.5	0.086	1.29	750	—	—	—	—
1000	12.5×13.5	0.086	1.29	750	—	—	—	—	—	—	—	—

Rated voltage(V) / Item / Rated capacitance(μF)	35 (1G)				50 (1U)				63 (4E)			
	Case	ESR(Ω max.)		Rated ripple current	Case	ESR(Ω max.)		Rated ripple current	Case	ESR(Ω max.)		Rated ripple current
	φD×L(mm)	20℃	−40℃	(mArms)	φD×L(mm)	20℃	−40℃	(mArms)	φD×L(mm)	20℃	−40℃	(mArms)
4.7	4×5.8	3.0	45	50	—	—	—	—	—	—	—	—
10	5×5.8	1.5	23	81	6.3×5.8	3.2	48	58	6.3×7.7	1.8	36	95
	6.3×5.8	1.0	15	114								
22	6.3×5.8	1.0	15	114	6.3×7.7	1.2	18	95	8×10	0.70	14	140
33	6.3×7.7	0.60	9.0	165	6.3×7.7	1.2	18	95	8×10	0.70	14	140
	8×6.5	0.60	9.0	180	8×10	0.50	7.5	180	10×10	0.50	10	200
47	6.3×7.7	0.60	9.0	165	8×10	0.50	7.5	180	8×10	0.70	14	140
	8×6.5	0.60	9.0	180								
	8×10	0.20	2.0	340	10×10	0.30	4.5	280	10×10	0.50	10	200
100	8×10	0.20	2.0	340	10×10	0.30	4.5	280	12.5×13.5	0.25	3.75	400
	10×10	0.15	1.5	500	12.5×13.5	0.18	2.7	550				
220	10×10	0.15	1.5	500	12.5×13.5	0.18	2.7	550	—	—	—	—
330	12.5×13.5	0.086	1.29	750	—	—	—	—	—	—	—	—

Rated voltage(V) / Item / Rated capacitance(μF)	80 (1R)				100 (1H)			
	Case	ESR(Ω max.)		Rated ripple current	Case	ESR(Ω max.)		Rated ripple current
	φD×L(mm)	20℃	−40℃	(mArms)	φD×L(mm)	20℃	−40℃	(mArms)
10	8×10	0.75	15	110	8×10	0.75	15	110
22	8×10	0.75	15	110	8×10	0.75	15	110
	10×10	0.55	11	150	10×10	0.55	11	150
33	8×10	0.75	15	110	10×10	0.55	11	150
	10×10	0.55	11	150				
47	—	—	—	—	12.5×13.5	0.32	4.8	300

(Note) Rated ripple current : 125℃, 100kHz
ESR : 100kHz

NOTE : Design, Specifications are subject to change without notice.
It is recommended that you shall obtain technical specifications
from ELNA to ensure that the component is suitable for your use.

Return to Type List

ELNA Vertical Chip Type Aluminum Electrolytic Capacitors VZJ, VMJ series

Code in front of series have been extracted from product code, which describes the segment of products, such as type and features.

- Compatible with surface mounting, low ESR, long life capacitors.
- Environmental : GREEN CAP™ , RoHS compliance.
- Supplied with carrier taping.
- Specify ESR after endurance test.
- Guaranteed 3000 hours at 125°C.
  (φ6.3 : 2000 hours)

Vibration resistance Low ESR, Long Life

VMJ ⇦ VZJ ⇦ VVT

Marking color : Black print

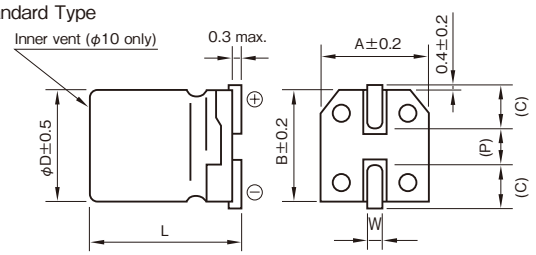
Specifications

Item	Performance
Category temperature range (℃)	−40 to +125
Tolerance at rated capacitance (%)	±20 (20℃,120Hz)
Leakage current (μA) (max.)	0.01CV or 3 whichever is larger (after 2 minutes) C : Rated capacitance (μF) ; V : Rated voltage (V) (20℃)
Tangent of loss angle (tanδ)	Rated voltage (V): 10, 16, 25, 35, 50 tanδ (max.): 0.30, 0.23, 0.18, 0.16, 0.16 (20℃,120Hz)
Characteristics at high and low temperature	Rated voltage (V): 10, 16, 25, 35, 50 Impedance ratio (max.) Z−25℃/Z+20℃: 3, 2, 2, 2, 2 Impedance ratio (max.) Z−40℃/Z+20℃: 4, 3, 3, 3, 3 (120Hz)
Endurance (125℃) (Applied ripple current)	Test time: 3000 hours (φ6.3 : 2000 hours) Leakage current: The initial specified value or less Percentage of capacitance change: Within ±30% of initial value Tangent of the loss angle: 300% or less of the initial specified value
Shelf life (125℃)	Test time : 1000hours ; other items are same as the endurance. Voltage application treatment : According to JIS C5101-4 4.1
Applicable standards	JIS C5101 - 1,- 18 (IEC 60384 - 1,- 18)

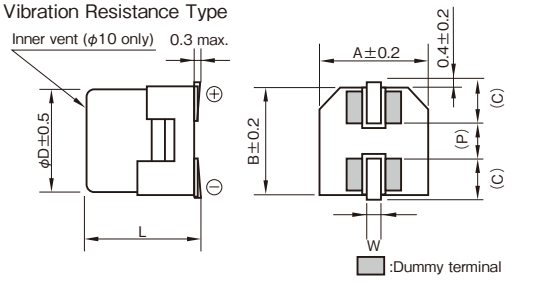
Outline Drawing

Unit : mm

Standard Type



For Vibration Resistance Type



( ): Reference size

φD	L	A	B	C	W	P	Size code
6.3	7.7±0.3	6.6	6.6	2.7	0.5~0.8	2.0	DE7
8	10±0.5	8.4	8.4	3.0	0.7~1.1	3.1	EH0
10	10±0.5	10.4	10.4	3.3	0.7~1.1	4.7	FH0

Refer to individual page.
(Soldering conditions, Land pattern size, The taping specifications)

Coefficient of Frequency for Rated Ripple Current

Rated voltage (V) \ Frequency (Hz)	120	1k	10k	100k
10 to 50	0.77	0.88	0.96	1

Product code system (*For general product)

Standard Type (example : 35V220μF)

RS*	VZJ	221	M	1G	FH0	002	U
Category code	Series code	capacitance code	Cap tol. code	Voltage code	Size code	Taping and packing code	Additional code

For Vibration Resistance Type (example : 35V220μF)

RS*	VMJ	221	M	1G	FH0	002	U
Category code	Series code	capacitance code	Cap tol. code	Voltage code	Size code	Taping and packing code	Additional code

For details, refer to the various "Product Code System" pages.

NOTE : Design, Specifications are subject to change without notice.
It is recommended that you shall obtain technical specifications
from ELNA to ensure that the component is suitable for your use.

Code in front of series have been extracted from product code, which describes the segment of products, such as type and features.

Standard Ratings

Rated voltag (V) / Item / Rated capacitance (μF)	10 (1L)						16 (1E)						25 (1T)					
	Case φD×L (mm)	Initial ESR (Ω max.)		After endurance test ESR (Ω max.)		Rated ripple current (mArms)	Case φD×L (mm)	Initial ESR (Ω max.)		After endurance test ESR (Ω max.)		Rated ripple current (mArms)	Case φD×L (mm)	Initial ESR (Ω max.)		After endurance test ESR (Ω max.)		Rated ripple current (mArms)
		20℃	−40℃	20℃	−40℃			20℃	−40℃	20℃	−40℃			20℃	−40℃	20℃	−40℃	
100	—	—	—	—	—	—	6.3×7.7	0.45	5.0	3.5	40	220	8×10	0.15	3.0	0.60	4.5	350
							8×10	0.15	3.0	0.60	4.5	350						
220	8×10	0.15	3.0	0.60	4.5	350	8×10	0.15	3.0	0.60	4.5	350	10×10	0.12	2.0	0.40	3.5	550
330	8×10	0.15	3.0	0.60	4.5	350	10×10	0.12	2.0	0.40	3.5	550	10×10	0.12	2.0	0.40	3.5	550
	10×10	0.12	2.0	0.40	3.5	550												
470	10×10	0.12	2.0	0.40	3.5	550	10×10	0.12	2.0	0.40	3.5	550	—	—	—	—	—	—

Rated voltag (V) / Item / Rated capacitance (μF)	35 (1G)						50 (1U)					
	Case φD×L (mm)	Initial ESR (Ω max.)		After endurance test ESR (Ω max.)		Rated ripple current (mArms)	Case φD×L (mm)	Initial ESR (Ω max.)		After endurance test ESR (Ω max.)		Rated ripple current (mArms)
		20℃	−40℃	20℃	−40℃			20℃	−40℃	20℃	−40℃	
22	—	—	—	—	—	—	6.3×7.7	0.50	5.0	—	40	197
33	—	—	—	—	—	—	6.3×7.7	0.50	5.0	—	40	197
							8×10	0.25	3.5	—	6	270
47	6.3×7.7	0.45	5.0	3.5	40	220	6.3×7.7	0.50	5.0	—	40	197
	8×10	0.15	3.0	0.60	4.5	350	8×10	0.25	3.5	—	6	270
100	8×10	0.15	3.0	0.60	4.5	350	10×10	0.20	2.5	—	4.5	500
220	10×10	0.12	2.0	0.40	3.5	550	—	—	—	—	—	—

(Note) After endurance test : 2000 hours
Rated ripple current : 125℃ , 100kHz, ESR : 100kHz

NOTE : Design, Specifications are subject to change without notice.
It is recommended that you shall obtain technical specifications
from ELNA to ensure that the component is suitable for your use.

Return to Type List

ELNA Vertical Chip Type Aluminum Electrolytic Capacitors VZF, VMF series

Code in front of series have been extracted from product code, which describes the segment of products, such as type and features.

- Compatible with surface mounting, low ESR, high CV, long life capacitors.
- Environmental : GREEN CAP™ , RoHS compliance.
- Supplied with carrier taping.
- Guaranteed 4000 hours at 125°C.
  (1000 hours : φ6.3x5.8L-50V)
  (2000 hours : φ6.3x5.8L-35V or less, φ6.3x7.7L)

Vibration resistance — High CV, Long Life

VMF ⇦ VZF ⇦ VVT

Marking color : Black print

Specifications

Item	Performance
Category temperature range (℃)	−40 to +125
Tolerance at rated capacitance (%)	±20 (20℃,120Hz)
Leakage current (μA) (max.)	0.01CV or 3 whichever is larger (after 2 minutes) C : Rated capacitance (μF) ; V : Rated voltage (V) (20℃)
Tangent of loss angle (tanδ)	

Rated voltage (V)	10	16	25	35	50
tanδ (max.)	0.24	0.20	0.16	0.14	0.14

(20℃,120Hz)

Characteristics at high and low temperature

Rated voltage (V)		10	16	25	35	50
Impedance ratio (max.)	Z−25℃/Z+20℃	3	2	2	2	2
	Z−40℃/Z+20℃	6	4	4	3	3

(120Hz)

Endurance (125℃) (Applied ripple current)

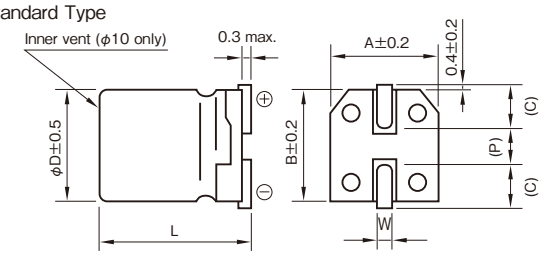
Test time	1000 hours (φ6.3x5.8L : 50V) 2000 hours (φ6.3x5.8L : 35V or less, φ6.3x7.7L) 4000 hours (φ8, φ10)
Leakage current	The initial specified value or less
Percentage of capacitance change	Within ±30% of initial value
Tangent of the loss angle	300% or less of the initial specified value

Shelf life (125℃)	Test time : 1000hours ; other items are same as the endurance. Voltage application treatment : According to JIS C5101-4 4.1
Applicable standards	JIS C5101 - 1,- 18 (IEC 60384 - 1,- 18)

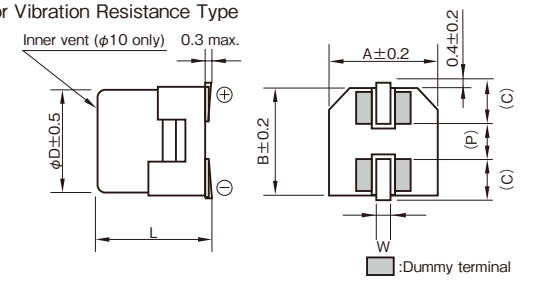
Outline Drawing

Unit : mm

Standard Type



For Vibration Resistance Type



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φD	L	A	B	C	W	P	Size code
6.3	5.8±0.3	6.6	6.6	2.7	0.5 to 0.8	2.0	DC8
6.3	7.7±0.3	6.6	6.6	2.7	0.5 to 0.8	2.0	DE7
8	10±0.5	8.4	8.4	3.0	0.7 to 1.1	3.1	EH0
10	10±0.5	10.4	10.4	3.3	0.7 to 1.1	4.7	FH0

Refer to individual page.
(Soldering conditions, Land pattern size, The taping specifications)

Coefficient of Frequency for Rated Ripple Current

Rated voltage(V) \ Frequency (Hz)	120	1k	10k	100k
10 to 50	0.77	0.88	0.96	1

Product code system (*For general product)

Standard Type (example : 35V100μF)

RS*	VZF	101	M	1G	DE7	002	U
Category code	Series code	capacitance code	Cap tol. code	Voltage code	Size code	Taping and packing code	Additional code

For Vibration Resistance Type (example : 25V330μF)

RS*	VMF	331	M	1T	FH0	002	U
Category code	Series code	capacitance code	Cap tol. code	Voltage code	Size code	Taping and packing code	Additional code

For details, refer to the various "Product Code System" pages.

NOTE : Design, Specifications are subject to change without notice.
It is recommended that you shall obtain technical specifications from ELNA to ensure that the component is suitable for your use.

Code in front of series have been extracted from product code, which describes the segment of products, such as type and features.

Standard Ratings

Rated voltage (V) / Item / Rated capacitance (μF)	10 (1L)				16 (1E)				25 (1T)			
	Case	ESR (Ω max.)		Rated ripple current	Case	ESR (Ω max.)		Rated ripple current	Case	ESR (Ω max.)		Rated ripple current
	φD × L (mm)	20℃	-40℃	(mArms)	φD × L (mm)	20℃	-40℃	(mArms)	φD × L (mm)	20℃	-40℃	(mArms)
47	—	—	—	—	6.3 × 5.8	1.2	22	110	6.3 × 5.8	1.2	22	110
100	6.3 × 5.8	1.2	22	110	6.3 × 5.8	1.2	22	110	6.3 × 7.7	0.60	12	220
220	6.3 × 7.7	0.60	12	220	6.3 × 7.7	0.60	12	220	8 × 10	0.30	5.5	296
330	8 × 10	0.30	5.5	296	8 × 10	0.30	5.5	296	10 × 10	0.20	3.6	440
470	8 × 10	0.30	5.5	296	10 × 10	0.20	3.6	440	—	—	—	—
680	10 × 10	0.20	3.6	440	10 × 10	0.20	3.6	440	—	—	—	—

Rated voltage (V) / Item / Rated capacitance (μF)	35 (1G)				50 (1U)			
	Case	ESR (Ω max.)		Rated ripple current	Case	ESR (Ω max.)		Rated ripple current
	φD × L (mm)	20℃	-40℃	(mArms)	φD × L (mm)	20℃	-40℃	(mArms)
22	—	—	—	—	6.3 × 5.8	3.2	48	58
33	—	—	—	—	6.3 × 5.8	3.2	48	58
47	6.3 × 5.8	1.2	22	110	6.3 × 7.7	1.2	18	95
100	6.3 × 7.7	0.60	12	220	8 × 10	0.50	7.5	180
220	8 × 10	0.30	5.5	296	10 × 10	0.30	4.5	280
330	10 × 10	0.20	3.6	440	—	—	—	—

(Note) Rated ripple current : 125℃ , 100kHz
ESR : 100kHz

Return to Type List

ELNA Vertical Chip Type Aluminum Electrolytic Capacitors VZE, VME series

Code in front of series have been extracted from product code, which describes the segment of products, such as type and features.

- Compatible with surface mounting, low ESR, high CV, long life capacitors.
- Environmental : GREEN CAP™ , RoHS compliance.
- Supplied with carrier taping.
- Specify ESR after endurance test.
- Guaranteed 2000 hours at 125°C.

Vibration resistance — High CV, Long Life

VME ⇦ VZE ⇦ VVT

Marking color : Black print

Specifications

Item	Performance
Category temperature range (℃)	−40 to +125
Tolerance at rated capacitance (%)	±20 (20℃,120Hz)
Leakage current (μA) (max.)	0.01CV or 3 whichever is larger (after 2 minutes) C : Rated capacitance (μF) ; V : Rated voltage (V) (20℃)
Tangent of loss angle (tanδ)	Rated voltage (V): 35; tanδ (max.): 0.14 (20℃,120Hz)
Characteristics at high and low temperature	Rated voltage (V): 35; Impedance Ratio (max.) Z−25℃/Z+20℃: 2; Z−40℃/Z+20℃: 3 (120Hz)
Endurance (125℃) (Applied ripple current)	Test time: 2000 hours; Leakage current: The initial specified value or less; Percentage of capacitance change: Within ±30% of initial value; Tangent of the loss angle: 300% or less of the initial specified value
Shelf life (125℃)	Test time : 1000hours ; other items are same as the endurance. Voltage application treatment : According to JIS C5101-4 4.1
Applicable standards	JIS C5101 - 1,- 18 (IEC 60384 - 1,- 18)

Coefficient of Frequency for Rated Ripple Current

Rated voltage(V) \ Frequency (Hz)	120	1k	10k	100k
35	0.77	0.88	0.96	1

Refer to individual page.
(Soldering conditions, Land pattern size, The taping specifications)

For details, refer to the various "Product Code System" pages.

Product code system (*For general product)

Standard Type (example : 35V47μF)

RS*	VZE	470	M	1G	DE7	002	U
Category code	Series code	capacitance code	Cap tol. code	Voltage code	Size code	Taping and packing code	Additional code

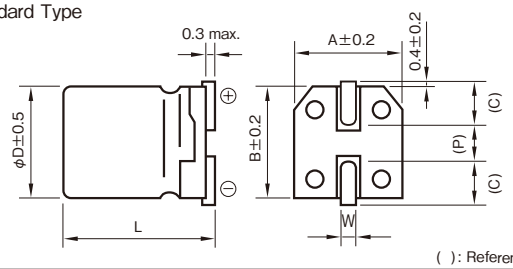
For Vibration Resistance Type (example : 35V47μF)

RS*	VME	470	M	1G	DE7	002	U
Category code	Series code	capacitance code	Cap tol. code	Voltage code	Size code	Taping and packing code	Additional code

Outline Drawing

Unit : mm

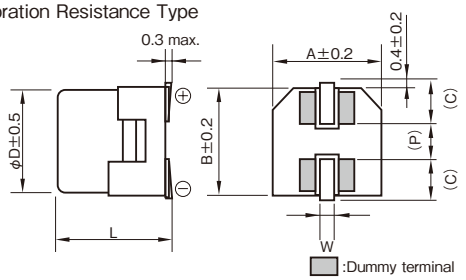
Standard Type



( ): Reference size

φD	L	A	B	C	W	P	Size code
6.3	7.7±0.3	6.6	6.6	2.7	0.5 to 0.8	2.0	DE7

For Vibration Resistance Type



Standard Ratings

Rated voltage (V) / Item / Rated capacitance (μF)	35 (1G)				
	Case φD × L (mm)	ESR (Ω max.) 20℃	ESR (Ω max.) -40℃	ESR (Ω max.) After Endurance -40℃	Rated ripple current (mArms)
47	6.3 × 7.7	0.30	3	6	240
100	6.3 × 7.7	0.30	3	6	240

(Note) Rated ripple current : 125℃ , 100kHz
ESR : 100kHz

NOTE : Design, Specifications are subject to change without notice.
It is recommended that you shall obtain technical specifications from ELNA to ensure that the component is suitable for your use.

Return to Type List

ELNA Vertical Chip Type Aluminum Electrolytic Capacitors VVX, VTX series

Code in front of series have been extracted from product code, which describes the segment of products, such as type and features.

- Compatible with surface mounting, high temperature capacitors.
- Environmental : GREEN CAP™ , RoHS compliance.
- Supplied with carrier taping.
- Guaranteed 1000 hours 135℃.

Vibration resistance ⇦ High temperature

VTX ⇦ VVX ⇦ VVT

Marking color : Black print

Specifications

Item	Performance
Category temperature range (℃)	−40 to +135
Tolerance at rated capacitance (%)	±20 (20℃,120Hz)
Leakage current (μA) (max.)	0.01CV or 3 whichever is larger (after 2 minutes) C : Rated capacitance (μF) ; V : Rated voltage (V) (20℃)
Tangent of loss angle (tanδ)	Rated voltage (V): 25 / 35; tanδ (max.): 0.24 / 0.20 (20℃,120Hz)
Characteristics at high and low temperature	Rated voltage (V): 25 / 35; Impedance Ratio (max.) Z−25℃/Z+20℃: 2 / 2; Z−40℃/Z+20℃: 3 / 3 (120Hz)
Endurance (135℃) (Applied ripple current)	Test time: 1000 hours; Leakage current: The initial specified value or less; Percentage of Capacitance change: Within ±30% of initial value; Tangent of loss angle: 300% or less of the initial specified value
Shelf life (135℃)	Test time : 500hours ; other items are same as the endurance. Voltage application treatment : According to JIS C5101-4 4.1
Applicable standards	JIS C5101 - 1,- 18 (IEC 60384 - 1,- 18)

Coefficient of Frequency for Rated Ripple Current

Rated voltage(V) \ Frequency (Hz)	120	1k	10k	100k
25 to 35	0.77	0.88	0.96	1

Refer to individual page.
(Soldering conditions, Land pattern size, The taping specifications)

For details, refer to the various "Product Code System" pages.

Product code system : 25V330μF (*For general product)

Standard Type

RS*	VVX	331	M	1T	FH0	002	U
Category code	Series code	capacitance code	Cap tol. code	Voltage code	Size code	Taping and packing code	Additional code

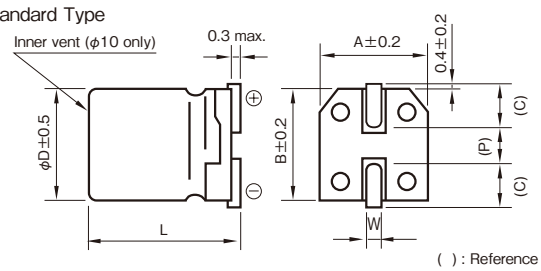
For Vibration Resistance Type

RS*	VTX	331	M	1T	FH0	002	U
Category code	Series code	capacitance code	Cap tol. code	Voltage code	Size code	Taping and packing code	Additional code

Outline Drawing

Unit : mm

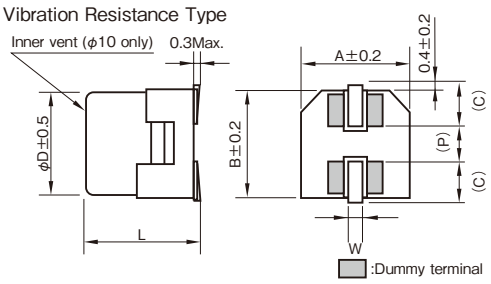
Standard Type



( ) : Reference size

φD	L	A	B	C	W	P	Size code
8	10±0.5	8.4	8.4	3.0	0.7 to 1.1	3.1	EH0
10	10±0.5	10.4	10.4	3.3	0.7 to 1.1	4.7	FH0

For Vibration Resistance Type



Standard Ratings

Rated capacitance (μF) \ Rated voltage (V) / Item	25 (1T) Case φD × L (mm)	Size code	ESR (Ω max.)	Rated ripple current (mArms)	35 (1G) Case φD × L (mm)	Size code	ESR (Ω max.)	Rated ripple current (mArms)
22	—	—	—	—	8 × 10	EH0	0.70	115
33	8 × 10	EH0	0.70	115	8 × 10	EH0	0.70	115
	10 × 10	FH0	0.50	155	10 × 10	FH0	0.50	155
47	8 × 10	EH0	0.70	115	8 × 10	EH0	0.70	115
	10 × 10	FH0	0.50	155	10 × 10	FH0	0.50	155
100	8 × 10	EH0	0.70	115	8 × 10	EH0	0.70	115
	10 × 10	FH0	0.50	155	10 × 10	FH0	0.50	155
220	8 × 10	EH0	0.70	115	10 × 10	FH0	0.50	155
	10 × 10	FH0	0.50	155				
330	10 × 10	FH0	0.50	155	—	—	—	—

(Note)
Rated ripple current : 135℃ , 100kHz
ESR : 20℃, 100kHz

NOTE : Design, Specifications are subject to change without notice.
It is recommended that you shall obtain technical specifications from ELNA to ensure that the component is suitable for your use.

Return to Type List

ELNA Vertical Chip Type Aluminum Electrolytic Capacitors VV9 series

Code in front of series have been extracted from product code, which describes the segment of products, such as type and features.

- Compatible with surface mounting. Bipolar capacitors.
- Environmental : GREEN CAP™ , RoHS compliance.
- Supplied with carrier taping.
- Guaranteed 2000 hours 105℃.

Long life

VV9 ⇦ VVP

Marking color : Black print

Specifications

Item	Performance
Category temperature range (℃)	−40 to +105
Tolerance at rated capacitance (%)	±20 (20℃,120Hz)
Leakage current (μA) (max.)	0.01CV or 3 whichever is larger (after 2 minutes) C : Rated capacitance (μF) , V : Rated voltage (V) (20℃)
Tangent of loss angle (tanδ)	
Characteristics at high and low temperature	
Endurance (105℃) (Applied ripple current)	
Shelf life (105℃)	Test time : 1000hours ; other items are same as the endurance. Voltage application treatment : According to JIS C5101-4 4.1
Applicable standards	JIS C5101 - 1, - 18 (IEC 60384 - 1, - 18)

Tangent of loss angle (tanδ):

Rated voltage (V)	6.3	10	16	25	35	50
tanδ (max.)	0.30	0.22	0.16	0.14	0.12	0.12

(20℃,120Hz)

Characteristics at high and low temperature:

Rated voltage (V)		6.3	10	16	25	35	50
Impedance ratio (max.)	Z−25℃/Z+20℃	4	3	2	2	2	2
	Z−40℃/Z+20℃	8	6	4	4	3	3

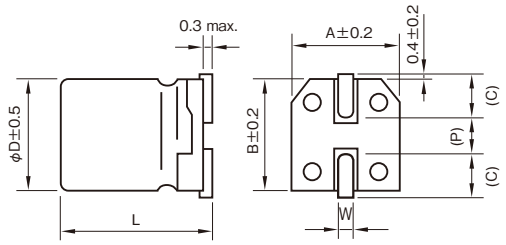
(120Hz)

Endurance (105℃) (Applied ripple current):

Test time	2000 hours (with the polarity inverted every 250 hours)
Leakage current	The initial specified value or less
Percentage of capacitance change	Within ±20% of initial value
Tangent of loss angle	200% or less of the initial specified value

Outline Drawing

Unit : mm



( ) : Reference size

φD	L	A	B	C	W	P	Size code
4	5.8±0.3	4.3	4.3	2.0	0.5 to 0.8	1.0	BC8
5	5.8±0.3	5.3	5.3	2.3	0.5 to 0.8	1.5	CC8
6.3	5.8±0.3	6.6	6.6	2.7	0.5 to 0.8	2.0	DC8

Refer to individual page.
(Soldering conditions, Land pattern size, The taping specifications)

Coefficient of Frequency for Rated Ripple Current

Rated voltage (V) \ Frequency (Hz)		50・60	120	1k	10k・100k
6.3 to 16		0.80	1	1.15	1.25
25 to 35		0.80	1	1.25	1.40
50	1 to 3.3μF	0.50	1	1.35	1.50
	4.7μF	0.70	1	1.35	1.50

Product code system : 6.3V47μF (*For general product)

RS*	VV9	470	M	1J	DC8	002	U
Category code	Series code	capacitance code	Cap tol. code	Voltage code	Size code	Taping and packing code	Additional code

For details, refer to the various "Product Code System" pages.

Standard Ratings

Rated voltage (V) / Item / Rated capacitance (μF)	6.3 (1J) Case φD×L (mm)	6.3 (1J) Rated ripple current (mArms)	10 (1L) Case φD×L (mm)	10 (1L) Rated ripple current (mArms)	16 (1E) Case φD×L (mm)	16 (1E) Rated ripple current (mArms)	25 (1T) Case φD×L (mm)	25 (1T) Rated ripple current (mArms)	35 (1G) Case φD×L (mm)	35 (1G) Rated ripple current (mArms)	50 (1U) Case φD×L (mm)	50 (1U) Rated ripple current (mArms)
1	–	–	–	–	–	–	–	–	–	–	4×5.8	10
2.2	–	–	–	–	–	–	–	–	4×5.8	10	–	–
3.3	–	–	–	–	–	–	4×5.8	12	–	–	5×5.8	17
											6.3×5.8	20
4.7	–	–	–	–	–	–	4×5.8	12	–	–	6.3×5.8	23
10	–	–	4×5.8	20	5×5.8	25	6.3×5.8	28	–	–	–	–
22	–	–	–	–	–	–	6.3×5.8	55	–	–	–	–
33	–	–	6.3×5.8	41	–	–	–	–	–	–	–	–
47	6.3×5.8	45	–	–	–	–	–	–	–	–	–	–

(Note) Rated ripple current : 105℃, 120Hz

NOTE : Design, Specifications are subject to change without notice.
It is recommended that you shall obtain technical specifications
from ELNA to ensure that the component is suitable for your use.

For Vibration Resistance,
Chip Type Aluminum Electrolytic Capacitors

CAT.No.2023/2024E

Return to Type List

ELNA Vertical Chip Type Aluminum Electrolytic Capacitors VTZ series

Code in front of series have been extracted from product code, which describes the segment of products, such as type and features.

- Compatible with surface mounting, low ESR capacitors.
- For Vibration resistance. (30G guaranteed)
- Environmental : GREEN CAP™ , RoHS compliance.
- Supplied with carrier taping.
- Guaranteed 5000 hours at 105℃.
  (φ6.3 : 1000 hours, φ8, φ10 : 2000 hours)

Vibration resistance

VTZ ⇦ VVZ

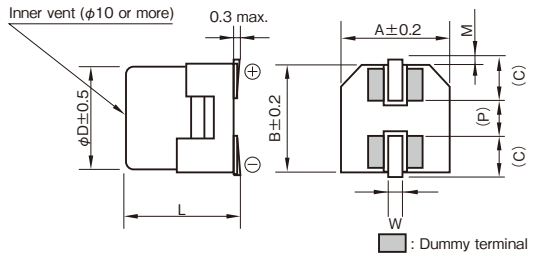
Marking color : Black print

Specifications

Item	Performance
Category temperature range (℃)	−55 to +105
Tolerance at rated capacitance (%)	±20 (20℃,120Hz)
Leakage current (μA) (max.)	0.01CV or 3 whichever is larger (after 2 minutes) C : Rated capacitance (μF) , V : Rated voltage (V) (20℃)
Tangent of loss angle (tanδ)	Rated voltage (V): 6.3, 10, 16, 25, 35 tanδ (max.): 0.28, 0.24, 0.20, 0.16, 0.14 0.02 is added to every 1000μF increase over 1000μF (20℃,120Hz)
Characteristics at high and low temperature	Rated voltage (V): 6.3, 10, 16, 25, 35 Impedance ratio (max.) Z−25℃/Z+20℃: 4, 3, 2, 2, 2 Impedance ratio (max.) Z−55℃/Z+20℃: 8, 5, 4, 3, 3 (120Hz)
Endurance (105℃) (Applied ripple current)	Test time: 1000 hours (φ6.3), 2000 hours (φ8, φ10), 5000 hours (φ12.5 or more) Leakage current: The initial specified value or less Percentage of capacitance change: Within ±25% of initial value Tangent of loss angle: 200% or less of the initial specified value
Shelf life (105℃)	Test time : 1000hours ; other items are same as the endurance. Voltage application treatment : According to JIS C5101-4 4.1
Applicable standards	JIS C5101 - 1, - 18 (IEC 60384 - 1, - 18)

Outline Drawing

Unit : mm



( ) : Reference size

φD	L	A	B	C	W	P	M	Size code
6.3	5.8±0.3	6.6	6.6	2.7	0.5 to 0.8	2.0	0.4±0.2	DC8
6.3	7.7±0.3	6.6	6.6	2.7	0.5 to 0.8	2.0	0.4±0.2	DE7
8	10±0.5	8.4	8.4	3.0	0.7 to 1.1	3.1	0.4±0.2	EH0
8	10.5±0.5	8.4	8.4	3.0	0.7 to 1.1	3.1	0.4±0.2	EH5
10	10±0.5	10.4	10.4	3.3	0.7 to 1.1	4.7	0.4±0.2	FH0
10	10.5±0.5	10.4	10.4	3.3	0.7 to 1.1	4.7	0.4±0.2	FH5
12.5	13.5±0.5	13.0	13.0	4.9	1.0 to 1.4	4.6	0.7±0.3	GL5
16	16.5±0.5	17.0	17.0	5.6	1.0 to 1.4	7.2	0.7±0.3	JP5
16	21.5±0.5	17.0	17.0	5.6	1.0 to 1.4	7.2	0.7±0.3	JU5
18	16.5±0.5	19.0	19.0	6.6	1.0 to 1.4	7.2	0.7±0.3	KP5
18	21.5±0.5	19.0	19.0	6.6	1.0 to 1.4	7.2	0.7±0.3	KU5

Refer to individual page.
(Soldering conditions, Land pattern size, The taping specifications)

Coefficient of Frequency for Rated Ripple Current

Rated voltage (V) \ Frequency (Hz)	120	1k	10k	100k
6.3 to 35	0.50	0.75	0.90	1

Product code system (*For general product)

φ6.3 (example : 6.3V220μF)

RS*	VTZ	221	M	1J	DC8	002	U
Category code	Series code	capacitance code	Cap tol. code	Voltage code	Size code	Taping and packing code	Additional code

φ8, φ10 (example : 6.3V1500μF)

RS*	VTZ	152	M	1J	FH5	002	SU
Category code	Series code	capacitance code	Cap tol. code	Voltage code	Size code	Taping and packing code	Additional code

φ12.5 or more (example : 6.3V2200μF)

RS*	VTZ	222	M	1J	GL5	005	T
Category code	Series code	capacitance code	Cap tol. code	Voltage code	Size code	Taping and packing code	Additional code

・If "Standard (terminal)" type is required, please see the series VVZ.
・For details, refer to the various "Product Code System" pages.

NOTE : Design, Specifications are subject to change without notice.
It is recommended that you shall obtain technical specifications
from ELNA to ensure that the component is suitable for your use.

Code in front of series have been extracted from product code, which describes the segment of products, such as type and features.

Standard Ratings

Rated voltage (V) / Item / Rated capacitance (μF)	6.3 (1J)				10 (1L)				16 (1E)				25 (1T)				35 (1G)			
	Case φD × L (mm)	Size code	ESR (Ω max.)	Rated ripple current (mArms)	Case φD × L (mm)	Size code	ESR (Ω max.)	Rated ripple current (mArms)	Case φD × L (mm)	Size code	ESR (Ω max.)	Rated ripple current (mArms)	Case φD × L (mm)	Size code	ESR (Ω max.)	Rated ripple current (mArms)	Case φD × L (mm)	Size code	ESR (Ω max.)	Rated ripple current (mArms)
33	—	—	—	—	—	—	—	—	6.3×5.8	DC8	0.44	230	6.3×5.8	DC8	0.44	230	6.3×5.8	DC8	0.44	230
47	—	—	—	—	6.3×5.8	DC8	0.44	230	6.3×5.8	DC8	0.44	230	6.3×5.8	DC8	0.44	230	6.3×5.8	DC8	0.44	230
																	6.3×7.7	DE7	0.34	280
68	6.3×5.8	DC8	0.44	230	6.3×5.8	DC8	0.44	230	6.3×5.8	DC8	0.44	230	6.3×5.8	DC8	0.44	230	6.3×7.7	DE7	0.34	280
100	6.3×5.8	DC8	0.44	230	6.3×5.8	DC8	0.44	230	6.3×5.8	DC8	0.44	230	6.3×7.7	DE7	0.34	280	8×10	EH0	0.20	450
																	8×10.5	EH5	0.17	450
150	6.3×5.8	DC8	0.44	230	6.3×5.8	DC8	0.44	230	6.3×7.7	DE7	0.34	280	8×10	EH0	0.20	450	8×10.5	EH5	0.17	450
													8×10.5	EH5	0.17	450	10×10	FH0	0.10	670
220	6.3×5.8	DC8	0.44	230	6.3×7.7	DE7	0.34	280	6.3×7.7	DE7	0.34	280	8×10.5	EH5	0.17	450	8×10.5	EH5	0.17	450
	6.3×7.7	DE7	0.34	280	8×10	EH0	0.20	450	8×10	EH0	0.20	450	10×10	FH0	0.10	670	10×10	FH0	0.10	670
330	6.3×7.7	DE7	0.34	280	8×10.5	EH5	0.17	450	8×10.5	EH5	0.17	450	8×10.5	EH5	0.17	450	10×10.5	FH5	0.090	670
	8×10	EH0	0.20	450	10×10	FH0	0.10	670	10×10	FH0	0.10	670	10×10	FH0	0.10	670				
470	8×10.5	EH5	0.17	450	8×10.5	EH5	0.17	450	8×10.5	EH5	0.17	450	10×10.5	FH5	0.090	670	12.5×13.5	GL5	0.060	1100
	10×10	FH0	0.10	670	10×10	FH0	0.10	670	10×10	FH0	0.10	670					16×16.5	JP5	0.046	1540
680	8×10.5	EH5	0.17	450	10×10.5	FH5	0.090	670	10×10.5	FH5	0.090	670	12.5×13.5	GL5	0.060	1100	12.5×13.5	GL5	0.060	1100
																	16×16.5	JP5	0.046	1540
1000	8×10.5	EH5	0.17	450	10×10.5	FH5	0.090	670	12.5×13.5	GL5	0.060	1100	12.5×13.5	GL5	0.060	1100	16×16.5	JP5	0.046	1540
	10×10	FH0	0.10	670					16×16.5	JP5	0.046	1540	16×16.5	JP5	0.046	1540	18×16.5	KP5	0.042	1760
1500	10×10.5	FH5	0.090	670	12.5×13.5	GL5	0.060	1100	12.5×13.5	GL5	0.060	1100	16×21.5	JU5	0.040	1840	—	—	—	—
					16×16.5	JP5	0.046	1540	16×16.5	JP5	0.046	1540	18×16.5	KP5	0.042	1760				
2200	12.5×13.5	GL5	0.060	1100	12.5×13.5	GL5	0.060	1100	16×16.5	JP5	0.046	1540	16×21.5	JU5	0.040	1840	18×21.5	KU5	0.038	1960
					16×16.5	JP5	0.046	1540	18×16.5	KP5	0.042	1760	18×16.5	KP5	0.042	1760				
3300	16×16.5	JP5	0.046	1540	16×16.5	JP5	0.046	1540	16×21.5	JU5	0.040	1840	18×21.5	KU5	0.038	1960	—	—	—	—
					18×16.5	KP5	0.042	1760	18×16.5	KP5	0.042	1760								
4700	16×21.5	JU5	0.040	1840	16×21.5	JU5	0.040	1840	18×21.5	KU5	0.038	1960	—	—	—	—	—	—	—	—
	18×16.5	KP5	0.042	1760	18×21.5	KU5	0.038	1960												
6800	18×21.5	KU5	0.038	1960	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
8200	18×21.5	KU5	0.038	1960	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

(Note) Rated ripple current : 105℃ , 100kHz
ESR : 20℃ , 100kHz

NOTE : Design, Specifications are subject to change without notice.
It is recommended that you shall obtain technical specifications
from ELNA to ensure that the component is suitable for your use.

Return to Type List

ELNA Vertical Chip Type Aluminum Electrolytic Capacitors VTD series

Code in front of series have been extracted from product code, which describes the segment of products, such as type and features.

- Compatible with surface mounting, low ESR, long life capacitors.
- For Vibration resistance. (30G guaranteed)
- Environmental : GREEN CAP™ , RoHS compliance.
- Supplied with carrier taping.
- Guaranteed 2000 hours at 105°C.
  (6.3V to 50V 10.0L : 5000 hours)
  (φ12.5 or more : 5000 hours)

Vibration resistance

VTD ⇦ VVD

Marking color : Black print

Specifications

Item	Performance
Category temperature range (℃)	−55 to +105
Tolerance at rated capacitance (%)	±20 (20℃,120Hz)
Leakage current (μA) (max.)	0.01CV or 3 whichever is larger (after 2 minutes) C : Rated capacitance (μF) , V : Rated voltage (V) (20℃)

Tangent of loss angle (tanδ)

Rated voltage (V)	6.3	10	16	25	35	50	63	80	100
tanδ (max.)	0.26	0.19	0.16	0.14	0.12	0.1	0.08	0.08	0.07

0.02 is added to every 1000μF increase over 1000μF (20℃,120Hz)

Characteristics at high and low temperature

Rated voltage (V)		6.3	10	16	25	35	50	63	80	100
Impedance ratio (max.)	Z−25℃/Z+20℃	2	2	2	2	2	2	2	2	2
	Z−40℃/Z+20℃	3	3	3	3	3	3	3	3	3
	Z−55℃/Z+20℃	8	4	4	3	3	3	3	3	3

(120Hz)

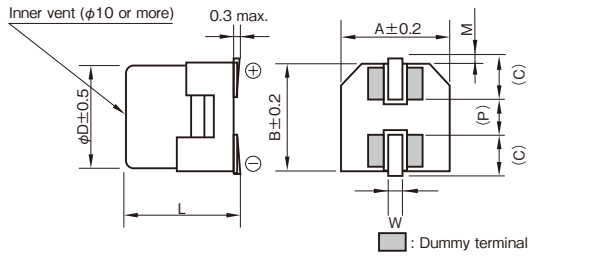
Endurance (105℃) (Applied ripple current)

Test time	2000 hours (φ12.5 or more, 6.3V to 50V 10.0L : 5000 hours)
Leakage current	The initial specified value or less
Percentage of capacitance change	Within ±30% of initial value
Tangent of loss angle	200% or less of the initial specified value (φ12.5 or more, 6.3V to 50V 10.0L : 300%)

Shelf life (105℃)	Test time : 1000hours ; other items are same as the endurance. Voltage application treatment : According to JIS C5101-4 4.1
Applicable standards	JIS C5101-1, -18 (IEC 60384-1, -18)

Outline Drawing

Unit : mm



( ) : Reference size

φD	L	A	B	C	W	P	M	Size code
6.3	5.8±0.3	6.6	6.6	2.7	0.5 to 0.8	2.0	0.4±0.2	DC8
6.3	7.7±0.3	6.6	6.6	2.7	0.5 to 0.8	2.0	0.4±0.2	DE7
8	10±0.5	8.4	8.4	3.0	0.7 to 1.1	3.1	0.4±0.2	EH0
10	10±0.5	10.4	10.4	3.3	0.7 to 1.1	4.7	0.4±0.2	FH0
12.5	13.5±0.5	13.0	13.0	4.9	1.0 to 1.4	4.6	0.7±0.3	GL5
16	16.5±0.5	17.0	17.0	5.6	1.0 to 1.4	7.2	0.7±0.3	JP5
16	21.5±0.5	17.0	17.0	5.6	1.0 to 1.4	7.2	0.7±0.3	JU5
18	16.5±0.5	19.0	19.0	6.6	1.0 to 1.4	7.2	0.7±0.3	KP5
18	21.5±0.5	19.0	19.0	6.6	1.0 to 1.4	7.2	0.7±0.3	KU5

Refer to individual page.
(Soldering conditions, Land pattern size, The taping specifications)

Coefficient of Frequency for Rated Ripple Current

Rated voltage (V) \ Frequency (Hz)	50・60	120	1k	10k・100k
6.3 to 100	0.50	0.50	0.75	1

Product code system (*For general product)

φ6.3 (example : 6.3V220μF)

RS*	VTD	221	M	1J	DC8	002	U
Category code	Series code	capacitance code	Cap tol. code	Voltage code	Size code	Taping and packing code	Additional code

φ8, φ10 (example : 6.3V1500μF)

RS*	VTD	152	M	1J	FH0	002	SU
Category code	Series code	capacitance code	Cap tol. code	Voltage code	Size code	Taping and packing code	Additional code

φ12.5 or more (example : 6.3V2200μF)

RS*	VTD	222	M	1J	GL5	005	T
Category code	Series code	capacitance code	Cap tol. code	Voltage code	Size code	Taping and packing code	Additional code

・If "Standard (terminal)" type is required, please see the series VVD.
・For details, refer to the various "Product Code System" pages.

NOTE : Design, Specifications are subject to change without notice.
It is recommended that you shall obtain technical specifications
from ELNA to ensure that the component is suitable for your use.

Code in front of series have been extracted from product code, which describes the segment of products, such as type and features.

Standard Ratings

Rated voltage (V) / Item / Rated capacitance (μF)	6.3 (1J)				10 (1L)				16 (1E)				25 (1T)				35 (1G)			
	Case φD × L (mm)	Size code	ESR (Ω max.)	Rated ripple current (mArms)	Case φD × L (mm)	Size code	ESR (Ω max.)	Rated ripple current (mArms)	Case φD × L (mm)	Size code	ESR (Ω max.)	Rated ripple current (mArms)	Case φD × L (mm)	Size code	ESR (Ω max.)	Rated ripple current (mArms)	Case φD × L (mm)	Size code	ESR (Ω max.)	Rated ripple current (mArms)
33	–	–	–	–	–	–	–	–	–	–	–	–	6.3×5.8	DC8	0.36	250	6.3×5.8	DC8	0.36	250
47	–	–	–	–	–	–	–	–	6.3×5.8	DC8	0.36	250	6.3×5.8	DC8	0.36	250	6.3×5.8	DC8	0.36	250
100	–	–	–	–	–	–	–	–	6.3×5.8	DC8	0.36	250	6.3×7.7	DE7	0.30	300	6.3×7.7	DE7	0.30	300
																	8×10	EH0	0.16	600
220	6.3×5.8	DC8	0.36	250	6.3×7.7	DE7	0.30	300	6.3×7.7	DE7	0.30	300	8×10	EH0	0.16	600	8×10	EH0	0.16	600
330	6.3×7.7	DE7	0.30	300	8×10	EH0	0.16	600	8×10	EH0	0.16	600	8×10	EH0	0.16	600	10×10	FH0	0.090	850
470	8×10	EH0	0.16	600	8×10	EH0	0.16	600	8×10	EH0	0.16	600	10×10	FH0	0.090	850	12.5×13.5	GL5	0.054	1160
680	8×10	EH0	0.16	600	10×10	FH0	0.090	850	10×10	FH0	0.090	850	12.5×13.5	GL5	0.054	1160	12.5×13.5	GL5	0.054	1160
1000	8×10	EH0	0.16	600	10×10	FH0	0.090	850	12.5×13.5	GL5	0.054	1160	12.5×13.5	GL5	0.054	1160	16×16.5	JP5	0.044	1620
1500	10×10	FH0	0.090	850	12.5×13.5	GL5	0.054	1160	12.5×13.5	GL5	0.054	1160	16×16.5	JP5	0.044	1620	18×16.5	KP5	0.040	1840
2200	12.5×13.5	GL5	0.054	1160	12.5×13.5	GL5	0.054	1160	16×16.5	JP5	0.044	1620	16×21.5	JU5	0.038	1920	18×21.5	KU5	0.036	2080
									18×16.5	KP5	0.040	1840	18×16.5	KP5	0.040	1840				
3300	16×16.5	JP5	0.044	1620	16×16.5	JP5	0.044	1620	16×21.5	JU5	0.038	1920	18×21.5	KU5	0.036	2080	–	–	–	–
									18×16.5	KP5	0.040	1840					–	–	–	–
4700	18×16.5	KP5	0.040	1840	18×21.5	KU5	0.036	2080	18×21.5	KU5	0.036	2080	–	–	–	–	–	–	–	–
6800	18×16.5	KP5	0.040	1840	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
8200	18×21.5	KU5	0.036	2080	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–

Rated voltage (V) / Item / Rated capacitance (μF)	50 (1U)				63 (4E)				80 (1R)				100 (1H)			
	Case φD × L (mm)	Size code	ESR (Ω max.)	Rated ripple current (mArms)	Case φD × L (mm)	Size code	ESR (Ω max.)	Rated ripple current (mArms)	Case φD × L (mm)	Size code	ESR (Ω max.)	Rated ripple current (mArms)	Case φD × L (mm)	Size code	ESR (Ω max.)	Rated ripple current (mArms)
10	6.3×5.8	DC8	0.86	170	–	–	–	–	–	–	–	–	–	–	–	–
22	6.3×5.8	DC8	0.86	170	–	–	–	–	8×10	EH0	0.90	130	8×10	EH0	1.30	130
33	6.3×7.7	DE7	0.66	195	8×10	EH0	0.65	250	8×10	EH0	0.90	130	10×10	FH0	0.70	200
47	6.3×7.7	DE7	0.66	195	8×10	EH0	0.65	250	10×10	FH0	0.50	200	–	–	–	–
68	–	–	–	–	8×10	EH0	0.65	250	–	–	–	–	–	–	–	–
100	8×10	EH0	0.32	350	10×10	FH0	0.35	400	12.5×13.5	GL5	0.18	550	16×16.5	JP5	0.17	700
					12.5×13.5	GL5	0.16	600								
220	10×10	FH0	0.18	700	12.5×13.5	GL5	0.16	600	16×16.5	JP5	0.16	720	18×16.5	KP5	0.15	800
330	12.5×13.5	GL5	0.12	900	16×16.5	JP5	0.14	800	18×16.5	KP5	0.13	830	18×21.5	KU5	0.13	940
470	16×16.5	JP5	0.080	1000	18×16.5	KP5	0.12	900	18×21.5	KU5	0.11	1000	–	–	–	–
680	16×16.5	JP5	0.080	1000	18×21.5	KU5	0.10	1050	–	–	–	–	–	–	–	–
1000	18×16.5	KP5	0.076	1100	–	–	–	–	–	–	–	–	–	–	–	–

(Note) Rated ripple current : 105℃ , 100kHz
ESR : 20℃ , 100kHz

NOTE : Design, Specifications are subject to change without notice.
It is recommended that you shall obtain technical specifications
from ELNA to ensure that the component is suitable for your use.

Return to Type List

ELNA Vertical Chip Type Aluminum Electrolytic Capacitors VTT series

Code in front of series have been extracted from product code, which describes the segment of products, such as type and features.

- Compatible with surface mounting, low ESR capacitors.
- For Vibration resistance. (30G guaranteed)
- Environmental : GREEN CAP™ , RoHS compliance.
- Supplied with carrier taping.
- Guaranteed 1000 to 5000 hours at 125°C. (See table below)

Vibration resistance

VTT ⇦ VVT

Marking color : Black print

Specifications

Item	Performance
Category temperature range (℃)	−40 to +125
Tolerance at rated capacitance (%)	±20 (20℃,120Hz)
Leakage current (μA) (max.)	0.01CV or 3 whichever is larger (after 2 minutes) C : Rated capacitance (μF) , V : Rated voltage (V) (20℃)
Tangent of loss angle (tanδ)	

Rated voltage (V)	10	16	25	35	50	63	80	100
tanδ (max.)	0.24	0.20	0.16	0.14	0.14	0.12	0.12	0.10

0.02 is added to every 1000μF increase over 1000μF (20℃,120Hz)

Characteristics at high and low temperature

Rated voltage (V)		10	16	25	35	50	63	80	100
Impedance ratio (max.)	Z−25℃/Z+20℃	3	2	2	2	2	2	2	2
	Z−40℃/Z+20℃	4	3	3	3	3	3	3	3

(120Hz)

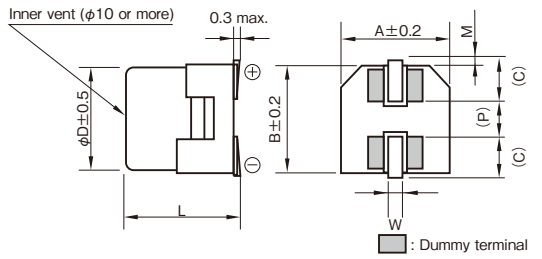
Endurance (125℃) (Applied ripple current)

Test time	1000 hours (φ6.3) 2000 hours (φ8, φ10) 3000 hours (63V to 100V : φ12.5) 3500 hours (63V to 100V : φ16x16.5L, φ18x16.5L) 4000 hours (63V to 100V : φ16x21.5L, φ18x21.5L) 5000 hours (50V or less : φ12.5 or more)
Leakage current	The initial specified value or less
Percentage of capacitance change	Within ±30% of initial value
Tangent of loss angle	300% or less of the initial specified value

Shelf life (125℃)	Test time : 1000hours ; other items are same as the endurance. Voltage application treatment : According to JIS C5101-4 4.1
Applicable standards	JIS C5101 - 1, - 18 (IEC 60384 - 1, - 18)

Outline Drawing

Unit : mm



( ) : Reference size

φD	L	A	B	C	W	P	M	Size code
6.3	5.8±0.3	6.6	6.6	2.7	0.5 to 0.8	2.0	0.4±0.2	DC8
6.3	7.7±0.3	6.6	6.6	2.7	0.5 to 0.8	2.0	0.4±0.2	DE7
8	10±0.5	8.4	8.4	3.0	0.7 to 1.1	3.1	0.4±0.2	EH0
10	10±0.5	10.4	10.4	3.3	0.7 to 1.1	4.7	0.4±0.2	FH0
12.5	13.5±0.5	13.0	13.0	4.9	1.0 to 1.4	4.6	0.7±0.3	GL5
16	16.5±0.5	17.0	17.0	5.6	1.0 to 1.4	7.2	0.7±0.3	JP5
16	21.5±0.5	17.0	17.0	5.6	1.0 to 1.4	7.2	0.7±0.3	JU5
18	16.5±0.5	19.0	19.0	6.6	1.0 to 1.4	7.2	0.7±0.3	KP5
18	21.5±0.5	19.0	19.0	6.6	1.0 to 1.4	7.2	0.7±0.3	KU5

Refer to individual page.
(Soldering conditions, Land pattern size, The taping specifications)

Coefficient of Frequency for Rated Ripple Current

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

Product code system (*For general product)

φ6.3 (example : 10V220μF)

RS*	VTT	221	M	1L	DE7	002	U
Category code	Series code	capacitance code	Cap tol. code	Voltage code	Size code	Taping and packing code	Additional code

φ8, φ10 (example : 35V100μF)

RS*	VTT	101	M	1G	FH0	002	SU
Category code	Series code	capacitance code	Cap tol. code	Voltage code	Size code	Taping and packing code	Additional code

50V or less : φ12.5 or more (example : 35V1000μF)

RS*	VTT	102	M	1G	KU5	005	T
Category code	Series code	capacitance code	Cap tol. code	Voltage code	Size code	Taping and packing code	Additional code

63V to 100V : φ12.5 or more (example : 63V220μF)

RS*	VTT	221	M	4E	JP5	005	KT
Category code	Series code	capacitance code	Cap tol. code	Voltage code	Size code	Taping and packing code	Additional code

・If "Standard (terminal)" type is required, please see the series VVT.
・For details, refer to the various "Product Code System" pages.

NOTE : Design, Specifications are subject to change without notice.
It is recommended that you shall obtain technical specifications from ELNA to ensure that the component is suitable for your use.

Code in front of series have been extracted from product code, which describes the segment of products, such as type and features.

Standard Ratings

Rated voltage (V) / Item / Rated capacitance (μF)	10 (1L)				16 (1E)				25 (1T)				35 (1G)				50 (1U)			
	Case	ESR (Ω max.)		Rated ripple current	Case	ESR (Ω max.)		Rated ripple current	Case	ESR (Ω max.)		Rated ripple current	Case	ESR (Ω max.)		Rated ripple current	Case	ESR (Ω max.)		Rated ripple current
	φD × L (mm)	20℃	− 40℃	(mArms)	φD × L (mm)	20℃	− 40℃	(mArms)	φD × L (mm)	20℃	− 40℃	(mArms)	φD × L (mm)	20℃	− 40℃	(mArms)	φD × L (mm)	20℃	− 40℃	(mArms)
10	–	–	–	–	–	–	–	–	–	–	–	–	6.3×5.8	1.0	15	114	6.3×5.8	3.2	48	58
22	–	–	–	–	–	–	–	–	6.3×5.8	1.0	15	114	6.3×5.8	1.0	15	114	6.3×7.7	1.2	18	95
33	–	–	–	–	6.3×5.8	1.0	15	114	6.3×5.8	1.0	15	114	6.3×7.7	0.60	9.0	165	6.3×7.7	1.2	18	95
																	8×10	0.50	7.5	180
47	–	–	–	–	6.3×5.8	1.0	15	114	6.3×7.7	0.60	9.0	165	6.3×7.7	0.60	9.0	165	8×10	0.50	7.5	180
													8×10	0.20	2.0	340	10×10	0.30	4.5	280
100	–	–	–	–	–	–	–	–	6.3×7.7	0.60	9.0	165	8×10	0.20	2.0	340	10×10	0.30	4.5	280
									8×10	0.20	2.0	340	10×10	0.15	1.5	500	12.5×13.5	0.18	2.7	550
220	6.3×7.7	0.60	9.0	165	8×10	0.20	2.0	340	8×10	0.20	2.0	340	8×10	0.20	2.0	340	12.5×13.5	0.18	2.7	550
					10×10	0.15	1.5	500	10×10	0.15	1.5	500	10×10	0.15	1.5	500				
330	8×10	0.20	2.0	340	10×10	0.15	1.5	500	10×10	0.15	1.5	500	12.5×13.5	0.086	1.29	750	16×16.5	0.12	1.8	850
	10×10	0.15	1.5	500					12.5×13.5	0.086	1.29	750	16×16.5	0.060	0.90	1000				
470	10×10	0.15	1.5	500	12.5×13.5	0.086	1.29	750	12.5×13.5	0.086	1.29	750	16×16.5	0.060	0.90	1000	18×16.5	0.10	1.5	920
									16×16.5	0.060	0.90	1000								
680	12.5×13.5	0.086	1.29	750	12.5×13.5	0.086	1.29	750	16×16.5	0.060	0.90	1000	18×16.5	0.050	0.75	1200	–	–	–	–
					16×16.5	0.060	0.90	1000	18×16.5	0.050	0.75	1200								
1000	12.5×13.5	0.086	1.29	750	18×16.5	0.050	0.75	1200	18×21.5	0.042	0.63	1550	18×21.5	0.042	0.63	1550	–	–	–	–
2200	16×16.5	0.060	0.90	1000	18×16.5	0.050	0.75	1200	–	–	–	–	–	–	–	–	–	–	–	–
3300	18×16.5	0.050	0.75	1200	18×21.5	0.042	0.63	1550	–	–	–	–	–	–	–	–	–	–	–	–
4700	18×21.5	0.042	0.63	1550	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–

Rated voltage (V) / Item / Rated capacitance (μF)	63 (4E)				80 (1R)				100 (1H)			
	Case	ESR (Ω max.)		Rated ripple current	Case	ESR (Ω max.)		Rated ripple current	Case	ESR (Ω max.)		Rated ripple current
	φD × L (mm)	20℃	− 40℃	(mArms)	φD × L (mm)	20℃	− 40℃	(mArms)	φD × L (mm)	20℃	− 40℃	(mArms)
10	–	–	–	–	8×10	0.75	15	110	8×10	0.75	15	110
22	8×10	0.70	14	140	8×10	0.75	15	110	8×10	0.75	15	110
					10×10	0.55	11	150	10×10	0.55	11	150
33	8×10	0.70	14	140	8×10	0.75	15	110	10×10	0.55	11	150
	10×10	0.50	10	200	10×10	0.55	11	150				
47	8×10	0.70	14	140	–	–	–	–	12.5×13.5	0.32	4.8	300
	10×10	0.50	10	200								
100	12.5×13.5	0.25	3.75	400	16×16.5	0.24	3.6	480	16×16.5	0.24	3.6	480
220	16×16.5	0.22	3.3	500	16×21.5	0.18	2.7	600	18×21.5	0.16	2.4	700
330	16×16.5	0.22	3.3	500	18×21.5	0.12	1.8	1000	–	–	–	–
470	16×21.5	0.16	2.4	650	–	–	–	–	–	–	–	–

(Note) Rated ripple current : 125℃ , 100kHz
ESR : 100kHz

NOTE : Design, Specifications are subject to change without notice.
It is recommended that you shall obtain technical specifications
from ELNA to ensure that the component is suitable for your use.

Return to Type List

ELNA Vertical Chip Type Aluminum Electrolytic Capacitors VTQ series

Code in front of series have been extracted from product code, which describes the segment of products, such as type and features.

- Compatible with surface mounting, high temperature capacitors for automotive.
- For Vibration resistance. (30G guaranteed)
- Environmental : GREEN CAP™ , RoHS compliance.
- Supplied with carrier taping.
- Guaranteed 1000 hours at 150°C.

High temperature

VTQ ⇦ VTT

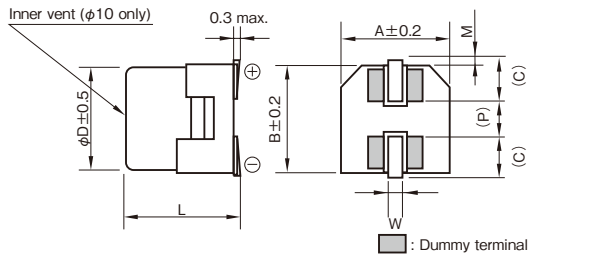
Marking color : Black print

Specifications

Item	Performance
Category temperature range (℃)	−40 to +150
Tolerance at rated capacitance (%)	±20 (20℃,120Hz)
Leakage current (μA) (max.)	Less than 0.02CV or 3 whichever is larger (after 2 minutes) C : Rated capacitance (μF) , V : Rated voltage (V) (20℃)
Tangent of loss angle (tanδ)	Rated voltage (V): 10 / 16 / 25 / 35 tanδ (max.): 0.26 / 0.20 / 0.16 / 0.14 0.02 is added to every 1000μF increase over 1000μF (20℃,120Hz)
Characteristics at high and low temperature	Rated voltage (V): 10 / 16 / 25 / 35 Impedance ratio (max.) Z−25℃/Z+20℃: 3 / 2 / 2 / 2 Impedance ratio (max.) Z−40℃/Z+20℃: 7 / 5 / 3 / 3 (120Hz)
Endurance (150℃) (Applied ripple current)	Test time: 1000 hours Leakage current: The initial specified value or less Percentage of capacitance change: Within ±30% of initial value Tangent of loss angle: 300% or less of the initial specified value
Shelf life (150℃)	Test time : 1000hours ; other items are same as the endurance. Voltage application treatment : According to JIS C5101-4 4.1
Applicable standards	JIS C5101 - 1, - 18 (IEC 60384 - 1, - 18)

Outline Drawing

Unit : mm



( ) : Reference size

ϕD	L	A	B	C	W	P	M	Size code
8	10±0.5	8.4	8.4	3.0	0.7 to 1.1	3.1	0.4±0.2	EH0
10	10±0.5	10.4	10.4	3.3	0.7 to 1.1	4.7	0.4±0.2	FH0

Refer to individual page.
(Soldering conditions, Land pattern size, The taping specifications)

Coefficient of Frequency for Rated Ripple Current

Rated voltage (V) \ Frequency (Hz)	120	1k	10k	100k
10 to 35	0.77	0.88	0.96	1

Product code system : 35V100μF
(*For automotive: powertrain, safety)

RA*	VTQ	101	M	1G	FH0	002	U
Category code	Series code	capacitance code	Cap tol. code	Voltage code	Size code	Taping and packing code	Additional code

For details, refer to the various "Product Code System" pages.

Standard Ratings

Rated voltage (V) / Item / Rated capacitance (μF)	10 (1L) Case ϕD×L (mm)	Size code	ESR (Ω max.)	Rated ripple current (mArms)	16 (1E) Case ϕD×L (mm)	Size code	ESR (Ω max.)	Rated ripple current (mArms)	25 (1T) Case ϕD×L (mm)	Size code	ESR (Ω max.)	Rated ripple current (mArms)
47	—	—	—	—	8 × 10	EH0	0.70	120	8 × 10	EH0	0.70	120
68	—	—	—	—	8 × 10	EH0	0.70	120	8 × 10	EH0	0.70	120
100	8 × 10	EH0	0.70	120	8 × 10	EH0	0.70	120	8 × 10	EH0	0.70	120
150	—	—	—	—	10 × 10	FH0	0.40	160	10 × 10	FH0	0.40	160
220	8 × 10	EH0	0.70	120	10 × 10	FH0	0.40	160	10 × 10	FH0	0.40	160
330	10 × 10	FH0	0.40	160	10 × 10	FH0	0.40	160	—	—	—	—
470	10 × 10	FH0	0.40	160	—	—	—	—	—	—	—	—

Rated voltage (V) / Item / Rated capacitance (μF)	35 (1G) Case ϕD×L (mm)	Size code	ESR (Ω max.)	Rated ripple current (mArms)
33	8 × 10	EH0	0.70	120
47	8 × 10	EH0	0.70	120
68	8 × 10	EH0	0.70	120
100	10 × 10	FH0	0.40	160
150	10 × 10	FH0	0.40	160

(Note)
Rated ripple current : 150℃ , 100kHz
ESR : 20℃ , 100kH

NOTE : Design, Specifications are subject to change without notice.
It is recommended that you shall obtain technical specifications from ELNA to ensure that the component is suitable for your use.

Miniature Type Aluminum Electrolytic Capacitors

CAT.No.2023/2024E

■ Product Code System

R

The Elna product code is Max.20 digits.

Example) RJD series 100V 22μF φ 8x12L

New product code
RSRJD220M1HE12300T

Old product code
RJD-100V220MG3#

1 2	3 4 5	6 7 8	9	10 11	12	13 14	15 16 17	18 19 20
R S	R J D	2 2 0	M	1 H	E	1 2	3 0 0	T
Product category code	Series code	Rated capacitance code	Capacitance tolerance code	Rated voltage code	Case size code		Lead forming and Packing code	Additional code

1 Product group
R : Energy devices
(Electrolytic capacitor)

2 Category
S : For general
*A : For automotive (powertrain, safety)
*C : For automotive (entertainment, audio)
M : For medical
(international classification Ⅲ)
L : For medical
(international classification Ⅰ, Ⅱ)

* AEC-Q200 Qualified.

10-11 Rated voltage code

voltage (V)	Code
4	1A
6.3	1J
10	1L
16	1E
25	1T
35	1G
50	1U
63	4E
80	1R
100	1H

12 Diameter code

D(mm)	Code
4	B
5	C
6.3	D
8	E
10	F
12.5	G
16	J
18	K

13-14 Length code

L(mm)	Code
5	05
7	07
10	10
11	11
11.5	11
12	12
12.5	12
・	・
・	・
42	42
42.5	42

3-5 Series code
Please refer to each series page.
The following changes the series code.

For Audio

old code	New code
RFO	RF0 *

* Change alphabet "O" into zero "0".

15-17 Lead forming and Packing code
Example

Contents	code
Long lead standard packing	300

Please contact us for lead forming, cutting, taping and special packaging.

18-20 Additional code
Example

Code	Contents
T	Sn 100% plated

Please contact us for details.

6-8 Rated capacitance code
The code denoting nominal capacitance shall consist of three numerals.
The first and second numerals shall represent the significant figures of nominal capacitance in the unit of microfarad (μF), And the third numeral shall represent the number of zeros following the significant figures.
Example

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

9 Capacitance tolerance code
Example

Tolerance (%)	Code
± 10	K
± 20	M
0 to +30	A
-10 to +30	Q
-10 to +50	T

NOTE : Design, Specifications are subject to change without notice.
It is recommended that you shall obtain technical specifications from ELNA to ensure that the component is suitable for your use.

Return to Type List

ELNA

Miniature Aluminum Electrolytic Capacitors RJB series

Code in front of series have been extracted from product code, which describes the segment of products, such as type and features.

- Low Impedance capacitors.
- Guaranteed 5000 hours at 105°C.
  (φ5 to φ6.3 : 2000 hours ; φ8 to φ10 : 3000 hours)
- Environmental : GREEN CAP™ , RoHS compliance.

Miniaturized

RJB ⇦ RJH

Marking color : White print on a black sleeve

Specifications

Item	Performance
Category temperature range (℃)	−55 to +105
Tolerance at rated capacitance (%)	±20 (20℃,120Hz)
Leakage current (μA) (max.)	0.01CV + 1 (after 2 minutes) C : Rated capacitance (μF) ; V : Rated voltage (V) (20℃)

Tangent of loss angle (tanδ)

Rated voltage (V)	6.3	10	16	25	35	50	63	100
tanδ (max.)	0.22	0.19	0.16	0.14	0.12	0.10	0.09	0.08

0.02 is added to every 1000μF increase over 1000μF. (20℃,120Hz)

Characteristics at high and low temperature

Rated voltage (V)		6.3	10	16	25	35	50	63	100
Impedance ratio (max.)	Z−55℃/Z+20℃	3	3	3	3	3	3	3	3

(120Hz)

Endurance (105℃) (Applied ripple current)

Test time	5000 hours (φ5 to φ6.3: 2000 hours) (φ8 to φ10 : 3000 hours)
Leakage current	The initial specified value or less
Percentage of capacitance change	Within ±20% of initial value
Tangent of the loss angle	200% or less of the initial specified value

Shelf life (105℃)

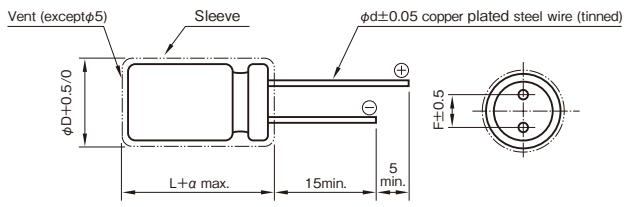
Test time	1000 hours
Leakage current	The initial specified value or less
Percentage of capacitance change	Within ±15% of initial value
Tangent of the loss angle	150% or less of the initial specified value

Voltage application treatment : According to JIS C5101-4 4.1

Applicable standards	JIS C5101 - 1,- 4 (IEC 60384 - 1,- 4)

Outline Drawing

Unit : mm



φD	5	6.3	8	10	12.5	16
F	2.0	2.5	3.5	5.0	5.0	7.5
φd	0.5	0.5	0.6	0.6	0.6	0.8
α	1.0	1.0	1.0	2.0	2.0	2.0

Coefficient of Frequency for Rated Ripple Current

Rated capacitance (μF) \ Frequency (Hz)	120	1k	10k	100k
3.3 to 180	0.40	0.75	0.90	1
220 to 390	0.50	0.85	0.95	1
470 to 1800	0.60	0.88	0.96	1
2200 to 3900	0.75	0.90	0.98	1
4700 to 10000	0.85	0.95	1.00	1

Product code system : 10V1000μF (*For general product)

RS*	RJB	102	M	1L	F16	300	T
Category code	Series code	capacitance code	Cap tol. code	Voltage code	Size code	Lead-forming and packing code	Additional code

・For details, refer to the various "Product Code System" pages.
・Lead-forming and packing code on this page are for lead long and standard packing products.
For standard packing, please refer to the "PACKING" page.

NOTE : Design, Specifications are subject to change without notice.
It is recommended that you shall obtain technical specifications from ELNA to ensure that the component is suitable for your use.

Code in front of series have been extracted from product code, which describes the segment of products, such as type and features.

Standard Ratings

Rated voltage (V) / Item / Rated capacitance (μF)	6.3 (1J)					10 (1L)					16 (1E)				
	Case φD×L (mm)	Size code	Impedance (Ω max.) 20℃	Impedance (Ω max.) −10℃	Rated ripple current (mArms)	Case φD×L (mm)	Size code	Impedance (Ω max.) 20℃	Impedance (Ω max.) −10℃	Rated ripple current (mArms)	Case φD×L (mm)	Size code	Impedance (Ω max.) 20℃	Impedance (Ω max.) −10℃	Rated ripple current (mArms)
100	—	—	—	—	—	5×11.5	C11	0.65	1.3	181	—	—	—	—	—
220	—	—	—	—	—	6.3×11.5	D11	0.32	0.64	290	—	—	—	—	—
330	6.3×11.5	D11	0.32	0.64	290	8×12	E12	0.17	0.34	555	8×12	E12	0.17	0.34	555
470	8×12	E12	0.17	0.34	555	8×12	E12	0.17	0.34	555	10×12.5	F12	0.12	0.24	760
680	8×12	E12	0.17	0.34	555	10×12.5	F12	0.12	0.24	760	10×16	F16	0.080	0.16	1050
1000	10×12.5	F12	0.12	0.24	760	10×16	F16	0.080	0.16	1050	10×20	F20	0.062	0.124	1220
2200	10×25	F25	0.052	0.104	1440	12.5×20	G20	0.042	0.084	1690	12.5×25	G25	0.034	0.068	1950
3300	12.5×20	G20	0.042	0.084	1690	12.5×25	G25	0.034	0.068	1950	16×25	J25	0.028	0.056	2560
4700	12.5×30	G30	0.030	0.060	2310	16×25	J25	0.028	0.056	2560	16×31.5	J31	0.025	0.050	3010
6800	16×25	J25	0.028	0.056	2560	16×31.5	J31	0.025	0.050	3010	—	—	—	—	—
10000	16×31.5	J31	0.025	0.050	3010	—	—	—	—	—	—	—	—	—	—

Rated voltage (V) / Item / Rated capacitance (μF)	25 (1T)					35 (1G)					50 (1U)				
	Case φD×L (mm)	Size code	Impedance (Ω max.) 20℃	Impedance (Ω max.) −10℃	Rated ripple current (mArms)	Case φD×L (mm)	Size code	Impedance (Ω max.) 20℃	Impedance (Ω max.) −10℃	Rated ripple current (mArms)	Case φD×L (mm)	Size code	Impedance (Ω max.) 20℃	Impedance (Ω max.) −10℃	Rated ripple current (mArms)
22	—	—	—	—	—	—	—	—	—	—	5×11.5	C11	0.95	1.9	170
33	—	—	—	—	—	5×11.5	C11	0.65	1.3	181	6.3×11.5	D11	0.46	0.92	260
47	5×11.5	C11	0.65	1.3	181	6.3×11.5	D11	0.32	0.64	290	6.3×11.5	D11	0.46	0.92	260
100	6.3×11.5	D11	0.32	0.64	290	8×12	E12	0.17	0.34	555	8×12	E12	0.21	0.42	485
150	—	—	—	—	—	—	—	—	—	—	10×12.5	F12	0.19	0.38	615
220	8×12	E12	0.17	0.34	555	10×12.5	F12	0.12	0.24	760	10×16	F16	0.16	0.32	850
330	10×12.5	F12	0.12	0.24	760	10×16	F16	0.080	0.16	1050	10×20	F20	0.085	0.17	1050
470	10×16	F16	0.080	0.16	1050	10×20	F20	0.062	0.124	1220	12.5×20	G20	0.060	0.12	1500
680	10×20	F20	0.062	0.124	1220	12.5×20	G20	0.042	0.084	1690	12.5×25	G25	0.045	0.090	1832
1000	12.5×20	G20	0.042	0.084	1690	12.5×25	G25	0.034	0.068	1950	16×25	J25	0.038	0.076	2240
2200	16×25	J25	0.028	0.056	2560	16×31.5	J31	0.025	0.050	3010	—	—	—	—	—
3300	16×31.5	J31	0.025	0.050	3010	—	—	—	—	—	—	—	—	—	—

Rated voltage (V) / Item / Rated capacitance (μF)	63 (4E)					100 (1H)				
	Case φD×L (mm)	Size code	Impedance (Ω max.) 20℃	Impedance (Ω max.) −10℃	Rated ripple current (mArms)	Case φD×L (mm)	Size code	Impedance (Ω max.) 20℃	Impedance (Ω max.) −10℃	Rated ripple current (mArms)
3.3	—	—	—	—	—	5×11.5	C11	1.9	7.6	57
4.7	5×11.5	C11	1.2	3.6	120	5×11.5	C11	1.9	7.6	57
10	5×11.5	C11	1.2	3.6	120	6.3×11.5	D11	1.1	4.4	78
22	6.3×11.5	D11	0.55	1.7	148	8×12	E12	0.53	2.1	275
33	6.3×11.5	D11	0.55	1.7	148	10×12.5	F12	0.47	1.9	319
47	8×12	E12	0.32	0.96	360	10×16	F16	0.32	1.3	424
100	10×12.5	F12	0.23	0.69	448	12.5×20	G20	0.13	0.52	805
220	10×20	F20	0.12	0.36	676	16×25	J25	0.081	0.32	1290
330	12.5×20	G20	0.075	0.23	979	16×25	J25	0.081	0.32	1290
470	12.5×25	G25	0.065	0.20	1180	16×31.5	J31	0.059	0.23	1630
1000	16×31.5	J31	0.042	0.13	1890	—	—	—	—	—

(Note) Rated ripple current : 105℃, 100kHz ; Impedance : 100kHz

NOTE : Design, Specifications are subject to change without notice.
It is recommended that you shall obtain technical specifications
from ELNA to ensure that the component is suitable for your use.

Return to Type List

ELNA

Miniature Aluminum Electrolytic Capacitors RJH series

Code in front of series have been extracted from product code, which describes the segment of products, such as type and features.

- Low Impedance capacitors.
- Guaranteed 5000 hours at 105℃.
  (φ5 to φ6.3 : 2000 hours ; φ8 to φ10 : 3000 hours)
- Environmental : GREEN CAP™ , RoHS compliance.

Long life

RJH ⇦ RJ3

Marking color : White print on a black sleeve

Specifications

Item	Performance
Category temperature range (℃)	−55 to +105
Tolerance at rated capacitance (%)	±20 (20℃,120Hz)
Leakage current (μA) (max.)	0.01CV + 2 (after 2 minutes) C : Rated capacitance (μF) ; V : Rated voltage (V) (20℃)
Tangent of loss angle (tanδ)	

Rated voltage (V)	6.3	10	16	25	35	50	63	100
tanδ (max.)	0.22	0.19	0.16	0.14	0.12	0.10	0.08	0.07

0.02 is added to every 1000μF increase over 1000μF. (20℃,120Hz)

Characteristics at high and low temperature

Rated voltage (V)		6.3	10	16	25	35	50	63	100
Impedance ratio (max.)	Z−25℃/Z+20℃	2	2	2	2	2	2	2	2
	Z−55℃/Z+20℃	3	3	3	3	3	3	3	3

(120Hz)

Endurance (105℃) (Applied ripple current)

Test time	5000 hours (φ5 to φ6.3: 2000 hours) (φ8 to φ10 : 3000 hours)
Leakage current	The initial specified value or less
Percentage of capacitance change	Within ±20% of initial value
Tangent of the loss angle	200% or less of the initial specified value

Shelf life (105℃)

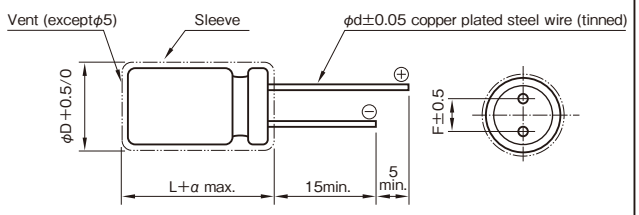
Test time	1000 hours
Leakage current	The initial specified value or less
Percentage of capacitance change	Within ±15% of initial value
Tangent of the loss angle	150% or less of the initial specified value

Voltage application treatment : According to JIS C5101-4 4.1

Applicable standards	JIS C5101 - 1, - 4 (IEC 60384 - 1, - 4)

Outline Drawing

Unit : mm



φD	5	6.3	8	10	12.5	16	18
F	2.0	2.5	3.5	5.0	5.0	7.5	7.5
φd	0.5	0.5	0.6	0.6	0.6	0.8	0.8
α	1.0	1.0	1.0	2.0	2.0	2.0	2.0

Coefficient of Frequency for Rated Ripple Current

Rated capacitance (μF) \ Frequency (Hz)	120	1k	10k	100k
1 to 4.7	0.40	0.68	0.78	1
5.6 to 47	0.50	0.76	0.87	1
56 to 270	0.70	0.85	0.90	1
330 to 1000	0.80	0.93	0.98	1
1200 to 15000	0.90	0.95	1.00	1

Product code system : 10V5600μF (*For general product)

RS*	RJH	562	M	1L	J31	300	T
Category code	Series code	capacitance code	Cap tol. code	Voltage code	Size code	Lead-forming and packing code	Additional code

・For details, refer to the various "Product Code System" pages.
・Lead-forming and packing code on this page are for lead long and standard packing products.
For standard packing, please refer to the "PACKING" page.

NOTE : Design, Specifications are subject to change without notice.
It is recommended that you shall obtain technical specifications from ELNA to ensure that the component is suitable for your use.

Code in front of series have been extracted from product code, which describes the segment of products, such as type and features.

Standard Ratings

Rated voltage (V) / Item		6.3 (1J)					10 (1L)				
Case φD×L (mm)	Size code	Rated capacitance (μF)	ESR (Ω)	Impedance (Ω max.) 20℃	Impedance (Ω max.) −10℃	Rated ripple current (mArms)	Rated capacitance (μF)	ESR (Ω)	Impedance (Ω max.) 20℃	Impedance (Ω max.) −10℃	Rated ripple current (mArms)
5×11.5	C11	100	3.65	0.65	1.46	175	82	3.84	0.65	1.46	175
6.3×11.5	D11	220	1.66	0.31	0.70	290	180	1.75	0.31	0.70	290
8×12	E12	470	0.777	0.17	0.38	488	330	0.956	0.17	0.38	488
8×15	E15	680	0.537	0.13	0.29	617	470	0.671	0.13	0.29	617
8×20	E20	1000	0.365	0.095	0.21	800	680	0.464	0.095	0.21	800
10×12.5	F12	680	0.537	0.10	0.23	625	470	0.671	0.10	0.23	625
10×16	F16	820	0.446	0.080	0.18	825	560	0.563	0.080	0.18	825
10×20	F20	1200	0.305	0.062	0.14	1010	1000	0.316	0.062	0.14	1010
10×25	F25	1500	0.244	0.052	0.12	1190	1200	0.263	0.052	0.12	1190
10×30	F30	2200	0.181	0.044	0.099	1440	1500	0.211	0.044	0.099	1440
12.5×15	G15	• 1200	0.305	0.062	0.14	1010	• 1000	0.316	0.062	0.14	1010
12.5×20	G20	2200	0.181	0.042	0.095	1400	1800	0.176	0.042	0.095	1400
12.5×25	G25	2700	0.148	0.034	0.076	1690	2200	0.159	0.034	0.076	1690
12.5×30	G30	3900	0.111	0.030	0.068	1950	2700	0.130	0.030	0.068	1950
12.5×35	G35	4700	0.099	0.024	0.054	2220	3300	0.116	0.024	0.054	2220
12.5×40	G40	5600	0.089	0.021	0.047	2390	3900	0.098	0.021	0.047	2390
16×16	J16	• 2700	0.148	0.046	0.10	1310	• 1800	0.176	0.046	0.10	1310
16×20	J20	• 4700	0.099	0.034	0.077	1660	• 3300	0.116	0.034	0.077	1660
16×25	J25	5600	0.089	0.028	0.063	2070	3900	0.098	0.028	0.063	2070
16×31.5	J31	6800	0.079	0.025	0.056	2350	5600	0.080	0.025	0.056	2350
16×35.5	J35	8200	0.073	0.022	0.050	2550	6800	0.071	0.022	0.050	2550
16×40	J40	12000	0.059	0.018	0.041	2970	8200	0.067	0.018	0.041	2970
18×16	K16	• 3300	0.131	0.043	0.097	1460	• 2200	0.159	0.043	0.097	1460
18×20	K20	• 5600	0.089	0.030	0.068	1850	• 3900	0.098	0.030	0.068	1850
18×25	K25	• 6800	0.079	0.027	0.061	2120	• 4700	0.089	0.027	0.061	2120
18×31.5	K31	10000	0.064	0.023	0.052	2410	6800	0.071	0.023	0.052	2410
18×35.5	K35	12000	0.059	0.019	0.043	2680	8200	0.067	0.019	0.043	2680
18×40	K40	15000	0.054	0.017	0.038	3010	10000	0.059	0.017	0.038	3010

Rated voltage (V) / Item		16 (1E)					25 (1T)				
Case φD×L (mm)	Size code	Rated capacitance (μF)	ESR (Ω)	Impedance (Ω max.) 20℃	Impedance (Ω max.) −10℃	Rated ripple current (mArms)	Rated capacitance (μF)	ESR (Ω)	Impedance (Ω max.) 20℃	Impedance (Ω max.) −10℃	Rated ripple current (mArms)
5×11.5	C11	56	4.74	0.65	1.46	175	39	5.96	0.65	1.46	175
6.3×11.5	D11	120	2.21	0.31	0.70	290	82	2.83	0.31	0.70	290
8×12	E12	270	0.983	0.17	0.38	488	180	1.29	0.17	0.38	488
8×15	E15	330	0.805	0.13	0.29	617	220	1.06	0.13	0.29	617
8×20	E20	470	0.565	0.095	0.21	800	330	0.704	0.095	0.21	800
10×12.5	F12	330	0.805	0.10	0.23	625	220	1.06	0.10	0.23	625
10×16	F16	390	0.681	0.080	0.18	825	270	0.861	0.080	0.18	825
10×20	F20	680	0.391	0.062	0.14	1010	470	0.495	0.062	0.14	1010
10×25	F25	820	0.324	0.052	0.12	1190	560	0.415	0.052	0.12	1190
10×30	F30	1200	0.222	0.044	0.099	1440	820	0.284	0.044	0.099	1440
12.5×15	G15	• 680	0.391	0.062	0.14	1010	• 470	0.495	0.062	0.14	1010
12.5×20	G20	1200	0.222	0.042	0.095	1400	820	0.284	0.042	0.095	1400
12.5×25	G25	1500	0.177	0.034	0.076	1690	1000	0.233	0.034	0.076	1690
12.5×30	G30	2200	0.136	0.030	0.068	1950	1500	0.155	0.030	0.068	1950
12.5×35	G35	2700	0.111	0.024	0.054	2220	1800	0.130	0.024	0.054	2220
12.5×40	G40	3300	0.101	0.021	0.047	2390	2200	0.121	0.021	0.047	2390
16×16	J16	• 1500	0.177	0.046	0.10	1310	• 820	0.284	0.046	0.10	1310
16×20	J20	• 2200	0.136	0.034	0.077	1660	• 1500	0.155	0.034	0.077	1660
16×25	J25	2700	0.111	0.028	0.063	2070	1800	0.130	0.028	0.063	2070
16×31.5	J31	3900	0.086	0.025	0.056	2350	2700	0.099	0.025	0.056	2350
16×35.5	J35	4700	0.078	0.022	0.050	2550	3300	0.091	0.022	0.050	2550
16×40	J40	5600	0.072	0.018	0.041	2970	3900	0.077	0.018	0.041	2970
18×16	K16	• 1500	0.177	0.043	0.097	1460	• 1200	0.194	0.043	0.097	1460
18×20	K20	• 2700	0.111	0.030	0.068	1850	• 1800	0.130	0.030	0.068	1850
18×25	K25	• 3900	0.086	0.027	0.061	2120	• 2700	0.099	0.027	0.061	2120
18×31.5	K31	4700	0.078	0.023	0.052	2410	3300	0.091	0.023	0.052	2410
18×35.5	K35	6800	0.064	0.019	0.043	2680	3900	0.077	0.019	0.043	2680
18×40	K40	8200	0.061	0.017	0.038	3010	4700	0.071	0.017	0.038	3010

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

NOTE : Design, Specifications are subject to change without notice.
It is recommended that you shall obtain technical specifications
from ELNA to ensure that the component is suitable for your use.

Code in front of series have been extracted from product code, which describes the segment of products, such as type and features.

Standard Ratings

Rated voltage (V) / Case Size φD×L (mm)	Item code	35 (1G) Rated capacitance (μF)	ESR (Ω)	Impedance (Ω max.) 20℃	Impedance (Ω max.) −10℃	Rated ripple current (mArms)	50 (1U) Rated capacitance (μF)	ESR (Ω)	Impedance (Ω max.) 20℃	Impedance (Ω max.) −10℃	Rated ripple current (mArms)
5×11.5	C11	—	—	—	—	—	1	166	3.5	7.0	36
5×11.5	C11	—	—	—	—	—	2.2	75.4	3.0	6.0	54
5×11.5	C11	—	—	—	—	—	3.3	50.3	2.6	5.2	63
5×11.5	C11	—	—	—	—	—	4.7	35.3	2.2	4.4	75
5×11.5	C11	—	—	—	—	—	10	16.6	1.4	2.8	110
5×11.5	C11	27	7.37	0.65	1.46	175	18	9.22	0.95	1.9	120
6.3×11.5	D11	56	3.56	0.31	0.70	290	39	4.25	0.43	0.86	148
8×12	E12	120	1.66	0.17	0.38	488	68	2.44	0.20	0.40	360
8×15	E15	180	1.11	0.13	0.29	617	82	2.02	0.18	0.36	460
8×20	E20	220	0.905	0.095	0.21	800	120	1.38	0.13	0.26	670
10×12.5	F12	150	1.33	0.10	0.23	625	82	2.02	0.18	0.36	443
10×16	F16	180	1.11	0.080	0.18	825	100	1.66	0.15	0.30	553
10×20	F20	330	0.604	0.062	0.14	1010	180	0.922	0.085	0.17	676
10×25	F25	390	0.511	0.052	0.12	1190	220	0.754	0.075	0.15	876
10×30	F30	560	0.356	0.044	0.099	1440	330	0.503	0.055	0.11	1010
12.5×15	G15	• 330	0.604	0.062	0.140	1010	• 180	0.922	0.095	0.19	745
12.5×20	G20	560	0.356	0.042	0.095	1400	330	0.503	0.060	0.12	979
12.5×25	G25	680	0.293	0.034	0.076	1690	470	0.353	0.044	0.088	1180
12.5×30	G30	1000	0.200	0.030	0.068	1950	560	0.297	0.040	0.080	1310
12.5×35	G35	1200	0.166	0.024	0.054	2220	680	0.244	0.036	0.072	1470
12.5×40	G40	1500	0.133	0.021	0.047	2390	820	0.203	0.034	0.068	1590
16×16	J16	• 560	0.356	0.046	0.10	1310	• 330	0.503	0.065	0.13	982
16×20	J20	• 1000	0.200	0.034	0.077	1660	• 680	0.244	0.045	0.090	1210
16×25	J25	1200	0.166	0.028	0.063	2070	820	0.203	0.038	0.076	1490
16×31.5	J31	1800	0.111	0.025	0.056	2350	1000	0.166	0.032	0.064	1890
16×35.5	J35	2200	0.106	0.022	0.050	2550	1200	0.139	0.028	0.056	2140
16×40	J40	2700	0.087	0.018	0.041	2970	1500	0.111	0.026	0.052	2410
18×16	K16	• 680	0.293	0.043	0.097	1460	• 470	0.353	0.048	0.096	1180
18×20	K20	• 1200	0.166	0.030	0.068	1850	• 820	0.203	0.036	0.072	1450
18×25	K25	• 1800	0.111	0.027	0.061	2120	• 1000	0.166	0.032	0.064	1720
18×31.5	K31	2200	0.106	0.023	0.052	2410	1500	0.111	0.026	0.052	1970
18×35.5	K35	2700	0.087	0.019	0.043	2680	1800	0.074	0.025	0.050	2310
18×40	K40	3300	0.081	0.017	0.038	3010	2200	0.073	0.024	0.048	2530

Rated voltage (V) / Case Size φD×L (mm)	Item code	63 (4E) Rated capacitance (μF)	ESR (Ω)	Impedance (Ω max.) 20℃	Impedance (Ω max.) −10℃	Rated ripple current (mArms)	100 (1H) Rated capacitance (μF)	ESR (Ω)	Impedance (Ω max.) 20℃	Impedance (Ω max.) −10℃	Rated ripple current (mArms)
5×11.5	C11	12	11.1	1.2	3.6	120	5.6	20.7	1.9	7.6	57
6.3×11.5	D11	27	4.92	0.55	1.7	148	12	9.68	1.1	4.4	78
8×12	E12	47	2.82	0.32	0.96	360	22	5.28	0.53	2.1	275
8×15	E15	68	1.95	0.24	0.72	469	33	3.52	0.35	1.4	360
8×20	E20	82	1.62	0.17	0.51	682	39	2.98	0.27	1.1	490
10×12.5	F12	56	2.37	0.23	0.69	448	27	4.30	0.47	1.9	319
10×16	F16	68	1.95	0.17	0.51	553	33	3.52	0.32	1.3	424
10×20	F20	120	1.11	0.12	0.36	676	56	2.07	0.25	1.0	499
10×25	F25	150	0.885	0.10	0.30	876	68	1.71	0.18	0.72	634
10×30	F30	180	0.738	0.085	0.26	1020	100	1.16	0.15	0.60	739
12.5×15	G15	• 150	0.885	0.11	0.33	745	• 68	1.71	0.20	0.80	613
12.5×20	G20	220	0.604	0.075	0.23	979	100	1.16	0.13	0.52	805
12.5×25	G25	270	0.492	0.065	0.20	1180	120	0.968	0.11	0.44	857
12.5×30	G30	390	0.341	0.055	0.17	1310	180	0.646	0.090	0.36	1120
12.5×35	G35	470	0.283	0.048	0.14	1470	220	0.528	0.075	0.30	1240
12.5×40	G40	560	0.237	0.042	0.13	1590	270	0.431	0.060	0.24	1330
16×16	J16	• 220	0.604	0.080	0.24	982	• 120	0.968	0.13	0.52	706
16×20	J20	• 390	0.341	0.057	0.17	1210	• 180	0.646	0.11	0.44	916
16×25	J25	470	0.283	0.052	0.16	1490	220	0.528	0.081	0.32	1290
16×31.5	J31	680	0.196	0.042	0.13	1890	330	0.352	0.059	0.23	1630
16×35.5	J35	820	0.162	0.036	0.11	2140	390	0.298	0.052	0.21	1750
16×40	J40	1000	0.133	0.032	0.096	2410	470	0.248	0.045	0.18	1920
18×16	K16	• 330	0.403	0.065	0.20	1200	• 150	0.775	0.12	0.48	871
18×20	K20	• 470	0.237	0.058	0.17	1460	• 270	0.431	0.085	0.34	1170
18×25	K25	• 680	0.196	0.050	0.15	1740	• 330	0.352	0.071	0.28	1500
18×31.5	K31	820	0.162	0.042	0.13	1990	390	0.298	0.058	0.23	1630
18×35.5	K35	1000	0.133	0.035	0.11	2340	560	0.208	0.054	0.22	1920
18×40	K40	1200	0.111	0.032	0.096	2560	680	0.171	0.041	0.16	2100

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

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

NOTE : Design, Specifications are subject to change without notice.
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Return to Type List

ELNA

Miniature Aluminum Electrolytic Capacitors RJF series

Code in front of series have been extracted from product code, which describes the segment of products, such as type and features.

- Extra low impedance capacitor.
- Environmental : GREEN CAP™ , RoHS compliance.

Low impedance

RJF ⇦ RJB

Marking color : White print on a black sleeve

Specifications

Item	Performance
Category temperature range (℃)	−40 to +105
Tolerance at rated capacitance (%)	±20 (20℃,120Hz)
Leakage current (μA) (max.)	0.01CV or 3 whichever is larger (after 2 minutes) C : Rated capacitance (μF) ; V : Rated voltage (V) (20℃)
Tangent of loss angle (tanδ)	

Rated voltage (V)	6.3	10	16	25	35	50	63	80	100
tanδ (max.)	0.22	0.19	0.16	0.14	0.12	0.10	0.09	0.09	0.08

0.02 is added to every 1000μF increase over 1000μF. (20℃,120Hz)

Characteristics at high and low temperature

Rated voltage (V)		6.3	10	16	25	35	50	63	80	100
Impedance ratio (max.)	Z−25℃/Z+20℃	2	2	2	2	2	2	2	2	2
	Z−40℃/Z+20℃	3	3	3	3	3	3	3	3	3

(120Hz)

Endurance (105℃) (Applied ripple current)

Test time	5L & 7L : 1000 hours φ5 & φ6.3 : 2000 hours (63 to 100WV:5000 hours) φ8 & φ10 : 3000 hours (63 to 100WV:7000 hours) φ12.5 to φ18 : 5000 hours (63 to 100WV:10000 hours)
Leakage current	The initial specified value or less
Percentage of capacitance change	Within ±25% of initial value
Tangent of the loss angle	200% or less of the initial specified value

Shelf life (105℃)

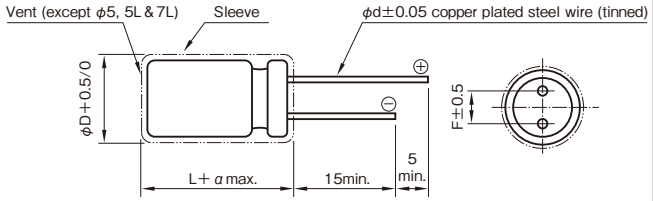
Test time	1000 hours
Leakage current	The initial specified value or less
Percentage of capacitance change	Within ±25% of initial value
Tangent of the loss angle	200% or less of the initial specified value

Voltage application treatment : According to JIS C5101-4 4.1

Applicable standards	JIS C5101 - 1,- 4 (IEC 60384 - 1,- 4)

Outline Drawing

Unit : mm



11.5L or more

φD	5	6.3	8	10	12.5	16	18
F	2.0	2.5	3.5	5.0	5.0	7.5	7.5
φd	0.5	0.5	0.6	0.6	0.6	0.8	0.8
α	1.0	1.0	1.0	2.0	2.0	2.0	2.0

5L, 7L

φD	4	5	6.3	8
F	1.5	2.0	2.5	3.5
φd	0.45	0.45	0.45	0.45
α	1.0	1.0	1.0	1.0

Coefficient of Frequency for Rated Ripple Current

Rated capacitance (μF) \ Frequency (Hz)	120	1k	10k	100k
5.6 to 180	0.40	0.75	0.90	1
220 to 390	0.50	0.85	0.94	1
470 to 1800	0.60	0.87	0.95	1
2200 to 3900	0.75	0.90	0.95	1
4700 to 6800	0.85	0.95	0.98	1

Product code system : 10V1000μF (*For general product)

RS*	RJF	102	M	1L	F16	300	T
Category code	Series code	capacitance code	Cap tol. code	Voltage code	Size code	Lead-forming and packing code	Additional code

・For details, refer to the various "Product Code System" pages.
・Lead-forming and packing code on this page are for lead long and standard packing products.
For standard packing, please refer to the "PACKING" page.

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Code in front of series have been extracted from product code, which describes the segment of products, such as type and features.

Standard Ratings

Rated voltage (V) / Item / Rated capacitance (μF)	6.3 (1J)					10 (1L)					16 (1E)				
	Case φDxL (mm)	Size code	Impedance (Ω max.) 20℃	Impedance (Ω max.) -10℃	Rated ripple current (mArms)	Case φDxL (mm)	Size code	Impedance (Ω max.) 20℃	Impedance (Ω max.) -10℃	Rated ripple current (mArms)	Case φDxL (mm)	Size code	Impedance (Ω max.) 20℃	Impedance (Ω max.) -10℃	Rated ripple current (mArms)
18	—	—	—	—	—	—	—	—	—	—	4 × 7	B07	0.92	2.8	130
27	—	—	—	—	—	4 × 7	B07	0.89	2.7	130	6.3 × 5	D05	0.30	0.95	210
33	—	—	—	—	—	—	—	—	—	—	5 × 7	C07	0.45	1.4	210
											6.3 × 5	D05	0.30	0.95	210
39	4 × 7	B07	0.85	2.6	130	—	—	—	—	—	—	—	—	—	—
47	—	—	—	—	—	6.3 × 5	D05	0.29	0.93	210	—	—	—	—	—
56	—	—	—	—	—	5 × 7	C07	0.44	1.4	210	5 × 11.5	C11	0.22	0.80	345
68	5 × 7	C07	0.43	1.3	210	—	—	—	—	—	6.3 × 7	D07	0.24	0.72	300
100	6.3 × 5	D05	0.28	0.91	210	5 × 11.5	C11	0.22	0.8	345	—	—		—	—
120	—	—	—	—	—	6.3 × 7	D07	0.23	0.69	300	8 × 7	E07	0.15	0.45	380
											6.3 × 11.5	D11	0.094	0.35	540
150	5 × 11.5	C11	0.22	0.80	345	—	—	—	—	—	—	—	—	—	—
	6.3 × 7	D07	0.23	0.69	300										
180	—	—	—	—	—	8 × 7	E07	0.15	0.45	380	—	—	—	—	—
220	8 × 7	E07	0.15	0.45	380	6.3 × 11.5	D11	0.094	0.35	540	—	—	—	—	—
330	6.3 × 11.5	D11	0.094	0.35	540	—	—	—	—	—	8 × 12	E12	0.056	0.19	945
470	—	—	—	—	—	8 × 12	E12	0.056	0.19	945	8 × 15	E15	0.045	0.15	1250
560	8 × 12	E12	0.056	0.19	945	—	—	—	—	—	10 × 16	F16	0.028	0.10	1760
680	—	—	—	—	—	10 × 12.5	F12	0.039	0.14	1330	—	—	—	—	—
820	8 × 15	E15	0.045	0.15	1250	—	—	—	—	—	—	—	—	—	—
1000	10 × 12.5	F12	0.039	0.14	1330	10 × 16	F16	0.028	0.10	1760	10 × 20	F20	0.020	0.060	1960
1200	10 × 16	F16	0.028	0.10	1760	10 × 20	F20	0.020	0.060	1960	10 × 25	F25	0.018	0.054	2250
1500	10 × 20	F20	0.020	0.060	1960	10 × 25	F25	0.018	0.054	2250	12.5 × 20	G20	0.017	0.043	2480
2200	10 × 25	F25	0.018	0.054	2250	12.5 × 20	G20	0.017	0.043	2480	12.5 × 25	G25	0.015	0.038	2900
2700	—	—	—	—	—	—	—	—	—	—	16 × 20	J20	0.015	0.038	3250
3300	12.5 × 20	G20	0.017	0.043	2480	12.5 × 25	G25	0.015	0.038	2900	16 × 25	J25	0.013	0.035	3630
3900	12.5 × 25	G25	0.015	0.038	2900	16 × 20	J20	0.015	0.038	3250	16 × 25	J25	0.013	0.035	3630
4700	12.5 × 30	G30	0.013	0.033	3450	16 × 25	J25	0.013	0.035	3630	—	—	—	—	—
5600	16 × 20	J20	0.015	0.038	3570	16 × 25	J25	0.013	0.035	3630	—	—	—	—	—
6800	16 × 25	J25	0.013	0.035	3630	—	—	—	—	—	—	—	—	—	—

Rated voltage (V) / Item / Rated capacitance (μF)	25 (1T)					35 (1G)					50 (1U)				
	Case φD × L (mm)	Size code	Impedance (Ω max.) 20℃	Impedance (Ω max.) -10℃	Rated ripple current (mArms)	Case φD × L (mm)	Size code	Impedance (Ω max.) 20℃	Impedance (Ω max.) -10℃	Rated ripple current (mArms)	Case φD × L (mm)	Size code	Impedance (Ω max.) 20℃	Impedance (Ω max.) -10℃	Rated ripple current (mArms)
5.6	—	—	—	—	—	—	—	—	—	—	4 × 7	B07	1.0	3.0	130
10	5 × 5	C05	0.61	1.5	130	5 × 5	C05	0.63	1.5	130	5 × 7	C07	0.50	1.5	210
						4 × 7	B07	0.96	2.9	130					
15	4 × 7	B07	0.94	2.9	130	—	—	—	—	—	—	—	—	—	—
18	—	—	—	—	—	5 × 7	C07	0.47	1.5	210	—	—	—	—	—
22	6.3 × 5	D05	0.31	0.97	210	6.3 × 5	D05	0.32	1.0	210	6.3 × 7	D07	0.26	0.78	300
											5 × 11.5	C11	0.34	1.18	238
27	5 × 7	C07	0.46	1.4	210	—	—	—	—	—	—	—	—	—	—
33	—	—	—	—	—	5 × 11.5	C11	0.22	0.80	345	8 × 7	E07	0.17	0.51	380
39	—	—	—	—	—	6.3 × 7	D07	0.25	0.75	300	—	—	—	—	—
47	5 × 11.5	C11	0.22	0.80	345	—	—	—	—	—	—	—	—	—	—
56	6.3 × 7	D07	0.24	0.72	300	8 × 7	E07	0.16	0.48	380	6.3 × 11.5	D11	0.14	0.50	385
						6.3 × 11.5	D11	0.094	0.35	540					
100	8 × 7	E07	0.15	0.45	380	—	—	—	—	—	8 × 12	E12	0.074	0.22	724
	6.3 × 11.5	D11	0.094	0.35	540										
120	—	—	—	—	—	—	—	—	—	—	8 × 15	E15	0.061	0.18	950
150	—	—	—	—	—	8 × 12	E12	0.056	0.19	945	10 × 12.5	F12	0.061	0.18	979
180	—	—	—	—	—	—	—	—	—	—	8 × 20	E20	0.046	0.14	1190
220	8 × 12	E12	0.056	0.19	945	10 × 12.5	F12	0.039	0.14	1330	10 × 16	F16	0.042	0.12	1370
270	—	—	—	—	—	8 × 20	E20	0.029	0.11	1500	10 × 20	F20	0.030	0.090	1580
330	10 × 12.5	F12	0.039	0.14	1330	10 × 16	F16	0.028	0.10	1760	10 × 25	F25	0.028	0.085	1870
470	10 × 16	F16	0.028	0.10	1760	10 × 20	F20	0.020	0.060	1960	12.5 × 20	G20	0.027	0.068	2050
560	—	—	—	—	—	10 × 25	F25	0.018	0.054	2250	12.5 × 25	G25	0.023	0.059	2410
680	10 × 20	F20	0.020	0.060	1960	12.5 × 20	G20	0.017	0.043	2480	16 × 20	J20	0.023	0.059	2730
820	10 × 25	F25	0.018	0.054	2250	—	—	—	—	—	16 × 20	J20	0.023	0.059	2730
1000	12.5 × 20	G20	0.017	0.043	2480	12.5 × 25	G25	0.015	0.038	2900	16 × 25	J25	0.021	0.056	3010
1200	—	—	—	—	—	16 × 20	J20	0.015	0.038	3250	—	—	—	—	—
1500	12.5 × 25	G25	0.015	0.038	2900	16 × 25	J25	0.013	0.035	3630	—	—	—	—	—
1800	16 × 20	J20	0.015	0.038	3250	16 × 25	J25	0.013	0.035	3630	—	—	—	—	—
2200	16 × 25	J25	0.013	0.035	3630	—	—	—	—	—	—	—	—	—	—
2700	16 × 25	J25	0.013	0.035	3630	—	—	—	—	—	—	—	—	—	—

(Note) Rated ripple current : 105℃ , 100kHz ; Impedance : 100kHz

NOTE : Design, Specifications are subject to change without notice.
It is recommended that you shall obtain technical specifications
from ELNA to ensure that the component is suitable for your use.

Code in front of series have been extracted from product code, which describes the segment of products, such as type and features.

Standard Ratings

Rated voltage (V) / Item / Rated capacitance (μF)	63 (4E)					80 (1R)					100 (1H)				
	Case φDxL (mm)	Size code	Impedance (Ω max.) 20℃	Impedance (Ω max.) -10℃	Rated ripple current (mArms)	Case φDxL (mm)	Size code	Impedance (Ω max.) 20℃	Impedance (Ω max.) -10℃	Rated ripple current (mArms)	Case φDxL (mm)	Size code	Impedance (Ω max.) 20℃	Impedance (Ω max.) -10℃	Rated ripple current (mArms)
6.8	–	—	–	–	–	—	–	–	–	–	5 × 11.5	C11	1.4	5.6	125
15	5 × 11.5	C11	0.88	3.5	165	—	–	–	–	–	6.3 × 11.5	D11	0.57	2.3	205
27	–	—	–	–	–	—	–	–	–	–	8 × 12	E12	0.36	1.4	335
33	6.3 × 11.5	D11	0.35	1.4	265	—	–	–	–	–	—	–	–	–	–
39	–	—	–	–	–	—	–	–	–	–	8 × 15	E15	0.25	1.0	450
47	–	—	–	–	–	—	–	–	–	–	10 × 12.5	F12	0.17	0.66	480
56	8 × 12	E12	0.22	0.88	500	—	–	–	–	–	8 × 20	E20	0.19	0.76	565
68	–	—	–	–	–	10 × 12.5	F12	0.17	0.66	480	10 × 16	F16	0.11	0.47	600
82	10 × 12.5	F12	0.11	0.44	690	–	—	–	–	–	10 × 20	F20	0.084	0.34	800
100	–	—	–	–	–	10 × 16	F16	0.11	0.47	600	12.5 × 15	G15	0.11	0.34	750
120	8 × 20	E20	0.12	0.48	820	10 × 20	F20	0.084	0.34	800	10 × 25	F25	0.069	0.28	900
	10 × 16	F16	0.076	0.31	950										
150	–	—	–	–	–	10 × 25	F25	0.069	0.28	900	12.5 × 20	G20	0.062	0.18	1100
180	10 × 20	F20	0.056	0.23	1150	–	—	–	–	–	—	–	–	–	–
220	10 × 25	F25	0.046	0.19	1350	12.5 × 20	G20	0.062	0.18	1100	16 × 20	J20	0.048	0.15	1350
270	12.5 × 20	G20	0.041	0.13	1500	–	—	–	–	–	12.5 × 30	G30	0.042	0.13	1500
330	–	—	–	–	–	12.5 × 25	G25	0.047	0.14	1250	12.5 × 35	G35	0.036	0.11	1650
											16 × 25	J25	0.038	0.12	1700
						16 × 20	J20	0.048	0.15	1350	18 × 20	K20	0.045	0.14	1500
390	12.5 × 25	G25	0.031	0.093	1900	12.5 × 30	G30	0.042	0.13	1500	12.5 × 40	G40	0.032	0.095	1800
470	12.5 × 30	G30	0.028	0.084	2300	12.5 × 35	G35	0.036	0.11	1650	16 × 31.5	J31	0.032	0.095	1850
						16 × 25	J25	0.038	0.12	1700	18 × 25	K25	0.036	0.11	1750
	16 × 20	J20	0.032	0.096	2000	18 × 20	K20	0.045	0.14	1500					
560	12.5 × 35	G35	0.024	0.070	2500	–	–	–	–	–	16 × 35.5	J35	0.029	0.086	2000
											18 × 31.5	K31	0.030	0.090	1900
680	12.5 × 40	G40	0.021	0.063	2800	16 × 31.5	J31	0.032	0.095	1850	16 × 40	J40	0.027	0.081	2480
	16 × 25	J25	0.025	0.075	2600						18 × 35.5	K35	0.027	0.081	2200
	18 × 20	K20	0.030	0.090	2500										
820	16 × 31.5	J31	0.021	0.063	2850	16 × 35.5	J35	0.029	0.086	2000	18 × 40	K40	0.026	0.077	2700
	18 × 25	K25	0.024	0.072	2800	18 × 31.5	K31	0.030	0.090	1900					
1000	16 × 35.5	J35	0.019	0.057	2900	–	–	–	–	–	—	–	–	–	–
1200	16 × 40	J40	0.018	0.054	3400	18 × 40	K40	0.026	0.077	2700	—	–	–	–	–
	18 × 31.5	K31	0.020	0.060	3300										
1500	18 × 35.5	K35	0.018	0.054	3400	—	–	–	–	–	—	–	–	–	–
1800	18 × 40	K40	0.017	0.051	3500	—	–	–	–	–	—	–	–	–	–

(Note) Rated ripple current : 105℃ , 100kHz ; Impedance : 100kHz

NOTE : Design, Specifications are subject to change without notice.
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from ELNA to ensure that the component is suitable for your use.

Return to Type List

ELNA

Miniature Aluminum Electrolytic Capacitors RJM series

Code in front of series have been extracted from product code, which describes the segment of products, such as type and features.

- Long life, extra low impedance capacitor.
- Guaranteed 10000 hours at 105℃.
  (φ5, φ6.3 : 6000 hours, φ8 : 8000 hours)
- Environmental : GREEN CAP™ , RoHS compliance.

Long life

RJM ⇦ RJF

Marking color : White print on a black sleeve

Specifications

Item	Performance
Category temperature range (℃)	−40 to +105
Tolerance at rated capacitance (%)	±20 (20℃,120Hz)
Leakage current (μA) (max.)	0.01CV or 3 whichever is larger (after 2 minutes) C : Rated capacitance (μF), V : Rated voltage (V) (20℃)
Tangent of loss angle (tanδ)	

Rated voltage (V)	6.3	10	16	25	35	50
tanδ (max.)	0.22	0.19	0.16	0.14	0.12	0.10

0.02 is added to every 1000μF increase over 1000μF. (20℃,120Hz)

Characteristics at high and low temperature

Rated voltage (V)		6.3	10	16	25	35	50
Impedance ratio (max.)	Z−25℃/Z+20℃	2	2	2	2	2	2
	Z−40℃/Z+20℃	3	3	3	3	3	3

(120Hz)

Endurance (105℃) (Applied ripple current)

Test time	φ5 & φ6.3 : 6000 hours φ8 : 8000 hours φ10 or more: 10000 hours
Leakage current	The initial specified value or less
Percentage of capacitance change	Within ±25% of initial value (φ6.3 or less : ±30%)
Tangent of the loss angle	200% or less of the initial specified value

Shelf life (105℃)

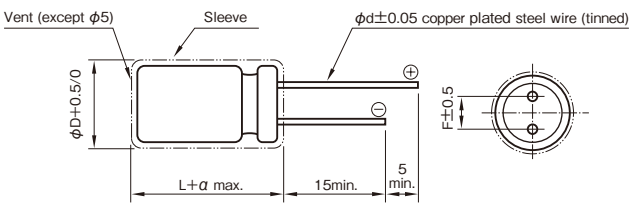
Test time	1000 hours
Leakage current	The initial specified value or less
Percentage of capacitance change	Within ±25% of initial value (φ6.3 or less : ±30%)
Tangent of the loss angle	200% or less of the initial specified value

Voltage application treatment : According to JIS C5101-4 4.1

Applicable standards	JIS C5101 - 1, - 4 (IEC 60384 - 1, - 4)

Outline Drawing

Unit : mm



φD	5	6.3	8	10	12.5	16
F	2.0	2.5	3.5	5.0	5.0	7.5
φd	0.5	0.5	0.6	0.6	0.6	0.8
α	1.0	1.0	1.0	2.0	2.0	2.0

Coefficient of Frequency for Rated Ripple Current

Rated capacitance (μF) \ Frequency (Hz)	120	1k	10k	100k
27 to 33	0.42	0.70	0.90	1
39 to 270	0.50	0.73	0.92	1
330 to 680	0.55	0.77	0.94	1
820 to 1800	0.60	0.80	0.96	1
2200 to 8200	0.70	0.85	0.98	1

Product code system : 10V1000μF (*For general product)

RS*	RJM	102	M	1L	E15	300	T
Category code	Series code	capacitance code	Cap tol. code	Voltage code	Size code	Lead-forming and packing code	Additional code

・For details, refer to the various "Product Code System" pages.
・Lead-forming and packing code on this page are for lead long and standard packing products.
For standard packing, please refer to the "PACKING" page.

NOTE : Design, Specifications are subject to change without notice.
It is recommended that you shall obtain technical specifications from ELNA to ensure that the component is suitable for your use.

Code in front of series have been extracted from product code, which describes the segment of products, such as type and features.

Standard Ratings

Rated voltage(V) / Item / Rated capacitance (μF)	6.3 (1J)					10 (1L)					16 (1E)				
	Case φDxL (mm)	Size code	Impedance (Ω max.) 20℃	Impedance (Ω max.) -10℃	Rated ripple current (mArms)	Case φDxL (mm)	Size code	Impedance (Ω max.) 20℃	Impedance (Ω max.) -10℃	Rated ripple current (mArms)	Case φDxL (mm)	Size code	Impedance (Ω max.) 20℃	Impedance (Ω max.) -10℃	Rated ripple current (mArms)
82	—	—	—	—	—	—	—	—	—	—	5×11.5	C11	0.22	0.80	345
100	—	—	—	—	—	5×11.5	C11	0.22	0.80	345	5×11.5	C11	0.22	0.80	345
120	—	—	—	—	—	5×11.5	C11	0.22	0.80	345	—	—	—	—	—
150	5×11.5	C11	0.22	0.80	345	5×11.5	C11	0.22	0.80	345	—	—	—	—	—
180	—	—	—	—	—	—	—	—	—	—	6.3×11.5	D11	0.094	0.35	540
220	5×11.5	C11	0.22	0.80	345	6.3×11.5	D11	0.094	0.35	540	6.3×11.5	D11	0.094	0.35	540
270	—	—	—	—	—	6.3×11.5	D11	0.094	0.35	540	—	—	—	—	—
330	6.3×11.5	D11	0.094	0.35	540	6.3×11.5	D11	0.094	0.35	540	—	—	—	—	—
470	6.3×11.5	D11	0.094	0.35	540	—	—	—	—	—	8×12	E12	0.056	0.19	945
680	—	—	—	—	—	8×12	E12	0.056	0.19	945	8×15	E15	0.045	0.15	1250
											10×12.5	F12	0.039	0.14	1560
820	8×12	E12	0.056	0.19	945	—	—	—	—	—	—	—	—	—	—
1000	—	—	—	—	—	8×15	E15	0.045	0.15	1250	8×20	E20	0.029	0.11	1500
						10×12.5	F12	0.039	0.14	1560	10×16	F16	0.028	0.10	2000
1200	8×15	E15	0.045	0.15	1250	—	—	—	—	—	—	—	—	—	—
	10×12.5	F12	0.039	0.14	1560										
1500	8×20	E20	0.029	0.11	1500	8×20	E20	0.029	0.11	1500	10×20	F20	0.020	0.060	2500
						10×16	F16	0.028	0.10	2000					
1800	10×16	F16	0.028	0.10	2000	10×20	F20	0.020	0.060	2500	10×25	F25	0.017	0.051	2900
2200	10×20	F20	0.020	0.060	2500	10×25	F25	0.017	0.051	2900	12.5×20	G20	0.017	0.043	2600
2700	10×25	F25	0.017	0.051	2900	—	—	—	—	—	12.5×25	G25	0.015	0.038	3200
3300	—	—	—	—	—	12.5×20	G20	0.017	0.043	2600	12.5×30	G30	0.013	0.033	3795
											16×20	J20	0.015	0.038	3575
3900	12.5×20	G20	0.017	0.043	2600	12.5×25	G25	0.015	0.038	3200	12.5×35	G35	0.012	0.031	4120
4700	12.5×25	G25	0.015	0.038	3200	12.5×30	G30	0.013	0.033	3795	16×25	J25	0.013	0.035	3810
						16×20	J20	0.015	0.038	3575					
5600	12.5×30	G30	0.013	0.033	3795	12.5×35	G35	0.012	0.031	4120	—	—	—	—	—
6800	12.5×35	G35	0.012	0.031	4120	16×25	J25	0.013	0.035	3810	—	—	—	—	—
	16×20	J20	0.015	0.038	3575										
8200	16×25	J25	0.013	0.035	3810	—	—	—	—	—	—	—	—	—	—

Rated voltage(V) / Item / Rated capacitance (μF)	25 (1T)					35 (1G)					50 (1U)				
	Case φDxL (mm)	Size code	Impedance (Ω max.) 20℃	Impedance (Ω max.) -10℃	Rated ripple current (mArms)	Case φDxL (mm)	Size code	Impedance (Ω max.) 20℃	Impedance (Ω max.) -10℃	Rated ripple current (mArms)	Case φDxL (mm)	Size code	Impedance (Ω max.) 20℃	Impedance (Ω max.) -10℃	Rated ripple current (mArms)
27	—	—	—	—	—	—	—	—	—	—	5×11.5	C11	0.34	1.18	238
39	5×11.5	C11	0.22	0.80	345	5×11.5	C11	0.22	0.80	345	6.3×11.5	D11	0.14	0.50	385
47	—	—	—	—	—	5×11.5	C11	0.22	0.80	345	—	—	—	—	—
56	5×11.5	C11	0.22	0.80	345	—	—	—	—	—	6.3×11.5	D11	0.14	0.50	385
68	5×11.5	C11	0.22	0.80	345	—	—	—	—	—	—	—	—	—	—
82	5×11.5	C11	0.22	0.80	345	6.3×11.5	D11	0.094	0.35	540	—	—	—	—	—
100	6.3×11.5	D11	0.094	0.35	540	6.3×11.5	D11	0.094	0.35	540	8×12	E12	0.074	0.22	724
120	6.3×11.5	D11	0.094	0.35	540	—	—	—	—	—	8×15	E15	0.061	0.18	950
150	6.3×11.5	D11	0.094	0.35	540	—	—	—	—	—	10×12.5	F12	0.061	0.18	1250
180	—	—	—	—	—	—	—	—	—	—	8×20	E20	0.046	0.14	1190
220	—	—	—	—	—	8×12	E12	0.056	0.19	945	10×16	F16	0.042	0.12	1650
270	—	—	—	—	—	8×15	E15	0.045	0.15	1250	10×20	F20	0.030	0.090	2060
330	8×12	E12	0.056	0.19	945	10×12.5	F12	0.039	0.14	1560	10×25	F25	0.028	0.084	2420
390	8×15	E15	0.045	0.15	1250	8×20	E20	0.029	0.11	1500	—	—	—	—	—
470	10×12.5	F12	0.039	0.14	1560	10×16	F16	0.028	0.10	2000	12.5×20	G20	0.027	0.068	2300
560	8×20	E20	0.029	0.11	1500	10×20	F20	0.020	0.060	2500	12.5×25	G25	0.023	0.059	2800
680	10×16	F16	0.028	0.10	2000	10×25	F25	0.017	0.051	2900	12.5×30	G30	0.021	0.052	3500
820	10×20	F20	0.020	0.060	2500	—	—	—	—	—	12.5×35	G35	0.019	0.051	3810
											16×20	J20	0.023	0.059	3070
1000	10×25	F25	0.017	0.051	2900	12.5×20	G20	0.017	0.043	2600	16×25	J25	0.021	0.056	3270
1200	—	—	—	—	—	12.5×25	G25	0.015	0.038	3200	—	—	—	—	—
1500	12.5×20	G20	0.017	0.043	2600	12.5×30	G30	0.013	0.033	3795	—	—	—	—	—
						16×20	J20	0.015	0.038	3575					
1800	12.5×25	G25	0.015	0.038	3200	12.5×35	G35	0.012	0.031	4120	—	—	—	—	—
2200	12.5×30	G30	0.013	0.033	3795	16×25	J25	0.013	0.035	3810	—	—	—	—	—
	16×20	J20	0.015	0.038	3575										
2700	12.5×35	G35	0.012	0.031	4120	—	—	—	—	—	—	—	—	—	—
3300	16×25	J25	0.013	0.035	3810	—	—	—	—	—	—	—	—	—	—

(Note) Rated ripple current : 105℃ , 100kHz ; Impedance : 100kHz

NOTE : Design, Specifications are subject to change without notice.
It is recommended that you shall obtain technical specifications
from ELNA to ensure that the component is suitable for your use.

Return to Type List

ELNA

Miniature Aluminum Electrolytic Capacitors RJD series

Code in front of series have been extracted from product code, which describes the segment of products, such as type and features.

- Low ESR capacitors.
- Guaranteed 8000 hours at 105℃.
  (ϕ5 to 6.3 : 2000 hours ; ϕ8: 3000 hours; ϕ10: 5000 hours)
- Environmental : GREEN CAP™ , RoHS compliance.

Miniaturized
Low ESR

RJD ⇦ RJB

Marking color : White print on a black sleeve

Specifications

Item	Performance
Category temperature range (℃)	−55 to +105
Tolerance at rated capacitance (%)	±20 (20℃,120Hz)
Leakage current (μA) (max.)	0.01CV or 3 whichever is larger (after 2 minutes) C : Rated capacitance (μF), V : Rated voltage (V) (20℃)
Tangent of loss angle (tanδ)	

Rated voltage (V)	6.3	10	16	25	35	50	63	80	100
tanδ (max.)	0.22	0.19	0.16	0.14	0.12	0.10	0.10	0.08	0.08

0.02 is added to every 1000μF increase over 1000μF. (20℃,120Hz)

Characteristics at high and low temperature

Rated voltage (V)		6.3	10	16	25	35	50	63	80	100
Impedance ratio (max.)	Z−55℃/Z+20℃	3	3	3	3	3	3	3	3	3

(120Hz)

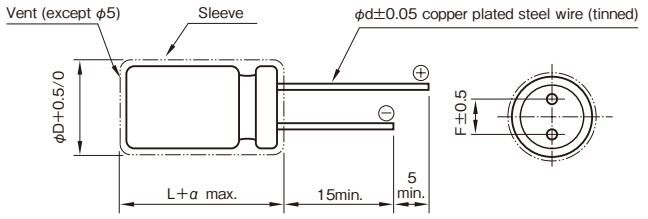
Endurance (105℃) (Applied ripple current)

Test time	ϕ5 & 6.3 : 2000 hours ϕ8 : 3000 hours ϕ10 : 5000 hours ϕ12.5 or more : 8000 hours
Leakage current	The initial specified value or less
Percentage of capacitance change	Within ±20% of initial value
Tangent of the loss angle	200% or less of the initial specified value

Shelf life (105℃)	Test time : 1000hours ; other items are same as the endurance. Voltage application treatment : According to JIS C5101-4 4.1
Applicable standards	JIS C5101 - 1,- 4 (IEC 60384 - 1,- 4)

Outline Drawing

Unit : mm



ϕD	5	6.3	8	10	12.5	16	18
F	2.0	2.5	3.5	5.0	5.0	7.5	7.5
ϕd	0.5	0.5	0.6	0.6	0.6	0.8	0.8
α	1.0	1.0	1.0	2.0	2.0	2.0	2.0

(Note) Whisker preventive structure is possible for ϕ8 or more.

Coefficient of Frequency for Rated Ripple Current

Rated Capacitance (μF) \ Frequency (Hz)	50・60	120	300	1k	10k・100k
56 or less	0.20	0.30	0.50	0.80	1
68 to 330	0.55	0.65	0.75	0.85	1
390 to 1000	0.70	0.75	0.80	0.90	1
1200 to 18000	0.80	0.85	0.90	0.95	1

Product code system : 25V10000μF (*For general product)

RS*	RJD	103	M	1T	K40	300	T
Category code	Series code	capacitance code	Cap tol. code	Voltage code	Size code	Lead-forming and packing code	Additional code

・If it is whisker preventive structure, should change "T" into "G".
・For details, refer to the various "Product Code System" pages.
・Lead-forming and packing code on this page are for lead long and standard packing products.
For standard packing, please refer to the "PACKING" page.

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Code in front of series have been extracted from product code, which describes the segment of products, such as type and features.

Standard Ratings

Rated voltage(V) / Item / Rated capacitance (μF)	6.3 (1J)					10 (1L)					16 (1E)				
	Case φD × L (mm)	Size code	ESR (Ω max.) 20℃	ESR (Ω max.) -10℃	Rated ripple current (mArms)	Case φD × L (mm)	Size code	ESR (Ω max.) 20℃	ESR (Ω max.) -10℃	Rated ripple current (mArms)	Case φD × L (mm)	Size code	ESR (Ω max.) 20℃	ESR (Ω max.) -10℃	Rated ripple current (mArms)
22	—	—	—	—	—	—	—	—	—	—	5 × 11.5	C11	0.50	1.0	182
33	—	—	—	—	—	—	—	—	—	—	5 × 11.5	C11	0.50	1.0	182
47	—	—	—	—	—	—	—	—	—	—	5 × 11.5	C11	0.50	1.0	182
82	—	—	—	—	—	—	—	—	—	—	5 × 11.5	C11	0.50	1.0	182
100	—	—	—	—	—	5 × 11.5	C11	0.50	1.0	182	6.3 × 11.5	D11	0.25	0.50	295
150	5 × 11.5	C11	0.50	1.0	182	—	—	—	—	—	6.3 × 11.5	D11	0.25	0.50	295
180	—	—	—	—	—	6.3 × 11.5	D11	0.25	0.50	295	8 × 12	E12	0.117	0.234	567
220	—	—	—	—	—	6.3 × 11.5	D11	0.25	0.50	295	8 × 12	E12	0.117	0.234	567
330	6.3 × 11.5	D11	0.25	0.50	295	8 × 12	E12	0.117	0.234	567	8 × 12	E12	0.117	0.234	567
390	—	—	—	—	—	—	—	—	—	—	8 × 12	E12	0.117	0.234	567
470	8 × 12	E12	0.117	0.234	567	8 × 12	E12	0.117	0.234	567	8 × 15	E15	0.085	0.170	733
											10 × 12.5	F12	0.090	0.180	764
560	8 × 12	E12	0.117	0.234	567	8 × 12	E12	0.117	0.234	567	8 × 20	E20	0.065	0.130	996
680	8 × 12	E12	0.117	0.234	567	—	—	—	—	—	8 × 15	E15	0.085	0.170	733
											10 × 12.5	F12	0.090	0.180	764
820	—	—	—	—	—	8 × 15	E15	0.085	0.170	733	8 × 20	E20	0.065	0.130	996
						10 × 12.5	F12	0.090	0.180	764	10 × 16	F16	0.068	0.136	1060
1000	8 × 15	E15	0.085	0.170	733	8 × 20	E20	0.065	0.130	996	10 × 16	F16	0.068	0.136	1060
						10 × 12.5	F12	0.090	0.180	764					
	10 × 12.5	F12	0.090	0.180	764	10 × 16	F16	0.068	0.136	1060	10 × 20	F20	0.052	0.104	1230
1200	10 × 12.5	F12	0.090	0.180	764	8 × 20	E20	0.065	0.130	996	10 × 20	F20	0.052	0.104	1230
	10 × 16	F16	0.068	0.136	1060	10 × 16	F16	0.068	0.136	1060	10 × 25	F25	0.045	0.090	1450
1500	8 × 20	E20	0.065	0.130	996	10 × 20	F20	0.052	0.104	1230	10 × 25	F25	0.045	0.090	1450
	10 × 16	F16	0.068	0.136	1060	12.5 × 15	G15	0.062	0.124	1210	10 × 30	F30	0.035	0.070	1830
1800	12.5 × 15	G15	0.062	0.124	1210	10 × 20	F20	0.052	0.104	1230	—	—	—	—	—
						10 × 25	F25	0.045	0.090	1450					
2200	10 × 20	F20	0.052	0.104	1230	10 × 25	F25	0.045	0.090	1450	10 × 30	F30	0.035	0.070	1830
											12.5 × 20	G20	0.038	0.076	1700
	10 × 25	F25	0.045	0.090	1450	12.5 × 20	G20	0.038	0.076	1700	16 × 16	J16	0.043	0.086	1700
2700	10 × 25	F25	0.045	0.090	1450	10 × 30	F30	0.035	0.070	1830	12.5 × 25	G25	0.030	0.060	1950
						12.5 × 20	G20	0.038	0.076	1700	18 × 16	K16	0.038	0.076	2010
3300	10 × 30	F30	0.035	0.070	1830	12.5 × 25	G25	0.030	0.060	1950	12.5 × 30	G30	0.025	0.050	2330
	12.5 × 20	G20	0.038	0.076	1700						16 × 20	J20	0.029	0.058	2230
3900	12.5 × 25	G25	0.030	0.060	1950	12.5 × 25	G25	0.030	0.060	1950	12.5 × 35	G35	0.022	0.044	2620
						18 × 16	K16	0.038	0.076	2010	16 × 20	J20	0.029	0.058	2230
4700	12.5 × 25	G25	0.030	0.060	1950	12.5 × 30	G30	0.025	0.050	2330	12.5 × 40	G40	0.017	0.034	3160
											16 × 25	J25	0.022	0.044	2650
	18 × 16	K16	0.038	0.076	2010	16 × 20	J20	0.029	0.058	2230	18 × 20	K20	0.028	0.056	2500
5600	12.5 × 30	G30	0.025	0.050	2330	12.5 × 35	G35	0.022	0.044	2620	16 × 25	J25	0.022	0.044	2650
	16 × 20	J20	0.029	0.058	2230						16 × 31.5	J31	0.018	0.036	3210
6800	12.5 × 35	G35	0.022	0.044	2620	12.5 × 40	G40	0.017	0.034	3160	18 × 25	K25	0.020	0.040	3000
						16 × 25	J25	0.022	0.044	2650					
8200	12.5 × 40	G40	0.017	0.034	3160	16 × 31.5	J31	0.018	0.036	3210	18 × 35.5	K35	0.015	0.030	3960
	16 × 25	J25	0.022	0.044	2650										
	18 × 20	K20	0.028	0.056	2500	18 × 25	K25	0.020	0.040	3000					
10000	16 × 31.5	J31	0.018	0.036	3210	16 × 40	J40	0.015	0.030	3880	18 × 40	K40	0.014	0.028	4300
	18 × 25	K25	0.020	0.040	3000	18 × 35.5	K35	0.015	0.030	3960					
12000	18 × 25	K25	0.020	0.040	3000	—	—	—	—	—	—	—	—	—	—
15000	18 × 35.5	K35	0.015	0.030	3960	18 × 40	K40	0.014	0.028	4300	—	—	—	—	—
18000	18 × 40	K40	0.014	0.028	4300	—	—	—	—	—	—	—	—	—	—

(Note) Rated ripple current : 105℃ , 100kHz ; ESR : 100kHz

NOTE : Design, Specifications are subject to change without notice.
It is recommended that you shall obtain technical specifications
from ELNA to ensure that the component is suitable for your use.

Code in front of series have been extracted from product code, which describes the segment of products, such as type and features.

Standard Ratings

Rated voltage(V) / Item / Rated capacitance (μF)	25 (1T)					35 (1G)					50 (1U)				
	Case φD × L (mm)	Size code	ESR (Ω max.) 20℃	ESR (Ω max.) -10℃	Rated ripple current (mArms)	Case φD × L (mm)	Size code	ESR (Ω max.) 20℃	ESR (Ω max.) -10℃	Rated ripple current (mArms)	Case φD × L (mm)	Size code	ESR (Ω max.) 20℃	ESR (Ω max.) -10℃	Rated ripple current (mArms)
10	5 × 11.5	C11	0.50	1.0	182	5 × 11.5	C11	0.50	1.0	182	5 × 11.5	C11	0.90	1.8	173
22	5 × 11.5	C11	0.50	1.0	182	5 × 11.5	C11	0.50	1.0	182	5 × 11.5	C11	0.90	1.8	173
27	5 × 11.5	C11	0.50	1.0	182	5 × 11.5	C11	0.50	1.0	182	5 × 11.5	C11	0.90	1.8	173
33	5 × 11.5	C11	0.50	1.0	182	5 × 11.5	C11	0.50	1.0	182	6.3 × 11.5	D11	0.40	0.80	285
47	5 × 11.5	C11	0.50	1.0	182	6.3 × 11.5	D11	0.25	0.50	295	6.3 × 11.5	D11	0.40	0.80	285
56	5 × 11.5	C11	0.50	1.0	182	6.3 × 11.5	D11	0.25	0.50	295	6.3 × 11.5	D11	0.40	0.80	285
82	6.3 × 11.5	D11	0.25	0.50	295	6.3 × 11.5	D11	0.25	0.50	295	8 × 12	E12	0.19	0.38	508
100	6.3 × 11.5	D11	0.25	0.50	295	8 × 12	E12	0.117	0.234	567	8 × 15	E15	0.155	0.31	636
150	8 × 12	E12	0.117	0.234	567	8 × 12	E12	0.117	0.234	567	10 × 12.5	F12	0.17	0.34	628
180	—	—	—	—	—	8 × 12	E12	0.117	0.234	567	10 × 12.5	F12	0.17	0.34	628
220	8 × 12	E12	0.117	0.234	567	8 × 15	E15	0.085	0.170	733	10 × 16	F16	0.119	0.238	850
270	8 × 12	E12	0.117	0.234	567	8 × 15	E15	0.085	0.170	733	10 × 20	F20	0.081	0.162	1120
						10 × 12.5	F12	0.090	0.180	764					
330	8 × 12	E12	0.117	0.234	567	8 × 20	E20	0.065	0.130	996	10 × 20	F20	0.081	0.162	1120
	10 × 12.5	F12	0.090	0.180	764	10 × 16	F16	0.068	0.136	1060	12.5 × 15	G15	0.09	0.18	1170
390	8 × 15	E15	0.085	0.170	733	8 × 20	E20	0.065	0.130	996	—	—	—	—	—
						10 × 16	F16	0.068	0.136	1060					
470	8 × 15	E15	0.085	0.170	733	10 × 20	F20	0.052	0.104	1230	12.5 × 20	G20	0.057	0.114	1540
	10 × 12.5	F12	0.090	0.180	764										
560	8 × 20	E20	0.065	0.130	996	10 × 20	F20	0.052	0.104	1230	12.5 × 25	G25	0.042	0.084	1910
	10 × 16	F16	0.068	0.136	1060	12.5 × 15	G15	0.062	0.124	1210					
680	10 × 16	F16	0.068	0.136	1060	10 × 25	F25	0.045	0.090	1450	18 × 20	K20	0.034	0.068	2420
820	10 × 20	F20	0.052	0.104	1230	12.5 × 20	G20	0.038	0.076	1700	12.5 × 30	G30	0.038	0.076	2290
	12.5 × 15	G15	0.062	0.124	1210						18 × 20	K20	0.034	0.068	2420
1000	10 × 25	F25	0.045	0.090	1450	10 × 30	F30	0.035	0.070	1830	16 × 25	J25	0.031	0.062	2450
	12.5 × 20	G20	0.038	0.076	1700	12.5 × 20	G20	0.038	0.076	1700	18 × 20	K20	0.034	0.068	2420
1200	12.5 × 20	G20	0.038	0.076	1700	12.5 × 25	G25	0.030	0.060	1950	18 × 25	K25	0.029	0.058	2750
						18 × 16	K16	0.038	0.076	2010					
1500	10 × 30	F30	0.035	0.070	1830	12.5 × 30	G30	0.025	0.050	2330	16 × 31.5	J31	0.027	0.054	3100
	16 × 16	J16	0.043	0.086	1700	16 × 20	J20	0.029	0.058	2230	18 × 25	K25	0.029	0.058	2750
1800	12.5 × 25	G25	0.030	0.060	1950	12.5 × 35	G35	0.022	0.044	2620	16 × 35.5	J35	0.023	0.046	3530
	18 × 16	K16	0.038	0.076	2010	16 × 20	J20	0.029	0.058	2230	18 × 31.5	K31	0.025	0.050	3200
2200	12.5 × 30	G30	0.025	0.050	2330	12.5 × 40	G40	0.017	0.034	3160	16 × 40	J40	0.020	0.040	3830
	16 × 20	J20	0.029	0.058	2230	16 × 25	J25	0.022	0.044	2650	18 × 35.5	K35	0.022	0.044	3670
						18 × 20	K20	0.028	0.056	2500					
2700	12.5 × 35	G35	0.022	0.044	2620	16 × 31.5	J31	0.018	0.036	3210	18 × 40	K40	0.018	0.036	4160
	18 × 25	K25	0.020	0.040	3000	18 × 25	K25	0.020	0.040	3000					
3300	12.5 × 40	G40	0.017	0.034	3160	18 × 25	K25	0.020	0.040	3000	—	—	—	—	—
	16 × 25	J25	0.022	0.044	2650										
	18 × 20	K20	0.028	0.056	2500	18 × 31.5	K31	0.016	0.032	3660					
3900	—	—	—	—	—	18 × 35.5	K35	0.015	0.030	3960	—	—	—	—	—
						18 × 40	K40	0.014	0.028	4300					
4700	18 × 25	K25	0.020	0.040	3000	18 × 35.5	K35	0.015	0.030	3960	—	—	—	—	—
						18 × 40	K40	0.014	0.028	4300					
5600	18 × 35.5	K35	0.015	0.030	3960	18 × 40	K40	0.014	0.028	4300	—	—	—	—	—
6800	18 × 35.5	K35	0.015	0.030	3960	18 × 40	K40	0.014	0.028	4300	—	—	—	—	—
8200	—	—	—	—	—	18 × 40	K40	0.014	0.028	4300	—	—	—	—	—
10000	18 × 40	K40	0.014	0.028	4300	—	—	—	—	—	—	—	—	—	—

Rated voltage(V) / Item / Rated capacitance (μF)	63 (4E)					80 (1R)					100 (1H)				
	Case φD × L (mm)	Size code	ESR (Ω max.) 20℃	ESR (Ω max.) -10℃	Rated ripple current (mArms)	Case φD × L (mm)	Size code	ESR (Ω max.) 20℃	ESR (Ω max.) -10℃	Rated ripple current (mArms)	Case φD × L (mm)	Size code	ESR (Ω max.) 20℃	ESR (Ω max.) -10℃	Rated ripple current (mArms)
10	5 × 11.5	C11	2.5	10	135	5 × 11.5	C11	2.5	10	135	6.3 × 11.5	D11	1.70	6.8	186
22	6.3 × 11.5	D11	1.2	4.8	225	8 × 12	E12	0.60	1.8	380	8 × 12	E12	0.70	2.1	315
27	6.3 × 11.5	D11	1.2	4.8	225	—	—	—	—	—	—	—	—	—	—
33	6.3 × 11.5	D11	1.2	4.8	225	8 × 12	E12	0.60	1.8	380	8 × 15	E15	0.51	1.53	423
47	8 × 12	E12	0.60	1.8	380	8 × 15	E15	0.45	1.4	470	10 × 12.5	F12	0.54	1.08	392
56	8 × 12	E12	0.60	1.8	380	10 × 12.5	F12	0.47	0.94	480	10 × 16	F16	0.37	0.74	520
82	8 × 20	E20	0.30	0.90	682	10 × 16	F16	0.32	0.64	620	10 × 20	F20	0.29	0.58	640
100	10 × 16	F16	0.32	0.64	620	10 × 20	F20	0.25	0.50	800	10 × 25	F25	0.20	0.40	820
150	10 × 20	F20	0.25	0.50	800	12.5 × 20	G20	0.075	0.15	1340	12.5 × 25	G25	0.11	0.22	1200
180	10 × 25	F25	0.18	0.36	960	—	—	—	—	—	—	—	—	—	—
220	12.5 × 20	G20	0.075	0.15	1340	12.5 × 25	G25	0.065	0.13	1730	12.5 × 30	G30	0.090	0.18	1450
330	12.5 × 25	G25	0.065	0.13	1730	12.5 × 30	G30	0.055	0.11	2110	16 × 25	J25	0.079	0.16	1650
470	12.5 × 30	G30	0.055	0.11	2110	16 × 31.5	J31	0.042	0.084	2710	16 × 35.5	J35	0.052	0.104	2340
	16 × 25	J25	0.052	0.104	2180	18 × 25	K25	0.050	0.10	2610	18 × 31.5	K31	0.054	0.108	2350
560	16 × 25	J25	0.052	0.104	2180	16 × 31.5	J31	0.042	0.084	2710	16 × 40	J40	0.045	0.090	2650
	18 × 20	K20	0.058	0.116	2290	18 × 25	K25	0.050	0.10	2610	18 × 35.5	K35	0.044	0.088	2730
680	16 × 31.5	J31	0.042	0.084	2710	16 × 35.5	J35	0.036	0.072	2820	16 × 40	J40	0.045	0.090	2650
	18 × 25	K25	0.050	0.10	2610	18 × 31.5	K31	0.042	0.084	3080	18 × 35.5	K35	0.044	0.088	2730
820	16 × 31.5	J31	0.042	0.084	2710	16 × 40	J40	0.032	0.064	3140	18 × 40	K40	0.039	0.078	3050
	18 × 25	K25	0.050	0.10	2610	18 × 35.5	K35	0.035	0.070	3530					
1000	16 × 35.5	J35	0.036	0.072	2820	18 × 40	K40	0.032	0.064	3880	—	—	—	—	—
	18 × 31.5	K31	0.042	0.084	3080										
1500	18 × 35.5	K35	0.035	0.070	3530	—	—	—	—	—	—	—	—	—	—
1800	18 × 40	K40	0.032	0.064	3880	—	—	—	—	—	—	—	—	—	—

(Note) Rated ripple current : 105℃ , 100kHz ; ESR : 100kHz

NOTE : Design, Specifications are subject to change without notice.
It is recommended that you shall obtain technical specifications
from ELNA to ensure that the component is suitable for your use.

Return to Type List

ELNA

Miniature Aluminum Electrolytic Capacitors RJE series

Code in front of series have been extracted from product code, which describes the segment of products, such as type and features.

- For SRS AirBag application
- Special tolerance at rated capacitance and high capacitance.
- Guaranteed 5000 hours at 105℃.
- Environmental : GREEN CAP™ , RoHS compliance.

For SAS AirBag

RJE ⇦ RJD

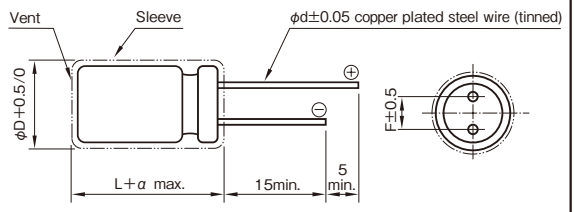
Marking color : White print on a black sleeve

Specifications

Item	Performance
Category temperature range (℃)	−55 to +105
Tolerance at rated capacitance (%)	0 to +30 (20℃,120Hz)
Leakage current (μA) (max.)	0.01CV (after 2 minutes) C : Rated capacitance (μF) , V : Rated voltage (V) (20℃)
Tangent of loss angle (tanδ)	Rated voltage (V): 25 / 35 tanδ (max.): 0.20 / 0.16 0.02 is added to every 1000μF increase over 1000μF (20℃,120Hz)
Characteristics at high and low temperature	Rated voltage (V): 25 / 35 Impedance ratio (max.) Z−55℃/Z+20℃: 3 / 3 (120Hz)
Endurance (105℃)	Test time: 5000 hours Leakage current: The initial specified value or less Percentage of capacitance change: Within ±30% of initial value Tangent of loss angle: 300% or less of the initial specified value
Shelf life (105℃)	Test time : 1000hours ; other items are same as the endurance. Voltage application treatment : According to JIS C5101-4 4.1
Applicable standards	JIS C5101 - 1,- 4 (IEC 60384 - 1,- 4)

Outline Drawing

Unit : mm



φD	12.5	16	18
F	5.0	7.5	7.5
φd	0.6	0.8	0.8
α	2.0	2.0	2.0

(Note) Whisker preventive structure is possible.

Coefficient of Frequency for Rated Ripple Current

Rated capacitance (μF) \ Frequency (Hz)	50・60	120	1k	10k・100k
830 to 1100	0.70	0.75	0.90	1
1200 to 11000	0.80	0.85	0.95	1

Product code system : 25V4200μF
(*For automotive: powertrain, safety)

RA*	RJE	422	A	1T	G40	300	T
Category code	Series code	capacitance code	Cap tol. code	Voltage code	Size code	Lead-forming and packing code	Additional code

・If it is whisker preventive structure, should change "T" into "G".
・For details, refer to the various "Product Code System" pages.
・Lead-forming and packing code on this page are for lead long and standard packing products.
For standard packing, please refer to the "PACKING" page.

Standard Ratings

Case size φD×L (mm)	Size code	25 (1T) Rated capacitance (μF)	ESR Ω (max.) 20℃	ESR Ω (max.) −40℃	Rated ripple current (mArms)	35 (1G) Rated capacitance (μF)	ESR Ω (max.) 20℃	ESR Ω (max.) −40℃	Rated ripple current (mArms)
12.5×15	G15	1100	0.174	0.52	1210	830	0.174	0.52	1210
12.5×20	G20	1800	0.107	0.27	1670	1300	0.107	0.27	1670
12.5×25	G25	2400	0.084	0.21	1950	1600	0.084	0.21	1950
12.5×30	G30	3200	0.070	0.18	2330	2200	0.070	0.18	2330
12.5×35	G35	3700	0.062	0.16	2620	2500	0.062	0.16	2620
12.5×40	G40	4200	0.048	0.12	3160	2900	0.048	0.12	3160
16×16	J16	2100	0.121	0.36	1700	1500	0.121	0.36	1700
16×20	J20	3100	0.082	0.21	2230	2100	0.082	0.21	2230
16×25	J25	4300	0.062	0.16	2650	3000	0.062	0.16	2650
16×31.5	J31	5800	0.051	0.13	3210	4000	0.051	0.13	3210
16×35.5	J35	6800	0.045	0.11	3570	4600	0.045	0.11	3570
16×40	J40	7800	0.042	0.11	3880	5300	0.042	0.11	3880
18×16	K16	3000	0.107	0.32	2010	2100	0.107	0.32	2010
18×20	K20	4300	0.079	0.20	2500	3000	0.079	0.20	2500
18×25	K25	6000	0.056	0.14	3000	4200	0.056	0.14	3000
18×31.5	K31	8000	0.045	0.11	3660	5600	0.045	0.11	3660
18×35.5	K35	9300	0.042	0.11	3960	6500	0.042	0.11	3960
18×40	K40	11000	0.040	0.10	4300	7400	0.040	0.10	4300

(Note) Rated ripple current : 105℃, 100kHz ; ESR : 100kHz

NOTE : Design, Specifications are subject to change without notice.
It is recommended that you shall obtain technical specifications from ELNA to ensure that the component is suitable for your use.

Return to Type List

ELNA

Miniature Aluminum Electrolytic Capacitors RJK series

Code in front of series have been extracted from product code, which describes the segment of products, such as type and features.

- For SRS AirBag application
- Special tolerance at rated capacitance and high capacitance, and good low temperature behavior.
- Guaranteed 5000 hours at 105℃.
- Environmental : GREEN CAP™ , RoHS compliance.

Miniaturized
Low ESR

RJK ⇦ RJE

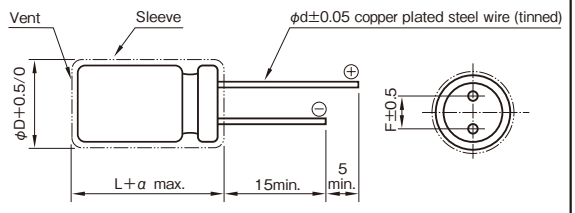
Marking color : White print on a black sleeve

Specifications

Item	Performance
Category temperature range (℃)	−55 to +105
Tolerance at rated capacitance (%)	0 to +30 (20℃,120Hz)
Leakage current (μA) (max.)	0.01CV (after 2 minutes) C : Rated capacitance (μF) , V : Rated voltage (V) (20℃)
Tangent of loss angle (tanδ)	Rated voltage (V): 25 / 35 tanδ (max.): 0.20 / 0.16 0.02 is added to every 1000μF increase over 1000μF (20℃,120Hz)
Characteristics at high and low temperature	Rated voltage (V): 25 / 35 Impedance ratio (max.) Z−55℃/Z+20℃: 3 / 3 (120Hz)
Endurance (105℃)	Test time: 5000 hours Leakage current: The initial specified value or less Percentage of capacitance change: Within ±30% of initial value Tangent of loss angle: 300% or less of the initial specified value
Shelf life (105℃)	Test time : 1000hours ; other items are same as the endurance. Voltage application treatment : According to JIS C5101-4 4.1
Applicable standards	JIS C5101 - 1,- 4 (IEC 60384 - 1,- 4)

Outline Drawing

Unit : mm



ϕD	16	18
F	7.5	7.5
ϕd	0.8	0.8
α	1.5	1.5

(Note) Whisker preventive structure is possible.

Coefficient of Frequency for Rated Ripple Current

Rated voltage (V) \ Frequency (Hz)	120	1k	10k	100k
25, 35	0.80	0.85	0.95	1

Product code system : 25V4200μF
(*For automotive: powertrain, safety)

RA*	RJK	422	A	1T	J20	300	T
Category code	Series code	capacitance code	Cap tol. code	Voltage code	Size code	Lead-forming and packing code	Additional code

・If it is whisker preventive structure, should change "T" into "G".
・For details, refer to the various "Product Code System" pages.
・Lead-forming and packing code on this page are for lead long and standard packing products.
For standard packing, please refer to the "PACKING" page.

NOTE : Design, Specifications are subject to change without notice.
It is recommended that you shall obtain technical specifications from ELNA to ensure that the component is suitable for your use.

Code in front of series have been extracted from product code, which describes the segment of products, such as type and features.

Standard Ratings

Rated voltage (V) / Item / Case φD × L (mm)	Size code	25 (1T) Rated capacitance (μF)	25 (1T) ESR (Ω max.) 20℃	25 (1T) ESR (Ω max.) − 40℃	25 (1T) Rated ripple current (mArms)	35 (1G) Rated capacitance (μF)	35 (1G) ESR (Ω max.) 20℃	35 (1G) ESR (Ω max.) − 40℃	35 (1G) Rated ripple current (mArms)
16 × 20	J20	4200	0.033	0.095	2250	2500	0.033	0.095	2250
18 × 20	K20	5300	0.029	0.082	2500	3100	0.029	0.082	2500
16 × 25	J25	5900	0.024	0.073	2600	3500	0.024	0.073	2600
18 × 25	K25	7500	0.022	0.063	2800	4500	0.022	0.063	2800
16 × 31.5	J31	8000	0.021	0.052	3200	4700	0.021	0.052	3200
18 × 31.5	K31	9500	0.019	0.046	3500	5600	0.019	0.046	3500
16 × 35.5	J35	10000	0.019	0.045	3500	6000	0.019	0.045	3500
18 × 35.5	K35	11000	0.017	0.040	3700	7100	0.017	0.040	3700
16 × 40	J40	11000	0.017	0.040	3800	6600	0.017	0.040	3800
18 × 40	K40	14000	0.015	0.035	4000	8400	0.015	0.035	4000

(Note) Rated ripple current : 105℃, 100kHz ; ESR : 100kHz

NOTE : Design, Specifications are subject to change without notice.
It is recommended that you shall obtain technical specifications
from ELNA to ensure that the component is suitable for your use.

Return to Type List

ELNA

Miniature Aluminum Electrolytic Capacitors RKD series

Code in front of series have been extracted from product code, which describes the segment of products, such as type and features.

- Low ESR capacitor.
- Guaranteed 5000 hours at 125℃.
  (2000 hours : ϕ8, 3000 hours; ϕ10)
  (4000 hours : 63V to 80V - ϕ16x20L)
- Environmental : GREEN CAP™ , RoHS compliance.

Miniaturized, Low ESR

RKD ⇦ RK1

Marking color : White print on a black sleeve

Specifications

Item	Performance
Category temperature range (℃)	−40 to +125
Tolerance at rated capacitance (%)	±20 (20℃,120Hz)
Leakage current (μA) (max.)	0.01CV or 3 whichever is larger (after 2 minutes) C : Rated capacitance (μF), V : Rated voltage (V) (20℃)
Tangent of loss angle (tanδ)	

Rated voltage (V)	10	16	25	35	50	63	80
tanδ (max.)	0.20	0.16	0.14	0.12	0.10	0.10	0.08

0.02 is added to every 1000μF increase over 1000μF. (20℃,120Hz)

Characteristics at high and low temperature

Rated voltage (V)		10	16	25	35	50	63	80
Impedance ratio (max.)	Z−40℃/Z+20℃	4	3	3	3	3	3	3

(120Hz)

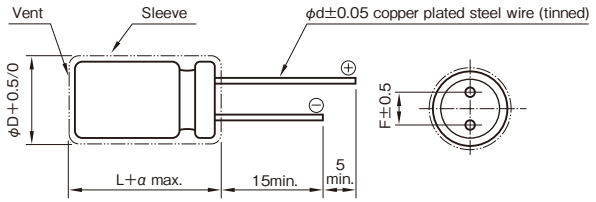
Endurance (125℃) (Applied ripple current)

Test time	5000 hours (2000 hours: ϕ8, 3000h: ϕ10) (4000 hours: 63V to 80V - ϕ16x20L)
Leakage current	The initial specified value or less
Percentage of capacitance change	Within ±30% of initial value
Tangent of the loss angle	300% or less of the initial specified value

Item	Performance
Shelf life (125℃)	Test time : 1000hours ; other items are same as the endurance. Voltage application treatment : According to JIS C5101-4 4.1
Applicable standards	JIS C5101 - 1, - 4 (IEC 60384 - 1, - 4)

Outline Drawing

Unit : mm



ϕD	8	10	12.5	16	18
F	3.5	5.0	5.0	7.5	7.5
ϕd	0.6	0.6	0.6	0.8	0.8
α	1.0	2.0	2.0	2.0	2.0

(Note) Whisker preventive structure is possible.

Coefficient of Frequency for Rated Ripple Current

Rated capacitance (μF) \ Frequency (Hz)	50・60	120	1k	10k・100k
100 to 330	0.55	0.65	0.85	1
390 to 1000	0.70	0.75	0.90	1
1200 to 6800	0.80	0.85	0.95	1

Product code system : 10V1000μF (*For general product)

RS*	RKD	102	M	1L	F20	300	T
Category code	Series code	capacitance code	Cap tol. code	Voltage code	Size code	Lead-forming and packing code	Additional code

・If it is whisker preventive structure, should change "T" into "G".
・For details, refer to the various "Product Code System" pages.
・Lead-forming and packing code on this page are for lead long and standard packing products.
For standard packing, please refer to the "PACKING" page.

NOTE : Design, Specifications are subject to change without notice.
It is recommended that you shall obtain technical specifications from ELNA to ensure that the component is suitable for your use.

Code in front of series have been extracted from product code, which describes the segment of products, such as type and features.

Standard Ratings

Rated voltage (V) / Item / Rated capacitance (μF)	10 (1L)				16 (1E)				25 (1T)				35 (1G)			
	Case φD × L (mm)	Size code	ESR (Ω max.)	Rated ripple current (mArms)	Case φD × L (mm)	Size code	ESR (Ω max.)	Rated ripple current (mArms)	Case φD × L (mm)	Size code	ESR (Ω max.)	Rated ripple current (mArms)	Case φD × L (mm)	Size code	ESR (Ω max.)	Rated ripple current (mArms)
100	—	—	—	—	8×12	E12	0.153	501	8×12	E12	0.153	501	8×12	E12	0.153	501
220	8×12	E12	0.153	501	8×12	E12	0.153	501	8×12	E12	0.153	501	10×12.5	F12	0.098	732
					10×12.5	F12	0.098	732	10×12.5	F12	0.098	732	10×16	F16	0.075	953
330	8×12	E12	0.153	501	8×12	E12	0.153	501	10×12.5	F12	0.098	732	10×16	F16	0.075	953
	10×12.5	F12	0.098	732	10×12.5	F12	0.098	732	10×16	F16	0.075	953	10×20	F20	0.057	1140
470	10×12.5	F12	0.098	732	10×16	F16	0.075	953	10×16	F16	0.075	953	10×20	F20	0.057	1140
									10×20	F20	0.057	1140	12.5×20	G20	0.040	1820
													16×16	J16	0.044	1930
1000	10×20	F20	0.057	1140	10×20	F20	0.057	1140	12.5×20	G20	0.040	1820	12.5×25	G25	0.032	2400
	12.5×15	G15	0.059	1380	12.5×20	G20	0.040	1820	12.5×25	G25	0.032	2400	16×25	J25	0.024	3100
					16×16	J16	0.044	1930	16×16	J16	0.044	1930	18×20	K20	0.029	2490
1200	—	—	—	—	—	—	—	—	12.5×20	G20	0.040	1820	12.5×30	G30	0.029	2560
													16×20	J20	0.032	2280
1500	—	—	—	—	—	—	—	—	—	—	—	—	12.5×35	G35	0.023	2970
													16×31.5	J31	0.020	3160
													18×25	K25	0.022	3200
1800	—	—	—	—	—	—	—	—	12.5×25	G25	0.032	2400	12.5×40	G40	0.020	3600
									16×20	J20	0.032	2280	16×25	J25	0.024	3100
2200	12.5×25	G25	0.032	2400	12.5×25	G25	0.032	2400	12.5×30	G30	0.029	2560	16×31.5	J31	0.020	3160
	16×20	J20	0.032	2280	16×25	J25	0.024	3100	16×25	J25	0.024	3100	16×35.5	J35	0.019	3590
	18×16	K16	0.041	2170	18×20	K20	0.029	2490	18×20	K20	0.029	2490	18×25	K25	0.022	3200
2700	—	—	—	—	—	—	—	—	12.5×35	G35	0.023	2970	16×35.5	J35	0.019	3590
									16×25	J25	0.024	3100	18×31.5	K31	0.018	3410
									18×20	K20	0.029	2490				
3300	16×25	J25	0.024	3100	16×31.5	J31	0.020	3160	12.5×40	G40	0.020	3600	16×40	J40	0.017	4300
	18×20	K20	0.029	2490	18×25	K25	0.022	3200	16×31.5	J31	0.020	3160	18×35.5	K35	0.017	4200
3900	—	—	—	—	—	—	—	—	16×35.5	J35	0.019	3590	—	—	—	—
									18×25	K25	0.022	3200				
4700	16×31.5	J31	0.020	3160	16×35.5	J35	0.019	3590	18×35.5	K35	0.017	4200	18×40	K40	0.016	4600
	18×25	K25	0.022	3200	18×31.5	K31	0.018	3410								
5600	—	—	—	—	—	—	—	—	16×40	J40	0.017	4300	—	—	—	—
									18×35.5	K35	0.017	4200				
6800	—	—	—	—	—	—	—	—	18×40	K40	0.016	4600	—	—	—	—

Rated voltage (V) / Item / Rated capacitance (μF)	50 (1U)				63 (4E)				80 (1R)			
	Case φD × L (mm)	Size code	ESR (Ω max.)	Rated ripple current (mArms)	Case φD × L (mm)	Size code	ESR (Ω max.)	Rated ripple current (mArms)	Case φD × L (mm)	Size code	ESR (Ω max.)	Rated ripple current (mArms)
220	10×20	F20	0.081	960	—	—	—	—	—	—	—	—
330	—	—	—	—	—	—	—	—	16×20	J20	0.19	1200
470	12.5×20	G20	0.057	1500	—	—	—	—	16×25	J25	0.11	1530
560	—	—	—	—	—	—	—	—	18×25	K25	0.094	1640
820	12.5×30	G30	0.038	2150	16×31.5	J31	0.08	1910	18×35.5	K35	0.062	2180
1000	16×25	J25	0.031	2620	16×35.5	J35	0.066	2110	18×40	K40	0.051	2470
1800	18×31.5	K31	0.025	3140	18×40	K40	0.051	2470	—	—	—	—
2200	18×35.5	K35	0.022	3510	—	—	—	—	—	—	—	—

(Note) Rated ripple current : 125℃ , 100kHz ; ESR : 20℃ , 100kHz

NOTE : Design, Specifications are subject to change without notice.
It is recommended that you shall obtain technical specifications
from ELNA to ensure that the component is suitable for your use.

Return to Type List

ELNA — Miniature Aluminum Electrolytic Capacitors RKB series

Code in front of series have been extracted from product code, which describes the segment of products, such as type and features.

- Guaranteed 3000 hours at 135℃. (φ10, 63 to 80V : 2000 hours)
- High temperature guaranteed and low ESR series for automotive.
- Environmental : GREEN CAP™ , RoHS compliance.

High temperature

RKB ⇦ RKD

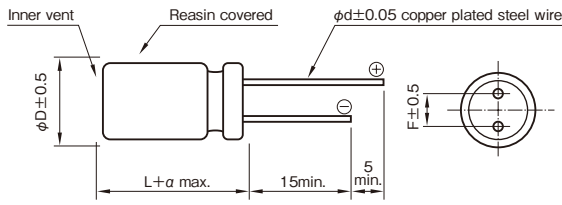
Marking color : Black print

Specifications

Item	Performance
Category temperature range (℃)	−40 to +135
Tolerance at rated capacitance (%)	±20 (20℃,120Hz)
Leakage current (μA) (max.)	0.01CV or 3 whichever is larger (after 2 minutes) C : Rated capacitance (μF), V : Rated voltage (V) (20℃)
Tangent of loss angle (tanδ)	Rated voltage (V): 10, 16, 25, 35, 50, 63, 80 tanδ (max.): 0.20, 0.16, 0.14, 0.12, 0.10, 0.10, 0.08 0.02 is added to every 1000μF increase over 1000μF. (20℃,120Hz)
Characteristics at high and low temperature	Rated voltage (V): 10, 16, 25, 35, 50, 63, 80 Impedance ratio (max.) Z−40℃/Z+20℃: 4, 3, 3, 3, 3, 3, 3 (120Hz)
Endurance (135℃) (Applied ripple current)	Test time: 10V to 50V : 3000 hours (φ10 : 2000 hours); 63V to 80V : 2000 hours Leakage current: The initial specified value or less Percentage of capacitance change: Within ±30% of initial value Tangent of the loss angle: 300% or less of the initial specified value
Shelf life (135℃)	Test time : 1000hours ; other items are same as the endurance. Voltage application treatment : According to JIS C5101-4 4.1
Applicable standards	JIS C5101 - 1, - 4 (IEC 60384 - 1, - 4)

Outline Drawing

Unit : mm



φD	10	12.5	16	18
F	5.0	5.0	7.5	7.5
φd	0.6	0.6	0.8	0.8
α	2.0	2.0	2.0	2.0

Coefficient of Frequency for Rated Ripple Current

Rated capacitance (μF) \ Frequency (Hz)	50・60	120	1k	10k・100k
220 to 330	0.55	0.65	0.85	1
470 to 1000	0.70	0.75	0.90	1
1200 to 6800	0.80	0.85	0.95	1

Product code system : 10V1000μF
(*For automotive: powertrain, safety)

RA*	RKB	102	M	1L	F20	300	T
Category code	Series code	capacitance code	Cap tol. code	Voltage code	Size code	Lead-forming and packing code	Additional code

・For details, refer to the various "Product Code System" pages.
・Lead-forming and packing code on this page are for lead long and standard packing products.
For standard packing, please refer to the "PACKING" page.

NOTE : Design, Specifications are subject to change without notice.
It is recommended that you shall obtain technical specifications from ELNA to ensure that the component is suitable for your use.

Code in front of series have been extracted from product code, which describes the segment of products, such as type and features.

Standard Ratings

Rated voltage (V) / Item / Rated capacitance (μF)	10 (1L)				16 (1E)				25 (1T)				35 (1G)			
	Case φD × L (mm)	Size code	ESR (Ω max.)	Rated ripple current (mArms)	Case φD × L (mm)	Size code	ESR (Ω max.)	Rated ripple current (mArms)	Case φD × L (mm)	Size code	ESR (Ω max.)	Rated ripple current (mArms)	Case φD × L (mm)	Size code	ESR (Ω max.)	Rated ripple current (mArms)
220	—	—	—	—	10×12.5	F12	0.098	725	10×12.5	F12	0.098	725	10×12.5	F12	0.098	725
													10×16	F16	0.075	951
330	10×12.5	F12	0.098	725	10×12.5	F12	0.098	725	10×12.5	F12	0.098	725	10×16	F16	0.075	951
									10×16	F16	0.075	951	10×20	F20	0.057	1130
470	10×12.5	F12	0.098	725	10×16	F16	0.075	951	10×16	F16	0.075	951	10×20	F20	0.057	1130
									10×20	F20	0.057	1130	12.5×20	G20	0.040	1550
1000	10×20	F20	0.057	1130	10×20	F20	0.057	1130	12.5×20	G20	0.040	1550	12.5×25	G25	0.032	1880
	12.5×15	G15	0.059	1130	12.5×20	G20	0.040	1550	12.5×25	G25	0.032	1880				
1200	—	—	—	—	—	—	—	—	12.5×20	G20	0.040	1550	12.5×30	G30	0.029	2160
													16×20	J20	0.032	2020
1500	—	—	—	—	—	—	—	—	—	—	—	—	12.5×35	G35	0.023	2580
													16×31.5	J31	0.020	3040
1800	—	—	—	—	—	—	—	—	12.5×25	G25	0.032	1880	12.5×40	G40	0.020	2920
									16×20	J20	0.032	2020	16×25	J25	0.024	2550
2200	12.5×25	G25	0.032	1880	12.5×25	G25	0.032	1880	12.5×30	G30	0.029	2160	16×31.5	J31	0.020	3040
	16×20	J20	0.032	2020	16×25	J25	0.024	2550	16×25	J25	0.024	2550	16×35.5	J35	0.019	3280
2700	—	—	—	—	—	—	—	—	12.5×35	G35	0.023	2580	16×35.5	J35	0.019	3280
									16×25	J25	0.024	2550	18×31.5	K31	0.018	3410
3300	16×25	J25	0.024	2550	16×31.5	J31	0.020	3040	12.5×40	G40	0.020	2920	16×40	J40	0.017	3630
	18×20	K20	0.029	2320	18×25	K25	0.022	2880	16×31.5	J31	0.020	3040	18×35.5	K35	0.017	3710
4700	16×31.5	J31	0.020	3040	16×35.5	J35	0.019	3280	16×35.5	J35	0.019	3280	18×40	K40	0.016	4000
	18×25	K25	0.022	2880	18×31.5	K31	0.018	3410	18×31.5	K31	0.018	3410				
5600	—	—	—	—	—	—	—	—	16×40	J40	0.017	3630	—	—	—	—
6800	—	—	—	—	—	—	—	—	18×40	K40	0.016	4000	—	—	—	—

Rated voltage (V) / Item / Rated capacitance (μF)	50 (1U)				63 (4E)				80 (1R)			
	Case φD × L (mm)	Size code	ESR (Ω max.)	Rated ripple current (mArms)	Case φD × L (mm)	Size code	ESR (Ω max.)	Rated ripple current (mArms)	Case φD × L (mm)	Size code	ESR (Ω max.)	Rated ripple current (mArms)
220	10×20	F20	0.081	930	–	–	–	–	–	–	–	–
330	–	–	–	–	–	–	–	–	16×20	J20	0.19	1100
470	12.5×20	G20	0.057	1170	16×20	J20	0.19	1100	16×25	J25	0.11	1370
560	–	–	–	–	–	–	–	–	18×25	K25	0.094	1450
820	12.5×30	G30	0.038	1680	16×31.5	J31	0.080	1790	18×35.5	K35	0.062	2100
1000	16×25	J25	0.031	1710	16×35.5	J35	0.066	2010	18×40	K40	0.051	2350
1800	18×35.5	K31	0.025	2670	18×40	K40	0.051	2350	–	–	–	–
2200	18×35.5	K35	0.022	2900	–	–	–	–	–	–	–	–

(Note) Rated ripple current : 135℃ , 100kHz ; ESR : 20℃ , 100kHz

NOTE : Design, Specifications are subject to change without notice.
It is recommended that you shall obtain technical specifications
from ELNA to ensure that the component is suitable for your use.

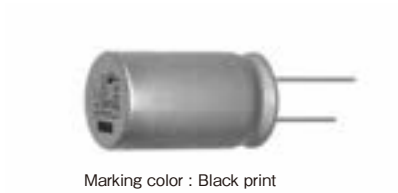
Return to Type List

ELNA — Miniature Aluminum Electrolytic Capacitors RKC series

Code in front of series have been extracted from product code, which describes the segment of products, such as type and features.

- Guaranteed 3000 hours at 135℃. (63V to 80V : 2000 hours)
- High temperature guaranteed for automotive.
- High CV, low ESR, high ripple current capacitors.
- For ECU of Direct injection engine, ESP etc.
- Environmental : GREEN CAP™ , RoHS compliance.

RKC ⇦ RKB (High CV, High ripple)



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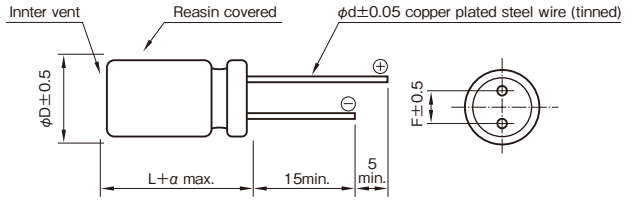
Specifications

Item	Performance
Category temperature range (℃)	−40 to +135
Tolerance at rated capacitance (%)	±20 (20℃,120Hz)
Leakage current (μA) (max.)	0.01CV or 3 whichever is larger (after 2 minutes) C : Rated capacitance (μF), V : Rated voltage (V) (20℃)
Tangent of loss angle (tanδ)	Rated voltage (V): 25, 35, 50, 63, 80 tanδ (max.): 0.14, 0.12, 0.10, 0.10, 0.08 0.02 is added to every 1000μF increase over 1000μF. (20℃,120Hz)
Characteristics at high and low temperature	Rated voltage (V): 25, 35, 50, 63, 80 Impedance ratio (max.) Z−40℃/Z+20℃: 3, 3, 3, 3, 3 (120Hz)
Endurance 1 (135℃) (Applied ripple current)	Test time: 3000 hours (63V to 80V : 2000 hours) Leakage current: The initial specified value or less Percentage of capacitance change: Within ±30% of initial value Tangent of the loss angle: 300% or less of the initial specified value
Endurance 2 (125℃) (Applied ripple current)	Test time: 3000 hours (63V to 80V : 2000 hours) Leakage current: The initial specified value or less Percentage of capacitance change: Within ±30% of initial value Tangent of the loss angle: 300% or less of the initial specified value
Shelf life (135℃)	Test time : 1000hours ; other items are same as the endurance. Voltage application treatment : According to JIS C5101-4 4.1
Applicable standards	JIS C5101 - 1, - 4 (IEC 60384 - 1, - 4)

Outline Drawing

Unit : mm



φD	12.5	16	18
F	5.0	7.5	7.5
φd	0.6	0.8	0.8
α	2.0	2.0	2.0

Coefficient of Frequency for Rated Ripple Current

Rated capacitance (μF) \ Frequency (Hz)	50・60	120	1k	10k・100k
270	0.55	0.65	0.85	1
390 to 1000	0.70	0.75	0.90	1
1100 to 12000	0.80	0.85	0.95	1

Product code system : 25V2000μF
(*For automotive: powertrain, safety)

RA*	RKC	202	M	1T	G20	300	T
Category code	Series code	capacitance code	Cap tol. code	Voltage code	Size code	Lead-forming and packing code	Additional code

・For details, refer to the various "Product Code System" pages.
・Lead-forming and packing code on this page are for lead long and standard packing products.
For standard packing, please refer to the "PACKING" page.

NOTE : Design, Specifications are subject to change without notice.
It is recommended that you shall obtain technical specifications from ELNA to ensure that the component is suitable for your use.

Code in front of series have been extracted from product code, which describes the segment of products, such as type and features.

Standard Ratings

Rated voltage (V) / Item / Rated capacitance (μF)	25 (1T)						35 (1G)						50 (1U)					
	Case	Size code	ESR (Ω max. / 100kHz)		Rated ripple current (mArms / 100kHz)		Case	Size code	ESR (Ω max. / 100kHz)		Rated ripple current (mArms / 100kHz)		Case	Size code	ESR (Ω max. / 100kHz)		Rated ripple current (mArms / 100kHz)	
	ϕD × L (mm)		20℃	-40℃	135℃	125℃	ϕD × L (mm)		20℃	-40℃	135℃	125℃	ϕD × L (mm)		20℃	-40℃	135℃	125℃
620	—	—	—	—	—	—	—	—	—	—	—	—	12.5 × 20	G20	0.073	0.88	1470	2400
820	—	—	—	—	—	—	—	—	—	—	—	—	12.5 × 25	G25	0.058	0.67	2260	3350
1000	—	—	—	—	—	—	—	—	—	—	—	—	16 × 20	J20	0.050	0.55	1870	2960
1100	—	—	—	—	—	—	—	—	—	—	—	—	12.5 × 30	G30	0.048	0.52	2520	4220
1300	—	—	—	—	—	—	12.5 × 20	G20	0.042	0.48	1690	2760	12.5 × 35	G35	0.042	0.44	2780	4810
													16 × 25	J25	0.042	0.44	2500	4040
													18 × 20	K20	0.042	0.44	2110	3130
1600	—	—	—	—	—	—	—	—	—	—	—	—	12.5 × 40	G40	0.037	0.36	3020	5240
													16 × 31.5	J31	0.035	0.36	2960	5130
1800	—	—	—	—	—	—	12.5 × 25	G25	0.033	0.30	2010	3480	18 × 25	K25	0.033	0.32	2530	4230
2000	12.5 × 20	G20	0.042	0.48	1690	2760	16 × 20	J20	0.035	0.27	2160	3040	—	—	—	—	—	—
2200	—	—	—	—	—	—	12.5 × 30	G30	0.028	0.24	2900	4490	16 × 35.5	J35	0.029	0.27	3160	5480
2400	—	—	—	—	—	—	18 × 20	K20	0.034	0.22	2320	3250	18 × 31.5	K31	0.028	0.25	3020	5240
2700	—	—	—	—	—	—	12.5 × 35	G35	0.025	0.21	3190	5140	16 × 40	J40	0.025	0.22	3420	5930
3000	12.5 × 25	G25	0.033	0.30	2010	3480	16 × 25	J25	0.028	0.22	2870	4260	18 × 35.5	K35	0.024	0.20	3390	5870
3300	16 × 20	J20	0.035	0.27	2160	3040	12.5 × 40	G40	0.024	0.19	3470	5810	—	—	—	—	—	—
3600	12.5 × 30	G30	0.028	0.24	2900	4490	16 × 31.5	J31	0.023	0.18	3400	5480	18 × 40	K40	0.023	0.16	3700	6420
3900	—	—	—	—	—	—	18 × 25	K25	0.027	0.19	2900	4500	—	—	—	—	—	—
4300	18 × 20	K20	0.034	0.22	2320	3250	16 × 35.5	J35	0.020	0.14	3630	6070	—	—	—	—	—	—
4700	12.5 × 35	G35	0.025	0.21	3190	5140	18 × 31.5	K31	0.022	0.16	3470	5600	—	—	—	—	—	—
	16 × 25	J25	0.028	0.22	2870	4260												
5100	12.5 × 40	G40	0.024	0.19	3470	5810	—	—	—	—	—	—	—	—	—	—	—	—
5600	16 × 31.5	J31	0.023	0.18	3400	5480	16 × 40	J40	0.019	0.12	3930	6810	—	—	—	—	—	—
6200	—	—	—	—	—	—	18 × 35.5	K35	0.019	0.12	3750	6280	—	—	—	—	—	—
7500	16 × 35.5	J35	0.020	0.14	3630	6070	18 × 40	K40	0.018	0.10	4080	7070	—	—	—	—	—	—
	18 × 31.5	K31	0.022	0.16	3470	5600												
9100	16 × 40	J40	0.019	0.12	3930	6810	—	—	—	—	—	—	—	—	—	—	—	—
10000	18 × 35.5	K35	0.019	0.12	3750	6280	—	—	—	—	—	—	—	—	—	—	—	—
12000	18 × 40	K40	0.018	0.10	4080	7070	—	—	—	—	—	—	—	—	—	—	—	—

Rated voltage (V) / Item / Rated capacitance (μF)	63 (4E)						80 (1R)					
	Case	Size code	ESR (Ω max. / 100kHz)		Rated ripple current (mArms / 100kHz)		Case	Size code	ESR (Ω max. / 100kHz)		Rated ripple current (mArms / 100kHz)	
	ϕD × L (mm)		20℃	-40℃	135℃	125℃	ϕD × L (mm)		20℃	-40℃	135℃	125℃
270	—	—	—	—	—	—	12.5 × 20	G20	0.072	0.56	1420	1640
390	12.5 × 20	G20	0.072	0.56	1420	1640	12.5 × 25	G25	0.052	0.39	2050	2520
470	—	—	—	—	—	—	16 × 20	J20	0.053	0.34	1910	2140
510	—	—	—	—	—	—	12.5 × 30	G30	0.042	0.30	2630	3110
560	12.5 × 25	G25	0.052	0.39	2050	2520	—	—	—	—	—	—
620	—	—	—	—	—	—	12.5 × 35	G35	0.035	0.25	2970	3760
							18 × 20	K20	0.044	0.26	2100	2350
680	16 × 20	J20	0.053	0.34	1910	2140	16 × 25	J25	0.038	0.23	2680	2940
750	12.5 × 30	G30	0.042	0.30	2630	3110	12.5 × 40	G40	0.031	0.22	3260	4610
							16 × 31.5	J31	0.034	0.20	3050	3860
820	—	—	—	—	—	—	18 × 25	K25	0.033	0.19	2810	3080
910	12.5 × 35	G35	0.035	0.25	2970	3760	—	—	—	—	—	—
	18 × 20	K20	0.044	0.26	2100	2350						
1000	16 × 25	J25	0.038	0.23	2680	2940	16 × 35.5	J35	0.027	0.15	3420	4590
1100	12.5 × 40	G40	0.031	0.22	3260	4610	18 × 31.5	K31	0.028	0.15	3220	4080
1200	16 × 31.5	J31	0.034	0.20	3050	3860	—	—	—	—	—	—
1300	18 × 25	K25	0.033	0.19	2810	3080	16 × 40	J40	0.025	0.14	3670	5190
							18 × 35.5	K35	0.022	0.12	3690	5220
1600	16 × 35.5	J35	0.027	0.15	3420	4590	18 × 40	K40	0.021	0.11	3820	5660
	18 × 31.5	K31	0.028	0.15	3220	4080						
1800	16 × 40	J40	0.025	0.14	3670	5190	—	—	—	—	—	—
2200	18 × 35.5	K35	0.022	0.12	3690	5220	—	—	—	—	—	—
2400	18 × 40	K40	0.021	0.11	3820	5660	—	—	—	—	—	—

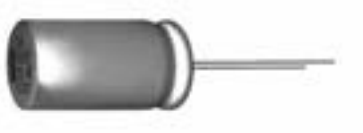
Return to Type List

ELNA

Miniature Aluminum Electrolytic Capacitors RQA series

Code in front of series have been extracted from product code, which describes the segment of products, such as type and features.

- Guaranteed 1000 hours at 150℃.
- High temperature capacitor.
- Environmental : GREEN CAP™ , RoHS compliance.



High temperature

RQA ⇦ RKB

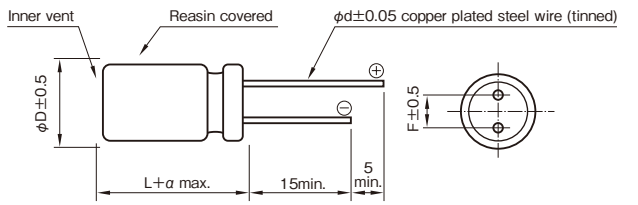
Marking color : Black print

Specifications

Item	Performance
Category temperature range (℃)	−40 to +150
Tolerance at rated capacitance (%)	±20 (20℃,120Hz)
Leakage current (μA) (max.)	0.01CV or 3 whichever is larger (after 2 minutes) C : Rated capacitance (μF), V : Rated voltage (V) (20℃)
Tangent of loss angle (tanδ)	Rated voltage (V): 10, 16, 25, 35 tanδ (max.): 0.20, 0.16, 0.14, 0.12 0.02 is added to every 1000μF increase over 1000μF. (20℃,120Hz)
Characteristics at high and low temperature	Rated voltage (V): 10, 16, 25, 35 Impedance ratio (max.) Z−40℃/Z+20℃: 4, 3, 3, 3 (120Hz)
Endurance (150℃) (Applied ripple current)	Test time: 1000 hours Leakage current: The initial specified value or less Percentage of capacitance change: Within ±30% of initial value Tangent of the loss angle: 300% or less of the initial specified value
Shelf life (150℃)	Test time : 1000hours ; other items are same as the endurance. Voltage application treatment : According to JIS C5101-4 4.1
Applicable standards	JIS C5101 - 1, - 4 (IEC 60384 - 1, - 4)

Outline Drawing

Unit : mm



φD	10	12.5	16	18
F	5.0	5.0	7.5	7.5
φd	0.6	0.6	0.8	0.8
α	2.0	2.0	2.0	2.0

Coefficient of Frequency for Rated Ripple Current

Rated capacitance (μF) \ Frequency (Hz)	50・60	120	1k	10k・100k
220 to 330	0.55	0.65	0.85	1
470 to 1000	0.70	0.75	0.90	1
2200 to 4700	0.80	0.85	0.95	1

Product code system : 35V1000μF (*For general product)

RS*	RQA	102	M	1G	G26	300	T
Category code	Series code	capacitance code	Cap tol. code	Voltage code	Size code	Lead-forming and packing code	Additional code

・For details, refer to the various "Product Code System" pages.
・Lead-forming and packing code on this page are for lead long and standard packing products.
For standard packing, please refer to the "PACKING" page.

Standard Ratings

Rated voltage (V) / Item / Rated capacitance (μF)	10 (1L)			16 (1E)			25 (1T)			35 (1G)		
	Case φD×L (mm)	Size code	Rated ripple current (mArms)	Case φD×L (mm)	Size code	Rated ripple current (mArms)	Case φD×L (mm)	Size code	Rated ripple current (mArms)	Case φD×L (mm)	Size code	Rated ripple current (mArms)
220	—	—	—	—	—	—	10×14.5	F14	300	10×14.5	F14	300
330	—	—	—	—	—	—	10×18	F18	510	10×18	F18	510
470	—	—	—	10×18	F18	510	10×22	F22	820	10×22	F22	820
1000	10×22	F22	820	10×22	F22	820	12.5×26	G26	1000	12.5×26	G26	1000
2200	12.5×26	G26	1000	12.5×26	G26	1000	16×26.5	J26	1200	16×33	J33	1370
3300	16×26.5	J26	1200	16×33	J33	1370	16×37	J37	1720	18×34	K34	1670
4700	16×33	J33	1370	16×37	J37	1720	18×38	K38	1790	18×42.5	K42	1870

(Note) Rated ripple current : 150℃ , 100kHz

NOTE : Design, Specifications are subject to change without notice.
It is recommended that you shall obtain technical specifications from ELNA to ensure that the component is suitable for your use.

Return to Type List

ELNA — Miniature Aluminum Electrolytic Capacitors RQB series

Code in front of series have been extracted from product code, which describes the segment of products, such as type and features.

- Guaranteed 2000 hours at 150℃.
- High temperature, high ripple current capacitor.
- Environmental : GREEN CAP™ , RoHS compliance.

High ripple
Long life

RQB ⇦ RQA

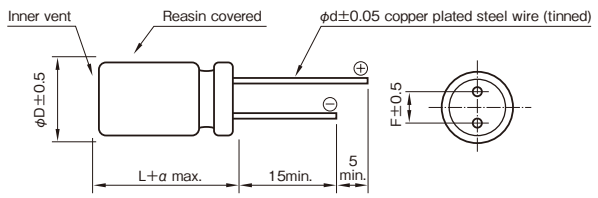
Marking color : Black print

Specifications

Item	Performance
Category temperature range (℃)	− 40 to + 150
Tolerance at rated capacitance (%)	± 20 (20℃ , 120Hz)
Leakage current (μA) (max.)	0.01CV or 3 whichever is larger (after 2 minutes) C : Rated capacitance (μF) ; V: Rated voltage (V) (20℃)
Tangent of loss angle (tanδ)	Rated voltage (V): 35, 50 tanδ (max.): 0.12, 0.10 0.02 is added to every 1000μF increase over 1000μF (20℃ , 120Hz)
Characteristics at high and low temperature	Rated voltage (V): 35, 50 Impedance ratio (max.) Z− 40℃ / Z+ 20℃: 3, 3 (120Hz)
Endurance (150℃) (Applied ripple current)	Test time: 2000 hours Leakage current: The initial specified value or less Percentage of capacitance change: Within ± 30% of initial value Tangent of the loss angle: 300% or less of the initial specified value
Shelf life (150℃)	Test time : 1000hours ; other items are same as the endurance. Voltage application treatment : According to JIS C5101-4 4.1
Applicable standards	JIS C5101-1, -4 (IEC 60384-1, -4)

Outline Drawing

Unit : mm



φD	16	18
F	7.5	7.5
φd	0.8	0.8
α	2.0	2.0

Coefficient of Frequency for Rated Ripple Current

Rated capacitance (μF) \ Frequency (Hz)	120	1k	10k	100k
1300 to 4700	0.85	0.95	1.00	1

Product code system : 35V2200μF (*For general product)

RS*	RQB	222	M	1G	J26	300	T
Category code	Series code	capacitance code	Cap tol. code	Voltage code	Size code	Lead-forming and packing code	Additional code

・For details, refer to the various "Product Code System" pages.
・Lead-forming and packing code on this page are for lead long and standard packing products.
For standard packing, please refer to the "PACKING" page.

Standard Ratings

Case size φD×L (mm)	Size code	35 (1G) Rated capacitance (μF)	ESR (Ω max.) 20℃	ESR (Ω max.) − 40℃	Rated ripple current (mArms)	50 (1U) Rated capacitance (μF)	ESR (Ω max.) 20℃	ESR (Ω max.) − 40℃	Rated ripple current (mArms)
16 × 26.5	J26	2200	0.038	0.380	1800	1300	0.040	0.400	1800
16 × 33	J33	2700	0.032	0.320	2200	1800	0.038	0.380	2200
16 × 37	J37	3000	0.030	0.300	2600	2000	0.032	0.320	2600
16 × 41.5	J41	3600	0.027	0.270	3000	2400	0.029	0.290	3000
18 × 27.5	K27	2400	0.036	0.360	2200	1800	0.034	0.340	2200
18 × 34	K34	3300	0.028	0.280	2800	2400	0.030	0.300	2700
18 × 42.5	K42	4700	0.023	0.230	3600	3000	0.023	0.230	3700

(Note) Rated ripple current : 150℃ , 100kHz ; ESR : 100kHz

NOTE : Design, Specifications are subject to change without notice.
It is recommended that you shall obtain technical specifications from ELNA to ensure that the component is suitable for your use.

For Vibration, Resistance,
Miniature Aluminum Electrolytic Capacitors

CAT.No.2023/2024E

Return to Type List

ELNA

Miniature Aluminum Electrolytic Capacitors RPK series

Code in front of series have been extracted from product code, which describes the segment of products, such as type and features.

- Guaranteed 5000 hours at 125℃. (4000 hours: 63V to 80V - φ16x20L)
- Best-suited to smoothing circuits and control circuits for industrial equipment power supplies of which long life and high reliability are required.
- NC terminal added items are lineup for vibration resistance. (30G guaranteed : 20mmL or less)
- Environmental : GREEN CAP™ , RoHS compliance.

For vibration

RPK ⇦ RKD

Marking color : White print on a black sleeve

Specifications

Item	Performance
Category temperature range (℃)	−40 to +125
Tolerance at rated capacitance (%)	±20 (20℃,120Hz)
Leakage current (μA) (max.)	0.01CV or 3 whichever is larger (after 2 minutes) C : Rated capacitance (μF) , V : Rated voltage (V) (20℃)
Tangent of loss angle (tanδ)	

Rated voltage (V)	10	16	25	35	50	63	80
tanδ (max.)	0.20	0.16	0.14	0.12	0.10	0.10	0.08

0.02 is added to every 1000μF increase over 1000μF. (20℃,120Hz)

Characteristics at high and low temperature

Rated voltage (V)		10	16	25	35	50	63	80
Impedance ratio (max.)	Z−40℃/Z+20℃	4	3	3	3	3	3	3

(120Hz)

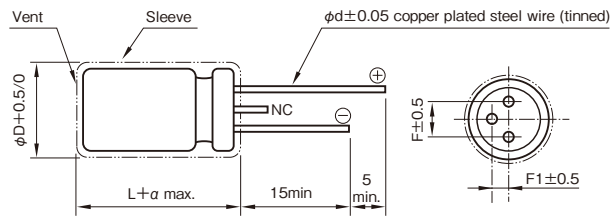
Endurance (125℃) (Applied ripple current)

Test time	5000 hours (4000 hours: 63V to 80V - φ16x20L)
Leakage current	The initial specified value or less
Percentage of capacitance change	Within ±30% of initial value
Tangent of the loss angle	300% or less of the initial specified value

Shelf life (125℃)	Test time : 1000hours ; other items are same as the endurance. Voltage application treatment : According to JIS C5101-4 4.1
Applicable standards	JIS C5101 - 1, - 4 (IEC 60384 - 1, - 4)

Outline Drawing

Unit : mm



φD	12.5	16	18
F	5.0	7.5	7.5
F1	2.5	3.75	3.75
φd	0.8	0.8	0.8
α	2.0 (30L : 2.5)	2.0 (20, 25L : 2.5)	

(Note) Since NC terminal is not insulated, it should be mounted at a position electronically independent from all other parts of the circuit.
(Note) Whisker preventive structure is possible.

Coefficient of Frequency for Rated Ripple Current

Rated capacitance (μF) \ Frequency (Hz)	50・60	120	1k	10k・100k
470 to 1000	0.70	0.75	0.90	1
1200 to 6800	0.80	0.85	0.95	1

Product code system : 16V2200μF (*For general product)

RS*	RPK	222	M	1E	J25	300	DT
Category code	Series code	capacitance code	Cap tol. code	Voltage code	Size code	Lead-forming and packing code	Additional code

・If it is whisker preventive structure, should change "T" into "G".
・For details, refer to the various "Product Code System" pages.
・Lead-forming and packing code on this page are for lead long and standard packing products.
For standard packing, please refer to the "PACKING" page.

NOTE : Design, Specifications are subject to change without notice.
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Code in front of series have been extracted from product code, which describes the segment of products, such as type and features.

Standard Ratings

Rated voltage (V) / Item / Rated capacitance (μF)	10 (1L)				16 (1E)				25 (1T)				35 (1G)			
	Case φD × L (mm)	Size code	ESR (Ω max.)	Rated ripple current (mArms)	Case φD × L (mm)	Size code	ESR (Ω max.)	Rated ripple current (mArms)	Case φD × L (mm)	Size code	ESR (Ω max.)	Rated ripple current (mArms)	Case φD × L (mm)	Size code	ESR (Ω max.)	Rated ripple current (mArms)
470	–	–	–	–	–	–	–	–	–	–	–	–	12.5×20	G20	0.040	1820
1000	12.5×15	G15	0.059	1380	12.5×20	G20	0.040	1820	12.5×20	G20	0.040	1820	12.5×25	G25	0.032	2400
									12.5×25	G25	0.032	2400	16×25	J25	0.024	3100
					16×16	J16	0.044	1930	16×16	J16	0.044	1930	18×20	K20	0.029	2490
1200	–	–	–	–	–	–	–	–	12.5×20	G20	0.040	1820	12.5×30	G30	0.029	2560
													16×20	J20	0.032	2280
1500	–	–	–	–	–	–	–	–	–	–	–	–	12.5×35	G35	0.023	2970
													16×31.5	J31	0.020	3160
													18×25	K25	0.022	3200
1800	–	–	–	–	–	–	–	–	12.5×25	G25	0.032	2400	12.5×40	G40	0.020	3600
									16×20	J20	0.032	2280	16×25	J25	0.024	3100
2200	12.5×25	G25	0.032	2400	12.5×25	G25	0.032	2400	12.5×30	G30	0.029	2560	16×31.5	J31	0.020	3160
	16×20	J20	0.032	2280	16×25	J25	0.024	3100	16×25	J25	0.024	3100	16×35.5	J35	0.019	3590
	18×16	K16	0.041	2170	18×20	K20	0.029	2490	18×20	K20	0.029	2490	18×25	K25	0.022	3200
2700	–	–	–	–	–	–	–	–	12.5×35	G35	0.023	2970	16×35.5	J35	0.019	3590
									16×25	J25	0.024	3100	18×31.5	K31	0.018	3410
									18×20	K20	0.029	2490				
3300	16×25	J25	0.024	3100	16×31.5	J31	0.020	3160	12.5×40	G40	0.020	3600	16×40	J40	0.017	4300
	18×20	K20	0.029	2490	18×25	K25	0.022	3200	16×31.5	J31	0.020	3160	18×35.5	K35	0.017	4200
3900	–	–	–	–	–	–	–	–	16×35.5	J35	0.019	3590	–	–	–	–
									18×25	K25	0.022	3200				
4700	16×31.5	J31	0.020	3160	16×35.5	J35	0.019	3590	18×35.5	K35	0.017	4200	18×40	K40	0.016	4600
	18×25	K25	0.022	3200	18×31.5	K31	0.018	3410								
5600	–	–	–	–	–	–	–	–	16×40	J40	0.017	4300	–	–	–	–
									18×35.5	K35	0.017	4200				
6800	–	–	–	–	–	–	–	–	18×40	K40	0.016	4600	–	–	–	–

Rated voltage (V) / Item / Rated capacitance (μF)	50 (1U)				63 (4E)				80 (1R)			
	Case φD × L (mm)	Size code	ESR (Ω max.)	Rated ripple current (mArms)	Case φD × L (mm)	Size code	ESR (Ω max.)	Rated ripple current (mArms)	Case φD × L (mm)	Size code	ESR (Ω max.)	Rated ripple current (mArms)
470	12.5×20	G20	0.070	1500	–	–	–	–	16×25	J25	0.116	1500
560	–	–	–	–	–	–	–	–	18×25	K25	0.100	1600
820	12.5×30	G30	0.038	2150	16×31.5	J31	0.080	1910	18×35.5	K35	0.062	2180
1000	16×25	J25	0.031	2620	16×35.5	J35	0.066	2110	18×40	K40	0.051	2470
1800	18×31.5	K31	0.025	3140	–	–	–	–	–	–	–	–
2200	18×35.5	K35	0.022	3510	–	–	–	–	–	–	–	–

(Note) Rated ripple current : 125℃ , 100kHz ; ESR : 20℃ , 100kHz

NOTE : Design, Specifications are subject to change without notice.
It is recommended that you shall obtain technical specifications
from ELNA to ensure that the component is suitable for your use.

Return to Type List

ELNA

Miniature Aluminum Electrolytic Capacitors RKE series

Code in front of series have been extracted from product code, which describes the segment of products, such as type and features.

- Vibration resistance (40G,10 to 2000Hz, X,Y,Z = per 2hours).
- For Automotive application (ABS and electric power steering etc.)
- Guaranteed 5000 hours at 125˚C.
- Environmental：GREEN CAP™ , RoHS compliance.

High vibration resistance

RKE ⇦ RKD

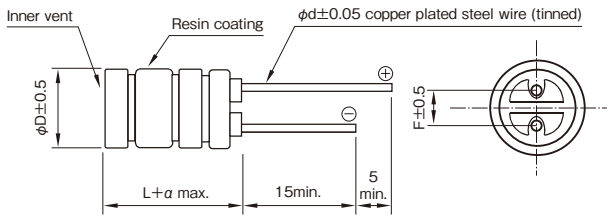
Marking color : Black print

Specifications

Item	Performance
Category temperature range (℃)	−40 to +125
Tolerance at rated capacitance (%)	±20 (20℃,120Hz)
Leakage current (μA) (max.)	0.01CV or 3 whichever is larger (after 2 minutes) C : Rated capacitance (μF), V : Rated voltage (V) (20℃)
Tangent of loss angle (tanδ)	Rated voltage (V): 25 / 35 / 50 tanδ (max.): 0.14 / 0.12 / 0.10 0.02 is added to every 1000μF increase over 1000μF. (20℃,120Hz)
Characteristics at high and low temperature	Rated voltage (V): 25 / 35 / 50 Impedance ratio (max.) Z−40℃/Z+20℃: 3 / 3 / 3 (120Hz)
Endurance (125℃) (Applied ripple current)	Test time: 5000 hours Leakage current: The initial specified value or less Percentage of capacitance change: Within ±30% of initial value Tangent of the loss angle: 300% or less of the initial specified value
Shelf life (125℃)	Test time : 1000hours ; other items are same as the endurance. Voltage application treatment : According to JIS C5101-4 4.1
Vibration	Vibration test condition Frequency range: 10 to 2000Hz Amplitude or Acceleration: 1.5 mm peak to peak or 40G (392m/s²), whichever is the less severe Sweep rate: 0.5 octave/min. Vibration axis and duration: X, Y, Z per 2 hours, total 6 hours Fixation: Capacitor mounted by its body which is rigidly clamped to the work surface. Specification after test Leakage current: The initial specified value or less Percentage of capacitance change: Within ±30% of initial value Tangent of the loss angle: 300% or less of the initial specified value
Applicable standards	JIS C5101 - 1, - 4 (IEC 60384 - 1, - 4)

Outline Drawing

Unit : mm



φD	16	18
F	7.5	7.5
φd	0.8	0.8
α	2.0	2.0

Coefficient of Frequency for Rated Ripple Current

Rated capacitance (μF) \ Frequency (Hz)	120	1k	10k	100k
1200 to 6800	0.85	0.95	1.00	1

Product code system : 35V2700μF
(*For automotive: powertrain, safety)

RA*	RKE	272	M	1G	K31	300	T
Category code	Series code	capacitance code	Cap tol. code	Voltage code	Size code	Lead-forming and packing code	Additional code

・For details, refer to the various "Product Code System" pages.
・Lead-forming and packing code on this page are for lead long and standard packing products.
For standard packing, please refer to the "PACKING" page.

NOTE : Design, Specifications are subject to change without notice.
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Code in front of series have been extracted from product code, which describes the segment of products, such as type and features.

Standard Ratings

Rated voltage(V) / Item / Rated capacitance (μF)	25 (1T)					35 (1G)					50 (1U)				
	Case φD × L (mm)	Size code	ESR (Ω max.) 20℃	ESR (Ω max.) -40℃	Rated ripple current (mArms)	Case φD × L (mm)	Size code	ESR (Ω max.) 20℃	ESR (Ω max.) -40℃	Rated ripple current (mArms)	Case φD × L (mm)	Size code	ESR (Ω max.) 20℃	ESR (Ω max.) -40℃	Rated ripple current (mArms)
1200	—	—	—	—	—	—	—	—	—	—	16×31.5	J31	0.048	0.20	2940
1500	—	—	—	—	—	16×31.5	J31	0.024	0.14	3160	16×35.5	J35	0.039	0.16	3300
2200	—	—	—	—	—	16×35.5	J35	0.023	0.13	3590	18×35.5	K35	0.033	0.15	3520
2700	16×31.5	J31	0.024	0.14	3160	18×31.5	K31	0.020	0.11	3410	—	—	—	—	—
3300	16×35.5	J35	0.023	0.13	3590	18×35.5	K35	0.019	0.10	3840	—	—	—	—	—
4700	18×31.5	K31	0.020	0.11	3410	18×40	K40	0.017	0.094	4250	—	—	—	—	—
5600	18×35.5	K35	0.019	0.10	3840	—	—	—	—	—	—	—	—	—	—
6800	18×40	K40	0.017	0.094	4250	—	—	—	—	—	—	—	—	—	—

(Note) Rated ripple current : 125℃ , 100kHz ; ESR : 100kHz

NOTE : Design, Specifications are subject to change without notice.
It is recommended that you shall obtain technical specifications
from ELNA to ensure that the component is suitable for your use.

Return to Type List

ELNA

Miniature Aluminum Electrolytic Capacitors RKF series

Code in front of series have been extracted from product code, which describes the segment of products, such as type and features.

- Vibration resistance (40G,10 to 2000Hz, X,Y,Z = per 2hours).
- For Automotive application (ABS and electric power steering etc.)
- Guaranteed 3000 hours at 135℃.
  (63V to 80V : Guaranteed 2000 hours)
- Environmental : GREEN CAP™ , RoHS compliance.

High vibration resistance

RKF ⇦ RKC

Marking color : Black print

Specifications

Item	Performance
Category temperature range (℃)	−40 to +135
Tolerance at rated capacitance (%)	±20 (20℃,120Hz)
Leakage current (μA) (max.)	0.01CV or 3 whichever is larger (after 2 minutes) C : Rated capacitance (μF), V : Rated voltage (V) (20℃)
Tangent of loss angle (tanδ)	

Rated voltage (V)	25	35	50	63	80
tanδ (max.)	0.14	0.12	0.10	0.10	0.08

0.02 is added to every 1000μF increase over 1000μF. (20℃,120Hz)

Characteristics at high and low temperature

Rated voltage (V)		25	35	50	63	80
Impedance ratio (max.)	Z−40℃/Z+20℃	3	3	3	3	3

(120Hz)

Endurance (135℃ or 125℃) (Applied ripple current)

Test time	3000 hours (63V to 80V : 2000 hours)
Leakage current	The initial specified value or less
Percentage of capacitance change	Within ±30% of initial value
Tangent of the loss angle	300% or less of the initial specified value

Shelf life (135℃): Test time : 1000hours ; other items are same as the endurance. Voltage application treatment : According to JIS C5101-4 4.1

Vibration

Vibration test condition

Frequency range	10 to 2000Hz
Amplitude or Acceleration	1.5 mm peak to peak or 40G (392m/s²), whichever is the less severe
Sweep rate	0.5 octave/min.
Vibration axis and duration	X, Y, Z per 2 hours, total 6 hours
Fixation	Capacitor mounted by its body which is rigidly clamped to the work surface.

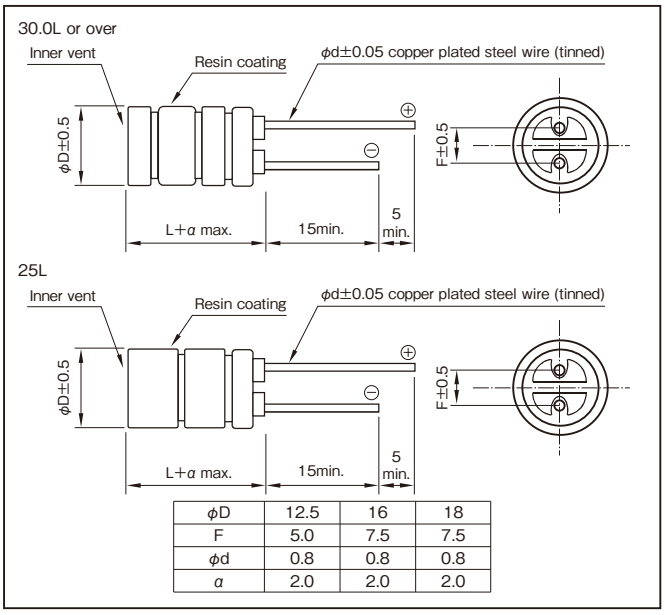
Specification after test

Leakage current	The initial specified value or less
Percentage of capacitance change	Within ±30% of initial value
Tangent of the loss angle	300% or less of the initial specified value

Applicable standards: JIS C5101 - 1, - 4 (IEC 60384 - 1, - 4)

Outline Drawing

Unit : mm



ϕD	12.5	16	18
F	5.0	7.5	7.5
ϕd	0.8	0.8	0.8
α	2.0	2.0	2.0

Coefficient of Frequency for Rated Ripple Current

Rated capacitance (μF) \ Frequency (Hz)	120	1k	10k	100k
290	0.65	0.85	1.00	1
390 to 1000	0.75	0.90	1.00	1
1100 to 8200	0.85	0.95	1.00	1

Product code system : 35V3600μF
(*For automotive: powertrain, safety)

RA*	RKF	362	M	1G	K31	300	T
Category code	Series code	capacitance code	Cap tol. code	Voltage code	Size code	Lead-forming and packing code	Additional code

・For details, refer to the various "Product Code System" pages.
・Lead-forming and packing code on this page are for lead long and standard packing products.
For standard packing, please refer to the "PACKING" page.

NOTE : Design, Specifications are subject to change without notice.
It is recommended that you shall obtain technical specifications from ELNA to ensure that the component is suitable for your use.

Code in front of series have been extracted from product code, which describes the segment of products, such as type and features.

Standard Ratings

Rated voltage (V)	Rated capacitance (μF)	Case φD × L (mm)	Size code	ESR (Ω max. / 100kHz) 20℃	ESR (Ω max. / 100kHz) -40℃	Rated ripple current (mArms / 100kHz) 135℃	Rated ripple current (mArms / 100kHz) 125℃
25 (1T)	1800	12.5 × 25	G25	0.033	0.30	2010	3480
	2200	12.5 × 30	G30	0.028	0.24	2900	4490
	2700	12.5 × 35	G35	0.025	0.21	3190	5140
	3300	12.5 × 40	G40	0.024	0.19	3470	5810
	4700	16 × 31.5	J31	0.023	0.18	3400	5480
	5400	16 × 35.5	J35	0.020	0.14	3630	6070
	6200	16 × 40	J40	0.019	0.12	3930	6810
	6200	18 × 31.5	K31	0.022	0.16	3470	5600
	7800	18 × 35.5	K35	0.019	0.12	3750	6280
	8200	18 × 40	K40	0.018	0.10	4080	7070
35 (1G)	1100	12.5 × 25	G25	0.033	0.30	2010	3480
	1500	12.5 × 30	G30	0.028	0.24	2900	4490
	1800	12.5 × 35	G35	0.025	0.21	3190	5140
	2000	12.5 × 40	G40	0.024	0.19	3470	5810
	2700	16 × 31.5	J31	0.023	0.18	3400	5480
	3100	16 × 35.5	J35	0.020	0.14	3630	6070
	3600	16 × 40	J40	0.019	0.12	3930	6810
	3600	18 × 31.5	K31	0.022	0.16	3470	5600
	4700	18 × 35.5	K35	0.019	0.12	3750	6280
	5400	18 × 40	K40	0.018	0.10	4080	7070
50 (1U)	560	12.5 × 25	G25	0.079	0.39	2260	3350
	750	12.5 × 30	G30	0.065	0.30	2520	4220
	900	12.5 × 35	G35	0.057	0.25	2780	4810
	1000	12.5 × 40	G40	0.050	0.22	3020	5240
	1300	16 × 31.5	J31	0.048	0.20	2960	5130
	1600	16 × 35.5	J35	0.039	0.15	3160	5480
	1900	16 × 40	J40	0.034	0.14	3420	5930
	2000	18 × 31.5	K31	0.038	0.15	3020	5240
	2400	18 × 35.5	K35	0.033	0.12	3390	5870
	2600	18 × 40	K40	0.031	0.11	3700	6420

Rated voltage (V)	Rated capacitance (μF)	Case φD × L (mm)	Size code	ESR (Ω max. / 100kHz) 20℃	ESR (Ω max. / 100kHz) -40℃	Rated ripple current (mArms / 100kHz) 135℃	Rated ripple current (mArms / 100kHz) 125℃
63 (4E)	390	12.5 × 25	G25	0.076	0.39	2050	2520
	560	12.5 × 30	G30	0.061	0.30	2630	3110
	650	12.5 × 35	G35	0.051	0.25	2970	3760
	750	12.5 × 40	G40	0.045	0.22	3260	4610
	1000	16 × 31.5	J31	0.049	0.20	3050	3860
	1300	16 × 35.5	J35	0.039	0.15	3420	4590
	1300	18 × 31.5	K31	0.041	0.15	3220	4080
	1500	16 × 40	J40	0.036	0.14	3670	5190
	1800	18 × 35.5	K35	0.032	0.12	3690	5220
	2000	18 × 40	K40	0.031	0.11	3820	5660
80 (1R)	290	12.5 × 25	G25	0.076	0.39	2050	2520
	420	12.5 × 30	G30	0.061	0.30	2630	3110
	490	12.5 × 35	G35	0.051	0.25	2970	3760
	570	12.5 × 40	G40	0.045	0.22	3260	4610
	750	16 × 31.5	J31	0.049	0.20	3050	3860
	820	16 × 35.5	J35	0.039	0.15	3420	4590
	820	18 × 31.5	K31	0.041	0.15	3220	4080
	950	16 × 40	J40	0.036	0.14	3670	5190
	1200	18 × 35.5	K35	0.032	0.12	3690	5220
	1300	18 × 40	K40	0.031	0.11	3820	5660

NOTE : Design, Specifications are subject to change without notice.
It is recommended that you shall obtain technical specifications
from ELNA to ensure that the component is suitable for your use.

Return to Type List

ELNA

Miniature Aluminum Electrolytic Capacitors RKG series

Code in front of series have been extracted from product code, which describes the segment of products, such as type and features.

- Vibration resistance (40G,10 to 2000Hz, X,Y,Z = per 2hours).
- For Automotive application (ABS and electric power steering etc.)
- Guaranteed 2000 hours at 150℃. (63V, 80V : 1000 hours)
- Environmental：GREEN CAP™ , RoHS compliance.

High vibration resistance

RKG ⇦ RQA

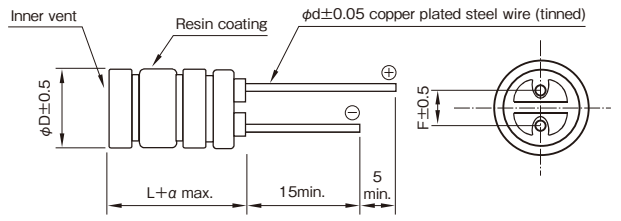
Marking color : Black print

Specifications

Item	Performance
Category temperature range (℃)	−40 to +150
Tolerance at rated capacitance (%)	±20 (20℃,120Hz)
Leakage current (μA) (max.)	0.01CV or 3 whichever is larger (after 2 minutes) C : Rated capacitance (μF), V : Rated voltage (V) (20℃)
Tangent of loss angle (tanδ)	Rated voltage (V): 25, 35, 50, 63, 80 tanδ (max.): 0.14, 0.12, 0.10, 0.10, 0.08 0.02 is added to every 1000μF increase over 1000μF. (20℃,120Hz)
Characteristics at high and low temperature	Rated voltage (V): 25, 35, 50, 63, 80 Impedance ratio (max.) Z−40℃/Z+20℃: 3, 3, 3, 3, 3 (120Hz)
Endurance (150℃ or 125℃) (Applied ripple current)	Test time: 2000 hours (63V, 80V : 1000 hours) Leakage current: The initial specified value or less Percentage of capacitance change: Within ±30% of initial value Tangent of the loss angle: 300% or less of the initial specified value
Shelf life (150℃)	Test time : 1000hours ; other items are same as the endurance. Voltage application treatment : According to JIS C5101-4 4.1
Vibration	Vibration test condition Frequency range: 10 to 2000Hz Amplitude or Acceleration: 1.5 mm peak to peak or 40G (392m/s²), whichever is the less severe Sweep rate: 0.5 octave/min. Vibration axis and duration: X, Y, Z per 2 hours, total 6 hours Fixation: Capacitor mounted by its body which is rigidly clamped to the work surface. Specification after test Leakage current: The initial specified value or less Percentage of capacitance change: Within ±30% of initial value Tangent of the loss angle: 300% or less of the initial specified value
Applicable standards	JIS C5101 - 1, - 4 (IEC 60384 - 1, - 4)

Outline Drawing

Unit : mm



ϕD	18
L	42
F	7.5
ϕd	0.8
α	2.0
Size code	K42

Coefficient of Frequency for Rated Ripple Current

Rated capacitance (μF) \ Frequency (Hz)	120	1k	10k	100k
800	0.75	0.90	1.00	1
1200 to 3900	0.85	0.95	1.00	1

Product code system : 35V2700μF
(*For automotive: powertrain, safety)

RA*	RKG	272	M	1G	K42	300	T
Category code	Series code	capacitance code	Cap tol. code	Voltage code	Size code	Lead-forming and packing code	Additional code

・For details, refer to the various "Product Code System" pages.
・Lead-forming and packing code on this page are for lead long and standard packing products.
For standard packing, please refer to the "PACKING" page.

Standard Ratings

Rated voltage (V)	Rated capacitance (μF)	ESR (Ω max. / 100kHz) 20℃	ESR 20℃ -40℃	Rated ripple current (mArms / 100kHz) 150℃	Rated ripple current 150℃ 125℃
25 (1T)	3900	0.020	0.11	3100	8000
35 (1G)	2700	0.020	0.11	3100	8000
50 (1U)	1800	0.034	0.19	2800	7000
63 (4E)	1200	0.034	0.19	2900	7300
80 (1R)	800	0.034	0.19	2900	7300

NOTE : Design, Specifications are subject to change without notice.
It is recommended that you shall obtain technical specifications from ELNA to ensure that the component is suitable for your use.

Aluminum Electrolytic Capacitors for Audio

CAT.No.2023/2024E

Return to Type List

ELNA Vertical Chip Type Aluminum Electrolytic Capacitors For Audio VVM series

Code in front of series have been extracted from product code, which describes the segment of products, such as type and features.

- New developed Al-Foil and Electrolyte for Audio grade allow lower distortion.
- New range of bright and smooth sound is achieved in SMD area.
- Guaranteed 2000 hours 105℃.
- Environmental：GREEN CAP™ , RoHS compliance.

High temperature, Long life

VVM ⇦ VVG

Marking color : Black print

Specifications

Item	Performance
Category temperature range (℃)	−55 to +105
Tolerance at rated capacitance (%)	±20 (20℃,120Hz)
Leakage current (μA) (max.)	0.01CV or 3 whichever is larger (after 2 minutes) C : Rated capacitance (μF), V: Rated voltage (V) (20℃)
Tangent of loss angle (tanδ)	

Rated voltage (V)	6.3	10	16	25	35	50
tanδ (max.)	0.28	0.24	0.20	0.16	0.13	0.12

(20℃,120Hz)

Characteristics at high and low temperature

Rated voltage (V)		6.3	10	16	25	35	50
Impedance ratio (max.)	Z−25℃/Z+20℃	2	2	2	2	2	2
	Z−55℃/Z+20℃	8	4	4	3	3	3

(120Hz)

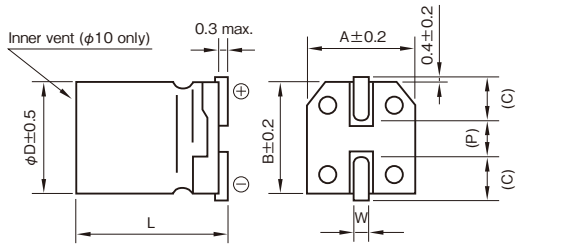
Endurance (105℃)

Test time	2000 hours
Leakage current	The initial specified value or less
Percentage of capacitance change	Within ±30% of initial value
Tangent of the loss angle	300% or less of the initial specified value

Shelf life (105℃)	Test time : 1000hours ; other items are same as the endurance. Voltage application treatment : According to JIS C5101-4 4.1
Applicable standards	JIS C5101 - 1, - 18 (IEC 60384 - 1, - 18)

Outline Drawing

Unit : mm



( ) : Reference size

φD	L	A	B	C	W	P	Size code
4	5.8±0.3	4.3	4.3	2.0	0.5 to 0.8	1.0	BC8
5	5.8±0.3	5.3	5.3	2.3	0.5 to 0.8	1.5	CC8
6.3	5.8±0.3	6.6	6.6	2.7	0.5 to 0.8	2.0	DC8
8	6.5±0.3	8.4	8.4	3.4	0.5 to 0.8	2.3	ED5
8	10.5±0.5	8.4	8.4	3.0	0.7 to 1.1	3.1	EH5
10	10.5±0.5	10.4	10.4	3.3	0.7 to 1.1	4.7	FH5

Refer to individual page.
(Soldering conditions, Land pattern size, The taping specifications)

Coefficient of Frequency for Rated Ripple Current

Rated voltage (V) \ Frequency (Hz)		50	120	1k	10k・100k
6.3 to 16		0.80	1	1.15	1.25
25 to 35		0.80	1	1.25	1.40
50	1 to 3.3μF	0.50	1	1.35	1.50
	4.7μF or more	0.70	1	1.35	1.50

Product code system : 6.3V220μF (*For general product)

RS*	VVM	221	M	1J	EH5	002	PU
Category code	Series code	capacitance code	Cap tol. code	Voltage code	Size code	Taping and packing code	Additional code

For details, refer to the various "Product Code System" pages.

Standard Ratings

Rated voltage (V) / Item / Rated capacitance (μF)	6.3 (1J) Case φD×L (mm)	6.3 (1J) Rated ripple current (mArms)	10 (1L) Case φD×L (mm)	10 (1L) Rated ripple current (mArms)	16 (1E) Case φD×L (mm)	16 (1E) Rated ripple current (mArms)	25 (1T) Case φD×L (mm)	25 (1T) Rated ripple current (mArms)	35 (1G) Case φD×L (mm)	35 (1G) Rated ripple current (mArms)	50 (1U) Case φD×L (mm)	50 (1U) Rated ripple current (mArms)
1	–	–	–	–	–	–	–	–	–	–	4×5.8	7
2.2	–	–	–	–	–	–	–	–	–	–	4×5.8	10
3.3	–	–	–	–	–	–	–	–	–	–	4×5.8	12
4.7	–	–	–	–	4×5.8	11	4×5.8	13	4×5.8	14	5×5.8	17
10	–	–	4×5.8	15	4×5.8	17	5×5.8	21	5×5.8	24	6.3×5.8	29
22	4×5.8	21	5×5.8	26	5×5.8	28	6.3×5.8	37	6.3×5.8	41	8×6.5	52
33	5×5.8	29	5×5.8	32	6.3×5.8	41	6.3×5.8	45	8×6.5	62	8×10.5	75
47	5×5.8	35	6.3×5.8	44	6.3×5.8	48	8×6.5	66	8×10.5	86	8×10.5	90
100	6.3×5.8	60	8×6.5	79	8×6.5	86	8×10.5	113	10×10.5	145	10×10.5	151
					8×10.5	101						
220	8×10.5	127	8×10.5	137	8×10.5	150	10×10.5	194	10×10.5	216	–	–
					10×10.5	174						
330	8×10.5	156	10×10.5	194	10×10.5	213	–	–	–	–	–	–
470	10×10.5	215	10×10.5	232	10×10.5	254	–	–	–	–	–	–

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

NOTE : Design, Specifications are subject to change without notice.
It is recommended that you shall obtain technical specifications from ELNA to ensure that the component is suitable for your use.

Return to Type List

ELNA Vertical Chip Type Aluminum Electrolytic Capacitors For Audio VVG series

Code in front of series have been extracted from product code, which describes the segment of products, such as type and features.

- New developed Al-Foil and Electrolyte for Audio grade allow lower distortion.
- New range of bright and smooth sound is achieved in SMD area.
- Environmental : GREEN CAP™ , RoHS compliance.

Marking color : Black print

Specifications

Item	Performance
Category temperature range (℃)	−40 to +85
Tolerance at rated capacitance (%)	±20 (20℃,120Hz)
Leakage current (μA) (max.)	0.01CV or 3 whichever is larger (after 2 minutes) C : Rated capacitance (μF) ; V : Rated voltage (V) (20℃)
Tangent of loss angle (tanδ)	

Rated voltage (V)	6.3	10	16	25	35
tanδ (max.)	0.28	0.24	0.20	0.16	0.14

(20℃,120Hz)

Characteristics at high and low temperature

Rated voltage (V)		6.3	10	16	25	35
Impedance ratio (max.)	Z−25℃/Z+20℃	4	3	2	2	2
	Z−40℃/Z+20℃	8	5	4	3	3

(120Hz)

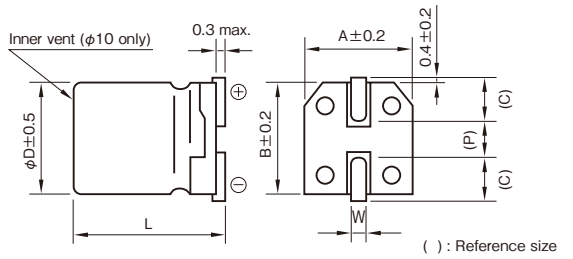
Endurance (85℃) (Applied ripple current)

Test time	2000 hours
Leakage current	The initial specified value or less
Percentage of capacitance change	Within ±20% of initial value
Tangent of the loss angle	200% or less of the initial specified value

Shelf life (85℃)	Test time : 500hours ; other items are same as the endurance. Voltage application treatment : According to JIS C5101-4 4.1
Applicable standards	JIS C5101 - 1, - 18 (IEC 60384 - 1, - 18)

Outline Drawing

Unit : mm



ϕD	L	A	B	C	W	P	Size code
4	5.3±0.2	4.3	4.3	2.0	0.5 to 0.8	1.0	BC3
5	5.3±0.2	5.3	5.3	2.3	0.5 to 0.8	1.5	CC3
6.3	5.3±0.2	6.3	6.3	2.7	0.5 to 0.8	2.0	DC3
8	6.5±0.3	8.4	8.4	3.4	0.5 to 0.8	2.3	ED5
8	10±0.5	8.4	8.4	3.0	0.7 to 1.1	3.1	EH0
10	10±0.5	10.4	10.4	3.3	0.7 to 1.1	4.7	FH0

Refer to individual page.
(Soldering conditions, Land pattern size, The taping specifications)

Coefficient of Frequency for Rated Ripple Current

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

Product code system : 16V47μF (*For general product)

RS*	VVG	470	M	1E	DC3	002	U
Category code	Series code	capacitance code	Cap tol. code	Voltage code	Size code	Taping and packing code	Additional code

For details, refer to the various "Product Code System" pages.

Standard Ratings

Rated voltage (V) / Item / Rated capacitance (μF)	6.3 (1J) Case ϕD×L (mm)	6.3 (1J) Rated ripple current (mArms)	10 (1L) Case ϕD×L (mm)	10 (1L) Rated ripple current (mArms)	16 (1E) Case ϕD×L (mm)	16 (1E) Rated ripple current (mArms)	25 (1T) Case ϕD×L (mm)	25 (1T) Rated ripple current (mArms)	35 (1G) Case ϕD×L (mm)	35 (1G) Rated ripple current (mArms)
3.3	—	—	—	—	—	—	—	—	4×5.3	11
4.7	—	—	—	—	4×5.3	11	4×5.3	12	4×5.3	13
10	—	—	—	—	5×5.3	19	5×5.3	21	5×5.3	22
22	4×5.3	20	—	—	5×5.3	28	6.3×5.3	36	6.3×5.3	39
33	5×5.3	29	5×5.3	31	6.3×5.3	40	6.3×5.3	44	8×6.5	60
47	5×5.3	34	6.3×5.3	43	6.3×5.3	47	8×6.5	66	8×10	82
100	6.3×5.3	58	8×6.5	79	8×6.5	87	8×10	112	10×10	139
220	8×6.5	107	8×10	136	8×10	149	10×10	192	—	—
330	8×10	153	8×10	166	10×10	221	—	—	—	—
470	8×10	183	10×10	229	—	—	—	—	—	—

(Note) Rated ripple current : 85℃, 120Hz

NOTE : Design, Specifications are subject to change without notice.
It is recommended that you shall obtain technical specifications from ELNA to ensure that the component is suitable for your use.

Return to Type List

ELNA Miniature Aluminum Electrolytic Capacitors For Audio RF0 series

Code in front of series have been extracted from product code, which describes the segment of products, such as type and features.

- New type miniaturized capacitor for audio, using synthetic mica paper for the separator. (PURECAP™)
- A capacitor utilizing a newly developed material for a high grade of audio reproduction.
- All lead wires are copper plated steel wires.
- Environmental : GREEN CAP™ , RoHS compliance.

New type

RF0 ⇦ RA2

Marking color : Gold print on a black sleeve

Specifications

Item	Performance
Category temperature range (℃)	−40 to +85
Tolerance at rated capacitance (%)	±20 (20℃,120Hz)
Leakage current (μA) (max.)	0.01CV or 3 whichever is larger (after 2 minutes) C : Rated capacitance (μF) ; V : Rated voltage (V) (20℃)
Tangent of loss angle (tanδ)	

Rated voltage (V)	6.3	10	16	25	35	50	63
tanδ (max.)	0.22	0.19	0.16	0.14	0.12	0.10	0.09

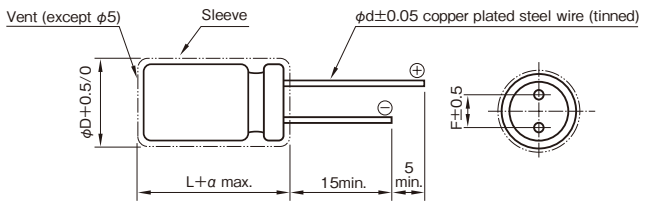
0.02 is added to every 1000μF increase over 1000μF (20℃,120Hz)

Endurance (85℃) (Applied ripple current)	
Test time	1000 hours
Leakage current	The initial specified value or less
Percentage of capacitance change	Within ±20% of initial value
Tangent of the loss angle	200% or less of the initial specified value

Shelf life (85℃)	Test time : 1000hours ; other items are same as the endurance. Voltage application treatment : According to JIS C5101-4 4.1
Applicable standards	JIS C5101 - 1, - 4 (IEC 60384 - 1, - 4)

Outline Drawing

Unit : mm



ϕD	5	6.3	8	10	12.5	16	18
F	2.0	2.5	3.5	5.0	5.0	7.5	7.5
ϕd	0.5	0.5	0.6	0.6	0.6	0.8	0.8
α	1.5			2.0 (16L or less : 1.5)	2.0		

Coefficient of Frequency for Rated Ripple Current

Rated voltage(V)	Frequency(Hz) / CV(μFxWV)	50・60	120	1k	10k	100k
6.3 to 16	All CV value	0.8	1	1.1	1.2	1.2
25 to 35	≤1000	0.8	1	1.5	1.7	1.7
	1000<	0.8	1	1.2	1.3	1.3
50 to 63	≤1000	0.8	1	1.6	1.9	1.9
	1000<	0.8	1	1.2	1.3	1.3

Product code system : 25V100μF (*For general product)

RS*	RF0	101	M	1T	D11	300	PT
Category code	Series code	capacitance code	Cap tol. code	Voltage code	Size code	Lead-forming and packing code	Additional code

・For details, refer to the various "Product Code System" pages.
・Lead-forming and packing code on this page are for lead long and standard packing products.
For standard packing, please refer to the "PACKING" page.

Size code

Case ϕD×L (mm)	Size code	Case ϕD×L (mm)	Size code	Case ϕD×L (mm)	Size code	Case ϕD×L (mm)	Size code
5×11	C11	10×12.5	F12	12.5×20	G20	16×31.5	J31
6.3×11	D11	10×16	F16	12.5×25	G25	18×35.5	K35
8×11.5	E11	10×20	F20	16×25	J25		

Standard Ratings

Rated voltage (V) / Item / Rated capacitance (μF)	6.3 (1J) Case ϕD×L (mm)	6.3 (1J) Rated ripple current (mArms)	10 (1L) Case ϕD×L (mm)	10 (1L) Rated ripple current (mArms)	16 (1E) Case ϕD×L (mm)	16 (1E) Rated ripple current (mArms)	25 (1T) Case ϕD×L (mm)	25 (1T) Rated ripple current (mArms)	35 (1G) Case ϕD×L (mm)	35 (1G) Rated ripple current (mArms)	50 (1U) Case ϕD×L (mm)	50 (1U) Rated ripple current (mArms)	63 (4E) Case ϕD×L (mm)	63 (4E) Rated ripple current (mArms)
1	—	—	—	—	—	—	—	—	—	—	5×11	15	—	—
2.2	—	—	—	—	—	—	—	—	—	—	5×11	20	—	—
3.3	—	—	—	—	—	—	—	—	—	—	5×11	25	—	—
4.7	—	—	—	—	—	—	—	—	5×11	30	5×11	30	5×11	35
10	—	—	—	—	—	—	—	—	5×11	45	5×11	45	5×11	50
22	—	—	—	—	5×11	50	5×11	55	5×11	60	5×11	70	6.3×11	85
33	—	—	5×11	55	5×11	60	5×11	70	5×11	80	6.3×11	100	6.3×11	100
47	—	—	5×11	65	5×11	75	5×11	85	6.3×11	110	6.3×11	120	8×11.5	150
100	5×11	85	5×11	95	6.3×11	120	6.3×11	140	8×11.5	190	8×11.5	210	10×12.5	260
220	6.3×11	150	6.3×11	165	8×11.5	220	8×11.5	250	10×12.5	330	10×16	400	10×20	460
330	6.3×11	180	8×11.5	240	8×11.5	270	10×12.5	370	10×16	450	10×20	540	12.5×20	650
470	8×11.5	260	8×11.5	280	10×12.5	390	10×16	480	10×20	590	12.5×20	740	12.5×25	850
1000	10×12.5	450	10×16	540	10×20	680	12.5×20	880	12.5×25	1050	16×25	1350	16×31.5	1550
2200	12.5×20	890	12.5×20	970	12.5×25	1200	16×25	1550	16×31.5	1750	18×35.5	2100	—	—
3300	12.5×20	1050	12.5×25	1250	16×25	1600	16×31.5	1950	18×35.5	2250	—	—	—	—
4700	16×25	1550	16×25	1650	16×31.5	2050	18×35.5	2500	—	—	—	—	—	—
6800	16×25	1750	16×31.5	2050	18×35.5	2550	—	—	—	—	—	—	—	—
10000	16×31.5	2150	18×35.5	2550	—	—	—	—	—	—	—	—	—	—
15000	18×35.5	2700	—	—	—	—	—	—	—	—	—	—	—	—

(Note) Rated ripple current : 85℃, 120Hz

NOTE : Design, Specifications are subject to change without notice.
It is recommended that you shall obtain technical specifications from ELNA to ensure that the component is suitable for your use.

Return to Type List

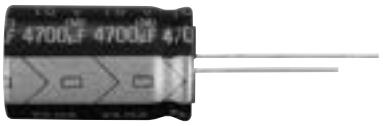
ELNA Miniature Aluminum Electrolytic Capacitors For Audio RW5 series

Code in front of series have been extracted from product code, which describes the segment of products, such as type and features.

- With the same size as that for Series RJ5 miniaturized standard capacitors, a high resolution sound quality grade has been realized.
- Guaranteed 1000 hours at 105℃.
- Environmental：GREEN CAP™ , RoHS compliance.

High temperature

RW5 ⇦ RA3



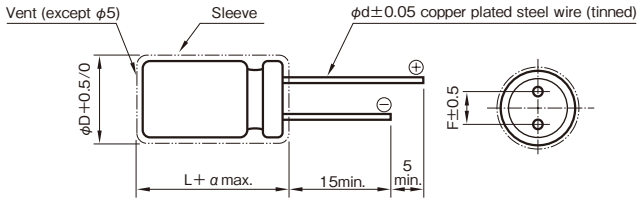
Marking color : Gold print on a black sleeve

Specifications

Item	Performance
Category temperature range (℃)	−55 to +105
Tolerance at rated capacitance (%)	±20 (20℃,120Hz)
Leekage current (μA) (max.)	0.03CV or 4 whichever is larger (after 1 minutes) C : Rated capacitance (μF) , V : Rated voltage (V) (20℃)
Tangent of loss angle (tanδ)	Rated voltage (V): 16 / 25 tanδ (max.): 0.24 / 0.20 0.02CV is added to every 1000μF increase over 1000μF (20℃,120Hz)
Characteristics at high and low temperature	Rated voltage (V): 16 / 25 Impedance ratio (max.) Z−25℃/Z+20℃: 3 / 2 Impedance ratio (max.) Z−40℃/Z+20℃: 6 / 4 (120Hz)
Endurance (105℃) (Applied ripple current)	Test time: 1000 hours Leakage current: The initial specified value or less Percentage of capacitance change: Within ±20% of initial value Tangent of the loss angle: 200% or less of the initial specified value
Shelf life (105℃)	Test time : 1000hours ; other items are same as the endurance. Voltage application treatment : According to JIS C5101-4 4.1
Applicable standerds	JIS C5101 - 1, - 4 (IEC 60384 - 1, - 4)

Outline Drawing

Unit : mm



φD	5	6.3	8	10	12.5	16	18
F	2.0	2.5	3.5	5.0	5.0	7.5	7.5
φd	0.5	0.5	0.6	0.6	0.6	0.8	0.8
α	1.0	1.0	1.0	2.0	2.0	2.0	2.0

Coefficient of Frequency for Rated Ripple Current

Rated Capacitance (μF) \ Frequency (Hz)	50・60	120	1k	10k	100k
100 to 220	0.8	1	1.2	1.3	1.4
330 to 1000	0.8	1	1.2	1.2	1.3
2200 to 15000	0.8	1	1.1	1.1	1.1

Product code system : 16V3300μF (*For general product)

RS*	RW5	332	M	1E	G25	300	T
Category code	Series code	capacitance code	Cap tol. code	Voltage code	Size code	Lead-forming and packing code	Additional code

・For details, refer to the various "Product Code System" pages.
・Lead-forming and packing code on this page are for lead long and standard packing products.
For standard packing, please refer to the "PACKING" page.

Standard Ratings

Rated voltage (V) / Item / Rated capacitance (μF)	16 (1E) Case φD×L (mm)	16 (1E) Size code	16 (1E) Rated ripple current (mArms)	25 (1T) Case φD×L (mm)	25 (1T) Size code	25 (1T) Rated ripple current (mArms)
100	—	—	—	5×11.5	C11	125
220	6.3×11.5	D11	190	6.3×11.5	D11	200
330	6.3×11.5	D11	225	8×12	E12	310
470	8×12	E12	323	10×12.5	F12	429
1000	10×12.5	F12	500	10×16	F16	610
2200	10×20	F20	710	12.5×25	G25	1180
				16×20	J20	1230
				18×16	K16	1200
3300	12.5×25	G25	1200	16×25	J25	1440
	16×20	J20	1250	18×20	K20	1400
4700	16×25	J25	1500	16×25	J25	1570
	18×20	K20	1460	18×20	K20	1530
6800	16×25	J25	1600	16×35.5	J35	1850
	18×20	K20	1560	18×31.5	K31	1870
10000	16×35.5	J35	1930	18×40	K40	2000
15000	18×40	K40	2210	—	—	—

(Note) Rated ripple current : 105℃, 120Hz

NOTE : Design, Specifications are subject to change without notice.
It is recommended that you shall obtain technical specifications from ELNA to ensure that the component is suitable for your use.

1 General Description of Aluminum Electrolytic Capacitors

1-1 The Principle of Capacitor

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

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

$Q = C \cdot V$

Q : Quantity of electricity (C)

V : Voltage (V)

C : Capacitance (F)

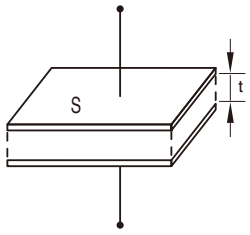


Fig.1-1

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

$$C[F] = \varepsilon 0 \cdot \varepsilon \cdot \frac{S}{t}$$

$\varepsilon 0$: Dielectric constant in vacuum ($=8.85\times10^{-12}$F/m)

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

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

Table 1

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

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

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

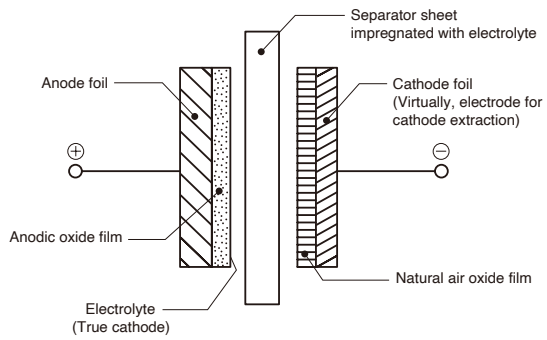
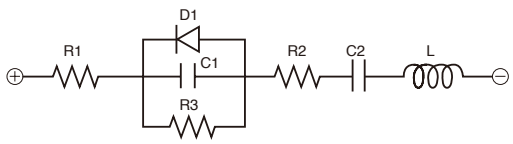


Fig.1-2

1-2 Equivalent Circuit of the Capacitor

The electrical equivalent circuit of the aluminum electrolytic capacitor is as presented in the following figure.



R1 : Resistance of terminal and electrode

R2 : Resistances of anodic oxide film and electrolyte

R3 : Insulation resistance because of defective anodic oxide film

D1 : Oxide semiconductor of anode foil

C1 : Capacity of anode foil

C2 : Capacity of cathode foil

L : Inductance caused by terminals, electrodes, etc.

2 About the Life of an Aluminum Electrolytic Capacitor

2-1 Concept of Life Estimation

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

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

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

Where L : Life at temperature T

L_0 : Life at temperature T_0

NOTE : Design, Specifications are subject to change without notice.
It is recommended that you shall obtain technical specifications from ELNA to ensure that the component is suitable for your use.

2-1-2 Estimation of life considering the ripple current.

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

$$P = I^2R \quad \text{.....(2)}$$

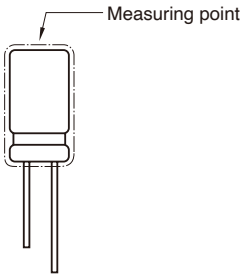
Where I : Ripple current (Arms)
R : ESR (Ω)

With increase in the temperature of the capacitor:

$$\Delta T = \frac{I^2 \times R}{A \times H} \quad \text{.....(3)}$$

Where ΔT : Temperature increase in the capacitor core(deg.)
I : Ripple current (Arms)
R : ESR (Ω)
A : Surface area of the capacitor (cm^2)
H : Radiation coefficient (Approx. 1.5 to 2.0 $\times 10^{-3} W/cm^2 \times ℃$)

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



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

Table 2-1

Case diameter	to 10	12.5 to 16	18
Core / Surface	1.1	1.2	1.25

①The life estimation formula that considers ambient temperature and temperature rise due to ripple is derived as follows by modifying formula (1).

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

Where L_d : Life at DC operation (h) at Upper category temperature
K : Ripple acceleration factor (K=2, within allowable ripple current)
T_0 : Upper category temperature (℃)
T : Operating temperature (℃)
ΔT : Temperature increase at capacitor core (deg.)

②The life estimation formula based on Guaranteed life (when rated ripple current is superimposed at upper category temperature) is derived as follows by modifying formula (4).

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

Where L_r : Guaranteed life (Life at the upper category temperature with the rated ripple current [h])
ΔT_0 : Temperature increase at capacitor core, at the upper category temperature (deg.)

③Life estimation formula considering ambient temperature and ripple current is derived as follows by using equation (3) to transform equation (5) into equations for I, I_0, ΔT_0.

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

Where I_0 : Rated ripple current at the upper category temperature (Arms)
I : Applied ripple current (Arms)

Use below ΔT_0 value at each category highest temperature when calculating life expectancy using equation (5) or (6).

Aluminum Electrolytic Capacitors	85	: 10deg
	105 to 135	: 5deg
	150	: 3deg
Polymer hybrid type aluminum Electrolytic Capacitors	105	: 15deg
	125	: 10deg
	135	: 10deg
	150	: 5deg

The life expectancy formula shall in principle be applied to the temperature range between the ambient temperature of +40℃ and upper category temperature. (Temperature conditions below +40℃ are uniformly treated as +40°C.)
The expected life time shall be about fifteen years at maximum as a guide in terms of deterioration of the sealant. Also, please note that the calculation results calculated by the above formulas (4), (5), and (6) are not guaranteed values.

2-2 Practical Examples of Life Expectancy

By using the life estimation formula (6), the capacitor's guaranteed time L_r (category upper limit temperature T_0, rated ripple current I_0) can be converted to operating time L under actual usage conditions (temperature T, ripple current I).

When considering whether a certain capacitor can be applied to a mission profile (a combination of multiple conditions of temperature, current, and operating time) that assumes actual use, calculate L for each profile condition using formula (6), and it can be assumed that the capacitor is applicable for profile conditions if the ratio of the total value of actual operating time L_c to the total value of L (life consumption rate L_{et}) is within 100%.

(Since the calculation result is not a guaranteed value, please make a decision after thorough testing regarding profile application.)

[Calculation example]
Calculate whether the RKC series 80V1600µF (Data A) is applicable to the mission profile (Data B).

Data A (Basic sample data)

Item	: 80V 1600µF φ18 x 40L RKC series
T_0	= 135°C
ΔT_0	= 5deg
I_0	= 3.82Arms at 135°C, 100kHz
L_r (Guarantee time)	= 2000hours at 135°C

Data B (Mission profile)

	T (Ambient temperature)	I (Ripple current at 100kHz)	L_c (Operating time)
Condition1	80°C	2.00Arms	5000h
Condition2	120°C	3.00Arms	3000h
Condition3	40°C	0.00Arms	123400h

[Condition1]
Calculate L_1 (80°C, 2.00Arms) by using
T_0=135°C, I_0=3.82Arms, L_r=2000h, ΔT_0=5degC

$$L_1 = 2000\times\left[2^{|(135-80)/10|}\times 2^{|1-(2.00/3.82)^2|\times(5/10)}\right] = 116400[h]$$

Life consumption rate L_{et1} of actual operating time L_{c1} (=5000h) against L_1 is calculated as,

$$L_{et1} = 100\times(L_{c1}/L_1) = 100\times(5000/116400) = 4.30[\%]$$

[Condition2]
Calculate L_2 (120°C, 3.00Arms) by using
T_0=135°C, I_0=3.82Arms, L_r=2000h, ΔT_0=5degC

$$L_2 = 2000\times\left[2^{|(135-120)/10|}\times 2^{|1-(3.00/3.82)^2|\times(5/10)}\right] = 6461[h]$$

Life consumption rate L_{et2} of actual operating time L_{c2} (=3000h) against L_2 is calculated as,

$$L_{et2} = 100\times(L_{c2}/L_2) = 100\times(3000/6461) = 46.4[\%]$$

[Condition3]
Calculate L_3 (40°C, 0.00Arms) by using
T_0=135°C, I_0=3.82Arms, L_r=2000h, ΔT_0=5degC

$$L_3 = 2000\times\left[2^{|(135-40)/10|}\times 2^{|1-(0.00/3.82)^2|\times(5/10)}\right] = 2048000[h]$$

Life consumption rate L_{et3} of actual operating time L_{c3} (=123400h) against L_3 is calculated as,

$$L_{et3} = 100\times(L_{c3}/L_3) = 100\times(123400/2048000) = 6.03[\%]$$

Therefore, the total value L_{et_all} of the life consumption rate of each profile is calculated as follows.

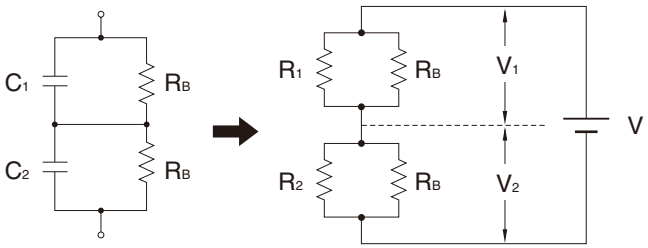
$$L_{et\_all} = L_{et1}+L_{et2}+L_{et3} = 4.30[\%]+46.4[\%]+6.03[\%] = 56.8[\%]$$

Therefore, since it is less than 100%, RKC series 80V1600µF is presumed to be applicable to this profile.

3 To calculate Balance when connecting in series

3-1 Circuit layout

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



Following are the preconditions of the circuit.

① V_2 shall be the rated voltage ($=V_0$). ($V_1<V_2$)

② V shall be a times $V_0\times2$. $V=2aV_0$ ($a<1$)

③ R_2 shall equal $R_1\times b$. ($b<1$) (1)

3-2 Formulas to calculate [R_B]

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

$$V_1\left[\frac{1}{R_1}+\frac{1}{R_B}\right]=V_2\left[\frac{1}{R_2}+\frac{1}{R_B}\right] \qquad (2)$$

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

$$V_2 \leqq V_0 \qquad (3)$$

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

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

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

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

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

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

Accordingly, balance resistance R shall be the following formula.

$$\boxed{R_B\leqq 2bR_1\frac{(1-a)}{(2a-1)\times b-1}} \qquad (5)$$

3-3 Calculation Example

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

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

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

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

Balance resistance R_B will be.

$$R_B\leqq 2\times2\times213(k\Omega)\frac{(1-0.8)}{(2\times0.8)\times2-1}=852(k\Omega)$$

4 Regarding Recovery Voltage

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

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

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

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

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

5 Electrode Foil Development Technology

5-1 Corrosion inhibition of cathode foil

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

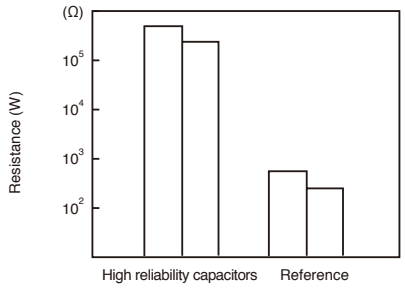


Fig. 3-1

5-2 Sealing material permeability of electrolyte

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

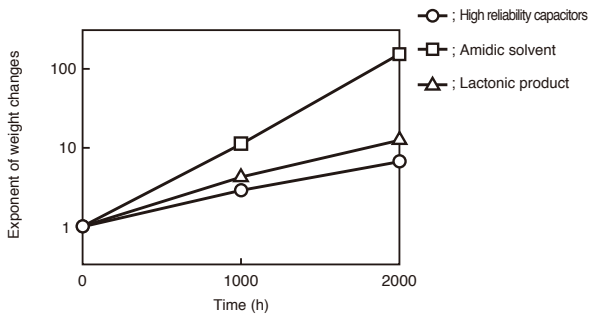


Fig. 3-2

5-3 Airtightness of sealing material

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

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

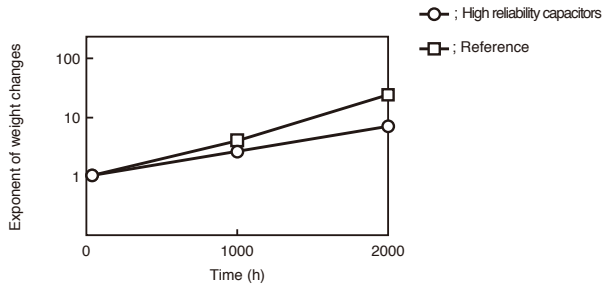


Fig. 3-3

5-4 Long-time stability of electrolyte

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

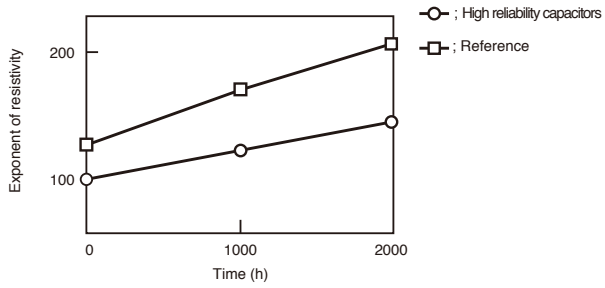


Fig. 3-4

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

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

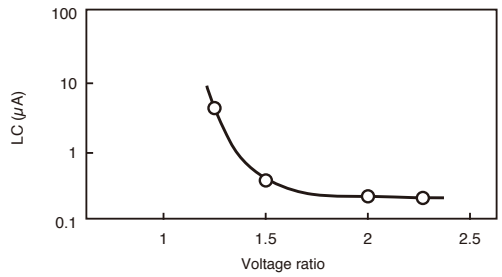


Fig. 3-5

5-6 Lowered ESR of Electrode Foil

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

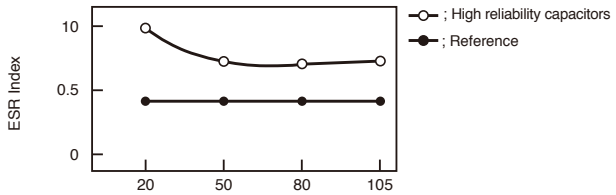


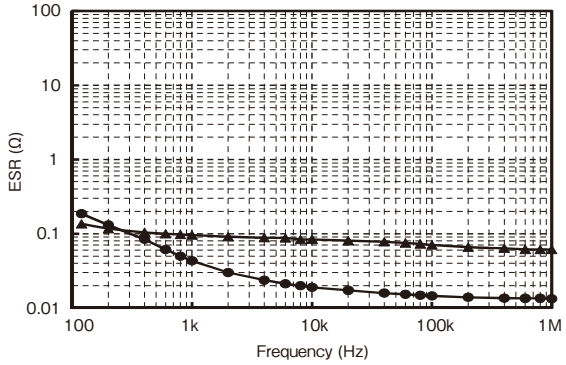
Fig. 3-6 ESR Index of Anode Foil

Electric Characteristics Data

1.CONDUCTIVE POLYMER HYBRID ALUMINUM ELECTROLYTIC CAPACITORS

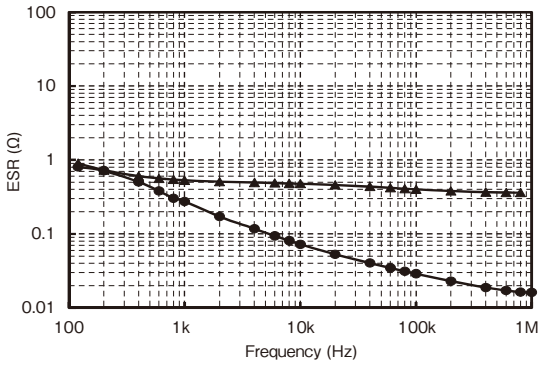
Series HV1 (guaranteed 105°C) Frequency characteristics at 20°C

	Series	Ratings	Case size
●—	HV1	25V330μF	φ10×10 L
▲—	VVD	25V470μF	φ10×10 L



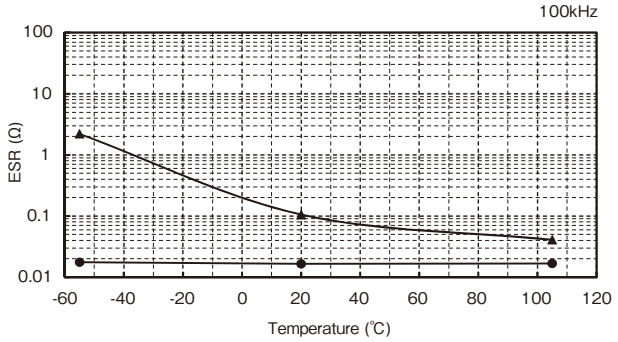
Series HVK (guaranteed 125°C) Frequency characteristics at 20°C

	Series	Ratings	Case size
●—	HVK	25V100μF	φ6.3×7.7 L
▲—	VVT	25V100μF	φ6.3×7.7 L



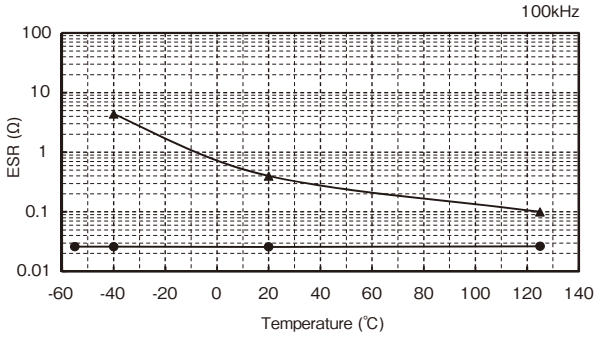
Temperature Characteristics

	Series	Ratings	Case size
●—	HV1	25V330μF	φ10×10 L
▲—	VVD	25V470μF	φ10×10 L



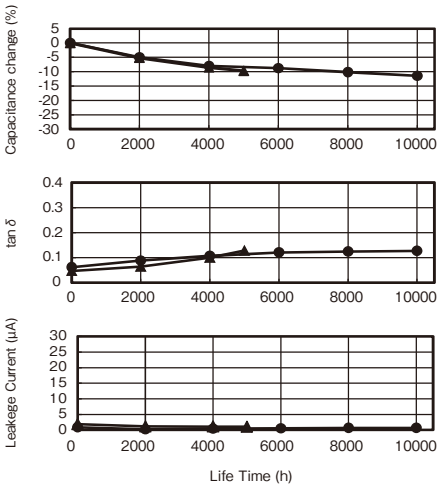
Temperature Characteristics

	Series	Ratings	Case size
●—	HVK	25V100μF	φ6.3×7.7 L
▲—	VVT	25V100μF	φ6.3×7.7 L



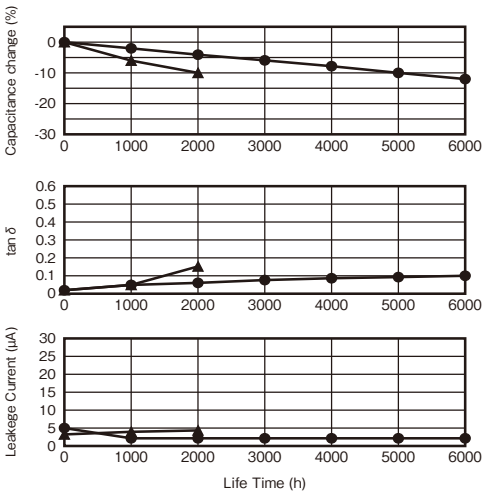
Endurance (Applied ripple current) at 105°C

	Series	Ratings	Case size	Rated ripple current (100kHz)
●—	HV1	25V220μF	φ8×10 L	2300mArms
▲—	VVD	25V220μF	φ8×10 L	600mArms



Endurance (Applied ripple current) at 125°C

	Series	Ratings	Case size	Rated ripple current (100kHz)
●—	HVK	35V270μF	φ10×10 L	2000mArms
▲—	VVT	35V220μF	φ10×10 L	500mArms



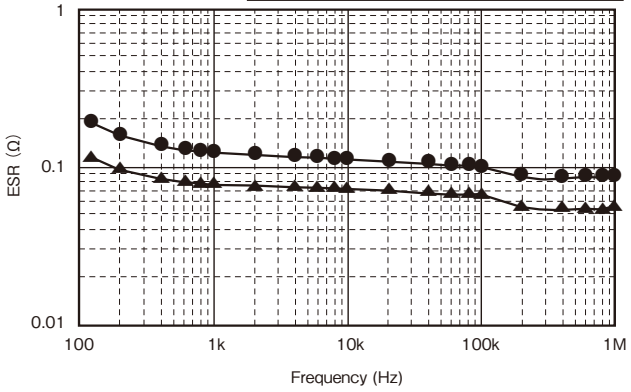
Notice : The measurement values are not guaranteed values, but measurements.

NOTE : Design, Specifications are subject to change without notice.
It is recommended that you shall obtain technical specifications from ELNA to ensure that the component is suitable for your use.

2.CHIP TYPE ALUMINUM ELECTROLYTIC CAPACITORS

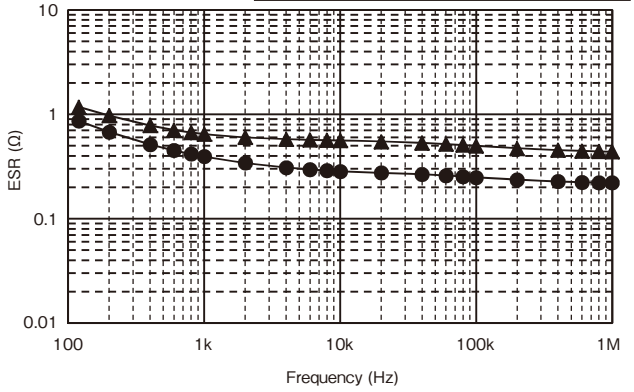
Series VZD (guaranteed 105°C)
Frequency characteristics at 20°C

	Series	Ratings	Case size
●—	VVD	35V330μF	φ10×10 L
▲—	VZD	35V560μF	φ10×10 L



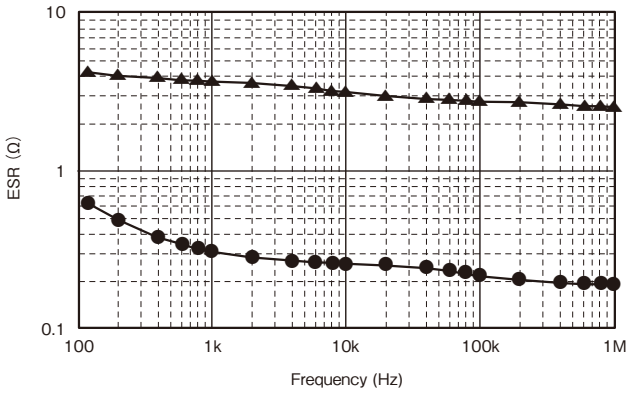
Series VZF (guaranteed 125°C)
Frequency characteristics at 20°C

	Series	Ratings	Case size
●—	VZF	35V100μF	φ6.3×7.7 L
▲—	VVT	35V47μF	φ6.3×7.7 L



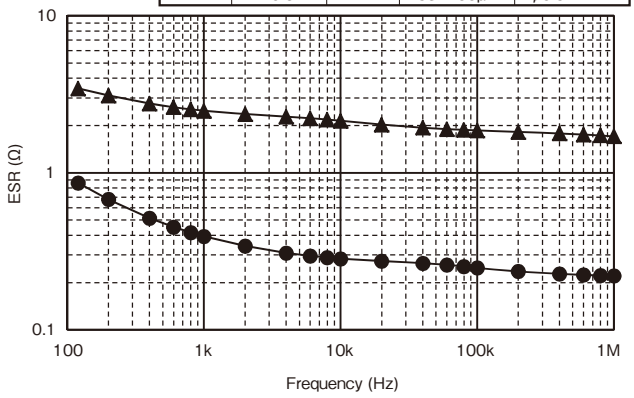
Temperature Characteristics (20°C, −40°C)

	Temperature	Series	Ratings	Case size
●—	20℃	VZD	35V100μF	φ6.3×5.8 L
▲—	−40℃	VZD	35V100μF	φ6.3×5.8 L



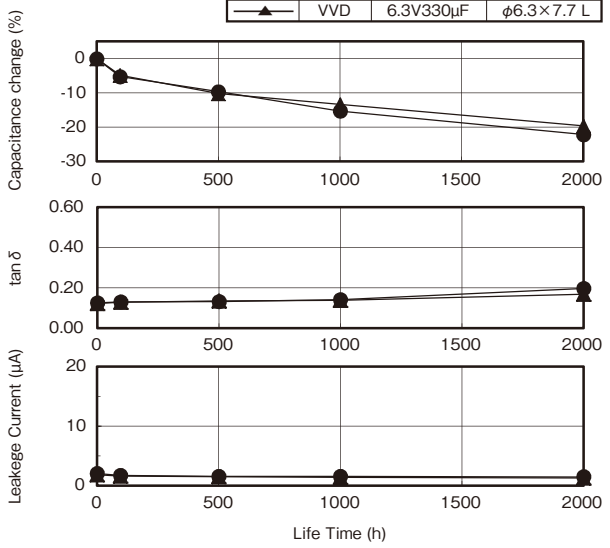
Temperature Characteristics (20°C, −40°C)

	Temperature	Series	Ratings	Case size
●—	20℃	VZF	35V100μF	φ6.3×7.7 L
▲—	−40℃	VZF	35V100μF	φ6.3×7.7 L



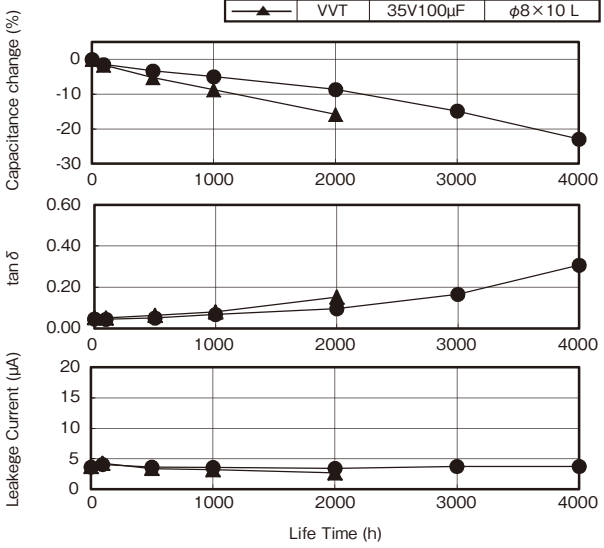
Endurance at 105°C

	Series	Ratings	Case size
●—	VZD	6.3V680μF	φ6.3×7.7 L
▲—	VVD	6.3V330μF	φ6.3×7.7 L



Endurance at 125°C

	Series	Ratings	Case size
●—	VZF	35V220μF	φ8×10 L
▲—	VVT	35V100μF	φ8×10 L



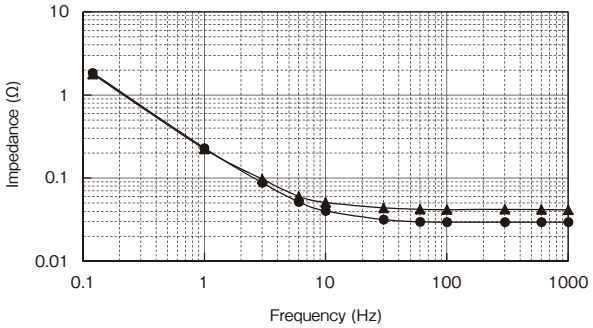
Notice : The measurement values are not guaranteed values, but measurements.

NOTE : Design, Specifications are subject to change without notice.
It is recommended that you shall obtain technical specifications
from ELNA to ensure that the component is suitable for your use.

3.MINIATURE ALUMINUM ELECTROLYTIC CAPACITORS (1)

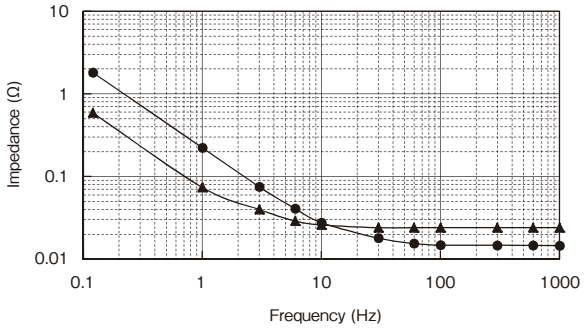
Series RJD (guaranteed 105°C)
Frequency characteristics at 20°C

	Series	Ratings	Case size
●—	RJD	35V1000μF	φ12.5×20 L
▲—	RJB	35V680μF	φ12.5×20 L



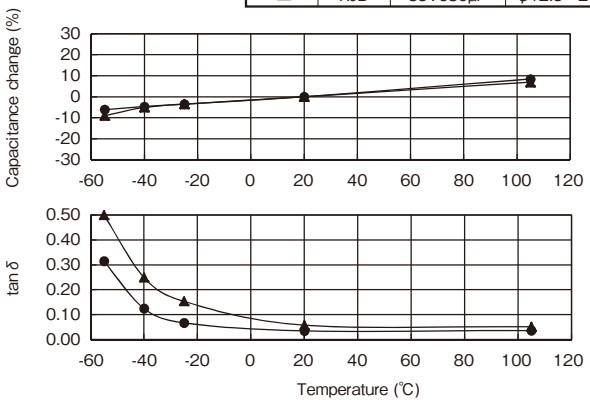
Series RJM (guaranteed 105°C)
Frequency characteristics at 20°C

	Series	Ratings	Case size
●—	RJM	35V1000μF	φ12.5×20 L
▲—	RJL	35V1000μF	φ12.5×25 L



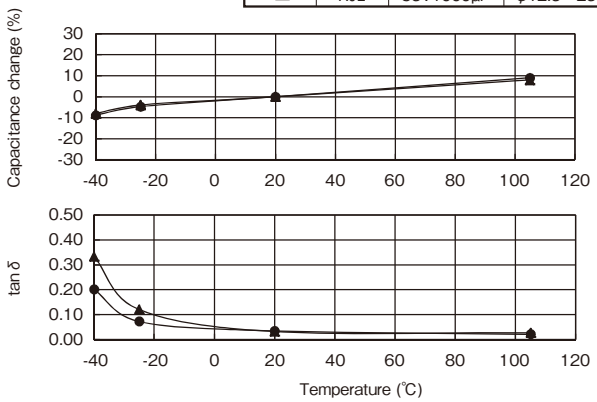
Temperature Characteristics

	Series	Ratings	Case size
●—	RJD	35V1000μF	φ12.5×20 L
▲—	RJB	35V680μF	φ12.5×20 L



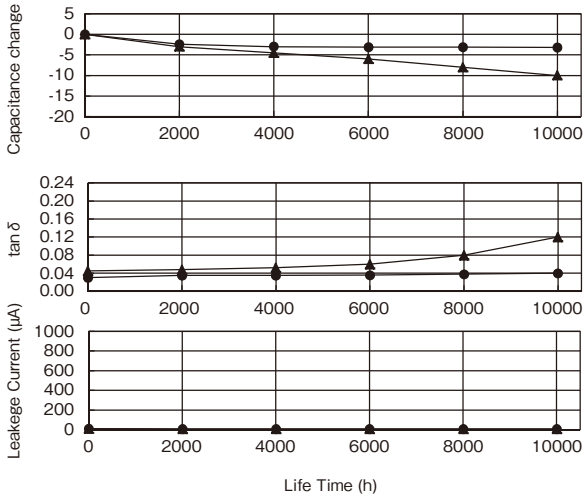
Temperature Characteristics

	Series	Ratings	Case size
●—	RJM	35V1000μF	φ12.5×20 L
▲—	RJL	35V1000μF	φ12.5×25 L



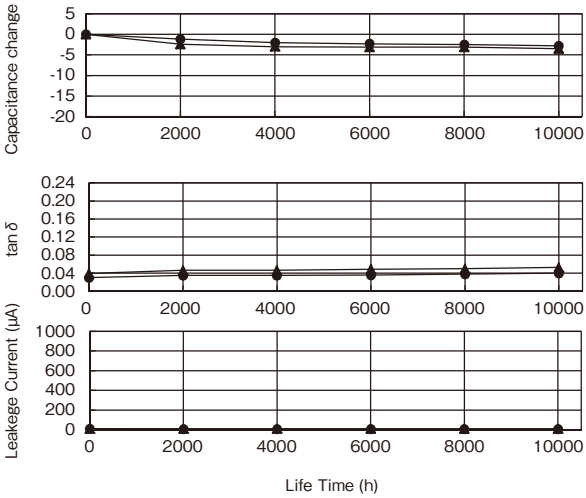
Endurance (Applied ripple current) at 105°C

	Series	Ratings	Case size	Rated ripple current (100kHz)
●—	RJD	35V1000μF	φ12.5×20 L	1700mArms
▲—	RJB	35V680μF	φ12.5×20 L	1690mArms



Endurance (Applied ripple current) at 105°C

	Series	Ratings	Case size	Rated ripple current (100kHz)
●—	RJM	35V1000μF	φ12.5×20 L	2600mArms
▲—	RJL	35V1000μF	φ12.5×25 L	2230mArms



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

NOTE : Design, Specifications are subject to change without notice.
It is recommended that you shall obtain technical specifications
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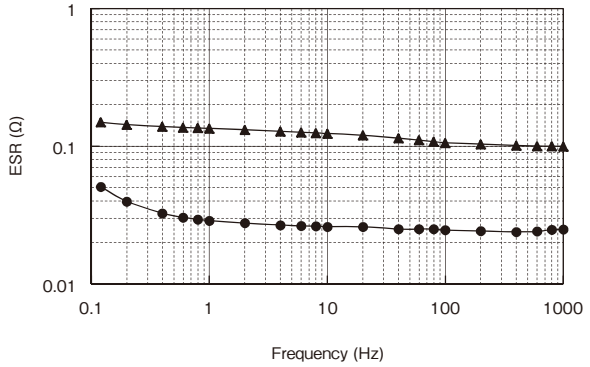
4.MINIATURE ALUMINUM ELECTROLYTIC CAPACITORS (2)

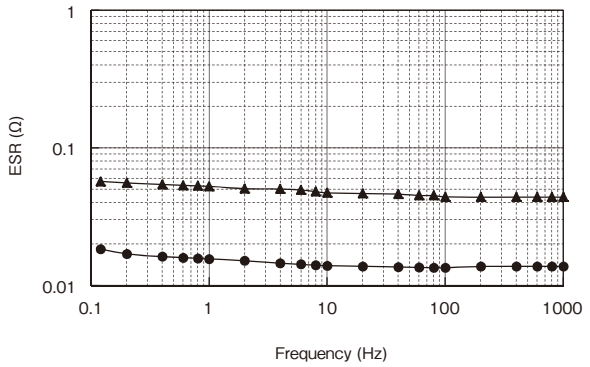
Series RKD (guaranteed 125°C)
Frequency characteristics at 20°C

	Temperature	Series	Ratings	Case size
●—	20℃	RKD	35V1000μF	φ12.5×25 L
▲—	−40℃	RKD	35V1000μF	φ12.5×25 L



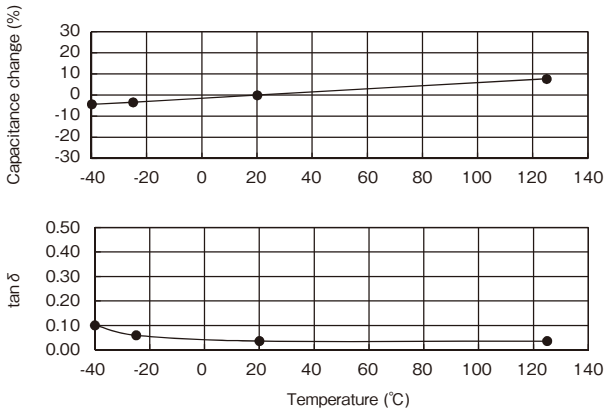
Series RKC (guaranteed 135°C)
Frequency characteristics at 20°C

	Temperature	Series	Ratings	Case size
●—	20℃	RKC	35V6200μF	φ18×35.5 L
▲—	−40℃	RKC	35V6200μF	φ18×35.5 L



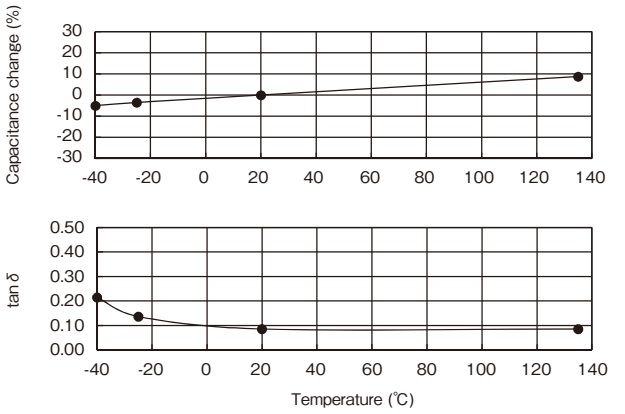
Temperature Characteristics

	Series	Ratings	Case size
●—	RKD	35V1000μF	φ12.5×25 L



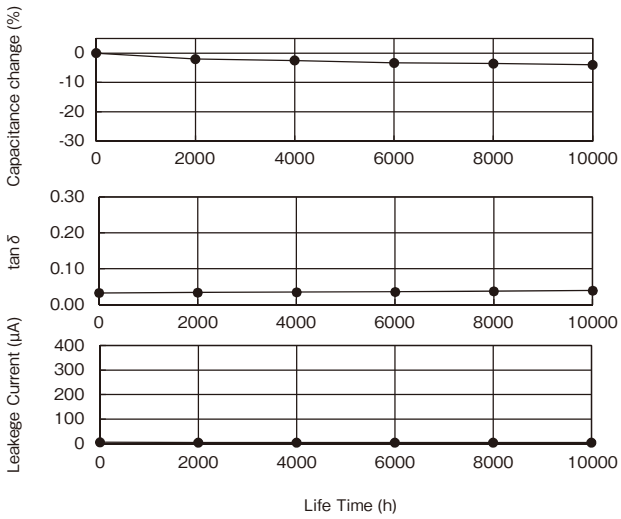
Temperature Characteristics

	Series	Ratings	Case size
●—	RKC	35V6200μF	φ18×35.5 L



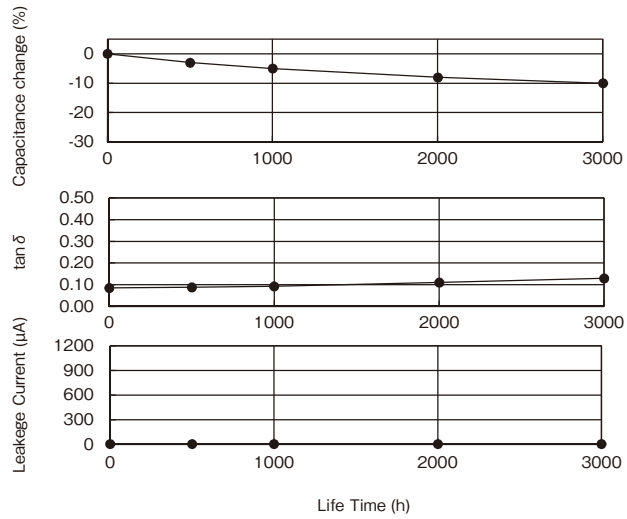
Endurance (Applied ripple current) at 125°C

	Series	Ratings	Case size	Rated ripple current (100kHz)
●—	RKD	35V1000μF	φ12.5×25 L	2400mArms



Endurance (Applied ripple current) at 135°C

	Series	Ratings	Case size	Rated ripple current (100kHz)
●—	RKC	35V6200μF	φ18×35.5 L	3750mArms



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

NOTE : Design, Specifications are subject to change without notice.
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Electric Double Layer capacitors “DYNACAP™”

CAT.No.2023/2024E

■ Product Code System

EDLC

The Elna product code is Max.20 digits.

Example) CHC series 5.5V 0.1F φ 13.5x9.5L

New product code
RSCHC1045R5G09014T

Old product code
DHC-5R5D104T

1 2	3 4 5	6 7 8	9 10 11	12	13 14	15 16 17	18 19 20
R S	C H C	1 0 4	5 R 5	G	0 9	0 1 4	T
Product category code	Series code	Rated capacitance code	Max. operating voltage code	Case size code		Lead forming and Packing code	Additional code

1 Product group
R : Energy devices
(Electrolytic double layer capacitor)

2 Category
S : For general
A : For automotive (powertrain, safety)
C : For automotive (entertainment, audio)
M : For medical
(international classification Ⅲ)
L : For medical
(international classification Ⅰ , Ⅱ)

3-5 Series code
Coin type

old code	New code
DVN	CVN
DVL	CVL
DVS	CVS
DB	CB1
DBN	CBN
DBJ	CBJ
DBS	CBS
DX	CX1
DXN	CXN
DXJ	CXJ
DXS	CXS
DH	CH1
DHL	CHL
DHC	CHC
DS	CS1
DSK	CSK

Cylindrical type
Lead type

old code	New code
DZ	DZ1
DZH	DZH
DZN	DZN
DDU	DDU

6-8 Rated capacitance code
The code denoting nominal capacitance shall consist of three numerals.
The first and second numerals shall represent the significant figures of nominal capacitance in the unit of microfarad (μF), And the third numeral shall represent the number of zeros following the significant figures.
Example

Rated capacitance (F)	Code
0.047	473
0.1	104
0.2	204
0.22	224
0.33	334
0.47	474
0.68	684
1	105
1.5	155
2.7	275
3.3	335
4.7	475
5.6	565
6.8	685
10	106
15	156
22	226
25	256
33	336
40	406
50	506

9-11 Max. operating voltage code

voltage (V)	Code
2.5	2R5
2.7	2R7
3.0	3R0
3.3	3R3
3.6	3R6
5.0	5R0
5.5	5R5

12 Diameter code

D(mm)	Code
6.3	D
6.8	D
8	E
10	F
11.5	F
12.5	G
13.5	G
16	J
18	K
19	K
21.5	L

13-14 Length code

L(mm)	Code
1.4	01
2.1	02
5	05
7.5	07
8	08
8.5	08
9.5	09
10.5	10
12	12
13	13
14	14
20	20
20.5	20
25	25
30	30
31.5	31
35	35
35.5	35
40	40

15-17 Lead forming and Packing code
The code below is for standard terminal (long lead) and standard packing.
Coin type

Standard packing			
Series code	Case size	Code	packing
CV □	φ 12.5	012	Taping
CX □	φ 11.5	013	Plastic bag
CB □ CH □	φ 13.5	014	Plastic bag
	φ 21.5	015	Small box
CS □	φ 6.8x1.4L	004	Taping
	φ 6.8x2.1L	008	Taping

Cylindrical cell lead type

Standard packing code	
Long lead	300

Please contact us for lead forming, cutting, taping and special packaging.

18-20 Additional code
Example

Code	Contents
T	Sn 100% plated
U	Sn 100% plated or Sn+Cu plated

Please contact us for details.

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■ Type List for DYNACAP™

Category		Series	Category temp. range ℃ Max.	Category temp. range ℃ Min.	Max.operating voltage V.DC	Capacitance range F	Color of sleeve	Applications	Remarks
For power	Standard type	DZ1	+70	−25	2.5 / 2.7	1 to 40	Black	Ideal for power supplies of LED displays, personal wireless items, backup for power supplies, and the storage battery of solar battery.	
	Large capacitance type	DZH	+60	−25	2.5	22 to 50	Black		
	High power type	DZN	+70	−25	2.5 / 2.7	1 to 40	Blue	Ideal for actuator of moters and electromagnetic coil drives.	
	High power Low temperature type	DDU	+70	−40	2.7	3.3 to 50	Brown	Ideal for actuator of moters and electromagnetic coil drives.	

■ NRND Poduct List

Not recommended for new design. (There are not substitute series.)

Category		Series	Category temp. range ℃ Max.	Category temp. range ℃ Min.	Max.operating voltage V.DC	Capacitance range F	Color of sleeve	Applications
For memory backup	Reflow soldering type	CVN	+70	−25	5.5	0.047 to 0.33	Brown	Ideal for industrial, smart meter, backing up of RTC's for surveillance camera, momentary power assistance of a battery etc.
	Reflow soldering type	CVL	+85	−40	5.5	0.047 to 0.22	Brown	
	Reflow soldering type	CVS	+85	−25	3.6	0.047 to 0.33	Brown	
	Standard type	CB1	+70	−25	5.5	0.047 to 1.5	Indigo	Ideal for backing up of CMOS's, IC's of camera, microcomputers, RAM's, RTC's and the like used in audio, general electronic device, and others.
	Low profile Low ESR type	CBN	+70	−25	5.5	0.047 to 1.5	Indigo	
	Low profile High temperature type	CBJ	+85	−10	5.5	0.047 to 1	Black	
	Low profile Low ESR High temperature	CBS	+85	−25	3.6	0.047 to 1	Black	Ideal for backing up of CMOS's, IC's of camera, microcomputers, RAM's, RTC's and the like used in audio, smart meter, general electronic device, and others.
	Miniaturized Standard type	CX1	+70	−25	5.5	0.047 to 0.47	Indigo	Ideal for backing up of CMOS's, IC's of camera, microcomputers, RAM's, RTC's and the like used in audio, general electronic device, and others.
	Miniaturized Low ESR type	CXN	+70	−25	5.5	0.047 to 0.47	Indigo	
	Miniaturized High temperature type	CXJ	+85	−10	5.5	0.047 to 0.33	Black	
	Miniaturized Low ESR High temperature type	CXS	+85	−25	3.6	0.047 to 0.47	Black	
	High temperature type	CH1	+85	−25	5.5	0.047 to 1	Indigo	Ideal for backing up of RTC's for smart meter, outdoor equipment, industrial, momentary power assistance of a battery, automotive etc.
	Wide temperature range type	CHL	+85	−40	5.5	0.047 to 1	Indigo	Ideal for backing up of CMOS IC's, microcomputers, RAM's, RTC's for smart meter, outdoor equipment, auto motive and industrial.
	High temperature long life type	CHC	+85	−25	5.5	0.047 to 1	Black	
	Reflow soldering Coin type	CS1 (614)	+70	−25	2.5	0.2	Silver	Mountable on board with best suited for mainly memory and time functions as well as memory backup for PDA and DSC.
		CSK (614)	+60	−10	3.3	0.2		
		CS1 (621)	+70	−25	2.5	0.33		
		CSK (621)	+60	−10	3.3	0.33		

● **Some of the series listed in the below table have been removed from the catalogue (discontinued series). Please select from the new series for a designing your (new) application.**

Category		Series	Category temp. range ℃ Max.	Category temp. range ℃ Min.	Max.operating voltage V.DC	Capacitance range F	Color of sleeve	Applications	Substitute series to recommend
For memory backup	Coin type	CC1 (614)	+70	−25	2.5	0.2	Silver	Ideal for backing up of pager, solar watches, solar calculators, solar remote control units, camaras and the like.	—
		CCK (614)	+60	−10	3.3	0.2 to 0.22			—
		CC1 (621)	+70	−25	2.5	0.22 to 0.33			—
		CCK (621)	+60	−10	3.3	0.22 to 0.4			—
	Reflow soldering Coin type	CSK (414)	+70	−10	3.3	0.07 to 0.08		Mountable on board with best suited for mainly memory and time functions as well as memory backup for PDA and DSC.	—
For power	High power Low temperature type	DU1	+65	−40	2.7	1 to 50	Brown	Ideal for actuator of moters and electromagnetic coil drives.	DDU
	High power High voltage tolerance Low temperature type	DUK	+65	−40	3.0	1 to 15		Ideal for actuator of moters and electromagnetic coil drives.	—

NOTE : Design, Specifications are subject to change without notice.
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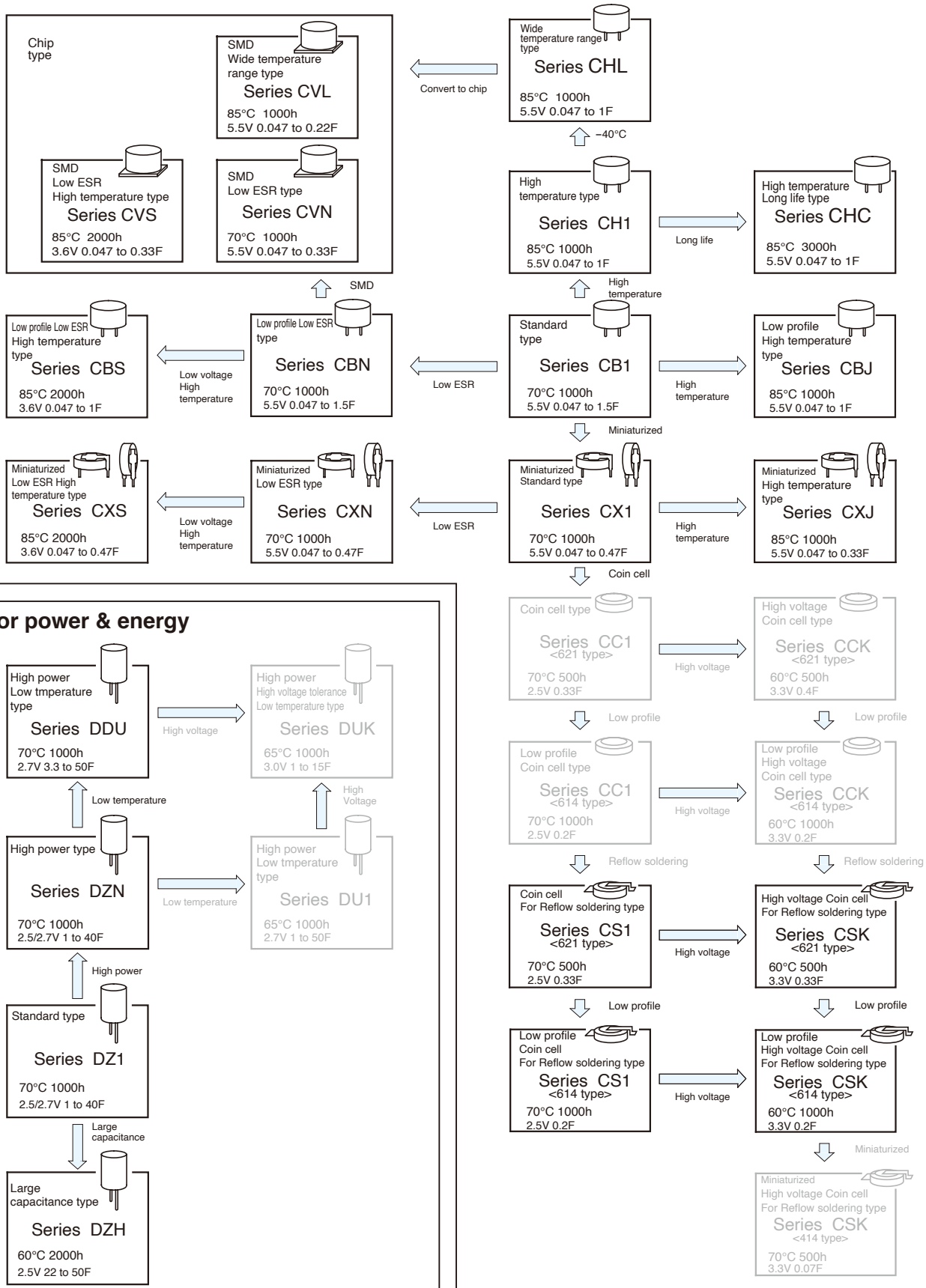
■ Systematized Classification of Electric Double Layer Capacitors

DYNACAP™ "POWERCAP™"

For memory backup



For power & energy

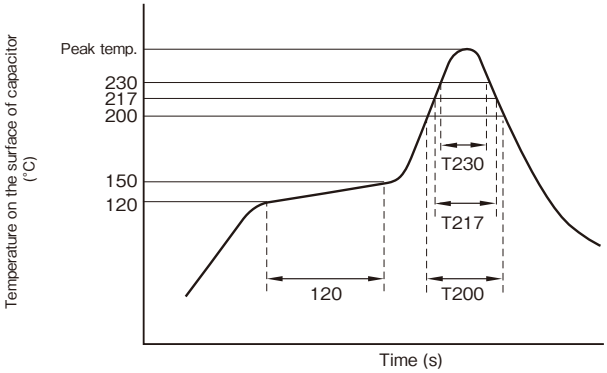
NOTE : Design, Specifications are subject to change without notice.
It is recommended that you shall obtain technical specifications from ELNA to ensure that the component is suitable for your use.

■ Recommended soldering conditions (Lead Free)

● Series CS1, CSK, CVN, CVL, CVS

Reflow soldering conditions.

Profile



1. Preheating shall be under 150℃ within 120 seconds.
2. Peak temperature shall be within the following table.
3. For conditions exceeding the tolerances, consult with us.

T200 : Duration while capacitor head temperature exceeds 200℃ (s).
T217 : Duration while capacitor head temperature exceeds 217℃ (s).
T230 : Duration while capacitor head temperature exceeds 230℃ (s).
The measurement temperature point is the case top.

Series	Size	Peak temp. (5sec or less)	T230	T217	T200	Reflow cycle
CS1 CSK	φ6.8	250℃ Max.	20sec. max.	30sec. max.	40sec. max.	2 times or less
CVN CVL CVS	φ12.5	260℃ Max.	20sec. max.	30sec. max.	50sec. max.	2 times or less

Attention : Carry out soldering work at low temperature and in the shortest time within above conditions.
Do NOT reflow solder, when cell voltage is above 0.5V.
＊Please consult with us about reflow soldering conditions other than the above.

■ Recommended soldering conditions (Lead free)

● Electric Double Layer capacitors

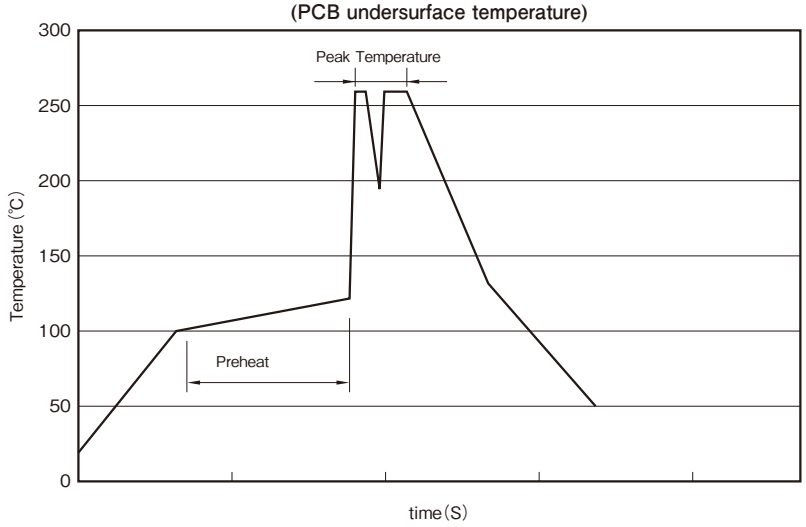
(1) Soldering iron conditions

Iron tip temperature should be 400°C±5°C within the duration of 4 secons.

(2) Flow soldering conditions

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

Recommended flow soldering profile
(PCB undersurface temperature)

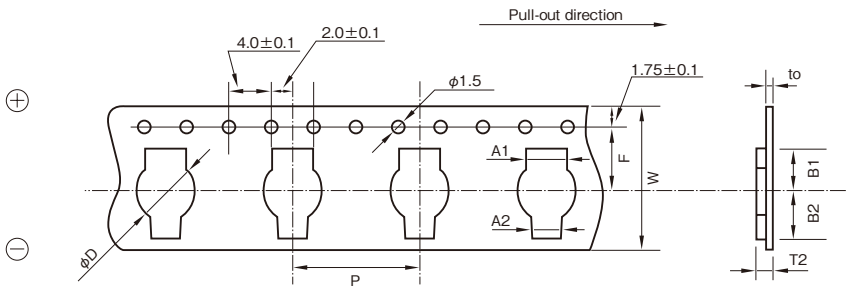


Type	Series	Size	Preheat		Peak	
			Temperature	Time	Temperature	Time
Coin cell	CB1,CBN,CBJ CBS,CX1,CXN CXJ,CXS,CH1 CHL,CHC	φ11.5 to φ21.5	100 to 110°C	30sec. max.	260°C Max	5sec. max.
Cylindrical cell	DZ1,DZH,DZN DDU	φ6.3 to φ18	100 to 130°C	30 to 60sec.	260°C±5°C	10sec. max.

Cautions when soldering

(1) Do not dip the capacitor into melted solder.
(2) Do not flux other part than the terminals.
(3) If there is a direct contact between the sleeve of the capacitor and the printed circuit pattern or a metal part of another component such as a lead wire, it may cause shrinkage of crack.
(4) If it is a coin type, please manage so that main part temperature including preheating does not exceed 90°C.
(5) Please refer to cautions for using and the specification about other notes.

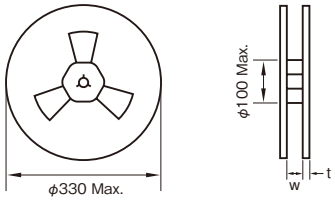
Carrier tape dimensions (Series CS1, CSK) polarity L



(Unit : mm)

Outside size	W	P	F	A1	A2	B1	B2	T2	to	ϕD
ϕ6.8×1.4 to 2.1L	24±0.2	12.0	11.5	4.4	3.4	5.9	6.5	3.2	0.3	6.9

Reel dimensions



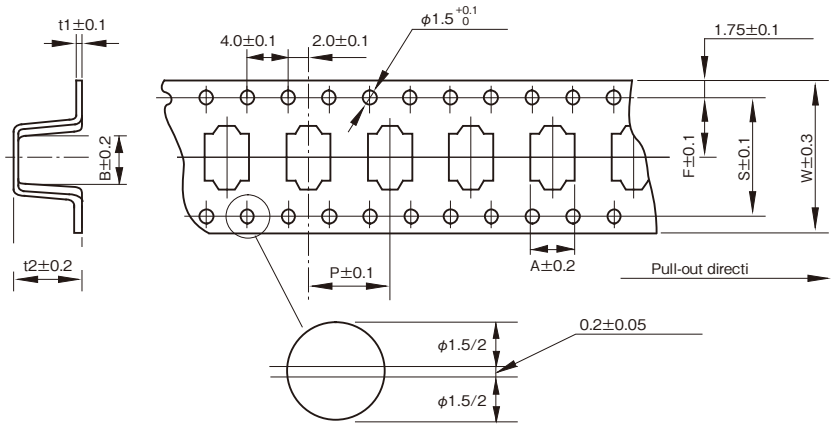
(Unit : mm)

Outside size	W	t
ϕ6.8×1.4 to 2.1L	26	3

Packing quantity

Outside size	Quantity
ϕ6.8×2.1L	1500PCS.
ϕ6.8×1.4L	1500PCS. to 2000PCS.

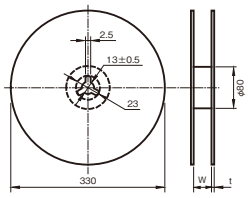
Carrier tape dimensions (Series CVN, CVL, CVS) polarity R



(Unit : mm)

Outside size	W	A	B	P	t2	F	t1	S
ϕ12.5×10.5L	32	13.4	13.4	24	11	14.2	0.5	28.4
ϕ12.5× 8.5L	32	13.4	13.4	24	9.5	14.2	0.5	28.4

Reel dimensions



(Unit : mm)

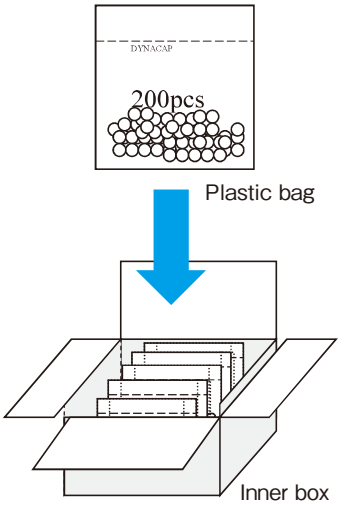
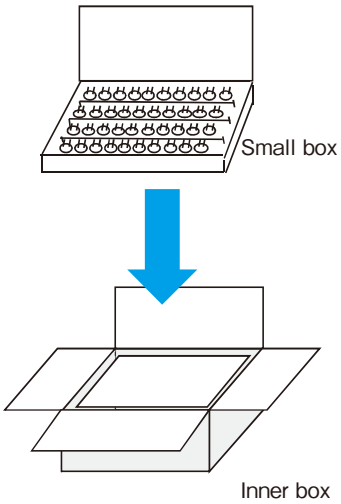
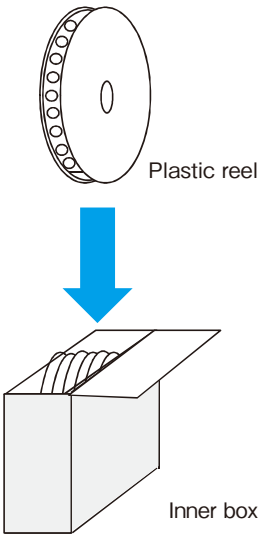
Outside size	W	t
ϕ12.5×10.5L	34	3
ϕ12.5× 8.5L	34	3

Packing quantity

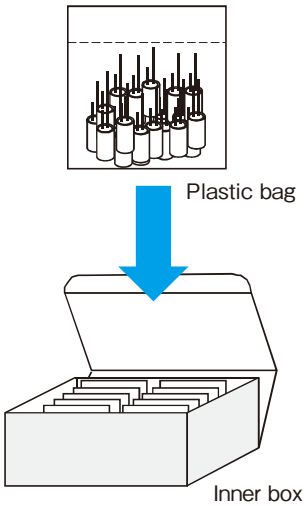
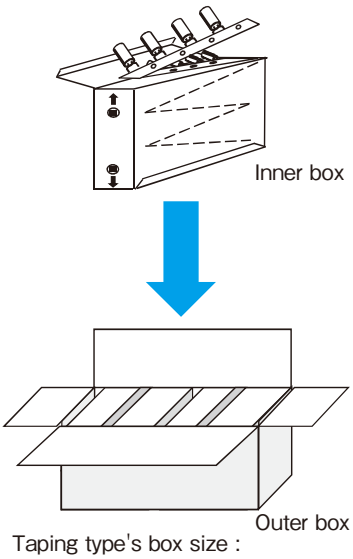
Outside size	Quantity
ϕ12.5×10.5L	250pcs.
ϕ12.5× 8.5L	300pcs.

NOTE : Design, Specifications are subject to change without notice.
It is recommended that you shall obtain technical specifications
from ELNA to ensure that the component is suitable for your use.

■ Standard packing specification of Coin cell type

Series	・CX1, CXJ, CXN, CXS ・CB1, CBN, CBJ, CBS, CH1, CHL, CHC (φ13.5)	・CB1, CBN, CBJ, CBS, CH1, CHL, CHC (φ21.5)	・CS1, CSK (614, 621) ・CVN, CVL, CVS
Packing style			

■ Standard packing specification of Cylindrical cell type

Series	・DDU, DZ1, DZN, DZH (φ6.3 to φ18)	・DDU, DZ1, DZN, DZH (φ6.3 to φ12.5) Taping
Packing style		 Taping type's box size : refer to specification of aluminum electrolytic capacitors.

Please inquire for details.

NOTE : Design, Specifications are subject to change without notice.
It is recommended that you shall obtain technical specifications from ELNA to ensure that the component is suitable for your use.

Cautions for Using Electric Double Layer Capacitors (DYNACAP™)

■ Usage

1. Electric double layer capacitors (EDLC) use a conductive organic electrolyte.

The use at excessive mounting temperature or exceeding the upper category temperature can cause the electrolyte to leak. Especially,coin and multilayer coin types for the memory backup (excluding cylindrical type) series use a low elastic plastic as the sealant in the cell construction like coin batteries; therefore, avoid using such capacitors in the Vicinity of automotive equipment with steep temperature change, and heating element such as motor, relay, transformer, power IC, etc. because of the risk of leakage of electrolyte.

2. Since EDLC is polarized, do not apply a reversed voltage.

EDLC is polarized. If a reversed voltage is applied for a long time, the leakage current will increase abruptly, which may cause a decrease in the capacity, an increase in the internal resistance, and causing leakage or damage to the product in some cases.

3. Do not apply any voltage higher than the Max. operating voltage (this means the surge voltage in the case of short-time charge).

If an overvoltage is applied to the product, the leakage current will increase abruptly and the product will become overheated, which may cause a decrease in the capacity, an increase in the internal resistance, and causing leakage or damage to the product in some cases.

4. Do not use smoothing a power supply (for absorbing its ripple).

Since the internal resistance of EDLC is high, the product will be overheated if it is used for smoothing a power supply (for absorbing its ripple), which may cause a decrease in the capacity. an increase in the internal resistance, and causing leakage or damage to the product in some cases .

5. Do not use in a circuit where quick charge and discharge are repeated Very often.

In a circuit where quick charge and discharge are repeated very often , the product will become overheated, which may cause a decrease in the capacity, an increase in the internal resistance, and causing leakage or damage to the product in some cases.

Reduce the charge and discharge currents while selecting a product with low internal resistance, and rnake sure that the product surface temperature does not rise.

6. EDLC life depends heavily on the ambient temperature.

①The lifetime of EDLC is seriously affected by change in ambient temperature. If the temperature is lowered by 10℃, the lifetime will be approximately doubled. Therefore, the product should be used at a temperature lower than the guaranteed maximum value for maximum life.

②If the capacitor is used at a temperature exceeding its maximum guaranteed temperature, not only is its life shortened, but increased vapor pressure of electrolyte or electrochemical reactions may increase the internal pressure, and causing leakage or damage to the product in some cases.

7. Do not use the product in an ambient atomsphere containing waterdrops (condensation) or toxic gases.

Although EDLC is sealed, water droplets or toxic gases may do degradation characteristics, a leakage and corrode the lead wires and the case, which may cause a breaking of the wires.

Avoid abrupt temperature changes, which may cause water droplets, resulting in product deterioration and electrolyte leakage.

8. Contact us before connecting the products in series.

A series connection will cause imbalance in the voltage, charged to the capacitors and an overvoltage may be charged to one or more them. This may cause a decrease in the capacity, an increase in the internal resistance and causing leakage or damage to the product in some cases. When using series connection for several capacitors, please derate the applied voltage from the Max. operating voltage or use balancing circuits (bleeder resistor, etc.) to compensate for the imbalance in the applied voltage for each capacitor. Moreover, please ensure the arrangement does not cause temperature fluctuation between capacitors.

9. About vibration.

A terminal blank, a terminal bend, and a crease may occur by adding too much vibration to a capacitor.

Moreover, depending on the case, an EDLC may do degradation of the characteristic, breakage, and a leakage.

When you become too much vibration, please contact us.

10. When used on a double sided printed circuit board, do not overlap the wiring patterns on the mounted part.

A short circuit may be created by certain wiring conditions. Should the electrolyte leaks, the circuit pattern may cause a short circuit, resulting in tracking or migration.

11. Do not keep In high temperature and high humidity atmospheres.

①Avoid high temperature or high humidity or direct rays when storing capacitors.

② Keep the product in a place where the temperature is 5℃ to 30℃ and the humidity is lower than 60%. Avoid an abrupt temperature change, which may cause condensation or deterioration of the product or liquid leakage. (Recommended storage term: 1year or less after delivery)

③ Do not store EDLC at a place where there is a possibility that they may get water, salt or oil spill.

NOTE : Design, Specifications are subject to change without notice.
It is recommended that you shall obtain technical specifications from ELNA to ensure that the component is suitable for your use.

④Do not store EDLC at place where the air contains dense hazardous gas (hydrogen sulfide, sulfurous acid, nitrous acid, chlorine ammonia, etc.).
⑤Fumigation treatment with toxic gas covering the whole wooden container frames as moth proofing during shipment may leave residual toxic gas.
⑥Do not store EDLC at a place where it gets ultraviolet ray or radioactive ray.

12. Capacitors fitted with a relief valve

①The relief valve is provided with a valve function with part of the case made thin to avoid explosion by increased internal pressure when the capacitor is under abnormal load such as overvoltage or reverse voltage. After activation of the relief valve, the capacitor must be replaced as it does not restore.
②For the capacitors with a case relief valve (Cylindrical type), provide a void on the top of the relief valve so as not to hamper its activation. Make a void of 2 mm or more for the product of ϕ18 or less in diameter in diameter on the top.

13. Use at a high altitude

The use of capacitors at high altitudes such as on an airplane causes a large difference between the internal pressure of the capacitors and the atmospheric pressure.
However, there is no problem in use under atmospheric pressure up to about an altitude of 10,000 meters.
If the condition is severe like space, please contact us.

■Mounting

1. Do not overheat when soldered.

Depending on the type and size of the board, the product may be subjected to overheat, leading to loss of airtightness. This may greatly shorten the product life or cause liquid leakage.
In case of a 1.6mm-thick and single side printed board. for example, keep the following soldering conditions: temperature lower then 260℃, time within 5 seconds (coin type), 10 seconds (Cylindrical type).
When a board thinner than 1.6 mm or multi-layer printed board is used, contact us.
In the case of hand soldering, the iron tip temperature is lower than 400℃, time is shorter than 4 seconds.
The coin types and multilayer coin types excluding the DZ and reflow-compatible coin types use polypropylene as the packing material for sealing and therefore susceptible to excessive heat. Note that the component body temperature shall be controlled so as not to exceed 90℃ including preheating.

2. When soldering the capacitor to the wiring board, do not attach the body of the capacitor to the circuit board.

If the body of the capacitor is attached directly to the circuit board, the flux or solder can blow through the through holes in the circuit board, negatively impacting the capacitor.
Moreover, the heat influence at the time of soldering can be reduced by floating the body.

3. Contact us when cleaning is necessary after soldering.

Certain types of solvents are not compatible and may cause damage.

4. Contact us when the product Is attached by adhesive bonding.

Certain types of adhesives are not compatible.
Paste bond partially between the product and the board so that the product will not adhere completely to the board.
Do not raise the temperature over the guaranteed value while the bond is hardening.

5. Heating conditions of adhesive curing oven

During heating of the adhesive curing oven, application of excessive heat may significantly shorten the product life or cause liquid leakage. Control the body temperature so as not to exceed 90℃ during work while setting the allowable atmospheric temperature below 110℃, and allowable heating time within 30 seconds.
For the heating conditions deviating from the above, consult with us providing your temperature profile conditions.

6. Be careful not to apply an excessive force to the capacitor body, terminals or lead wires.

①Mount the capacitor while making sure that the terminal spacing of the capacitor and the spacing of the holes in the printed wiring board are aligned.
②If the capacitor body is subjected to stress such as grabbing, falling, bend, pushing or twisting after mounted, its terminals may come off, leading to open, short or liquid leakage.

■Other cautions

1. Emergency procedures

If the EDLC overheats or starts to smell, immediately switch off the units main power supply to stop operation.
Keep your face and hands away from the EDLC, since the temperature may be high enough to cause the EDLC to ignite and burn.

2. Periodical inspections should be established for the EDLC used in industrial appliances.

The following items should be checked:
①Appearance : Check if there is leakage.
②Electronic performance : Check the leakage current, the electrostatic, the internal resistance and other items described in the catalog or the product specifications.

3. Disposing of EDLC

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

4. Other notes

Please refer to the following literature for anything not described in the specification or the catalog. (Technical Report of Japan Electronics and Information Technology Industries Association #EIAJ RCR-2370 “Guideline of notabilia for fixed electric double layer capacitors”)

NOTE : Design, Specifications are subject to change without notice.
It is recommended that you shall obtain technical specifications from ELNA to ensure that the component is suitable for your use.

Return to Type List

ELNA

This products are not recommended for new design.

Electric Double Layer Capacitors "DYNACAP" CVN series

Code in front of series have been extracted from product code, which describes the segment of products, such as type and features.

- Size : φ12.5×8.5Lmm, compatible with surface mounting and low ESR.
- Unlike batteries, safe and high reliability without containing active and hazardous substance.
- Unlike batteries, excellent charge and discharge characteristics with no chemical reactions.
- Responds to temperature 260℃ during the reflow peek.
- Ideal for industrial, smart meter, backing up of RTC's for surveillance camera, momentary power assistance of a battery etc.
- Environmental : GREEN CAP™ , RoHS compliance.

Convert to chip

CVN ⇦ CBN

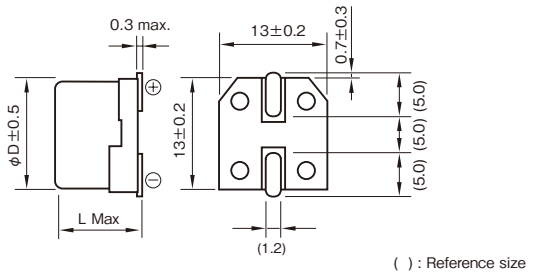
Marking color : White print on an brown sleeve

Specifications

Item	Performance
Category temperature range (℃)	−25 to +70
Tolerance at rated capacitance (%)	−20 to +80
Internal resistance at 1 kHz	Rated capacitance (F): 0.047 / 0.1 / 0.22 / 0.33 Internal resistance (Ω Max.): 30 / 30 / 30 / 30
Characteristics at high and low temperature	Percentage of capacitance change: Within ±30% of the value at 20℃ Internal resistance: Five times or less of the value at 20℃
Endurance (70℃)	Test time: 1000 hours Percentage of capacitance change: Within ±30% of the initial measured value Internal resistance: Four times or less of the initial specified value.
Shelf life (70℃)	Test time : 1000 hours ; Same as endurance.
Applicable standards	Conforms to JIS C5160 - 1 (IEC 62391 - 1)

Outline Drawing

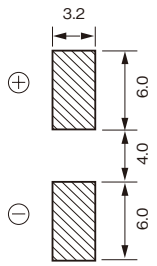
Unit : mm



( ) : Reference size

Recommended land pattern size

Unit : mm



Thickness of solder paste: 0.15mm

Product code system : 5.5V0.22F (*For general product)						
RS*	CVN	224	5R5	G08	012	T
Category code	Series code	capacitance code	Voltage code	Size code	Taping and packing code	Additional code

Product code is refer to following table and "Product Code System" pages.

Standard Ratings

Max. operating voltage (V)	Rated capacitance (F)	ELNA Parts No.	φD×L (mm)
5.5	0.047	RSCVN4735R5G08012T	12.5×8.5
5.5	0.1	RSCVN1045R5G08012T	12.5×8.5
5.5	0.22	RSCVN2245R5G08012T	12.5×8.5
5.5	0.33	RSCVN3345R5G08012T	12.5×8.5

*soldering conditions are described on Individual page.
*It can discharge with 1.5 times as much current (mA) as rated capacitance.

NOTE : Design, Specifications are subject to change without notice.
It is recommended that you shall obtain technical specifications from ELNA to ensure that the component is suitable for your use.

Return to Type List

ELNA

This products are not recommended for new design.

Electric Double Layer Capacitors "DYNACAP" CVL series

Code in front of series have been extracted from product code, which describes the segment of products, such as type and features.

- Size : φ12.5×10.5Lmm, compatible with surface mounting.
- Wide temperature range (−40 to 85℃), Low ESR.
- Unlike batteries, safe and high reliability without containing active and hazardous substance.
- Unlike batteries, excellent charge and discharge characteristics with no chemical reactions.
- Responds to temperature 260℃ during the reflow peek.
- Ideal for industrial, smart meter, backing up of RTC's for surveillance camera, momentary power assistance of a battery, automotive etc.
- Environmental : GREEN CAP™ , RoHS compliance.

Convert to chip

CVL ⇦ CHL

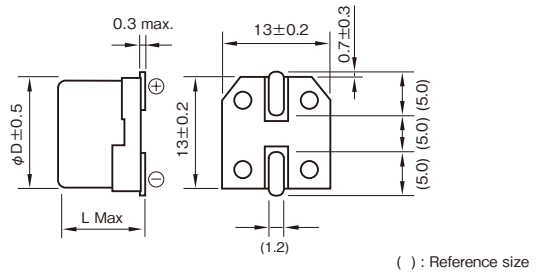
Marking color : White print on an brown sleeve

Specifications

Item	Performance
Category temperature range (℃)	− 40 to +85
Tolerance at rated capacitance (%)	− 20 to +80
Internal resistance at 1 kHz	Rated capacitance (F): 0.047 / 0.1 / 0.22 Internal resistance (Ω Max.): 45 / 45 / 45
Characteristics at high and low temperature	Percentage of capacitance change: Within ±30% of the value at 20℃ Internal resistance: −40℃ : Seven times or less of the value at 20℃ 85℃ : Five times or less of the value at 20℃
Endurance (85℃)	Test time: 1000 hours Percentage of capacitance change: Within ±30% of the initial measured value Internal resistance: Four times or less of the initial specified value
Shelf life (85℃)	Test time : 1000 hours ; Same as endurance.
Applicable standards	Conforms to JIS C5160 - 1 (IEC 62391 - 1)

Outline Drawing

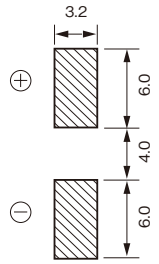
Unit : mm



( ) : Reference size

Recommended land pattern size

Unit : mm



Thickness of solder paste: 0.15mm

Product code system : 5.5V0.22F (*For general product)

RS*	CVL	224	5R5	G10	012	T
Category code	Series code	capacitance code	Voltage code	Size code	Taping and packing code	Additional code

Product code is refer to following table and "Product Code System" pages.

Standard Ratings

Max. operating voltage (V)	Rated capacitance (F)	ELNA Parts No.	φD×L (mm)
5.5	0.047	RSCVL4735R5G10012T	12.5×10.5
5.5	0.1	RSCVL1045R5G10012T	12.5×10.5
5.5	0.22	RSCVL2245R5G10012T	12.5×10.5

*soldering conditions are described on Individual page.

NOTE : Design, Specifications are subject to change without notice.
It is recommended that you shall obtain technical specifications from ELNA to ensure that the component is suitable for your use.

Return to Type List

ELNA

This products are not recommended for new design.

Electric Double Layer Capacitors "DYNACAP" CVS series

Code in front of series have been extracted from product code, which describes the segment of products, such as type and features.

- Size : φ12.5×8.5Lmm, compatible with surface mounting.
- Wide temperature range (−25 to 85℃), Low ESR.
- Unlike batteries, safe and high reliability without containing active and hazardous substance.
- Unlike batteries, excellent charge and discharge characteristics with no chemical reactions.
- Responds to temperature 260℃ during the reflow peek.
- Ideal for industrial, smart meter, backing up of RTC's for surveillance camera, momentary power assistance of a battery, automotive etc.
- Environmental : GREEN CAP™ , RoHS compliance.

Convert to chip

CVS ⇦ CBS

Marking color : White print on a brown sleeve

Specifications

Item	Performance
Category temperature range (℃)	−25 to +85
Tolerance at rated capacitance (%)	−20 to +80
Internal resistance at 1 kHz	
Characteristics at high and low temperature	
Endurance (85℃)	
Shelf life (85℃)	Test time : 1000 hours ; Same as endurance.
Applicable standards	Conforms to JIS C5160 - 1 (IEC 62391 - 1)

Internal resistance at 1 kHz:

Rated capacitance (F)	0.047	0.1	0.22	0.33
Internal resistance (Ω Max.)	30	30	30	30

Characteristics at high and low temperature:

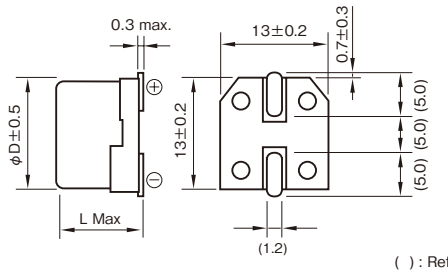
Percentage of capacitance change	Within ±30% of the value at 20℃
Internal resistance	Five times or less of the value at 20℃

Endurance (85℃):

Test time	2000 hours
Percentage of capacitance change	Within ±30% of the initial measured value
Internal resistance	Four times or less of the initial specified value.

Outline Drawing

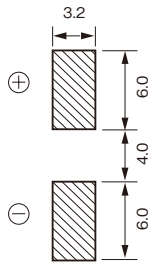
Unit : mm



( ) : Reference size

Recommended land pattern size

Unit : mm



Thickness of solder paste: 0.15mm

Product code system : 3.6V0.22F (*For general product)						
RS*	CVS	224	3R6	G08	012	T
Category code	Series code	capacitance code	Voltage code	Size code	Taping and packing code	Additional code

Product code is refer to following table and "Product Code System" pages.

Standard Ratings

Max. operating voltage (V)	Rated capacitance (F)	ELNA Parts No.	φD×L (mm)
3.6	0.047	RSCVS4733R6G08012T	12.5×8.5
3.6	0.1	RSCVS1043R6G08012T	12.5×8.5
3.6	0.22	RSCVS2243R6G08012T	12.5×8.5
3.6	0.33	RSCVS3343R6G08012T	12.5×8.5

∗soldering conditions are described on Individual page.
∗It can discharge with 1.5 times as much current (mA) as rated capacitance.

NOTE : Design, Specifications are subject to change without notice.
It is recommended that you shall obtain technical specifications from ELNA to ensure that the component is suitable for your use.

Return to Type List

ELNA

This products are not recommended for new design.

Electric Double Layer Capacitors "DYNACAP" CB1 series

Code in front of series have been extracted from product code, which describes the segment of products, such as type and features.

- Small-sized, large capacity, excellent voltage holding.
- For all ratings, uniform 5mm pitch of terminal spacing.
- Wider temperature range (−25 to +70°C) than battery.
- φ21.5×8.0Lmm size can encase up to 1.5F.
- Ideal for backing up of CMOS's, IC's of camera, microcomputers, RAM's, RTC's and the like used in audio, general electronic device, and others.
- Environmental : GREEN CAP™ , RoHS compliance.

CB1

Marking color : White print on an indigo sleeve

Specifications

Item	Performance
Category temperature range (℃)	−25 to +70
Tolerance at rated capacitance (%)	−20 to +80
Internal resistance at 1 kHz	
Characteristics at high and low temperature	
Endurance (70℃)	
Shelf life (70℃)	Test time : 1000 hours ; Same as endurance.
Applicable standards	Conforms to JIS C5160 - 1 (IEC 62391 - 1)

Internal resistance at 1 kHz:

Rated capacitance (F)	0.047	0.1	0.22	0.33	0.47	0.47	1	1.5
Internal resistance (Ω Max.)	120	75	75	75	75(φ13.5)	30(φ21.5)	30	30

Characteristics at high and low temperature:

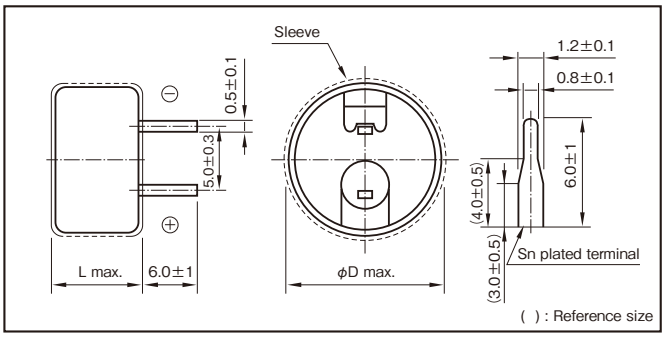
Percentage of capacitance change	Within ±30% of the value at 20℃
Internal resistance	Five times or less of the value at 20℃

Endurance (70℃):

Test time	1000 hours
Percentage of capacitance change	Within ±30% of the initial measured value
Internal resistance	Four times or less of the initial specified value

Outline Drawing

Unit : mm



Product code system : 5.5V0.22F (*For general product)						
RS*	CB1	224	5R5	G07	014	T
Category code	Series code	capacitance code	Voltage code	Size code	Lead-forming and packing code	Additional code

・Product code is refer to following table and "Product Code System" pages.
・Lead-forming and packing code on this page are for standard terminals and standard packing products.
For standard packing, please refer to the "PACKING" page.

Standard Ratings

Max. operating voltage (V)	Rated capacitance (F)	ELNA Parts No.	φD×L (mm)
5.5	0.047	RSCB14735R5G07014T	13.5×7.5
5.5	0.1	RSCB11045R5G07014T	13.5×7.5
5.5	0.22	RSCB12245R5G07014T	13.5×7.5
5.5	0.33	RSCB13345R5G07014T	13.5×7.5
5.5	0.47	RSCB14745R5G07014ST	13.5×7.5
5.5	0.47	RSCB14745R5L08015T	21.5×8.0
5.5	1	RSCB11055R5L08015T	21.5×8.0
5.5	1.5	RSCB11555R5L08015T	21.5×8.0

NOTE : Design, Specifications are subject to change without notice.
It is recommended that you shall obtain technical specifications from ELNA to ensure that the component is suitable for your use.

Return to Type List

ELNA

This products are not recommended for new design.

Electric Double Layer Capacitors "DYNACAP" CBN series

Code in front of series have been extracted from product code, which describes the segment of products, such as type and features.

- Internal resistance was reduced to about 1/3 (φ13.5) , compared with CB1 series.
- It excels in rapid charge.
- Environmental : GREEN CAP™ , RoHS compliance.

Low resistance

CBN ⇦ CB1

Marking color : White print on an indigo sleeve

Specifications

Item	Performance
Category temperature range (℃)	−25 to +70
Tolerance at rated capacitance (%)	−20 to +80
Internal resistance at 1 kHz	
Characteristics at high and low temperature	
Endurance (70℃)	
Shelf life (70℃)	Test time : 1000 hours ; Same as endurance.
Applicable standards	Conforms to JIS C5160 - 1 (IEC 62391 - 1)

Internal resistance at 1 kHz:

Rated capacitance (F)	0.047	0.1	0.22	0.33	0.47	0.47	1	1.5
Internal resistance (Ω Max.)	25	25	25	25	25(φ13.5)	20(φ21.5)	20	20

Characteristics at high and low temperature:

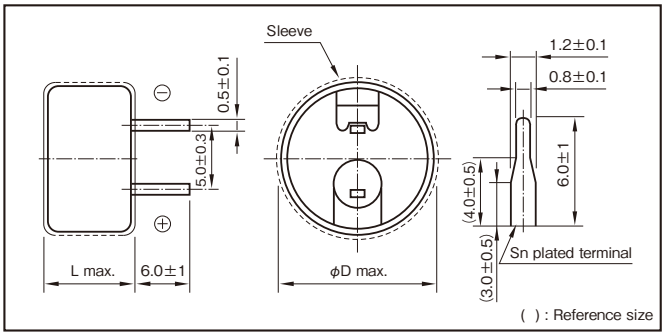
Percentage of capacitance change	Within ±30% of the value at 20℃
Internal resistance	Five times or less of the value at 20℃

Endurance (70℃):

Test time	1000 hours
Percentage of capacitance change	Within ±30% of the initial measured value
Internal resistance	Four times or less of the initial specified value

Outline Drawing

Unit : mm



Product code system : 5.5V0.22F (*For general product)

RS*	CBN	224	5R5	G07	014	T
Category code	Series code	capacitance code	Voltage code	Size code	Lead-forming and packing code	Additional code

・Product code is refer to following table and "Product Code System" pages.
・Lead-forming and packing code on this page are for standard terminals and standard packing products.
For standard packing, please refer to the "PACKING" page.

Standard Ratings

Max. operating voltage (V)	Rated capacitance (F)	ELNA Parts No.	φD×L (mm)
5.5	0.047	RSCBN4735R5G07014T	13.5×7.5
5.5	0.1	RSCBN1045R5G07014T	13.5×7.5
5.5	0.22	RSCBN2245R5G07014T	13.5×7.5
5.5	0.33	RSCBN3345R5G07014T	13.5×7.5
5.5	0.47	RSCBN4745R5G07014ST	13.5×7.5
5.5	0.47	RSCBN4745R5L08015T	21.5×8.0
5.5	1	RSCBN1055R5L08015T	21.5×8.0
5.5	1.5	RSCBN1555R5L08015T	21.5×8.0

*It can discharge with 1.5 times as much current (mA) as rated capacitance.

NOTE : Design, Specifications are subject to change without notice.
It is recommended that you shall obtain technical specifications from ELNA to ensure that the component is suitable for your use.

Return to Type List

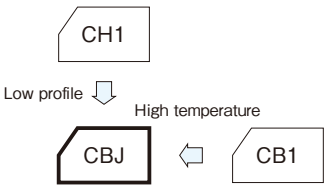
ELNA

This products are not recommended for new design.

Electric Double Layer Capacitors "DYNACAP" CBJ series

Code in front of series have been extracted from product code, which describes the segment of products, such as type and features.

- High temperature type of series CB1.
- Small-sized, large capacity, excellent voltage holding.
- For all ratings, uniform 5mm pitch of terminal spacing.
- φ13.5×7.5Lmm size can encase up to 0.33F.
- Ideal for backing up of CMOS's, IC's of camera, microcomputers, RAM's, RTC's and the like used in audio, general electronic device, and others.
- Environmental : GREEN CAP™ , RoHS compliance.



Marking color : White print on a black sleeve

Specifications

Item	Performance
Category temperature range (℃)	−10 to +85
Tolerance at rated capacitance (%)	−20 to +80
Internal resistance at 1 kHz	

Rated capacitance (F)	0.047	0.1	0.22	0.33	0.47	1
Internal resistance (Ω Max.)	200	150	150	150	100	75

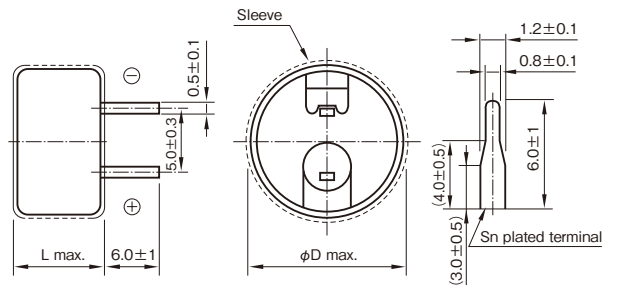
Characteristics at high and low temperature	
Percentage of capacitance change	Within ±30% of the value at 20℃
Internal resistance	Four times or less of the initial specified value.

Endurance (85℃)	
Test time	1000 hours
Percentage of capacitance change	Within ±30% of the initial measured value
Internal resistance	Four times or less of the initial specified value

Shelf life (85℃)	Test time : 1000 hours ; Same as endurance.
Applicable standards	Conforms to JIS C5160 - 1 (IEC 62391 - 1)

Outline Drawing

Unit : mm



( ) : Reference size

Product code system : 5.5V0.22F (*For general product)

RS*	CBJ	224	5R5	G07	014	T
Category code	Series code	capacitance code	Voltage code	Size code	Lead-forming and packing code	Additional code

・Product code is refer to following table and "Product Code System" pages.
・Lead-forming and packing code on this page are for standard terminals and standard packing products.
For standard packing, please refer to the "PACKING" page.

Standard Ratings

Max. operating voltage (V)	Rated capacitance (F)	ELNA Parts No.	φD×L (mm)
5.5	0.047	RSCBJ4735R5G07014T	13.5×7.5
5.5	0.1	RSCBJ1045R5G07014T	13.5×7.5
5.5	0.22	RSCBJ2245R5G07014T	13.5×7.5
5.5	0.33	RSCBJ3345R5G07014T	13.5×7.5
5.5	0.47	RSCBJ4745R5L08015T	21.5×8.0
5.5	1	RSCBJ1055R5L08015T	21.5×8.0

NOTE : Design, Specifications are subject to change without notice.
It is recommended that you shall obtain technical specifications from ELNA to ensure that the component is suitable for your use.

Return to Type List

ELNA

This products are not recommended for new design.

Electric Double Layer Capacitors "DYNACAP" CBS series

Code in front of series have been extracted from product code, which describes the segment of products, such as type and features.

- Long life of 3.6V 2000 hours in small size low ESR.
- For all ratings, uniform 5mm pitch of terminal spacing.
- Wider temperature range (−25 to +85℃) than battery.
- φ13.5×7.5Lmm size can encase up to 0.47F.
- Ideal for backing up of CMOS's, IC's of camera, microcomputers, RAM's, RTC's and the like used in audio, smart meter, general electronic device, and others.
- It excels in rapid charge.
- Environmental : GREEN CAP™ , RoHS compliance.

Low voltage
High
temperature

CBS ⇦ CBN

Marking color : White print on a black sleeve

Specifications

Item	Performance
Category temperature range (℃)	−25 to +85
Tolerance at rated capacitance (%)	−20 to +80
Internal resistance at 1 kHz	
Characteristics at high and low temperature	
Endurance (85℃)	
Shelf life (85℃)	Test time : 1000 hours ; Same as endurance.
Applicable standards	Conforms to JIS C5160 - 1 (IEC 62391 - 1)

Internal resistance at 1 kHz:

Rated capacitance (F)	0.047	0.1	0.22	0.33	0.47	0.47	1
Internal resistance (Ω Max.)	25	25	25	25	25(φ13.5)	20(φ21.5)	20

Characteristics at high and low temperature:

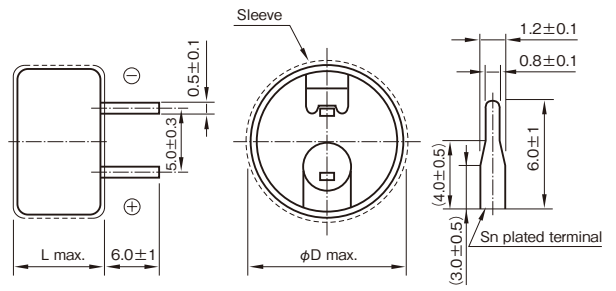
Percentage of capacitance change	Within ±30% of the value at 20℃
Internal resistance	Five times or less of the value at 20℃

Endurance (85℃):

Test time	2000 hours (φ13.5 0.47F : 1000 hours)
Percentage of capacitance change	Within ±30% of the initial measured value
Internal resistance	Four times or less of the initial specified value

Outline Drawing

Unit : mm



( ) : Reference size

Product code system : 3.6V0.22F (*For general product)

RS*	CBS	224	3R6	G07	014	T
Category code	Series code	capacitance code	Voltage code	Size code	Lead-forming and packing code	Additional code

・Product code is refer to following table and "Product Code System" pages.
・Lead-forming and packing code on this page are for standard terminals and standard packing products.
For standard packing, please refer to the "PACKING" page.

Standard Ratings

Max. operating voltage (V)	Rated capacitance (F)	ELNA Parts No.	φD×L (mm)
3.6	0.047	RSCBS4733R6G07014T	13.5×7.5
3.6	0.1	RSCBS1043R6G07014T	13.5×7.5
3.6	0.22	RSCBS2243R6G07014T	13.5×7.5
3.6	0.33	RSCBS3343R6G07014T	13.5×7.5
3.6	0.47	RSCBS4743R6G07014ST	13.5×7.5
3.6	0.47	RSCBS4743R6L08015T	21.5×8.0
3.6	1	RSCBS1053R6L08015T	21.5×8.0

*It can discharge with 1.5 times as much current (mA) as rated capacitance.

NOTE : Design, Specifications are subject to change without notice.
It is recommended that you shall obtain technical specifications from ELNA to ensure that the component is suitable for your use.

Return to Type List

ELNA

This products are not recommended for new design.

Electric Double Layer Capacitors "DYNACAP" CX1 series

Code in front of series have been extracted from product code, which describes the segment of products, such as type and features.

- Smaller and lighter than Series CB1.
- 5mm tall. Max. thin profile.
- Ideal for backing up of CMOS's, IC's of camera, microcomputers, RAM's, RTC's and the like used in audio, general electronic device, and others.
- Environmental : GREEN CAP™ , RoHS compliance.

Miniaturized

CX1 ⇦ CB1

Marking color :
White print on an indigo sleeve

Specifications

Item	Performance
Category temperature range (℃)	−25 to +70
Tolerance at rated capacitance (%)	−20 to +80
Internal resistance at 1 kHz	
Characteristics at high and low temperature	
Endurance (70℃)	
Shelf life (70℃)	Test time : 1000 hours ; Same as endurance.
Applicable standards	Conforms to JIS C5160 - 1 (IEC 62391 - 1)

Rated capacitance (F)	0.047	0.1	0.22	0.33	0.47
Internal resistance (Ω Max.)	120	75	75	75	75

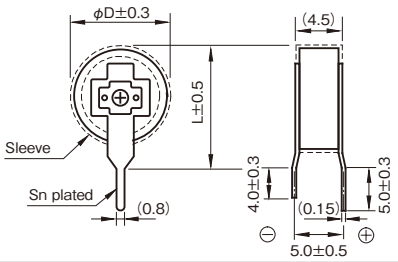
Percentage of capacitance change	Within ±30% of the value at 20℃
Internal resistance	Five times or less of the value at 20℃

Test time	1000 hours
Percentage of capacitance change	Within ±30% of the initial measured value
Internal resistance	Four times or less of the initial specified value

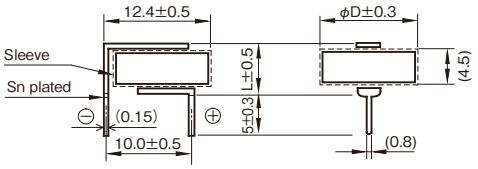
Outline Drawing

Unit : mm

Terminal shaped : V (φ11.5 x 13.0L)



Terminal shaped : H (φ11.5 x 5.0L)



( ) : Reference size

Product code system : 5.5V0.22F (*For general product)

RS*	CX1	224	5R5	⬚	013	U
Category code	Series code	capacitance code	Voltage code	Size code	Lead-forming and packing code	Additional code

・Product code is refer to following table and "Product Code System" pages.
・Lead-forming and packing code on this page are for standard terminals and standard packing products.
For standard packing, please refer to the "PACKING" page.

Note

Do not apply external force to products or terminals as stress such as twisting, bending, pushing, or falling of such products or terminals may remove the terminals, resulting in an open/short circuit or liquid leakage.
Avoid applying excessive heat to capacitors during heating of an adhesive curing oven.
For details, refer to the precautions in use of DYNACAP.

Standard Ratings

Max. operating voltage (V)	Rated capacitance (F)	ELNA Parts No.	φD×L (mm)
5.5	0.047	RSCX14735R5F13013U	11.5×13.0
		RSCX14735R5F05013U	11.5× 5.0
5.5	0.1	RSCX11045R5F13013U	11.5×13.0
		RSCX11045R5F05013U	11.5× 5.0
5.5	0.22	RSCX12245R5F13013U	11.5×13.0
		RSCX12245R5F05013U	11.5× 5.0
5.5	0.33	RSCX13345R5F13013U	11.5×13.0
		RSCX13345R5F05013U	11.5× 5.0
5.5	0.47	RSCX14745R5F13013SU	11.5×13.0
		RSCX14745R5F05013SU	11.5× 5.0

NOTE : Design, Specifications are subject to change without notice.
It is recommended that you shall obtain technical specifications from ELNA to ensure that the component is suitable for your use.

Return to Type List

ELNA

This products are not recommended for new design.

Electric Double Layer Capacitors "DYNACAP" CXN series

Code in front of series have been extracted from product code, which describes the segment of products, such as type and features.

- Internal resistance was reduced to about 1/3, compared with CX1 series.
- 5mm tall. Max. thin profile.
- It excels in rapid charge.
- Ideal for backing up of CMOS's, IC's of camera, microcomputers, RAM's, RTC's and the like used in audio, general electronic device, and others.
- Environmental : GREEN CAP™ , RoHS compliance.

Low resistance

CXN ⇦ CX1

Marking color :
White print on an indigo sleeve

Specifications

Item	Performance
Category temperature range (℃)	−25 to +70
Tolerance at rated capacitance (%)	−20 to +80
Internal resistance at 1 kHz	
Characteristics at high and low temperature	
Endurance (70℃)	
Shelf life (70℃)	Test time : 1000 hours ; Same as endurance.
Applicable standards	Conforms to JIS C5160 - 1 (IEC 62391 - 1)

Rated capacitance (F)	0.047	0.1	0.22	0.33	0.47
Internal resistance (Ω Max.)	25	25	25	25	25

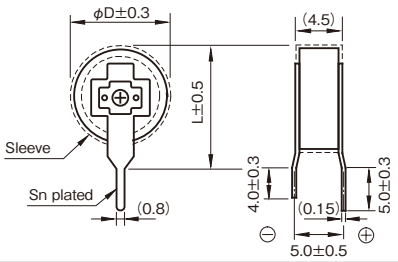
Percentage of capacitance change	Within ±30% of the value at 20℃
Internal resistance	Five times or less of the value at 20℃

Test time	1000 hours
Percentage of capacitance change	Within ±30% of the initial measured value
Internal resistance	Four times or less of the initial specified value

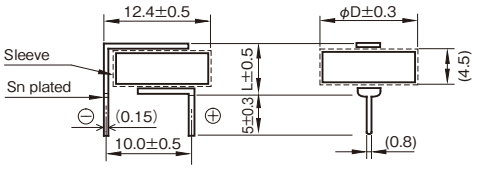
Outline Drawing

Unit : mm

Terminal shaped : V (φ11.5 x 13.0L)



Terminal shaped : H (φ11.5 x 5.0L)



( ) : Reference size

Product code system : 5.5V0.22F (*For general product)

RS*	CXN	224	5R5	⬚	013	U
Category code	Series code	capacitance code	Voltage code	Size code	Lead-forming and packing code	Additional code

・Product code is refer to following table and "Product Code System" pages.
・Lead-forming and packing code on this page are for standard terminals and standard packing products.
For standard packing, please refer to the "PACKING" page.

Note

Do not apply external force to products or terminals as stress such as twisting, bending, pushing, or falling of such products or terminals may remove the terminals, resulting in an open/short circuit or liquid leakage.
Avoid applying excessive heat to capacitors during heating of an adhesive curing oven.
For details, refer to the precautions in use of DYNACAP.

Standard Ratings

Max. operating voltage (V)	Rated capacitance (F)	ELNA Parts No.	φD×L (mm)
5.5	0.047	RSCXN4735R5F13013U	11.5×13.0
		RSCXN4735R5F05013U	11.5× 5.0
5.5	0.1	RSCXN1045R5F13013U	11.5×13.0
		RSCXN1045R5F05013U	11.5× 5.0
5.5	0.22	RSCXN2245R5F13013U	11.5×13.0
		RSCXN2245R5F05013U	11.5× 5.0
5.5	0.33	RSCXN3345R5F13013U	11.5×13.0
		RSCXN3345R5F05013U	11.5× 5.0
5.5	0.47	RSCXN4745R5F13013SU	11.5×13.0
		RSCXN4745R5F05013SU	11.5× 5.0

*It can discharge with 1.5 times as much current (mA) as rated capacitance.

NOTE : Design, Specifications are subject to change without notice.
It is recommended that you shall obtain technical specifications from ELNA to ensure that the component is suitable for your use.

Return to Type List

ELNA

This products are not recommended for new design.

Electric Double Layer Capacitors "DYNACAP" CXJ series

Code in front of series have been extracted from product code, which describes the segment of products, such as type and features.

- High temperature type of Series CX1.
- 5mm tall. Max. thin profile.
- Ideal for backing up of CMOS's, IC's of camera, microcomputers, RAM's, RTC's and the like used in audio, general electronic device, and others.
- Environmental : GREEN CAP™ , RoHS compliance.

High temperature

CXJ ⇦ CX1

Marking color :
White print on a black sleeve

Specifications

Item	Performance
Category temperature range (℃)	−10 to +85
Tolerance at rated capacitance (%)	−20 to +80
Internal resistance at 1 kHz	

Rated capacitance (F)	0.047	0.1	0.22	0.33
Internal resistance (Ω Max.)	200	150	150	150

Characteristics at high and low temperature	
Percentage of capacitance change	Within ±30% of the value at 20℃
Internal resistance	Four times or less of the initial specified value.

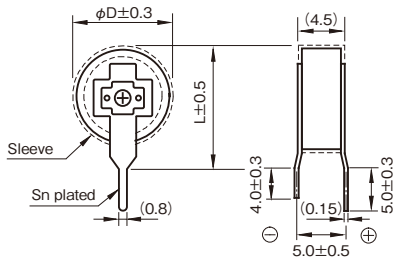
Endurance (85℃)	
Test time	1000 hours
Percentage of capacitance change	Within ±30% of the initial measured value
Internal resistance	Four times or less of the initial specified value.

Shelf life (85℃)	Test time : 1000 hours ; Same as endurance.
Applicable standards	Conforms to JIS C5160 - 1 (IEC 62391 - 1)

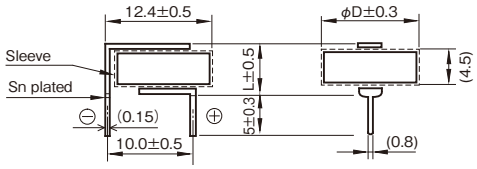
Outline Drawing

Unit : mm

Terminal shaped : V (φ11.5 x 13.0L)



Terminal shaped : H (φ11.5 x 5.0L)



( ) : Reference size

Product code system : 5.5V0.22F (*For general product)

RS*	CXJ	224	5R5	⬚	013	U
Category code	Series code	capacitance code	Voltage code	Size code	Lead-forming and packing code	Additional code

・Product code is refer to following table and "Product Code System" pages.
・Lead-forming and packing code on this page are for standard terminals and standard packing products.
For standard packing, please refer to the "PACKING" page.

Note

Do not apply external force to products or terminals as stress such as twisting, bending, pushing, or falling of such products or terminals may remove the terminals, resulting in an open/short circuit or liquid leakage.
Avoid applying excessive heat to capacitors during heating of an adhesive curing oven.
For details, refer to the precautions in use of DYNACAP.

Standard Ratings

Max. operating voltage (V)	Rated capacitance (F)	ELNA Parts No.	φD×L (mm)
5.5	0.047	RSCXJ4735R5F13013U	11.5×13.0
		RSCXJ4735R5F05013U	11.5× 5.0
5.5	0.1	RSCXJ1045R5F13013U	11.5×13.0
		RSCXJ1045R5F05013U	11.5× 5.0
5.5	0.22	RSCXJ2245R5F13013U	11.5×13.0
		RSCXJ2245R5F05013U	11.5× 5.0
5.5	0.33	RSCXJ3345R5F13013U	11.5×13.0
		RSCXJ3345R5F05013U	11.5× 5.0

NOTE : Design, Specifications are subject to change without notice.
It is recommended that you shall obtain technical specifications from ELNA to ensure that the component is suitable for your use.

Return to Type List

ELNA

This products are not recommended for new design.

Electric Double Layer Capacitors "DYNACAP" CXS series

Code in front of series have been extracted from product code, which describes the segment of products, such as type and features.

- Long life of 3.6V 2000 hours, low ESR in CX1 series and this size.
- 5mm tall. Max. thin profile.
- Wider temperature range (−25 to +85°C) than battery.
- It excels in rapid charge.
- Ideal for backing up of CMOS's, IC's of camera, microcomputers, RAM's, RTC's and the like used in audio, general electronic device, and others.
- Environmental : GREEN CAP™ , RoHS compliance.

Low voltage
High temperature

CXS ⇦ CXN

Marking color :
White print on a black sleeve

Specifications

Item	Performance
Category temperature range (℃)	−25 to +85
Tolerance at rated capacitance (%)	−20 to +80
Internal resistance at 1 kHz	

Rated capacitance (F)	0.047	0.1	0.22	0.33	0.47
Internal resistance (Ω Max.)	25	25	25	25	25

Characteristics at high and low temperature	
Percentage of capacitance change	Within ±30% of the value at 20℃
Internal resistance	Five times or less of the value at 20℃

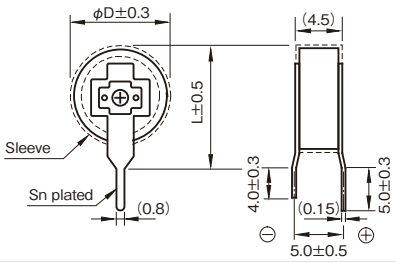
Endurance (85℃)	
Test time	2000 hours (0.47F : 1000 hours)
Percentance of capacitance change	Within ±30% of the initial measured value
Internal resistance	Four times or less of the initial specified value

Shelf life (85℃)	Test time : 1000 hours ; Same as endurance.
Applicable standards	Conforms to JIS C5160 - 1 (IEC 62391 - 1)

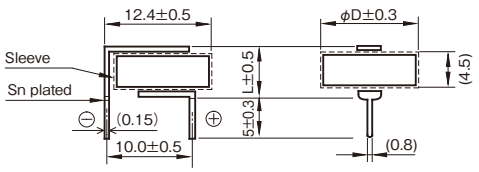
Outline Drawing

Unit : mm

Terminal shaped : V (φ11.5 x 13.0L)



Terminal shaped : H (φ11.5 x 5.0L)



( ) : Reference size

Product code system : 3.6V0.22F (*For general product)						
RS*	CXS	224	3R6	☐	013	U
Category code	Series code	capacitance code	Voltage code	Size code	Lead-forming and packing code	Additional code

・Product code is refer to following table and "Product Code System" pages.
・Lead-forming and packing code on this page are for standard terminals and standard packing products.
For standard packing, please refer to the "PACKING" page.

Note

Do not apply external force to products or terminals as stress such as twisting, bending, pushing, or falling of such products or terminals may remove the terminals, resulting in an open/short circuit or liquid leakage.
Avoid applying excessive heat to capacitors during heating of an adhesive curing oven.
For details, refer to the precautions in use of DYNACAP.

Standard Ratings

Max. operating voltage (V)	Rated capacitance (F)	ELNA Parts No.	φD×L (mm)
3.6	0.047	RSCXS4733R6F13013U	11.5×13.0
		RSCXS4733R6F05013U	11.5× 5.0
3.6	0.1	RSCXS1043R6F13013U	11.5×13.0
		RSCXS1043R6F05013U	11.5× 5.0
3.6	0.22	RSCXS2243R6F13013U	11.5×13.0
		RSCXS2243R6F05013U	11.5× 5.0
3.6	0.33	RSCXS3343R6F13013U	11.5×13.0
		RSCXS3343R6F05013U	11.5× 5.0
3.6	0.47	RSCXS4743R6F13013SU	11.5×13.0
		RSCXS4743R6F05013SU	11.5× 5.0

∗It can discharge with 1.5 times as much current (mA) as rated capacitance.

NOTE : Design, Specifications are subject to change without notice.
It is recommended that you shall obtain technical specifications from ELNA to ensure that the component is suitable for your use.

Return to Type List

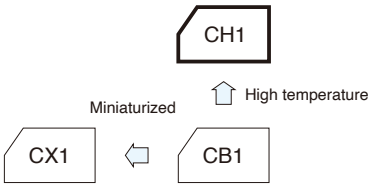
ELNA

This products are not recommended for new design.

Electric Double Layer Capacitors "DYNACAP" CH1 series

Code in front of series have been extracted from product code, which describes the segment of products, such as type and features.

- High temperature tolerant (−25 to +85℃) and highly reliable.
- Ideal for backing up of CMOS IC's, microcomputers, RAM's, RTC's for smart meter, outdoor equipment, industrial.
- Environmental : GREEN CAP™ , RoHS compliance.



Marking color :
White print on an indigo sleeve

Specifications

Item	Performance
Category temperature range (℃)	−25 to +85
Tolerance at rated capacitance (%)	−20 to +80
Internal resistance at 1 kHz	
Characteristics at high and low temperature	
Endurance (85℃)	
Shelf life (85℃)	Test time : 1000 hours ; Same as endurance.
Applicable standards	Conforms to JIS C5160 - 1 (IEC 62391 - 1)

Internal resistance at 1 kHz:

Rated capacitance (F)	0.047	0.1	0.22	0.47	0.68	1
Internal resistance (Ω Max.)	300	200	120	50	50	30

Characteristics at high and low temperature:

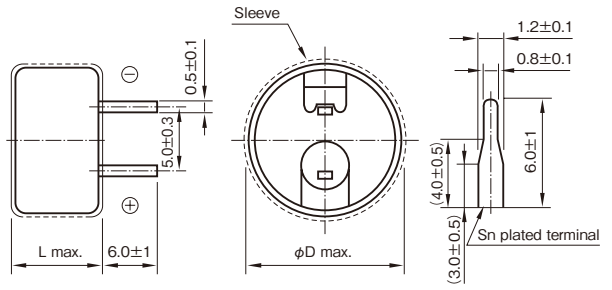
Percentage of capacitance change	Within ±30% of the value at 20℃
Internal resistance	Five times or less of the value at 20°C

Endurance (85℃):

Test time	1000 hours
Percentage of capacitance change	Within ±30% of the initial measured value
Internal resistance	Four times or less of the initial specified value

Outline Drawing

Unit : mm



( ) : Reference size

Product code system : 5.5V0.22F (*For general product)

RS*	CH1	224	5R5	G09	014	T
Category code	Series code	capacitance code	Voltage code	Size code	Lead-forming and packing code	Additional code

・Product code is refer to following table and "Product Code System" pages.
・Lead-forming and packing code on this page are for standard terminals and standard packing products.
For standard packing, please refer to the "PACKING" page.

Standard Ratings

Max. operating voltage (V)	Rated capacitance (F)	ELNA Parts No.	ϕD×L (mm)
5.5	0.047	RSCH14735R5G09014T	13.5×9.5
5.5	0.1	RSCH11045R5G09014T	13.5×9.5
5.5	0.22	RSCH12245R5G09014T	13.5×9.5
5.5	0.47	RSCH14745R5L09015T	21.5×9.5
5.5	0.68	RSCH16845R5L09015T	21.5×9.5
5.5	1	RSCH11055R5L09015T	21.5×9.5

NOTE : Design, Specifications are subject to change without notice.
It is recommended that you shall obtain technical specifications from ELNA to ensure that the component is suitable for your use.

Return to Type List

ELNA

This products are not recommended for new design.

Electric Double Layer Capacitors "DYNACAP" CHL series

Code in front of series have been extracted from product code, which describes the segment of products, such as type and features.

- It is a category temperature range larger than battery.
- ϕ13.5 size can encase up to 0.22F, ϕ21.5 size can encase up to 1.0F.
- It excels in rapid charge.
- Ideal for backing up of CMOS IC's, microcomputers, RAM's, RTC's for smart meter, outdoor equipment, auto motive and industrial.
- Environmental : GREEN CAP™ , RoHS compliance.

Wide temperature range

CHL ⇦ CH1

Marking color :
White print on an indigo sleeve

Specifications

Item	Performance
Category temperature range (℃)	−40 to +85
Tolerance at rated capacitance (%)	−20 to +80
Internal resistance at 1 kHz	
Characteristics at high and low temperature	
Endurance (85℃)	
Shelf life (85℃)	Test time : 1000 hours ; Same as endurance.
Applicable standards	Conforms to JIS C5160 - 1 (IEC 62391 - 1)

Internal resistance at 1 kHz:

Rated capacitance (F)	0.047	0.1	0.22	0.47	0.68	1
Internal resistance (Ω Max.)	40	40	40	20	20	20

Characteristics at high and low temperature:

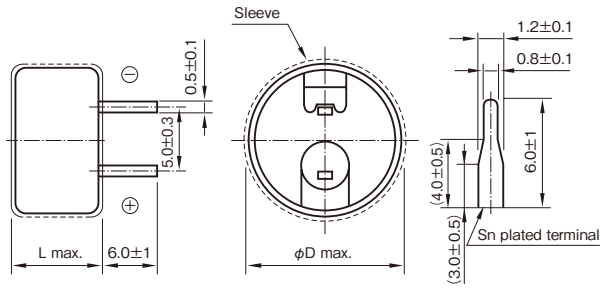
Percentage of capacitance change	Within ±30% of the value at 20℃
Internal resistance	−40℃ : Seven times or less of the value at 20℃ 85℃ : Five times or less of the value at 20℃

Endurance (85℃):

Test time	1000 hours
Percentage of capacitance change	Within ±30% of the initial measured value
Internal resistance	Four times or less of the initial specified value

Outline Drawing

Unit : mm



( ) : Reference size

Product code system : 5.5V0.22F (*For general product)

RS*	CHL	224	5R5	G09	014	T
Category code	Series code	capacitance code	Voltage code	Size code	Lead-forming and packing code	Additional code

・Product code is refer to following table and "Product Code System" pages.
・Lead-forming and packing code on this page are for standard terminals and standard packing products.
For standard packing, please refer to the "PACKING" page.

Standard Ratings

Max. operating voltage (V)	Rated capacitance (F)	ELNA Parts No.	ϕD×L (mm)
5.5	0.047	RSCHL4735R5G09014T	13.5×9.5
5.5	0.1	RSCHL1045R5G09014T	13.5×9.5
5.5	0.22	RSCHL2245R5G09014T	13.5×9.5
5.5	0.47	RSCHL4745R5L09015T	21.5×9.5
5.5	0.68	RSCHL6845R5L09015T	21.5×9.5
5.5	1	RSCHL1055R5L09015T	21.5×9.5

NOTE : Design, Specifications are subject to change without notice.
It is recommended that you shall obtain technical specifications from ELNA to ensure that the component is suitable for your use.

Return to Type List

ELNA

This products are not recommended for new design.

Electric Double Layer Capacitors "DYNACAP" CHC series

Code in front of series have been extracted from product code, which describes the segment of products, such as type and features.

- Guaranteed 3000 hours at 85℃, 5.5V (10 years at room temperature).
- It is a category temperature range larger than battery.
- It excels in rapid charge.
- Ideal for backing up of CMOS IC's, microcomputers, RAM's, RTC's for smart meter, outdoor equipment, auto motive and industrial.
- Environmental : GREEN CAP™ , RoHS compliance.

Long Life

CHC ⇦ CH1

Marking color :
White print on a Black sleeve

Specifications

Item	Performance
Category temperature range (℃)	−25 to +85
Tolerance at rated capacitance (%)	−20 to +80
Internal resistance at 1 kHz	
Characteristics at high and low temperature	
Endurance (85℃)	
Shelf life (85℃)	Test time : 1000 hours ; Same as endurance.
Applicable standards	Conforms to JIS C5160 - 1 (IEC 62391 - 1)

Internal resistance at 1 kHz:

Rated capacitance (F)	0.047	0.1	0.22	0.47	0.68	1
Internal resistance (Ω Max.)	300	200	120	50	50	30

Characteristics at high and low temperature:

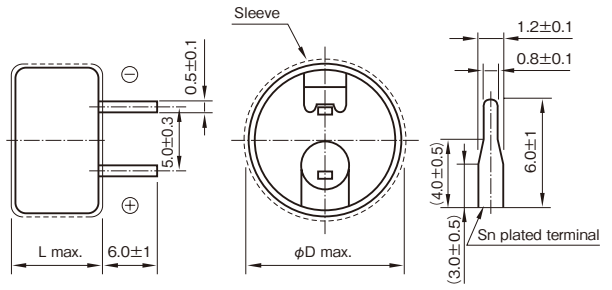
Percentage of capacitance change	Within ±30% of the value at 20℃
Internal resistance	Five times or less of the value at 20℃

Endurance (85℃):

Test time	3000 hours
Percentage of capacitance change	Within ±30% of the initial measured value
Internal resistance	Four times or less of the initial specified value

Outline Drawing

Unit : mm



( ) : Reference size

Product code system : 5.5V0.22F (*For general product)

RS*	CHC	224	5R5	G09	014	T
Category code	Series code	capacitance code	Voltage code	Size code	Lead-forming and packing code	Additional code

・Product code is refer to following table and "Product Code System" pages.
・Lead-forming and packing code on this page are for standard terminals and standard packing products.
For standard packing, please refer to the "PACKING" page.

Standard Ratings

Max. operating voltage (V)	Rated capacitance (F)	ELNA Parts No.	ϕD×L (mm)
5.5	0.047	RSCHC4735R5G09014T	13.5×9.5
5.5	0.1	RSCHC1045R5G09014T	13.5×9.5
5.5	0.22	RSCHC2245R5G09014T	13.5×9.5
5.5	0.47	RSCHC4745R5L09015T	21.5×9.5
5.5	0.68	RSCHC6845R5L09015T	21.5×9.5
5.5	1	RSCHC1055R5L09015T	21.5×9.5

NOTE : Design, Specifications are subject to change without notice.
It is recommended that you shall obtain technical specifications from ELNA to ensure that the component is suitable for your use.

Return to Type List

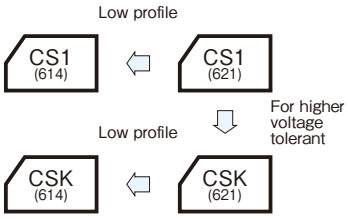
ELNA

This products are not recommended for new design.

Electric Double Layer Capacitors "DYNACAP" CS1, CSK series

Code in front of series have been extracted from product code, which describes the segment of products, such as type and features.

- Reflow soldering method available.
- High reliability, Safe and unlike secondarybatteries, environmentally friendly devices.
- Unlike batteries, excellent charge and discharge characteristics with no chemical reactions.
- 1.8Lmm height type 614 made lineup in the CS1, CSK series.
- Ideal for backing up of portable device etc.
- Environmental : GREEN CAP™ , RoHS compliance.

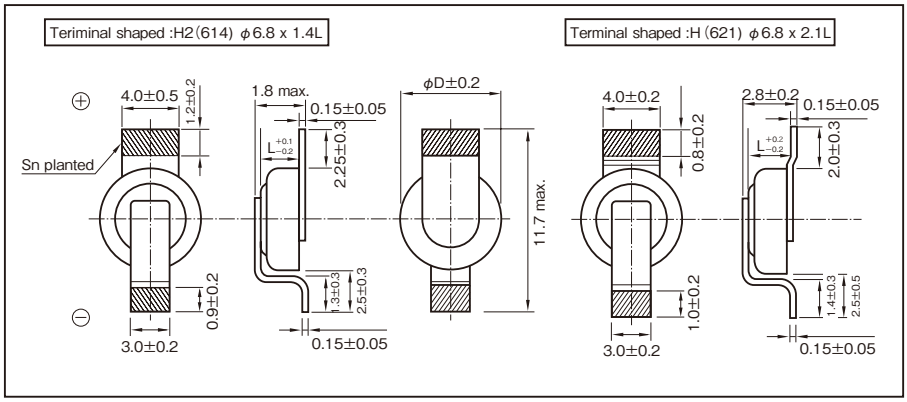


Specifications

Item	Performance					
Series Name	Series CS1			Series CSK		
Max.operating voltage (V)	2.5			3.3		
Category temperature range (℃)	−25 to +70			−10 to +60		
Tolerance at rated capacitance (%)	−20 to +80			−20 to +80		
Internal resistance (Ω) at 1 kHz	Size code	614 (D01)	621 (D02)	Size code	614 (D01)	621 (D02)
	Rated capacitance (F)	0.2	0.33	Rated capacitance (F)	0.2	0.33
	Internal resistance (Ω Max.)	100	100	Internal resistance (Ω Max.)	200	200
Characteristics at high and low temperature	Size code	614 (D01)	621 (D02)	Size code	614 (D01)	621 (D02)
	Percentage of capacitance change	Within ±30% of the value at 20℃	Within ±30% of the value at 20℃	Percentage of capacitance change	Within ±50% of the value at 20℃	Within ±50% of the value at 20℃
	Internal resistance	Five times or less of the value at 20℃	Five times or less of the value at 20℃	Internal resistance	Five times or less of the initial specified value	Five times or less of the value at 20℃
Endurance	Size code	614 (D01)	621 (D02)	Size code	614 (D01)	621 (D02)
	Test time and temp.	70℃ 1000 hours	70℃ 500 hours	Test time and temp.	60℃ 1000 hours	60℃ 500 hours
	Percentage of capacitance change	Within ±30% of the initial measured value	Within ±30% of the initial measured value	Percentage of capacitance change	Within ±30% of the initial measured value	Within ±30% of the initial measured value
	Internal resistance	1kΩ Max.	400Ω Max.	Internal resistance	2kΩ Max.	800Ω Max.
Shelf life	Same as endurance.			Same as endurance.		
Applicable standards	Conforms to JIS C5160 - 1 (IEC 62391 - 1)					

Outline Drawing

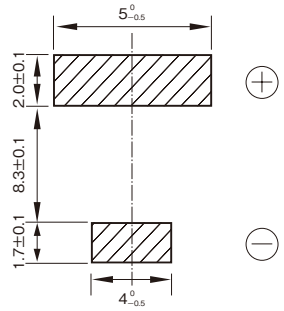
Unit : mm



※Please consult with us about other terminal form.

Recommended land pattern size

Unit : mm



Thickness of solder paste: 0.15mm

Product code system (example : 614, 2.5V0.2F, terminal shaped : H2)						
RS*	CS1	204	2R5	D01	004	T
Category code	Series code	capacitance code	Voltage code	Size code	Taping and packing code	Additional code

Product code system (example : 621, 3.3V0.33F, terminal shaped : H)						
RS*	CSK	334	3R3	D02	008	T
Category code	Series code	capacitance code	Voltage code	Size code	Taping and packing code	Additional code

*Example of for general product. Product code is refer to following table and "Product Code System" pages.

Standard Ratings

Max. operating voltage (V)	Rated capacitance (F)	ELNA Parts No.	φD×L (mm)
2.5	0.2	RSCS12042R5D01004T	6.8×1.4
3.3	0.2	RSCSK2043R3D01004T	6.8×1.4
2.5	0.33	RSCS13342R5D02008T	6.8×2.1
3.3	0.33	RSCSK3343R3D02008T	6.8×2.1

＊Soldering conditions are described on Individual page.

NOTE : Design, Specifications are subject to change without notice.
It is recommended that you shall obtain technical specifications from ELNA to ensure that the component is suitable for your use.

Return to Type List

ELNA Electric Double Layer Capacitors "DYNACAP" DZ1, DZH series

Code in front of series have been extracted from product code, which describes the segment of products, such as type and features.

- Standard, Large Capacitance Type Capacitors.
- Environmentally Friendly : without environmentally hazardous substances such as Cd or Pb.
- Unlike batteries, excellent charge and discharge characteristics with no chemical reactions.
- Environmental : GREEN CAP™ , RoHS compliance.

Large capacitance

DZH ⇦ DZ1

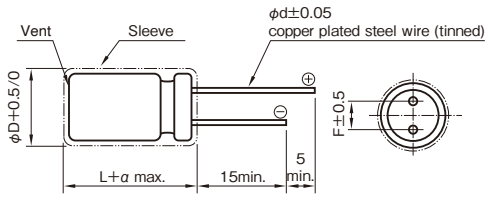
Marking color :
White print on a black sleeve

Specifications

Item	Performance	
Series name	Series DZ1	Series DZH
Category temperature range (℃)	−25 to +70	−25 to +60
Tolerance at rated capacitance (%)	−20 to +80	−20 to +80
Internal resistance at 1kHz	Refer to the following page	
Characteristics at high and low temperature	Percentage of capacitance change: Within ±30% of the value at 20℃ Internal resistance: Five times or less of the value at 20℃	Percentage of capacitance change: Within ±30% of the value at 20℃ Internal resistance: Eight times or less of the value at 20℃
Endurance	Test temperature: 70℃ Test time: 1000 hours Percentage of capacitance change: Within ±30% of the initial measured value Internal resistance: Four times or less of the initial specified value	Test temperature: 60℃ Test time: 2000 hours Percentage of capacitance change: Within ±30% of the initial measured value Internal resistance: Four times or less of the initial specified value
Shelf life	Same as endurance	Same as endurance
Applicable standards	Conforms to JIS C5160 - 1 (IEC 62391 - 1)	

Outline Drawing

Unit : mm



φD	6.3	8	10	12.5	16	18
F	2.5	3.5	5.0		7.5	
φd	0.6				0.8	
α	2.0					

Product code system: 2.5V10F (*For general product)

RS*	DZ1	106	2R5	⬚	300	(S)T
Category code	Series code	capacitance code	Voltage code	Size code	Lead-forming and packing code	Additional code

・For details, refer to the variaous "Product Code System" pages.
・Lead-forming and packing code on this page are for lead long and standard packing products.
For standard packing, please refer to the "PACKING" page.

NOTE : Design, Specifications are subject to change without notice.
It is recommended that you shall obtain technical specifications from ELNA to ensure that the component is suitable for your use.

Code in front of series have been extracted from product code, which describes the segment of products, such as type and features.

Standard Ratings (Series DZ1 2.5V)

Max. operating voltage (V)	Rated capacitance (F)	Max. Leakage Current (mA) after 24h	ELNA Parts No.	φD × L (mm)	Internal resistance (Ω max.) at 1kHz	Internal resistance (mΩ) at 1kHz (measurement value)
2.5	1	0.1	RSDZ11052R5D14300T	6.3 × 14	1.0	400
2.5	1	0.1	RSDZ11052R5E12300T	8 × 12	1.0	200
2.5	2.7	0.2	RSDZ12752R5E20300ST	8 × 20	0.5	150
2.5	3.3	0.2	RSDZ13352R5F20300T	10 × 20	0.3	90
2.5	4.7	0.3	RSDZ14752R5F20300T	10 × 20	0.2	80
2.5	5.6	0.3	RSDZ15652R5F20300T	10 × 20	0.2	70
2.5	6.8	0.4	RSDZ16852R5F25300T	10 × 25	0.2	60
2.5	10	0.5	RSDZ11062R5F35300T	10 × 35	0.2	40
2.5	10	0.5	RSDZ11062R5G25300ST	12.5 × 25	0.2	40
2.5	15	0.7	RSDZ11562R5G35300ST	12.5 × 35	0.2	35
2.5	15	0.7	RSDZ11562R5J20300T	16 × 20	0.2	35
2.5	22	0.8	RSDZ12262R5J25300T	16 × 25	0.2	30
2.5	33	0.8	RSDZ13362R5J35300T	16 × 35.5	0.2	30
2.5	40	0.8	RSDZ14062R5K40300T	18 × 40	0.2	30

Standard Ratings (Series DZ1 2.7V)

Max. operating voltage (V)	Rated capacitance (F)	Max. Leakage Current (mA) after 24h	ELNA Parts No.	φD × L (mm)	Internal resistance (Ω max.) at 1kHz	Internal resistance (mΩ) at 1kHz (measurement value)
2.7	1	0.2	RSDZ11052R7D14300T	6.3 × 14	1.0	400
2.7	1	0.2	RSDZ11052R7E12300T	8 × 12	1.0	200
2.7	2.7	0.3	RSDZ12752R7E20300ST	8 × 20	0.5	150
2.7	3.3	0.3	RSDZ13352R7F20300T	10 × 20	0.3	130
2.7	4.7	0.4	RSDZ14752R7F20300T	10 × 20	0.2	80
2.7	5.6	0.4	RSDZ15652R7F20300T	10 × 20	0.2	70
2.7	6.8	0.5	RSDZ16852R7F25300T	10 × 25	0.2	60
2.7	10	0.6	RSDZ11062R7F35300T	10 × 35	0.2	40
2.7	10	0.6	RSDZ11062R7G25300ST	12.5 × 25	0.2	40
2.7	15	0.8	RSDZ11562R7G35300ST	12.5 × 35	0.2	35
2.7	15	0.8	RSDZ11562R7J25300T	16 × 25	0.2	35
2.7	22	1.0	RSDZ12262R7J31300T	16 × 31.5	0.2	30
2.7	33	1.0	RSDZ13362R7J40300T	16 × 40	0.2	30

Standard Ratings (Series DZH 2.5V)

Max. operating voltage (V)	Rated capacitance (F)	Max. Leakage Current (mA) after 24h	ELNA Parts No.	φD × L (mm)	Internal resistance (Ω max.) at 1kHz	Internal resistance (mΩ) at 1kHz (measurement value)
2.5	22	0.8	RSDZH2262R5G35300ST	12.5 × 35	0.2	55
2.5	50	1.0	RSDZH5062R5K40300T	18 × 40	0.08	30

NOTE : Design, Specifications are subject to change without notice.
It is recommended that you shall obtain technical specifications
from ELNA to ensure that the component is suitable for your use.

Return to Type List

ELNA

Electric Double Layer Capacitors "DYNACAP" DZN series

Code in front of series have been extracted from product code, which describes the segment of products, such as type and features.

- High Power Type Capacitors.
- Low internal resistance allows boosting charge and heavy-current discharge. (ampere level)
- Environmentally Friendly : without environmentally hazardous substances such as Cd or Pb.
- Unlike batteries, excellent charge and discharge characteristics with no chemical reaction.
- Environmental : GREEN CAP™ , RoHS compliance.

High power

DZN ⇦ DZ1

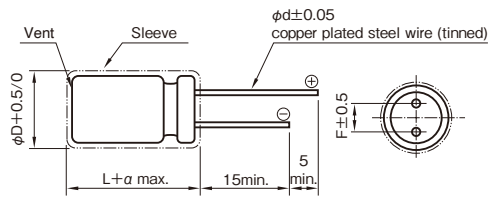
Marking color :
White print on a blue sleeve

Specifications

Item	Performance	
Category temperature range (℃)	−25 to +70	
Tolerance at rated capacitance (%)	−20 to +80	
Internal resistance	Refer to the following page	
Characteristics at high and low temperature	Percentage of capacitance change	Within ±30% of the value at 20℃
	Internal resistance	Five times or less of the value at 20℃
Endurance (70℃)	Test time	1000 hours
	Percentage of capacitance change	Within ±30% of the initial measured value
	Internal resistance	Four times or less of the initial specified value
Shelf life (70℃)	Test time : 1000 hours ; Same as endurance.	
Applicable standards	Conforms to JIS C5160 - 1 (IEC 62391 - 1)	

Outline Drawing

Unit : mm



ϕD	6.3	8	10	12.5	16	18
F	2.5	3.5	5.0		7.5	
ϕd	0.6				0.8	
α	2.0					

Product code system: 2.5V10F (*For general product)

RS*	DZN	106	2R5	⬚	300	(S)T
Category code	Series code	capacitance code	Voltage code	Size code	Lead-forming and packing code	Additional code

・Product code is refer to following table and "Product Code System" pages.
・Lead-forming and packing code on this page are for lead long and standard packing products.
For standard packing, please refer to the "PACKING" page.

NOTE : Design, Specifications are subject to change without notice.
It is recommended that you shall obtain technical specifications from ELNA to ensure that the component is suitable for your use.

Code in front of series have been extracted from product code, which describes the segment of products, such as type and features.

Standard Ratings (2.5V)

Max. operating voltage (V)	Rated capacitance (F)	Max. Leakage Current (mA) after 24h	ELNA Parts No.	φD × L (mm)	Internal resistance (Ω max.) at 1kHz	Internal DC resistance (mΩ Max.)
2.5	1	0.1	RSDZN1052R5D14300T	6.3 × 14	0.4	1500
2.5	1	0.1	RSDZN1052R5E12300T	8 × 12	0.3	1000
2.5	2.7	0.2	RSDZN2752R5E20300ST	8 × 20	0.3	500
2.5	3.3	0.2	RSDZN3352R5F20300T	10 × 20	0.1	400
2.5	4.7	0.3	RSDZN4752R5F20300T	10 × 20	0.1	400
2.5	5.6	0.3	RSDZN5652R5F20300T	10 × 20	0.1	350
2.5	6.8	0.4	RSDZN6852R5F25300T	10 × 25	0.1	300
2.5	10	0.5	RSDZN1062R5F35300T	10 × 35	0.1	200
2.5	10	0.5	RSDZN1062R5G25300ST	12.5 × 25	0.1	200
2.5	15	0.7	RSDZN1562R5G35300ST	12.5 × 35	0.1	150
2.5	15	0.7	RSDZN1562R5J20300T	16 × 20	0.1	150
2.5	22	0.8	RSDZN2262R5J25300T	16 × 25	0.1	120
2.5	33	0.8	RSDZN3362R5J35300T	16 × 35.5	0.1	100
2.5	40	0.8	RSDZN4062R5K40300T	18 × 40	0.1	75

Standard Ratings (2.7V)

Max. operating voltage (V)	Rated capacitance (F)	Max. Leakage Current (mA) after 24h	ELNA Parts No.	φD × L (mm)	Internal resistance (Ω max.) at 1kHz	Internal DC resistance (mΩ Max.)
2.7	1	0.2	RSDZN1052R7D14300T	6.3 × 14	0.4	1500
2.7	1	0.2	RSDZN1052R7E12300T	8 × 12	0.3	1000
2.7	2.7	0.3	RSDZN2752R7E20300ST	8 × 20	0.3	500
2.7	3.3	0.3	RSDZN3352R7F20300T	10 × 20	0.2	470
2.7	4.7	0.4	RSDZN4752R7F20300T	10 × 20	0.1	400
2.7	5.6	0.4	RSDZN5652R7F20300T	10 × 20	0.1	350
2.7	6.8	0.5	RSDZN6852R7F25300T	10 × 25	0.1	300
2.7	10	0.6	RSDZN1062R7F35300T	10 × 35	0.1	200
2.7	10	0.6	RSDZN1062R7G25300ST	12.5 × 25	0.1	200
2.7	15	0.8	RSDZN1562R7G35300ST	12.5 × 35	0.1	150
2.7	15	0.8	RSDZN1562R7J25300T	16 × 25	0.1	150
2.7	22	1.0	RSDZN2262R7J31300T	16 × 31.5	0.1	120
2.7	33	1.0	RSDZN3362R7J40300T	16 × 40	0.1	100

NOTE : Design, Specifications are subject to change without notice.
It is recommended that you shall obtain technical specifications
from ELNA to ensure that the component is suitable for your use.

Return to Type List

ELNA Electric Double Layer Capacitors "DYNACAP" DDU series

Code in front of series have been extracted from product code, which describes the segment of products, such as type and features.

- High power, for low temperature (− 40°C) type capacitors.
- Environmentally Friendly : without environmentally hazardous substances such as Cd or Pb.
- Unlike batteries, excellent charge and discharge characteristics with no chemical reaction.
- Environmental : GREEN CAP™ , RoHS compliance.

For low temperature

DDU ⇦ DZN

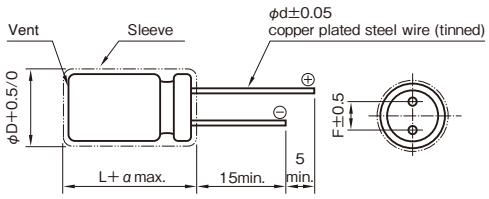
Marking color :
White print on a brown sleeve

Specifications

Item	Performance	
Category temperature range (℃)	−40 to +70	
Tolerance at rated capacitance (%)	−20 to +20	
Internal resistance	Refer to the Standard Ratings	
Characteristics at high and low temperature	Percentage of capacitance change	Within ±30% of the value at 20℃
	Internal resistance	Three times or less of the value at 20℃
Endurance (70℃)	Test time	1000 hours
	Percentage of capacitance change	Within ±30% of the initial measured value
	Internal resistance	Three times or less of the initial specified value
Shelf life (70℃)	Test time : 1000 hours ; same as endurance.	
Applicable standards	Conforms to JIS C5160 - 1 (IEC 62391 - 1)	

Outline Drawing

Unit : mm



ϕD	8	10	12.5	16	18
F	3.5	5.0		7.5	
ϕd	0.6			0.8	
α	2.0				

Product code system : 2.7V10F (*For general product)						
RS*	DDU	106	2R7	F30	300	T
Category code	Series code	capacitance code	Voltage code	Size code	Lead-forming and packing code	Additional code

・Product code is refer to following table and "Product Code System" pages.
・Lead-forming and packing code on this page are for lead long and standard packing products.
For standard packing, please refer to the "PACKING" page.

Standard Ratings

Max. operating voltage (V)	Rated capacitance (F)	Max. Leakage Current (mA) after 24h	ELNA Parts No.	ϕD × L (mm)	Internal resistance (mΩ max.) at 1kHz	Internal DC resistance (mΩ Max.)
2.7	3.3	0.3	RSDDU3352R7E20300T	8 × 20	60	180
2.7	6.8	0.5	RSDDU6852R7F20300T	10 × 20	50	100
2.7	10	0.6	RSDDU1062R7F30300T	10 × 30	30	65
2.7	15	0.8	RSDDU1562R7G25300T	12.5 × 25	25	50
2.7	25	1.0	RSDDU2562R7J25300T	16 × 25	17	35
2.7	33	1.0	RSDDU3362R7J31300T	16 × 31.5	13	25
2.7	50	1.5	RSDDU5062R7K40300T	18 × 40	10	21

NOTE : Design, Specifications are subject to change without notice.
It is recommended that you shall obtain technical specifications from ELNA to ensure that the component is suitable for your use.

1 Description of Electric Double Layer Capacitor

1-1 Basic Concepts

Generally capacitors are constructed with a dielectric placed between opposed electrodes, functioning as capacitors by accumulating charges in the dielectric material. Aluminum electrolytic and tantalum electrolytic capacitors, for example, use an aluminum oxide film and a tantalum oxide film as the dielectric, respectively.

On the other hand, Electric Double Layer Capacitors have no visible dielectric in a general sense but utilize the state referred to as the electric double layer, which is developed naturally on the interface between substances, as the function of dielectric.

1-2 Operating Principle

The Electric Double Layer represents the state in which positive and negative charges exist at a very short distance on the boundary where contact occurs between two different substances (e.g. solid and liquid). By externally applying a voltage below a certain voltage to the boundary, higher charges can be accumulated. Accordingly, charge and discharge of electric double layer capacitors utilize adsorption and desorption of ions to the ionic adsorption layer (Electric Double Layer) formed on the electrode surface of the activated carbon used for electrodes.

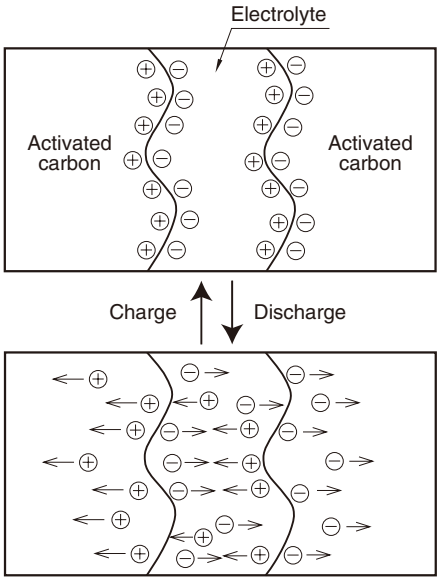


Fig.1 Schematic of Principle of Electric Double Layer Capacitor

Applying DC voltage externally across the electrodes of the Electric Double Layer allows almost no passage of current up to a certain voltage, exhibiting a condition like insulation.
However, the application of voltages exceeding the certain voltage causes electrolysis to occur in the electrolyte, resulting in abrupt passage of current.

This voltage determines the resistance of voltage of an Electric Double Layer Capacitor. We use an organic electrolyte and its standard electrolysis occurs at the voltage of about 2.5 to 3V.

1-3 Advantages and Disadvantages of Electric Double Layer Capacitor

[Advantages]

(1) Small size and capacitance in farads (F) available by utilizing the activated carbon electrode with a large surface area
(2) No special charging circuit and constrains during discharge are required.
(3) No effect on the life through overcharging and overdischarging
(4) Environmentally clean energy

[Disadvantage]

(1) The life is limited due to the use of electrolyte.
(2) Series connection is required when used with a low resistance of voltage at a high voltage.
(3) Cannot be used in AC circuits due to high internal resistance unlike aluminum electrolytic capacitors.

1-4 Construction of DYNACAP

The series which consists of coin cells is similar to that of coin-type batteries as shown in Fig.2. DYNACAP contains a single cell or two to three cells stacked in series.

Since these series have a large electrode-to-electrode distance and a small electrode area exhibiting a large internal resistance, they are suitable for the memory backup application that involves microcurrent discharge.

The cylindrical cell construction as seen in the DZ1 and DZN series has the construction similar to that of aluminum electrolytic capacitors as shown in Fig.3.

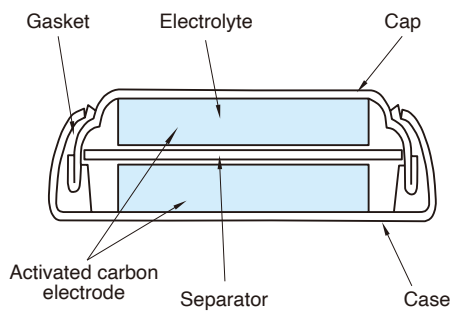


Fig.2 Example of Basic Construction of Coin Cell

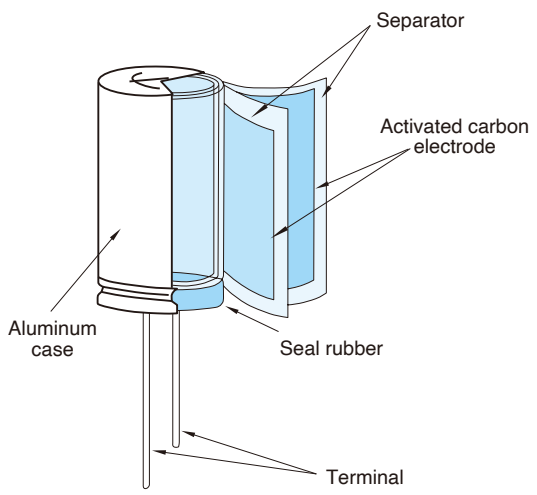


Fig.3 Example of Basic Construction of Cylindrical Cell

These series have a small electrode-to-electrode distance, allowing a large electrode area because of the winding structure. This decreases the internal resistance, which is primary suitable for applications requiring high-power such as motor drive and LED lighting that need high currents.

2 Description of Life Expectancy

Generally, the life of Electric Double Layer Capacitors is largely affected by the ambient temperature.
The expected life is approximated by the equation as shown below:

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

Where,

- L : Expected lifetime at temperature T
- L_0 : Lifetime at temperature T_0
- T : Expected working temperature
- T_0 : Upper category temperature

Note that the above equation does not cover charge and discharge. In the case of charge and discharge, heat generation occurs inside a capacitor; the temperature rise by this heat generation must also be considered.

The expected life time is a maximum as a guide in terms of deterioration of the sealant.
Coin cell type : about ten years
Cylindrical type : about fifteen years

3 Calculation Method of Discharge Time

3-1 Approximating the Discharge Time of Basic Constant Current Discharge

The discharge time at the constant current of a capacitor can be calculated by the following equation.

$$t = (C \times \Delta V)/I$$

Where,

- t : Discharge time (sec.)
- C : Capacitor capacitance (F)
- ΔV : Working voltage range (V)
- I : Discharge current (A)

As an example, we calculate the discharge time when a capacitor of the CB1 series 5.5V 1F is charged with 5V and discharged to 3V at a constant current of 1 mA. Since the working voltage range ΔV is 2V from 5 − 3V, t = (1F × 2V)/0.001A from the above equation, and the discharge time can be calculated as 2,000 seconds (about 33 minutes). Note that the actual discharge time may be different because this equation does not cover the effect of the self-discharge and the IR drop by internal resistance described below.

3-2 Effect of Self-discharge at Microcurrents

When backup is made by discharge with a micro-current below some μA especially for the memory backup application and the like, the discharge time must be determined while taking into account the self-discharge as shown in Fig.4.

The value closer to the actual discharge curve is obtained by adding the voltage drop through the self-discharge determined from the voltage retention characteristic test to the discharge curve given by calculation.

Note that the value of self-discharge varies by the charge time, charging current and an ambient temperature.

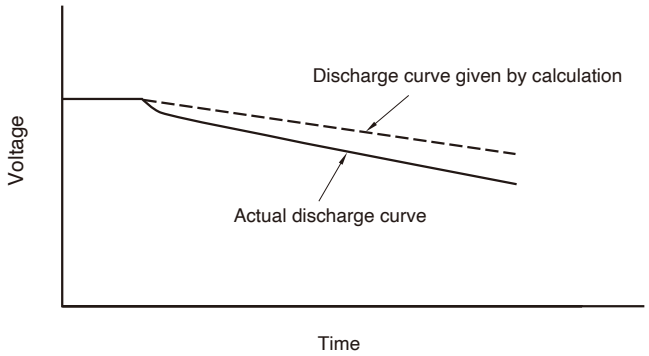


Fig.4 Example of Discharge Curve involving Self-Discharge

3-3 Effect of IR Drop at Large Currents

When a large Current discharge and a capacitor with a high internal resistance are used, the effect of IR drop by the product of the internal resistance and the current must be considered as shown in Fig.5. Moreover, the maximum discharge current of the product (coin cell series) of a memory backup use recommends below 1 mA/F (at20 °C).

When a large current is required in a very short time, or a large instantaneous current flows at the start of discharge, the voltage drop indicated with ΔV1 counts. However, when the discharge continues as it is, the discharge curve indicates in a manner showing a slow diffusion and then keeps a constant straight line.

We also make calculation including ΔV2 of the intersection extending from the initial discharge and the discharge straight line section including the diffusion curve when indicating the DC internal resistance.

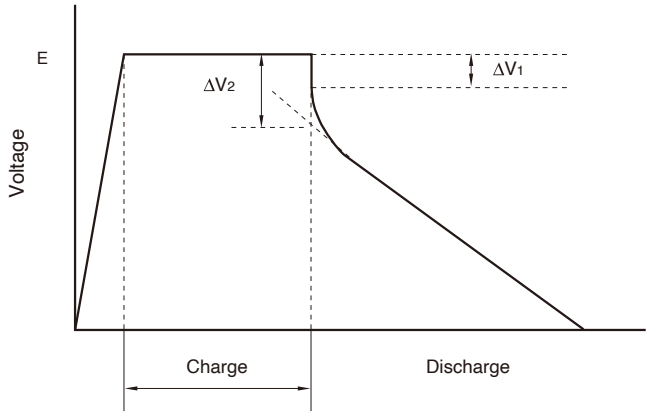


Fig.5 Example of Discharge Curve involving IR Drop

Due to IR drop, the shape of the discharge curve varies by the internal resistance and ambient temperature for each series.

4 Moisture-proof provision

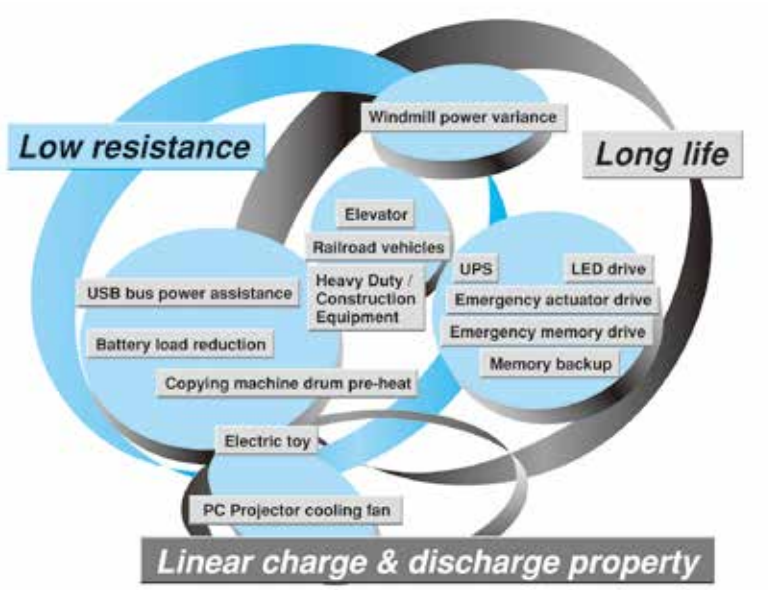
If a electric double layer capacitor is used in a heat-and-high-humidity environment, the characteristic will deteriorate.
Please consult when using in a heat and high humidlty environment.

5 Regarding Recovery Voltage

After charging and then discharging the electric double layer capacitor, and further causing short-circuit to the terminals and leave them alone, the voltage between the two terminals will rise again after some interval. This voltage is called recovery voltage.
This voltage may cause the bad influence to the low-voltage driven components (CPU, memory, etc.) or damage of the capacitor with soldering.
Discharging before use is safer. It is important especially when using it by series connection.
Moreover, it is possible making the terminals in short-circuit condition at the production stage. Please consult us for adequate procedures.

6 Applications

Features & Benefits of Electric Double Layer Capacitor



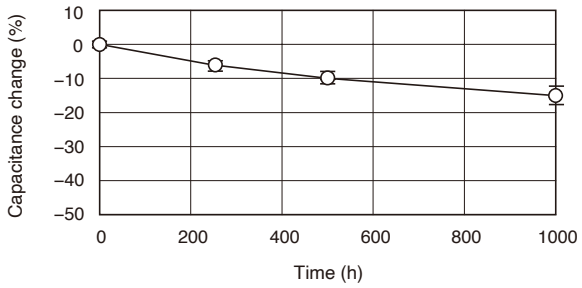
7 Electric Characteristics Data

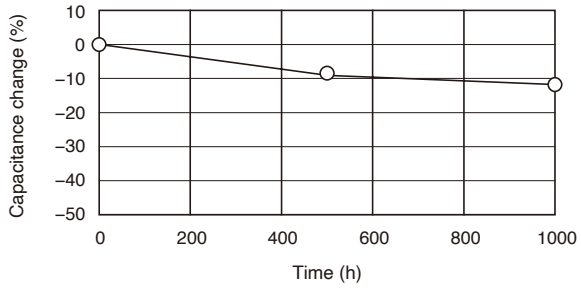
7-1 Coin type for memory back-up

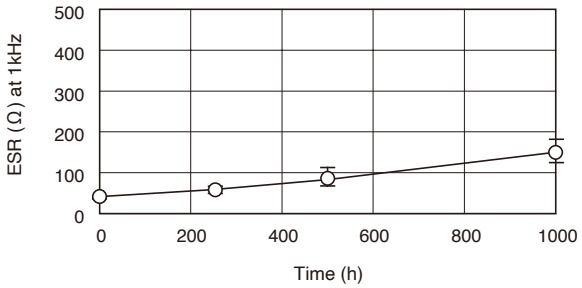
DYNACAP Series CXJ
5.5V 0.33F ϕ11.5×5L (mm)

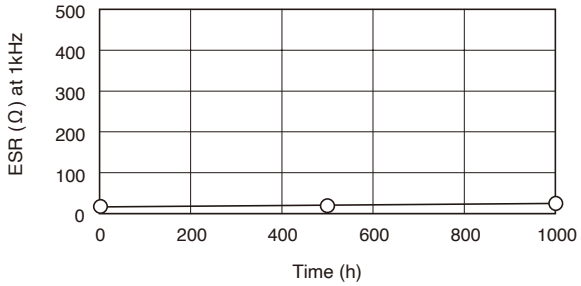
DYNACAP Series CHL
5.5V 0.22F ϕ13.5×9.5L (mm)

■ Endurance (85℃ 5.5V.DC)

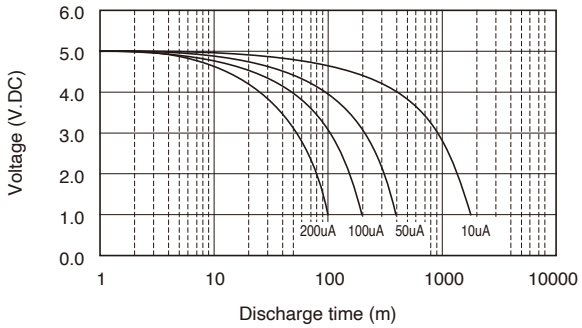


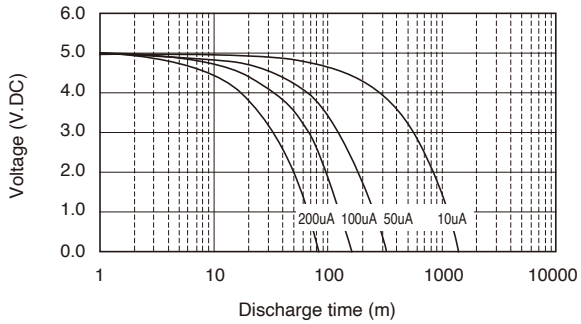




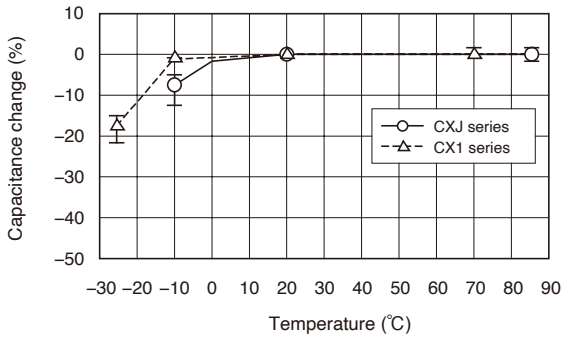


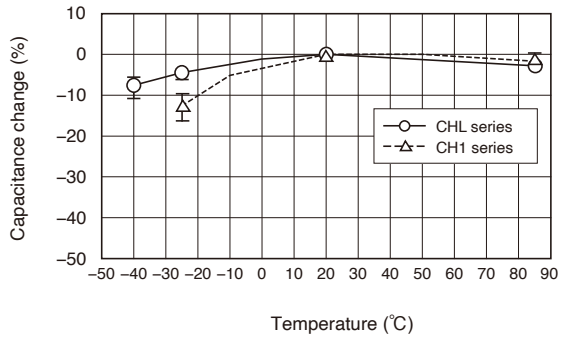
■ Discharge characteristics

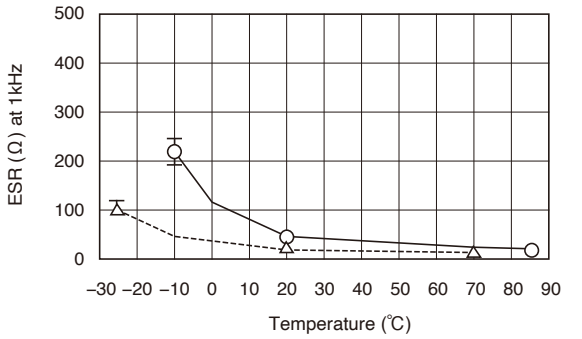


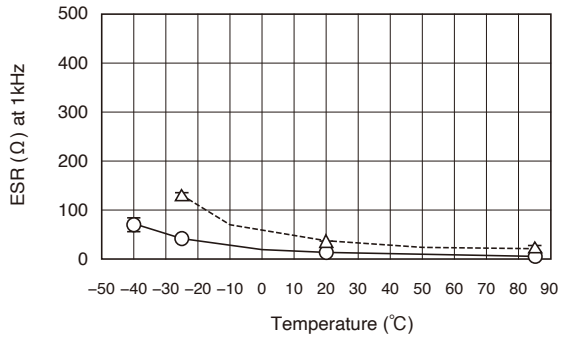


■ Characteristics at high and low temperature









NOTE : Design, Specifications are subject to change without notice.
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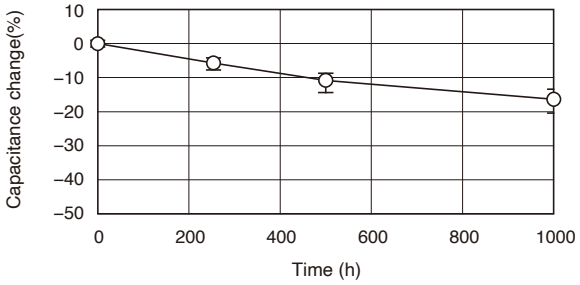
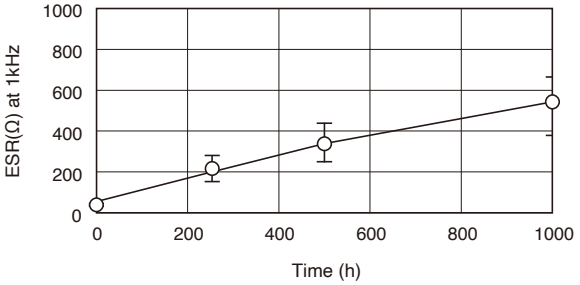
from ELNA to ensure that the component is suitable for your use.

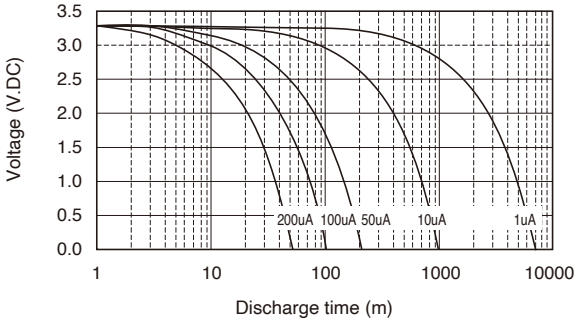
DYNACAP Series CSK
3.3V 0.2F ϕ6.8×1.4 L (mm)

■ Endurance (60℃ 3.3V.DC)

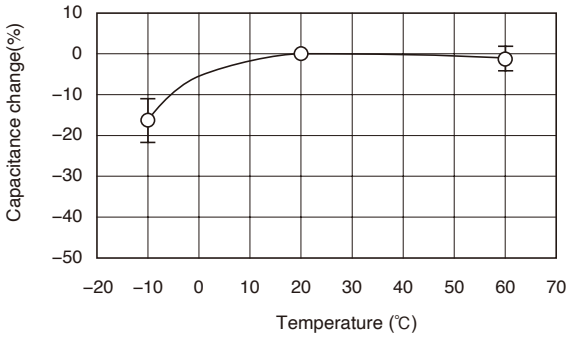


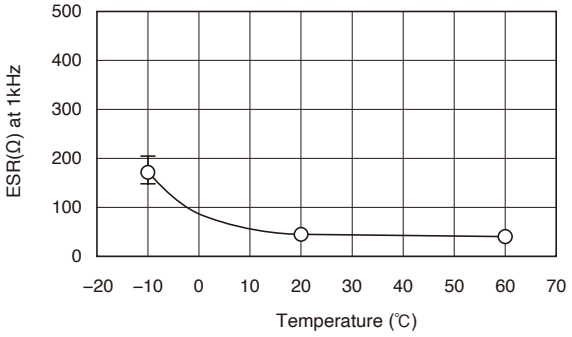


■ Discharge characteristics



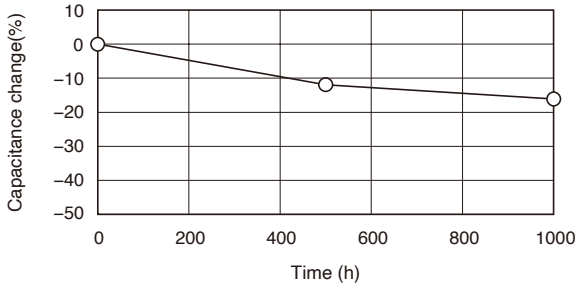
■ Characteristics at high and low temperature

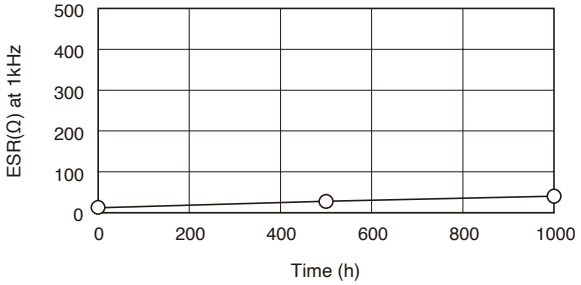


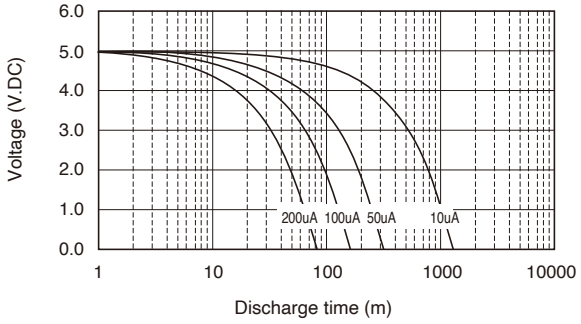


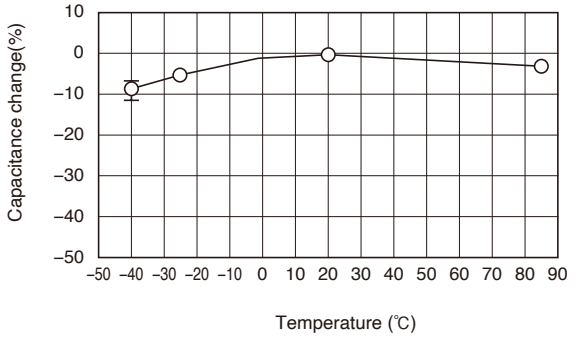
DYNACAP Series CVL
5.5V 0.22F ϕ12.5×10.5L (mm)

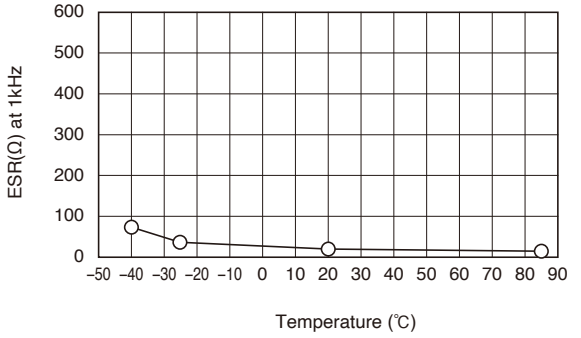
■ Endurance (85℃ 5.5V.DC)











NOTE : Design, Specifications are subject to change without notice.
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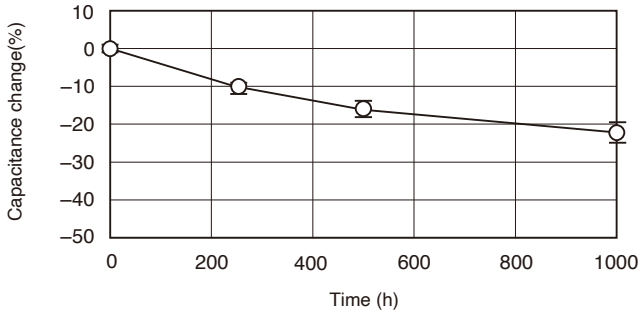
from ELNA to ensure that the component is suitable for your use.

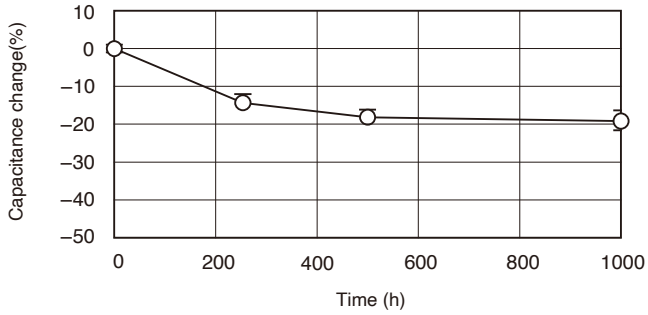
7-2 Cylindrical type for power

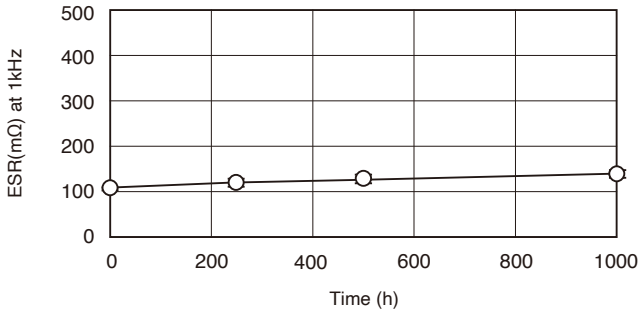
DYNACAP Series DZN
2.7V 2.7F ϕ8×20L (mm)

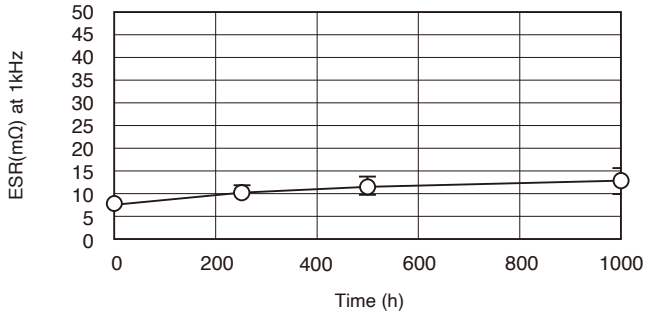
DYNACAP Series DDU
2.7V 25F ϕ16×25L (mm)

■ Endurance (70℃ 2.7V.DC)

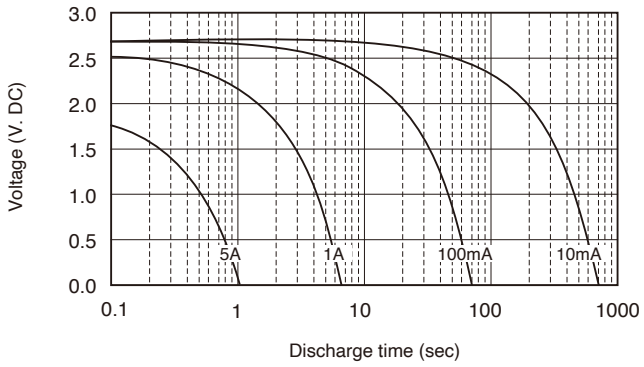


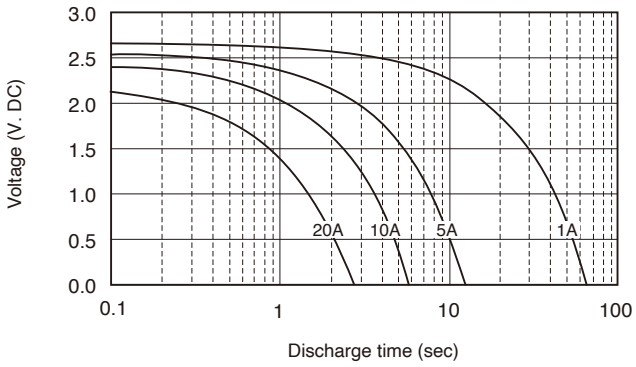




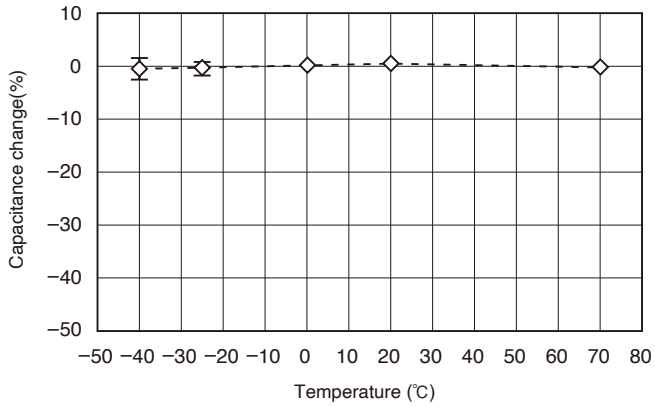


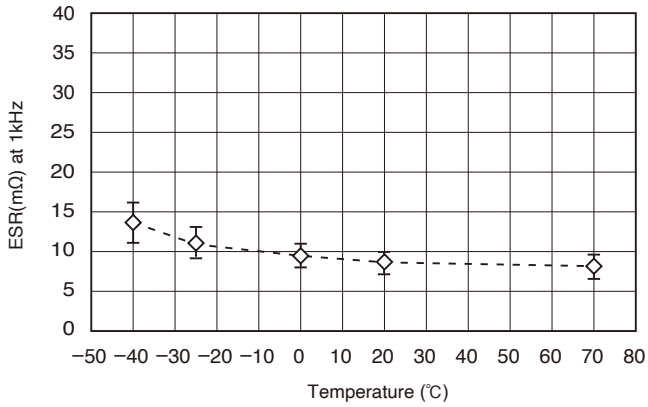
■ Discharge characteristics





■ Characteristics at high and low temperature DYNACAP Series DDU : 2.7V 25F ϕ16×25L(mm)





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