



Electronic Components

High Quality

CAPACITORS

CONDUCTIVE POLYMER HYBRID ALUMINUM ELECTROLYTIC CAPACITORS

ALUMINUM ELECTROLYTIC CAPACITORS WITH CONDUCTIVE POLYMER SOLID ELECTROLYTE

ALUMINUM ELECTROLYTIC CAPACITORS

ELNA

TAIYO YUDEN

Certifications of Quality Management System (as of Sep. 2017)

Factory	Applicable Standard	Certification Number	Item	Applicable Organization
ELNA TOHOKU CO., LTD. AOMORI Factory (Japan) ELNA CO., LTD. SHIRAKAWA Tech. (Japan)	ISO 9001	JP05/060268	Aluminum electrolytic capacitors Aluminum Electrolytic Capacitors With Conductive Polymer Solid Electrolyte Electric double layer capacitors	SGS
	ISO/TS 16949	IATF0256654 SGS JP14/062589	Aluminum electrolytic capacitors Aluminum Electrolytic Capacitors With Conductive Polymer Solid Electrolyte	SGS
TANIN ELNA CO., LTD. (Thailand)	ISO/TS 16949	IATF0216504 44 111 060686	Aluminum electrolytic capacitors Electric double layer capacitors	TÜV
	ISO 9001	44 100 990506	Aluminum electrolytic capacitors Electric double layer capacitors	TÜV
ELNA-SONIC SDN. BHD. (Malaysia)	ISO/TS 16949	IATF0246007 SGS MY04/0675	Aluminum electrolytic capacitors	SGS
	ISO 9001	SG02/20012	Aluminum electrolytic capacitors	SGS

Certifications of Environmental Management System (as of Sep. 2017)

Factory	Applicable Standard	Certification Number	Applicable Organization
ELNA TOHOKU CO., LTD. AOMORI Factory (Japan)	ISO 14001	JQA-EM2918	Japan Quality Assurance (JQA)
TANIN ELNA CO., LTD. (Thailand)	ISO 14001	04104 990506	TÜV
ELNA-SONIC SDN. BHD. (Malaysia)	ISO 14001	MY03/60718	SGS

Be sure to read “Cautions for Using Electrolytic Capacitors”, before using those products.

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Aluminum Electrolytic Capacitors

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ALUMINUM

Polymer hybrid type aluminum Electrolytic Capacitors

Aluminum Electrolytic Capacitors With Conductive Polymer Solid Electrolyte

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POLYMER
HYBRID

Chip Type Aluminum Electrolytic Capacitors

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CHIP
ALUMINUM

Miniature Type Aluminum Electrolytic Capacitors

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MINIATURE
ALUMINUM

Large Capacitance Aluminum Electrolytic Capacitors

101

LARGE
ALUMINUM

Aluminum Electrolytic Capacitors for Audio

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FOR AUDIO
ALUMINUM

■ Please read this notice before using the ELNA Products.**! REMINDERS**

- Product information in this catalog is as of October 2017. All of the contents specified herein are subject to change without notice due to technical improvements, etc. Therefore, please check for the latest information carefully before practical application or use of the products listed in this catalog.

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

- Please contact TAIYO YUDEN for further details of product specifications as the individual product specification sheets are available.
- Please conduct validation and verification of the products listed in this catalog in actual condition of mounting and operating environment before using the products.
- The products listed in this catalog are intended for 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). Please be sure to contact TAIYO YUDEN for further information before using the products for any equipment which may directly cause loss of human life or bodily injury (e.g., transportation equipment including, without limitation, automotive powertrain control system, train control system, and ship control system, traffic signal equipment, disaster prevention equipment, medical equipment classified as Class I, II or III by IMDRF, highly public information network equipment including, without limitation, telephone exchange, and base station).

Please do not incorporate the products listed in this catalog into any equipment requiring high levels of safety and/or reliability (e.g., aerospace equipment, aviation equipment, medical equipment classified as Class IV by IMDRF, nuclear control equipment, undersea equipment, military equipment).

When the products listed in this catalog are used even for high safety and/or reliability-required devices or circuits of general electronic equipment, it is strongly recommended to perform a thorough safety evaluation prior to use of the products and to install a protection circuit as necessary.

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- The contents of this catalog are applicable to the products listed in this catalog which are purchased from our sales offices or authorized distributors (hereinafter "TAIYO YUDEN's official sales channel"). Please note that the contents of this catalog are not applicable to the products purchased from any seller other than TAIYO YUDEN's official sales channel.
- Caution for Export
Some of the 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.

■ “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

Pb : lead, Cr⁶⁺ : hexavalent chromium, Hg : mercury and Cd : cadmium,
PBB : the polybrominated biphenyl, PBDE : the polybromo-diphenyl ether,

■ Regarding to various environmental Regulations

- It suits “EU RoHS Directives”.
- According to the content of RIP3.8TGD(Technical Guidance Document which is published on 26 May 2008), our electronic components are “articles without any intended release”.

Therefore they are not applicable for “Registration” for EU REACH Regulation Article 7 (1).

ELNA develops the products without substance of very high concern(SVHC). DEHP(CASNo.117-81-7) was contained as some covering material.

- If you need “Halogen-Free” products, please consult with us.

Terminal area plating material and sleeve material

● Aluminum (Polymer hybrid,Conductive Polymer Solid Electrolyte) electrolytic capacitors

Category		Terminal area plating	Plating thickness	Sleeve
SMD (Chip type)	φ 4 to 6.3	Sn-Bi	12μm	Sleeve less
	φ 8,10	Sn-Bi	12μm	PET or sleeve less
	φ 12.5	Sn 100%	12μm	Sleeve less
	φ 16 to 18	Sn 100%	12μm	Sleeve less
	Supplementary terminal of RT* type	Sn 100%	12μm	—
	RY* type	Sn 100%	12μm	Sleeve less
Lead terminal		Sn 100%	12μm	PET or sleeve less
Snap-in		Sn 100%	12μm	PET

Note : Sn : Tin Bi : Bismuth

Please inquire when hoping excluding the above-mentioned terminal plating and sleeve.

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 (flat box)	Taping (reel)	
			(Q'ty/Bag)	MOQ/Box	(Q'ty/Bag)	MOQ/Box	MOQ/Box	MOQ/Reel	(Q'ty/Bag)
Aluminum Electrolytic Capacitors With Conductive Polymer Solid Electrolyte Conductive Polymer Hybrid Aluminum Electrolytic Capacitors	Chip Type	φ5 to φ6.3×4.5 to 7.7	—	—	—	—	—	1,000	5,000
		φ8×6.7 to 7.7	—	—	—	—	—	1,000	5,000
		φ8×8.7 to 10.5, φ10×7.7 to 10.5	—	—	—	—	—	500	2,000
		φ10×12.5	—	—	—	—	—	400	1,600
Chip Type		φ4	—	—	—	—	—	2,000	10,000
		φ5 to φ6.3×4.5 to 7.7, φ8×6.5	—	—	—	—	—	1,000	5,000
		φ8 to φ10×10 to 10.5	—	—	—	—	—	500	2,000
		φ12.5×13.5	—	—	—	—	—	200	1,000
		φ16×16.5, φ18×16.5	—	—	—	—	—	125	375
		φ16×21.5, φ18×21.5	—	—	—	—	—	75	225
		9.5×19 to 24	—	—	—	—	—	400	2,000
O4 Type		φ4 to φ5×5, φ4×7	200	2,000	200	5,000	2,000	—	—
		φ5×7	200	2,000	200	4,000	2,000	—	—
		φ6.3×5, φ6.3×7	200	2,000	200	2,000	2,000	—	—
		φ8×5 to 7	200	2,000	200	2,000	1,000	—	—
		φ5 to φ6.3×11, 11.5	200	2,000	200	2,000	2,000	—	—
		φ8×11.5, 12	200	2,000	200	2,000	1,000	—	—
		φ8×15	200	1,000	200	1,000	1,000	—	—
		φ8×20	200	1,000	200	1,000	1,000	—	—
		φ10×12.5	200	1,000	200	1,000	500	—	—
		φ10×16	200	1,000	200	1,000	500	—	—
		φ10×20	200	1,000	100 (200)	500 (1000)	500	—	—
		φ10×25 to 30	200	1,000	100	500	500	—	—
		φ12.5×15 to 20	100	1,000	100 (200)	1000 (200)	500	—	—
		φ12.5×25	100	500 (100)	100 (200)	1000 (200)	500	—	—
		φ12.5×30	100	500 (100)	200	2000 (200)	500	—	—
		φ12.5×35	100	500	200	2000 (200)	500	—	—
		φ12.5×40	100	500 (100)	200 (100)	2000 (100)	—	—	—
		φ16×16 to 25	100	500	100	1000 (100)	—	—	—
		φ16×31.5 to 35.5	50	200 (400)	100	1000 (100)	—	—	—
		φ16×40	50 (100)	100	100	800 (100)	—	—	—
		φ18×16	50	100	100	1,000	—	—	—
		φ18×20 to 25	50 (100)	100 (500)	100	1000 (100)	—	—	—
		φ18×31.5 to 35.5	50 (100)	100	100	1000 (100)	—	—	—
		φ18×40 to 50	50 (100)	250 (100)	100	800 (100)	—	—	—
LA*, LT*		φ22 to φ25	—	100					
		φ30 to φ35	—	50					

(Note) In the case of RH* series, please see the inside of each parenthesis.

* Please inquire.



Aluminum Electrolytic Capacitors

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Type List for Aluminum Electrolytic Capacitors

★ : New series
☆ : Upgrade

● Aluminum (Conductive Polymer, Hybrid) Electrolytic Capacitors

Category	Series	Page	Application	Category Temp. Range (°C)		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.			
Hybrid	HV	28	Low ESR Hybrid Polymer Chip	-55	+105	10000	25	100	10	560	6.3×5.8	10×12.5	Silver	32	☆
	HT	28	Low ESR Hybrid Polymer Chip, Vibration resistance	-55	+105	10000	25	100	15	560	8×10	10×12.5	Silver	32	☆
	HVK	30	Low ESR, 125°C, Hybrid Polymer Chip	-55	+125	4000	25	100	10	560	6.3×5.8	10×12.5	Silver	32	☆
	HTK	30	Low ESR, 125°C, Hybrid Polymer Chip, Vibration resistance	-55	+125	4000	25	100	15	560	8×10	10×12.5	Silver	32	☆
Polymer	PVG	—	Ultra Low ESR Conductive Polymer Chip	-55	+105	2000	2.5	6.3	120	1200	5×5.7	10×7.7	Silver	32	
	PVX	—	Ultra Low ESR Conductive Polymer Chip	-55	+105	2000	2.5	10	100	1200	5×5.7	10×7.7	Silver	32	
	PVM	—	Super Low ESR Conductive Polymer Chip	-55	+105	2000	2.5	16	33	1200	5×5.7	10×7.7	Silver	32	
	PVK	32	Super Low ESR, High Temp. Conductive Polymer Chip	-55	+125	1000	2.5	16	33	1000	6.3×5.7	10×7.7	Silver	32	
	PRM	—	Super Low ESR Conductive Polymer, lead terminal type	-55	+105	2000	2.5	10	220	1500	6.3×8.0	10×12.5	Silver	04	

● Chip Type Aluminum Electrolytic Capacitors

Category	Series	Page	Application	Category Temp. Range (°C)		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	RV4	—	4.5mm L	-40	+85	2000		6.3	50	0.22	100	4×4.5	6.3×4.5	Silver	32	
	RV5	—	High CV	-40	+85	2000		6.3	100	0.22	2200	4×5.3	12.5×13.5	Silver Brown	32	
	RVB	—	Non Polarized	-40	+85	2000		6.3	50	0.22	47	4×5.3	6.3×5.3	Silver	32	
High Reliability	RVE	—	105°C , 4.5mm L	-40	+105	1000		6.3	50	0.22	100	4×4.5	6.3×4.5	Silver	32	
	RVS	—	105°C , 5.5mm L	-55	+105	1000		6.3	50	0.22	1500	4×5.3	10×10.5	Silver	32	
	RVL	—	105°C , 5.5mm L	-55	+105	2000		6.3	50	0.22	100	4×5.7	6.3×5.7	Silver	32	
	RVJ	—	105°C, Higher Capacitance	-55	+105	2000	5000	6.3	100	10	1000	8×6.5	12.5×13.5	Silver Brown	32	
	RVR	42	105°C, Long Life, High CV	-40	+105	2000		4	50	0.22	1500	4×5.3	10×10.5	Silver	32	
	RVI	—	105°C , Non Polarized, 2000h	-40	+105	2000		6.3	50	0.33	47	4×5.8	6.3×5.8	Silver	32	
	RVC	44	105°C, 3000h/5000h	-40	+105	3000	5000	6.3	50	0.33	1000	4×5.8	10×10	Silver	32	
Low Impedance, Low ESR, High Reliability	RVZ	—	105°C , Low Impedance	-55	+105	1000	5000	6.3	35	4.7	2700	4×5.3	12.5×13.5	Silver Brown	32	
	RVD	46	105°C , Low Impedance, Long life	-55	+105	2000	5000	6.3	100	4.7	2200	4×5.8	12.5×13.5	Silver	32	
	RVV	48	105°C , Low Impedance, High CV	-55	+105	2000		6.3	35	4.7	1500	6.3×5.8	10×10	Silver	32	☆
	RZD	50	105°C , Low Impedance, High CV	-55	+105	2000		6.3	35	22	2200	6.3×5.8	10×10	Silver	32	☆
	RVT	52	125°C , Low ESR	-40	+125	1000	2000	10	100	4.7	1000	4×5.8	12.5×13.5	Silver	32	
	RZF	54	125°C , Low ESR, Long Life, High CV	-40	+125	2000	4000	10	35	47	680	6.3×5.8	10×10	Silver	32	☆
	RVX	56	135°C, Higher Reliability	-40	+135	1000		25	35	22	330	8×10	10×10	Silver	32	
For Vibration Resistance	RTZ	58	105°C, Low Z, High CV, 30G Vibration resistance	-55	+105	2000	5000	6.3	35	150	8200	8×10	18×21.5	Silver	32	
	RTD	59	105°C, Low Z, High CV, 30G Vibration resistance	-55	+105	5000		6.3	100	100	8200	8×10.5	18×21.5	Silver	32	
	RTT	60	125°C, Low ESR, High CV, 30G Vibration resistance	-40	+125	2000	5000	10	100	47	4700	8×10	18×21.5	Silver	32	
	RTQ	61	150°C, Low ESR, High CV, 30G Vibration resistance	-40	+150	1000		10	35	33	470	8×10	10×10	Silver	32	★
	RYK	62	125°C , Horizontal type	-40	+125	1000		6.3	63	56	820	9.5×19.0	9.5×24.0	Black	88	

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

■ Type List for Aluminum Electrolytic Capacitors

★ : New series
☆ : Upgrade

● Miniature Aluminum Electrolytic Capacitors

Category	Series	Page	Application	Category Temp. Range (°C)		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 profile	RC3	—	5mmL, Standard	−40	+85	1000		4	50	0.33	470	4×5	8×5	Blue	04	
	R3S	—	5mmL, 105°C	−55	+105	1000		6.3	50	0.33	100	4×5	6.3×5	Black	04	
	RB3	—	5mmL, Bipolar	−40	+85	1000		6.3	50	0.33	47	4×5	6.3×5	Blue	04	
	RC2	—	7mmL, Standard	−40	+85	1000		4	100	0.33	330	4×7	8×7	Blue	04	
	R2S	—	7mmL, 105°C	−55	+105	1000		6.3	50	0.33	100	4×7	6.3×7	Black	04	
	RB2	—	7mmL, Bipolar	−40	+85	1000		6.3	50	0.33	47	4×7	6.3×7	Blue	04	
Standard	RE3	—	Miniaturized Standard	−40	+85	2000		6.3	450	0.47	22000	5×11	18×40	Blue	04	
	R2B	—	Bipolarity Standard	−40	+85	2000		6.3	100	1	4700	5×11	18×35.5	Blue	04	
	RJP	—	105°C, Bipolar	−40	+105	1000	2000	6.3	50	1	6800	5×11	18×35.5	Black	04	
	RJ5	—	105°C, Miniaturized, High CV	−55 −40	+105	1000 1000	2000 2000	6.3 160	100 450	1 1	22000 470	5×11 6.3×11	18×40 18×40	Black	04	
	RJ4	—	105°C, Miniaturized	−55 −40	+105	1000 1000	2000 2000	6.3 160	100 450	1 1	22000 330	5×11 6.3×11	18×40 18×35.5	Black	04	
	RJ3	—	105°C, Low Impedance	−55 −40	+105	1000 1000	2000 2000	6.3 160	100 400	1 1	15000 220	5×11 6.3×11	18×35.5 18×40	Black	04	
	RLB	—	Low-leakage Current	−40	+85	1000		6.3	50	1	2200	5×11	18×35.5	Blue	04	
Special	RLB	—	Low-leakage Current	−40	+85	1000		6.3	50	1	2200	5×11	18×35.5	Blue	04	
Low Impedance, Low ESR, High Reliability	RJB	64	105°C, Low Impedance, Miniaturized	−55	+105	2000	5000	6.3	100	3.3	10000	5×11.5	16×31.5	Black	04	
	RJH	66	105°C, Extra Low Impedance	−55	+105	2000	5000	6.3	100	1	15000	5×11.5	18×40	Black	04	
	RJF	69	105°C, Extra Low Impedance, Miniaturized	−40	+105	1000	10000	6.3	100	5.6	6800	4×7	16×25	Black	04	
	RJL	72	105°C, Long life, Low Impedance	−40	+105	4000	10000	6.3	100	6.8	6800	5×11.5	16×25	Black	04	
	RJM	74	105°C, Long life, Low Impedance	−40	+105	5000	10000	6.3	50	27	8200	5×11.5	16×25	Black	04	
	RJD	76	105°C, Low ESR, High Ripple, Miniaturized	−55	+105	2000	8000	6.3	35	10	18000	5×11.5	18×40	Black	04	
	RKD	86	125°C, Low ESR, Miniaturized	−40	+125	2000	5000	10	35	100	6800	8×12	18×40	Black	04	
	RKB	88	135°C, Low ESR, Miniaturized	−40	+135	2000	3000	10	100	220	6800	10×12.5	18×40	Silver	04	
	RKC	90	135°C, Low ESR, Miniaturized	−40	+135	2000	3000	25	80	270	12000	12.5×20	18×40	Silver	04	★
	RQA	92	150°C, Miniaturized	−40	+150	1000		10	35	220	4700	10×14.5	18×42.5	Silver	04	
For Air bag	RJE	79	105°C, Low ESR, High Ripple, For Airbag	−55	+105	5000		25	35	830	11000	12.5×15	18×40	Black	04	
For Vibration Resistance	RPK	94	125°C, Low ESR, 30G Vibration resistance	−40	+125	5000		10	35	470	6800	12.5×15	18×40	Black	04	
	RKE	96	125°C, Low ESR, 40G Vibration resistance	−40	+125	5000		25	35	1500	6800	16×31.5	18×40	Silver	04	
	RKF	98	135°C, Low ESR, 40G Vibration resistance	−40	+135	2000	3000	25	80	290	8200	12.5×25	18×40	Silver	04	★
	RKG	100	150°C, Low ESR, 40G Vibration resistance	−40	+150	1000	2000	25	35	2700	3900	18×42		Silver	04	★
High Ripple, long Life	RHS	80	105°C, Long Life, High Ripple, For Ballast	−40 −25	+105	4000	5000	160 350	250 450	4.7 1	560 220	10×12.5	18×50	Black	04	
	RHC	82	105°C, Long Life, High Ripple, For Ballast	−25	+105	5000	10000	160	450	1	680	10×12.5	18×50	Black	04	
	RHD	84	105°C, Long Life, High Ripple, For Ballast	−25	+105	8000	12000	160	450	3.3	680	10×12.5	18×50	Black	04	

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

Type List for Aluminum Electrolytic Capacitors

★ : New series
☆ : Upgrade

Large Capacitance Aluminum Electrolytic Capacitors

Category	Series	Page	Application	Category Temp. Range (°C)		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.			
Snap-in	LA5	—	Miniaturized	—40	+85	2000	10	400	82	150000	22×20	35×50	Black	692	
	LAH	103	105°C, Standard	—25	+105	2000	—	450	68	820	22×20	35×50	Black	692	☆
	LAT	106	105°C, Miniaturized	—25	+105	2000	16	100	390	82000	22×20	35×50	Black	692	☆
	LAZ	108	High-Reliability, High Ripple, Long Life	—25	+105	3000	160	450	56	2200	22×20	35×50	Black	692	☆
	LAX	112	105°C, Ultra Long Life	—25	+105	5000	160	500	39	3300	22×20	35×50	Black	692	☆
	LJ6	114	105°C, Higher Capacitance, Ultra Long Life	—25	+105	5000	200	500	390	3900	35×60	40×100	Black	—	
	LJ2	—	105°C, Higher Capacitance, Ultra Long Life	—25	+105	5000	200	500	560	3900	40×60	40×100	Black	—	
Special	LPM	—	High ripple current	—25	+85	2000	250	400	45	220	35×40	35×50	Black	692	
	LM	—	High ripple current, Higher Capacitance	—25	+85	2000	250	400	90	440	35×80	40×100	Black	—	
Screw terminal	LYX	—	105°C, Ultra Long Life	—25	+105	5000	350	450	1000	15000	51×75	90×236	Black	331	
	LYL	—	Ultra Long Life	—40	+85	20000	350	450	1000	15000	51×75	90×236	Black	331	
	LY6	—	High Ripple, Miniaturized	—25	+85	5000	400	600	1000	22000	51×115	101×237	Black	331	
	LY5	—	Standard	—40	+85	2000	10	250	1500	820000	36×53	101×220	Black	331	

Aluminum Electrolytic Capacitors for Audio

Category	Series	Page	Application	Category Temp. Range (°C)		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	RVO	118	Chip Type (PURECAP)	—40	+85	2000	6.3	50	0.33	1000	4×5.3	10×10	Silver Brown	32	
	RVF	119	Chip Type (SILMIC)	—40	+85	2000	10	50	1	100	4×5.3	8×10	Silver	32	
	RVM	120	Chip Type 105°C, 2000h	—55	+105	2000	6.3	50	1	470	4×5.8	10×10.5	Silver	32	
	RVG	121	Chip Type	—40	+85	2000	6.3	35	3.3	470	4×5.3	10×10	Silver	32	
	RFS	122	High Grade (SILMIC II)	—55	+85	1000	6.3	100	3.3	3300	5×11	18×40	Brown	04	
	ROS	123	High Grade (SILMIC)	—40	+85	1000	16	100	10	2200	6.3×11	18×40	Brown	04	
	ROB	—	Miniaturized Standard (TONEREX)	—40	+85	1000	6.3	100	1	10000	5×11	18×40	Black	04	
	RFO	—	Standard (PURECAP)	—40	+85	1000	6.3	100	1	15000	5×11	18×35.5	Black	04	
	RA3	—	Miniaturized Standard	—40	+85	2000	6.3	100	1	22000	5×11	18×35.5	Brown	04	
	RW5	124	105°C, Miniaturized	—55	+105	1000	16	25	100	15000	5×11.5	18×40	Black	04	
	RBD	—	Miniaturized Bipolar	—40	+85	2000	6.3	100	1	4700	5×11	18×35.5	Black	04	
	LAO	—	For Audio, Higher Capacitance	—40	+85	1000	16	100	680	10000	22×20	35×50	Black	692	

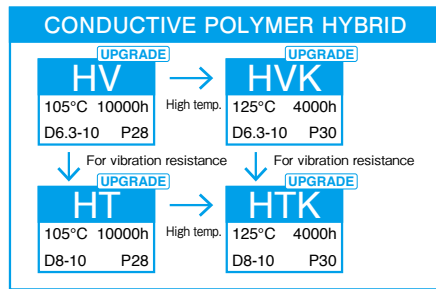
* Be sure to "Cautions for using Aluminum Electrolytic capacitors", before using these products.

Dis-continued & not recommended items (These are not inserted at this catalog. Please consult, when you want to newly use.)

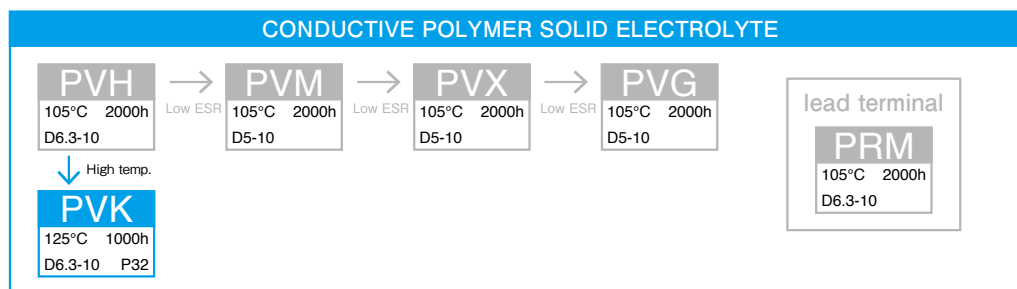
Category	Series	Application	Category Temp. Range (°C)		Life time Range (hours)		Rated Voltage Range (V.DC)		Rated Capacitance Range (μF)		Size range φD x L (mm)		Substitute series to recommend
			Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	
Chip	RV2	85°C, 5.5mm L, Standard	—40	+85	2000		4	50	0.1	220	3×5.3	6.3×5.3	—
	RV3	85°C, High CV	—40	+85	2000		6.3	50	4.7	330	4×5.3	6.3×7.7	—
	RV	85°C, Large Capacitance	—40	+85	2000		6.3	100	10	2200	8×6.5	12.5×13.5	—
	RVK	125°C, Standard	—40	+125	1000	5000	10	63	10	1000	8×10	12.5×13.5	RVT
	RTJ	105°C, Vibration resistance	—55	+105	2000		6.3	100	10	470	8×10	10×10.5	RTZ
For Audio	RTK	125°C, Vibration resistance	—40	+125	1000	1250	10	63	10	330	8×10	10×10.5	RTT
	RVW	105°C, Chip Type (PURECAP)	—55	+105	1000		6.3	50	0.33	470	4×5.3	10×10	Please consult

■ Systematized Classification of Aluminum Electrolytic Capacitors

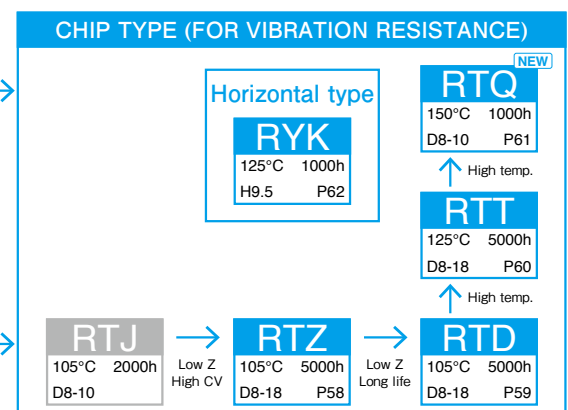
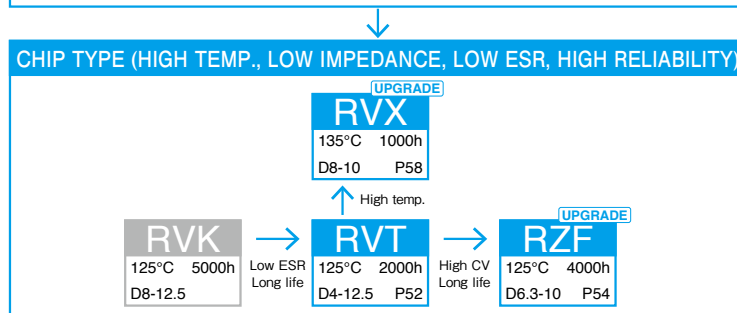
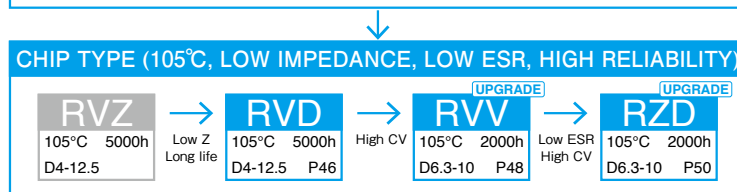
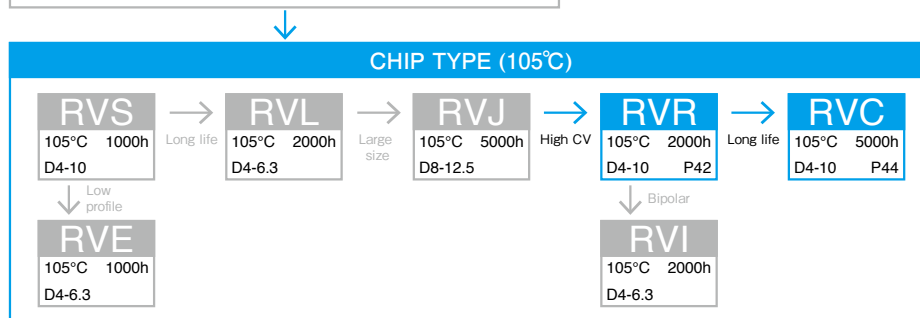
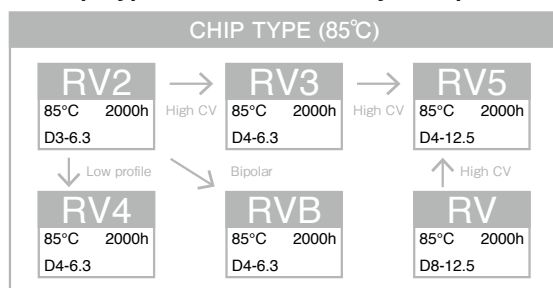
● Conductive Polymer Hybrid Aluminum Electrolytic Capacitors



● Aluminum Electrolytic Capacitors with Conductive Polymer Solid Electrolyte



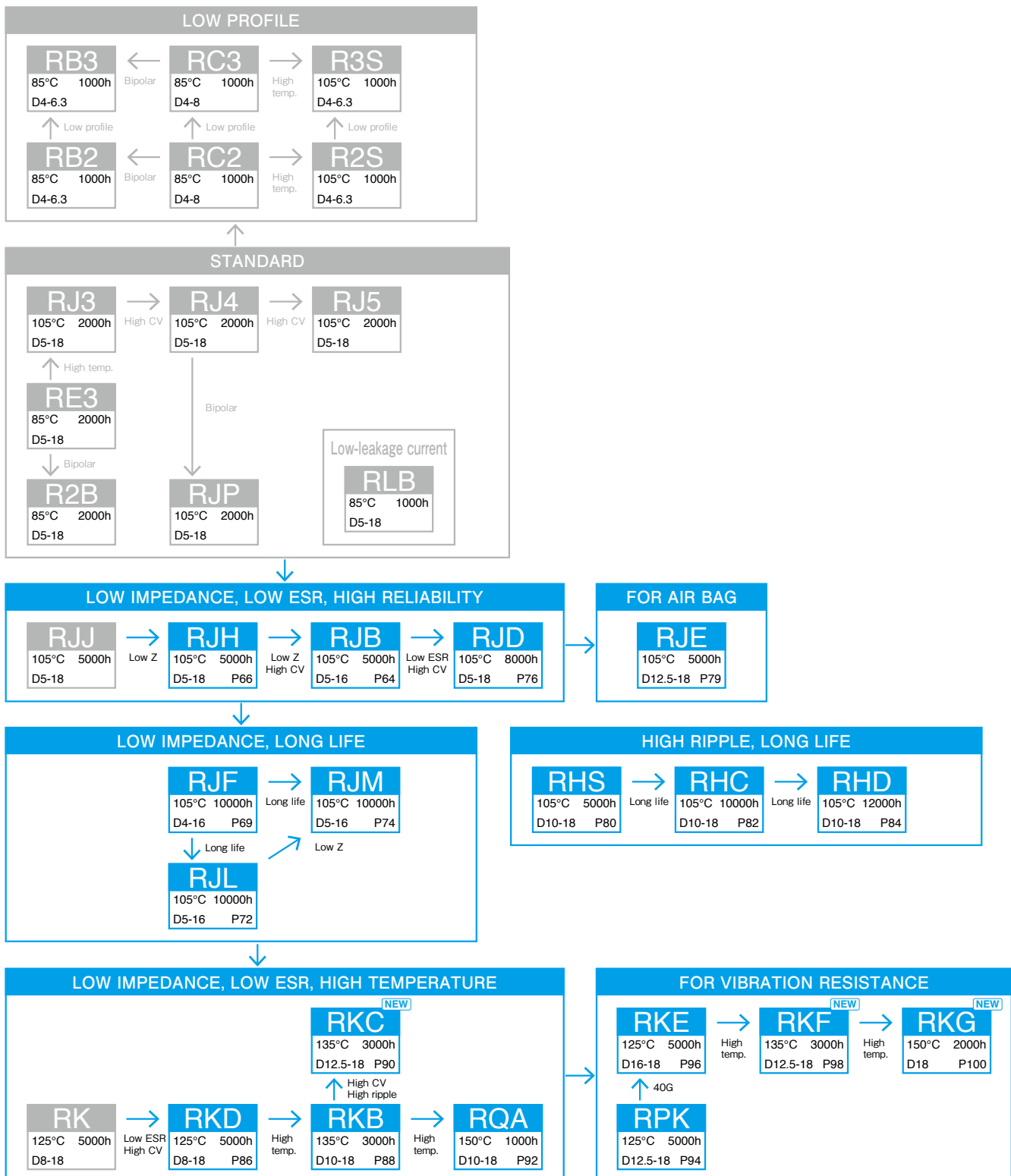
● Chip Type Aluminum Electrolytic Capacitors



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.

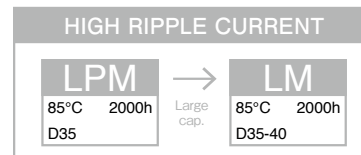
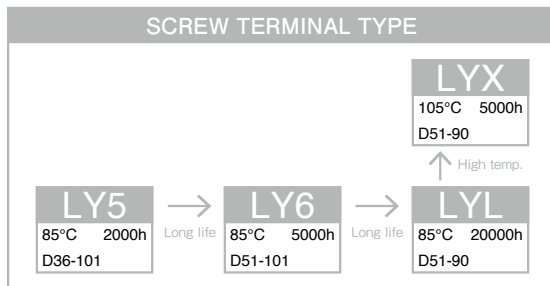
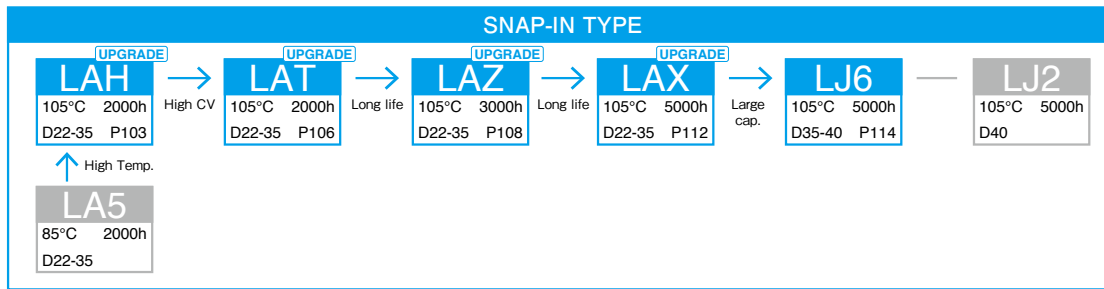
Systematized Classification of Aluminum Electrolytic Capacitors

Miniature Aluminum Electrolytic Capacitors

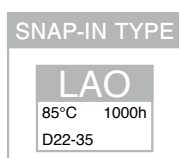
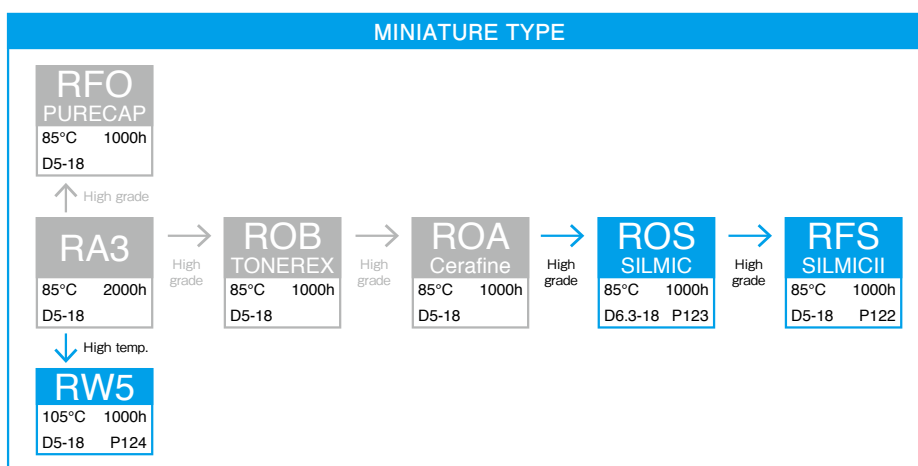
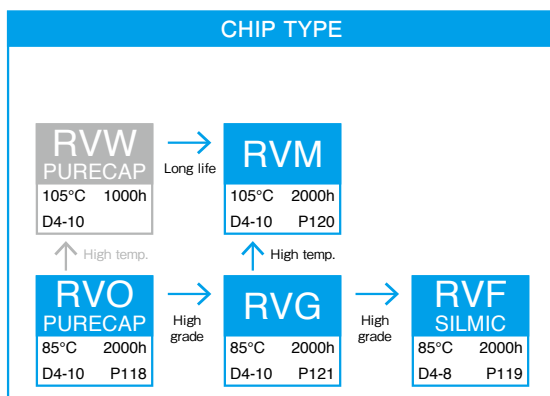


■ Systematized Classification of Aluminum Electrolytic Capacitors

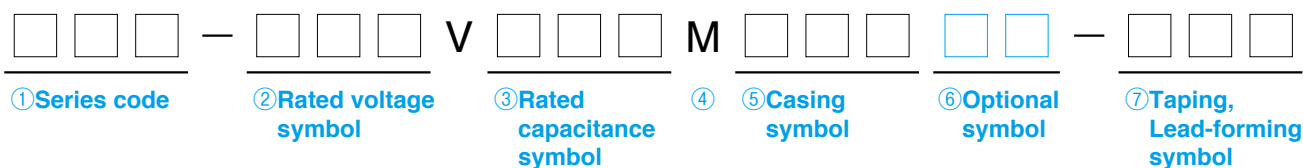
● Large Capacitance Aluminum Electrolytic Capacitors



● Aluminum Electrolytic Capacitors For Audio



■ Product Symbol System for Aluminum Electrolytic Capacitors



① Series code

Please refer to the page of each series.

② Rated voltage symbol

Write down the rated voltage itself ; however, write 2R5 for 2.5V, 6 for 6.3V.

③ Rated capacitance symbol

The symbol 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.
A decimal point is expressed with "R."

Example

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

④ Capacitance tolerance symbol

Example

Capacitance tolerance	Symbol
$\pm 10\%$	K
$\pm 20\%$	M
-10 to $+30\%$	Q
-10 to $+50\%$	T

⑤ Casing symbol

Please refer to the page of each series.

⑥ Optional symbol

Plating

Example

Symbol	Contents
#	Sn 100% plating +PET sleeve (lead terminal type)
U	Sn-Bi plating (chip type)
T	Sn 100% plating (chip type)

For Automotive

Example

Symbol	Contents
Q	Based on AEC-Q200
N	Based on AEC-Q200

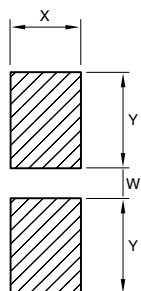
⑦ Taping, Lead-forming symbol

Write down one of the forming symbols given on page 16 to 19 for taping and lead-forming capacitors.
When taping or lead-forming is not necessary, leave the boxes blank.

Recommended land pattern and size

(Vertical chip type)

● Standard type



(Unit : mm)

Case Size φ D × L	Land Size			Thickness of Solder paste
	X	Y	W	
4 × 4.5, 5.3, 5.7, 5.8	1.6	2.6	1.0	0.15
5 × 4.5, 5.3, 5.7, 5.8	1.6	3.0	1.4	0.15
6.3 × 4.5, 5.3, 5.7, 5.8	1.6	3.6	1.9	0.15
6.3 × 7.7	1.6	3.6	1.9	0.15
8 × 6.5, 6.7, 7.7, 8.7	1.6	4.0	2.1	0.15
8 × 10, 10.5	2.5	*3.5	*3.0	0.15
10 × 7.7, 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

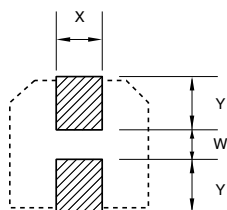
φ 8 × 6.5 Y=4.5 W=1.0

φ 8 × 10, φ 8 × 10.5 Y=4.0 W=2.5

φ 10 × 10, φ 10 × 10.5 Y=4.5 W=3.0

● For vibration resistance type

RTZ, RTD, RTT, RTQ, RTV, RMD, RMF, HT, HTK series

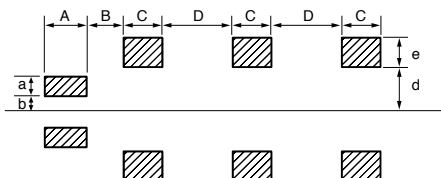


(Unit : mm)

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

(Horizontal chip type)

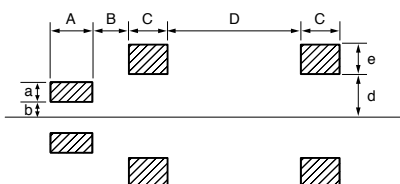
● □ 9.5 × 24.0 (8 pin type)



(Unit : mm)

	8 pin
A	4.0
B	1.0
C	3.0
D	5.5
a	1.5
b	1.0
d	3.0
e	2.0
Thickness of Solder paste	0.15

● □ 9.5 × 19.0 (6 pin type)



(Unit : mm)

	6 pin
A	4.0
B	1.0
C	3.0
D	9.0
a	1.5
b	1.0
d	3.0
e	2.0
Thickness of Solder paste	0.15

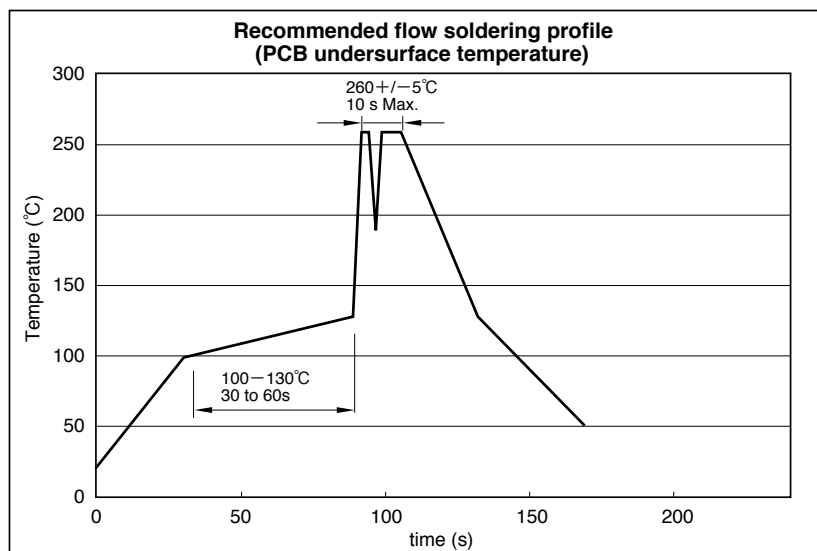
■ Recommended soldering conditions

● Aluminum (Conductive Polymer) electrolytic capacitors (Lead terminal type, Snap-in type)

(1) Soldering iron conditions
Iron tip temperature shall be $400^{\circ}\text{C} \pm 5^{\circ}\text{C}$ within the duration of $3^{\frac{1}{2}}$ seconds.

(2) Flow soldering conditions

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



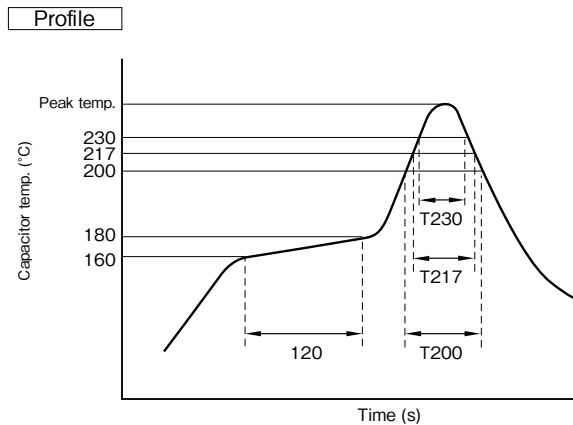
Caution for Using aluminum Electrolytic Capacitors

- (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 or 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 24 to 26 or 36 to 39 and product specifications about other notes.

Recommended soldering conditions

● Chip type aluminum (Conductive Polymer, Hybrid) electrolytic capacitors

- (1) Soldering iron conditions
Iron tip temperature shall be $400^{\circ}\text{C} \pm 5^{\circ}\text{C}$ within the duration of $3\frac{1}{2}$ seconds.
- (2) Reflow soldering conditions



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 aluminum Conductive Polymer, Hybrid electrolytic capacitors

Series	Size	Peak temp. (5sec or less)	T230	T217	T200	Reflow cycle
HV, HVK, HT, HTK, PVG, PVX, PVM, PVK	$\phi 5$ to $\phi 6.3$	250°C Max.	40 sec. max.	50 sec. max.	60 sec. max.	2 times or less
	$\phi 8$ to $\phi 10$	240°C Max.	40 sec. max.	50 sec. max.	60 sec. max.	2 times or less

● Chip type aluminum electrolytic capacitors

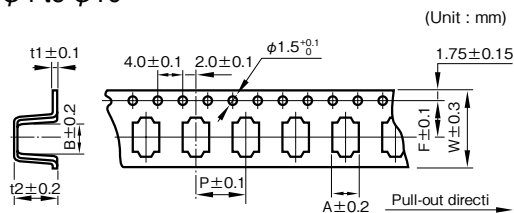
Series	Size	Peak temp. (5sec or less)	T230	T217	T200	Reflow cycle
RV5, RVB, RVS, RVL, RVR, RVC, RVZ, RVD, RVV, RZD, RVT, RZF, RVX, RVE, RVI, RVO, RVF, RVM, RVW, RVG	$\phi 4$ to $\phi 6.3$	250°C Max.	40 sec. max.	50 sec. max.	60 sec. max.	2 times or less
	$\phi 8$ to $\phi 10$	240°C Max.	40 sec. max.	50 sec. max.	60 sec. max.	2 times or less
	$\phi 12.5$	240°C Max.	20 sec. max.	30 sec. max.	50 sec. max.	2 times or less
RV4	$\phi 4$ to $\phi 5$	250°C Max.	40 sec. max.	50 sec. max.	60 sec. max.	2 times or less
	$\phi 6.3$	240°C Max.	40 sec. max.	50 sec. max.	60 sec. max.	2 times or less
RVJ	$\phi 8$ to $\phi 10$	240°C Max.	40 sec. max.	50 sec. max.	60 sec. max.	2 times or less
	$\phi 12.5$	230°C Max.	—	20 sec. max.	30 sec. max.	2 times or less
RTZ, RTD, RTT, RTQ, RTV, RMD, RMF	$\phi 8$ to $\phi 10$	250°C Max.	30 sec. max.	60 sec. max.	80 sec. max.	2 times or less
	$\phi 12.5$ to $\phi 18$	240°C Max.	20 sec. max.	30 sec. max.	50 sec. max.	2 times or less
RYK	—	230°C Max.	—	20 sec. max.	30 sec. max.	2 times or less

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

■ Taping

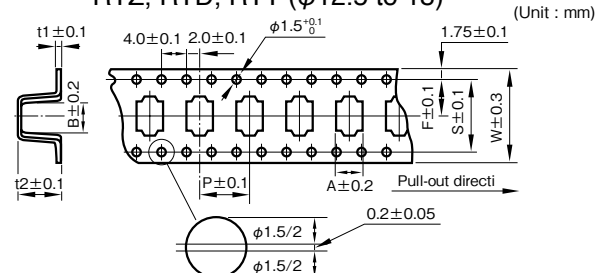
■ Carrier tape dimension (taping polarity R)

● $\phi 4$ to $\phi 10$



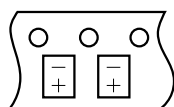
● Series RYK,

RV5, RVJ, RVZ, RVD, RVT ($\phi 12.5$), RTZ, RTD, RTT ($\phi 12.5$ to 18)

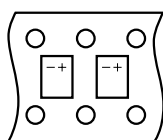


■ Taping polarity

(The all series except RVB and RYK)

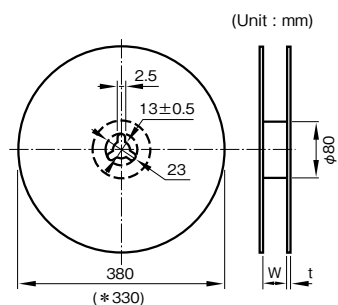


(Series RYK)



Outside size $\phi D \times L$	W	A	B	P	t2	F	t1	S
4×4.5	12	4.7	4.7	8.0	4.8	5.5	0.4	—
4×5.3	12	4.7	4.7	8.0	5.8	5.5	0.4	—
4×5.7, 5.8	12	4.7	4.7	8.0	6.2	5.5	0.4	—
5×4.5	12	5.7	5.7	12	4.8	5.5	0.4	—
5×5.3	12	5.7	5.7	12	5.8	5.5	0.4	—
5×5.7, 5.8	12	5.7	5.7	12	6.2	5.5	0.4	—
6.3×4.5	16	7.0	7.0	12	4.8	7.5	0.4	—
6.3×5.3	16	7.0	7.0	12	5.8	7.5	0.4	—
6.3×5.7, 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	—
8×6.7	24	8.7	8.7	12	7.2	11.5	0.4	—
8×7.7	24	8.7	8.7	12	8.2	11.5	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	—
10×7.7	24	10.7	10.7	16	8.2	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
* 9.5×19.0	44	9.9	22.9	16	9.5	20.2	0.4	40.4
* 9.5×24.0	44	9.9	27.9	16	9.5	20.2	0.4	40.4

■ Reel dimension



■ Reel material

Card board : symbol R

Polystyrene: symbol R2 ($\phi 10$ or less)

R5 ($\phi 12.5$ or more)

■ Packing quantity (Reel)

Outside size $\phi D \times L$	Reel dimension	
	W	t
4	14	3
5	14	3
6.3	18	3
8×6.5	18	3
8×6.7	26	3
8, 10	26	3
* 12.5	34	3
* 16	46	3
* 18	46	3
* 9.5×19.0	46	3
* 9.5×24.0	46	3

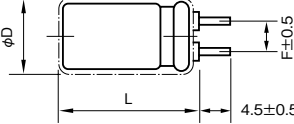
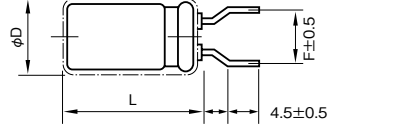
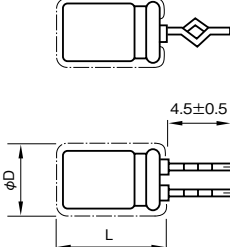
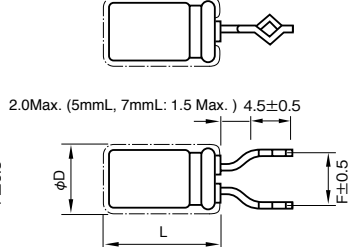
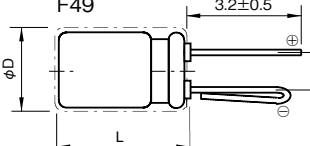
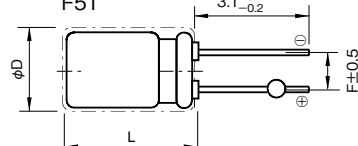
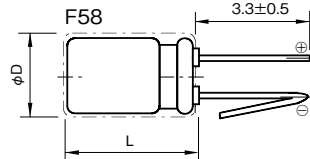
Outside size $\phi D \times L$	Quantity (PCS.)
4	2000
5, 6.3	1000
8×6.5, 6.7	1000
8×7.7 to 10.5	500
10×7.7 to 10.5	500
10×12.5	400
* 12.5×13.5	200
* 16×16.5	125
* 16×21.5	75
* 18×16.5	125
* 18×21.5	75
* 9.5×19.0	400
* 9.5×24.0	400

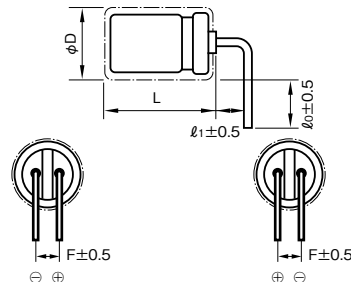
Lead Forming

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

Product Size Table

Unit: mm

Forming name	Lead forming symbol	Dimension		Style	Outline drawing
		F (Lead pitch)	φD (Case diameter)		
Forming cut	F10	2.0	4	B	Processed style A  Processed style B 
	F1		5	A	
	F12	2.5	4 to 5	B	
	F1		6.3	A	
	F1	3.5	8	A	
	F4		4 to 8	B	
	F	5.0	4 to 8	B	
	F		10 to 12.5	A	
	F	7.5	16 to 18	A	
Snap-in	S1	5.0	4 to 8	B	Processed style A  Processed style B 
	S1		10 to 12.5	A	
	S1	7.5	16 to 18	A	
	S1		16 to 18	A	
Forming cut (restrict series)	F49	5.0	10 to 12.5		F49  F51  F58 
	F51		10 to 12.5		
	F58		10		
	F49	7.5	16 to 18		
	F51		16 to 18		

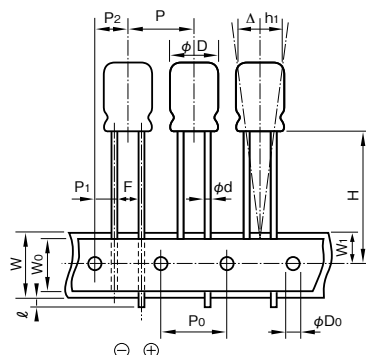
Forming name	Lead forming symbol	Dimension				Outline drawing
		F (Lead pitch)	φD (Case diameter)	ℓ ₀	ℓ ₁	
For 90° side mount of case	G9, G10	3.5	8	5.5	1.0	 G9, G55, G59, G95, G99, GAS G10, G56, G60, G96, GA0, GAT
	G59, G60		8	3.6	1.0	
	G9, G10	5.0	10 to 12.5	5.5	1.0	
	G55, G56		12.5	7.5	2.5	
	G59, G60		10 to 12.5	3.6	1.0	
	G95, G96		12.5	0.95	4.9	
	G99, GA0		10	1.0	1.9	
	GAS, GAT		10 to 12.5	4.5	1.0	
	G9, G10	7.5	16 to 18	5.5	1.0	
	GAS, GAT		16 to 18	4.5	1.0	

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.

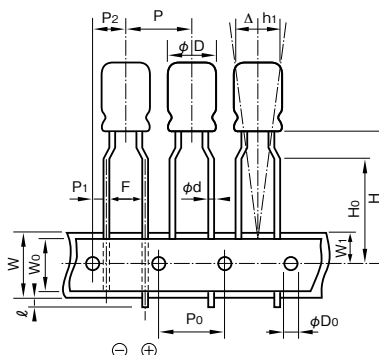
■ Taping

- 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		
			φ3 to φ8(except φ8×7L)		φ4 to φ8
Lead forming symbol	—	—	T36	T58	T2
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	
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		

■ Taping

- For automatic insertion (radial lead type)

Product Size Table

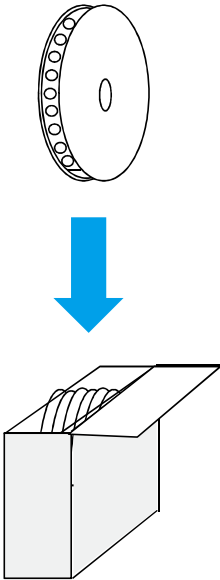
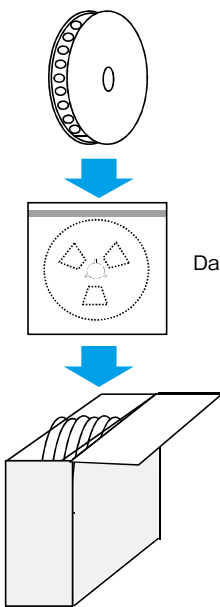
Unit: mm

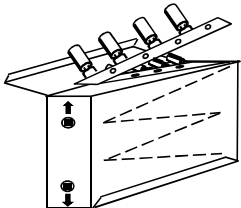
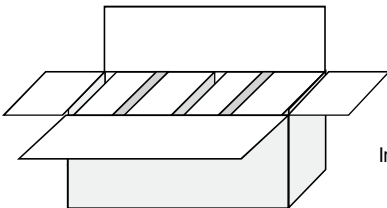
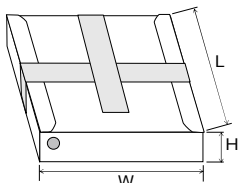
Item	Symbol	Tolerance	11L to 25L						
			φ5, φ6.3			φ8	φ10	φ12.5	
Lead forming symbol	—	—	T36	T58	T2	T2	T2	T4	
Style	—	—	A or B		B		A		
Lead-wire diameter	φd	±0.05	0.5 or 0.6			0.6			
Lead to lead distance	F	+0.8 −0.2	2.5		5.0				
Height of component from tape center	H	+0.75 −0.5	18.5	17.5	18.5	20.0	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						

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

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

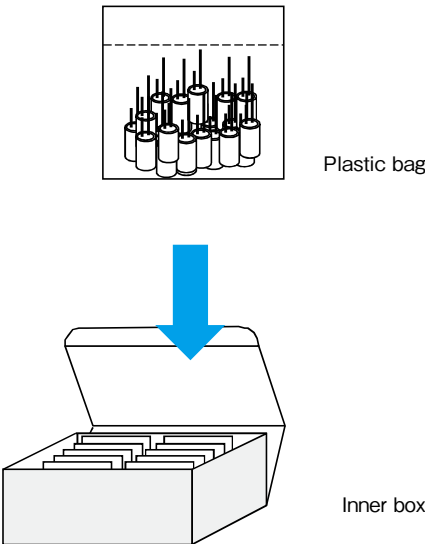
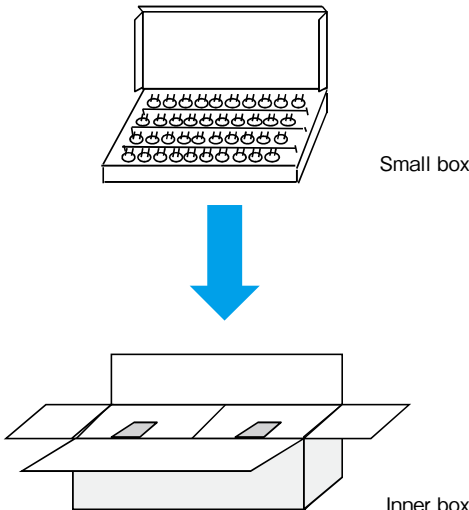
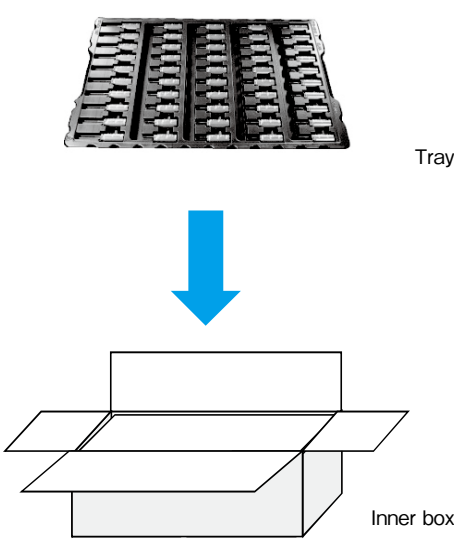
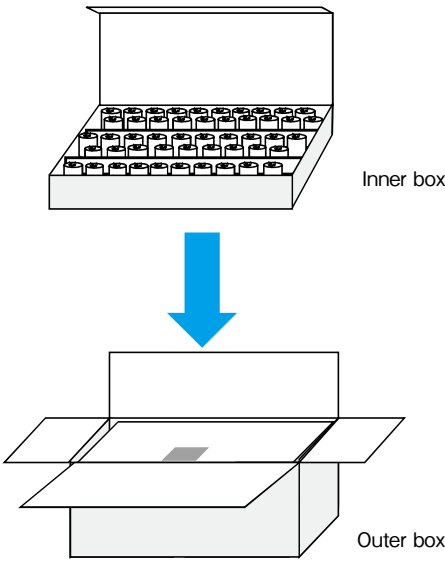
Standard packing specification of aluminum (Conductive Polymer, Hybrid) electrolytic capacitors (taping article)

Classification	Chip type	
	Aluminum electrolytic capacitors	Polymer hybrid type aluminum electrolytic capacitors, Aluminium electrolytic capacitors with conductive polymer solid electrolyte
Packing style	 Reel Inner box	 Reel Dampproof bag Inner box

Classification	Lead terminal type																																																																										
Packing style	 Flat box  Inner box	Packing size and quantity <table><tr><th rowspan="2">Case size</th><th colspan="3">Size (mm)</th><th rowspan="2">Quantity (pcs)</th></tr><tr><th>W</th><th>L</th><th>H</th></tr><tr><td>$\phi 4\times 5$, $\phi 4\times 7$</td><td>215</td><td>335</td><td>50</td><td>2,000</td></tr><tr><td>$\phi 5\times 5$, $\phi 5\times 7$</td><td>260</td><td>335</td><td>50</td><td>2,000</td></tr><tr><td>$\phi 6.3\times 5$, $\phi 6.3\times 7$</td><td>300</td><td>340</td><td>50</td><td>2,000</td></tr><tr><td>$\phi 8\times 5$, $\phi 8\times 7$</td><td>260</td><td>335</td><td>50</td><td>1,000</td></tr><tr><td>$\phi 5\times 11$, $\phi 5\times 11.5$</td><td>265</td><td>340</td><td>55</td><td>2,000</td></tr><tr><td>$\phi 6.3\times 11$, $\phi 6.3\times 11.5$</td><td>300</td><td>340</td><td>55</td><td>2,000</td></tr><tr><td>$\phi 8\times 11.5$, $\phi 8\times 12$</td><td>265</td><td>340</td><td>55</td><td>1,000</td></tr><tr><td>$\phi 8\times 15$, $\phi 8\times 20$</td><td>265</td><td>335</td><td>65</td><td>1,000</td></tr><tr><td>$\phi 10\times 12.5$, $\phi 10\times 16$</td><td>215</td><td>330</td><td>55</td><td>500</td></tr><tr><td>$\phi 10\times 20$</td><td>215</td><td>330</td><td>60</td><td>500</td></tr><tr><td>$\phi 12.5\times 15$</td><td>290</td><td>330</td><td>50</td><td>500</td></tr><tr><td>$\phi 12.5\times 20$</td><td>285</td><td>330</td><td>58</td><td>500</td></tr><tr><td>$\phi 12.5\times 25$</td><td>280</td><td>330</td><td>65</td><td>500</td></tr></table>	Case size	Size (mm)			Quantity (pcs)	W	L	H	$\phi 4\times 5$, $\phi 4\times 7$	215	335	50	2,000	$\phi 5\times 5$, $\phi 5\times 7$	260	335	50	2,000	$\phi 6.3\times 5$, $\phi 6.3\times 7$	300	340	50	2,000	$\phi 8\times 5$, $\phi 8\times 7$	260	335	50	1,000	$\phi 5\times 11$, $\phi 5\times 11.5$	265	340	55	2,000	$\phi 6.3\times 11$, $\phi 6.3\times 11.5$	300	340	55	2,000	$\phi 8\times 11.5$, $\phi 8\times 12$	265	340	55	1,000	$\phi 8\times 15$, $\phi 8\times 20$	265	335	65	1,000	$\phi 10\times 12.5$, $\phi 10\times 16$	215	330	55	500	$\phi 10\times 20$	215	330	60	500	$\phi 12.5\times 15$	290	330	50	500	$\phi 12.5\times 20$	285	330	58	500	$\phi 12.5\times 25$	280	330	65	500
	Case size	Size (mm)			Quantity (pcs)																																																																						
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Please inquire for details.

■ Standard packing specification of aluminum electrolytic capacitors
(long lead, lead forming)

Classification	Long lead, Lead forming of $\phi 10$ or less (Standard packing)	Lead forming of $\phi 12.5$ or more (Standard packing)
Packing style	 Plastic bag Inner box	 Small box Inner box
Classification	$\phi 10$ to $\phi 22$ (Optional packing)	$\phi 22$ or more (Standard packing)
Packing style	 Tray Inner box	 Inner box Outer box

Please inquire for details.

■ 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

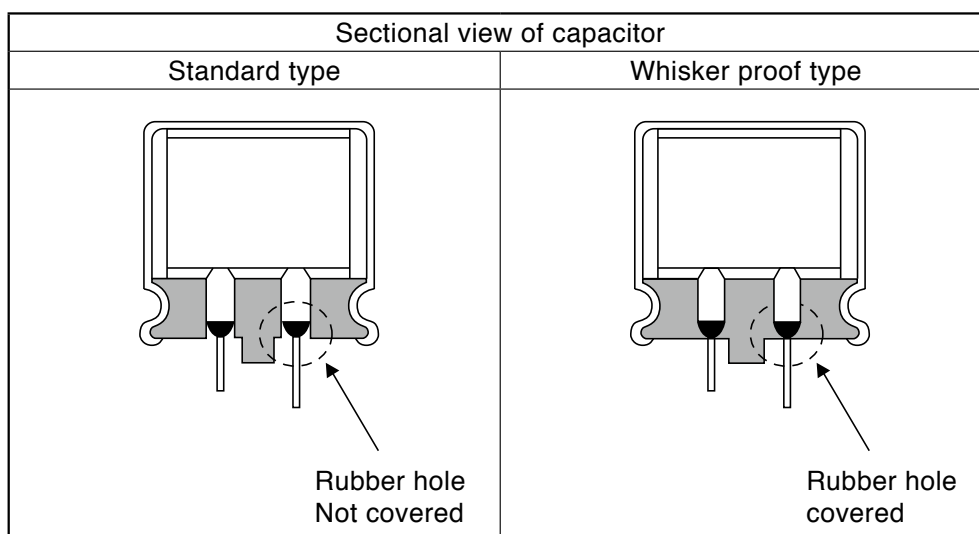
In the past Sn-plate with Pb was used and recently plate with Bi is being introduced to prevent the whisker from generating. However the whisker will still generate under the temperature and moisture condition.

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, RKD and RPK for 125°C use.

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



Aluminum Electrolytic Capacitors	ALUMINUM
Polymer hybrid type Electrolytic Capacitors Aluminum Electrolytic Capacitors With Conductive Polymer Solid Electrolyte	POLYMER HYBRID
Chip Type Aluminum Electrolytic Capacitors	CHIP ALUMINUM
Miniature Aluminum Electrolytic Capacitors	MINIATURE ALUMINUM
Large Capacitance Aluminum Electrolytic Capacitors	LARGE ALUMINUM
Aluminum Electrolytic Capacitors for Audio	FOR AUDIO ALUMINUM

■ Conductive Polymer Hybrid Aluminum Electrolytic Capacitors

Cautions for Using Aluminum Electrolytic Capacitors With Conductive Polymer Solid Electrolyte

Please be sure to read this specification before using this product.

Before placing an order, please inquire about the Product Specification to check details.

■ Cautions for Usage

1. Conductive Polymer Hybrid Aluminum Electrolytic Capacitors, Solid Conductive Polymer 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.
 - ① Coupling circuits
 - ② Circuits 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, solid conductive polymer 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.

- ① Capacitance expressed in the value at 20°C, 120 Hz increases with increased temperature and decreases with decreasing temperature.
- ② Tangent of loss angle ($\tan\delta$) expressed in the value at 20°C, 120 Hz is temperature-independent.
- ③ Equivalent series resistance (ESR) expressed in the value at 20°C, 100 kHz is temperature independent.
- ④ Leakage 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.
 - ① Capacitance expressed in the value at 20°C, 120 Hz decreases with increased frequency.
 - ② Tangent of loss angle ($\tan\delta$) expressed in the value at 20°C, 120 Hz increases with increased frequency.
 - ③ Equivalent series resistance (ESR) expressed in the value at 20°C, 100 kHz increases with decreasing frequency.

8. Failure modes of solid conductive polymer aluminum electrolytic capacitors

- The failure modes of solid conductive polymer aluminum electrolytic capacitors are a wear-out failure by deterioration of electrical performance and a random failure by a short. The failure rate level is 0.5%/1,000h at the reliability level of 60% with the specified voltage applied at 105°C.
- If a short occurs and continues with the application of a voltage exceeding the rated voltage, increasing the internal temperature, the internal pressure increases by vaporization of the cathode material, which may cause the aluminum case to come off.

9. 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.

10. Fumigation Process

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.

- 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.

11. The case of Conductive Polymer Hybrid Aluminum Electrolytic Capacitors, Solid Conductive Polymer 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.

12. 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.

13. Regarding Connection of Conductive Polymer Hybrid Aluminum Electrolytic Capacitors, Solid Conductive Polymer Aluminum Electrolytic Capacitors

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

14. 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.

15. 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 capacitor 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

- Do not solder capacitor body by dipping into melted solder.
- Soldering conditions (preheating, soldering temperature, terminal dipping time) should be within the ranges specified in the catalog or the delivery specification.
Please refer to page 15.
- Flux should not adhere to the parts other than the terminals.
- When using a soldering iron, avoid excessive stress to capacitor body.
- Although leakage current may increase (from a few μA to hundreds of μA) after soldering, it can be reduced through self-repair by applying voltage. It is advised to operate the set properly after treating with the recommended voltage.
- In case of a long-term use of equipment, control the soldering characteristics so that capacitors and PCB do not fail to connect to avoid abnormal current passage by a failure of soldering to mount.

4. Handling after Soldering

- Do not tilt, fall, raise or twist capacitor body.
- 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.

5. Cleaning after Soldering

- Recommended cleaning method

①Cleaning solutions:

- (a) CLEANTHROUGH 710M, 750H, 750L
- (b) PINEALPHA ST-100S
- (c) Techno Care FRW-4~17
- (d) Isopropyl alcohol (2-propanol)

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.

■ Other Cautions

1. Do not directly touch the terminals of Conductive Polymer Hybrid Aluminum Electrolytic Capacitors, Solid Conductive Polymer 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, Solid Conductive Polymer 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 delivery 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.
- During delivery, capacitors are stored in airtight moistureproof bags to ensure satisfactory soldering. Once the bag is opened right before mounting, it is better to use up the capacitors. If some are unavoidably left over, return them to the moistureproof bag, and seal the opening hermetically.
- Solid conductive polymer aluminum electrolytic capacitors 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, Solid Conductive Polymer Aluminum Electrolytic Capacitors.

- Entrust to specialists of industrial waste treatment for incineration.

7. Others

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

Technical Report of Japan Electronics and Information Technology Industries Association

EIAJ RCR-2367B

Guideline of notabilia for fixed aluminum electrolytic capacitors for use in electronic equipment

MEMO

Conductive Polymer Hybrid Capacitors

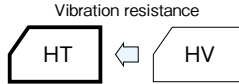
GREEN CAP

SMD

Low ESR

105°C
10000hours

- Low ESR and high ripple current are realized.
- HT 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°C, 10000 hours.



Marking color : Blue print

Specifications

Item	Performance																				
Category temperature range (°C)	-55~+105																				
Tolerance at rated capacitance (%)	±20 (20°C, 120Hz)																				
Leakage current (μA)	Less than 0.01CV or 3(μA) whichever is larger (after 2 minutes) C : Rated capacitance (μF) , V : Rated voltage (V) (20°C)																				
Tangent of loss angle (tanδ)	<table><tr><td>Rated voltage (V)</td><td>25</td><td>35</td><td>50</td><td>63</td><td>80</td><td>100</td></tr><tr><td>tanδ (max.)</td><td>0.14</td><td>0.12</td><td>0.10</td><td>0.08</td><td>0.08</td><td>0.08</td></tr></table> (20°C, 120Hz)							Rated voltage (V)	25	35	50	63	80	100	tanδ (max.)	0.14	0.12	0.10	0.08	0.08	0.08
Rated voltage (V)	25	35	50	63	80	100															
tanδ (max.)	0.14	0.12	0.10	0.08	0.08	0.08															
Characteristics at high and low temperature	<table><tr><td rowspan="2">Impedance ratio (max.)</td><td>Z-25°C/Z+20°C</td><td>1.5</td></tr><tr><td>Z-55°C/Z+20°C</td><td>2.0</td></tr></table> (100kHz)							Impedance ratio (max.)	Z-25°C/Z+20°C	1.5	Z-55°C/Z+20°C	2.0									
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Endurance (105°C) (Applied ripple current)	<table><tr><td>Test time</td><td>10000 hours</td></tr><tr><td>Leakage current</td><td>The initial specified value or less</td></tr><tr><td>Percentage of capacitance change</td><td>Within ±30% of initial value</td></tr><tr><td>Tangent of the loss angle</td><td>200% or less of the initial specified value</td></tr><tr><td>ESR change</td><td>200% or less of the initial specified value</td></tr></table>							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				
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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°C)	Test time : 1000hours ; other items are same as the endurance. Voltage application treatment : According to JIS C5101-4 4.1																				

Outline Drawing

Unit : mm

Series HV							
() : Reference size							
ϕD	L	A	B	C	W	P	Casing symbol
6.3	5.8±0.3	6.6	6.6	2.7	0.5 to 0.8	2.0	F61
6.3	7.7±0.3	6.6	6.6	2.7	0.5 to 0.8	2.0	F80
8	8.7±0.3	8.4	8.4	3.0	0.5 to 0.8	3.1	G90
8	10±0.5	8.4	8.4	3.0	0.7 to 1.1	3.1	G10
10	8.7±0.3	10.4	10.4	3.3	0.7 to 1.1	4.7	H90
10	10±0.5	10.4	10.4	3.3	0.7 to 1.1	4.7	H10
10	12.5±0.5	10.4	10.4	3.3	0.7 to 1.1	4.7	HC5

Series HT							
() : Reference size							
ϕD	L	A	B	C	W	P	Casing symbol
8	10±0.5	8.4	8.4	3.0	0.7 to 1.1	3.1	G10
10	10±0.5	10.4	10.4	3.3	0.7 to 1.1	4.7	H10
10	12.5±0.5	10.4	10.4	3.3	0.7 to 1.1	4.7	HC5

- Soldering conditions are described on page 15.
- Land pattern size are described on page 13.
- The taping specifications are described on page 16.

Coefficient of Frequency for Rated Ripple Current

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

Part numbering system

HV (example : 35V270μF)

HV	—	35	V	271	M	H10	E*	—	□
Series code		Rated voltage symbol		Rated capacitance symbol	Capacitance tolerance symbol	Casing symbol			Taping symbol

HT (example : 35V270μF)

HT	—	35	V	271	M	H10	E*	—	□
Series code		Rated voltage symbol		Rated capacitance symbol	Capacitance tolerance symbol	Casing symbol			Taping symbol

* If it is for automotive, should add "Q".

Standard Ratings

Rated voltage (V) Item Rated capacitance (μF)	25			35			50			63		
	Case	ESR	Rated ripple current	Case	ESR	Rated ripple current	Case	ESR	Rated ripple current	Case	ESR	Rated ripple current
	φ D×L (mm)	(mΩ max.)	(mA _{rms})	φ D×L (mm)	(mΩ max.)	(mA _{rms})	φ D×L (mm)	(mΩ max.)	(mA _{rms})	φ D×L (mm)	(mΩ max.)	(mA _{rms})
10	—	—	—	—	—	—	—	—	—	6.3×5.8	120	1000
22	—	—	—	—	—	—	6.3×5.8	80	1100	6.3×7.7	80	1500
27	—	—	—	—	—	—	—	—	—	8×8.7	50	1600
33	—	—	—	—	—	—	6.3×7.7	40	1600	8×10	40	1600
47	—	—	—	6.3×5.8	60	1300	8×8.7	35	1700	10×8.7	35	1700
56	6.3×5.8	50	1300	—	—	—	—	—	—	10×10	30	1800
68	—	—	—	6.3×7.7	35	2000	8×10	30	1800	—	—	—
82	—	—	—	—	—	—	10×8.7	28	1900	—	—	—
100	6.3×7.7	30	2000	8×8.7	30	2100	10×10	28	2000	10×12.5	26	2500
150	8×8.7	27	2100	8×10	27	2300	10×12.5	24	3000	—	—	—
220	8×10	27	2300	10×8.7	25	2400	—	—	—	—	—	—
270	10×8.7	25	2400	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			100		
	Case	ESR	Rated ripple current	Case	ESR	Rated ripple current
	φ D×L (mm)	(mΩ max.)	(mA _{rms})	φ D×L (mm)	(mΩ max.)	(mA _{rms})
15	—	—	—	10×10	45	1600
22	8×10	45	1550	—	—	—
33	10×10	36	1700	—	—	—

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

Conductive Polymer Hybrid Capacitors

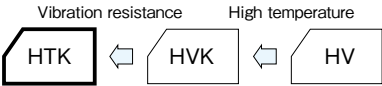
GREEN
CAP

SMD

Low
ESR

125°C
4000hours

- 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)
- Guaranteed 125°C, 4000 hours.



Marking color : Blue print

Specifications

Item	Performance																																									
Category temperature range (°C)	-55~+125																																									
Tolerance at rated capacitance (%)	±20 (20°C, 120Hz)																																									
Leakage current (μA)	Less than 0.01CV or 3(μA) whichever is larger (after 2 minutes) C : Rated capacitance (μF) , V : Rated voltage (V) (20°C)																																									
Tangent of loss angle (tanδ)	<table><tr><td>Rated voltage (V)</td><td>25</td><td>35</td><td>50</td><td>63</td><td>80</td><td>100</td></tr><tr><td>tanδ (max.)</td><td>0.14</td><td>0.12</td><td>0.10</td><td>0.08</td><td>0.08</td><td>0.08</td></tr></table> (20°C, 120Hz)							Rated voltage (V)	25	35	50	63	80	100	tanδ (max.)	0.14	0.12	0.10	0.08	0.08	0.08																					
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Characteristics at high and low temperature	<table><tr><td rowspan="2">Impedance ratio (max.)</td><td colspan="2">Z-25°C/Z+20°C</td><td colspan="4">1.5</td></tr><tr><td colspan="2">Z-55°C/Z+20°C</td><td colspan="4">2.0</td></tr></table> (100kHz)							Impedance ratio (max.)	Z-25°C/Z+20°C		1.5				Z-55°C/Z+20°C		2.0																									
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Endurance (125°C) (Applied ripple current)	<table><tr><td>Test time</td><td colspan="6">4000 hours</td></tr><tr><td>Leakage current</td><td colspan="6">The initial specified value or less</td></tr><tr><td>Percentage of capacitance change</td><td colspan="6">Within ±30% of initial value</td></tr><tr><td>Tangent of the loss angle</td><td colspan="6">200% or less of the initial specified value</td></tr><tr><td>ESR change</td><td colspan="6">200% or less of the initial specified value</td></tr></table>							Test time	4000 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					
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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°C)	Test time : 1000hours ; other items are same as the endurance. Voltage application treatment : According to JIS C5101-4 4.1																																									

Outline Drawing

Unit : mm

Series HVK

ϕD	L	A	B	C	W	P	Casing symbol
6.3	5.8±0.3	6.6	6.6	2.7	0.5 to 0.8	2.0	F61
6.3	7.7±0.3	6.6	6.6	2.7	0.5 to 0.8	2.0	F80
8	8.7±0.3	8.4	8.4	3.0	0.5 to 0.8	3.1	G90
8	10±0.5	8.4	8.4	3.0	0.7 to 1.1	3.1	G10
10	8.7±0.3	10.4	10.4	3.3	0.7 to 1.1	4.7	H90
10	10±0.5	10.4	10.4	3.3	0.7 to 1.1	4.7	H10
10	12.5±0.5	10.4	10.4	3.3	0.7 to 1.1	4.7	HC5

() : Reference size

Series HTK

ϕD	L	A	B	C	W	P	Casing symbol
8	10±0.5	8.4	8.4	3.0	0.7 to 1.1	3.1	G10
10	10±0.5	10.4	10.4	3.3	0.7 to 1.1	4.7	H10
10	12.5±0.5	10.4	10.4	3.3	0.7 to 1.1	4.7	HC5

() : Reference size

□ : Dummy terminal

- Soldering conditions are described on page 15.
- Land pattern size are described on page 13.
- The taping specifications are described on page 16.

Coefficient of Frequency for Rated Ripple Current

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

Part numbering system
HVK (example : 35V270μF)

HVK	35	V	271	M	H10	E*	□
Series code	Rated voltage symbol		Rated capacitance symbol	Capacitance tolerance symbol	Casing symbol		Taping symbol

HTK (example : 35V270μF)

HTK	35	V	271	M	H10	E*	□
Series code	Rated voltage symbol		Rated capacitance symbol	Capacitance tolerance symbol	Casing symbol		Taping symbol

* If it is for automotive, should add "Q".

Standard Ratings

Rated voltage (V) Rated capacitance (μF)	Item	25			35			50			63		
		Case	ESR	Rated ripple current	Case	ESR	Rated ripple current	Case	ESR	Rated ripple current	Case	ESR	Rated ripple current
		φ D × L (mm)	(mΩ max.)	(mA rms)	φ D × L (mm)	(mΩ max.)	(mA rms)	φ D × L (mm)	(mΩ max.)	(mA rms)	φ D × L (mm)	(mΩ max.)	(mA rms)
10	—	—	—	—	—	—	—	—	—	—	6.3×5.8	120	700
22	—	—	—	—	—	—	—	6.3×5.8	80	750	6.3×7.7	80	900
27	—	—	—	—	—	—	—	—	—	—	8×8.7	50	1000
33	—	—	—	—	—	—	—	6.3×7.7	40	1100	8×10	40	1100
47	—	—	—	—	6.3×5.8	60	900	8×8.7	35	1200	10×8.7	35	1200
56	6.3×5.8	50	900	—	—	—	—	—	—	—	10×10	30	1400
68	—	—	—	—	6.3×7.7	35	1400	8×10	30	1250	—	—	—
82	—	—	—	—	—	—	—	10×8.7	28	1400	—	—	—
100	6.3×7.7	30	1400	—	8×8.7	30	1500	10×10	28	1600	10×12.5	26	2000
150	8×8.7	27	1500	—	8×10	27	1600	10×12.5	24	2500	—	—	—
220	8×10	27	1600	—	10×8.7	25	1700	—	—	—	—	—	—
270	10×8.7	25	1700	—	10×10	20	2000	—	—	—	—	—	—
330	10×10	20	2000	—	—	—	—	—	—	—	—	—	—
390	—	—	—	—	10×12.5	18	3000	—	—	—	—	—	—
560	10×12.5	18	3000	—	—	—	—	—	—	—	—	—	—

Rated voltage (V) Rated capacitance (μF)	Item	80			100		
		Case	ESR	Rated ripple current	Case	ESR	Rated ripple current
		φ D × L (mm)	(mΩ max.)	(mA rms)	φ D × L (mm)	(mΩ max.)	(mA rms)
15	—	—	—	—	10×10	45	1000
22	8×10	45	1100	—	—	—	—
33	10×10	36	1200	—	—	—	—

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

Chip Type

GREEN
CAP

SMD

Low
ESR

125°C
1000hours

Anti-
cleaning
solvent

- Super low ESR and high ripple current are realized.
- Guaranteed 125°C, 1000 hours.

High temperature



Marking color : Blue print



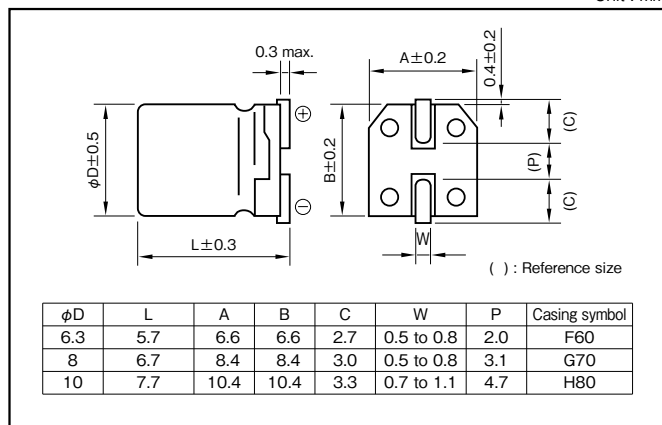
Specifications

Item	Performance	
Category temperature range (°C)	-55 to +125	
Tolerance at rated capacitance (%)	±20 (20°C, 120Hz)	
Leakage current (μA) *Note	Rated voltage (V)	2.5 to 16
	Leakage current (μA)	Less than 0.2 CV (after 2 minutes)
	C : Rated capacitance (μF) , V : Rated voltage (V) (20°C)	
Tangent of the loss angle (tanδ)	Less than 0.12 (20°C, 120Hz)	
Characteristics at high and low temperature	Impedance ratio (max.)	Z-25°C/Z+20°C 1.15
		Z-55°C/Z+20°C 1.25 (100kHz)
Endurance (125°C) (Applied ripple current)	Test time	1000 hours
	Leakage current	The initial specified value or less
	Percentage of capacitance change	Within ±20% of initial value
	Tangent of the loss angle	150% or less of the initial specified value
	ESR change	150% or less of the initial specified value
Bias Humidity 60°C, 90 to 95%RH	Test time	500 hours
	Leakage current	The initial specified value or less
	Percentage of capacitance change	Within ±20% of initial value
	Tangent of the loss angle	150% or less of the initial specified value
	ESR change	150% or less of the initial specified value
Characteristics of applied surge voltage	The capacitors shall be subject to 1000 cycles each consisting of charge with the surge voltage specified at 125°C for 30 seconds through a protective resistor (Rc=1kΩ) in 6 minutes per cycle. Surge voltage : 1.15 times of rated voltage	
	Leakage current	The initial specified value or less
	Percentage of capacitance change	Within ±20% of initial value
	Tangent of the loss angle	150% or less of the initial specified value
	ESR change	150% or less of the initial specified value
Failure rate	0.5% per 1000 hours maximum (Confidence level 60% at 125°C)	

*Note : If any doubt arises, measure the leakage current after following voltage application treatment.
Voltage application treatment : DC rated voltage are applied to the capacitors for 120 minutes at 125°C.

Outline Drawing

Unit : mm



- Soldering conditions are described on page 15.
- Land pattern size are described on page 13.
- The taping specifications are described on page 16.

Part numbering system (example : 4V150μF)

PVK	—	4	V	151	M	F60	E*	—	□
Series code		Rated voltage symbol		Rated capacitance symbol	Capacitance tolerance symbol	Casing symbol			Taping symbol

* If it is for automotive, should add "Q".

Standard Ratings

Rated voltage (V) Rated capacitance (μF) Item	2.5			4			6.3			10			16		
	Case	ESR	Rated ripple current	Case	ESR	Rated ripple current	Case	ESR	Rated ripple current	Case	ESR	Rated ripple current	Case	ESR	Rated ripple current
	φD×L (mm)	(mΩ max.)	(mA rms)	φD×L (mm)	(mΩ max.)	(mA rms)	φD×L (mm)	(mΩ max.)	(mA rms)	φD×L (mm)	(mΩ max.)	(mA rms)	φD×L (mm)	(mΩ max.)	(mA rms)
33	—	—	—	—	—	—	—	—	—	—	—	—	6.3×5.7	37	590
39	—	—	—	—	—	—	—	—	—	—	—	—	6.3×5.7	37	590
47	—	—	—	—	—	—	—	—	—	6.3×5.7	31	680	6.3×5.7	37	590
56	—	—	—	—	—	—	—	—	—	6.3×5.7	31	680	—	—	—
68	—	—	—	—	—	—	6.3×5.7	27	720	—	—	—	—	—	—
82	—	—	—	—	—	—	6.3×5.7	27	720	—	—	—	8×6.7	30	830
100	—	—	—	6.3×5.7	26	770	6.3×5.7	27	720	8×6.7	27	880	8×6.7	30	830
120	—	—	—	—	—	—	6.3×5.7	27	720	8×6.7	27	880	—	—	—
150	—	—	—	6.3×5.7	26	770	8×6.7	25	960	8×6.7	27	880	10×7.7	26	930
180	—	—	—	—	—	—	—	—	—	—	—	—	10×7.7	26	930
220	6.3×5.7	25	770	8×6.7	25	960	8×6.7	25	960	10×7.7	24	1010	—	—	—
270	—	—	—	—	—	—	—	—	—	10×7.7	24	1010	—	—	—
330	8×6.7	23	960	8×6.7	25	960	10×7.7	20	1100	10×7.7	24	1010	—	—	—
470	8×6.7	23	960	10×7.7	20	1100	10×7.7	20	1100	—	—	—	—	—	—
560	8×6.7	23	960	—	—	—	—	—	—	—	—	—	—	—	—
680	—	—	—	10×7.7	20	1100	—	—	—	—	—	—	—	—	—
1000	10×7.7	19	1100	—	—	—	—	—	—	—	—	—	—	—	—

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

ALUMINUM

POLYMER
HYBRID

125°C

MEMO

Aluminum Electrolytic Capacitors	ALUMINUM
Polymer hybrid type aluminum Electrolytic Capacitors Aluminum Electrolytic Capacitors With Conductive Polymer Solid Electrolyte	POLYMER HYBRID
Chip Type Aluminum Electrolytic Capacitors	CHIP ALUMINUM
Miniature Type Aluminum Electrolytic Capacitors	MINIATURE ALUMINUM
Large Capacitance Aluminum Electrolytic Capacitors	LARGE ALUMINUM
Aluminum Electrolytic Capacitors for Audio	FOR AUDIO ALUMINUM

■ Cautions for Using Aluminum Electrolytic Capacitors

Please read product specifications before using ELNA products.

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

■ Cautions for usage

1. DC electrolytic capacitors are polarized.

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

2. Use within the rated voltage.

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

3. 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 ($\tan\delta$) is normally shown as the value at 20°C-120Hz. It decreases as the ambient temperature gets high and increases as it gets low.
- (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 ($\tan\delta$) 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 or mounted on the appliance, the leakage current of an aluminum electrolytic capacitor will increase. This tendency is more prominent when the ambient temperature is high. If a capacitor has been stored for more than 2 years under normal temperature (shorter if high temperature) and it shows increased leakage current, a treatment by voltage application is recommended. Addition of a protective circuit in the design of the appliance is also recommended, considering the effect of the initial increased current.

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.

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, LJ6, LJ2)

- 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.

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.

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	20 to 40
Required space above the valve (mm)	2.0	3.0

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 Mounting

1. Cautions for mounting.

- Check the ratings (electrostatic capacitance and rated voltage) of the capacitor before mounting.
- 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.
- 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.
- A PCB self-standing (snap-in) type capacitor should be pushed to the end (till there is no space) to the PCB for 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

Chip type : Please refer to page 15.

small and large type : 260°C, 10 s (max.)

The preliminary heating and other conditions described in the catalog or product specifications.

- 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 or 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:

- CLEANTHROUGH 710M, 750H, 750L
- PINEALPHA ST-100S
- Techno Care FRW-4~17
- Isopropyl alcohol (2-propanol)

(2)Cleaning conditions:

- The temperature of cleaning solution shall be less than 60°C.
 - Use immersion or ultrasonic waves within two minutes.
 - 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.
 - 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 used in industrial appliances.

- The following items should be checked:

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) 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 product specifications or the catalog.

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

MEMO

Aluminum Electrolytic Capacitors	ALUMINUM
Polymer hybrid type aluminum Electrolytic Capacitors Aluminum Electrolytic Capacitors With Conductive Polymer Solid Electrolyte	POLYMER HYBRID
Chip Type Aluminum Electrolytic Capacitors	CHIP ALUMINUM
Miniature Type Aluminum Electrolytic Capacitors	MINIATURE ALUMINUM
Large Capacitance Aluminum Electrolytic Capacitors	LARGE ALUMINUM
Aluminum Electrolytic Capacitors for Audio	FOR AUDIO ALUMINUM

Chip type, 105°C Use, Long Life, High CV Capacitors

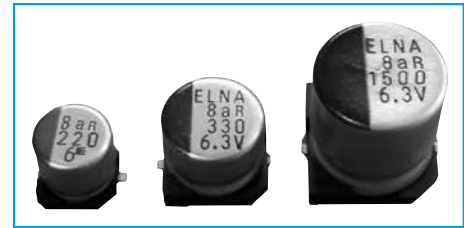
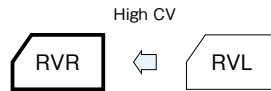
GREEN
CAP

SMD

105°C
2000hours

Anti-
cleaning
solvent

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



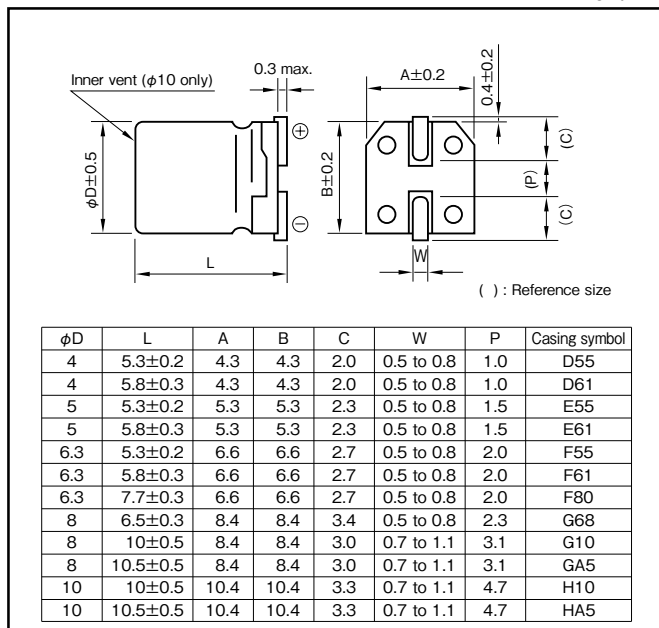
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Specifications

Item	Performance								
Category temperature range (°C)	-40 to +105								
Tolerance at rated capacitance (%)	±20 (20°C,120Hz)								
Leakage current (μA)	Less than 0.01CV or 3 whichever is larger (after 2 minutes) C : Rated capacitance (μF), V : Rated voltage (V) (20°C)								
Tangent of loss angle (tanδ)	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°C,120Hz)								
Characteristics at high and low temperature	Rated voltage (V)		4	6.3	10	16	25	35	50
	Impedance ratio (max.)	Z-25°C/Z+20°C	7	4	3	2	2	2	2
		Z-40°C/Z+20°C	15	8	6	4	4	3	3
(120Hz)									
Endurance (105°C)	Test time		2000 hours						
	Leakage current		The initial specified value or less						
	Percentage of capacitance change		Within ±20% of initial value(φ5 or Smaller & 16V or less:±30%)						
	Tangent of loss angle		200% or less of the initial specified value						
Shelf life (105°C)	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 1998,-18 1999(IEC 60384-1 1992, -18 1993)								

Outline Drawing

Unit : mm



- Soldering conditions are described on page 15.
- Land pattern size are described on page 13.
- The taping specifications are described on page 16.

Coefficient of Frequency for Rated Ripple Current

Frequency (Hz)	50 · 60	120	1k	10k · 100k
Rated voltage (V)				
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

Part numbering system (example : 16V100μF)

RVR	—	16	V	101	M	F61	U*	—	□
Series code		Rated voltage symbol		Rated capacitance symbol	Capacitance tolerance symbol	Casing symbol			Taping symbol

* If it is for automotive, should add "Q".

Standard Ratings

Rated voltage(V) Rated capacitance(μF)	Item	4			6.3			10			16			25		
		Case φD×L (mm)	Casing symbol	Rated ripple current (mA _{rms})	Case φD×L (mm)	Casing symbol	Rated ripple current (mA _{rms})	Case φD×L (mm)	Casing symbol	Rated ripple current (mA _{rms})	Case φD×L (mm)	Casing symbol	Rated ripple current (mA _{rms})	Case φD×L (mm)	Casing symbol	Rated ripple current (mA _{rms})
4.7	—	—	—	—	—	—	—	—	—	—	—	—	—	4×5.3	D55	22
6.8	—	—	—	—	—	—	—	—	—	—	—	—	—	4×5.3	D55	25
10	—	—	—	—	—	—	—	—	—	—	4×5.3	D55	25	4×5.8	D61	36
22	—	—	—	—	4×5.3	D55	26	4×5.8	D61	33	4×5.8	D61	39	5×5.8	E61	48
					4×5.8	D61	28				5×5.3	E55	39			
33	—	—	—	—	5×5.8	E61	40	4×5.8	D61	41	5×5.8	E61	46	5×5.8	E61	59
								5×5.3	E55	43	6.3×5.8	F61	66	6.3×5.3	F55	65
47	4×5.8	D61	42	—	4×5.8	D61	42	6.3×5.8	F61	74	5×5.8	E61	66	6.3×5.8	F61	82
					5×5.3	E55	46				6.3×5.3	F55	70			
100	5×5.8	E61	70	—	5×5.8	E61	70	6.3×5.8	F61	95	6.3×5.8	F61	112	6.3×7.7	F80	132
					6.3×5.3	F55	71				8×6.5	G68	146	8×6.5	G68	146
150	—	—	—	—	—	—	—	6.3×5.8	F61	117	8×6.5	G68	151	—	—	—
220	6.3×5.8	F61	121	—	6.3×5.8	F61	121	6.3×7.7	F80	156	6.3×7.7	F80	183	8×10	G10	320
330	6.3×7.7	F80	163	—	6.3×7.7	F80	163	8×6.5	G68	173	8×6.5	G68	157	8×10.5	GA5	320
	8×6.5	G68	181	—	8×6.5	G68	181	8×10	G10	296	8×10	G10	291	8×10.5	GA5	340
470	—	—	—	—	8×10	G10	320	8×10	G10	326	8×10	G10	348	10×10.5	HA5	490
680	—	—	—	—	8×10.5	GA5	340	8×10.5	GA5	326	8×10.5	GA5	348	—	—	—
820	—	—	—	—	—	—	—	10×10	H10	440	10×10	H10	484	—	—	—
1000	—	—	—	—	8×10.5	GA5	370	10×10.5	HA5	500	—	—	—	—	—	—
					10×10	H10	495									
1200	—	—	—	—	10×10.5	HA5	495	—	—	—	—	—	—	—	—	—
1500	—	—	—	—	10×10.5	HA5	550	—	—	—	—	—	—	—	—	—

ALUMINUM

CHIP
ALUMINUM
105°C

Rated voltage(V) Rated capacitance(μF)	Item	35			50		
		Case φD×L (mm)	Casing symbol	Rated ripple current (mA _{rms})	Case φD×L (mm)	Casing symbol	Rated ripple current (mA _{rms})
0.22	—	—	—	—	4×5.3	D55	2
0.33	—	—	—	—	4×5.3	D55	3
0.47	—	—	—	—	4×5.3	D55	5
1	—	—	—	—	4×5.3	D55	10
					4×5.8	D61	12
2.2	—	—	—	—	4×5.3	D55	16
					4×5.8	D61	19
3.3	—	—	—	—	4×5.3	D55	16
					4×5.8	D61	22
4.7	4×5.8	D61	23	—	4×5.8	D61	26
					5×5.3	E55	23
6.8	—	—	—	—	5×5.8	E61	29
					—	—	—
10	4×5.8	D61	30	—	5×5.8	E61	35
					6.3×5.3	F55	35
22	5×5.8	E61	52	—	6.3×5.8	F61	47
					—	—	—
33	6.3×5.8	F61	74	—	6.3×7.7	F80	82
					8×6.5	G68	91
47	6.3×5.8	F61	89	—	6.3×7.7	F80	97
					8×6.5	G68	108
68	6.3×7.7	F80	117	—	—	—	—
					—	—	—
100	6.3×7.7	F80	142	—	8×10.5	GA5	230
					10×10.5	HA5	262
150	8×10	G10	283	—	10×10.5	HA5	300
					—	—	—
220	8×10.5	GA5	302	—	10×10.5	HA5	375
					—	—	—
330	10×10.5	HA5	450	—	—	—	—

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

Chip Type, 105°C Use, Long Life Capacitors

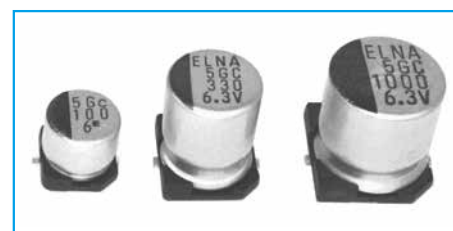
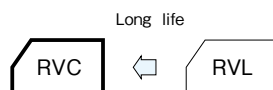
GREEN
CAP

SMD

105°C
3000hours

Anti-
cleaning
solvent

- Compatible with surface mounting.
- Supplied with carrier taping.
- Guarantees 3000 hours at 105°C.
(10L:5000 hours).



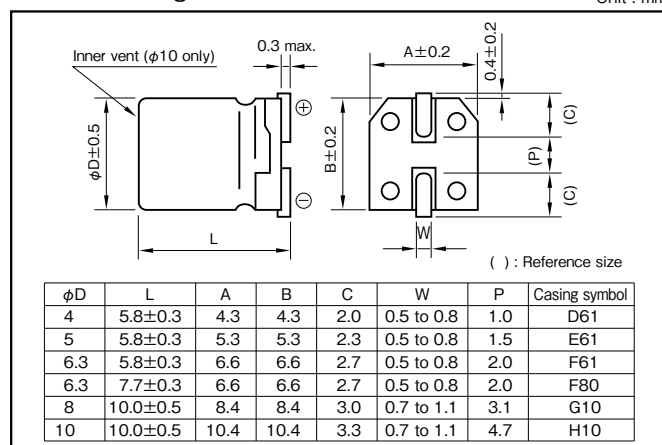
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Specifications

Item	Performance						
Category temperature range (°C)	-40 to +105						
Tolerance at rated capacitance (%)	±20 (20°C,120Hz)						
Leakage current (μA)	Less than 0.01CV or 3 whichever is larger (after 2 minutes) C : Rated capacitance (μF), V : Rated voltage (V) (20°C)						
Tangent of loss angle (tanδ)	Rated voltage (V)	6.3	10	16	25	35	50
	tanδ (max.)	0.28	0.24	0.20	0.16	0.13	0.12
Characteristics at high and low temperature	(20°C,120Hz)						
	Rated voltage (V)	6.3	10	16	25	35	50
	Impedance ratio (max.)	Z-25°C/Z+20°C	4	3	2	2	2
		Z-40°C/Z+20°C	10	7	5	3	3
(120Hz)							
Endurance (105°C)	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°C)	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 1998, -18 1999 (IEC 60384-1 1992, -18 1993)						

Outline Drawing

Unit : mm



Coefficient of Frequency for Rated Ripple Current

Frequency (Hz)	50 · 60	120	1k	10k · 100k
Rated voltage (V)				
6.3 to 16	0.80	1	1.15	1.25
25 to 35	0.80	1	1.25	1.40
50	0.1 to 3.3μF	0.50	1	1.35
4.7 or more	0.70	1	1.35	1.50

Part numbering system (example : 16V47μF)

RVC	—	16	V	470	M	F61	U*	—	□
Series code		Rated voltage symbol		Rated capacitance symbol	Capacitance tolerance symbol	Casing symbol			Taping symbol

* If it is for automotive, should add "Q".

- Soldering conditions are described on page 15.
- Land pattern size are described on page 13.
- The taping specifications are described on page 16.

Standard Ratings

Rated voltage (V) Item Rated capacitance (μF)	6.3			10			16			25			35			50		
	Case φD×L(mm)	Casing symbol	Rated ripple current mA Arms	Case φD×L(mm)	Casing symbol	Rated ripple current mA Arms	Case φD×L(mm)	Casing symbol	Rated ripple current mA Arms	Case φD×L(mm)	Casing symbol	Rated ripple current mA Arms	Case φD×L(mm)	Casing symbol	Rated ripple current mA Arms	Case φD×L(mm)	Casing symbol	Rated ripple current mA Arms
0.33	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	4×5.8	D61	3.2
0.47	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	4×5.8	D61	5.0
1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	4×5.8	D61	10
2.2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	4×5.8	D61	16
3.3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	4×5.8	D61	17
4.7	—	—	—	—	—	—	—	—	—	—	—	—	4×5.8	D61	16	5×5.8	E61	23
10	—	—	—	—	—	—	4×5.8	D61	28	—	—	—	5×5.8	E61	28	6.3×5.8	F61	35
22	4×5.8	D61	26	—	—	—	5×5.8	E61	39	—	—	—	6.3×5.8	F61	55	6.3×7.7	F80	58
33	—	—	—	5×5.8	E61	43	—	—	—	6.3×5.8	F61	60	6.3×7.7	F80	57	8×10	G10	91
47	5×5.8	E61	46	—	—	—	6.3×5.8	F61	70	6.3×7.7	F80	65	—	—	—	8×10	G10	100
100	6.3×5.8	F61	71	—	—	—	6.3×7.7	F80	81	8×10	G10	130	—	—	—	10×10	H10	160
220	6.3×7.7	F80	101	8×10	G10	160	—	—	—	—	—	—	10×10	H10	220	—	—	—
330	8×10	G10	230	—	—	—	—	—	—	10×10	H10	238	—	—	—	—	—	—
470	—	—	—	—	—	—	10×10	H10	340	—	—	—	—	—	—	—	—	—
1000	10×10	H10	313	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

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

ALUMINUM

CHIP
ALUMINUM

105°C

Chip Type, 105°C Use, Low Impedance, Long Life Capacitors

GREEN
CAP

SMD

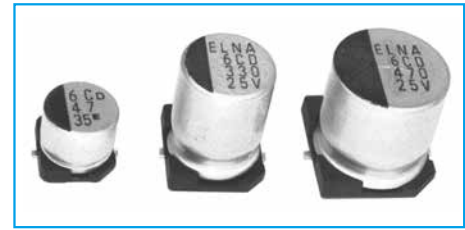
Low Z

105°C
2000hours

Anti-
cleaning
solvent

- Compatible with surface mounting.
- Supplied with carrier taping.
- Guarantees 2000 hours at 105°C.
(6.3 to 50V 10.0L, 10.5L: 5000 hours)
(φ12.5x13.5L: 5000 hours)

Low Z, Long life



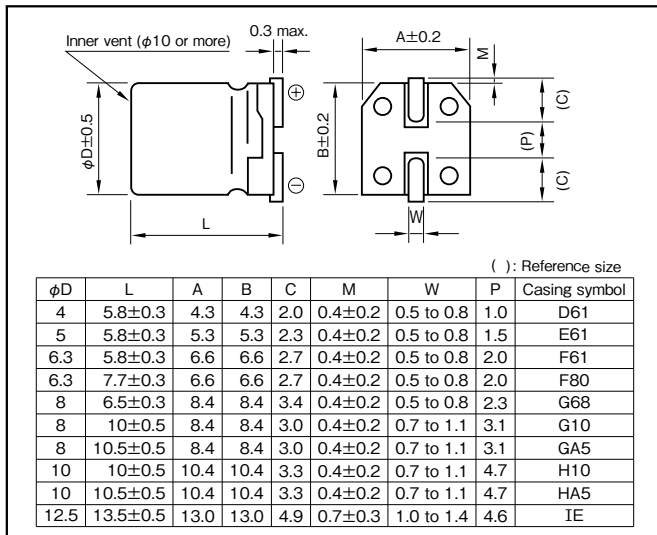
Marking color : Black print

Specifications

Item	Performance										
Category temperature range (°C)	-55 to +105										
Tolerance at rated capacitance (%)	±20 (20°C,120Hz)										
Leakage current (μA)	Less than 0.01CV or 3 whichever is larger (after 2 minutes) C : Rated capacitance (μF) , V : Rated voltage (V) (20°C)										
Tangent of loss angle (tanδ)	Rated voltage (V)		6.3	10	16	25	35	50	63	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°C,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°C/Z+20°C	2	2	2	2	2	2	2	2	2
		Z-40°C/Z+20°C	3	3	3	3	3	3	3	3	3
		Z-55°C/Z+20°C	8	4	4	3	3	3	3	3	3
(120Hz)											
Endurance (105°C)	Test time		2000 hours (6.3 to 50V 10.0L,10.5L,φ12.5x13.5L : 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 (6.3 to 50V 10.0L,10.5L,φ12.5x13.5L : 300% or less)								
Shelf life (105°C)	Test time : 1000hours ; other items are same as the endurance. Voltage application treatment : According to JIS C5101-4 4.1										
Applicable standards	JIS C 5101-1 1998, -18 1999(IEC 60384-1 1992, -18 1993)										

Outline Drawing

Unit : mm



- Soldering conditions are described on page 15.
- Land pattern size are described on page 13.
- The taping specifications are described on page 16.

Coefficient of Frequency for Rated Ripple Current

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

Part numbering system

φ 10X10.5L or less (example : 16V100μF)

RVD	—	16	V	101	M	F61	U*	—	□
Series code		Rated voltage symbol		Rated capacitance symbol	Capacitance tolerance symbol	Casing symbol			Taping symbol

φ 12.5X13.5 (example : 16V1000μF)

RVD	—	16	V	102	M	IE	T*	—	R5
Series code		Rated voltage symbol		Rated capacitance symbol	Capacitance tolerance symbol	Casing symbol			Taping symbol

* If it is for automotive, should add "Q".

If "For Vibration Resistance" type is required, please see the series RTD of page 59.

Standard Ratings

Rated voltage (V)	Item	6.3				10				16			
		Case	Casing symbol	Impedance	Rated ripple current	Case	Casing symbol	Impedance	Rated ripple current	Case	Casing symbol	Impedance	Rated ripple current
		φD×L (mm)		(Ω max.)	(mA _{rms})	φD×L (mm)		(Ω max.)	(mA _{rms})	φD×L (mm)		(Ω max.)	(mA _{rms})
10	—	—	—	—	—	—	—	—	—	4×5.8	D61	1.35	90
22	4×5.8	D61	1.35	90	4×5.8	D61	1.35	90	90	4×5.8	D61	1.35	90
										5×5.8	E61	0.70	170
33	—	—	—	—	—	4×5.8	D61	1.35	90	—	—	—	—
						5×5.8	E61	0.70	170				
47	4×5.8	D61	1.35	90	—	—	—	—	—	5×5.8	E61	0.70	170
	5×5.8	E61	0.70	170						6.3×5.8	F61	0.36	250
100	5×5.8	E61	0.70	170	—	—	—	—	—	6.3×5.8	F61	0.36	250
	6.3×5.8	F61	0.36	250									
220	6.3×5.8	F61	0.36	250	6.3×7.7	F80	0.30	300	300	6.3×7.7	F80	0.30	300
					8×6.5	G68	0.30	300	300	8×6.5	G68	0.30	300
330	6.3×7.7	F80	0.30	300	8×10	G10	0.16	600	600	8×10	G10	0.16	600
	8×6.5	G68	0.30	300									
470	8×10	G10	0.16	600	8×10	G10	0.16	600	600	8×10	G10	0.16	600
680	—	—	—	—	8×10	G10	0.16	600	600	10×10	H10	0.090	850
										10×10.5	HA5	0.080	850
1000	8×10	G10	0.16	600	10×10	H10	0.090	850	850	12.5×13.5	IE	0.054	1160
					10×10.5	HA5	0.080	850	850				
1500	10×10	H10	0.090	850	12.5×13.5	IE	0.054	1160	1160	12.5×13.5	IE	0.054	1160
	10×10.5	HA5	0.080	850									
2200	12.5×13.5	IE	0.054	1160	12.5×13.5	IE	0.054	1160	1160	—	—	—	—

Rated voltage (V)	Item	25				35				50			
		Case	Casing symbol	Impedance	Rated ripple current	Case	Casing symbol	Impedance	Rated ripple current	Case	Casing symbol	Impedance	Rated ripple current
		φD×L (mm)		(Ω max.)	(mA _{rms})	φD×L (mm)		(Ω max.)	(mA _{rms})	φD×L (mm)		(Ω max.)	(mA _{rms})
4.7	—	—	—	—	—	4×5.8	D61	1.35	90	4×5.8	D61	2.7	60
10	4×5.8	D61	1.35	90	4×5.8	D61	1.35	90	90	5×5.8	E61	1.5	90
					5×5.8	E61	0.70	170	170	6.3×5.8	F61	0.86	170
22	5×5.8	E61	0.70	170	5×5.8	E61	0.70	170	170	6.3×5.8	F61	0.86	170
33	5×5.8	E61	0.70	170	6.3×5.8	F61	0.36	250	250	6.3×7.7	F80	0.66	195
	6.3×5.8	F61	0.36	250						8×6.5	G68	0.63	200
47	6.3×5.8	F61	0.36	250	6.3×5.8	F61	0.36	250	250	6.3×7.7	F80	0.66	195
										8×6.5	G68	0.63	200
100	6.3×7.7	F80	0.30	300	6.3×7.7	F80	0.30	300	300	8×10	G10	0.34	350
	8×6.5	G68	0.30	300	8×10	G10	0.16	600	600	8×10.5	GA5	0.32	350
220	8×10	G10	0.16	600	8×10	G10	0.16	600	600	10×10	H10	0.20	700
										10×10.5	HA5	0.18	700
330	8×10	G10	0.16	600	10×10	H10	0.090	850	850	12.5×13.5	IE	0.12	900
					10×10.5	HA5	0.080	850	850				
470	10×10	H10	0.090	850	12.5×13.5	IE	0.054	1160	1160	—	—	—	—
	10×10.5	HA5	0.080	850									
680	12.5×13.5	IE	0.054	1160	12.5×13.5	IE	0.054	1160	1160	—	—	—	—
1000	12.5×13.5	IE	0.054	1160	—	—	—	—	—	—	—	—	—

Rated voltage (V)	Item	63				80				100			
		Case	Casing symbol	Impedance	Rated ripple current	Case	Casing symbol	Impedance	Rated ripple current	Case	Casing symbol	Impedance	Rated ripple current
		φD×L (mm)		(Ω max.)	(mA _{rms})	φD×L (mm)		(Ω max.)	(mA _{rms})	φD×L (mm)		(Ω max.)	(mA _{rms})
4.7	—	—	—	—	—	—	—	—	—	—	—	—	—
10	6.3×5.8	F61	1.5	80	6.3×7.7	F80	2.4	60	60	—	—	—	—
22	6.3×7.7	F80	1.2	120	8×10	G10	0.90	130	130	8×10	G10	1.30	130
33	8×10	G10	0.65	250	8×10	G10	0.90	130	130	10×10	H10	0.70	200
47	8×10	G10	0.65	250	10×10	H10	0.50	200	200	—	—	—	—
68	8×10	G10	0.65	250	—	—	—	—	—	—	—	—	—
100	10×10	H10	0.35	400	12.5×13.5	IE	0.18	550	550	—	—	—	—
	12.5×13.5	IE	0.16	600									
220	12.5×13.5	IE	0.16	600	—	—	—	—	—	—	—	—	—

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

RVV VERTICAL CHIP TYPE ALUMINUM ELECTROLYTIC CAPACITORS



Chip Type, 105°C Use, Low Impedance Capacitors

GREEN
CAP

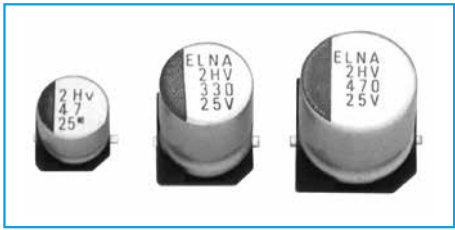
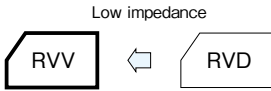
SMD

Low Z

105°C
2000hours

Anti-
cleaning
solvent

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



Marking color : Black print

Specifications

Item	Performance						
Category temperature range (°C)	-55 to +105						
Tolerance at rated capacitance (%)	±20 (20°C,120Hz)						
Leakage current (μA)	Less than 0.01CV or 3 whichever is larger (after 2 minutes) C : Rated capacitance (μF) , V : Rated voltage (V) (20°C)						
Tangent of loss angle (tanδ)	Rated voltage (V)	6.3	10	16	25	35	
	tanδ (max.)	0.26	0.19	0.16	0.14	0.12	
	(20°C,120Hz)						
Characteristics at high and low temperature	Rated voltage (V)		6.3	10	16	25	35
	Impedance ratio (max.)	Z-25°C/Z+20°C	2	2	2	2	2
		Z-40°C/Z+20°C	3	3	3	3	3
		Z-55°C/Z+20°C	4	4	4	3	3
		(120Hz)					
Endurance (105°C)	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				
Shelf life (105°C)	Test time : 1000hours ; other items are same as the endurance. Voltage application treatment : According to JIS C5101-4 4.1						
Applicable standards	JIS C 5101-1 1998, -18 1999(IEC 60384-1 1992, -18 1993)						

Outline Drawing

Unit : mm

Standard Type

For Vibration Resistance Type (φ8X10, φ10X10)

() : Reference size

φD	L	A	B	C	W	P	Casing symbol
6.3	5.8±0.3	6.6	6.6	2.7	0.5 to 0.8	2.0	F61
6.3	7.7±0.3	6.6	6.6	2.7	0.5 to 0.8	2.0	F80
8	6.5±0.3	8.4	8.4	3.4	0.5 to 0.8	2.3	G68
8	10±0.5	8.4	8.4	3.0	0.7 to 1.1	3.1	G10
10	10±0.5	10.4	10.4	3.3	0.7 to 1.1	4.7	H10

Coefficient of Frequency for Rated Ripple Current

Frequency (Hz)	50 · 60	120	1k	10k · 100k
Rated voltage (V)	50 · 60	120	1k	10k · 100k
6.3 to 35	0.50	0.50	0.75	1

Part numbering system

Standard Type (example : 16V100μF)

RVV	—	16	V	101	M	F61	U*	—	□
Series code		Rated voltage symbol		Rated capacitance symbol	Capacitance tolerance symbol	Casing symbol			Taping symbol

For Vibration Resistance Type (example : 25V470μF)

RTV	—	25	V	471	M	H10	U*	—	□
Series code		Rated voltage symbol		Rated capacitance symbol	Capacitance tolerance symbol	Casing symbol			Taping symbol

* If it is for automotive, should add "Q".

- Soldering conditions are described on page 15.
- Land pattern size are described on page 13.
- The taping specifications are described on page 16.

Standard Ratings

Rated voltage (V)	Item	6.3				10				16			
		Case	Casing symbol	Impedance	Rated ripple current	Case	Casing symbol	Impedance	Rated ripple current	Case	Casing symbol	Impedance	Rated ripple current
		φD × L (mm)		(Ω max.)	(mA rms)	φD × L (mm)		(Ω max.)	(mA rms)	φD × L (mm)		(Ω max.)	(mA rms)
47		—	—	—	—	—	—	—	—	6.3 × 5.8	F61	0.26	300
100		6.3 × 5.8	F61	0.26	300	—	—	—	—	6.3 × 5.8	F61	0.26	300
										6.3 × 7.7	F80	0.16	600
220		6.3 × 5.8	F61	0.26	300	6.3 × 7.7	F80	0.16	600	6.3 × 7.7	F80	0.16	600
						8 × 6.5	G68	0.18	500	8 × 6.5	G68	0.18	500
330		6.3 × 7.7	F80	0.16	600	8 × 10	G10	0.09	850	8 × 10	G10	0.09	850
		8 × 6.5	G68	0.18	500								
470		8 × 10	G10	0.09	850	8 × 10	G10	0.09	850	8 × 10	G10	0.09	850
680		—	—	—	—	8 × 10	G10	0.09	850	10 × 10	H10	0.07	1190
1000		8 × 10	G10	0.09	850	10 × 10	H10	0.07	1190	—	—	—	—
1500		10 × 10	H10	0.07	1190	—	—	—	—	—	—	—	—

Rated voltage (V)	Item	25				35			
		Case	Casing symbol	Impedance	Rated ripple current	Case	Casing symbol	Impedance	Rated ripple current
		φD × L (mm)		(Ω max.)	(mA rms)	φD × L (mm)		(Ω max.)	(mA rms)
33		6.3 × 5.8	F61	0.26	300	6.3 × 5.8	F61	0.26	300
47		6.3 × 5.8	F61	0.26	300	6.3 × 5.8	F61	0.26	300
100		6.3 × 7.7	F80	0.16	600	6.3 × 7.7	F80	0.16	600
		8 × 6.5	G68	0.18	500	8 × 10	G10	0.09	850
220		8 × 10	G10	0.09	850	8 × 10	G10	0.09	850
330		8 × 10	G10	0.09	850	10 × 10	H10	0.07	1190
470		10 × 10	H10	0.07	1190	—	—	—	—

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

RZD VERTICAL CHIP TYPE ALUMINUM ELECTROLYTIC CAPACITORS



Chip Type, 105°C Use, Low ESR, High CV Capacitors

GREEN
CAP

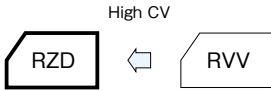
SMD

Low ESR

105°C
2000hours

Anti-
cleaning
solvent

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



Marking color : Black print

Specifications

Item	Performance					
Category temperature range (°C)	-55 to +105					
Tolerance at rated capacitance (%)	±20 (20°C,120Hz)					
Leakage current (μA)	Less than 0.01CV or 3 whichever is larger (after 2 minutes) C : Rated capacitance (μF) , V : Rated voltage (V) (20°C)					
Tangent of loss angle (tanδ)	Rated voltage (V)	6.3	10	16	25	35
	tanδ (max.)	0.26	0.19	0.16	0.14	0.12
0.02 is added to every 1000μF increase over 1000μF. (20°C,120Hz)						
Characteristics at high and low temperature	Rated voltage (V)	6.3	10	16	25	35
	Impedance ratio (max.)	Z-25°C/Z+20°C	2	2	2	2
		Z-40°C/Z+20°C	3	3	3	3
		Z-55°C/Z+20°C	4	4	4	3
(120Hz)						
Endurance (105°C)	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°C)	Test time : 1000hours ; other items are same as the endurance. Voltage application treatment : According to JIS C5101-4 4.1					
Applicable standards	JIS C 5101-1 1998, -18 1999(IEC 60384-1 1992, -18 1993)					

Outline Drawing

Unit : mm

Standard Type

For Vibration Resistance Type (φ8X10, φ10X10)

() : Reference size

φD	L	A	B	C	W	P	Casing symbol
6.3	5.8±0.3	6.6	6.6	2.7	0.5 to 0.8	2.0	F61
6.3	7.7±0.3	6.6	6.6	2.7	0.5 to 0.8	2.0	F80
8	10±0.5	8.4	8.4	3.0	0.7 to 1.1	3.1	G10
10	10±0.5	10.4	10.4	3.3	0.7 to 1.1	4.7	H10

Coefficient of Frequency for Rated Ripple Current

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

Part numbering system

Standard Type (example : 35V150μF)

RZD	—	35	V	151	M	F80	U*	—	□
Series code		Rated voltage symbol		Rated capacitance symbol	Capacitance tolerance symbol	Casing symbol			Taping symbol

For Vibration Resistance Type (example : 25V820μF)

RMD	—	25	V	821	M	H10	U*	—	□
Series code		Rated voltage symbol		Rated capacitance symbol	Capacitance tolerance symbol	Casing symbol			Taping symbol

* If it is for automotive, should add "Q".

- Soldering conditions are described on page 15.
- Land pattern size are described on page 13.
- The taping specifications are described on page 16.

Standard Ratings

Rated voltage (V) Item Rated capacitance (μF)	6.3				10				16			
	Case	Casing symbol	ESR	Rated ripple current	Case	Casing symbol	ESR	Rated ripple current	Case	Casing symbol	ESR	Rated ripple current
	φD × L (mm)		(Ω max.)	(mA _{rms})	φD × L (mm)		(Ω max.)	(mA _{rms})	φD × L (mm)		(Ω max.)	(mA _{rms})
150	—	—	—	—	—	—	—	—	6.3 × 5.8	F61	0.26	300
220	—	—	—	—	6.3 × 5.8	F61	0.26	300	6.3 × 5.8	F61	0.26	300
330	6.3 × 5.8	F61	0.26	300	6.3 × 7.7	F80	0.16	600	6.3 × 7.7	F80	0.16	600
470	6.3 × 7.7	F80	0.16	600	6.3 × 7.7	F80	0.16	600	—	—	—	—
680	6.3 × 7.7	F80	0.16	600	—	—	—	—	8 × 10	G10	0.08	850
1000	—	—	—	—	8 × 10	G10	0.08	850	10 × 10	H10	0.06	1190
1500	8 × 10	G10	0.08	850	10 × 10	H10	0.06	1190	—	—	—	—
2200	10 × 10	H10	0.06	1190	—	—	—	—	—	—	—	—

Rated voltage (V) Item Rated capacitance (μF)	25				35			
	Case	Casing symbol	ESR	Rated ripple current	Case	Casing symbol	ESR	Rated ripple current
	φD × L (mm)		(Ω max.)	(mA _{rms})	φD × L (mm)		(Ω max.)	(mA _{rms})
100	—	—	—	—	6.3 × 5.8	F61	0.26	300
150	6.3 × 5.8	F61	0.26	300	6.3 × 7.7	F80	0.16	600
220	6.3 × 7.7	F80	0.16	600	—	—	—	—
330	—	—	—	—	8 × 10	G10	0.08	850
470	8 × 10	G10	0.08	850	—	—	—	—
560	—	—	—	—	10 × 10	H10	0.06	1190
820	10 × 10	H10	0.06	1190	—	—	—	—

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

Chip Type, 125°C Use, Low ESR, Long Life Capacitors

GREEN
CAP

SMD

Low ESR

125°C
2000hours

Anti-
cleaning
solvent

- Compatible with surface mounting.
- Supplied with carrier taping.
- Guarantees 2000 hours at 125°C.
($\phi 4$ to $\phi 8 \times 6.5L$: 1000 hours)
($\phi 12.5 \times 13.5L$: 5000 hours)

Low ESR, Long Life



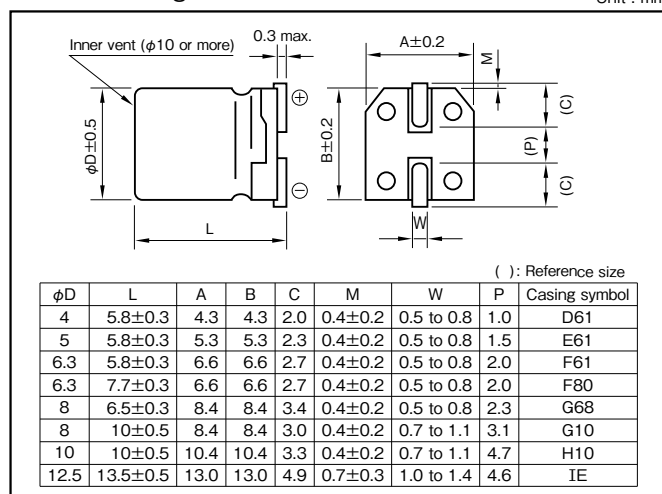
Marking color : Black print

Specifications

Item	Performance								
Category temperature range (°C)	-40 to +125								
Tolerance at rated capacitance (%)	±20 (20°C, 120Hz)								
Leakage current (μA)	Less than 0.01CV or 3 whichever is larger (after 2 minutes) C : Rated capacitance (μF) ; V : Rated voltage (V) (20°C)								
Tangent of loss angle	Rated voltage (V)	10	16	25	35	50	63	80	100
	Tangent of loss angle	0.24	0.20	0.16	0.14	0.14	0.12	0.12	0.10
Characteristics at high and low temperature	Rated voltage (V)	10	16	25	35	50	63	80	100
	Impedance Ratio (max.)	Z-25°C/Z+20°C	3	2	2	2	2	2	2
		Z-40°C/Z+20°C	4	3	3	3	3	3	3
Endurance (125°C)	Test time	2000 hours (φ4 to φ8×6.5L : 1000 hours, φ12.5×13.5L : 5000 hours)							
	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							
	Shelf life (125°C)	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 1998, -18 1999 (IEC 60384-1 1992, -18 1993)								

Outline Drawing

Unit : mm



- Soldering conditions are described on page 15.
- Land pattern size are described on page 13.
- The taping specifications are described on page 16.

Coefficient of Frequency for Rated Ripple Current

Frequency (Hz)	120	1k	10k	100k
Rated voltage(V)				
10 to 100	0.77	0.88	0.96	1.00

Part numbering system

$\phi 10 \times 10L$ or less (example : 16V100 μF)

RVT	—	35	V	221	M	H10	U*	—	
Series code		Rated voltage symbol		Rated capacitance symbol	Capacitance tolerance symbol	Casing symbol			Taping symbol

$\phi 12.5 \times 13.5$ (example : 35V330 μF)

RVT	—	35	V	331	M	IE	T*	—	R5
Series code		Rated voltage symbol		Rated capacitance symbol	Capacitance tolerance symbol	Casing symbol			Taping symbol

* If it is for automotive, should add "Q".

If "For Vibration Resistance" type is required, please see the series RTT of page 60.

Standard Ratings

Rated voltage(V) Rated capacitance(μF)	Item	10				16				25			
		Case	ESR(Ω max.)		Rated ripple current (mA rms)	Case	ESR(Ω max.)		Rated ripple current (mA rms)	Case	ESR(Ω max.)		Rated ripple current (mA rms)
		φD×L (mm)	20°C	−40°C		φD×L (mm)	20°C	−40°C		φD×L (mm)	20°C	−40°C	
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
100	—	—	—	—	—	—	—	—	—	8×6.5	0.60	9.0	180
										6.3×7.7	0.60	9.0	165
										8×10	0.20	2.0	340
220	—	—	—	—	—	—	—	—	—	8×10	0.20	2.0	340
										10×10	0.15	1.5	500
330	—	—	—	—	—	—	—	—	—	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) Rated capacitance(μF)	Item	35				50				63			
		Case	ESR(Ω max.)		Rated ripple current (mA rms)	Case	ESR(Ω max.)		Rated ripple current (mA rms)	Case	ESR(Ω max.)		Rated ripple current (mA rms)
		φD×L (mm)	20°C	−40°C		φD×L (mm)	20°C	−40°C		φD×L (mm)	20°C	−40°C	
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) Rated capacitance(μF)	Item	80				100			
		Case	ESR(Ω max.)		Rated ripple current (mA rms)	Case	ESR(Ω max.)		Rated ripple current (mA rms)
		φD×L (mm)	20°C	−40°C		φD×L (mm)	20°C	−40°C	
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°C, 100kHz
ESR : 100kHz

RZF

VERTICAL CHIP TYPE ALUMINUM ELECTROLYTIC CAPACITORS



Chip Type, 125°C Use, High CV, Long Life Capacitors

GREEN
CAP

SMD

Low ESR

125°C
4000hours

Anti-
cleaning
solvent

- Compatible with surface mounting.
- Supplied with carrier taping.
- Guaranteed 4000 hours at 125°C.
($\phi 6.3$: 2000 hours)

High CV, Long Life



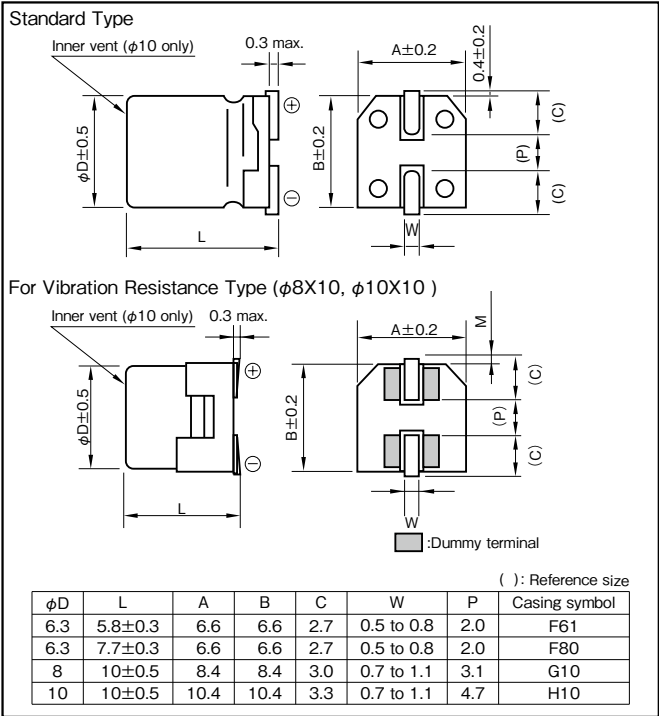
Marking color : Black print

Specifications

Item	Performance					
Category temperature range (°C)	-40 to +125					
Tolerance at rated capacitance (%)	±20 (20°C,120Hz)					
Leakage current (μA)	Less than 0.01CV or 3 whichever is larger (after 2 minutes) C : Rated capacitance (μF) ; V : Rated voltage (V) (20°C)					
Tangent of loss angle (tanδ)	Rated voltage (V)	10	16	25	35	
	tanδ (max.)	0.24	0.20	0.16	0.14	
(20°C,120Hz)						
Characteristics at high and low temperature	Rated voltage (V)		10	16	25	35
	Impedance ratio (max.)	Z-25°C/Z+20°C	3	2	2	2
		Z-40°C/Z+20°C	6	4	4	3
	(120Hz)					
Endurance (125°C)	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		300% or less of the initial specified value			
Shelf life (125°C)	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 1998, -18 1999 (IEC 60384-1 1992, -18 1993)					

Outline Drawing

Unit : mm



- Soldering conditions are described on page 15.
- Land pattern size are described on page 13.
- The taping specifications are described on page 16.

Coefficient of Frequency for Rated Ripple Current

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

Part numbering system

Standard Type (example : 35V100 μF)

RZF	—	35	V	101	M	F80	U*	—	
Series code		Rated voltage symbol		Rated capacitance symbol	Capacitance tolerance symbol	Casing symbol	Taping symbol		

For Vibration Resistance Type (example : 25V330 μF)

RMF	—	25	V	331	M	H10	U*	—	
Series code		Rated voltage symbol		Rated capacitance symbol	Capacitance tolerance symbol	Casing symbol	Taping symbol		

* If it is for automotive, should add "Q".

Standard Ratings

Rated voltage (V) Item Rated capacitance (μF)	10				16				25			
	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°C	-40°C	(mA _{rms})	φD × L (mm)	20°C	-40°C	(mA _{rms})	φD × L (mm)	20°C	-40°C	(mA _{rms})
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			
	Case	ESR (Ω max.)		Rated ripple current
	φD × L (mm)	20°C	-40°C	(mA _{rms})
47	6.3 × 5.8	1.2	22	110
100	6.3 × 7.7	0.60	12	220
220	8 × 10	0.30	5.5	296
330	10 × 10	0.20	3.6	440

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

RVX VERTICAL CHIP TYPE ALUMINUM ELECTROLYTIC CAPACITORS

ELNA®

Chip Type, 135°C Capacitors

GREEN
CAP

SMD

135°C
1000hours

Anti-
cleaning
solvent

- Compatible with surface mounting.
- Supplied with carrier taping.
- Guarantees 1000 hours 135°C.

RVK

High temperature ↑

RVT



Marking color : Black print

Specifications

Item	Performance		
Category temperature range (°C)	-40 to +135		
Tolerance at rated capacitance (%)	±20 (20°C,120Hz)		
Leakage current (μA)	Less than 0.01CV or 3 whichever is larger (after 2 minutes) C : Rated capacitance (μF) ; V : Rated voltage (V) (20°C)		
Tangent of loss angle (tanδ)	Rated voltage (V)	25	35
	tanδ (max.)	0.24	0.20 (20°C,120Hz)
Characteristics at high and low temperature	Rated voltage (V)	25	35
	Impedance Ratio (max.)	Z-25°C/Z+20°C	2
		Z-40°C/Z+20°C	3 (120Hz)
Endurance (135°C)	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°C)	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 1998, -18 1999 (IEC 60384-1 1992, -18 1993)		

Coefficient of Frequency for Rated Ripple Current

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

- Soldering conditions are described on page 15.
- Land pattern size are described on page 13.
- The taping specifications are described on page 16.

Part numbering system (example : 25V330μF)

Standard Type

RVX	—	25	V	331	M	H10	U*	□
Series code		Rated voltage symbol		Rated capacitance symbol	Capacitance tolerance symbol	Casing symbol		Taping symbol

For Vibration Resistance Type

RTX	—	25	V	331	M	H10	U*	□
Series code		Rated voltage symbol		Rated capacitance symbol	Capacitance tolerance symbol	Casing symbol		Taping symbol

* If it is for automotive, should add "Q".

Outline Drawing

Standard Type

For Vibration Resistance Type (φ8X10, φ10X10)

Unit : mm

φD	L	A	B	C	W	P	Casing symbol
8	10±0.5	8.4	8.4	3.0	0.7 to 1.1	3.1	G10
10	10±0.5	10.4	10.4	3.3	0.7 to 1.1	4.7	H10

() : Reference size

□ : Dummy terminal

Standard Ratings

Rated voltage (V)	Item	25				35			
		Case	Casing symbol	ESR (Ω max.)	Rated ripple current (mAmps)	Case	Casing symbol	ESR (Ω max.)	Rated ripple current (mAmps)
22		8 × 10	G10	0.70	115	8 × 10	G10	0.70	115
33		10 × 10	H10	0.50	155	10 × 10	H10	0.50	155
47		8 × 10	G10	0.70	115	8 × 10	G10	0.70	115
		10 × 10	H10	0.50	155	10 × 10	H10	0.50	155
100		8 × 10	G10	0.70	115	8 × 10	G10	0.70	115
		10 × 10	H10	0.50	155	10 × 10	H10	0.50	155
220		8 × 10	G10	0.70	115	10 × 10	H10	0.50	155
		10 × 10	H10	0.50	155				
330		10 × 10	H10	0.50	155				

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

For Vibration Resistance, Chip Type Aluminum Electrolytic Capacitors



Series RTZ	30G	105°C, Low Impedance	…Page 58
Series RTD	30G	105°C, Low Impedance, Long Life	…Page 59
Series RTT	30G	125°C, Low ESR, Long Life	…Page 60
Series RTQ	30G	150°C, Low ESR, Long Life	…Page 61
Series RYK	Horizontal	125°C	…Page 62

Chip Type 105°C Use, Low Z, For Vibration Capacitors

GREEN
CAP

SMD

Vibration
Resistance

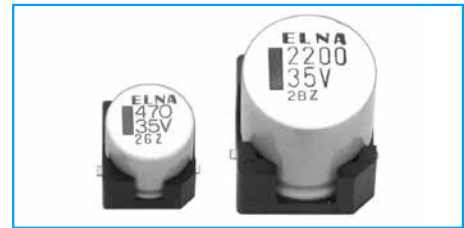
Low Z

105°C
2000hours

Anti-
cleaning
solvent

- Compatible with surface mounting.
- For Vibration resistance. (30G guaranteed)
- Supplied with carrier taping.
- Guarantees 2000 hours at 105°C.
($\phi 12.5$ to $\phi 18$: 5000hours)

Vibration resistance



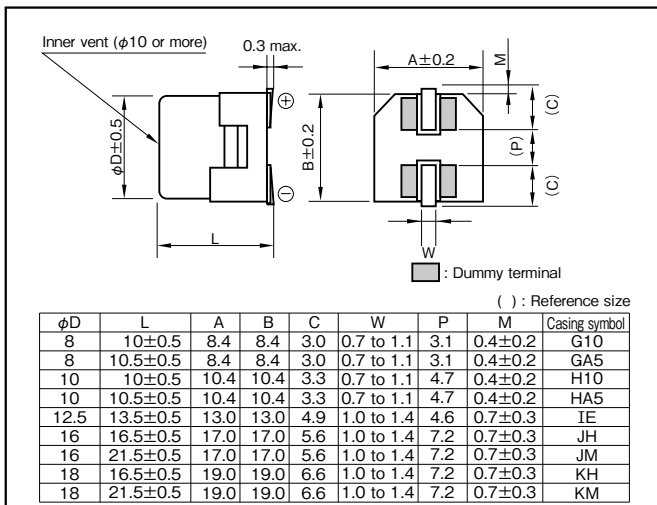
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Specifications

Item	Performance						
Category temperature range (°C)	-55 to +105						
Tolerance at rated capacitance (%)	±20 (20°C,120Hz)						
Leakage current (μA)	Less than 0.01CV or 3 whichever is larger (after 2 minutes) C : Rated capacitance (μF) , V : Rated voltage (V) (20°C)						
Tangent of loss angle (tanδ)	Rated voltage (V)		6.3	10	16	25	35
	tanδ (max.)		0.28	0.24	0.20	0.16	0.14
	0.02 is added to every 1000μF increase over 1000μF (20°C,120Hz)						
Characteristics at high and low temperature	Rated voltage (V)		6.3	10	16	25	35
	Impedance ratio (max.)	Z-25°C/Z+20°C	4	3	2	2	2
		Z-55°C/Z+20°C	8	5	4	3	3
						(120Hz)	
Endurance (105°C) (Applied ripple current)	Test time		2000 hours (φ8, 10) 5000 hours (φ12.5 to 18)				
	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°C)	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 1998, -18 1999 (IEC 60384-1 1992, -18 1993)						

Outline Drawing

Unit : mm



Coefficient of Frequency for Rated Ripple Current

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

Part numbering system

$\phi 8, \phi 10$ (example : 6.3V1500 μF)

RTZ	6	V	152	M	HA5	SU	*	
Series code	Rated voltage symbol	Rated capacitance symbol	Capacitance tolerance symbol	Casing symbol	Taping symbol			
$\phi 12.5$ or more (example : 6.3V2200 μF)								
RTZ	6	V	222	M	IE	T	*	
Series code	Rated voltage symbol	Rated capacitance symbol	Capacitance tolerance symbol	Casing symbol	Taping symbol			

* If it is for automotive, should add "Q".

- Soldering conditions are described on page 15.
- Land pattern size are described on page 13.
- The taping specifications are described on page 16.

Standard Ratings

Rated voltage (V)	6.3				10				16				25				35			
	Case	Casing symbol	Impedance (Ω max.)	Rated ripple current (mA rms)	Case	Casing symbol	Impedance (Ω max.)	Rated ripple current (mA rms)	Case	Casing symbol	Impedance (Ω max.)	Rated ripple current (mA rms)	Case	Casing symbol	Impedance (Ω max.)	Rated ripple current (mA rms)	Case	Casing symbol	Impedance (Ω max.)	Rated ripple current (mA rms)
150	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
220	—	—	—	—	—	—	—	—	8 x 10	G10	0.20	450	8 x 10.5	GA5	0.17	450	10 x 10	H10	0.10	670
330	—	—	—	—	8 x 10.5	GA5	0.17	450	8 x 10.5	GA5	0.17	450	8 x 10.5	GA5	0.17	450	10 x 10.5	HA5	0.090	670
470	8 x 10.5	GA5	0.17	450	10 x 10	H10	0.10	670	10 x 10	H10	0.10	670	10 x 10	H10	0.10	670	12.5 x 13.5	IE	0.060	1100
680	10 x 10	H10	0.10	670	8 x 10.5	GA5	0.17	450	8 x 10.5	GA5	0.17	450	10 x 10.5	HA5	0.090	670	16 x 16.5	JH	0.046	1540
1000	8 x 10.5	GA5	0.17	450	10 x 10.5	HA5	0.090	670	10 x 10.5	HA5	0.090	670	12.5 x 13.5	IE	0.060	1100	12.5 x 13.5	IE	0.060	1100
1500	10 x 10	H10	0.10	670	12.5 x 13.5	IE	0.060	1100	12.5 x 13.5	IE	0.060	1100	16 x 16.5	JH	0.046	1540	16 x 16.5	JH	0.046	1540
2200	12.5 x 13.5	IE	0.060	1100	16 x 16.5	JH	0.046	1540	16 x 16.5	JH	0.046	1540	18 x 16.5	KH	0.042	1760	18 x 16.5	KH	0.042	1760
3300	16 x 16.5	JH	0.046	1540	16 x 16.5	JH	0.046	1540	16 x 16.5	JH	0.046	1540	18 x 16.5	KH	0.042	1760	18 x 21.5	KM	0.038	1960
4700	16 x 21.5	JM	0.040	1840	18 x 16.5	KH	0.042	1760	18 x 16.5	KH	0.042	1760	18 x 21.5	KM	0.038	1960	—	—	—	—
6800	18 x 21.5	KM	0.038	1960	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
8200	18 x 21.5	KM	0.038	1960	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

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

Chip Type 105°C Use, Low Z, Long Life, For Vibration Capacitors

GREEN
CAP

SMD

Vibration
Resistance

Low Z

105°C
5000hoursAnti-
cleaning
solvent

- Compatible with surface mounting.
- For Vibration resistance. (30G guaranteed)
- Supplied with carrier taping.
- Guarantees 5000 hours at 105°C.

Vibration resistance

RTD



RVD



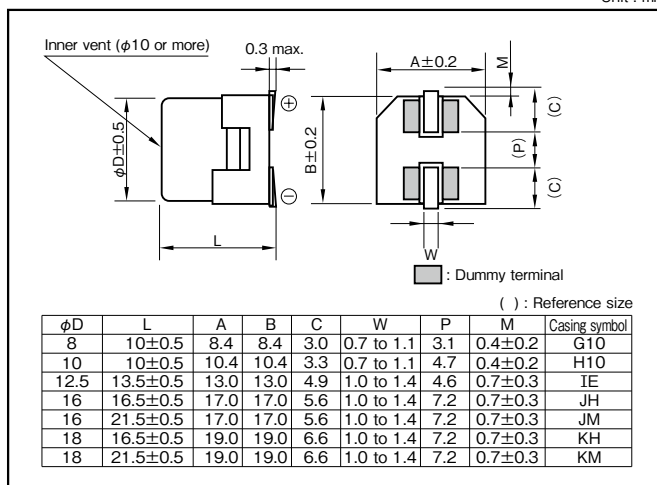
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Specifications

Item		Performance									
Category temperature range (°C)		-55 to +105									
Tolerance at rated capacitance (%)		±20 (20°C,120Hz)									
Leakage current (μA)		Less than 0.01CV or 3 whichever is larger (after 2 minutes) C : Rated capacitance (μF) , V : Rated voltage (V) (20°C)									
Tangent of loss angle (tanδ)	Rated voltage (V)		6.3	10	16	25	35	50	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°C,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°C/Z+20°C	2	2	2	2	2	2	2	2	2
		Z-40°C/Z+20°C	3	3	3	3	3	3	3	3	3
		Z-55°C/Z+20°C	8	4	4	3	3	3	3	3	3
		(120Hz)									
Endurance (105°C)	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°C)		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 1998, -18 1999 (IEC 60384-1 1992, -18 1993)									

Outline Drawing

Unit : mm



Coefficient of Frequency for Rated Ripple Current

Frequency (Hz)	50 · 60	120	1k	10k · 100k
Rated voltage (V)				
6.3 to 100	0.50	0.50	1.00	1

Part numbering system

φ8, φ10 (example : 6.3V1500μF)

RTD	—	6	V	152	M	HA5	SU	*	—	□
Series code		Rated voltage symbol		Rated capacitance symbol	Capacitance tolerance symbol	Casing symbol		Taping symbol		

φ12.5 or more (example : 6.3V2200μF)

RTD	—	6	V	222	M	IE	T	*	—	□
Series code		Rated voltage symbol		Rated capacitance symbol	Capacitance tolerance symbol	Casing symbol		Taping symbol		

* If it is for automotive, should add "Q".

- Soldering conditions are described on page 15.
- Land pattern size are described on page 13.
- The taping specifications are described on page 16.

Standard Ratings

Rated voltage (V)	Item	6.3				10				16				25				35				
		Case	Casing symbol	Impedance	Rated ripple current	Case	Casing symbol	Impedance	Rated ripple current	Case	Casing symbol	Impedance	Rated ripple current	Case	Casing symbol	Impedance	Rated ripple current	Case	Casing symbol	Impedance	Rated ripple current	
		φD×L (mm)	Symbol	(Ω max.)	(mA rms)	φD×L (mm)	Symbol	(Ω max.)	(mA rms)	φD×L (mm)	Symbol	(Ω max.)	(mA rms)	φD×L (mm)	Symbol	(Ω max.)	(mA rms)	φD×L (mm)	Symbol	(Ω max.)	(mA rms)	
100	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
220	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
330	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
470	8×10	G10	0.16	600	8×10	G10	0.16	600	8×10	G10	0.16	600	8×10	G10	0.16	600	8×10	G10	0.16	600	8×10	G10
680	8×10	G10	0.16	600	10×10	H10	0.090	850	10×10	H10	0.090	850	12.5×13.5	IE	0.054	1160	12.5×13.5	IE	0.054	1160	12.5×13.5	IE
1000	8×10	G10	0.16	600	10×10	H10	0.090	850	12.5×13.5	IE	0.054	1160	12.5×13.5	IE	0.054	1160	16×16.5	JH	0.044	1620	16×16.5	JH
1500	10×10	H10	0.090	850	12.5×13.5	IE	0.054	1160	12.5×13.5	IE	0.054	1160	16×16.5	JH	0.044	1620	18×16.5	KH	0.040	1840	18×16.5	KH
2200	12.5×13.5	IE	0.054	1160	12.5×13.5	IE	0.054	1160	16×16.5	JH	0.044	1620	16×16.5	JH	0.044	1620	18×21.5	KM	0.036	2080	18×21.5	KM
3300	16×16.5	JH	0.044	1620	16×16.5	JH	0.044	1620	18×16.5	KH	0.040	1840	18×16.5	KH	0.040	1840	—	—	—	—	—	—
4700	18×16.5	KH	0.040	1840	18×21.5	KM	0.036	2080	18×16.5	KH	0.040	1840	18×21.5	KM	0.036	2080	—	—	—	—	—	—
6800	18×16.5	KH	0.040	1840	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
8200	18×21.5	KM	0.036	2080	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Rated voltage (V)	Item	50				63				80				100			
		Case	Casing symbol	Impedance	Rated ripple current	Case	Casing symbol	Impedance	Rated ripple current	Case	Casing symbol	Impedance	Rated ripple current	Case	Casing symbol	Impedance	Rated ripple current
		φD×L (mm)	Symbol	(Ω max.)	(mA rms)	φD×L (mm)	Symbol	(Ω max.)	(mA rms)	φD×L (mm)	Symbol	(Ω max.)	(mA rms)	φD×L (mm)	Symbol	(Ω max.)	(mA rms)
100	8×10	G10	0.32	350	12.5×13.5	IE	0.16	600	12.5×13.5	IE	0.18	550	16×16.5	JH	0.17	700	
220	10×10	H10	0.18	700	12.5×13.5	IE	0.16	600	16×16.5	JH	0.16	720	18×16.5	KH	0.15	800	
330	12.5×13.5	IE	0.12	900	16×16.5	JH	0.14	800	18×16.5	KH	0.13	830	18×21.5	KM	0.13	940	
470	16×16.5	JH	0.080	1000	18×16.5	KH	0.12	900	18×21.5	KM	0.11	1000	—	—	—	—	
680	16×16.5	JH	0.080	1000	18×21.5	KM	0.10	1050	—	—	—	—	—	—	—	—	
1000	18×16.5	KH	0.076	1100	—	—	—	—	—	—	—	—	—	—	—	—	

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

Chip Type 125°C Use, Low ESR, For Vibration Capacitors

GREEN
CAP

SMD

Vibration
Resistance

Low ESR

125°C
2000hours

Anti-
cleaning
solvent

- Compatible with surface mounting.
- For Vibration resistance. (30G guaranteed)
- Supplied with carrier taping.
- Guarantees 2000 hours at 125°C.
($\phi 12.5$ or more : 5000h)

Vibration resistance



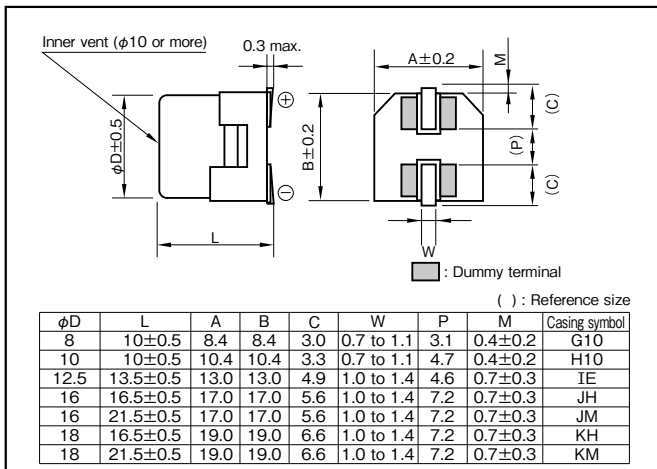
Marking color : Black print

Specifications

Item	Performance									
Category temperature range (°C)	-40 to +125									
Tolerance at rated capacitance (%)	±20 (20°C,120Hz)									
Leakage current (μA)	Less than 0.01CV or 3 whichever is larger (after 2 minutes) C : Rated capacitance (μF) , V : Rated voltage (V) (20°C)									
Tangent of loss angle (tanδ)	Rated voltage (V)		10	16	25	35	50	63	80	100
	Tangent of loss angle		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°C,120Hz)									
Characteristics at high and low temperature	Rated voltage (V)		10	16	25	35	50	63	80	100
	Impedance ratio (max.)	Z-25°C/Z+20°C	3	2	2	2	2	2	2	2
		Z-40°C/Z+20°C	4	3	3	3	3	3	3	3
(120Hz)										
Endurance (125°C)	Test time		2000 hours (ϕ 12.5 or more : 5000h)							
	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°C)	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 1998, -18 1999 (IEC 60384-1 1992, -18 1993)									

Outline Drawing

Unit : mm



Coefficient of Frequency for Rated Ripple Current

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

Part numbering system

$\phi 8, \phi 10$ (example : 35V100 μF)

RTT	35	V	101	M	H10	SU	*	
Series code	Rated voltage symbol	Rated capacitance symbol	Capacitance tolerance symbol	Casing symbol	Taping symbol			

$\phi 12.5$ or more (example : 35V1000 μF)

RTT	35	V	102	M	KM	T	*	
Series code	Rated voltage symbol	Rated capacitance symbol	Capacitance tolerance symbol	Casing symbol	Taping symbol			

* If it is for automotive, should add "Q".

- Soldering conditions are described on page 15.
- Land pattern size are described on page 13.
- The taping specifications are described on page 16.

Standard Ratings

Rated voltage (V)	Item	10				16				25				35				50			
		Case	ESR (Ω max.)	Rated ripple current	Rated ripple current	Case	ESR (Ω max.)	Rated ripple current	Rated ripple current	Case	ESR (Ω max.)	Rated ripple current	Rated ripple current	Case	ESR (Ω max.)	Rated ripple current	Rated ripple current	Case	ESR (Ω max.)	Rated ripple current	Rated ripple current
		$\phi D \times L$ (mm)	20°C	-40°C	(mAmps)	$\phi D \times L$ (mm)	20°C	-40°C	(mAmps)	$\phi D \times L$ (mm)	20°C	-40°C	(mAmps)	$\phi D \times L$ (mm)	20°C	-40°C	(mAmps)	$\phi D \times L$ (mm)	20°C	-40°C	(mAmps)
100		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
220		—	—	—	—	8 $\times$ 10	0.20	2.0	340	8 $\times$ 10	0.20	2.0	340	10 $\times$ 10	0.15	1.5	500	10 $\times$ 10	0.50	7.5	250
330		8 $\times$ 10	0.20	2.0	340	10 $\times$ 10	0.15	1.5	500	10 $\times$ 10	0.15	1.5	500	10 $\times$ 10	0.15	1.5	500	12.5 $\times$ 13.5	0.18	2.7	550
470		10 $\times$ 10	0.15	1.5	500	12.5 $\times$ 13.5	0.086	1.29	750	12.5 $\times$ 13.5	0.086	1.29	750	16 $\times$ 16.5	0.060	0.90	1000	16 $\times$ 16.5	0.12	1.8	850
680		12.5 $\times$ 13.5	0.086	1.29	750	16 $\times$ 16.5	0.060	0.90	1000	16 $\times$ 16.5	0.060	0.90	1000	18 $\times$ 16.5	0.050	0.75	1200	—	—	—	—
1000		12.5 $\times$ 13.5	0.086	1.29	750	18 $\times$ 16.5	0.050	0.75	1200	18 $\times$ 21.5	0.042	0.63	1550	18 $\times$ 21.5	0.042	0.63	1550	—	—	—	—
2200		16 $\times$ 16.5	0.060	0.90	1000	18 $\times$ 16.5	0.050	0.75	1200	—	—	—	—	—	—	—	—	—	—	—	—
3300		18 $\times$ 16.5	0.050	0.75	1200	18 $\times$ 21.5	0.042	0.63	1550	—	—	—	—	—	—	—	—	—	—	—	—
4700		18 $\times$ 21.5	0.042	0.63	1550	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

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

Chip Type 150°C Use, Low ESR, For Vibration Capacitors

GREEN
CAP

SMD

Vibration
Resistance

Low ESR

150°C
1000hoursAnti-
cleaning
solvent

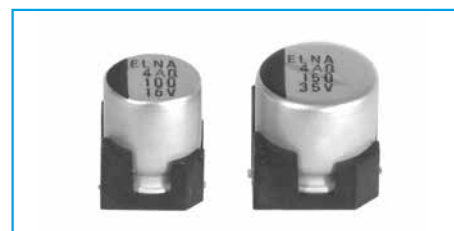
- Compatible with surface mounting.
- For Vibration resistance. (30G guaranteed)
- Supplied with carrier taping.
- Guaranteed 1000 hours at 150°C.

High temperature

RTQ



RTT



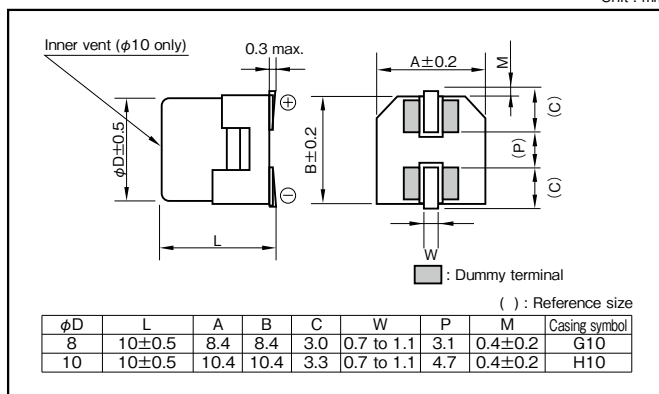
Marking color : Black print

Specifications

Item	Performance				
Category temperature range (°C)	-40 to +150				
Tolerance at rated capacitance (%)	±20 (20°C,120Hz)				
Leakage current (μA)	Less than 0.02CV or 3 whichever is larger (after 2 minutes) C : Rated capacitance (μF) , V : Rated voltage (V) (20°C)				
Tangent of loss angle (tanδ)	Rated voltage (V)	10	16	25	35
	tanδ (max.)	0.26	0.20	0.16	0.14
	0.02 is added to every 1000μF increase over 1000μF (20°C, 120Hz)				
Characteristics at high and low temperature	Rated voltage (V)	10	16	25	35
	Impedance ratio (max.)	Z-25°C/Z+20°C	3	2	2
		Z-40°C/Z+20°C	7	5	3
	(120Hz)				
Endurance (150°C)	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°C)	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 1998, -18 1999 (IEC 60384-1 1992, -18 1993)				

Outline Drawing

Unit : mm



Coefficient of Frequency for Rated Ripple Current

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

Part numbering system

φ10X10L (example : 35V100μF)

RTQ	—	35	V	101	M	H10	U	Q	—	
Series code		Rated voltage symbol		Rated capacitance symbol	Capacitance tolerance symbol	Casing symbol		Additional symbol		Taping symbol

- Soldering conditions are described on page 15.
- Land pattern size are described on page 13.
- The taping specifications are described on page 16.

Standard Ratings

Rated voltage (V)	10					16					25				
	Item	Case	Casing symbol	ESR	Rated ripple current	Case	Casing symbol	ESR	Rated ripple current	Case	Casing symbol	ESR	Rated ripple current	Case	Casing symbol
		φD×L (mm)		Ω (max.)		φD×L (mm)		Ω (max.)		φD×L (mm)		Ω (max.)		φD×L (mm)	
47		—	—	—	—	8×10	G10	0.70	120	8×10	G10	0.70	120	8×10	G10
68		—	—	—	—	8×10	G10	0.70	120	8×10	G10	0.70	120	8×10	G10
100		8×10	G10	0.70	120	8×10	G10	0.70	120	8×10	G10	0.70	120	8×10	G10
150		—	—	—	—	10×10	H10	0.40	160	10×10	H10	0.40	160	10×10	H10
220		8×10	G10	0.70	120	10×10	H10	0.40	160	10×10	H10	0.40	160	10×10	H10
330		10×10	H10	0.40	160	10×10	H10	0.40	160	—	—	—	—	—	—
470		10×10	H10	0.40	160	—	—	—	—	—	—	—	—	—	—

Rated voltage (V)	35				
Item	Case	Casing symbol	ESR	Rated ripple current	
	φD×L (mm)		Ω (max.)		
33	8×10	G10	0.70	120	
47	8×10	G10	0.70	120	
68	8×10	G10	0.70	120	
100	10×10	H10	0.40	160	
150	10×10	H10	0.40	160	

(Note) Rated ripple current : 150°C, 100kHz ; ESR : 20°C, 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.

Horizontal Type, 125°C Use, For Vibration Capacitors

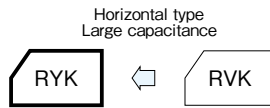
SMD

Vibration
Resistance

125°C
1000hours

Anti-
cleaning
solvent

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



Marking color : White print on a black case

Specifications

Item	Performance							
Category temperature range (°C)	-40 to +125							
Tolerance at rated capacitance (%)	±20 (20°C,120Hz)							
Leakage current (μA)	Less than 0.02CV (after 2 minutes) C : Rated capacitance (μF) ; V : Rated voltage (V) (20°C)							
Tangent of loss angle (tanδ)	Rated voltage (V)	6.3	10	16	25	35	50	63
	tanδ (max.)	0.30	0.28	0.26	0.24	0.20	0.19	0.18
Characteristics at high and low temperature	Rated voltage (V)	6.3	10	16	25	35	50	63
	Impedance ratio (max.)	Z-25°C/Z+20°C	3	3	3	3	3	3
		Z-40°C/Z+20°C	5	5	5	5	5	5
		(120Hz)						
Endurance (125°C) (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 (125°C)	Test time	500 hours						
	Leakage current	The initial specified value or less						
	Percentage of capacitance change	Within ±20% of initial value						
	Tangent of the loss angle	200% or less of the initial specified value						
Voltage application treatment : According to JIS C5101-4 4.1								
Applicable standards	JIS C5101-1 1998, -18 1999 (IEC 60384-1 1992, -18 1993)							

Outline Drawing

Unit : mm

Case Size : 9.5×24.0 ■ 8 terminals type : Casing symbol G5T									
Case size	W	L0	L	L1	H	H0	H1	F	
9.5×24	9.5±0.5	24±1	21±0.5	22±0.5	9.3±0.5	9.3±0.5	9.1±0.3	3.5±0.5	

Case Size : 9.5×19.0 ■ 6 terminals type : Casing symbol G4									
Case size	W	L0	L	L1	H	H0	H1	F	
9.5×19	9.5±0.5	19±1	16±0.5	17±0.5	9.3±0.5	9.3±0.5	9.1±0.3	3.5±0.5	

- Soldering conditions are described on page 15.
- Land pattern size are described on page 13.
- The taping specifications are described on page 16.

Part numbering system (example: 10V560μF)

RYK	—	10	V	561	M	G5T	T*	—	FL
Series code		Rated voltage symbol		Rated capacitance symbol	Capacitance tolerance symbol	Casing symbol			Taping polarity symbol

* If it is for automotive, should add "Q".

Standard Ratings

Rated voltage (V)	6.3			10			16			25			35			50			63		
	Case	Impedance (Ω max.)	Rated ripple current (mA rms)	Case	Impedance (Ω max.)	Rated ripple current (mA rms)	Case	Impedance (Ω max.)	Rated ripple current (mA rms)	Case	Impedance (Ω max.)	Rated ripple current (mA rms)	Case	Impedance (Ω max.)	Rated ripple current (mA rms)	Case	Impedance (Ω max.)	Rated ripple current (mA rms)	Case	Impedance (Ω max.)	Rated ripple current (mA rms)
56	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	9.5×19.0	0.52	204
82	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	9.5×24.0	0.37	272
100	—	—	—	—	—	—	—	—	—	—	—	—	9.5×19.0	0.40	232	9.5×24.0	0.35	279	—	—	—
220	—	—	—	—	—	—	—	—	—	9.5×19.0	0.40	232	9.5×24.0	0.30	302	—	—	—	—	—	—
270	—	—	—	—	—	—	9.5×19.0	0.40	232	9.5×24.0	0.30	302	—	—	—	—	—	—	—	—	—
470	—	—	—	9.5×19.0	0.40	232	9.5×24.0	0.30	302	—	—	—	—	—	—	—	—	—	—	—	—
560	9.5×19.0	0.40	232	9.5×24.0	0.30	302	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
820	9.5×24.0	0.30	302	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

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

Aluminum Electrolytic Capacitors	ALUMINUM
Polymer hybrid type aluminum Electrolytic Capacitors Aluminum Electrolytic Capacitors With Conductive Polymer Solid Electrolyte	POLYMER HYBRID
Chip Type Aluminum Electrolytic Capacitors	CHIP ALUMINUM
Miniature Type Aluminum Electrolytic Capacitors	MINIATURE ALUMINUM
Large Capacitance Aluminum Electrolytic Capacitors	LARGE ALUMINUM
Aluminum Electrolytic Capacitors for Audio	FOR AUDIO ALUMINUM

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

GREEN
CAP

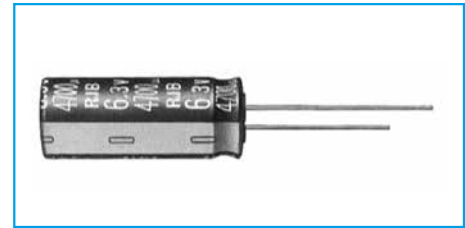
Low
Impedance

105°C
5000hours

Anti-
cleaning
solvent

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

Miniaturized



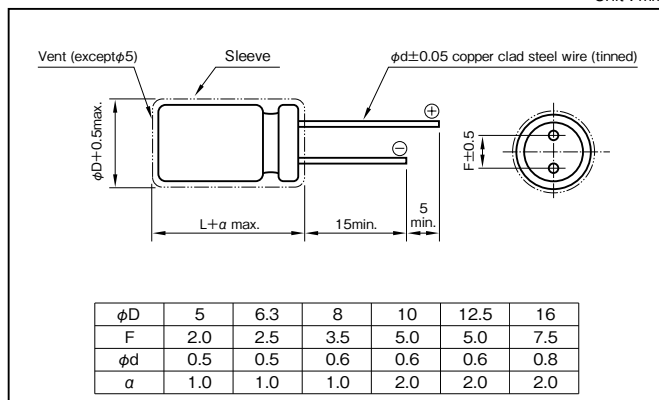
Marking color : White print on a black sleeve

Specifications

Item	Performance									
Category temperature range (°C)	-55 to +105									
Tolerance at rated capacitance (%)	±20 (20°C,120Hz)									
Leakage current (μA)	Less than 0.01CV + 1 (after 2 minutes) C : Rated capacitance (μF) ; V : Rated voltage (V) (20°C)									
Tangent of loss angle (tanδ)	Rated voltage (V)		6.3	10	16	25	35	50	63	100
	tanδ (max.)		0.22	0.19	0.16	0.14	0.12	0.10	0.09	0.08
	0.02 is added to every 1000μF increase over 1000μF. (20°C,120Hz)									
Characteristics at high and low temperature	Rated voltage (V)		6.3	10	16	25	35	50	63	100
	Impedance ratio (max.)	Z-55°C/Z+20°C	3	3	3	3	3	3	3	3
	(120Hz)									
Endurance (105°C) (Applied ripple current)	Test time		5000 hours (φ5 to 6.3 : 2000 hours) (φ8 to 10 : 3000 hours)							
	Leakage current		The initial specified value or less							
	Percentage of capacitance change		Within ±20% of initial value							
	Tangent of the loss angle		200% or less of the initial specified value							
Shelf life (105°C)	Test time		1000 hours							
	Leakage current		The initial specified value or less							
	Percentage of capacitance change		Within ±15% of initial value							
	Tangent of the loss angle		150% or less of the initial specified value							
	Voltage application treatment : According to JIS C5101-4 4.1									
Applicable standards	JIS C5101-1, -4 1998 (IEC 60384-1 1992, -4 1985)									

Outline Drawing

Unit : mm



Coefficient of Frequency for Rated Ripple Current

Rated capacitance (μ F)	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

Part numbering system (example : 10V1000 μ F)

RJB	—	10	V	102	M	H4	#*	—	□
Series code		Rated voltage symbol		Rated capacitance symbol	Capacitance tolerance symbol	Casing symbol			Taping(Forming) symbol

* If it is for automotive, should add "Q".

Standard Ratings

Rated voltage (V) Rated capacitance (μF)	Item	6.3					10					16				
		Case φD×L (mm)	Casing symbol	Impedance (Ω max.)		Rated ripple current (mA rms)	Case φD×L (mm)	Casing symbol	Impedance (Ω max.)		Rated ripple current (mA rms)	Case φD×L (mm)	Casing symbol	Impedance (Ω max.)		Rated ripple current (mA rms)
				20°C	−10°C				20°C	−10°C				20°C	−10°C	
100	—	—	—	—	—	—	5×11.5	E3	0.65	1.3	181	—	—	—	—	—
220	—	—	—	—	—	—	6.3×11.5	F3	0.32	0.64	290	—	—	—	—	—
330	6.3×11.5	F3		0.32	0.64	290	8×12	G3	0.17	0.34	555	8×12	G3	0.17	0.34	555
470	8×12	G3		0.17	0.34	555	8×12	G3	0.17	0.34	555	10×12.5	H3	0.12	0.24	760
680	8×12	G3		0.17	0.34	555	10×12.5	H3	0.12	0.24	760	10×16	H4	0.080	0.16	1050
1000	10×12.5	H3		0.12	0.24	760	10×16	H4	0.080	0.16	1050	10×20	H5	0.062	0.124	1220
2200	10×25	H6		0.052	0.104	1440	12.5×20	I5	0.042	0.084	1690	12.5×25	I6	0.034	0.068	1950
3300	12.5×20	I5		0.042	0.084	1690	12.5×25	I6	0.034	0.068	1950	16×25	J6	0.028	0.056	2560
4700	12.5×30	I7		0.030	0.060	2310	16×25	J6	0.028	0.056	2560	16×31.5	J7	0.025	0.050	3010
6800	16×25	J6		0.028	0.056	2560	16×31.5	J7	0.025	0.050	3010	—	—	—	—	—
10000	16×31.5	J7		0.025	0.050	3010	—	—	—	—	—	—	—	—	—	—

ALUMINUM

Rated voltage (V) Rated capacitance (μF)	Item	25					35					50				
		Case φD×L (mm)	Casing symbol	Impedance (Ω max.)		Rated ripple current (mA rms)	Case φD×L (mm)	Casing symbol	Impedance (Ω max.)		Rated ripple current (mA rms)	Case φD×L (mm)	Casing symbol	Impedance (Ω max.)		Rated ripple current (mA rms)
				20°C	−10°C				20°C	−10°C				20°C	−10°C	
22	—	—	—	—	—	—	—	—	—	—	—	5×11.5	E3	0.95	1.9	170
33	—	—	—	—	—	—	5×11.5	E3	0.65	1.3	181	6.3×11.5	F3	0.46	0.92	260
47	5×11.5	E3		0.65	1.3	181	6.3×11.5	F3	0.32	0.64	290	6.3×11.5	F3	0.46	0.92	260
100	6.3×11.5	F3		0.32	0.64	290	8×12	G3	0.17	0.34	555	8×12	G3	0.21	0.42	485
150	—	—	—	—	—	—	—	—	—	—	—	10×12.5	H3	0.19	0.38	615
220	8×12	G3		0.17	0.34	555	10×12.5	H3	0.12	0.24	760	10×16	H4	0.16	0.32	850
330	10×12.5	H3		0.12	0.24	760	10×16	H4	0.080	0.16	1050	10×20	H5	0.085	0.17	1050
470	10×16	H4		0.080	0.16	1050	10×20	H5	0.062	0.124	1220	12.5×20	I5	0.060	0.12	1500
680	10×20	H5		0.062	0.124	1220	12.5×20	I5	0.042	0.084	1690	12.5×25	I6	0.045	0.090	1832
1000	12.5×20	I5		0.042	0.084	1690	12.5×25	I6	0.034	0.068	1950	16×25	J6	0.038	0.076	2240
2200	16×25	J6		0.028	0.056	2560	16×31.5	J7	0.025	0.050	3010	—	—	—	—	—
3300	16×31.5	J7		0.025	0.050	3010	—	—	—	—	—	—	—	—	—	—

MINIATURE
ALUMINUM

Rated voltage (V) Rated capacitance (μF)	Item	63					100				
		Case φD×L (mm)	Casing symbol	Impedance (Ω max.)		Rated ripple current (mA rms)	Case φD×L (mm)	Casing symbol	Impedance (Ω max.)		Rated ripple current (mA rms)
				20°C	−10°C				20°C	−10°C	
3.3	—	—	—	—	—	—	5×11.5	E3	1.9	7.6	57
4.7	5×11.5	E3		1.2	3.6	120	5×11.5	E3	1.9	7.6	57
10	5×11.5	E3		1.2	3.6	120	6.3×11.5	F3	1.1	4.4	78
22	6.3×11.5	F3		0.55	1.7	148	8×12	G3	0.53	2.1	275
33	6.3×11.5	F3		0.55	1.7	148	10×12.5	H3	0.47	1.9	319
47	8×12	G3		0.32	0.96	360	10×16	H4	0.32	1.3	424
100	10×12.5	H3		0.23	0.69	448	12.5×20	I5	0.13	0.52	805
220	10×20	H5		0.12	0.36	676	16×25	J6	0.081	0.32	1290
330	12.5×20	I5		0.075	0.23	979	16×25	J6	0.081	0.32	1290
470	12.5×25	I6		0.065	0.20	1180	16×31.5	J7	0.059	0.23	1630
1000	16×31.5	J7		0.042	0.13	1890	—	—	—	—	—

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

105°C

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

GREEN
CAP

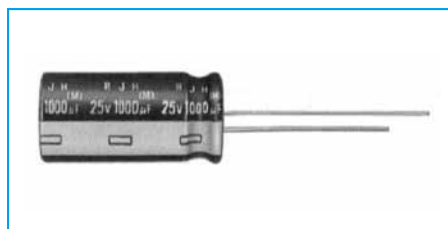
Low
Impedance

105°C
5000hours

Anti-
cleaning
solvent

- Guarantees 5000 hours at 105°C.
($\phi 5$ to 6.3 : 2000 hours ; $\phi 8$ to 10 : 3000 hours)

Long life



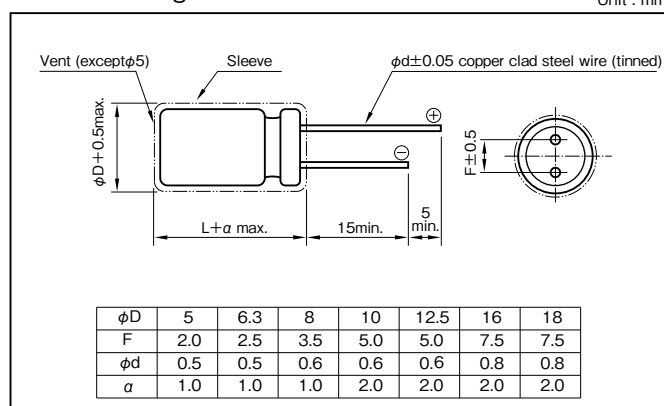
Marking color : White print on a black sleeve

Specifications

Item	Performance									
Category temperature range (°C)	-55 to +105									
Tolerance at rated capacitance (%)	±20 (20°C,120Hz)									
Leakage current (μA)	Less than 0.01CV + 2 (after 2 minutes) C : Rated capacitance (μF) ; V : Rated voltage (V) (20°C)									
Tangent of loss angle (tanδ)	Rated voltage (V)		6.3	10	16	25	35	50	63	100
	tanδ (max.)		0.22	0.19	0.16	0.14	0.12	0.10	0.08	0.07
	0.02 is added to every 1000μF increase over 1000μF. (20°C,120Hz)									
Characteristics at high and low temperature	Rated voltage (V)		6.3	10	16	25	35	50	63	100
	Impedance ratio (max.)	Z-25°C/Z+20°C	2	2	2	2	2	2	2	2
		Z-55°C/Z+20°C	3	3	3	3	3	3	3	3
(120Hz)										
Endurance (105°C) (Applied ripple current)	Test time		5000 hours (φ5 to 6.3 : 2000 hours) (φ8 to 10 : 3000 hours)							
	Leakage current		The initial specified value or less							
	Percentage of capacitance change		Within ±20% of initial value							
	Tangent of the loss angle		200% or less of the initial specified value							
Shelf life (105°C)	Test time		1000 hours							
	Leakage current		The initial specified value or less							
	Percentage of capacitance change		Within ±15% of initial value							
	Tangent of the loss angle		150% or less of the initial specified value							
Voltage application treatment : According to JIS C5101-4 4.1										
Applicable standards	JIS C5101-1, -4 1998 (IEC 60384-1 1992, -4 1985)									

Outline Drawing

Unit : mm



Coefficient of Frequency for Rated Ripple Current

Rated 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

Part numbering system (example : 10V5600 μF)

RJH	—	10	V	562	M	J7	#*	—	□
Series code		Rated voltage symbol		Rated capacitance symbol	Capacitance tolerance symbol	Casing symbol		Taping(Forming) symbol	

* If it is for automotive, should add "Q".

Standard Ratings

Rated voltage (V) Case φD×L (mm) Casing symbol		Item	6.3					10				
			Rated capacitance (μF)	ESR (Ω)	Impedance (Ω max.)		Rated ripple current (mA rms)	Rated capacitance (μF)	ESR (Ω)	Impedance (Ω max.)		Rated ripple current (mA rms)
					20°C	−10°C				20°C	−10°C	
5×11.5	E3		100	3.65	0.65	1.46	175	82	3.84	0.65	1.46	175
6.3×11.5	F3		220	1.66	0.31	0.70	290	180	1.75	0.31	0.70	290
8×12	G3		470	0.777	0.17	0.38	488	330	0.956	0.17	0.38	488
8×15	G4		680	0.537	0.13	0.29	617	470	0.671	0.13	0.29	617
8×20	G5		1000	0.365	0.095	0.21	800	680	0.464	0.095	0.21	800
10×12.5	H3		680	0.537	0.10	0.23	625	470	0.671	0.10	0.23	625
10×16	H4		820	0.446	0.080	0.18	825	560	0.563	0.080	0.18	825
10×20	H5		1200	0.305	0.062	0.14	1010	1000	0.316	0.062	0.14	1010
10×25	H6		1500	0.244	0.052	0.12	1190	1200	0.263	0.052	0.12	1190
10×30	H7		2200	0.181	0.044	0.099	1440	1500	0.211	0.044	0.099	1440
12.5×15	I4	•	1200	0.305	0.062	0.14	1010	• 1000	0.316	0.062	0.14	1010
12.5×20	I5		2200	0.181	0.042	0.095	1400	1800	0.176	0.042	0.095	1400
12.5×25	I6		2700	0.148	0.034	0.076	1690	2200	0.159	0.034	0.076	1690
12.5×30	I7		3900	0.111	0.030	0.068	1950	2700	0.130	0.030	0.068	1950
12.5×35	I8		4700	0.099	0.024	0.054	2220	3300	0.116	0.024	0.054	2220
12.5×40	I9		5600	0.089	0.021	0.047	2390	3900	0.098	0.021	0.047	2390
16×16	J4	•	2700	0.148	0.046	0.10	1310	• 1800	0.176	0.046	0.10	1310
16×20	J5	•	4700	0.099	0.034	0.077	1660	• 3300	0.116	0.034	0.077	1660
16×25	J6		5600	0.089	0.028	0.063	2070	3900	0.098	0.028	0.063	2070
16×31.5	J7		6800	0.079	0.025	0.056	2350	5600	0.080	0.025	0.056	2350
16×35.5	J8		8200	0.073	0.022	0.050	2550	6800	0.071	0.022	0.050	2550
16×40	J9		12000	0.059	0.018	0.041	2970	8200	0.067	0.018	0.041	2970
18×16	K4	•	3300	0.131	0.043	0.097	1460	• 2200	0.159	0.043	0.097	1460
18×20	K5	•	5600	0.089	0.030	0.068	1850	• 3900	0.098	0.030	0.068	1850
18×25	K6	•	6800	0.079	0.027	0.061	2120	• 4700	0.089	0.027	0.061	2120
18×31.5	K7		10000	0.064	0.023	0.052	2410	6800	0.071	0.023	0.052	2410
18×35.5	K8		12000	0.059	0.019	0.043	2680	8200	0.067	0.019	0.043	2680
18×40	K9		15000	0.054	0.017	0.038	3010	10000	0.059	0.017	0.038	3010

Rated voltage (V) Case φD×L (mm) Casing symbol		Item	16					25				
			Rated capacitance (μF)	ESR (Ω)	Impedance (Ω max.)		Rated ripple current (mA rms)	Rated capacitance (μF)	ESR (Ω)	Impedance (Ω max.)		Rated ripple current (mA rms)
					20°C	−10°C				20°C	−10°C	
5×11.5	E3		56	4.74	0.65	1.46	175	39	5.96	0.65	1.46	175
6.3×11.5	F3		120	2.21	0.31	0.70	290	82	2.83	0.31	0.70	290
8×12	G3		270	0.983	0.17	0.38	488	180	1.29	0.17	0.38	488
8×15	G4		330	0.805	0.13	0.29	617	220	1.06	0.13	0.29	617
8×20	G5		470	0.565	0.095	0.21	800	330	0.704	0.095	0.21	800
10×12.5	H3		330	0.805	0.10	0.23	625	220	1.06	0.10	0.23	625
10×16	H4		390	0.681	0.080	0.18	825	270	0.861	0.080	0.18	825
10×20	H5		680	0.391	0.062	0.14	1010	470	0.495	0.062	0.14	1010
10×25	H6		820	0.324	0.052	0.12	1190	560	0.415	0.052	0.12	1190
10×30	H7		1200	0.222	0.044	0.099	1440	820	0.284	0.044	0.099	1440
12.5×15	I4	•	680	0.391	0.062	0.14	1010	• 470	0.495	0.062	0.14	1010
12.5×20	I5		1200	0.222	0.042	0.095	1400	820	0.284	0.042	0.095	1400
12.5×25	I6		1500	0.177	0.034	0.076	1690	1000	0.233	0.034	0.076	1690
12.5×30	I7		2200	0.136	0.030	0.068	1950	1500	0.155	0.030	0.068	1950
12.5×35	I8		2700	0.111	0.024	0.054	2220	1800	0.130	0.024	0.054	2220
12.5×40	I9		3300	0.101	0.021	0.047	2390	2200	0.121	0.021	0.047	2390
16×16	J4	•	1500	0.177	0.046	0.10	1310	• 820	0.284	0.046	0.10	1310
16×20	J5	•	2200	0.136	0.034	0.077	1660	• 1500	0.155	0.034	0.077	1660
16×25	J6		2700	0.111	0.028	0.063	2070	1800	0.130	0.028	0.063	2070
16×31.5	J7		3900	0.086	0.025	0.056	2350	2700	0.099	0.025	0.056	2350
16×35.5	J8		4700	0.078	0.022	0.050	2550	3300	0.091	0.022	0.050	2550
16×40	J9		5600	0.072	0.018	0.041	2970	3900	0.077	0.018	0.041	2970
18×16	K4	•	1500	0.177	0.043	0.097	1460	• 1200	0.194	0.043	0.097	1460
18×20	K5	•	2700	0.111	0.030	0.068	1850	• 1800	0.130	0.030	0.068	1850
18×25	K6	•	3900	0.086	0.027	0.061	2120	• 2700	0.099	0.027	0.061	2120
18×31.5	K7		4700	0.078	0.023	0.052	2410	3300	0.091	0.023	0.052	2410
18×35.5	K8		6800	0.064	0.019	0.043	2680	3900	0.077	0.019	0.043	2680
18×40	K9		8200	0.061	0.017	0.038	3010	4700	0.071	0.017	0.038	3010

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

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

• The standard ratings follow the next page.

Standard Ratings

Case φD×L (mm)	Casing symbol	Item	35					50				
			Rated capacitance (μF)	ESR (Ω)	Impedance (Ω max.)		Rated ripple current (mA rms)	Rated capacitance (μF)	ESR (Ω)	Impedance (Ω max.)		Rated ripple current (mA rms)
					20°C	−10°C				20°C	−10°C	
5×11.5	E3	—	—	—	—	—	—	1	166	3.5	7.0	36
5×11.5	E3	—	—	—	—	—	—	2.2	75.4	3.0	6.0	54
5×11.5	E3	—	—	—	—	—	—	3.3	50.3	2.6	5.2	63
5×11.5	E3	—	—	—	—	—	—	4.7	35.3	2.2	4.4	75
5×11.5	E3	—	—	—	—	—	—	10	16.6	1.4	2.8	110
5×11.5	E3	27	7.37	0.65	1.46	175	18	9.22	0.95	1.9	120	120
6.3×11.5	F3	56	3.56	0.31	0.70	290	39	4.25	0.43	0.86	148	148
8×12	G3	120	1.66	0.17	0.38	488	68	2.44	0.20	0.40	360	360
8×15	G4	180	1.11	0.13	0.29	617	82	2.02	0.18	0.36	460	460
8×20	G5	220	0.905	0.095	0.21	800	120	1.38	0.13	0.26	670	670
10×12.5	H3	150	1.33	0.10	0.23	625	82	2.02	0.18	0.36	443	443
10×16	H4	180	1.11	0.080	0.18	825	100	1.66	0.15	0.30	553	553
10×20	H5	330	0.604	0.062	0.14	1010	180	0.922	0.085	0.17	676	676
10×25	H6	390	0.511	0.052	0.12	1190	220	0.754	0.075	0.15	876	876
10×30	H7	560	0.356	0.044	0.099	1440	330	0.503	0.055	0.11	1010	1010
12.5×15	I4	• 330	0.604	0.062	0.140	1010	• 180	0.922	0.095	0.19	745	745
12.5×20	I5	560	0.356	0.042	0.095	1400	330	0.503	0.060	0.12	979	979
12.5×25	I6	680	0.293	0.034	0.076	1690	470	0.353	0.044	0.088	1180	1180
12.5×30	I7	1000	0.200	0.030	0.068	1950	560	0.297	0.040	0.080	1310	1310
12.5×35	I8	1200	0.166	0.024	0.054	2220	680	0.244	0.036	0.072	1470	1470
12.5×40	I9	1500	0.133	0.021	0.047	2390	820	0.203	0.034	0.068	1590	1590
16×16	J4	• 560	0.356	0.046	0.10	1310	• 330	0.503	0.065	0.13	982	982
16×20	J5	• 1000	0.200	0.034	0.077	1660	• 680	0.244	0.045	0.090	1210	1210
16×25	J6	1200	0.166	0.028	0.063	2070	820	0.203	0.038	0.076	1490	1490
16×31.5	J7	1800	0.111	0.025	0.056	2350	1000	0.166	0.032	0.064	1890	1890
16×35.5	J8	2200	0.106	0.022	0.050	2550	1200	0.139	0.028	0.056	2140	2140
16×40	J9	2700	0.087	0.018	0.041	2970	1500	0.111	0.026	0.052	2410	2410
18×16	K4	• 680	0.293	0.043	0.097	1460	• 470	0.353	0.048	0.096	1180	1180
18×20	K5	• 1200	0.166	0.030	0.068	1850	• 820	0.203	0.036	0.072	1450	1450
18×25	K6	• 1800	0.111	0.027	0.061	2120	• 1000	0.166	0.032	0.064	1720	1720
18×31.5	K7	2200	0.106	0.023	0.052	2410	1500	0.111	0.026	0.052	1970	1970
18×35.5	K8	2700	0.087	0.019	0.043	2680	1800	0.074	0.025	0.050	2310	2310
18×40	K9	3300	0.081	0.017	0.038	3010	2200	0.073	0.024	0.048	2530	2530

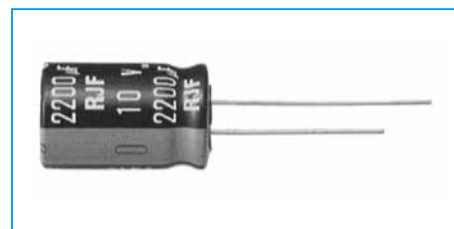
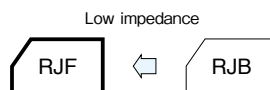
Case φD×L (mm)	Casing symbol	Item	63					100				
			Rated capacitance (μF)	ESR (Ω)	Impedance (Ω max.)		Rated ripple current (mA rms)	Rated capacitance (μF)	ESR (Ω)	Impedance (Ω max.)		Rated ripple current (mA rms)
					20°C	−10°C				20°C	−10°C	
5×11.5	E3	12	11.1	1.2	3.6	120	5.6	20.7	1.9	7.6	57	57
6.3×11.5	F3	27	4.92	0.55	1.7	148	12	9.68	1.1	4.4	78	78
8×12	G3	47	2.82	0.32	0.96	360	22	5.28	0.53	2.1	275	275
8×15	G4	68	1.95	0.24	0.72	469	33	3.52	0.35	1.4	360	360
8×20	G5	82	1.62	0.17	0.51	682	39	2.98	0.27	1.1	490	490
10×12.5	H3	56	2.37	0.23	0.69	448	27	4.30	0.47	1.9	319	319
10×16	H4	68	1.95	0.17	0.51	553	33	3.52	0.32	1.3	424	424
10×20	H5	120	1.11	0.12	0.36	676	56	2.07	0.25	1.0	499	499
10×25	H6	150	0.885	0.10	0.30	876	68	1.71	0.18	0.72	634	634
10×30	H7	180	0.738	0.085	0.26	1020	100	1.16	0.15	0.60	739	739
12.5×15	I4	• 150	0.885	0.11	0.33	745	• 68	1.71	0.20	0.80	613	613
12.5×20	I5	220	0.604	0.075	0.23	979	100	1.16	0.13	0.52	805	805
12.5×25	I6	270	0.492	0.065	0.20	1180	120	0.968	0.11	0.44	857	857
12.5×30	I7	390	0.341	0.055	0.17	1310	180	0.646	0.090	0.36	1120	1120
12.5×35	I8	470	0.283	0.048	0.14	1470	220	0.528	0.075	0.30	1240	1240
12.5×40	I9	560	0.237	0.042	0.13	1590	270	0.431	0.060	0.24	1330	1330
16×16	J4	• 220	0.604	0.080	0.24	982	• 120	0.968	0.13	0.52	706	706
16×20	J5	• 390	0.341	0.057	0.17	1210	• 180	0.646	0.11	0.44	916	916
16×25	J6	470	0.283	0.052	0.16	1490	220	0.528	0.081	0.32	1290	1290
16×31.5	J7	680	0.196	0.042	0.13	1890	330	0.352	0.059	0.23	1630	1630
16×35.5	J8	820	0.162	0.036	0.11	2140	390	0.298	0.052	0.21	1750	1750
16×40	J9	1000	0.133	0.032	0.096	2410	470	0.248	0.045	0.18	1920	1920
18×16	K4	• 330	0.403	0.065	0.20	1200	• 150	0.775	0.12	0.48	871	871
18×20	K5	• 560	0.237	0.058	0.17	1460	• 270	0.431	0.085	0.34	1170	1170
18×25	K6	• 680	0.196	0.050	0.15	1740	• 330	0.352	0.071	0.28	1500	1500
18×31.5	K7	820	0.162	0.042	0.13	1990	390	0.298	0.058	0.23	1630	1630
18×35.5	K8	1000	0.133	0.035	0.11	2340	560	0.208	0.054	0.22	1920	1920
18×40	K9	1200	0.111	0.032	0.096	2560	680	0.171	0.041	0.16	2100	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.

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

GREEN
CAPLow
Impedance105°C
5000hoursAnti-
cleaning
solvent

- Higher ripple current and Lower impedance than RJB series.



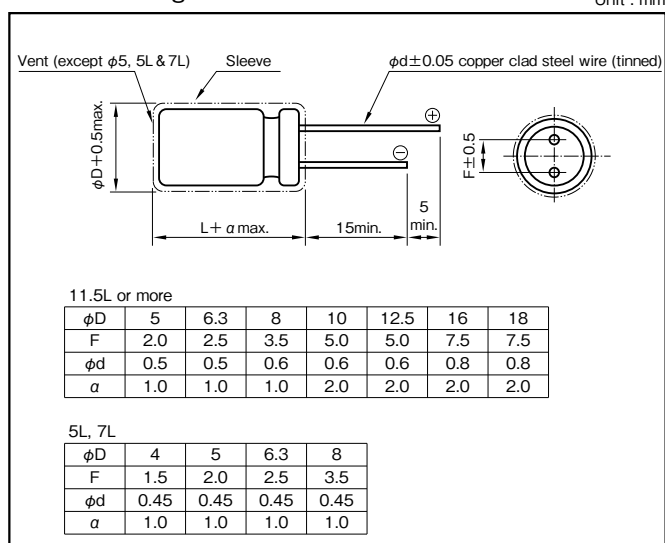
Marking color : White print on a black sleeve

Specifications

Item	Performance										
Category temperature range (°C)	-40 to +105										
Tolerance at rated capacitance (%)	±20 (20°C,120Hz)										
Leakage current (μA)	Less than 0.01CV or 3 whichever is larger (after 2 minutes) C : Rated capacitance (μF) ; V : Rated voltage (V) (20°C)										
Tangent of loss angle (tanδ)	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°C,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°C/Z+20°C	2	2	2	2	2	2	2	2	2
		Z-40°C/Z+20°C	3	3	3	3	3	3	3	3	3
(120Hz)											
Endurance (105°C) (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°C)	Test time		1000 hours								
	Leakage current		The initial specified value or less								
	Percentage of capacitance change		Within ±25% of initial value								
	Tangent of the loss angle		200% or less of the initial specified value								
Voltage application treatment : According to JIS C5101-4 4.1											
Applicable standards	JIS C5101-1, -4 1998 (IEC 60384-1 1992, -4 1985)										

Outline Drawing

Unit : mm



Coefficient of Frequency for Rated Ripple Current

Rated 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

Part numbering system (example : 10V1000μF)

RJF	—	10 V	102	M	H4	#*	—	□
Series code		Rated voltage symbol	Rated capacitance symbol	Capacitance tolerance symbol	Casing symbol	Taping (Forming) symbol		

* If it is for automotive, should add "Q".

- The standard ratings are described on the next page.

Standard Ratings

Rated voltage (V)	Item	6.3					10					16				
		Case	Casing symbol	Impedance (Ω max.)		Rated ripple current (mA _{rms})	Case	Casing symbol	Impedance (Ω max.)		Rated ripple current (mA _{rms})	Case	Casing symbol	Impedance (Ω max.)		Rated ripple current (mA _{rms})
		φD×L (mm)		20℃	−10℃		φD×L (mm)		20℃	−10℃		φD×L (mm)		20℃	−10℃	
Rated capacitance (μF)																
18	—	—	—	—	—	—	—	—	—	—	4×7	D1	0.92	2.8	130	
27	—	—	—	—	—	4×7	D1	0.89	2.7	130	6.3×5	F0	0.30	0.95	210	
33	—	—	—	—	—	—	—	—	—	—	5×7	E1	0.45	1.4	210	
											6.3×5	F0	0.30	0.95	210	
39	4×7	D1	0.85	2.6	130	—	—	—	—	—	—	—	—	—	—	
47	—	—	—	—	—	6.3×5	F0	0.29	0.93	210	—	—	—	—	—	
56	—	—	—	—	—	5×7	E1	0.44	1.4	210	5×11.5	E3	0.22	0.80	345	
68	5×7	E1	0.43	1.3	210	—	—	—	—	—	6.3×7	F1	0.24	0.72	300	
100	6.3×5	F0	0.28	0.91	210	5×11.5	E3	0.22	0.8	345	—	—	—	—	—	
120	—	—	—	—	—	6.3×7	F1	0.23	0.69	300	8×7	G1	0.15	0.45	380	
											6.3×11.5	F3	0.094	0.35	540	
150	5×11.5	E3	0.22	0.80	345	—	—	—	—	—	—	—	—	—	—	
	6.3×7	F1	0.23	0.69	300	—	—	—	—	—	—	—	—	—	—	
180	—	—	—	—	—	8×7	G1	0.15	0.45	380	—	—	—	—	—	
220	8×7	G1	0.15	0.45	380	6.3×11.5	F3	0.094	0.35	540	—	—	—	—	—	
330	6.3×11.5	F3	0.094	0.35	540	—	—	—	—	—	8×12	G3	0.056	0.19	945	
470	—	—	—	—	—	8×12	G3	0.056	0.19	945	8×15	G4	0.045	0.15	1250	
560	8×12	G3	0.056	0.19	945	—	—	—	—	—	10×16	H4	0.028	0.10	1760	
680	—	—	—	—	—	10×12.5	H3	0.039	0.14	1330	—	—	—	—	—	
820	8×15	G4	0.045	0.15	1250	—	—	—	—	—	—	—	—	—	—	
1000	10×12.5	H3	0.039	0.14	1330	10×16	H4	0.028	0.10	1760	10×20	H5	0.020	0.060	1960	
1200	10×16	H4	0.028	0.10	1760	10×20	H5	0.020	0.060	1960	10×25	H6	0.018	0.054	2250	
1500	10×20	H5	0.020	0.060	1960	10×25	H6	0.018	0.054	2250	12.5×20	I5	0.017	0.043	2480	
2200	10×25	H6	0.018	0.054	2250	12.5×20	I5	0.017	0.043	2480	12.5×25	I6	0.015	0.038	2900	
2700	—	—	—	—	—	—	—	—	—	—	16×20	J5	0.015	0.038	3250	
3300	12.5×20	I5	0.017	0.043	2480	12.5×25	I6	0.015	0.038	2900	16×25	J6	0.013	0.035	3630	
3900	12.5×25	I6	0.015	0.038	2900	16×20	J5	0.015	0.038	3250	16×25	J6	0.013	0.035	3630	
4700	12.5×30	I7	0.013	0.033	3450	16×25	J6	0.013	0.035	3630	—	—	—	—	—	
5600	16×20	J5	0.015	0.038	3570	16×25	J6	0.013	0.035	3630	—	—	—	—	—	
6800	16×25	J6	0.013	0.035	3630	—	—	—	—	—	—	—	—	—	—	

Rated voltage (V) Item Rated capacitance (μF)	25					35					50				
	Case φD×L (mm)	Casing symbol	Impedance (Ω max.)		Rated ripple current (mA rms)	Case φD×L (mm)	Casing symbol	Impedance (Ω max.)		Rated ripple current (mA rms)	Case φD×L (mm)	Casing symbol	Impedance (Ω max.)		Rated ripple current (mA rms)
			20℃	−10℃				20℃	−10℃				20℃	−10℃	
5.6	—	—	—	—	—	—	—	—	—	—	4×7	D1	1.0	3.0	130
10	5×5	E0	0.61	1.5	130	5×5	E0	0.63	1.5	130	5×7	E1	0.50	1.5	210
						4×7	D1	0.96	2.9	130					
15	4×7	D1	0.94	2.9	130	—	—	—	—	—	—	—	—	—	—
18	—	—	—	—	—	5×7	E1	0.47	1.5	210	—	—	—	—	—
22	6.3×5	F0	0.31	0.97	210	6.3×5	F0	0.32	1.0	210	6.3×7	F1	0.26	0.78	300
											5×11.5	E3	0.34	1.18	238
27	5×7	E1	0.46	1.4	210	—	—	—	—	—	—	—	—	—	—
33	—	—	—	—	—	5×11.5	E3	0.22	0.80	345	8×7	G1	0.17	0.51	380
39	—	—	—	—	—	6.3×7	F1	0.25	0.75	300	—	—	—	—	—
47	5×11.5	E3	0.22	0.80	345	—	—	—	—	—	—	—	—	—	—
56	6.3×7	F1	0.24	0.72	300	8×7	G1	0.16	0.48	380	6.3×11.5	F3	0.14	0.50	385
						6.3×11.5	F3	0.094	0.35	540					
100	8×7	G1	0.15	0.45	380	—	—	—	—	—	8×12	G3	0.074	0.22	724
	6.3×11.5	F3	0.13	0.41	405										
120	—	—	—	—	—	—	—	—	—	—	8×15	G4	0.061	0.18	950
150	—	—	—	—	—	8×12	G3	0.056	0.19	945	10×12.5	H3	0.061	0.18	979
180	—	—	—	—	—	—	—	—	—	—	8×20	G5	0.046	0.14	1190
220	8×12	G3	0.056	0.19	945	10×12.5	H3	0.039	0.14	1330	10×16	H4	0.042	0.12	1370
270	—	—	—	—	—	8×20	G5	0.029	0.11	1500	10×20	H5	0.030	0.090	1580
330	10×12.5	H3	0.039	0.14	1330	10×16	H4	0.028	0.10	1760	10×25	H6	0.028	0.085	1870
470	10×16	H4	0.028	0.10	1760	10×20	H5	0.020	0.060	1960	12.5×20	I5	0.027	0.068	2050
560	—	—	—	—	—	10×25	H6	0.018	0.054	2250	12.5×25	I6	0.023	0.059	2410
680	10×20	H5	0.020	0.060	1960	12.5×20	I5	0.017	0.043	2480	16×20	J5	0.023	0.059	2730
820	10×25	H6	0.018	0.054	2250	—	—	—	—	—	16×20	J5	0.023	0.059	2730
1000	12.5×20	I5	0.017	0.043	2480	12.5×25	I6	0.015	0.038	2900	16×25	J6	0.021	0.056	3010
1200	—	—	—	—	—	16×20	J5	0.015	0.038	3250	—	—	—	—	—
1500	12.5×25	I6	0.015	0.038	2900	16×25	J6	0.013	0.035	3630	—	—	—	—	—
1800	16×20	J5	0.015	0.038	3250	16×25	J6	0.013	0.035	3630	—	—	—	—	—
2200	16×25	J6	0.013	0.035	3630	—	—	—	—	—	—	—	—	—	—
2700	16×25	J6	0.013	0.035	3630	—	—	—	—	—	—	—	—	—	—

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

Standard Ratings

Rated voltage (V) Rated capacitance (μF) Item	63					80					100				
	Case φDxL (mm)	Casing symbol	Impedance (Ω max.)		Rated ripple current (mA rms)	Case φDxL (mm)	Casing symbol	Impedance (Ω max.)		Rated ripple current (mA rms)	Case φDxL (mm)	Casing symbol	Impedance (Ω max.)		Rated ripple current (mA rms)
			20°C	-10°C				20°C	-10°C				20°C	-10°C	
6.8	—	—	—	—	—	—	—	—	—	—	5 × 11.5	E3	1.4	5.6	125
15	5 × 11.5	E3	0.88	3.5	165	—	—	—	—	—	6.3 × 11.5	F3	0.57	2.3	205
27	—	—	—	—	—	—	—	—	—	—	8 × 12	G3	0.36	1.4	335
33	6.3 × 11.5	F3	0.35	1.4	265	—	—	—	—	—	—	—	—	—	—
39	—	—	—	—	—	—	—	—	—	—	8 × 15	G4	0.25	1.0	450
47	—	—	—	—	—	—	—	—	—	—	10 × 12.5	H3	0.17	0.66	480
56	8 × 12	G3	0.22	0.88	500	—	—	—	—	—	8 × 20	G5	0.19	0.76	565
68	—	—	—	—	—	10 × 12.5	H3	0.17	0.66	480	10 × 16	H4	0.11	0.47	600
82	10 × 12.5	H3	0.11	0.44	690	—	—	—	—	—	10 × 20	H5	0.084	0.34	800
100	—	—	—	—	—	10 × 16	H4	0.11	0.47	600	12.5 × 15	I4	0.11	0.34	750
120	8 × 20	G5	0.12	0.48	820	10 × 20	H5	0.084	0.34	800	10 × 25	H6	0.069	0.28	900
	10 × 16	H4	0.076	0.31	950										
150	—	—	—	—	—	10 × 25	H6	0.069	0.28	900	12.5 × 20	I5	0.062	0.18	1100
180	10 × 20	H5	0.056	0.23	1150	—	—	—	—	—	—	—	—	—	—
220	10 × 25	H6	0.046	0.19	1350	12.5 × 20	I5	0.062	0.18	1100	16 × 20	J5	0.048	0.15	1350
270	12.5 × 20	I5	0.041	0.13	1500	—	—	—	—	—	12.5 × 30	I7	0.042	0.13	1500
330	—	—	—	—	—	12.5 × 25	I6	0.047	0.14	1250	12.5 × 35	I8	0.036	0.11	1650
						16 × 20	J5	0.048	0.15	1350	16 × 25	J6	0.038	0.12	1700
											18 × 20	K5	0.045	0.14	1500
390	12.5 × 25	I6	0.031	0.093	1900	12.5 × 30	I7	0.042	0.13	1500	12.5 × 40	I9	0.032	0.095	1800
470	12.5 × 30	I7	0.028	0.084	2300	12.5 × 35	I8	0.036	0.11	1650	16 × 31.5	J7	0.032	0.095	1850
	16 × 20	J5	0.032	0.096	2000	16 × 25	J6	0.038	0.12	1700	18 × 25	K6	0.036	0.11	1750
						18 × 20	K5	0.045	0.14	1500					
560	12.5 × 35	I8	0.024	0.070	2500	—	—	—	—	—	16 × 35.5	J8	0.029	0.086	2000
											18 × 31.5	K7	0.030	0.090	1900
680	12.5 × 40	I9	0.021	0.063	2800	16 × 31.5	J7	0.032	0.095	1850	16 × 40	J9	0.027	0.081	2480
	16 × 25	J6	0.025	0.075	2600						18 × 35.5	K8	0.027	0.081	2200
	18 × 20	K5	0.030	0.090	2500										
820	16 × 31.5	J7	0.021	0.063	2850	16 × 35.5	J8	0.029	0.086	2000	18 × 40	K9	0.026	0.077	2700
	18 × 25	K6	0.024	0.072	2800	18 × 31.5	K7	0.030	0.090	1900					
1000	16 × 35.5	J8	0.019	0.057	2900	—	—	—	—	—	—	—	—	—	—
1200	16 × 40	J9	0.018	0.054	3400	18 × 40	K9	0.026	0.077	2700	—	—	—	—	—
	18 × 31.5	K7	0.020	0.060	3300										
1500	18 × 35.5	K8	0.018	0.054	3400	—	—	—	—	—	—	—	—	—	—
1800	18 × 40	K9	0.017	0.051	3500	—	—	—	—	—	—	—	—	—	—

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

105°C Use, Miniature, Long Life, extra Low Impedance Capacitors

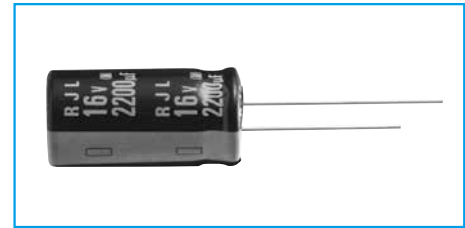
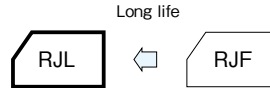
GREEN
CAP

Low
Impedance

105°C
10000hours

Anti-
cleaning
solvent

- Long life than RJF series.
- Guarantees 4000 to 10000 hours at 105°C.



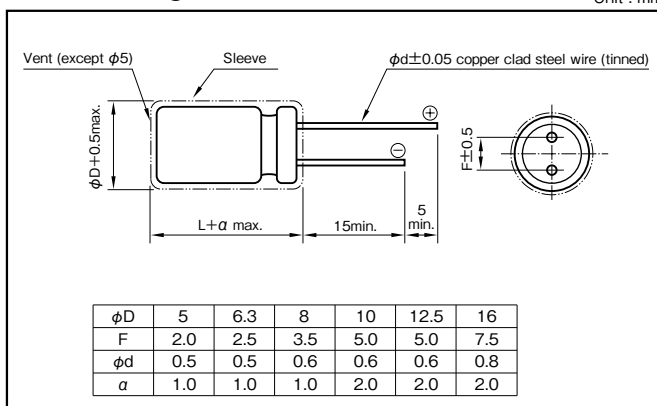
Marking color : White print on a black sleeve

Specifications

Item	Performance									
Category temperature range (°C)	-40 to +105									
Tolerance at rated capacitance (%)	±20 (20°C,120Hz)									
Leakage current (μA)	Less than 0.01CV or 3 whichever is larger (after 2 minutes) C : Rated capacitance (μF), V : Rated voltage (V) (20°C)									
Tangent of loss angle (tanδ)	Rated voltage (V)		6.3	10	16	25	35	50	63	100
	tanδ (max.)		0.22	0.19	0.16	0.14	0.12	0.10	0.09	0.08
	0.02 is added to every 1000μF increase over 1000μF. (20°C,120Hz)									
Characteristics at high and low temperature	Rated voltage (V)		6.3	10	16	25	35	50	63	100
	Impedance ratio (max.)	Z-25°C/Z+20°C	4	3	2	2	2	2	2	2
		Z-40°C/Z+20°C	8	6	4	3	3	3	3	3
(120Hz)										
Endurance (105°C) (Applied ripple current)	Test time		φ5 & φ6.3 : 5000 hours (6.3~10WV : 4000 hours) φ8 & φ10 : 7000 hours (6.3~10WV : 6000 hours) φ12.5 & φ16 : 10000 hours (6.3~10WV : 8000 hours)							
	Leakage current		The initial specified value or less							
	Percentage of capacitance change		Within ±25% of initial value							
	Tangent of the loss angle		200% or less of the initial specified value							
Shelf life (105°C)	Test time		1000 hours							
	Leakage current		The initial specified value or less							
	Percentage of capacitance change		Within ±25% of initial value							
	Tangent of the loss angle		200% or less of initial specified value							
Voltage application treatment : According to JIS C5101-4 4.1										
Applicable standards	JIS C5101-1, -4 1998 (IEC 60384-1 1992, -4 1985)									

Outline Drawing

Unit : mm



Coefficient of Frequency for Rated Ripple Current

Rated capacitance (µF) \ Frequency (Hz)	120	1k	10k	100k
to 33	0.42	0.70	0.90	1
47 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 6800	0.70	0.85	0.98	1

Part numbering system (example : 10V1000µF)

RJL	—	10	V	102	M	H4	#	*	—	□
Series code		Rated voltage symbol		Rated capacitance symbol	Capacitance tolerance symbol	Casing symbol				Taping(Forming) symbol

* If it is for automotive, should add "Q".

Standard Ratings

Rated voltage (V)	Item	6.3					10					16				
		Case	Casing symbol	Impedance (Ω max.)		Rated ripple current (mA rms)	Case	Casing symbol	Impedance (Ω max.)		Rated ripple current (mA rms)	Case	Casing symbol	Impedance (Ω max.)		Rated ripple current (mA rms)
				20°C	-10°C				20°C	-10°C				20°C	-10°C	
Rated capacitance (μF)		φD×L (mm)					φD×L (mm)					φD×L (mm)				
56	—	—	—	—	—	—	—	—	—	—	—	5×11.5	E3	0.58	2.3	210
100	—	—	—	—	—	—	5×11.5	E3	0.58	2.3	210	—	—	—	—	—
120	—	—	—	—	—	—	—	—	—	—	—	6.3×11.5	F3	0.22	0.87	340
150	5×11.5	E3	0.58	2.3	210	—	—	—	—	—	—	—	—	—	—	—
220	—	—	—	—	—	—	6.3×11.5	F3	0.22	0.87	340	—	—	—	—	—
330	6.3×11.5	F3	0.22	0.87	340	—	—	—	—	—	—	8×12	G3	0.13	0.52	640
470	—	—	—	—	—	—	8×12	G3	0.13	0.52	640	8×15	G4	0.087	0.35	840
560	8×12	G3	0.13	0.52	640	—	8×15	G4	0.087	0.35	840	—	—	—	—	—
680	8×12	G3	0.13	0.52	640	—	10×12.5	H3	0.080	0.32	865	10×16	H4	0.060	0.24	1210
820	10×12.5	H3	0.080	0.32	865	—	10×16	H4	0.060	0.24	1210	10×20	H5	0.046	0.18	1400
1000	8×15	G4	0.087	0.35	840	—	10×16	H4	0.060	0.24	1210	10×20	H5	0.046	0.18	1400
1200	10×16	H4	0.060	0.24	1210	—	10×20	H5	0.046	0.18	1400	10×25	H6	0.042	0.17	1650
1500	10×20	H5	0.046	0.18	1400	—	10×25	H6	0.042	0.17	1650	12.5×20	I5	0.035	0.12	1900
1800	10×25	H6	0.042	0.17	1650	—	12.5×20	I5	0.035	0.12	1900	12.5×25	I6	0.027	0.089	2230
2200	10×25	H6	0.042	0.17	1650	—	12.5×20	I5	0.035	0.12	1900	12.5×25	I6	0.027	0.089	2230
2700	—	—	—	—	—	—	—	—	—	—	—	16×20	J5	0.027	0.078	2530
3300	12.5×20	I5	0.035	0.12	1900	—	12.5×25	I6	0.027	0.089	2230	12.5×35	I8	0.020	0.065	2880
3900	—	—	—	—	—	—	—	—	—	—	—	16×25	J6	0.021	0.060	2930
4700	12.5×30	I7	0.024	0.078	2650	—	12.5×35	I8	0.020	0.065	2880	—	—	—	—	—
5600	16×20	J5	0.027	0.078	2530	—	16×25	J6	0.021	0.060	2930	—	—	—	—	—
6800	16×25	J6	0.021	0.060	2930	—	—	—	—	—	—	—	—	—	—	—

Rated voltage (V)	Item	25					35					50				
		Case	Casing symbol	Impedance (Ω max.)		Rated ripple current (mA rms)	Case	Casing symbol	Impedance (Ω max.)		Rated ripple current (mA rms)	Case	Casing symbol	Impedance (Ω max.)		Rated ripple current (mA rms)
				20°C	-10°C				20°C	-10°C				20°C	-10°C	
Rated capacitance (μF)		φD×L (mm)					φD×L (mm)					φD×L (mm)				
10	—	—	—	—	—	—	—	—	—	—	—	5×11.5	E3	1.50	6.0	100
22	—	—	—	—	—	—	—	—	—	—	—	5×11.5	E3	0.70	2.8	180
33	—	—	—	—	—	—	5×11.5	E3	0.58	2.3	210	—	—	—	—	—
47	5×11.5	E3	0.58	2.3	210	—	—	—	—	—	—	—	—	—	—	—
56	—	—	—	—	—	—	6.3×11.5	F3	0.22	0.87	340	6.3×11.5	F3	0.30	1.2	295
100	6.3×11.5	F3	0.22	0.87	340	—	—	—	—	—	—	8×12	G3	0.17	0.68	555
120	—	—	—	—	—	—	—	—	—	—	—	8×15	G4	0.12	0.48	730
150	—	—	—	—	—	—	8×12	G3	0.13	0.52	640	10×12.5	H3	0.12	0.48	760
180	—	—	—	—	—	—	8×15	G4	0.087	0.35	870	8×20	G5	0.091	0.36	910
220	8×12	G3	0.13	0.52	640	—	8×15	G4	0.087	0.35	870	10×16	H4	0.084	0.34	1050
270	—	—	—	—	—	—	8×20	G5	0.069	0.27	1050	10×20	H5	0.060	0.24	1220
330	8×15	G4	0.087	0.35	840	—	10×16	H4	0.060	0.24	1210	10×25	H6	0.055	0.22	1440
470	10×16	H4	0.060	0.24	1210	—	10×20	H5	0.046	0.18	1400	12.5×20	I5	0.045	0.15	1660
560	—	—	—	—	—	—	10×25	H6	0.042	0.17	1650	12.5×25	I6	0.034	0.11	1950
680	10×20	H5	0.046	0.18	1400	—	12.5×20	I5	0.035	0.12	1900	12.5×25	I6	0.034	0.11	1950
820	10×25	H6	0.042	0.17	1650	—	12.5×25	I6	0.027	0.089	2230	12.5×30	I7	0.030	0.10	2310
1000	12.5×20	I5	0.035	0.12	1900	—	12.5×25	I6	0.027	0.089	2230	16×25	J6	0.025	0.075	2555
1200	12.5×25	I6	0.027	0.089	2230	—	16×20	J5	0.027	0.078	2530	—	—	—	—	—
1500	12.5×25	I6	0.027	0.089	2230	—	12.5×35	I8	0.020	0.065	2880	—	—	—	—	—
1800	16×20	J5	0.027	0.078	2530	—	16×25	J6	0.021	0.060	2930	—	—	—	—	—
2200	12.5×35	I8	0.020	0.065	2880	—	—	—	—	—	—	—	—	—	—	—
2700	16×25	J6	0.021	0.060	2930	—	—	—	—	—	—	—	—	—	—	—

Rated voltage (V)	Item	63					100				
		Case	Casing symbol	Impedance (Ω max.)		Rated ripple current (mA rms)	Case	Casing symbol	Impedance (Ω max.)		Rated ripple current (mA rms)
				20°C	-10°C				20°C	-10°C	
Rated capacitance (μF)		φD×L (mm)					φD×L (mm)				
6.8	—	—	—	—	—	—	5×11.5	E3	2.3	9.3	55
15	5×11.5	E3	2.3	9.3	55	—	6.3×11.5	F3	1.2	5.0	115
27	6.3×11.5	F3	1.2	5.0	115	—	8×12	G3	0.63	2.8	232
47	—	—	—	—	—	—	10×12.5	H3	0.43	1.8	288
56	8×12	G3	0.63	2.8	232	—	8×20	G5	0.33	1.6	362
68	—	—	—	—	—	—	10×16	H4	0.31	1.5	357
82	8×15	G4	0.45	2.1	300	—	10×20	H5	0.21	0.94	466
100	—	—	—	—	—	—	10×25	H6	0.20	0.84	531
120	10×16	H4	0.31	1.5	357	—	12.5×20	I5	0.16	0.64	690
180	10×20	H5	0.21	0.94	466	—	12.5×25	I6	0.120	0.45	784
220	10×25	H6	0.20	0.84	531	—	16×20	J5	0.091	0.38	1040
270	12.5×20	I5	0.16	0.64	690	—	16×25	J6	0.073	0.27	1250
330	12.5×25	I6	0.12	0.45	784	—	—	—	—	—	—
390	16×20	J5	0.091	0.38	1040	—	—	—	—	—	—
470	16×20	J5	0.091	0.38	1040	—	—	—	—	—	—
560	16×25	J6	0.073	0.27	1250	—	—	—	—	—	—

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

105°C Use, Miniature, Long Life, Extra Low Impedance Capacitors

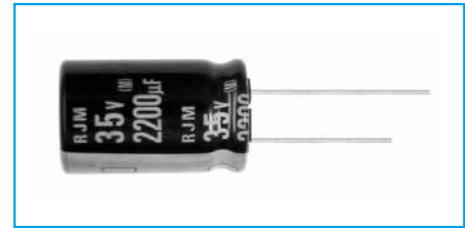
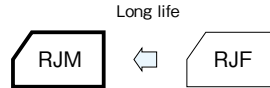
GREEN
CAP

Low
Impedance

105°C
10000hours

Anti-
cleaning
solvent

- Long life than RJF series.
- Guarantees 10000 hours at 105°C.
($\phi 5$: 5000 hours, $\phi 6.3$: 6000 hours, $\phi 8$: 8000 hours)



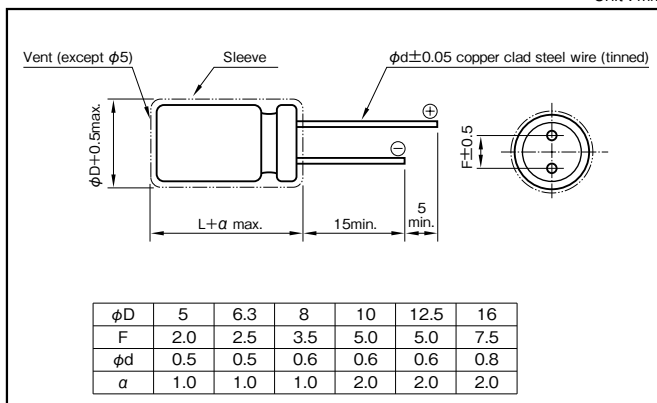
Marking color : White print on a black sleeve

Specifications

Item	Performance						
Category temperature range (°C)	-40 to +105						
Tolerance at rated capacitance (%)	±20 (20°C,120Hz)						
Leakage current (μA)	Less than 0.01CV or 3 whichever is larger (after 2 minutes) C : Rated capacitance (μF), V : Rated voltage (V) (20°C)						
Tangent of loss angle (tanδ)							
	Rated voltage (V)	6.3	10	16	25	35	50
	tanδ (max.)	0.22	0.19	0.16	0.14	0.12	0.10
	0.02 is added to every 1000μF increase over 1000μF. (20°C,120Hz)						
Characteristics at high and low temperature							
	Rated voltage (V)	6.3	10	16	25	35	50
	Impedance ratio (max.)	Z-25°C/Z+20°C	2	2	2	2	2
Z-40°C/Z+20°C		3	3	3	3	3	3
	(120Hz)						
Endurance (105°C) (Applied ripple current)							
	Test time	φ5 : 5000 hours 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 (φ6.3 or less : 300%)					
Shelf life (105°C)							
	Test time	1000 hours					
	Leakage current	The initial specified value or less					
	Percentage of capacitance change	Within ±25% of initial value (φ6.3 or less : ±30%)					
	Tangent of the loss angle	200% or less of the initial specified value (φ6.3 or less : 300%)					
	Voltage application treatment : According to JIS C5101-4 4.1						
Applicable standards	JIS C5101-1, -4 1998 (IEC 60384-1 1992, -4 1985)						

Outline Drawing

Unit : mm



Coefficient of Frequency for Rated Ripple Current

Rated 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

Part numbering system (example : 10V1000 μF)

RJM	—	10	V	102	M	G4	#*	—	□
Series code		Rated voltage symbol		Rated capacitance symbol	Capacitance tolerance symbol	Casing symbol		Taping(Forming) symbol	

* If it is for automotive, should add "Q".

Standard Ratings

Rated voltage(V) Rated capacitance(μF)	Item	6.3					10					16				
		Case φDxL (mm)	Casing symbol	Impedance (Ω max.)		Rated ripple current (mA rms)	Case φDxL (mm)	Casing symbol	Impedance (Ω max.)		Rated ripple current (mA rms)	Case φDxL (mm)	Casing symbol	Impedance (Ω max.)		Rated ripple current (mA rms)
				20°C	-10°C				20°C	-10°C				20°C	-10°C	
82	—	—	—	—	—	—	—	—	—	—	—	5×11.5	E3	0.22	0.80	345
100	—	—	—	—	—	—	5×11.5	E3	0.22	0.80	345	5×11.5	E3	0.22	0.80	345
120	—	—	—	—	—	—	5×11.5	E3	0.22	0.80	345	—	—	—	—	—
150	5×11.5	E3	0.22	0.80	345	—	5×11.5	E3	0.22	0.80	345	—	—	—	—	—
180	—	—	—	—	—	—	—	—	—	—	—	6.3×11.5	F3	0.094	0.35	540
220	5×11.5	E3	0.22	0.80	345	—	6.3×11.5	F3	0.094	0.35	540	6.3×11.5	F3	0.094	0.35	540
270	—	—	—	—	—	—	6.3×11.5	F3	0.094	0.35	540	—	—	—	—	—
330	6.3×11.5	F3	0.094	0.35	540	—	6.3×11.5	F3	0.094	0.35	540	—	—	—	—	—
470	6.3×11.5	F3	0.094	0.35	540	—	—	—	—	—	—	8×12	G3	0.056	0.19	945
680	—	—	—	—	—	—	8×12	G3	0.056	0.19	945	8×15	G4	0.045	0.15	1250
820	8×12	G3	0.056	0.19	945	—	—	—	—	—	—	10×12.5	H3	0.039	0.14	1560
1000	—	—	—	—	—	—	8×15	G4	0.045	0.15	1250	8×20	G5	0.029	0.11	1500
1200	8×15	G4	0.045	0.15	1250	—	10×12.5	H3	0.039	0.14	1560	10×16	H4	0.028	0.10	2000
1500	8×20	G5	0.029	0.11	1500	—	8×20	G5	0.029	0.11	1500	10×20	H5	0.020	0.060	2500
1800	10×16	H4	0.028	0.10	2000	—	10×16	H4	0.028	0.10	2000	10×25	H6	0.017	0.051	2900
2200	10×20	H5	0.020	0.060	2500	—	10×20	H5	0.020	0.060	2500	12.5×20	I5	0.017	0.043	2600
2700	10×25	H6	0.017	0.051	2900	—	10×25	H6	0.017	0.051	2900	12.5×25	I6	0.015	0.038	3200
3300	—	—	—	—	—	—	12.5×20	I5	0.017	0.043	2600	12.5×30	I7	0.013	0.033	3795
3900	12.5×20	I5	0.017	0.043	2600	—	12.5×25	I6	0.015	0.038	3200	16×20	J5	0.015	0.038	3575
4700	12.5×25	I6	0.015	0.038	3200	—	12.5×30	I7	0.013	0.033	3795	12.5×35	I8	0.012	0.031	4120
5600	12.5×30	I7	0.013	0.033	3795	—	16×20	J5	0.015	0.038	3575	16×25	J6	0.013	0.035	3810
6800	12.5×35	I8	0.012	0.031	4120	—	12.5×35	I8	0.012	0.031	4120	—	—	—	—	—
8200	16×20	J5	0.015	0.038	3575	—	16×25	J6	0.013	0.035	3810	—	—	—	—	—
8200	16×25	J6	0.013	0.035	3810	—	—	—	—	—	—	—	—	—	—	—

Rated voltage(V) Rated capacitance(μF)	Item	25					35					50				
		Case φDxL (mm)	Casing symbol	Impedance (Ω max.)		Rated ripple current (mA rms)	Case φDxL (mm)	Casing symbol	Impedance (Ω max.)		Rated ripple current (mA rms)	Case φDxL (mm)	Casing symbol	Impedance (Ω max.)		Rated ripple current (mA rms)
				20°C	-10°C				20°C	-10°C				20°C	-10°C	
27	—	—	—	—	—	—	—	—	—	—	—	5×11.5	E3	0.34	1.18	238
39	5×11.5	E3	0.22	0.80	345	—	5×11.5	E3	0.22	0.80	345	6.3×11.5	F3	0.14	0.50	385
47	—	—	—	—	—	—	5×11.5	E3	0.22	0.80	345	—	—	—	—	—
56	5×11.5	E3	0.22	0.80	345	—	—	—	—	—	—	6.3×11.5	F3	0.14	0.50	385
68	5×11.5	E3	0.22	0.80	345	—	—	—	—	—	—	—	—	—	—	—
82	5×11.5	E3	0.22	0.80	345	—	6.3×11.5	F3	0.094	0.35	540	—	—	—	—	—
100	6.3×11.5	F3	0.094	0.35	540	—	6.3×11.5	F3	0.094	0.35	540	8×12	G3	0.074	0.22	724
120	6.3×11.5	F3	0.094	0.35	540	—	—	—	—	—	—	8×15	G4	0.061	0.18	950
150	6.3×11.5	F3	0.094	0.35	540	—	—	—	—	—	—	10×12.5	H3	0.061	0.18	1250
180	—	—	—	—	—	—	—	—	—	—	—	8×20	G5	0.046	0.14	1190
220	—	—	—	—	—	—	8×12	G3	0.056	0.19	945	10×16	H4	0.042	0.12	1650
270	—	—	—	—	—	—	8×15	G4	0.045	0.15	1250	10×20	H5	0.030	0.090	2060
330	8×12	G3	0.056	0.19	945	—	10×12.5	H3	0.039	0.14	1560	10×25	H6	0.028	0.084	2420
390	8×15	G4	0.045	0.15	1250	—	8×20	G5	0.029	0.11	1500	—	—	—	—	—
470	10×12.5	H3	0.039	0.14	1560	—	10×16	H4	0.028	0.10	2000	12.5×20	I5	0.027	0.068	2300
560	8×20	G5	0.029	0.11	1500	—	10×20	H5	0.020	0.060	2500	12.5×25	I6	0.023	0.059	2800
680	10×16	H4	0.028	0.10	2000	—	10×25	H6	0.017	0.051	2900	12.5×30	I7	0.021	0.052	3500
820	10×20	H5	0.020	0.060	2500	—	—	—	—	—	—	12.5×35	I8	0.019	0.051	3810
1000	10×25	H6	0.017	0.051	2900	—	—	—	—	—	—	16×20	J5	0.023	0.059	3070
1200	—	—	—	—	—	—	12.5×20	I5	0.017	0.043	2600	16×25	J6	0.021	0.056	3270
1500	12.5×20	I5	0.017	0.043	2600	—	12.5×25	I6	0.015	0.038	3200	—	—	—	—	—
1800	12.5×25	I6	0.015	0.038	3200	—	12.5×30	I7	0.013	0.033	3795	—	—	—	—	—
2200	12.5×30	I7	0.013	0.033	3795	—	16×20	J5	0.015	0.038	3575	—	—	—	—	—
2700	12.5×35	I8	0.012	0.031	4120	—	16×25	J6	0.013	0.035	3810	—	—	—	—	—
3300	16×25	J6	0.013	0.035	3810	—	—	—	—	—	—	—	—	—	—	—

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

105°C Use,miniature,Hi-Reliability, Low ESR Capacitors

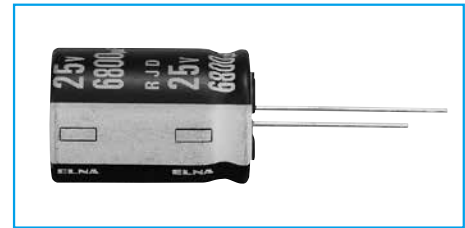
GREEN
CAP

Low
ESR

105°C
8000hours

Anti-
cleaning
solvent

- Smaller and higher ripple current than RJB series.
- Guarantees 8000 hours at 105°C.
($\phi 5$ to 6.3 : 2000 hours; $\phi 8$: 3000 hours; $\phi 10$: 5000 hours)



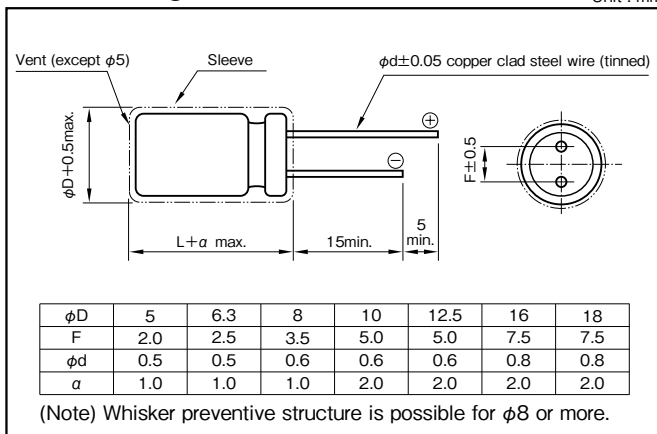
Marking color : White print on a black sleeve

Specifications

Item	Performance																			
Category temperature range (°C)	-55 to +105																			
Tolerance at rated capacitance (%)	±20 (20°C,120Hz)																			
Leakage current (μA)	Less than 0.01CV or 3 whichever is larger (after 2 minutes) C : Rated capacitance (μF), V : Rated voltage (V) (20°C)																			
Tangent of loss angle (tanδ)	<table><tr><td colspan="2">Rated voltage (V)</td><td>6.3</td><td>10</td><td>16</td><td>25</td><td>35</td></tr><tr><td colspan="2">tanδ (max.)</td><td>0.22</td><td>0.19</td><td>0.16</td><td>0.14</td><td>0.12</td></tr></table>						Rated voltage (V)		6.3	10	16	25	35	tanδ (max.)		0.22	0.19	0.16	0.14	0.12
	Rated voltage (V)		6.3	10	16	25	35													
	tanδ (max.)		0.22	0.19	0.16	0.14	0.12													
0.02 is added to every 1000μF increase over 1000μF. (20°C,120Hz)																				
Characteristics at high and low temperature	<table><tr><td colspan="2">Rated voltage (V)</td><td>6.3</td><td>10</td><td>16</td><td>25</td><td>35</td></tr><tr><td>Impedance ratio (max.)</td><td>Z-55°C/Z+20°C</td><td>3</td><td>3</td><td>3</td><td>3</td><td>3</td></tr></table>						Rated voltage (V)		6.3	10	16	25	35	Impedance ratio (max.)	Z-55°C/Z+20°C	3	3	3	3	3
	Rated voltage (V)		6.3	10	16	25	35													
Impedance ratio (max.)	Z-55°C/Z+20°C	3	3	3	3	3														
(120Hz)																				
Endurance (105°C) (Applied ripple current)	<table><tr><td>Test time</td><td>φ5 & 6.3 : 2000 hours φ8 : 3000 hours φ10 : 5000 hours φ12.5 to φ18 : 8000 hours</td></tr><tr><td>Leakage current</td><td>The initial specified value or less</td></tr><tr><td>Percentage of capacitance change</td><td>Within ±20% of initial value</td></tr><tr><td>Tangent of the loss angle</td><td>200% or less of the initial specified value</td></tr></table>						Test time	φ5 & 6.3 : 2000 hours φ8 : 3000 hours φ10 : 5000 hours φ12.5 to φ18 : 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						
	Test time	φ5 & 6.3 : 2000 hours φ8 : 3000 hours φ10 : 5000 hours φ12.5 to φ18 : 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°C)	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 1998 (IEC 60384-1 1992, -4 1985)																			

Outline Drawing

Unit : mm



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

Part numbering system (example : 6.3V10000 μF)

RJD	—	6	V	103	M	J7	#*	—	□
Series code		Rated voltage symbol		Rated capacitance symbol	Capacitance tolerance symbol	Casing symbol		Taping(Forming) symbol	

If it is whisker preventive structure, should change “#” into “G”.

* If it is for automotive, should add “Q”.

Standard Ratings

Rated voltage(V) Rated capacitance(μF)	Item	6.3					10					16				
		Case φ D × L (mm)	Casing symbol	ESR (Ω max.)		Rated ripple current (mA rms)	Case φ D × L (mm)	Casing symbol	ESR (Ω max.)		Rated ripple current (mA rms)	Case φ D × L (mm)	Casing symbol	ESR (Ω max.)		Rated ripple current (mA rms)
				20℃	-10℃				20℃	-10℃				20℃	-10℃	
22	—	—	—	—	—	—	—	—	—	—	—	5 × 11.5	E3	0.50	1.0	182
33	—	—	—	—	—	—	—	—	—	—	—	5 × 11.5	E3	0.50	1.0	182
47	—	—	—	—	—	—	—	—	—	—	—	5 × 11.5	E3	0.50	1.0	182
82	—	—	—	—	—	—	—	—	—	—	—	5 × 11.5	E3	0.50	1.0	182
100	—	—	—	—	—	—	5 × 11.5	E3	0.50	1.0	182	6.3 × 11.5	F3	0.25	0.50	295
150	5 × 11.5	E3	0.50	1.0	182	—	—	—	—	—	—	6.3 × 11.5	F3	0.25	0.50	295
180	—	—	—	—	—	—	6.3 × 11.5	F3	0.25	0.50	295	8 × 12	G3	0.117	0.234	567
220	—	—	—	—	—	—	6.3 × 11.5	F3	0.25	0.50	295	8 × 12	G3	0.117	0.234	567
330	6.3 × 11.5	F3	0.25	0.50	295	—	8 × 12	G3	0.117	0.234	567	8 × 12	G3	0.117	0.234	567
390	—	—	—	—	—	—	—	—	—	—	—	8 × 12	G3	0.117	0.234	567
470	8 × 12	G3	0.117	0.234	567	—	8 × 12	G3	0.117	0.234	567	8 × 15	G4	0.085	0.170	733
560	8 × 12	G3	0.117	0.234	567	—	8 × 12	G3	0.117	0.234	567	10 × 12.5	H3	0.090	0.180	764
680	8 × 12	G3	0.117	0.234	567	—	—	—	—	—	—	8 × 15	G4	0.085	0.170	733
820	—	—	—	—	—	—	8 × 15	G4	0.085	0.170	733	10 × 12.5	H3	0.090	0.180	764
1000	8 × 15	G4	0.085	0.170	733	—	10 × 12.5	H3	0.090	0.180	764	8 × 20	G5	0.065	0.130	996
1200	10 × 12.5	H3	0.090	0.180	764	—	10 × 16	H4	0.068	0.136	1060	10 × 16	H4	0.068	0.136	1060
1500	8 × 20	G5	0.065	0.130	996	—	10 × 20	H5	0.052	0.104	1230	10 × 20	H5	0.052	0.104	1230
1800	12.5 × 15	I4	0.062	0.124	1210	—	12.5 × 15	I4	0.062	0.124	1210	10 × 25	H6	0.045	0.090	1450
2200	10 × 20	H5	0.052	0.104	1230	—	10 × 20	H5	0.052	0.104	1230	10 × 30	H7	0.035	0.070	1830
2700	10 × 25	H6	0.045	0.090	1450	—	10 × 25	H6	0.045	0.090	1450	—	—	—	—	—
3300	10 × 30	H7	0.035	0.070	1830	—	10 × 30	H7	0.035	0.070	1830	12.5 × 20	I5	0.038	0.076	1700
3900	12.5 × 25	I6	0.030	0.060	1950	—	12.5 × 25	I6	0.030	0.060	1950	16 × 16	J4	0.043	0.086	1700
4700	12.5 × 25	I6	0.030	0.060	1950	—	18 × 16	K4	0.038	0.076	2010	12.5 × 25	I7	0.025	0.050	2330
5600	12.5 × 30	I7	0.025	0.050	2330	—	12.5 × 30	I7	0.025	0.050	2330	16 × 20	J5	0.029	0.058	2230
6800	16 × 20	J5	0.029	0.058	2230	—	16 × 20	J5	0.029	0.058	2230	12.5 × 35	I8	0.022	0.044	2620
8200	12.5 × 35	I8	0.022	0.044	2620	—	12.5 × 35	I8	0.022	0.044	2620	16 × 25	J6	0.022	0.044	2650
10000	12.5 × 40	I9	0.017	0.034	3160	—	16 × 25	J6	0.022	0.044	2650	16 × 31.5	J7	0.018	0.036	3210
12000	16 × 25	J6	0.022	0.044	2650	—	16 × 31.5	J7	0.018	0.036	3210	18 × 25	K6	0.020	0.040	3000
15000	18 × 20	K5	0.028	0.056	2500	—	18 × 25	K6	0.020	0.040	3000	18 × 35.5	K8	0.015	0.030	3960
18000	16 × 31.5	J7	0.018	0.036	3210	—	16 × 40	J9	0.015	0.030	3880	18 × 40	K9	0.014	0.028	4300
	18 × 25	K6	0.020	0.040	3000	—	18 × 35.5	K8	0.015	0.030	3960	—	—	—	—	—
	18 × 25	K6	0.020	0.040	3000	—	—	—	—	—	—	—	—	—	—	—
	18 × 35.5	K8	0.015	0.030	3960	—	18 × 40	K9	0.014	0.028	4300	—	—	—	—	—
	18 × 40	K9	0.014	0.028	4300	—	—	—	—	—	—	—	—	—	—	—

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

Standard Ratings

Rated voltage(V) Rated capacitance (μF)	Item	25				35					
		Case φ D × L (mm)	Casing symbol	ESR (Ω max.)		Rated ripple current (mAmps)	Case φ D × L (mm)	Casing symbol	ESR (Ω max.)		Rated ripple current (mAmps)
				20℃	-10℃				20℃	-10℃	
10	5 × 11.5	E3	0.50	1.0	182	5 × 11.5	E3	0.50	1.0	182	
22	5 × 11.5	E3	0.50	1.0	182	5 × 11.5	E3	0.50	1.0	182	
27	5 × 11.5	E3	0.50	1.0	182	5 × 11.5	E3	0.50	1.0	182	
33	5 × 11.5	E3	0.50	1.0	182	5 × 11.5	E3	0.50	1.0	182	
47	5 × 11.5	E3	0.50	1.0	182	6.3 × 11.5	F3	0.25	0.50	295	
56	5 × 11.5	E3	0.50	1.0	182	6.3 × 11.5	F3	0.25	0.50	295	
82	6.3 × 11.5	F3	0.25	0.50	295	6.3 × 11.5	F3	0.25	0.50	295	
100	6.3 × 11.5	F3	0.25	0.50	295	8 × 12	G3	0.117	0.234	567	
150	8 × 12	G3	0.117	0.234	567	8 × 12	G3	0.117	0.234	567	
180	—	—	—	—	—	8 × 12	G3	0.117	0.234	567	
220	8 × 12	G3	0.117	0.234	567	8 × 15	G4	0.085	0.170	733	
270	8 × 12	G3	0.117	0.234	567	8 × 15	G4	0.085	0.170	733	
						10 × 12.5	H3	0.090	0.180	764	
330	8 × 12	G3	0.117	0.234	567	8 × 20	G5	0.065	0.130	996	
	10 × 12.5	H3	0.090	0.180	764	10 × 16	H4	0.068	0.136	1060	
390	8 × 15	G4	0.085	0.170	733	8 × 20	G5	0.065	0.130	996	
						10 × 16	H4	0.068	0.136	1060	
470	8 × 15	G4	0.085	0.170	733	10 × 20	H5	0.052	0.104	1230	
	10 × 12.5	H3	0.090	0.180	764						
560	8 × 20	G5	0.065	0.130	996	10 × 20	H5	0.052	0.104	1230	
	10 × 16	H4	0.068	0.136	1060	12.5 × 15	I4	0.062	0.124	1210	
680	10 × 16	H4	0.068	0.136	1060	10 × 25	H6	0.045	0.090	1450	
820	10 × 20	H5	0.052	0.104	1230	12.5 × 20	I5	0.038	0.076	1700	
	12.5 × 15	I4	0.062	0.124	1210						
1000	10 × 25	H6	0.045	0.090	1450	10 × 30	H7	0.035	0.070	1830	
	12.5 × 20	I5	0.038	0.076	1700	12.5 × 20	I5	0.038	0.076	1700	
1200	12.5 × 20	I5	0.038	0.076	1700	12.5 × 25	I6	0.030	0.060	1950	
						18 × 16	K4	0.038	0.076	2010	
1500	10 × 30	H7	0.035	0.070	1830	12.5 × 30	I7	0.025	0.050	2330	
	16 × 16	J4	0.043	0.086	1700	16 × 20	J5	0.029	0.058	2230	
1800	12.5 × 25	I6	0.030	0.060	1950	12.5 × 35	I8	0.022	0.044	2620	
	18 × 16	K4	0.038	0.076	2010	16 × 20	J5	0.029	0.058	2230	
2200	12.5 × 30	I7	0.025	0.050	2330	12.5 × 40	I9	0.017	0.034	3160	
	16 × 20	J5	0.029	0.058	2230	16 × 25	J6	0.022	0.044	2650	
2700	12.5 × 35	I8	0.022	0.044	2620	18 × 20	K5	0.028	0.056	2500	
						16 × 31.5	J7	0.018	0.036	3210	
						18 × 25	K6	0.020	0.040	3000	
3300	12.5 × 40	I9	0.017	0.034	3160	18 × 25	K6	0.020	0.040	3000	
	16 × 25	J6	0.022	0.044	2650						
	18 × 20	K5	0.028	0.056	2500						
3900	—	—	—	—	—	18 × 31.5	K7	0.016	0.032	3660	
	—	—	—	—	—	18 × 35.5	K8	0.015	0.030	3960	
4700	18 × 25	K6	0.020	0.040	3000	18 × 40	K9	0.014	0.028	4300	
						18 × 35.5	K8	0.015	0.030	3960	
5600	18 × 35.5	K8	0.015	0.030	3960	18 × 40	K9	0.014	0.028	4300	
6800	18 × 35.5	K8	0.015	0.030	3960	18 × 40	K9	0.014	0.028	4300	
8200	—	—	—	—	—	18 × 40	K9	0.014	0.028	4300	
10000	18 × 40	K9	0.014	0.028	4300	—	—	—	—	—	

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

For SRS AirBag

GREEN
CAP

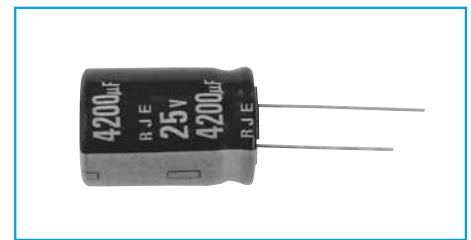
105°C
5000hours

Anti-
cleaning
solvent

For AirBag

- For SRS AirBag application
- High capacitance, low impedance, and good low temperature behavior
- Guarantees 5000 hours at 105°C.

For SAS AirBag



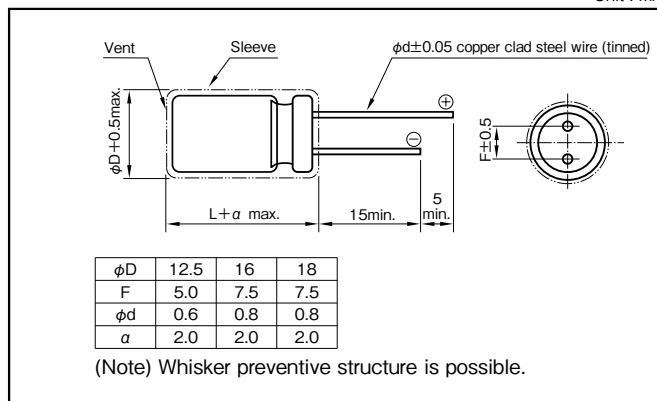
Marking color : White print on a black sleeve

Specifications

Item	Performance		
Category temperature range (°C)	-55 to +105		
Tolerance at rated capacitance (%)	0 to +30 (20°C,120Hz)		
Leakage current (μA)	Less than 0.01CV (after 2 minutes) C : Rated capacitance (μF) , V : Rated voltage (V) (20°C)		
Tangent of loss angle (tanδ)	Rated voltage (V)	25	35
	tanδ (max.)	0.20	0.16
	0.02 is added to every 1000μF increase over 1000μF (20°C,120Hz)		
Characteristics at high and low temperature	Rated voltage (V)	25	35
	Impedance ratio (max.)	Z-55°C/Z+20°C	3
	(120Hz)		
Endurance (105°C)	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°C)	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 1998 (IEC 60384-1 1992, -4 1985)		

Outline Drawing

Unit : mm



Coefficient of Frequency for Rated Ripple Current

Frequency (Hz)	50 · 60	120	1k	10k·100k
Rated capacitance (µF)				
830 to 1100	0.70	0.75	0.90	1
1200 to 11000	0.80	0.85	0.95	1

Part numbering system (example : 25V4200µF)

RJE	—	25	V	422	A	I9	(#)Q	—	
Series code		Rated voltage symbol		Rated capacitance symbol	Capacitance tolerance symbol	Casing symbol	Optional symbol		Taping(Forming) symbol

If it is whisker preventive structure, should change “#” into “G”.

Standard Ratings

Rated voltage(V)		25				35			
Case size φD×L(mm)	Casing symbol	Item	Capacitance (µF)	Q (max.) ESR / 100kHz	Rated ripple current (mA rms)	Capacitance (µF)	Q (max.) ESR / 100kHz	Rated ripple current (mA rms)	
12.5×15	I4		1100	0.174	0.52	1210			
12.5×20	I5		1800	0.107	0.27	1670			
12.5×25	I6		2400	0.084	0.21	1950			
12.5×30	I7		3200	0.070	0.18	2330			
12.5×35	I8		3700	0.062	0.16	2620			
12.5×40	I9		4200	0.048	0.12	3160			
16×16	J4		2100	0.121	0.36	1700			
16×20	J5		3100	0.082	0.21	2230			
16×25	J6		4300	0.062	0.16	2650			
16×31.5	J7		5800	0.051	0.13	3210			
16×35.5	J8		6800	0.045	0.11	3570			
16×40	J9		7800	0.042	0.11	3880			
18×16	K4		3000	0.107	0.32	2010			
18×20	K5		4300	0.079	0.20	2500			
18×25	K6		6000	0.056	0.14	3000			
18×31.5	K7		8000	0.045	0.11	3660			
18×35.5	K8		9300	0.042	0.11	3960			
18×40	K9		11000	0.040	0.10	4300			

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

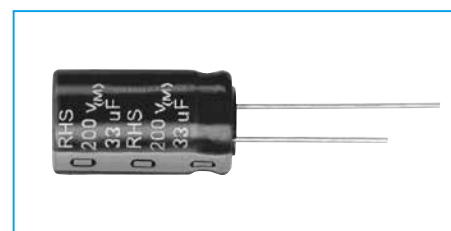
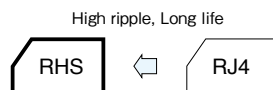
NOTE : Design, Specifications are subject to change without notice.
It is recommended that you shall obtain technical specifications from ELNA to ensure that the component is suitable for your use.

105°C Use, Miniature, High-Ripple, Long Life Capacitors

GREEN
CAP

105°C
5000hours

- Higher ripple current.
- Guarantees 4000 to 5000 hours at 105°C.
- Best-suited to electronic ballast.



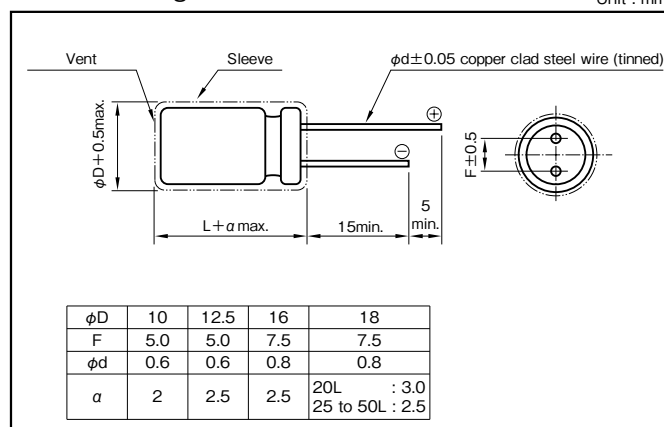
Marking color : White print on a black sleeve

Specifications

Item	Performance														
Category temperature range (°C)	-40 to +105 (-25 to +105 at 350V or more)														
Rated Voltage (V)	160 to 450														
Tolerance at rated capacitance (%)	±20 (20°C,120Hz)														
Leakage current (μA)	CV≤1000 : Less than 0.06CV+40 (after 1 minutes) CV>1000 : Less than 0.03CV+70 (after 1 minutes) C : Rated capacitance (μF), V : Rated voltage (V) (20°C)														
Tangent of loss angle (tanδ)	<table><tr><td>Rated voltage (V)</td><td>160 to 250</td><td>350 to 400</td><td>450</td></tr><tr><td>Tangent of loss angle</td><td>0.12</td><td>0.15</td><td>0.20</td></tr></table> (20°C,120Hz)				Rated voltage (V)	160 to 250	350 to 400	450	Tangent of loss angle	0.12	0.15	0.20			
Rated voltage (V)	160 to 250	350 to 400	450												
Tangent of loss angle	0.12	0.15	0.20												
Characteristics at high and low temperature	<table><tr><td colspan="2">Rated voltage (V)</td><td>160 to 250</td><td>350 to 450</td></tr><tr><td rowspan="2">Impedance ratio</td><td>Z-25°C/Z+20°C</td><td>3</td><td>6</td></tr><tr><td>Z-40°C/Z+20°C</td><td>4</td><td>—</td></tr></table> (120Hz)				Rated voltage (V)		160 to 250	350 to 450	Impedance ratio	Z-25°C/Z+20°C	3	6	Z-40°C/Z+20°C	4	—
Rated voltage (V)		160 to 250	350 to 450												
Impedance ratio	Z-25°C/Z+20°C	3	6												
	Z-40°C/Z+20°C	4	—												
Endurance (105°C) (Applied ripple current)	<table><tr><td>Test time</td><td>φ10 : 4000 hours φ12.5 to φ18 : 5000 hours</td></tr><tr><td>Leakage current</td><td>The initial specified value or less</td></tr><tr><td>Capacitance change</td><td>Within -20% to +20% of initial value</td></tr><tr><td>Tangent of loss angle</td><td>300% or less of the initial specified value</td></tr></table>				Test time	φ10 : 4000 hours φ12.5 to φ18 : 5000 hours	Leakage current	The initial specified value or less	Capacitance change	Within -20% to +20% of initial value	Tangent of loss angle	300% or less of the initial specified value			
Test time	φ10 : 4000 hours φ12.5 to φ18 : 5000 hours														
Leakage current	The initial specified value or less														
Capacitance change	Within -20% to +20% of initial value														
Tangent of loss angle	300% or less of the initial specified value														
Shelf life (105°C)	<table><tr><td>Test time</td><td>1000 hours</td></tr><tr><td>Leakage current</td><td>The initial specified value or less</td></tr><tr><td>Capacitance change</td><td>Within -20% to +20% of initial value</td></tr><tr><td>Tangent of loss angle</td><td>200% or less of the initial specified value</td></tr></table> Voltage application treatment : According to JIS C5101-4 4.1				Test time	1000 hours	Leakage current	The initial specified value or less	Capacitance change	Within -20% to +20% of initial value	Tangent of loss angle	200% or less of the initial specified value			
Test time	1000 hours														
Leakage current	The initial specified value or less														
Capacitance change	Within -20% to +20% of initial value														
Tangent of loss angle	200% or less of the initial specified value														
Applicable Standards	JIS C 5101-01, -04 1998 (IEC 60384-1 1992, 60384-4 1985)														

Outline Drawing

Unit : mm



Coefficient of Frequency for Rated Ripple Current

Rated voltage (V)	Rated capacitance (μF)	Frequency (Hz)				
		50 ~ 60	120	1k	10k	100k
160 to 250	4.7 to 10	0.80	1	1.75	2.00	2.50
	12 to 47	0.80	1	1.60	1.80	2.00
	56 to 560	0.80	1	1.30	1.40	1.40
350 to 450	1 to 10	0.80	1	1.75	2.00	2.50
	12 to 18	0.80	1	1.60	1.80	2.00
	22 to 220	0.80	1	1.40	1.50	1.50

Part numbering system (example : 400V10μF)

RHS	—	400 V	100	M	I5	#	B	—	□
Series code		Rated voltage symbol	Rated capacitance symbol	Capacitance tolerance symbol	Casing symbol	Optional symbol	Taping(Forming) symbol		

Standard Ratings

Case φD × L(mm)	Casing symbol	Item	Rated voltage (V)			160			200			250			350		
			Rated capacitance (μF)	ESR (Ω max.)	Rated ripple current (mA rms)	Rated capacitance (μF)	ESR (Ω max.)	Rated ripple current (mA rms)	Rated capacitance (μF)	ESR (Ω max.)	Rated ripple current (mA rms)	Rated capacitance (μF)	ESR (Ω max.)	Rated ripple current (mA rms)			
10 × 12.5	H3		27	5.9	145	4.7	34	60	4.7	34	60	3.3	60	50			
						18	8.8	105	10	16	82	4.7	42	55			
												8.2	24	85			
10 × 16	H4		10	16	96	10	16	95	10	16	90	4.7	42	65			
			39	4.1	185	22	7.2	110				12	17	120			
10 × 20	H5		22	7.2	145	22	7.2	145	10	16	105	15	13	145			
			56	2.8	270	33	4.8	170	22	7.2	150						
10 × 25	H6		68	2.3	290	47	3.4	245	39	4.1	240	22	9.0	175			
10 × 30	H7		100	1.6	315	68	2.3	350	47	3.4	270	27	7.4	210			
12.5 × 20	I5		33	4.8	190	33	4.8	190	47	3.4	260	10	20	120			
			82	1.9	270	56	2.8	240				27	7.4	200			
12.5 × 25	I6		47	3.4	280	47	3.4	280	22	7.2	180	22	9.0	180			
			100	1.6	325	82	1.9	320	33	4.8	250	39	5.1	225			
12.5 × 30	I7		150	1.1	435	120	1.3	420	68	2.3	265	56	3.6	290			
12.5 × 40	I9		220	0.7	500	—	—	—	120	1.3	580	68	2.9	370			
16 × 20	J5		47	3.4	280	47	3.4	280	33	4.8	250	22	9.0	180			
			120	1.3	375	100	1.6	370	68	2.3	275	47	4.2	270			
16 × 25	J6		180	0.9	505	150	1.1	500	47	3.4	300	33	6.0	210			
									120	1.3	405	68	2.9	365			
16 × 31.5	J7		270	0.6	685	100	1.6	410	100	1.6	410	82	2.4	445			
						220	0.7	665	150	1.1	510	—	—	—			
16 × 35.5	J8		330	0.5	800	—	—	—	180	0.9	590	47	4.2	300			
16 × 40	J9		390	0.4	915	270	0.6	820	220	0.7	685	100	2.0	520			
18 × 20	K5		100	1.6	380	120	1.3	430	47	3.4	300	120	1.7	600			
			180	0.9	490				100	1.6	360	56	3.6	325			
18 × 25	K6		270	0.6	660	100	1.6	410	100	1.6	410	82	2.4	430			
						180	0.9	580	150	1.1	485						
18 × 31.5	K7		330	0.5	810	270	0.6	790	180	0.9	590	47	4.2	300			
												100	2.0	520			
18 × 35.5	K8		220	0.7	630	—	—	—	220	0.7	690	120	1.7	600			
			390	0.4	925							150	1.3	715			
18 × 40	K9		470	0.3	1050	330	0.5	970	270	0.6	810	150	1.3	715			
18 × 45	KA		560	0.3	1230	390	0.4	1100	330	0.5	945	180	1.1	730			
18 × 50	KB		—	—	—	470	0.3	1200	—	—	—	220	0.9	960			

Rated voltage (V)		400			450			
Case φD × L(mm)	Casing symbol	Item	Rated capacitance	ESR	Rated ripple current	Rated capacitance	ESR	Rated ripple current
			(μF)	(Ω max.)	(mA rms)	(μF)	(Ω max.)	(mA rms)
10 × 12.5	H3		2.2	90	40	1.0	265	30
			6.8	29	70	5.6	47	60
10 × 16	H4		3.3	60	50	2.2	121	45
						4.7	56	68
			10	20	95	8.2	32	90
10 × 20	H5		4.7	42	70	3.3	80	65
						12	22	120
10 × 25	H6		18	11	160	15	18	150
10 × 30	H7		22	9.0	200	22	12	190
12.5 × 20	I5		10	20	120	18	15	170
			22	9.0	200			
12.5 × 25	I6		27	7.4	220	10	27	140
						27	9.8	210
12.5 × 30	I7		39	5.1	310	33	8.0	280
12.5 × 40	I9		56	3.6	440	47	5.6	400
16 × 20	J5		33	6.0	220	27	9.8	220
16 × 25	J6		22	9.0	200	22	12	220
						33	8.0	280
			47	4.2	340	47	5.6	380
16 × 31.5	J7		33	6.0	245	47	5.6	420
			68	2.9	465	56	4.7	520
16 × 35.5	J8		82	2.4	500	68	3.9	520
16 × 40	J9		100	2.0	525	82	3.2	680
18 × 20	K5		22	9.0	200	39	6.8	330
			47	4.2	335			
18 × 25	K6		33	6.0	245	68	3.9	420
			68	2.9	450			
18 × 31.5	K7		47	4.2	300	82	3.2	580
			82	2.4	500			
			100	2.0	525			
18 × 35.5	K8		—	—	—	100	2.7	750
18 × 40	K9		120	1.7	785	120	2.2	800
18 × 45	KA		150	1.3	865	150	1.8	920
18 × 50	KB		—	—	—	180	1.5	1100

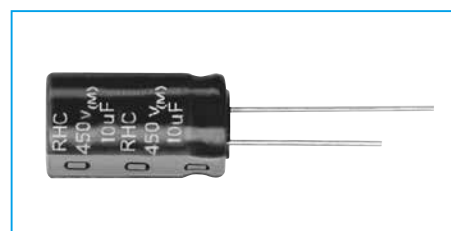
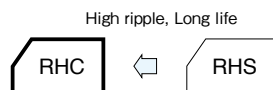
(Note) Rated ripple current : 105°C , 120Hz ; ESR : 20°C , 120Hz

105°C Use, Miniature, High-Ripple, Long Life Capacitors

GREEN
CAP

105°C
10000hours

- Higher ripple current.
- Guarantees 5000 to 10000 hours at 105°C.
- Best-suited to electronic ballast.



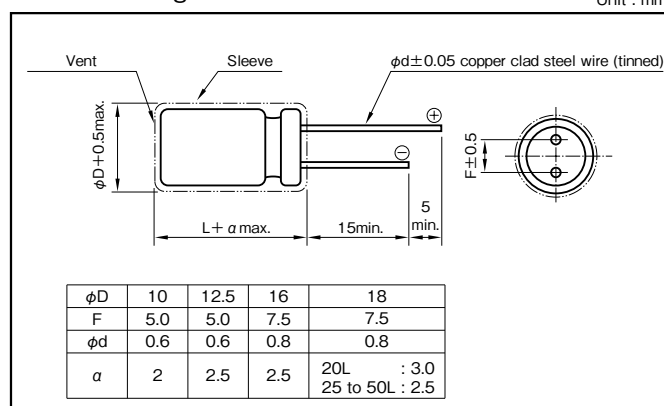
Marking color : White print on a black sleeve

Specifications

Item	Performance																		
Category temperature range (°C)	-25 to +105																		
Rated Voltage (V)	160 to 450																		
Tolerance at rated capacitance (%)	±20 (20°C,120Hz)																		
Leakage current (μA)	Less than 0.04CV + 100 (after 1 minutes) C : Rated capacitance (μF), V : Rated voltage (V) (20°C)																		
Tangent of loss angle (tanδ)	<table><tr><td>Rated voltage (V)</td><td>160 to 250</td><td>350 to 450</td></tr><tr><td>Tangent of loss angle</td><td>0.10 (0.15*)</td><td>0.12 (0.20*)</td></tr></table>			Rated voltage (V)	160 to 250	350 to 450	Tangent of loss angle	0.10 (0.15*)	0.12 (0.20*)										
	Rated voltage (V)	160 to 250	350 to 450																
	Tangent of loss angle	0.10 (0.15*)	0.12 (0.20*)																
* The black circles in the capacitance column correspond. (20°C,120Hz)																			
Characteristics at high and low temperature	<table><tr><td colspan="2">Rated voltage (V)</td><td>160 to 250</td><td>350 to 450</td></tr><tr><td>Impedance ratio</td><td>Z-25°C/Z+20°C</td><td>3</td><td>6</td></tr></table>			Rated voltage (V)		160 to 250	350 to 450	Impedance ratio	Z-25°C/Z+20°C	3	6								
	Rated voltage (V)		160 to 250	350 to 450															
Impedance ratio	Z-25°C/Z+20°C	3	6																
(120Hz)																			
Endurance (105°C) (Applied ripple current)	<table><tr><td>Test time</td><td colspan="3">φ10×12.5L : 5000 hours φ10×16L to 25L : 8000 hours φ10×30L, φ12.5 to φ18 : 10000 hours</td></tr><tr><td>Leakage current</td><td colspan="3">The initial specifide value or less</td></tr><tr><td>Capacitance change</td><td colspan="3">Within -30% to + 30% of initial value</td></tr><tr><td>Tangent of loss angle</td><td colspan="3">300% or less of the initial specified value</td></tr></table>			Test time	φ10×12.5L : 5000 hours φ10×16L to 25L : 8000 hours φ10×30L, φ12.5 to φ18 : 10000 hours			Leakage current	The initial specifide value or less			Capacitance change	Within -30% to + 30% of initial value			Tangent of loss angle	300% or less of the initial specified value		
	Test time	φ10×12.5L : 5000 hours φ10×16L to 25L : 8000 hours φ10×30L, φ12.5 to φ18 : 10000 hours																	
	Leakage current	The initial specifide value or less																	
	Capacitance change	Within -30% to + 30% of initial value																	
Tangent of loss angle	300% or less of the initial specified value																		
Shelf life (105°C)	<table><tr><td>Test time</td><td colspan="3">1000 hours</td></tr><tr><td>Leakage current</td><td colspan="3">The initial specifide value or less</td></tr><tr><td>Capacitance change</td><td colspan="3">Within -20% to + 20% of initial value</td></tr><tr><td>Tangent of loss angle</td><td colspan="3">200% or less of the initial specified value</td></tr></table>			Test time	1000 hours			Leakage current	The initial specifide value or less			Capacitance change	Within -20% to + 20% of initial value			Tangent of loss angle	200% or less of the initial specified value		
	Test time	1000 hours																	
	Leakage current	The initial specifide value or less																	
	Capacitance change	Within -20% to + 20% of initial value																	
Tangent of loss angle	200% or less of the initial specified value																		
Voltage application treatment : According to JIS C5101-4 4.1																			
Applicable standards	JIS C 5101-01, -04 1998 (IEC 60384-1 1992, 60384-4 1985)																		

Outline Drawing

Unit : mm



Coefficient of Frequency for Rated Ripple Current

Rated capacitance (μF)	Frequency (Hz)			
	120	1k	10k	100k
1 to 5.6	0.20	0.40	0.80	1
6.8 to 18	0.30	0.60	0.90	1
22 to 82	0.40	0.70	0.90	1
100 to 680	0.45	0.75	0.90	1

Part numbering system (example : 400V10μF)

RHC	—	400	V	100	M	H5	#	B	—	□
Series code		Rated voltage symbol		Rated capacitance symbol	Capacitance tolerance symbol	Casing symbol		Optional symbol		Taping(Foring) symbol

Standard Ratings

Rated voltage(V)			160			200			250			350		
Case φD × L (mm)	Casing symbol	Item	Rated capacitance (μF)	ESR (Ω max.)	Rated ripple current (mA rms)	Rated capacitance (μF)	ESR (Ω max.)	Rated ripple current (mA rms)	Rated capacitance (μF)	ESR (Ω max.)	Rated ripple current (mA rms)	Rated capacitance (μF)	ESR (Ω max.)	Rated ripple current (mA rms)
10 × 12.5	H3	● 27	7.4	350	4.7	28	200	4.7	28	200	1.5	106	100	
10 × 16	H4	● 10	13	320	6.8	20	220	6.8	20	250	2.2	72	140	
10 × 20	H5	● 39	5.1	600	10	13	320	10	13	320	3.3	48	180	
10 × 25	H6	● 22	6.0	500	22	6.0	500	22	6.0	500	4.7	34	220	
10 × 30	H7	● 33	4.0	650	33	4.0	650	33	4.0	650	5.6	28	250	
12.5 × 20	I5	● 47	2.8	750	56	3.6	860	33	4.0	720	12	22	360	
12.5 × 25	I6	● 82	2.4	1110	68	2.9	1010	47	2.8	980	27	9.8	585	
12.5 × 30	I7	● 68	2.0	1180	47	2.8	980	33	4.0	800	22	7.2	650	
12.5 × 35	I8	● 100	1.3	1420	68	2.0	1300	47	2.8	980	27	9.8	700	
12.5 × 40	I9	● 120	1.7	1500	100	2.0	1375	68	2.9	1260	39	6.8	825	
16 × 20	J5	● 120	1.1	1500	120	1.7	1540	82	2.4	1410	56	4.7	1050	
16 × 25	J6	● 150	0.9	1890	150	1.3	1890	100	1.3	1530	68	3.9	1210	
16 × 31.5	J7	● 220	0.9	2265	180	1.1	2200	120	1.7	1675	82	3.2	1375	
16 × 35.5	J8	● 330	0.6	3000	220	0.9	2420	150	1.3	1740	100	2.7	1640	
16 × 40	J9	● 390	0.5	3330	270	0.7	2710	180	1.1	2210	120	2.2	1830	
18 × 20	K5	● 470	0.4	3775	330	0.6	3120	220	0.9	2380	150	1.3	1940	
18 × 25	K6	● 180	1.1	1900	—	—	—	100	2.0	1530	68	3.9	1375	
18 × 31.5	K7	● 220	0.6	2865	270	0.7	2750	220	0.9	2200	68	2.3	1470	
18 × 35.5	K8	● 270	0.7	2510	330	0.6	3100	150	1.3	1940	82	3.2	1510	
18 × 40	K9	● 330	0.6	2865	270	0.7	2460	220	0.9	2200	100	2.7	1650	
18 × 45	KA	● 470	0.4	4230	330	0.6	3100	270	0.7	2460	120	2.2	1760	
18 × 50	KB	● 560	0.3	4365	470	0.4	3475	330	0.6	2660	150	1.8	2085	
18 × 50	KB	● 680	0.3	4365	470	0.4	3475	—	—	—	180	1.5	2265	
18 × 50	KB	—	—	—	560	0.4	3900	390	0.5	3555	220	1.2	2530	

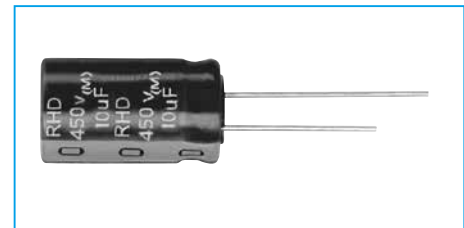
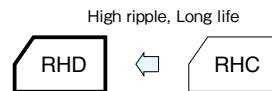
Rated voltage(V)			400			450		
Case φD × L (mm)	Casing symbol	Item	Rated capacitance (μF)	ESR (Ω max.)	Rated ripple current (mA rms)	Rated capacitance (μF)	ESR (Ω max.)	Rated ripple current (mA rms)
10 × 12.5	H3	1	159	70	● 3.9	68	200	
		1.5	106	100				
		2.2	72	140				
		● 3.3	80	160				
10 × 16	H4	3.3	48	180	2.2	72	150	
		4.7	34	220	3.3	48	180	
		● 10	27	315	● 6.8	39	280	
		5.6	28	250	4.7	34	220	
10 × 20	H5	6.8	23	280	5.6	28	250	
		10	16	350	6.8	23	280	
		● 15	18	420	● 10	27	330	
		● 18	15	445	● 15	18	500	
10 × 30	H7	● 22	12	525	● 22	12	535	
12.5 × 20	I5	15	11	550	10	16	450	
		● 22	12	650	● 18	15	525	
12.5 × 25	I6	22	7.2	760	15	11	600	
		● 27	9.8	760	● 27	9.8	635	
		33	4.8	720	● 33	8.0	725	
12.5 × 30	I7	● 47	5.6	920	● 33	8.0	800	
		47	3.4	960				
12.5 × 35	I8	● 56	4.7	1260	● 39	6.8	850	
12.5 × 40	I9	—	—	—	● 47	5.6	1010	
16 × 20	J5	22	7.2	760	22	7.2	730	
		● 33	8.0	900	● 27	9.8	775	
16 × 25	J6	● 47	5.6	1180	33	4.8	980	
		● 39	6.8	935				
16 × 31.5	J7				● 68	3.9	1350	● 56
16 × 35.5	J8	● 100	2.7	1550	● 68	3.9	1250	
16 × 40	J9	● 120	2.2	1740	● 82	3.2	1650	
18 × 20	K5	● 56	4.7	1350	● 39	6.8	935	
18 × 25	K6	● 68	3.9	1470	47	3.4	1200	
18 × 31.5	K7	82	1.9	1600	● 68	3.9	1260	
		● 100	2.7	1720	● 82	3.2	1360	
18 × 35.5	K8	● 120	2.2	1760	● 100	2.7	1685	
18 × 40	K9	● 120	2.2	1945	● 120	2.2	1865	
		● 150	1.8	1930				
18 × 45	KA	● 150	1.8	2215	—	—	—	
18 × 50	KB	—	—	—	● 150	1.8	2040	

105°C Use, Miniature, High-Ripple, Long Life Capacitors

GREEN
CAP

105°C
12000hours

- Higher ripple current.
- Guarantees 8000 to 12000 hours at 105°C.
- Best-suited to electronic ballast.



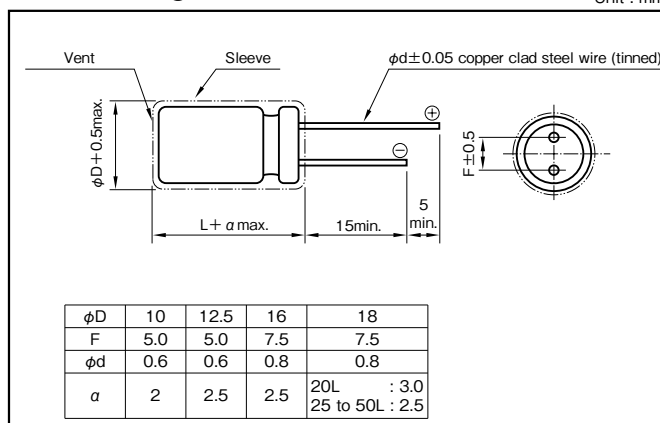
Marking color : White print on a black sleeve

Specifications

Item	Performance		
Category temperature range (°C)	-25 to +105		
Rated Voltage (V)	160 to 450		
Tolerance at rated capacitance (%)	±20 (20°C,120Hz)		
Leakage current(μA)	Less than 0.04CV + 100 (after 1 minutes) C:Rated capacitance (μF),V:Rated Voltage (V) (20°C)		
Tangent of loss angle (tanδ)	Rated voltage (V)	160 to 250	350 to 450
	Tangent of loss angle	0.15	0.20
(20°C,120Hz)			
Characteristics at high and low temperature	Rated voltage (V)	160 to 250	350 to 450
	Impedance ratio	Z-25°C/Z+20°C	3
6 (120Hz)			
Endurance (105°C) (Applied ripple current)	Test time	φ10×12.5L : 8000hours φ10×16L to 25L : 10000hours φ10×30L, φ12.5 to φ18 : 12000hours	
	Leakage current	The initial specified value or less	
	Capacitance change	Within -30% to +30% of initial value	
	Tangent of loss angle	300% or less of the initial specified value	
Shelf life (105°C)	Test time	1000hours	
	Leakage current	The initial specified value or less	
	Capacitance change	Within -20% to +20% of initial value	
	Tangent of loss angle	200% or less of the initial specified value	
Voltage application treatment : According to JIS C5101-4 4.1			
Applicable Standards	JIS C 5101-01, -04 1998 (IEC 60384-1 1992,60384-4 1985)		

Outline Drawing

Unit : mm



Coefficient of Frequency for Rated Ripple Current

Rated voltage (V)	Frequency (Hz)	50	120	1k	10k	100k
160 to 450		0.30	0.50	0.80	0.90	1

Part numbering system (example : 400V47μF)

RHD	—	400	V	470	M	K6	#	B	—	
Series code		Rated voltage symbol		Rated capacitance symbol	Capacitance tolerance symbol	Casing symbol		Optional symbol		Taping(Forming) symbol

Standard Ratings

Rated voltage(V)			160			200			250			350		
Case φD × L (mm)	Casing symbol	Item	Rated capacitance (μF)	ESR (Ω max.)	Rated ripple current (mA rms)	Rated capacitance (μF)	ESR (Ω max.)	Rated ripple current (mA rms)	Rated capacitance (μF)	ESR (Ω max.)	Rated ripple current (mA rms)	Rated capacitance (μF)	ESR (Ω max.)	Rated ripple current (mA rms)
10 × 12.5	H3	—	—	—	—	10	20	250	6.8	29	250	4.7	56	200
						12	17	310				5.6	47	220
10 × 16	H4	10	20	250	10	20	250	22	22	9.0	350	6.8	39	220
		39	5.1	490	22	9.0	360					12	22	280
		22	9.0	500	22	9.0	500	10	10	20	280	10	27	280
10 × 20	H5	33	6.0	500	33	6.0	640	33	33	6.0	500	15	18	360
		56	3.6	620	39	5.1	640							
10 × 25	H6	68	2.9	760	47	4.2	660	39	39	5.1	570	22	12	440
					56	3.6	680							
10 × 30	H7	100	2.0	980	56	3.6	700	47	47	4.2	670	27	9.8	500
					68	2.9	800							
12.5 × 20	I5	47	4.2	660	33	6.0	600	22	22	9.0	600	22	12	350
					47	4.2	660							
		82	2.4	1040	56	3.6	700	33	33	6.0	600	27	9.8	600
					68	2.9	940							
12.5 × 25	I6	68	2.9	760	100	2.0	1240	47	47	4.2	720	39	6.8	770
		100	2.0	1260				68	68	2.9	1020			
12.5 × 30	I7	—	—	—	120	1.7	1430	82	82	2.4	1200	56	4.7	980
12.5 × 35	I8	180	1.1	1880	150	1.3	1700	100	100	2.0	1400	68	3.9	1160
12.5 × 40	I9	220	0.9	2170	180	1.1	1950	—	—	—	—	82	3.2	1300
16 × 20	J5	68	2.9	760	68	2.9	760	47	47	4.2	720	33	8.0	500
		150	1.3	1560	100	2.0	1260	82	82	2.4	1150	47	5.6	860
16 × 25	J6	100	2.0	1120	150	1.3	1680	68	68	2.9	920	68	3.9	1130
		180	1.1	1850				120	120	1.7	1260			
16 × 31.5	J7	270	0.7	2500	220	0.9	2220	100	100	2.0	1200	82	3.2	1350
								150	150	1.3	1800			
16 × 35.5	J8	330	0.6	2730	270	0.7	2480	180	180	1.1	2040	100	2.7	1510
16 × 40	J9	390	0.5	3090	330	0.6	2840	220	220	0.9	2330	120	2.2	1750
18 × 20	K5	100	2.0	1120	100	2.0	1120	68	68	2.9	920	47	5.6	660
		180	1.1	1800	150	1.3	1300	100	100	2.0	1330	56	4.7	1000
		150	1.3	1360										
18 × 25	K6	220	0.9	1400	220	0.9	1400	150	150	1.3	1730	82	3.2	1290
		270	0.7	2340										
		330	0.6	2580	220	0.9	1700					100	2.7	1420
18 × 31.5	K7	390	0.5	3000	270	0.7	2530	220	220	0.9	2240	120	2.2	1710
18 × 35.5	K8	470	0.4	3420	330	0.6	2840	270	270	0.7	2550	150	1.8	2115
18 × 40	K9	560	0.4	3780	390	0.5	3170	330	330	0.6	2910	180	1.5	2100
18 × 45	KA	680	0.3	4240	470	0.4	3500	—	—	—	—	220	1.2	2400
18 × 50	KB	—	—	—	560	0.4	3880	390	390	0.5	3240	—	—	—

Rated voltage(V)			400			450		
Case φD×L(mm)	Casing symbol	Item	Rated capacitance (μF)	ESR (Ω max.)	Rated ripple current (mA rms)	Rated capacitance (μF)	ESR (Ω max.)	Rated ripple current (mA rms)
10×12.5	H3		4.7	56	220	3.9	68	120
10×16	H4		3.3	80	200	4.7	56	130
			6.8	39	220			
			10	27	280	6.8	39	140
10×20	H5		10	27	280	4.7	56	140
					6.8	39	150	
			12	22	330	10	27	280
10×25	H6		18	15	500	15	18	380
10×30	H7		22	12	600	22	12	470
12.5×20	I5		18	15	540	10	27	320
					15	18	380	
					18	15	500	
12.5×25	I6		27	9.8	710	22	12	620
12.5×30	I7		47	5.6	910	27	9.8	690
12.5×35	I8		—	—	—	33	8.0	700
12.5×40	I9		—	—	—	39	6.8	920
			56	4.7	1090	47	5.6	1050
16×20	J5		22	12	430			
			33	8.0	790	27	9.8	700
16×25	J6		47	5.6	1180	22	12	560
16×31.5	J7		68	3.9	1250	47	5.6	1000
16×35.5	J8		82	3.2	1380	56	4.7	1160
16×40	J9		100	2.7	1510	68	3.9	1300
			120	2.2	1740	82	3.2	1480
18×20	K5		33	8.0	640	22	12	560
			47	5.6	910	39	6.8	870
18×25	K6		68	3.9	1250	33	8.0	700
					56	4.7	1120	
18×31.5	K7		82	3.2	1280	82	3.2	1450
			100	2.7	1520			
18×35.5	K8		100	2.7	1640	68	3.9	1130
			120	2.2	1700	100	2.7	1640
18×40	K9		120	2.2	1740	100	2.7	1670
			150	1.8	1900	120	2.2	1830
18×45	KA		150	1.8	1970			
			180	1.5	2100			
18×50	KB		—	—	—	150	1.8	2100

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

125°C Use, Miniature, Low ESR Capacitors

GREEN
CAP

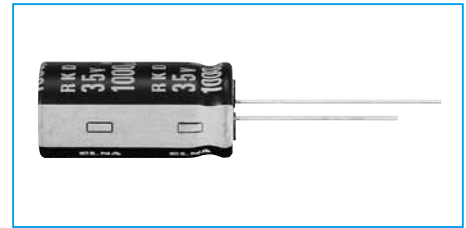
Low
ESR

125°C
5000hours

Anti-
cleaning
solvent

- Smaller and low ESR than RK series.
- Guarantees 5000 hours at 125°C ($\phi 8$: 2000h, $\phi 10$: 3000h)

Miniaturized, Low ESR



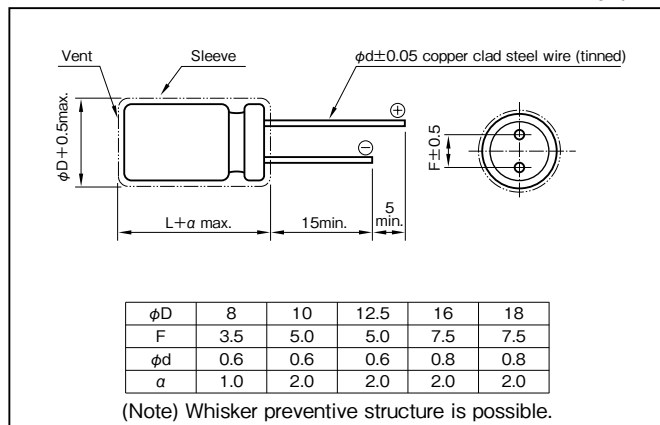
Marking color : White print on a black sleeve

Specifications

Item	Performance																
Category temperature range (°C)	-40 to +125																
Tolerance at rated capacitance (%)	±20 (20°C,120Hz)																
Leakage current (μA)	Less than 0.01CV or 4 whichever is larger (after 2 minutes) C : Rated capacitance (μF), V : Rated voltage (V) (20°C)																
Tangent of loss angle (tanδ)	<table><tr><td colspan="2">Rated voltage (V)</td><td>10</td><td>16</td><td>25</td><td>35</td></tr><tr><td colspan="2">tanδ (max.)</td><td>0.20</td><td>0.16</td><td>0.14</td><td>0.12</td></tr></table>					Rated voltage (V)		10	16	25	35	tanδ (max.)		0.20	0.16	0.14	0.12
	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°C,120Hz)																	
Characteristics at high and low temperature	<table><tr><td colspan="2">Rated voltage (V)</td><td>10</td><td>16</td><td>25</td><td>35</td></tr><tr><td>Impedance ratio (max.)</td><td>Z-40°C/Z+20°C</td><td>4</td><td>3</td><td>3</td><td>3</td></tr></table>					Rated voltage (V)		10	16	25	35	Impedance ratio (max.)	Z-40°C/Z+20°C	4	3	3	3
	Rated voltage (V)		10	16	25	35											
Impedance ratio (max.)	Z-40°C/Z+20°C	4	3	3	3												
(120Hz)																	
Endurance (125°C) (Applied ripple current)	Test time		5000 hours (φ8 : 2000 hours) (φ10 : 3000 hours)														
	Leakage current		The initial specified value or less														
	Percentage of capacitance change		Within ±30% of initial value														
	Tangent of the loss angle		300% or less of the initial specified value														
Shelf life (125°C)	Test time : 1000hours ; other items are same as the endurance. Voltage application treatment : According to JIS C5101-4 4.1																
Applicable standards	JIS C5101-1, -4 1998 (IEC 60384-1 1992, -4 1985)																

Outline Drawing

Unit : mm



Coefficient of Frequency for Rated Ripple Current

Rated 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

Part numbering system (example : 10V1000 μF)

RKD	—	10	V	102	M	H5	#	*	—	□
Series code		Rated voltage symbol		Rated capacitance symbol	Capacitance tolerance symbol	Casing symbol				Taping(Forming) symbol

If it is whisker preventive structure, should change “#” into “G”.

* If it is for automotive, should add “Q”.

Standard Ratings

Rated voltage (V) Rated capacitance (μF)	Item	10				16				25				35			
		Case	Casing symbol	ESR (Ω max.)	Rated ripple current (mA rms)	Case	Casing symbol	ESR (Ω max.)	Rated ripple current (mA rms)	Case	Casing symbol	ESR (Ω max.)	Rated ripple current (mA rms)	Case	Casing symbol	ESR (Ω max.)	Rated ripple current (mA rms)
		φ D × L (mm)				φ D × L (mm)				φ D × L (mm)				φ D × L (mm)			
100		—	—	—	—	8×12	G3	0.153	501	8×12	G3	0.153	501	8×12	G3	0.153	501
220		8×12	G3	0.153	501	8×12	G3	0.153	501	8×12	G3	0.153	501	10×12.5	H3	0.098	732
						10×12.5	H3	0.098	732	10×12.5	H3	0.098	732	10×16	H4	0.075	953
330		8×12	G3	0.153	501	8×12	G3	0.153	501	10×12.5	H3	0.098	732	10×16	H4	0.075	953
		10×12.5	H3	0.098	732	10×12.5	H3	0.098	732	10×16	H4	0.075	953	10×20	H5	0.057	1140
470		10×12.5	H3	0.098	732	10×16	H4	0.075	953	10×16	H4	0.075	953	10×20	H5	0.057	1140
										10×20	H5	0.057	1140	12.5×20	I5	0.040	1820
														16×16	J4	0.044	1930
1000		10×20	H5	0.057	1140	10×20	H5	0.057	1140	12.5×20	I5	0.040	1820	12.5×25	I6	0.032	2400
		12.5×15	I4	0.059	1380	12.5×20	I5	0.040	1820	12.5×25	I6	0.032	2400	16×25	J6	0.024	3100
						16×16	J4	0.044	1930	16×16	J4	0.044	1930	18×20	K5	0.029	2490
1200		—	—	—	—	—	—	—	—	12.5×20	I5	0.040	1820	12.5×30	I7	0.029	2560
														16×20	J5	0.032	2280
1500		—	—	—	—	—	—	—	—	—	—	—	—	12.5×35	I8	0.023	2970
														16×31.5	J7	0.020	3160
														18×25	K6	0.022	3200
1800		—	—	—	—	—	—	—	—	12.5×25	I6	0.032	2400	12.5×40	I9	0.020	3600
										16×20	J5	0.032	2280	16×25	J6	0.024	3100
2200		12.5×25	I6	0.032	2400	12.5×25	I6	0.032	2400	12.5×30	I7	0.029	2560	16×31.5	J7	0.020	3160
		16×20	J5	0.032	2280	16×25	J6	0.024	3100	16×25	J6	0.024	3100	16×35.5	J8	0.019	3590
		18×16	K4	0.041	2170	18×20	K5	0.029	2490	18×20	K5	0.029	2490	18×25	K6	0.022	3200
2700		—	—	—	—	—	—	—	—	12.5×35	I8	0.023	2970	16×35.5	J8	0.019	3590
										16×25	J6	0.024	3100	18×31.5	K7	0.018	3410
										18×20	K5	0.029	2490	18×40	J9	0.017	4300
3300		16×25	J6	0.024	3100	16×31.5	J7	0.020	3160	12.5×40	I9	0.020	3600	18×35.5	K8	0.017	4200
		18×20	K5	0.029	2490	18×25	K6	0.022	3200	16×31.5	J7	0.020	3160	—	—	—	—
3900		—	—	—	—	—	—	—	—	16×35.5	J8	0.019	3590	—	—	—	—
										18×25	K6	0.022	3200	—	—	—	—
4700		16×31.5	J7	0.020	3160	16×35.5	J8	0.019	3590	18×35.5	K8	0.017	4200	18×40	K9	0.016	4600
		18×25	K6	0.022	3200	18×31.5	K7	0.018	3410	—	—	—	—	—	—	—	—
5600		—	—	—	—	—	—	—	—	16×40	J9	0.017	4300	—	—	—	—
6800		—	—	—	—	—	—	—	—	18×35.5	K8	0.017	4200	—	—	—	—
						—	—	—	—	18×40	K9	0.016	4600	—	—	—	—

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

135°C Use, Miniature, Low ESR Capacitors

GREEN
CAP

Low
ESR

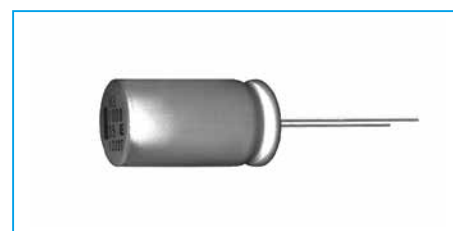
135°C
3000hours

Anti-
cleaning
solvent

- High temperature guaranteed and low ESR series for automotive.
- Guarantees 3000 hours at 135°C. ($\phi 10$: 2000 hours)



High temperature



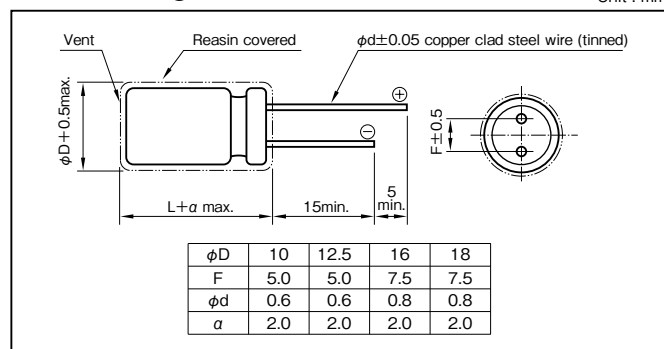
Marking color : Black print

Specifications

Item	Performance								
Category temperature range (°C)	-40 to +135								
Tolerance at rated capacitance (%)	±20 (20°C,120Hz)								
Leakage current (μA)	Less than 0.01CV or 4 whichever is larger (after 2 minutes) C : Rated capacitance (μF), V : Rated voltage (V) (20°C)								
Tangent of loss angle (tanδ)	Rated voltage (V)		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°C,120Hz)								
Characteristics at high and low temperature	Rated voltage (V)		10	16	25	35	50	63	80
	Impedance ratio (max.)	Z-40°C/Z+20°C	4	3	3	3	3	3	3
	(120Hz)								
Endurance (135°C) (Applied ripple current)	Test time		3000 hours (φ10 : 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°C)	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 1998 (IEC 60384-1 1992, -4 1985)								

Outline Drawing

Unit : mm



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

Part numbering system (example : 10V1000 μF)

RKB	—	10	V	102	M	H5	#	*	—	
Series code		Rated voltage symbol		Rated capacitance symbol	Capacitance tolerance symbol	Casing symbol				Taping(Forming) symbol

* If it is for automotive, should add "Q".

Standard Ratings

Rated voltage (V) Rated capacitance (μF)	Item	10				16				25				35			
		Case	Casing symbol	ESR (Ω max.)	Rated ripple current (mA rms)	Case	Casing symbol	ESR (Ω max.)	Rated ripple current (mA rms)	Case	Casing symbol	ESR (Ω max.)	Rated ripple current (mA rms)	Case	Casing symbol	ESR (Ω max.)	Rated ripple current (mA rms)
		φD × L (mm)				φD × L (mm)				φD × L (mm)				φD × L (mm)			
220		—	—	—	—	10×12.5	H3	0.098	725	10×12.5	H3	0.098	725	10×12.5	H3	0.098	725
330		10×12.5	H3	0.098	725	10×12.5	H3	0.098	725	10×12.5	H3	0.098	725	10×16	H4	0.075	951
										10×16	H4	0.075	951	10×20	H5	0.057	1130
470		10×12.5	H3	0.098	725	10×16	H4	0.075	951	10×16	H4	0.075	951	10×20	H5	0.057	1130
1000		10×20	H5	0.057	1130	10×20	H5	0.057	1130	12.5×20	I5	0.040	1550	12.5×20	I5	0.040	1550
		12.5×15	I4	0.059	1130	12.5×20	I5	0.040	1550	12.5×25	I6	0.032	1880	12.5×25	I6	0.032	1880
1200		—	—	—	—	—	—	—	—	12.5×20	I5	0.040	1550	12.5×30	I7	0.029	2160
1500		—	—	—	—	—	—	—	—	—	—	—	—	16×20	J5	0.032	2020
1800		—	—	—	—	—	—	—	—	12.5×25	I6	0.032	1880	12.5×40	I9	0.020	2920
										16×20	J5	0.032	2020	16×25	J6	0.024	2550
2200		12.5×25	I6	0.032	1880	12.5×25	I6	0.032	1880	12.5×30	I7	0.029	2160	16×31.5	J7	0.020	3040
		16×20	J5	0.032	2020	16×25	J6	0.024	2550	16×25	J6	0.024	2550	16×35.5	J8	0.019	3280
2700		—	—	—	—	—	—	—	—	12.5×35	I8	0.023	2580	16×35.5	J8	0.019	3280
3300		16×25	J6	0.024	2550	16×31.5	J7	0.020	3040	16×25	J6	0.024	2550	18×31.5	K7	0.018	3410
		18×20	K5	0.029	2320	18×25	K6	0.022	2880	16×31.5	J7	0.020	3040	18×35.5	K8	0.017	3710
4700		16×31.5	J7	0.020	3040	16×35.5	J8	0.019	3280	16×35.5	J8	0.019	3280	18×40	K9	0.016	4000
		18×25	K6	0.022	2880	18×31.5	K7	0.018	3410	18×31.5	K7	0.018	3410	—	—	—	—
5600		—	—	—	—	—	—	—	—	16×40	J9	0.017	3630	—	—	—	—
6800		—	—	—	—	—	—	—	—	18×40	K9	0.016	4000	—	—	—	—

Rated voltage (V) Rated capacitance (μF)	Item	50				63				80			
		Case	Casing symbol	ESR (Ω max.)	Rated ripple current (mA rms)	Case	Casing symbol	ESR (Ω max.)	Rated ripple current (mA rms)	Case	Casing symbol	ESR (Ω max.)	Rated ripple current (mA rms)
		φD × L (mm)				φD × L (mm)				φD × L (mm)			
220		10×20	H5	0.098	930	—	—	—	—	—	—	—	—
330		—	—	—	—	—	—	—	—	16×20	J5	0.131	1070
470		12.5×20	I5	0.070	1170	16×20	J5	0.099	1230	16×25	J6	0.097	1350
560		—	—	—	—	—	—	—	—	18×25	K6	0.088	1530
820		12.5×30	I7	0.047	1680	16×31.5	J7	0.062	1850	18×35.5	K8	0.069	1980
1000		16×25	J6	0.039	1990	16×35.5	J8	0.058	2010	18×40	K9	0.066	2120
1800		18×31.5	K7	0.030	2670	18×40	K9	0.053	2350	—	—	—	—
2200		18×35.5	K8	0.028	2900	—	—	—	—	—	—	—	—

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

135°C Use, High CV, Low ESR Capacitors

GREEN
CAPLow
ESR135°C
3000hoursAnti-
cleaning
solvent

- High temperature guaranteed for automotive.
- Guaranteed 3000 hours at 135°C.
(63V to 80V : 2000 hours)
- High CV, high ripple current.
- For ECU of Direct injection engine, ESP etc.

High CV
High ripple

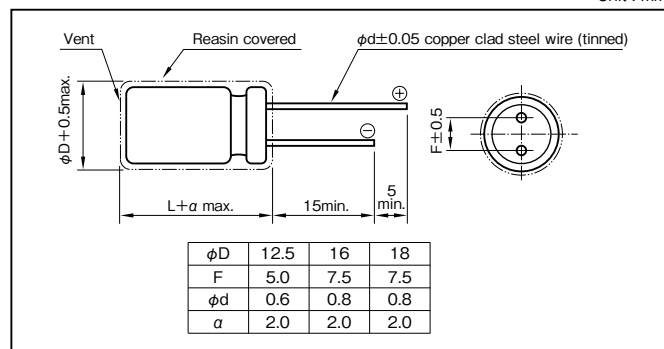
Marking color : Black print

Specifications

Item	Performance																	
Category temperature range (°C)	-40 to +135																	
Tolerance at rated capacitance (%)	±20 (20°C,120Hz)																	
Leakage current (μA)	Less than 0.01CV or 4 whichever is larger (after 2 minutes) C : Rated capacitance (μF), V : Rated voltage (V) (20°C)																	
Tangent of loss angle (tanδ)	<table><tr><td>Rated voltage (V)</td><td>25</td><td>35</td><td>50</td><td>63</td><td>80</td></tr><tr><td>tanδ (max.)</td><td>0.14</td><td>0.12</td><td>0.10</td><td>0.10</td><td>0.08</td></tr></table>						Rated voltage (V)	25	35	50	63	80	tanδ (max.)	0.14	0.12	0.10	0.10	0.08
	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°C,120Hz)																		
Characteristics at high and low temperature	<table><tr><td>Rated voltage (V)</td><td>25</td><td>35</td><td>50</td><td>63</td><td>80</td></tr><tr><td>Impedance ratio (max.)</td><td>Z-40°C/Z+20°C</td><td>3</td><td>3</td><td>3</td><td>3</td></tr></table>						Rated voltage (V)	25	35	50	63	80	Impedance ratio (max.)	Z-40°C/Z+20°C	3	3	3	3
	Rated voltage (V)	25	35	50	63	80												
Impedance ratio (max.)	Z-40°C/Z+20°C	3	3	3	3													
(120Hz)																		
Endurance 1 (135°C) (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 (135°C) (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°C)	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 1998 (IEC 60384-1 1992, -4 1985)																	

Outline Drawing

Unit : mm



Coefficient of Frequency for Rated Ripple Current

Rated capacitance (μF) \ Frequency (Hz)	50 · 60	120	1k	10k · 100k
270 to 330	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

Part numbering system (example : 25V2000μF)

RKC	—	25	V	202	M	I5	#	*	—	□
Series code		Rated voltage symbol		Rated capacitance symbol	Capacitance tolerance symbol	Casing symbol				Taping(Forming) symbol

* If it is for automotive, should add "Q".

Standard Ratings

Rated voltage (V) Rated capacitance (μF) Item	25						35						50					
	Case φD × L (mm)	Casing symbol	ESR (Ω max. / 100kHz)		Rated ripple current (mA rms / 100kHz)		Case φD × L (mm)	Casing symbol	ESR (Ω max. / 100kHz)		Rated ripple current (mA rms / 100kHz)		Case φD × L (mm)	Casing symbol	ESR (Ω max. / 100kHz)		Rated ripple current (mA rms / 100kHz)	
			20°C	-40°C	135°C	125°C			20°C	-40°C	135°C	125°C			20°C	-40°C	135°C	125°C
620	—	—	—	—	—	—	—	—	—	—	—	—	12.5 × 20	I5	0.073	0.88	1470	2400
820	—	—	—	—	—	—	—	—	—	—	—	—	12.5 × 25	I6	0.058	0.67	2260	3350
1000	—	—	—	—	—	—	—	—	—	—	—	—	16 × 20	J5	0.050	0.55	1870	2960
1100	—	—	—	—	—	—	—	—	—	—	—	—	12.5 × 30	I7	0.048	0.52	2520	4220
1300	—	—	—	—	—	12.5 × 20	I5	0.042	0.48	1690	2760	12.5 × 35	I8	0.042	0.44	2780	4810	
												16 × 25	J6	0.042	0.44	2500	4040	
												18 × 20	K5	0.042	0.44	2110	3130	
1600	—	—	—	—	—	—	—	—	—	—	—	12.5 × 40	I9	0.037	0.36	3020	5240	
												16 × 31.5	J7	0.035	0.36	2960	5130	
1800	—	—	—	—	—	12.5 × 25	I6	0.033	0.30	2010	3480	18 × 25	K6	0.033	0.32	2530	4230	
2000	12.5 × 20	I5	0.042	0.48	1690	2760	16 × 20	J5	0.035	0.27	2160	3040	—	—	—	—	—	—
2200	—	—	—	—	—	—	12.5 × 30	I7	0.028	0.24	2900	4490	16 × 35.5	J8	0.029	0.27	3160	5480
2400	—	—	—	—	—	—	18 × 20	K5	0.034	0.22	2320	3250	18 × 31.5	K7	0.028	0.25	3020	5240
2700	—	—	—	—	—	—	12.5 × 35	I8	0.025	0.21	3190	5140	16 × 40	J9	0.025	0.22	3420	5930
3000	12.5 × 25	I6	0.033	0.30	2010	3480	16 × 25	J6	0.028	0.22	2870	4260	18 × 35.5	K8	0.024	0.20	3390	5870
3300	16 × 20	J5	0.035	0.27	2160	3040	12.5 × 40	I9	0.024	0.19	3470	5810	—	—	—	—	—	—
3600	12.5 × 30	I7	0.028	0.24	2900	4490	16 × 31.5	J7	0.023	0.18	3400	5480	18 × 40	K9	0.023	0.16	3700	6420
3900	—	—	—	—	—	—	18 × 25	K6	0.027	0.19	2900	4500	—	—	—	—	—	—
4300	18 × 20	K5	0.034	0.22	2320	3250	16 × 35.5	J8	0.020	0.14	3630	6070	—	—	—	—	—	—
4700	12.5 × 35	I8	0.025	0.21	3190	5140	18 × 31.5	K7	0.022	0.16	3470	5600	—	—	—	—	—	—
	16 × 25	J6	0.028	0.22	2870	4260							—	—	—	—	—	—
5100	12.5 × 40	I9	0.024	0.19	3470	5810	—	—	—	—	—	—	—	—	—	—	—	—
5600	16 × 31.5	J7	0.023	0.18	3400	5480	16 × 40	J9	0.019	0.12	3930	6810	—	—	—	—	—	—
6200	—	—	—	—	—	—	18 × 35.5	K8	0.019	0.12	3750	6280	—	—	—	—	—	—
7500	16 × 35.5	J8	0.020	0.14	3630	6070	18 × 40	K9	0.018	0.10	4080	7070	—	—	—	—	—	—
	18 × 31.5	K7	0.022	0.16	3470	5600							—	—	—	—	—	—
9100	16 × 40	J9	0.019	0.12	3930	6810	—	—	—	—	—	—	—	—	—	—	—	—
10000	18 × 35.5	K8	0.019	0.12	3750	6280	—	—	—	—	—	—	—	—	—	—	—	—
12000	18 × 40	K9	0.018	0.10	4080	7070	—	—	—	—	—	—	—	—	—	—	—	—

Rated voltage (V)	Item	63						80						
		Case φD × L (mm)	Casing symbol	ESR (Ω max. / 100kHz)		Rated ripple current (mA _{rms} / 100kHz)		Case φD × L (mm)	Casing symbol	ESR (Ω max. / 100kHz)		Rated ripple current (mA _{rms} / 100kHz)		
				20℃	-40℃	135℃	125℃			20℃	-40℃	135℃	125℃	
Rated capacitance (μF)	270	—	—	—	—	—	—	12.5 × 20	I5	0.072	0.56	1420	1640	
	300	—	—	—	—	—	—	—	—	—	—	—	—	
	360	—	—	—	—	—	—	—	—	—	—	—	—	
	360	—	—	—	—	—	—	—	—	—	—	—	—	
	390	12.5 × 20	I5	0.072	0.56	1420	1640	12.5 × 25	I6	0.052	0.39	2050	2520	
	430	—	—	—	—	—	—	—	—	—	—	—	—	
	470	—	—	—	—	—	—	16 × 20	J5	0.053	0.34	1910	2140	
	510	—	—	—	—	—	—	12.5 × 30	I7	0.042	0.30	2630	3110	
	560	12.5 × 25	I6	0.052	0.39	2050	2520	—	—	—	—	—	—	
	620	—	—	—	—	—	—	12.5 × 35	I8	0.035	0.25	2970	3760	
								18 × 20	K5	0.044	0.26	2100	2350	
	680	16 × 20	J5	0.053	0.34	1910	2140	16 × 25	J6	0.038	0.23	2680	2940	
	750	12.5 × 30	I7	0.042	0.30	2630	3110	—	12.5 × 40	I9	0.031	0.22	3260	4610
									16 × 31.5	J7	0.034	0.20	3050	3860
	820	—	—	—	—	—	—	18 × 25	K6	0.033	0.19	2810	3080	
	910	12.5 × 35	I8	0.035	0.25	2970	3760	—	—	—	—	—	—	
		18 × 20	K5	0.044	0.26	2100	2350							
	1000	16 × 25	J6	0.038	0.23	2680	2940	16 × 35.5	J8	0.027	0.15	3420	4590	
	1100	12.5 × 40	I9	0.031	0.22	3260	4610	18 × 31.5	K7	0.028	0.15	3220	4080	
	1200	16 × 31.5	J7	0.034	0.20	3050	3860	—	—	—	—	—	—	
	1300	18 × 25	K6	0.033	0.19	2810	3080	16 × 40	J9	0.025	0.14	3670	5190	
								18 × 35.5	K8	0.022	0.12	3690	5220	
	1600	16 × 35.5	J8	0.027	0.15	3420	4590	18 × 40	K9	0.021	0.11	3820	5660	
		18 × 31.5	K7	0.028	0.15	3220	4080							
1800	16 × 40	J9	0.025	0.14	3670	5190	—	—	—	—	—	—		
2200	18 × 35.5	K8	0.022	0.12	3690	5220	—	—	—	—	—	—		
2400	18 × 40	K9	0.021	0.11	3820	5660	—	—	—	—	—	—		

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

150°C Miniature Capacitors

GREEN
CAP

Low
Impedance

150°C
1000hours

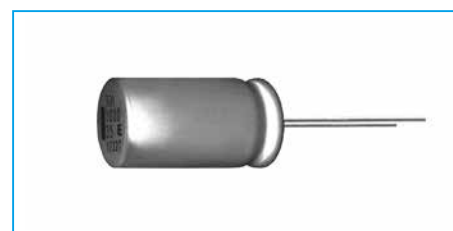
Anti-
cleaning
solvent

- 150°C, High temperature guaranteed.
- Guarantees 1000 hours at 150°C.

RQA

High temperature

RKB



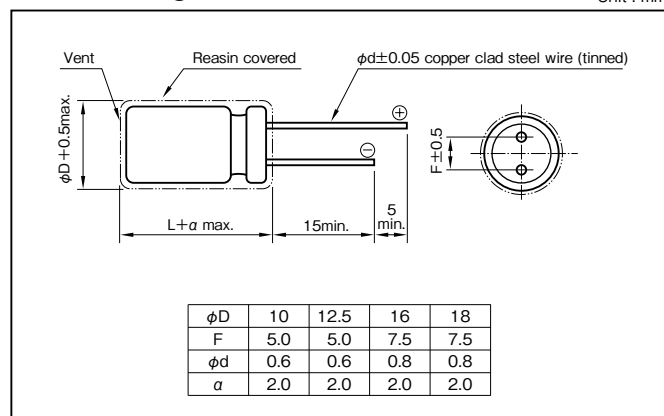
Marking color : Black print

Specifications

Item	Performance																
Category temperature range (°C)	−40 to +150																
Tolerance at rated capacitance (%)	±20 (20°C,120Hz)																
Leakage current (μA)	Less than 0.01CV or 4 whichever is larger (after 2 minutes) C : Rated capacitance (μF), V : Rated voltage (V) (20°C)																
Tangent of loss angle (tanδ)	<table><tr><td colspan="2">Rated voltage (V)</td><td>10</td><td>16</td><td>25</td><td>35</td></tr><tr><td colspan="2">tanδ (max.)</td><td>0.20</td><td>0.16</td><td>0.14</td><td>0.12</td></tr></table>					Rated voltage (V)		10	16	25	35	tanδ (max.)		0.20	0.16	0.14	0.12
	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°C,120Hz)																	
Characteristics at high and low temperature	<table><tr><td colspan="2">Rated voltage (V)</td><td>10</td><td>16</td><td>25</td><td>35</td></tr><tr><td>Impedance ratio (max.)</td><td>Z−40°C/Z+20°C</td><td>4</td><td>3</td><td>3</td><td>3</td></tr></table>					Rated voltage (V)		10	16	25	35	Impedance ratio (max.)	Z−40°C/Z+20°C	4	3	3	3
	Rated voltage (V)		10	16	25	35											
Impedance ratio (max.)	Z−40°C/Z+20°C	4	3	3	3												
(120Hz)																	
Endurance (150°C) (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°C)	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 1998 (IEC 60384 - 1 1992, - 4 1985)																

Outline Drawing

Unit : mm



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
1500 to 4700	0.80	0.85	0.95	1

Part numbering system (example : 35V1000μF)

RQA	—	35	V	102	M	I 6	#	*	—	□
Series code		Rated voltage symbol		Rated capacitance symbol	Capacitance tolerance symbol	Casing symbol				Taping(Forming) symbol

* If it is for automotive, should add "Q".

Standard Ratings

Rated voltage (V)		10			16			25			35		
Rated capacitance (μF)	Item	Case	Casing symbol	Rated ripple current	Case	Casing symbol	Rated ripple current	Case	Casing symbol	Rated ripple current	Case	Casing symbol	Rated ripple current
		φD×L (mm)		(mA rms)	φD×L (mm)		(mA rms)	φD×L (mm)		(mA rms)	φD×L (mm)		(mA rms)
220	—	—	—	—	—	—	—	10×14.5	H3	300	10×14.5	H3	300
330	—	—	—	—	—	—	—	10×18	H4	510	10×18	H4	510
470	—	—	—	—	10×18	H4	510	10×22	H5	820	10×22	H5	820
1000	10×22	H5	820	10×22	H5	820	12.5×26	I6	1000	12.5×26	I6	1000	
2200	12.5×26	I6	1000	12.5×26	I6	1000	16×26.5	J6	1200	16×33	J7	1370	
3300	16×26.5	J6	1200	16×33	J7	1370	16×37	J8	1720	18×34	K7	1670	
4700	16×33	J7	1370	16×37	J8	1720	18×38	K8	1790	18×42.5	K9	1870	

(Note) Rated ripple current : 150°C , 100kHz

For Vibration, Resistance Miniature Aluminum Electrolytic Capacitors



Series RPK	30G	125°C, Long Life, with NC terminal	…Page 94
Series RKE	40G	125°C, Miniature, Low ESR	…Page 96
Series RKF	40G	135°C, Miniature, Low ESR	…Page 98
Series RKG	40G	150°C, Miniature, Low ESR	…Page 100

125°C Use, Long Life Capacitors

GREEN
CAP

Vibration
Resistance

Low
ESR

125°C
5000hours

Anti-
cleaning
solvent

- Guarantees 5000 hours at 125°C.
- 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)

For vibration



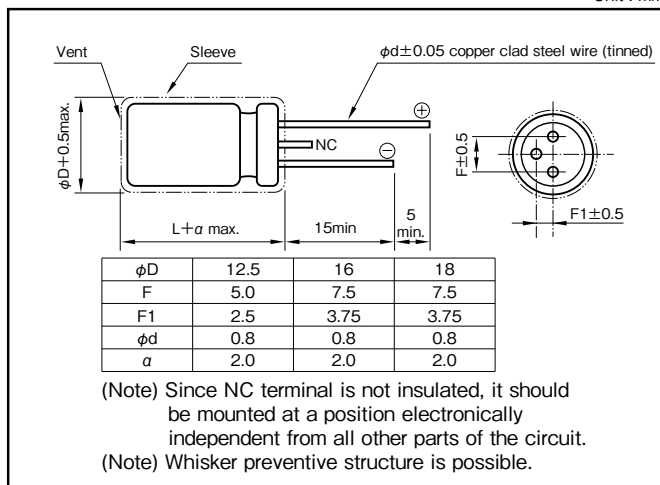
Marking color : White print on a black sleeve

Specifications

Item	Performance																												
Category temperature range (°C)	-40 to +125																												
Tolerance at rated capacitance (%)	±20 (20°C,120Hz)																												
Leakage current (μA)	Less than 0.01CV or 4 whichever is larger (after 2 minutes) C : Rated capacitance (μF) , V : Rated voltage (V) (20°C)																												
Tangent of loss angle (tanδ)	<table><tr><td colspan="2">Rated voltage (V)</td><td>10</td><td>16</td><td>25</td><td>35</td></tr><tr><td colspan="2">tanδ (max.)</td><td>0.20</td><td>0.16</td><td>0.14</td><td>0.12</td></tr></table>					Rated voltage (V)		10	16	25	35	tanδ (max.)		0.20	0.16	0.14	0.12												
	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°C,120Hz)																													
Characteristics at high and low temperature	<table><tr><td colspan="2">Rated voltage (V)</td><td>10</td><td>16</td><td>25</td><td>35</td></tr><tr><td>Impedance ratio (max.)</td><td>Z-40°C/Z+20°C</td><td>4</td><td>3</td><td>3</td><td>3</td></tr></table>					Rated voltage (V)		10	16	25	35	Impedance ratio (max.)	Z-40°C/Z+20°C	4	3	3	3												
	Rated voltage (V)		10	16	25	35																							
	Impedance ratio (max.)	Z-40°C/Z+20°C	4	3	3	3																							
(120Hz)																													
Endurance (125°C) (Applied ripple current)	<table><tr><td colspan="2">Test time</td><td colspan="4">5000 hours</td></tr><tr><td colspan="2">Leakage current</td><td colspan="4">The initial specified value or less</td></tr><tr><td colspan="2">Percentage of capacitance change</td><td colspan="4">Within ±30% of initial value</td></tr><tr><td colspan="2">Tangent of the loss angle</td><td colspan="4">300% or less of the initial specified value</td></tr></table>					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			
	Test time		5000 hours																										
	Leakage current		The initial specified value or less																										
	Percentage of capacitance change		Within ±30% of initial value																										
Tangent of the loss angle		300% or less of the initial specified value																											
Shelf life (125°C)	Test time : 1000hours ; other items are same as the endurance. Voltage application treatment : According to JIS C5101-4 4.1																												
Applicable standards	JIS C5101-1, -4 1998 (IEC 60384-1 1992, -4 1985)																												

Outline Drawing

Unit : mm



Coefficient of Frequency for Rated Ripple Current

Rated capacitance (µF) \ Frequency (Hz)	50 · 60	120	1k	10k · 100k
470 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

Part numbering system (example : 16V2200µF)

RPK	—	16	V	222	M	J6	D#	*	—	□
Series code		Rated voltage symbol		Rated capacitance symbol	Capacitance tolerance symbol	Casing symbol				Taping(Forming) symbol

If it is whisker preventive structure, should change " #" into "G".

* If it is for automotive, should add "Q".

Standard Ratings

Rated voltage (V) Rated capacitance (μF)	Item	10				16				25				35			
		Case	Casing symbol	ESR (Ω max.)	Rated ripple current (mA rms)	Case	Casing symbol	ESR (Ω max.)	Rated ripple current (mA rms)	Case	Casing symbol	ESR (Ω max.)	Rated ripple current (mA rms)	Case	Casing symbol	ESR (Ω max.)	Rated ripple current (mA rms)
		φ D × L (mm)				φ D × L (mm)				φ D × L (mm)				φ D × L (mm)			
470	—	—	—	—	—	—	—	—	—	—	—	—	12.5×20	I5	0.040	1820	
1000	12.5×15	I4	0.059	1380	12.5×20	I5	0.040	1820	12.5×20	I5	0.040	1820	12.5×25	I6	0.032	2400	
					16×16	J4	0.044	1930	12.5×25	I6	0.032	2400	16×25	J6	0.024	3100	
									16×16	J4	0.044	1930	18×20	K5	0.029	2490	
1200	—	—	—	—	—	—	—	—	12.5×20	I5	0.040	1820	12.5×30	I7	0.029	2560	
1500	—	—	—	—	—	—	—	—	—	—	—	—	16×20	J5	0.032	2280	
													12.5×35	I8	0.023	2970	
													16×31.5	J7	0.020	3160	
													18×25	K6	0.022	3200	
1800	—	—	—	—	—	—	—	—	—	—	—	—	12.5×40	I9	0.020	3600	
													16×20	J5	0.032	2280	16×25
2200	12.5×25	I6	0.032	2400	12.5×25	I6	0.032	2400	12.5×30	I7	0.029	2560	16×31.5	J7	0.020	3160	
	16×20	J5	0.032	2280	16×25	J6	0.024	3100	16×25	J6	0.024	3100	16×35.5	J8	0.019	3590	
	18×16	K4	0.041	2170	18×20	K5	0.029	2490	18×20	K5	0.029	2490	18×25	K6	0.022	3200	
									12.5×35	I8	0.023	2970	16×35.5	J8	0.019	3590	
2700	—	—	—	—	—	—	—	—	16×25	J6	0.024	3100					
3300	16×25	J6	0.024	3100	16×31.5	J7	0.020	3160	12.5×40	I9	0.020	3600	16×40	J9	0.017	4300	
	18×20	K5	0.029	2490	18×25	K6	0.022	3200	16×31.5	J7	0.020	3160	18×35.5	K8	0.017	4200	
3900	—	—	—	—	—	—	—	—	16×35.5	J8	0.019	3590	—	—	—	—	
	16×31.5	J7	0.020	3160	16×35.5	J8	0.019	3590	18×25	K6	0.022	3200	—	—	—	—	
4700	18×25	K6	0.022	3200	18×31.5	K7	0.018	3410	18×35.5	K8	0.017	4200	18×40	K9	0.016	4600	
	—	—	—	—	—	—	—	—	16×40	J9	0.017	4300	20×40	L9	0.015	5100	
5600	—	—	—	—	—	—	—	—	18×35.5	K8	0.017	4200					
6800	—	—	—	—	—	—	—	—	18×40	K9	0.016	4600	—	—	—	—	

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

ALUMINUM

MINIATURE
ALUMINUM

125°C

125°C Use, Miniature, Low ESR, High Vibration Resistance Capacitors

GREEN
CAP

High
Vibration
Resistance

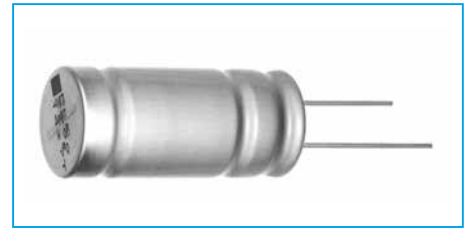
Low
ESR

125°C
5000hours

Anti-
cleaning
solvent

- Vibration resistance (40G, 10 to 2000Hz, X, Y, Z = per 2 hours).
- For Automotive application (ABS and electric power steering etc.)
- Guaranteed 5000 hours at 125°C

High vibration
resistance



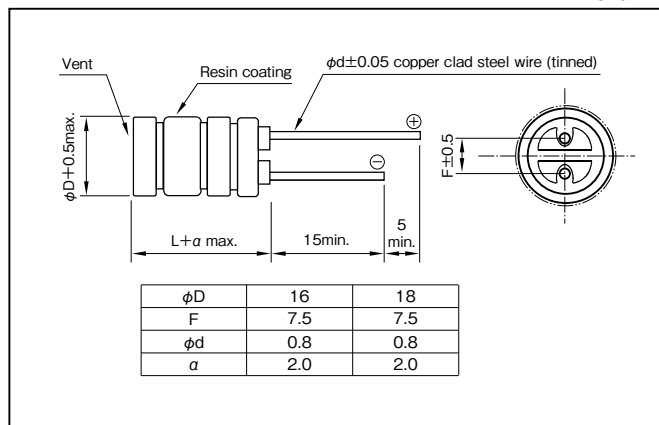
Marking color : Black print

Specifications

Item	Performance		
Category temperature range (°C)	-40 to +125		
Tolerance at rated capacitance (%)	±20 (20°C,120Hz)		
Leakage current (μA)	Less than 0.01CV or 3 whichever is larger (after 2 minutes) C : Rated capacitance (μF), V : Rated voltage (V) (20°C)		
Tangent of loss angle (tanδ)			
	Rated voltage (V)	25	35
	tanδ (max.)	0.14	0.12
0.02 is added to every 1000μF increase over 1000μF. (20°C,120Hz)			
Characteristics at high and low temperature			
	Rated voltage (V)	25	35
	Impedance ratio (max.)	Z-40°C/Z+20°C	3
(120Hz)			
Endurance (125°C) (Applied ripple current)			
	Test time	5000 hours	
	Leakage current	The initial specified value or less	
	Percentage of capacitance change	Within ±30% of initial value	
	Tangent of the loss angle	300% or less of the initial specified value	
Shelf life (125°C)	Test time : 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	
	Displacement amplitude	1.5 mm max.	
	Acceleration	40G (392m/s²) max.	
	Sweep rate	0.5 octave/min.	
	Vibration axis and duration	X, Y, Z per 2 hours, total 6 hours	
	Fixation	Capacitor mouted 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 1998 (IEC 60384-1 1992, -4 1985)		

Outline Drawing

Unit : mm



Coefficient of Frequency for Rated Ripple Current

Rated capacitance (μF)	Frequency (Hz)	120	1k	10k	100k
1500 to 6800		0.85	0.95	1.00	1

Part numbering system (example : 35V2700μF)

RKE	—	35	V	272	M	K7	#*	—	□
Series code		Rated voltage symbol		Rated capacitance symbol	Capacitance tolerance symbol	Casing symbol			Forming symbol

* If it is for automotive, should add "Q".

Standard Ratings

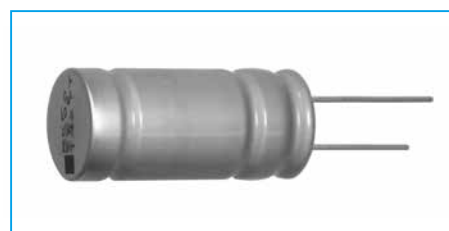
Rated voltage(V) Rated capacitance (μ F)	Item	25					35				
		Case $\phi D \times L$ (mm)	Casing symbol	ESR (Ω max.)		Rated ripple current (mA rms)	Case $\phi D \times L$ (mm)	Casing symbol	ESR (Ω max.)		Rated ripple current (mA rms)
				20°C	-40°C				20°C	-40°C	
1500	—	—	—	—	—	—	16×31.5	J7	0.024	0.14	3160
2200	—	—	—	—	—	—	16×35.5	J8	0.023	0.13	3590
2700	16×31.5	J7	0.024	0.14	3160	18×31.5	K7	0.020	0.11	3410	3410
3300	16×35.5	J8	0.023	0.13	3590	18×35.5	K8	0.019	0.10	3840	3840
4700	18×31.5	K7	0.020	0.11	3410	18×40	K9	0.017	0.094	4250	4250
5600	18×35.5	K8	0.019	0.10	3840	—	—	—	—	—	—
6800	18×40	K9	0.017	0.094	4250	—	—	—	—	—	—

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

135°C Use, Miniature, Low ESR, High Vibration Resistance Capacitors

GREEN
CAPHigh
Vibration
ResistanceLow
ESR135°C
3000hoursAnti-
cleaning
solvent

- Vibration resistance (40G, 10 to 2000Hz, X, Y, Z = per 2 hours).
- For Automotive application (ABS and electric power steering etc.)
- Guaranteed 3000 hours at 135°C
(63V to 80V : Guaranteed 2000 hours)

High vibration
resistance

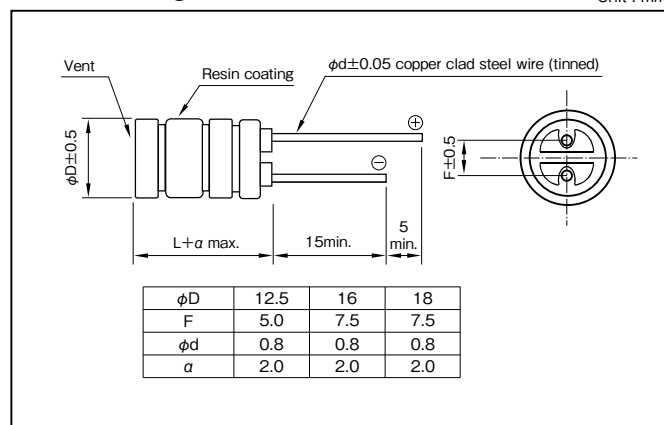
Marking color : Black print

Specifications

Item	Performance																			
Category temperature range (°C)	-40 to +135																			
Tolerance at rated capacitance (%)	±20 (20°C,120Hz)																			
Leakage current (μA)	Less than 0.01CV or 3 whichever is larger (after 2 minutes) C : Rated capacitance (μF), V : Rated voltage (V) (20°C)																			
Tangent of loss angle (tanδ)	<table><tr><td colspan="2">Rated voltage (V)</td><td>25</td><td>35</td><td>50</td><td>63</td><td>80</td></tr><tr><td colspan="2">tanδ (max.)</td><td>0.14</td><td>0.12</td><td>0.10</td><td>0.10</td><td>0.08</td></tr></table>						Rated voltage (V)		25	35	50	63	80	tanδ (max.)		0.14	0.12	0.10	0.10	0.08
	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°C,120Hz)																				
Characteristics at high and low temperature	<table><tr><td colspan="2">Rated voltage (V)</td><td>25</td><td>35</td><td>50</td><td>63</td><td>80</td></tr><tr><td>Impedance ratio (max.)</td><td>Z-40°C/Z+20°C</td><td>3</td><td>3</td><td>3</td><td>3</td><td>3</td></tr></table>						Rated voltage (V)		25	35	50	63	80	Impedance ratio (max.)	Z-40°C/Z+20°C	3	3	3	3	3
	Rated voltage (V)		25	35	50	63	80													
Impedance ratio (max.)	Z-40°C/Z+20°C	3	3	3	3	3														
(120Hz)																				
Endurance (135°C or 125°C) (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°C)	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																	
	Displacement amplitude		1.5 mm max.																	
	Acceleration		40G (392m/s²) max.																	
	Sweep rate		0.5 octave/min.																	
	Vibration axis and duration		X, Y, Z per 2 hours, total 6 hours																	
	Fixation		Capacitor mouted 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 1998 (IEC 60384-1 1992, -4 1985)																			

Outline Drawing

Unit : mm



Coefficient of Frequency for Rated Ripple Current

Rated capacitance (μF) \ Frequency (Hz)	120	1k	10k	100k
290 to 330	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

Part numbering system (example : 35V3600μF)

RKF	—	35	V	362	M	K7	#*	—	□
Series code		Rated voltage symbol		Rated capacitance symbol	Capacitance tolerance symbol	Casing symbol			Forming symbol

* If it is for automotive, should add "Q".

Standard Ratings

Rated voltage (V)	Rated capacitance $\phi D \times L$ (mm)	Case $\phi D \times L$ (mm)	Casing symbol	ESR (Ω max. / 100kHz)		Rated ripple current (mA _{rms} / 100kHz)	
				20°C	-40°C	135°C	125°C
25	1800	12.5 × 25	I6	0.033	0.30	2010	3480
	2200	12.5 × 30	I7	0.028	0.24	2900	4490
	2700	12.5 × 35	I8	0.025	0.21	3190	5140
	3300	12.5 × 40	I9	0.024	0.19	3470	5810
	4700	16 × 31.5	J7	0.023	0.18	3400	5480
	5400	16 × 35.5	J8	0.020	0.14	3630	6070
	6200	16 × 40	J9	0.019	0.12	3930	6810
	6200	18 × 31.5	K7	0.022	0.16	3470	5600
	7800	18 × 35.5	K8	0.019	0.12	3750	6280
	8200	18 × 40	K9	0.018	0.10	4080	7070
35	1100	12.5 × 25	I6	0.033	0.30	2010	3480
	1500	12.5 × 30	I7	0.028	0.24	2900	4490
	1800	12.5 × 35	I8	0.025	0.21	3190	5140
	2000	12.5 × 40	I9	0.024	0.19	3470	5810
	2700	16 × 31.5	J7	0.023	0.18	3400	5480
	3100	16 × 35.5	J8	0.020	0.14	3630	6070
	3600	16 × 40	J9	0.019	0.12	3930	6810
	3600	18 × 31.5	K7	0.022	0.16	3470	5600
	4700	18 × 35.5	K8	0.019	0.12	3750	6280
	5400	18 × 40	K9	0.018	0.10	4080	7070
50	560	12.5 × 25	I6	0.079	0.39	2260	3350
	750	12.5 × 30	I7	0.065	0.30	2520	4220
	900	12.5 × 35	I8	0.057	0.25	2780	4810
	1000	12.5 × 40	I9	0.050	0.22	3020	5240
	1300	16 × 31.5	J7	0.048	0.20	2960	5130
	1600	16 × 35.5	J8	0.039	0.15	3160	5480
	1900	16 × 40	J9	0.034	0.14	3420	5930
	2000	18 × 31.5	K7	0.038	0.15	3020	5240
	2400	18 × 35.5	K8	0.033	0.12	3390	5870
	2600	18 × 40	K9	0.031	0.11	3700	6420

Rated voltage (V)	Rated capacitance $\phi D \times L$ (mm)	Case $\phi D \times L$ (mm)	Casing symbol	ESR (Ω max. / 100kHz)		Rated ripple current (mA _{rms} / 100kHz)	
				20°C	-40°C	135°C	125°C
63	390	12.5 × 25	I6	0.076	0.39	2050	2520
	560	12.5 × 30	I7	0.061	0.30	2630	3110
	650	12.5 × 35	I8	0.051	0.25	2970	3760
	750	12.5 × 40	I9	0.045	0.22	3260	4610
	1000	16 × 31.5	J7	0.049	0.20	3050	3860
	1300	16 × 35.5	J8	0.039	0.15	3420	4590
	1300	18 × 31.5	K7	0.041	0.15	3220	4080
	1500	16 × 40	J9	0.036	0.14	3670	5190
	1800	18 × 35.5	K8	0.032	0.12	3690	5220
	2000	18 × 40	K9	0.031	0.11	3820	5660
80	290	12.5 × 25	I6	0.076	0.39	2050	2520
	420	12.5 × 30	I7	0.061	0.30	2630	3110
	490	12.5 × 35	I8	0.051	0.25	2970	3760
	570	12.5 × 40	I9	0.045	0.22	3260	4610
	750	16 × 31.5	J7	0.049	0.20	3050	3860
	820	16 × 35.5	J8	0.039	0.15	3420	4590
	820	18 × 31.5	K7	0.041	0.15	3220	4080
	950	16 × 40	J9	0.036	0.14	3670	5190
	1200	18 × 35.5	K8	0.032	0.12	3690	5220
	1300	18 × 40	K9	0.031	0.11	3820	5660

150°C Use, Miniature, Low ESR, High Vibration Resistance Capacitors

GREEN
CAPHigh
Vibration
ResistanceLow
ESR150°C
2000hoursAnti-
cleaning
solvent

- Vibration resistance (40G, 10 to 2000Hz, X, Y, Z = per 2 hours).
- For Automotive application (ABS and electric power steering etc.)
- Guaranteed 2000 hours at 150°C

High vibration
resistance

RKG



RQA



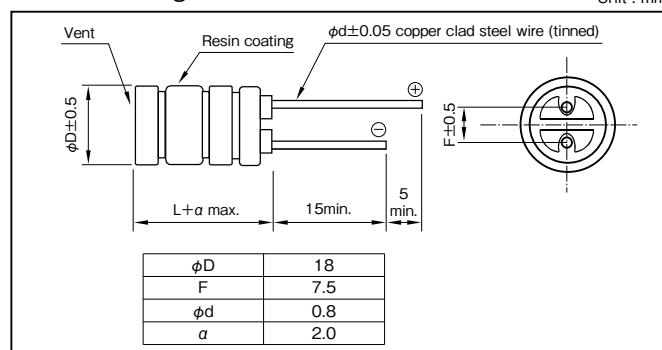
Marking color : Black print

Specifications

Item	Performance		
Category temperature range (°C)	-40 to +150		
Tolerance at rated capacitance (%)	±20 (20°C,120Hz)		
Leakage current (μA)	Less than 0.01CV or 3 whichever is larger (after 2 minutes) C : Rated capacitance (μF), V : Rated voltage (V) (20°C)		
Tangent of loss angle (tanδ)	Rated voltage (V)	25	35
	tanδ (max.)	0.14	0.12
	0.02 is added to every 1000μF increase over 1000μF. (20°C,120Hz)		
Characteristics at high and low temperature	Rated voltage (V)	25	35
	Impedance ratio (max.)	Z-40°C/Z+20°C	3
	(120Hz)		
Endurance (150°C or 125°C) (Applied ripple current)	Test time	2000 hours	
	Leakage current	The initial specified value or less	
	Percentage of capacitance change	Within ±30% of initial value	
	Tangent of the loss angle	300% or less of the initial specified value	
Shelf life (150°C)	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	
	Displacement amplitude	1.5 mm max.	
	Acceleration	40G (392m/s ²) max.	
	Sweep rate	0.5 octave/min.	
	Vibration axis and duration	X, Y, Z per 2 hours, total 6 hours	
	Fixation	Capacitor mouted 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 1998 (IEC 60384-1 1992, -4 1985)		

Outline Drawing

Unit : mm



Coefficient of Frequency for Rated Ripple Current

Rated capacitance (μF) \ Frequency (Hz)	120	1k	10k	100k
2700 to 3900	0.85	0.95	1.00	1

Part numbering system (example : 35V2700μF)

RKG	—	35	V	272	M	K9	#*	—	□
Series code		Rated voltage symbol		Rated capacitance symbol	Capacitance tolerance symbol	Casing symbol			Forming symbol

* If it is for automotive, should add "Q".

Standard Ratings

Rated voltage (V)	Item	25						35					
		Case	Casing symbol	ESR (Ω max. / 100kHz)		Rated ripple current (mA rms / 100kHz)		Case	Casing symbol	ESR (Ω max. / 100kHz)		Rated ripple current (mA rms / 100kHz)	
				20°C	-40°C	150°C	125°C			20°C	-40°C	150°C	125°C
2700	—	—	—	—	—	—	—	—	—	—	—	—	—
3900	—	18 × 42	K9	0.020	0.11	3100	8000	—	—	—	—	—	—

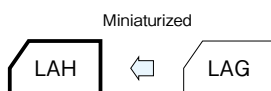
Aluminum Electrolytic Capacitors	ALUMINUM
Polymer hybrid type aluminum Electrolytic Capacitors Aluminum Electrolytic Capacitors With Conductive Polymer Solid Electrolyte	POLYMER HYBRID
Chip Type Aluminum Electrolytic Capacitors	CHIP ALUMINUM
Miniature Type Aluminum Electrolytic Capacitors	MINIATURE ALUMINUM
Large Capacitance Aluminum Electrolytic Capacitors	LARGE ALUMINUM
Aluminum Electrolytic Capacitors for Audio	FOR AUDIO ALUMINUM

MEMO

Miniaturized, High-Reliability, High-Ripple Capacitors

GREEN
CAP105°C
2000hours

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



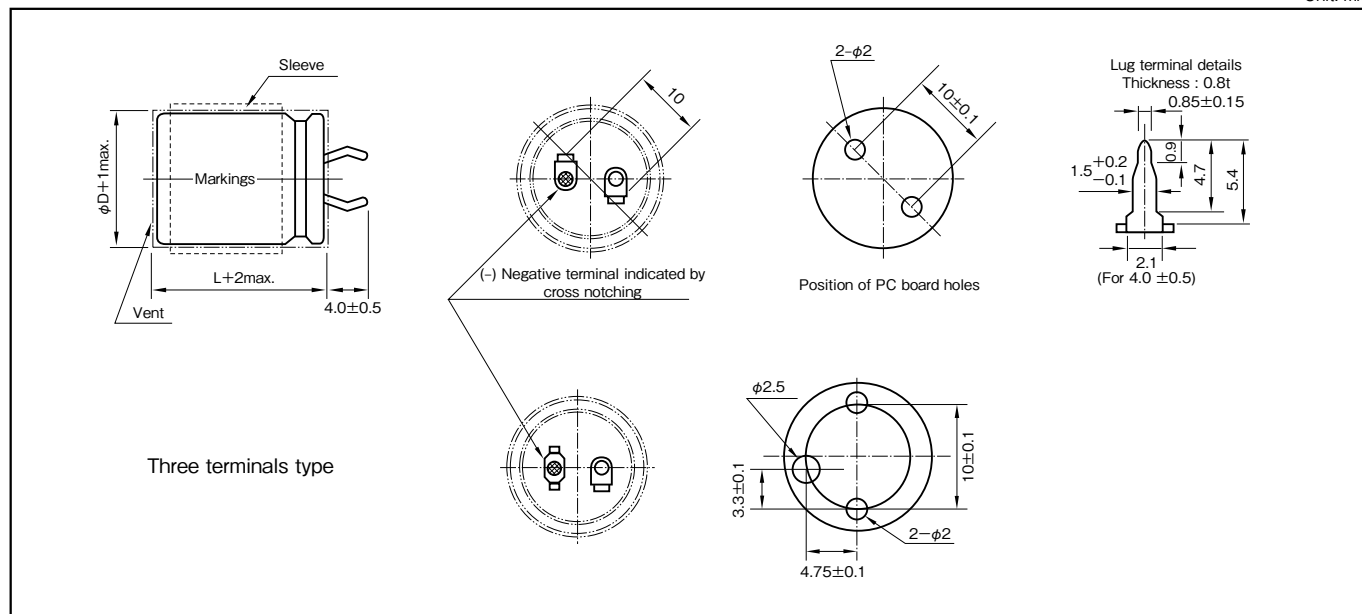
Marking color : White print on a black sleeve

Specifications

Item	Performance							
Category temperature range (°C)	-40 to +105 (-25 to +105 at 160V or more)							
Tolerance at rated capacitance (%)	± 20 (20°C,120Hz)							
Leakage current (μA)	Less than 3√CV (after 5 minutes) C : Rated capacitance (μF) ; V : Rated voltage (V) (20°C)							
Tangent of loss angle (tanδ)	Rated voltage (V)	16	25	35	50	63 to 100	160 to 250	400 to 450
	tanδ (max.)	0.50	0.40	0.35	0.30	0.20	0.15	0.20 (20°C,120Hz)
Characteristics at high and low temperature	Rated voltage (V)		16 to 100		160 to 200		250 to 400	
	Impedance ratio (max.)	Z-25°C/Z+20°C	4		4		4 (120Hz)	
		Z-40°C/Z+20°C	15		—		—	
Endurance (105°C) (Applied ripple current)	Test time		2000 hours					
	Leakage current		The initial specified value or less					
	Percentage of capacitance change		Within ±20% of initial value					
	Tangent of the loss angle		200% or less of the initial specified value					
Shelf life (105°C)	Test time		1000 hours					
	Leakage current		The initial specified value or less					
	Percentage of capacitance change		Within ±15% of initial value					
	Tangent of the loss angle		150% or less of the initial specified value					
	Voltage application treatment : According to JIS C5101-4 4.1							
Applicable standards	JIS C5101-1, -4 1998 (IEC 60384-1 1992, -4 1985)							

Outline Drawing

Unit: mm



Part numbering system					
series LAH, standard terminal type :400V330µF					
LAH	—	400	V	331	M S54 # B
Series code		Rated voltage symbol		Rated capacitance symbol	Capacitance tolerance symbol Casing symbol Optional symbol
series LTH, three terminals type :400V330µF					
LTH	—	400	V	331	M S54 # B
Series code		Rated voltage symbol		Rated capacitance symbol	Capacitance tolerance symbol Casing symbol Optional symbol

Coefficient of Frequency for Rated Ripple Current

Frequency (Hz)	50	120	1k	10k	30k
Rated voltage (V)					
100 or less	0.95	1	1.10	1.15	1.15
160 to 250	0.81	1	1.32	1.45	1.50
315 or more	0.77	1	1.30	1.41	1.43

- The standard ratings are described on next 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.

Standard Ratings

Case φD×L (mm)		Rated voltage (V)		16		25		35		50		63		80		100	
		Item		Rated capacitance	Rated ripple current	Rated capacitance	Rated ripple current	Rated capacitance	Rated ripple current	Rated capacitance	Rated ripple current	Rated capacitance	Rated ripple current	Rated capacitance	Rated ripple current	Rated capacitance	Rated ripple current
		Casing Symbol	(μF)	(Arms)	(μF)	(Arms)	(μF)	(Arms)	(μF)	(Arms)	(μF)	(Arms)	(μF)	(Arms)	(μF)	(Arms)	(μF)
22×20	S21	4700	1.23	3300	1.21	2200	1.08	1200	0.99	820	0.96	560	0.85	390	0.83		
		5600	1.35	3900	1.31	2700	1.20	1500	1.11	1000	1.06	680	0.94	470	0.91		
		6800	1.48	4700	1.44	3300	1.33	1800	1.22	1200	1.16	820	1.03	560	0.99		
22×25	S22	6800	1.60	4700	1.55	3300	1.43	1800	1.31	1200	1.25	820	1.11	560	1.07		
		8200	1.76	5600	1.69	3900	1.55	2200	1.45	1500	1.40	1000	1.23	680	1.18		
		10000	1.94	6800	1.86	4700	1.71	2700	1.60	1800	1.53	1200	1.34	820	1.29		
22×30	S23	10000	1.99	6800	1.91	3900	1.65	2700	1.70	1800	1.60	1200	1.39	820	1.35		
		12000	2.18	8200	2.10	4700	1.81	3300	1.88	2200	1.68	1500	1.55	1000	1.49		
		15000	2.44	10000	2.32	5600	1.98	3900	2.04	2700	1.86	1800	1.70	1200	1.63		
22×35	S24	12000	2.28	8200	2.14	5600	2.02	3300	1.98	2200	1.73	1500	1.61	1000	1.54		
		15000	2.55	10000	2.36	6800	2.23	3900	2.15	2700	1.92	1800	1.76	1200	1.69		
		18000	2.79	12000	2.59	8200	2.44	4700	2.36	3300	2.12	2200	1.95	1500	1.89		
22×40	S25	18000	2.89	12000	2.63	6800	2.28	4700	2.47	3300	2.18	2200	2.02	1500	1.95		
		22000	3.20	15000	2.94	8200	2.50	5600	2.70	3900	2.37	2700	2.24	1800	2.13		
		—	—	—	—	10000	2.76	—	—	—	—	—	—	—	—	—	
22×45	S26	22000	3.29	15000	3.01	10000	2.83	5600	2.79	3900	2.42	2700	2.32	1800	2.18		
		27000	3.65	18000	3.29	12000	3.09	6800	3.08	4700	2.65	3300	2.56	2200	2.41		
		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
22×50	S27	27000	3.81	18000	3.44	12000	3.23	6800	3.18	4700	2.77	3300	2.67	2200	2.52		
		33000	4.21	22000	3.80	—	—	8200	3.50	—	—	3900	2.90	—	—		
		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
25×20	S31	6800	1.53	4700	1.48	3300	1.39	1800	1.29	1200	1.16	820	1.07	560	1.04		
		8200	1.68	5600	1.61	3900	1.51	2200	1.43	1500	1.29	1000	1.18	680	1.14		
		10000	1.85	6800	1.78	4700	1.66	2700	1.58	1800	1.42	1200	1.29	820	1.26		
25×25	S32	10000	1.99	6800	1.91	4700	1.78	2700	1.70	1800	1.52	1200	1.39	820	1.35		
		12000	2.18	8200	2.10	5600	1.94	3300	1.88	2200	1.68	1500	1.55	1000	1.49		
		15000	2.44	10000	2.32	6800	2.14	3900	2.04	2700	1.86	1800	1.70	1200	1.63		
25×30	S33	12000	2.30	8200	2.16	5600	2.04	3300	2.00	2200	1.75	1500	1.62	1000	1.56		
		15000	2.57	10000	2.39	6800	2.25	3900	2.17	2700	1.94	1800	1.77	1200	1.71		
		18000	2.82	12000	2.61	8200	2.47	4700	2.39	3300	2.14	2200	1.96	1500	1.91		
25×35	S34	18000	2.94	12000	2.67	8200	2.54	4700	2.50	3300	2.20	2200	2.01	1500	1.97		
		22000	3.25	15000	2.99	10000	2.80	5600	2.73	3900	2.39	2700	2.23	1800	2.16		
		—	—	—	—	—	—	—	—	—	—	3300	2.46	—	—		
25×40	S35	22000	3.36	15000	3.06	10000	2.87	5600	2.81	3900	2.47	2700	2.32	1800	2.22		
		27000	3.72	18000	3.36	12000	3.15	6800	3.10	4700	2.71	3300	2.57	2200	2.46		
		—	—	—	—	—	—	8200	3.40	—	—	3900	2.79	—	—		
25×45	S36	27000	3.77	18000	3.45	12000	3.20	6800	3.24	4700	2.79	3900	2.92	2200	2.52		
		33000	4.16	22000	3.81	15000	3.58	8200	3.56	5600	3.04	—	—	2700	2.79		
		—	—	—	—	—	—	10000	3.93	—	—	—	—	—	—		
25×50	S37	33000	4.21	22000	3.91	15000	3.64	10000	4.09	5600	3.14	3900	3.00	2700	2.85		
		39000	4.58	27000	4.34	18000	3.99	—	—	6800	3.46	4700	3.29	3300	3.15		
		—	—	—	—	—	—	—	—	—	—	—	—	—	—		
30×20	S41	8200	1.84	5600	1.74	3900	1.65	2700	1.73	1800	1.47	1200	1.38	820	1.32		
		10000	2.03	6800	1.92	4700	1.82	3300	1.91	2200	1.63	1500	1.55	1000	1.46		
		12000	2.23	8200	2.10	5600	1.98	3900	2.08	2700	1.81	1800	1.69	1200	1.60		
30×25	S42	12000	2.38	8200	2.25	5600	2.12	3900	2.22	2700	1.93	1800	1.81	1200	1.71		
		15000	2.66	10000	2.48	6800	2.34	4700	2.44	3300	2.13	2200	2.00	1500	1.91		
		18000	2.91	12000	2.72	8200	2.57	5600	2.66	3900	2.32	2700	2.22	1800	2.09		
30×30	S43	18000	3.00	12000	2.70	8200	2.56	4700	2.58	3300	2.24	2200	2.10	1500	2.00		
		22000	3.32	15000	3.02	10000	2.83	5600	2.82	3900	2.44	2700	2.33	1800	2.19		
		27000	3.67	18000	3.31	12000	3.10	6800	3.10	4700	2.67	3300	2.57	2200	2.42		
30×35	S44	22000	3.39	15000	3.13	10000	2.92	6800	3.25	4700	2.80	3300	2.69	2200	2.51		
		27000	3.76	18000	3.43	12000	3.20	8200	3.57	5600	3.06	3900	2.92	2700	2.78		
		33000	4.15	22000	3.79	15000	3.58	—	—	—	—	—	—	—	—		
30×40	S45	33000	4.23	22000	3.91	15000	3.67	8200	3.72	5600	3.17	3900	3.02	2700	2.87		
		39000	4.60	27000	4.34	18000	4.02	10000	4.11	6800	3.49	4700	3.32	3300	3.17		
		—	—	—	—	—	—	—	—	—	—	—	—	—	—		
30×45	S46	39000	4.67	27000	4.70	18000	4.10	10000	4.30	6800	3.61	4700	3.43	3300	3.25		
		47000	5.13	33000	5.19	22000	4.53	12000	4.71	8200	3.97	5600	3.74	3900	3.53		
		—	—	—	—	—	—	—	—	—	—	—	—	—	—		
30×50	S47	47000	5.20	33000	5.40	22000	4.71	12000	4.68	8200	4.10	5600	3.89	3900	3.61		
		56000	5.68	39000	5.88	27000	5.22	15000	5.23	10000	4.52	6800	4.28	4700	3.96		
		—	—	—	—	—	—	—	—	—	—	—	—	—	—		
35×20	S51	12000	2.38	8200	2.17	5600	2.16	3300	2.10	2200	1.85	1500	1.68	1000	1.59		
		15000	2.66	10000	2.40	6800	2.38	3900	2.28	2700	2.05	1800	1.84	1200	1.74		
		18000	2.91	12000	2.63	8200	2.61	4700	2.51	3300	2.26	2200	2.04	1500	1.94		
35×25	S52	18000	3.10	12000	2.80	8200	2.78	4700	2.67	3300	2.41	2200	2.17	1500	2.07		
		22000	3.43	15000	3.13	10000	3.07	5600	2.91	3900	2.62	2700	2.40	1800	2.27		
		27000	3.80	18000	3.43	12000	3.36	6800	3.21	4700	2.88	3300	2.66	2200	2.51		
35×30	S53	27000	3.82	15000	3.22	12000	3.20	6800	3.31	4700	2.83	3300	2.71	2200	2.56		
		33000	4.22	18000	3.53	15000	3.58	8200	3.63	5600	3.09	3900	2.95	2700	2.79		
		39000	4.59	22000	3.90	18000	3.92	10000	4.01	6800	3.40	4700	3.23	3300	3.09		
35×35	S54	33000	4.24	22000	3.96	15000	3.69	8200	3.66	5600	3.24	3900	3.07	2700	2.90		
		39000	4.61	27000	4.39	18000	4.04	10000	4.05	6800	3.57	4700	3.37	3300	3.21		
		47000	5.06	33000	4.85	22000	4.47	12000	4.43	8200	3.92	5600	3.68	3900	3.49		
35×40	S55	47000	5.18	27000	4.56	22000	4.60	12000	4.46	8200	4.07	5600	3.82	3900	3.60		
		56000	5.66	33000	5.04	27000	5.09	1500									

Standard Ratings

Rated voltage (V)		160		180		200		250		400		450	
Case φD×L (mm)	Item Casing Symbol	Rated capacitance	Rated ripple current	Rated capacitance	Rated ripple current	Rated capacitance	Rated ripple current	Rated capacitance	Rated ripple current	Rated capacitance	Rated ripple current	Rated capacitance	Rated ripple current
		(μF)	(Arms)	(μF)	(Arms)	(μF)	(Arms)	(μF)	(Arms)	(μF)	(Arms)	(μF)	(Arms)
22×25	S22	330	1.16	270	1.08	220	1.08	180	0.94	68	0.47	56	0.47
22×30	S23	390	1.43	330	1.30	330	1.30	220	1.10	82	0.56	68	0.56
22×35	S24	470	1.52	470	1.50	390	1.41	270	1.13	120	0.64	82	0.64
22×40	S25	560	1.62	560	1.62	470	1.50	330	1.20	150	0.70	100	0.70
22×45	S26	680	1.70	—	—	560	1.58	390	1.26	—	—	120	0.73
22×50	S27	820	1.81	680	1.76	680	1.68	470	1.37	180	0.78	150	0.78
25×25	S32	470	1.55	390	1.35	330	1.35	220	1.15	82	0.65	68	0.65
25×30	S33	560	1.73	470	1.62	470	1.47	330	1.30	120	0.70	100	0.70
25×35	S34	680	1.81	560	1.69	560	1.65	390	1.41	150	0.73	120	0.73
25×40	S35	820	1.98	680	1.72	680	1.80	470	1.52	180	0.82	150	0.82
25×45	S36	1000	2.04	820	1.78	—	—	560	1.59	220	0.87	180	0.87
25×50	S37	1200	2.12	1000	1.91	820	1.87	680	1.66	270	0.94	220	0.94
30×25	S42	680	1.82	560	1.67	470	1.56	330	1.30	120	0.78	100	0.78
30×30	S43	820	1.98	680	1.74	680	1.82	470	1.36	180	0.83	150	0.83
30×35	S44	1000	2.14	820	1.85	820	1.99	560	1.57	220	0.86	180	0.86
30×40	S45	1200	2.22	1000	2.01	—	—	680	1.76	270	0.95	220	0.95
30×45	S46	1500	2.46	1200	2.19	1000	2.17	820	1.83	330	1.11	270	1.11
30×50	S47	—	—	1500	2.36	1200	2.22	1000	1.87	390	1.15	330	1.15
35×25	S52	820	1.93	680	1.92	680	1.96	470	1.40	180	0.86	150	0.86
35×30	S53	1200	2.40	1000	2.16	820	2.07	560	1.56	270	0.91	220	0.91
35×35	S54	1500	2.53	1200	2.34	1000	2.22	820	1.82	330	1.13	270	1.13
35×40	S55	—	—	1500	2.56	1200	2.42	1000	1.99	390	1.26	330	1.26
35×45	S56	1800	2.98	1800	2.67	1500	2.59	1200	2.10	470	1.31	390	1.31
35×50	S57	2200	3.10	—	—	1800	2.70	—	—	560	1.50	470	1.50

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

LAT LARGE CAPACITANCE ALUMINUM ELECTROLYTIC CAPACITORS

ELNA®

Ultra Miniaturized, High-Reliability, High-Ripple Capacitors

GREEN
CAP

105°C
2000hours

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



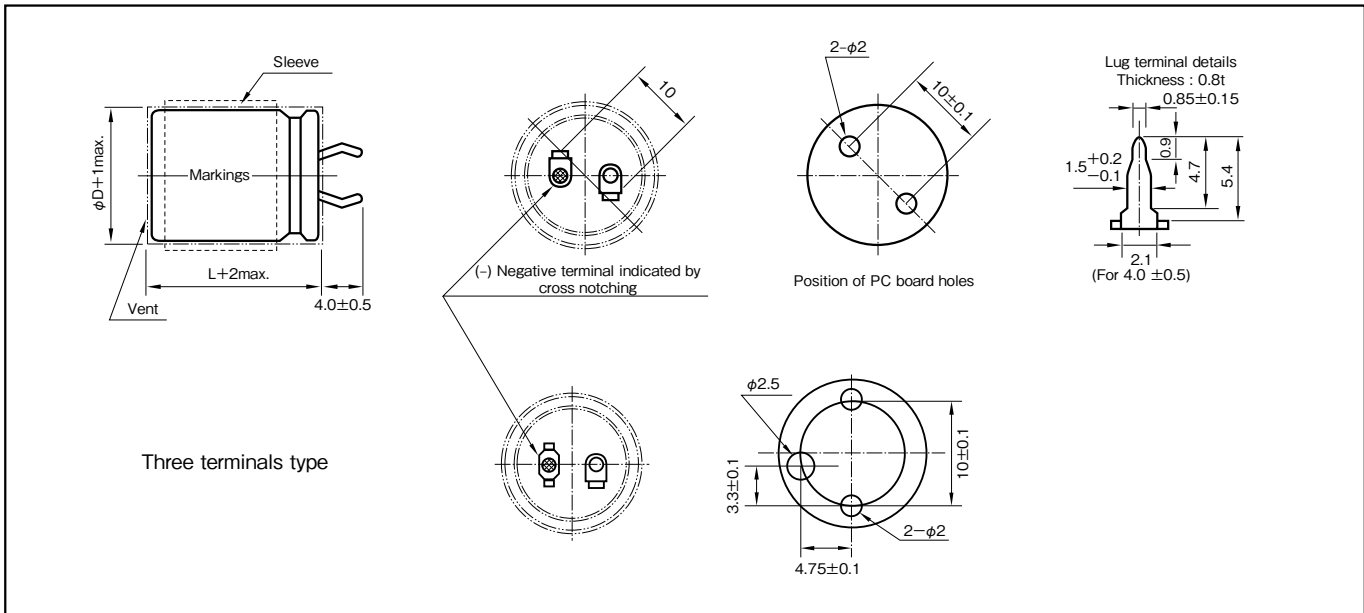
Marking color : White print on a black sleeve

Specifications

Item	Performance		
Category temperature range (°C)	-25 to +105		
Tolerance at rated capacitance (%)	±20 (20°C,120Hz)		
Leakage current (μA)	Less than $3\sqrt{CV}$ (after 5 minutes) C : Rated capacitance (μF) ; V : Rated voltage (V) (20°C)		
Tangent of loss angle (tanδ)	Rated voltage (V)	160 to 250	350 to 500
	tanδ (max.)	0.15	0.20
(20°C,120Hz)			
Characteristics at high and low temperature	Percentage of capacitance change (%)	-25°C	Within ±30% of the value at 20°C
	Impedance ratio (max.)	Z-25°C/Z+20°C	4
(120Hz)			
Endurance (105°C) (Applied ripple current)	Test time	2000 hours	
	Leakage current	The initial specified value or less	
	Percentage of capacitance change	Within ±20% of initial value	
	Tangent of the loss angle	200% or less of the initial specified value	
Shelf life (105°C)	Test time	1000 hours	
	Leakage current	The initial specified value or less	
	Percentage of capacitance change	Within ±15% of initial value	
	Tangent of the loss angle	150% or less of the initial specified value	
Voltage application treatment : According to JIS C5101-4 4.1			
Applicable standards	JIS C5101-1, -4 1998 (IEC 60384-1 1992, -4 1985)		

Outline Drawing

Unit : mm



Part numbering system

series LAT, standard terminal type :400V220μF

LAT	—	400 V	221	M	S52 #	B
Series code		Rated voltage symbol	Rated capacitance symbol	Capacitance tolerance symbol	Casing symbol	Optional symbol

series LTT, three terminals type :400V220μF

LTT	—	400 V	221	M	S52 #	B
Series code		Rated voltage symbol	Rated capacitance symbol	Capacitance tolerance symbol	Casing symbol	Optional symbol

Coefficient of Frequency for Rated Ripple Current

Frequency (Hz)	50	120	1k	10k	30k
Rated voltage (V)					
160 to 250	0.81	1	1.32	1.45	1.50
315 or more	0.77	1	1.30	1.41	1.43

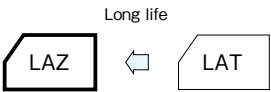
Standard Ratings

Rated voltage (V) Item Case øD×L (mm) Casing Symbol			160		180		200		250		350		400		450		500	
			Rated capacitance (μF)	Rated ripple current (Arms)	Rated capacitance (μF)	Rated ripple current (Arms)	Rated capacitance (μF)	Rated ripple current (Arms)	Rated capacitance (μF)	Rated ripple current (Arms)	Rated capacitance (μF)	Rated ripple current (Arms)	Rated capacitance (μF)	Rated ripple current (Arms)	Rated capacitance (μF)	Rated ripple current (Arms)	Rated capacitance (μF)	Rated ripple current (Arms)
22×20	S21	270	1.00	220	0.91	180	0.82	150	0.75	82	0.55	68	0.58	56	0.53	39	0.44	
		330	1.10	270	1.00	220	0.91	180	0.82	100	0.61	82	0.64	68	0.58	47	0.48	
		390	1.20	330	1.11	270	1.00	220	0.91	120	0.67	100	0.70	82	0.64	56	0.53	
22×25	S22	390	1.35	330	1.25	330	1.29	220	1.11	100	0.69	82	0.71	68	0.65	56	0.59	
		470	1.48	390	1.35	390	1.35	270	1.13	120	0.75	100	0.79	82	0.71	68	0.65	
		560	1.61	470	1.49	470	1.49	—	—	150	0.84	120	0.86	120	0.86	82	0.71	
22×30	S23	470	1.56	470	1.55	390	1.57	270	1.33	150	0.88	120	0.90	100	0.82	68	0.68	
		560	1.68	560	1.69	470	1.67	330	1.47	180	0.96	150	1.01	150	1.01	82	0.74	
		680	1.85	680	1.86	560	1.69	390	1.49	220	1.06	180	1.10	—	—	100	0.82	
22×35	S24	680	1.93	560	1.73	560	1.73	330	1.50	180	0.98	150	1.03	120	0.92	100	0.84	
		820	2.08	680	1.90	680	1.90	390	1.52	220	1.08	180	1.13	180	1.13	120	0.92	
		—	—	820	2.09	—	—	470	1.58	270	1.20	220	1.25	—	—	—	—	
22×40	S25	820	2.17	820	2.17	680	1.97	470	1.64	270	1.24	220	1.29	150	1.07	120	0.95	
		1000	2.38	1000	2.39	820	2.17	560	1.79	330	1.37	270	1.43	220	1.29	150	1.07	
22×45	S26	1000	2.42	1000	2.44	820	2.21	560	1.82	270	1.27	220	1.32	180	1.19	150	1.09	
		1200	2.66	1200	2.67	1000	2.44	680	2.01	330	1.40	270	1.46	270	1.46	180	1.19	
		—	—	—	—	—	—	—	—	390	1.52	330	1.61	—	—	—	—	
22×50	S27	1200	2.84	1200	2.74	1200	2.74	680	2.06	390	1.56	270	1.50	220	1.35	180	1.22	
		1500	3.05	—	—	—	—	820	2.27	—	—	—	—	—	—	220	1.35	
25×20	S31	330	1.25	270	1.14	270	1.14	180	1.01	100	0.69	82	0.72	68	0.66	47	0.55	
		390	1.36	330	1.26	330	1.26	220	1.12	120	0.76	100	0.80	82	0.72	56	0.60	
		470	1.49	470	1.50	390	1.37	270	1.14	150	0.85	120	0.87	100	0.80	68	0.66	
25×25	S32	470	1.59	470	1.56	390	1.52	270	1.33	150	0.88	120	0.75	100	0.84	68	0.68	
		560	1.74	560	1.70	470	1.67	330	1.47	180	0.97	150	1.01	120	0.91	82	0.75	
		680	1.86	680	1.88	560	1.70	390	1.50	220	1.07	180	1.11	150	1.01	100	0.83	
25×30	S33	680	1.91	560	1.74	560	1.70	390	1.55	180	0.99	150	1.01	120	0.93	82	0.77	
		820	2.09	680	1.91	680	1.87	470	1.61	220	1.09	180	1.11	150	1.03	100	0.85	
		1000	2.35	820	2.10	—	—	—	—	270	1.18	220	1.23	180	1.13	120	0.93	
25×35	S34	820	2.17	820	2.14	680	1.95	470	1.68	270	1.23	220	1.28	180	1.16	120	0.95	
		1000	2.40	1000	2.37	820	2.14	560	1.77	330	1.36	270	1.42	220	1.28	150	1.05	
		1200	2.58	—	—	820	1.91	—	—	—	—	270	1.10	—	—	—	—	
25×40	S35	1200	2.84	1000	2.43	820	2.20	560	1.82	330	1.40	270	1.45	220	1.31	150	1.08	
		—	—	1200	2.67	1000	2.43	680	2.01	390	1.52	330	1.61	270	1.45	180	1.19	
25×45	S36	1500	3.25	1200	2.73	1000	2.49	680	2.06	390	1.56	330	1.65	220	1.37	180	1.22	
		—	—	1500	3.06	1200	2.73	820	2.26	470	1.71	390	1.79	270	1.49	220	1.35	
		—	—	—	—	—	—	—	—	—	—	390	1.40	330	1.65	—	—	
25×50	S37	1500	3.38	1500	3.26	1200	2.92	820	2.42	470	1.83	390	1.91	270	1.59	220	1.44	
		1800	3.70	—	—	1500	3.26	1000	2.66	560	1.99	470	2.10	—	—	270	1.59	
30×20	S41	470	1.50	470	1.50	390	1.37	270	1.14	150	0.85	120	0.87	100	0.80	68	0.66	
		560	1.63	560	1.64	470	1.50	330	1.26	180	0.93	150	0.98	120	0.87	82	0.72	
		680	1.80	680	1.81	560	1.64	390	1.37	220	1.03	180	1.07	150	0.98	100	0.80	
30×25	S42	680	1.85	680	1.86	560	1.75	390	1.47	220	1.06	180	1.10	150	1.00	100	0.82	
		820	2.03	820	2.04	680	1.92	470	1.61	270	1.17	220	1.22	180	1.10	120	0.90	
		1000	2.24	1000	2.25	820	2.04	560	1.69	330	1.29	270	1.35	220	1.22	150	1.00	
30×30	S43	1000	2.60	820	2.17	820	2.17	560	1.80	270	1.24	220	1.06	180	1.15	120	0.95	
		1200	2.84	1000	2.39	1000	2.39	680	1.98	330	1.37	270	1.43	220	1.27	150	1.07	
		1500	2.91	1200	2.62	—	—	—	—	390	1.49	330	1.58	270	1.43	180	1.17	
30×35	S44	1200	2.96	1200	2.66	1000	2.43	680	2.04	390	1.52	330	1.61	270	1.45	180	1.19	
		1500	3.10	1500	2.98	1200	2.45	820	2.24	470	1.67	390	1.75	330	1.61	220	1.31	
		1800	3.40	—	—	1200	2.66	1000	2.43	—	—	—	—	—	—	—	—	
30×40	S45	1800	3.52	1500	3.01	1200	2.69	1000	2.60	470	1.69	390	1.77	330	1.62	220	1.33	
		2200	3.89	1800	3.30	1500	3.01	1200	2.61	560	1.84	470	1.94	390	1.77	270	1.47	
30×45	S46	2200	4.32	1800	3.42	1500	3.12	1200	3.00	560	1.91	470	2.01	330	1.68	270	1.52	
		—	—	2200	3.78	1800	3.42	—	—	680	2.10	560	2.19	390	1.83	330	1.68	
		—	—	—	—	—	—	—	—	—	—	—	470	2.01	—	—		
30×50	S47	2700	4.59	2200	3.91	1800	3.54	1200	3.00	680	2.18	560	2.27	390	2.07	330	1.74	
		—	—	—	—	2200	3.91	1500	3.03	820	2.39	680	2.50	470	2.22	390	1.90	
35×20	S51	680	2.01	560	1.66	560	1.82	390	1.41	180	0.94	150	0.99	120	0.89	100	0.81	
		820	2.20	680	1.83	680	2.01	470	1.55	220	1.04	180	1.08	150	0.99	120	0.89	
		1000	2.21	820	2.01	820	2.01	560	1.66	270	1.15	220	1.20	180	1.08	150	0.99	
35×25	S52	1000	2.60	820	2.11	820	2.42	560	1.80	270	1.19	220	1.08	180	1.12	150	1.02	
		1200	2.84	1000	2.33	1000	2.67	680	1.98	330	1.31	270	1.37	220	1.23	180	1.12	
		1500	2.78	1200	2.55	1200	2.50	820	2.07	390	1.43	330	1.51	270	1.37	220	1.23	
35×30	S53	1500	3.06	1200	2.65	1000	2.65	680	2.04	390	1.51	330	1.20	270	1.50	180	1.15	
		1800	3.35	1500	2.96	1200	2.90	820	2.24	470	1.66	390	1.69	330	1.66	220	1.27	
		—	—	1800	3.25	1500	2.96	1000	2.47	560	1.81	470	1.86	—	—	270	1.41	
35×35	S54	1800	3.52	1500	3.02	1500	2.97	1000	2.60	470	1.69	390	1.54	330	1.62	270	1.46	
		2200	3.89	1800	3.31	1800	3.25	1200	2.78	560	1.85	470	1.93	390	1.76	330	1.62	
		—	—	2200	3.66	—	—	—	—	680	2.04	560	2.11	470	1.93	—	—	
35×40	S55	2200	4.36	2200	3.73	1800	3.78	1200	2.80	680	2.07	560	2.16	390	2.00	330	1.66	
		2700	4.83	2700	4.13	2200	3.73	1500	2.82	820	2.28	680	2.39	470	2.20	390	1.81	
		—	—	—	—	—	—	—	—	—	—	—	560	2.40	—	—		
35×45	S56	3300	5.33	2700	4.25	1800	4.00	1500	2.88	820	2.34	680	2.53	560	2.48	390	1.86	
		—	—	—	—	2200	4.42	1800	2.98	1000	2.59	820	2.70	—	—	470	2.04	
		—	—	—	—	2700	4.25	—	—	—	—	—	—	—	—	—	—	
35×50	S57	2700	5.15	3300														

High-Reliability, High-Ripple, Long Life Capacitors

GREEN
CAP 105°C
3000hours

- High-reliability, high-ripple, long life capacitors.
- Guarantees 3000 hours at 105°C.



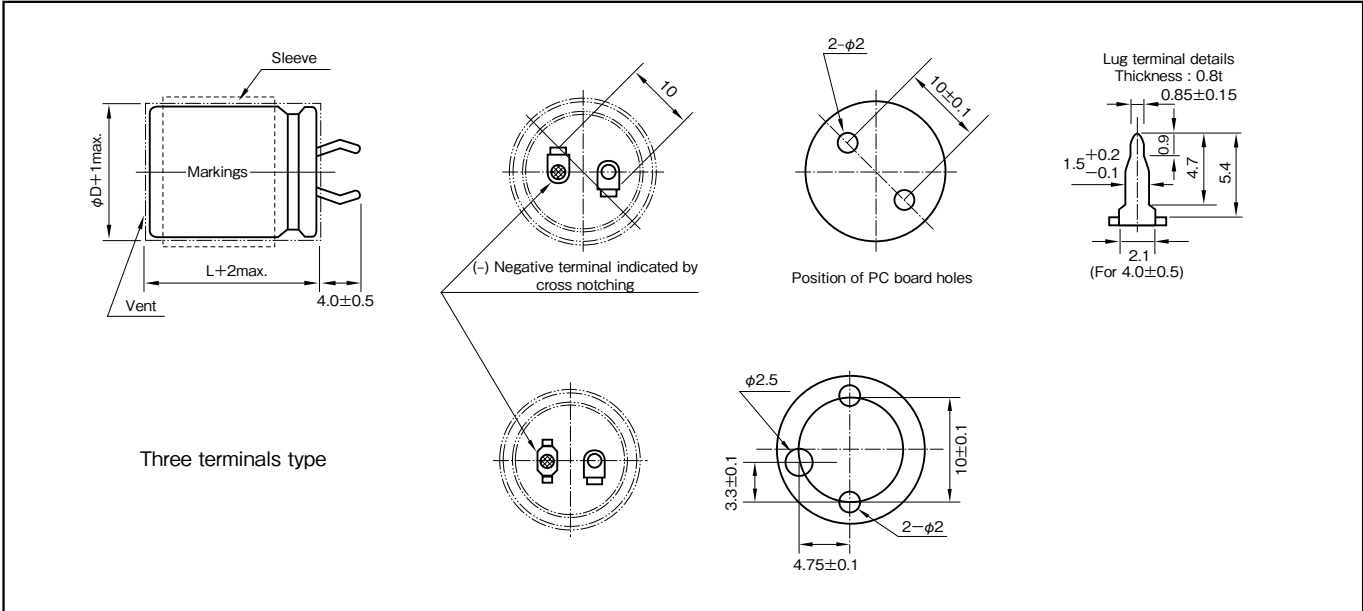
Marking color : White print on a black sleeve

Specifications

Item	Performance							
Category temperature range (°C)	-40 to +105 (-25 to +105 at 160V or more)							
Tolerance at rated capacitance (%)	±20 (20°C,120Hz)							
Leakage current (μA)	Less than 3√C√V (after 5 minutes) C : Rated capacitance (μF) ; V : Rated voltage (V) (20°C)							
Tangent of loss angle (tanδ)	Rated voltage (V)	16	25	35	50	63 to 100	160 to 250	350 to 500
	tanδ (max.)	0.50	0.40	0.35	0.30	0.20	0.15	0.20
(20°C,120Hz)								
Characteristics at high and low temperature	Rated voltage (V)		16 to 100			160 to 500		
	Impedance ratio (max.)	Z-25°C/Z+20°C	4			4		
		Z-40°C/Z+20°C	15			—		
(120Hz)								
Endurance (105°C) (Applied ripple current)	Test time		3000 hours					
	Leakage current		The initial specified value or less					
	Percentage of capacitance change		Within ±20% of initial value					
	Tangent of the loss angle		200% or less of the initial specified value					
Shelf life (105°C)	Test time		1000 hours					
	Leakage current		The initial specified value or less					
	Percentage of capacitance change		Within ±15% of initial value					
	Tangent of the loss angle		150% or less of the initial specified value					
Voltage application treatment : According to JIS C5101-4 4.1								
Applicable standards	JIS C5101-1, -4 1998 (IEC 60384-1 1992, -4 1985)							

Outline Drawing

Unit: mm



Part numbering system					
series LAZ, standard terminal type :400V470μF					
LAZ	—	400 V	471	M	S54 # B
Series code		Rated voltage symbol	Rated capacitance symbol	Capacitance tolerance symbol	Casing symbol Optional symbol
series LTZ, three terminals type :400V470μF					
LTZ	—	400 V	471	M	S54 # B
Series code		Rated voltage symbol	Rated capacitance symbol	Capacitance tolerance symbol	Casing symbol Optional symbol

Coefficient of Frequency for Rated Ripple Current

Frequency (Hz)	50	120	1k	10k	30k
Rated voltage (V)					
100 or less	0.95	1	1.10	1.15	1.15
160 to 250	0.81	1	1.32	1.45	1.50
315 or more	0.77	1	1.30	1.41	1.43

Standard Ratings

Case φD×L (mm)	Casing Symbol	Item	Rated voltage (V)		16		25		35		50		63		80		100	
			Rated capacitance (μF)	Rated ripple current (Arms)	Rated capacitance (μF)	Rated ripple current (Arms)	Rated capacitance (μF)	Rated ripple current (Arms)	Rated capacitance (μF)	Rated ripple current (Arms)	Rated capacitance (μF)	Rated ripple current (Arms)	Rated capacitance (μF)	Rated ripple current (Arms)	Rated capacitance (μF)	Rated ripple current (Arms)	Rated capacitance (μF)	Rated ripple current (Arms)
22×20	S21		4700	1.23	3300	1.21	2200	1.08	1200	0.99	820	0.96	560	0.85	390	0.83		
			5600	1.35	3900	1.31	2700	1.20	1500	1.11	1000	1.06	680	0.94	470	0.91		
			6800	1.48	4700	1.44	3300	1.33	1800	1.22	1200	1.16	820	1.03	560	0.99		
22×25	S22		6800	1.60	4700	1.55	3300	1.43	1800	1.31	1200	1.25	820	1.11	560	1.07		
			8200	1.76	5600	1.69	3900	1.55	2200	1.45	1500	1.40	1000	1.23	680	1.18		
			10000	1.94	6800	1.86	4700	1.71	2700	1.60	1800	1.53	1200	1.34	820	1.29		
22×30	S23		10000	1.99	6800	1.91	3900	1.65	2700	1.70	1800	1.60	1200	1.39	820	1.35		
			12000	2.18	8200	2.10	4700	1.81	3300	1.88	2200	1.68	1500	1.55	1000	1.49		
			15000	2.44	10000	2.32	5600	1.98	3900	2.04	2700	1.86	1800	1.70	1200	1.63		
22×35	S24		12000	2.28	8200	2.14	5600	2.02	3300	1.98	2200	1.73	1500	1.61	1000	1.54		
			15000	2.55	10000	2.36	6800	2.23	3900	2.15	2700	1.92	1800	1.76	1200	1.69		
			18000	2.79	12000	2.59	8200	2.44	4700	2.36	3300	2.12	2200	1.95	1500	1.89		
22×40	S25		18000	2.89	12000	2.63	6800	2.28	4700	2.47	3300	2.18	2200	2.02	1500	1.95		
			22000	3.20	15000	2.94	8200	2.50	5600	2.70	3900	2.37	2700	2.24	1800	2.13		
			—	—	—	—	10000	2.76	—	—	—	—	—	—	—	—		
22×45	S26		22000	3.29	15000	3.01	10000	2.83	5600	2.79	3900	2.42	2700	2.32	1800	2.18		
			27000	3.65	18000	3.29	12000	3.09	6800	3.08	4700	2.65	3300	2.56	2200	2.41		
22×50	S27		27000	3.81	18000	3.44	12000	3.23	6800	3.18	4700	2.77	3300	2.67	2200	2.52		
			33000	4.21	22000	3.80	—	—	8200	3.50	—	—	—	—	3900	2.90	—	—
25×20	S31		6800	1.53	4700	1.48	3300	1.39	1800	1.29	1200	1.16	820	1.07	560	1.04		
			8200	1.68	5600	1.61	3900	1.51	2200	1.43	1500	1.29	1000	1.18	680	1.14		
			10000	1.85	6800	1.78	4700	1.66	2700	1.58	1800	1.42	1200	1.29	820	1.26		
25×25	S32		10000	1.99	6800	1.91	4700	1.78	2700	1.70	1800	1.52	1200	1.39	820	1.35		
			12000	2.18	8200	2.10	5600	1.94	3300	1.88	2200	1.68	1500	1.55	1000	1.49		
			15000	2.44	10000	2.32	6800	2.14	3900	2.04	2700	1.86	1800	1.70	1200	1.63		
25×30	S33		12000	2.30	8200	2.16	5600	2.04	3300	2.00	2200	1.75	1500	1.62	1000	1.56		
			15000	2.57	10000	2.39	6800	2.25	3900	2.17	2700	1.94	1800	1.77	1200	1.71		
			18000	2.82	12000	2.61	8200	2.47	4700	2.39	3300	2.14	2200	1.96	1500	1.91		
25×35	S34		18000	2.94	12000	2.67	8200	2.54	4700	2.50	3300	2.20	2200	2.01	1500	1.97		
			22000	3.25	15000	2.99	10000	2.80	5600	2.73	3900	2.39	2700	2.23	1800	2.16		
			—	—	—	—	—	—	—	—	—	—	3300	2.46	—	—		
25×40	S35		22000	3.36	15000	3.06	10000	2.87	5600	2.81	3900	2.47	2700	2.32	1800	2.22		
			27000	3.72	18000	3.36	12000	3.15	6800	3.10	4700	2.71	3300	2.57	2200	2.46		
			—	—	—	—	—	—	8200	3.40	—	—	3900	2.79	—	—		
25×45	S36		27000	3.77	18000	3.45	12000	3.20	6800	3.24	4700	2.79	3900	2.92	2200	2.52		
			33000	4.16	22000	3.81	15000	3.58	8200	3.56	5600	3.04	—	—	2700	2.79		
			—	—	—	—	—	—	10000	3.93	—	—	—	—	—	—		
25×50	S37		33000	4.21	22000	3.91	15000	3.64	10000	4.09	5600	3.14	4700	3.29	2700	2.85		
			39000	4.58	27000	4.34	18000	3.99	—	—	6800	3.46	—	—	3300	3.15		
30×20	S41		8200	1.84	5600	1.74	3900	1.65	2700	1.73	1800	1.47	1200	1.38	820	1.32		
			10000	2.03	6800	1.92	4700	1.82	3300	1.91	2200	1.63	1500	1.55	1000	1.46		
			12000	2.23	8200	2.10	5600	1.98	3900	2.08	2700	1.81	1800	1.69	1200	1.60		
30×25	S42		12000	2.38	8200	2.25	5600	2.12	3900	2.22	2700	1.93	1800	1.81	1200	1.71		
			15000	2.66	10000	2.48	6800	2.34	4700	2.44	3300	2.13	2200	2.00	1500	1.91		
			18000	2.91	12000	2.72	8200	2.57	5600	2.66	3900	2.32	2700	2.22	1800	2.09		
30×30	S43		18000	3.00	12000	2.70	8200	2.56	4700	2.58	3300	2.24	2200	2.10	1500	2.00		
			22000	3.32	15000	3.02	10000	2.83	5600	2.82	3900	2.44	2700	2.33	1800	2.19		
			27000	3.67	18000	3.31	12000	3.10	6800	3.10	4700	2.67	3300	2.57	2200	2.42		
30×35	S44		22000	3.39	15000	3.13	10000	2.92	6800	3.25	4700	2.80	3300	2.69	2200	2.51		
			27000	3.76	18000	3.43	12000	3.20	8200	3.57	5600	3.06	3900	2.92	2700	2.78		
			33000	4.15	22000	3.79	15000	3.58	—	—	—	—	—	—	—	—		
30×40	S45		33000	4.23	22000	3.91	15000	3.67	8200	3.72	5600	3.17	3900	3.02	2700	2.87		
			39000	4.60	27000	4.34	18000	4.02	10000	4.11	6800	3.49	4700	3.32	3300	3.17		
30×45	S46		39000	4.67	27000	4.70	18000	4.10	10000	4.30	6800	3.61	4700	3.43	3300	3.25		
			47000	5.13	33000	5.19	22000	4.53	12000	4.71	8200	3.97	5600	3.74	3900	3.53		
30×50	S47		47000	5.20	33000	5.40	22000	4.71	12000	4.68	8200	4.10	5600	3.89	3900	3.61		
			56000	5.68	39000	5.88	27000	5.22	15000	5.23	10000	4.52	6800	4.28	4700	3.96		
35×20	S51		12000	2.38	8200	2.17	5600	2.16	3300	2.10	2200	1.85	1500	1.68	1000	1.59		
			15000	2.66	10000	2.40	6800	2.38	3900	2.28	2700	2.05	1800	1.84	1200	1.74		
			18000	2.91	12000	2.63	8200	2.61	4700	2.51	3300	2.26	2200	2.04	1500	1.94		
35×25	S52		18000	3.10	12000	2.80	8200	2.78	4700	2.67	3300	2.41	2200	2.17	1500	2.07		
			22000	3.43	15000	3.13	10000	3.07	5600	2.91	3900	2.62	2700	2.40	1800	2.27		
			27000	3.80	18000	3.43	12000	3.36	6800	3.21	4700	2.88	3300	2.66	2200	2.51		
35×30	S53		27000	3.82	15000	3.22	12000	3.20	6800	3.31	4700	2.83	3300	2.71	2200	2.56		
			33000	4.22	18000	3.53	15000	3.58	8200	3.63	5600	3.09	3900	2.95	2700	2.79		
			39000	4.59	22000	3.90	18000	3.92	10000	4.01	6800	3.40	4700	3.23	3300	3.09		
35×35	S54		33000	4.24	22000	3.96	15000	3.69	8200	3.66	5600	3.24	3900	3.07	2700	2.90		
			39000	4.61	27000	4.39	18000	4.04	10000	4.05	6800	3.57	4700	3.37	3300	3.21		

MEMO

LAX LARGE CAPACITANCE ALUMINUM ELECTROLYTIC CAPACITORS

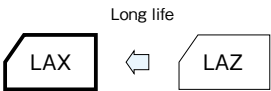
ELNA®

Ultra Long Life, High-Reliability Capacitors

GREEN
CAP

105°C
5000hours

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



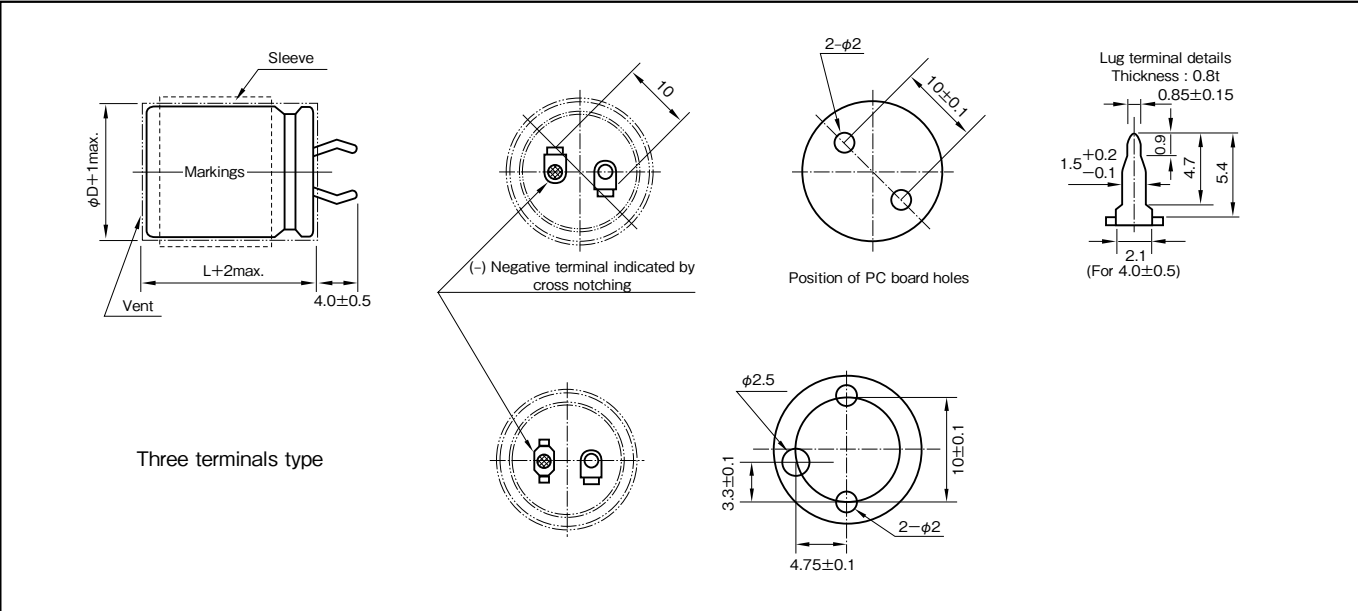
Marking color : White print on a black sleeve

Specifications

Item	Performance		
Category temperature range (°C)	-25 to +105		
Tolerance at rated capacitance (%)	±20 (20°C,120Hz)		
Leakage current (μA)	Less than $3\sqrt{C\bar{V}}$ (after 5 minutes) C : Rated capacitance (μF) ; V : Rated voltage (V) (20°C)		
Tangent of loss angle (tanδ)	Rated voltage (V)	160 to 250	350 to 500
	tanδ (max.)	0.15	0.20 (20°C,120Hz)
Characteristics at high and low temperature	Percentage of capacitance change (%)	-25°C	Within ±30% of the value at 20°C
	Impedance ratio (max.)	Z-25°C/Z+20°C	4 (120Hz)
Endurance (105°C) (Applied ripple current)	Test time	5000 hours	
	Leakage current	The initial specified value or less	
	Percentage of capacitance change	Within ±20% of initial value	
	Tangent of the loss angle	200% or less of the initial specified value	
Shelf life (105°C)	Test time	1000 hours	
	Leakage current	The initial specified value or less	
	Percentage of capacitance change	Within ±15% of initial value	
	Tangent of the loss angle	150% or less of the initial specified value	
Voltage application treatment : According to JIS C5101-4 4.1			
Applicable standards	JIS C5101-1, -4 1998 (IEC 60384-1 1992, -4 1985)		

Outline Drawing

Unit: mm



Part numbering system

series LAX, standard terminal type :200V680μF

LAX	—	200 V	681	M	S34 #	B
Series code		Rated voltage symbol	Rated capacitance symbol	Capacitance tolerance symbol	Casing symbol	Optional symbol

series LTX, three terminals type :400V330μF

LTX	—	400 V	331	M	S53 #	B
Series code		Rated voltage symbol	Rated capacitance symbol	Capacitance tolerance symbol	Casing symbol	Optional symbol

Coefficient of Frequency for Rated Ripple Current

Frequency (Hz)	50	120	1k	10k	30k
Rated voltage (V)					
160 to 250	0.81	1	1.32	1.45	1.50
400 to 500	0.77	1	1.30	1.41	1.43

Standard Ratings

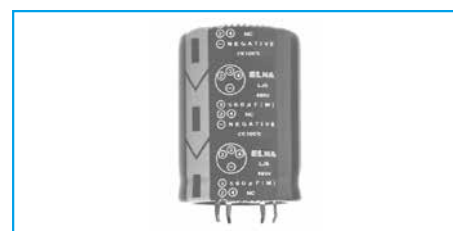
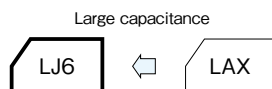
Rated voltage (V) Item Casing Symbol			160		180		200		250		350		400		450		500	
			Rated capacitance (μF)	Rated ripple current (Arms)	Rated capacitance (μF)	Rated ripple current (Arms)	Rated capacitance (μF)	Rated ripple current (Arms)	Rated capacitance (μF)	Rated ripple current (Arms)	Rated capacitance (μF)	Rated ripple current (Arms)	Rated capacitance (μF)	Rated ripple current (Arms)	Rated capacitance (μF)	Rated ripple current (Arms)	Rated capacitance (μF)	Rated ripple current (Arms)
Case φD×L (mm)			220	0.90	180	0.82	180	0.82	120	0.67	82	0.55	56	0.53	56	0.53	39	0.44
			270	1.00	220	0.91	220	0.91	150	0.75	100	0.61	68	0.58	68	0.58	47	0.48
22×20	S21	330	1.10	270	1.00	270	1.00	180	0.82	120	0.67	82	0.64	—	—	—	56	0.53
		330	1.24	270	1.13	270	1.17	180	1.00	120	0.75	82	0.71	68	0.65	56	0.59	
		390	1.35	330	1.25	330	1.29	220	1.11	150	0.84	100	0.79	82	0.71	68	0.65	
		470	1.48	390	1.35	390	1.35	270	1.13	180	0.92	120	0.86	100	0.79	82	0.71	
22×25	S22	470	1.56	390	1.41	330	1.40	270	1.33	150	0.88	120	0.90	82	0.74	68	0.68	
		560	1.68	470	1.55	390	1.57	330	1.47	180	0.96	150	1.01	100	0.82	82	0.74	
		680	1.85	560	1.69	470	1.67	390	1.49	220	1.06	180	1.10	120	0.90	100	0.82	
		560	1.75	470	1.58	470	1.70	330	1.50	220	1.08	150	1.03	120	0.92	100	0.84	
22×30	S23	680	1.93	560	1.73	560	1.73	390	1.52	270	1.20	180	1.13	150	1.03	120	0.92	
		820	2.08	680	1.90	680	1.90	470	1.58	—	—	220	1.25	—	—	—	—	
		820	2.17	680	1.97	560	1.79	470	1.64	270	1.24	220	1.29	150	1.07	120	0.95	
		1000	2.38	820	2.17	680	1.97	560	1.79	330	1.37	270	1.43	180	1.17	150	1.07	
22×35	S24	1000	2.42	820	2.21	820	2.21	560	1.82	330	1.40	270	1.46	180	1.19	150	1.09	
		—	—	1000	2.44	—	—	680	2.01	390	1.52	—	—	220	1.32	180	1.19	
		1200	2.84	1000	2.50	820	2.27	680	2.06	390	1.56	330	1.65	220	1.35	180	1.22	
		—	—	—	—	1000	2.50	—	—	—	—	—	—	270	1.50	—	—	
22×40	S25	270	1.13	270	1.14	220	1.03	150	0.92	100	0.69	82	0.72	56	0.60	47	0.55	
		330	1.25	330	1.26	270	1.14	180	1.01	120	0.76	100	0.80	68	0.66	56	0.60	
		390	1.36	390	1.37	330	1.26	220	1.12	150	0.85	120	0.87	82	0.72	68	0.66	
		390	1.45	390	1.42	330	1.40	270	1.33	150	0.88	120	0.91	82	0.75	68	0.68	
22×45	S26	470	1.59	470	1.56	390	1.52	330	1.47	180	0.97	150	1.01	100	0.84	82	0.75	
		560	1.74	560	1.70	470	1.67	390	1.50	220	1.07	180	1.11	120	0.91	100	0.83	
		560	1.73	470	1.59	470	1.56	330	1.51	180	0.99	150	1.01	120	0.93	82	0.77	
		680	1.91	560	1.74	560	1.70	390	1.55	220	1.09	180	1.11	150	1.03	100	0.85	
22×50	S27	820	2.09	680	1.91	680	1.87	470	1.61	270	1.21	220	1.23	180	1.13	120	0.93	
		680	1.98	680	1.95	560	1.77	470	1.68	270	1.23	220	1.28	150	1.05	120	0.95	
		820	2.17	820	2.14	680	1.95	560	1.77	330	1.36	270	1.42	180	1.16	150	1.05	
		1000	2.40	—	—	820	2.14	—	—	—	—	—	—	220	1.28	—	—	
25×20	S31	1000	2.60	820	2.20	820	2.20	560	1.82	330	1.40	270	1.45	220	1.31	150	1.08	
		1200	2.84	1000	2.43	1000	2.43	680	2.01	390	1.52	330	1.61	270	1.45	180	1.19	
		1200	2.90	1000	2.49	1000	2.49	680	2.06	390	1.56	330	1.65	270	1.49	180	1.22	
		1500	3.25	1200	2.73	1200	2.73	820	2.26	470	1.71	390	1.79	—	—	220	1.35	
25×25	S32	1500	3.38	1200	2.92	1200	2.92	820	2.42	470	1.83	390	1.91	330	1.76	220	1.44	
		—	—	1500	3.26	—	—	1000	2.66	560	1.99	—	—	—	—	270	1.59	
		470	1.50	390	1.37	330	1.26	270	1.14	150	0.85	120	0.87	82	0.72	68	0.66	
		560	1.63	470	1.50	390	1.37	330	1.26	180	0.93	150	0.98	100	0.80	82	0.72	
25×30	S33	680	1.80	560	1.64	470	1.50	390	1.37	220	1.03	180	1.07	120	0.87	100	0.80	
		680	1.85	560	1.69	470	1.60	390	1.47	220	1.06	180	1.10	120	0.90	100	0.82	
		820	2.03	680	1.86	560	1.75	470	1.61	270	1.17	220	1.22	150	1.00	120	0.90	
		1000	2.24	820	2.04	680	1.92	560	1.69	330	1.29	270	1.35	180	1.10	150	1.00	
25×35	S34	820	2.35	680	1.97	680	1.97	470	1.65	270	1.24	220	1.29	150	1.05	120	0.95	
		1000	2.60	820	2.17	820	2.17	560	1.80	330	1.37	270	1.43	180	1.15	150	1.07	
		1200	2.84	1000	2.39	1000	2.39	680	1.98	390	1.49	330	1.58	220	1.27	180	1.17	
		1200	2.96	1000	2.43	820	2.20	680	2.04	390	1.52	330	1.61	220	1.31	180	1.19	
25×40	S35	1500	3.10	1200	2.66	1000	2.43	820	2.24	470	1.67	390	1.75	270	1.45	220	1.31	
		—	—	—	—	1200	2.66	—	—	560	1.82	—	—	—	—	—	—	
		1500	3.21	1200	2.69	1200	2.69	820	2.42	470	1.69	390	1.77	270	1.47	220	1.33	
		1800	3.52	1500	3.01	1500	3.01	1000	2.60	560	1.84	470	1.94	330	1.62	270	1.47	
25×45	S36	1800	3.91	1500	3.12	1500	3.12	1000	2.76	680	2.10	470	2.01	330	1.68	270	1.52	
		2200	4.32	1800	3.42	—	—	1200	3.00	—	—	560	2.19	390	1.83	330	1.68	
		2200	4.50	1800	3.54	1800	3.54	1200	3.00	680	2.18	560	2.27	390	2.07	330	1.74	
		—	—	2200	3.91	—	—	—	—	820	2.39	—	—	470	2.22	390	1.90	
25×50	S37	560	1.82	560	1.66	470	1.67	330	1.30	180	0.94	150	0.99	120	0.89	100	0.81	
		680	2.01	680	1.83	560	1.82	390	1.41	220	1.04	180	1.08	150	0.99	120	0.89	
		820	2.20	820	2.01	680	2.01	470	1.55	270	1.15	220	1.20	180	1.08	150	0.99	
		820	2.35	820	2.11	680	2.20	470	1.65	270	1.19	220	1.23	180	1.12	150	1.02	
30×20	S41	1000	2.60	1000	2.33	820	2.42	560	1.80	330	1.31	270	1.37	220	1.23	180	1.12	
		1200	2.84	1200	2.55	1000	2.67	680	1.98	390	1.43	330	1.51	270	1.37	220	1.23	
		1200	2.95	1000	2.42	820	2.40	680	2.04	390	1.51	330	1.56	220	1.35	180	1.15	
		1500	3.06	1200	2.65	1000	2.65	820	2.24	470	1.66	390	1.69	270	1.50	220	1.27	
30×25	S42	1800	3.35	1500	2.96	1200	2.90	1000	2.47	560	1.81	470	1.86	330	1.66	270	1.41	
		1500	3.21	1500	3.02	1200	2.65	820	2.35	470	1.69	390	1.76	330	1.62	270	1.46	
		1800	3.52	1800	3.31	1500	2.97	1000	2.60	560	1.85	470	1.93	390	1.76	330	1.62	
		2200	3.89	—	—	—	—	1200	2.78	680	2.04	560	2.11	—	—	—	—	
30×30	S43	2200	4.36	1800	3.37	1500	3.45	1200	2.80	680	2.07	560	2.16	390	2.00	330	1.66	
		—	—	2200	3.73	1800	3.78	1500	2.82	820	2.28	—	—	470	2.20	390	1.81	
		—	—	2200	3.84	1800	4.00	1500	2.88	820	2.34	680	2.53	470	2.27	390	1.86	
		—	—	2700	4.25	2200	4.42	—	—	—	—	—	—	560	2.48	470	2.04	
30×35	S44	2700	5.15	2700	4.29	2200	4.60	1800	3.44	1000	2.61	680	2.73	560	2.50	470	2.06	
		3300	5.69	—	—	2700	5.09	—	—	—	—	820	3.00	680	2.61	560	2.25	
		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
30×40	S45	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
30×45	S46	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
30×50	S47	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
		—	—	—	—	—	—</											

Large-Capacitance, Long-Life, High-Reliability Capacitors

GREEN
CAP

105°C
5000hours

- Large-capacitance, Long-life, High-reliability capacitors.
- Guarantees 5000 hours at 105°C.



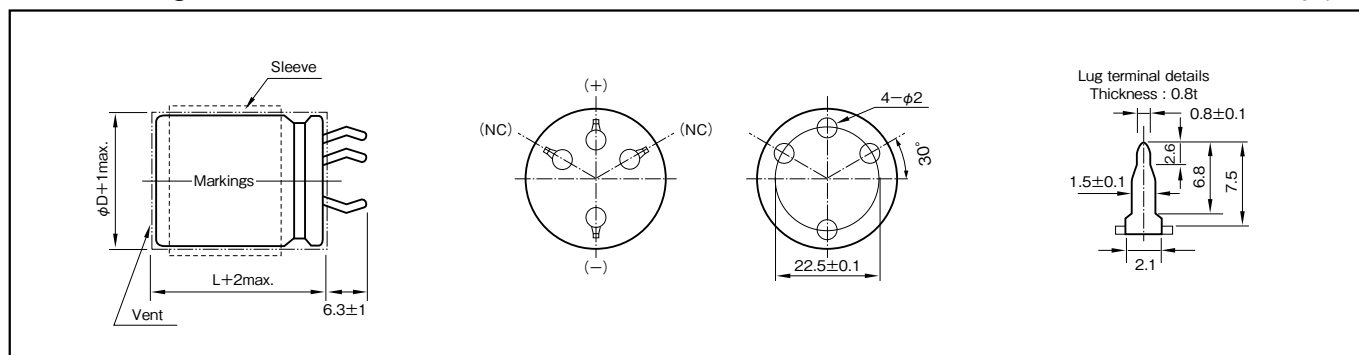
Marking color : White print on a black sleeve

Specifications

Item	Performance	
Category temperature range (°C)	-25~+105	
Tolerance at rated capacitance (%)	±20 (20°C, 120Hz)	
Leakage current (μA)	Less than 0.02CV or 5mA whichever is smaller (after 5 minutes) C : Rated capacitance (μF) ; V : Rated voltage (V) (20°C)	
Tangent of loss angle (tanδ)	Rated voltage (V)	200 to 500
	tanδ (max.)	0.15 (20°C, 120Hz)
Characteristics at high and low temperature	Percentage of capacitance change (%)	Within ±30% of the value at 20°C
	Impedance ratio (max.)	4 (120Hz)
Endurance (105°C) (Applied ripple current)	Test time	5000 hours
	Leakage current	The initial specified value or less
	Percentage of capacitance change	Within ±20% of initial value
	Tangent of the loss angle	200% or less of the initial specified value
Shelf life (105°C)	Test time	1000 hours
	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 1998 (IEC 60384-1 1992, -4 1985)	

Outline Drawing

Unit : mm



Part numbering system (example : 350V1500μF)					
LJ6	—	350	V	152	M S6D # B
Series code		Rated voltage symbol		Rated capacitance symbol	Capacitance tolerance symbol Casing symbol Optional symbol

Coefficient of Frequency for Rated Ripple Current

Frequency (Hz)	50	120	1k	10k	30k
Rated voltage (V)					
200 to 250	0.87	1	1.11	1.18	1.20
315 to 500	0.80	1	1.14	1.19	1.20

Standard Ratings

Rated voltage(V)		200			250			315			350		
Case	Item	Rated capacitance	ESR	Rated ripple current	Rated capacitance	ESR	Rated ripple current	Rated capacitance	ESR	Rated ripple current	Rated capacitance	ESR	Rated ripple current
$\phi D \times L$ (mm)	Casing symbol	(μF)	(Ω Max.)	(Arms)	(μF)	(Ω Max.)	(Arms)	(μF)	(Ω Max.)	(Arms)	(μF)	(Ω Max.)	(Arms)
35×60	S59	2200	0.090	4.05	1500	0.13	3.17	820	0.24	2.23	820	0.24	2.10
35×70	S5B	2700	0.073	4.77	1800	0.11	3.69	1000	0.20	2.62	1000	0.20	2.46
35×80	S5C	3300	0.060	5.56	2200	0.090	4.31	1200	0.17	3.03	1200	0.17	2.84
35×90	S5D	—	—	—	—	—	—	1500	0.13	3.55	1500	0.13	3.34
35×100	S5E	3900	0.051	6.64	2700	0.073	5.24	1800	0.11	4.07	1800	0.11	3.82
40×60	S69	2200	0.090	4.40	1800	0.11	3.77	1000	0.20	2.68	1000	0.20	2.50
40×70	S6B	2700	0.073	5.17	2200	0.090	4.43	1200	0.17	3.11	1200	0.17	2.90
40×80	S6C	3300	0.060	6.02	—	—	—	1500	0.13	3.67	1500	0.13	3.40
40×90	S6D	3900	0.051	7.00	2700	0.073	5.42	1800	0.11	4.21	1800	0.11	3.95

Rated voltage(V)		400			450			500		
Case	Item	Rated capacitance	ESR	Rated ripple current	Rated capacitance	ESR	Rated ripple current	Rated capacitance	ESR	Rated ripple current
$\phi D \times L$ (mm)	Casing symbol	(μF)	(Ω Max.)	(Arms)	(μF)	(Ω Max.)	(Arms)	(μF)	(Ω Max.)	(Arms)
35×60	S59	820	0.24	2.49	560	0.36	2.16	390	0.51	1.65
35×70	S5B	1000	0.20	2.93	680	0.29	2.53	470	0.42	1.92
35×80	S5C	—	—	—	820	0.24	2.94	560	0.36	2.22
35×90	S5D	1200	0.17	3.55	1000	0.20	3.41	680	0.29	2.57
35×100	S5E	1500	0.13	4.15	1200	0.17	3.90	—	—	—
40×60	S69	—	—	—	680	0.29	2.45	560	0.36	2.15
40×70	S6B	1000	0.20	3.10	820	0.24	2.84	680	0.29	2.51
40×80	S6C	—	—	—	1000	0.20	3.33	—	—	—
40×90	S6D	1200	0.17	3.65	1200	0.17	3.65	820	0.24	3.05
40×100	S6E	1500	0.13	4.30	—	—	—	1000	0.20	3.51

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

MEMO

Aluminum Electrolytic Capacitors	ALUMINUM
Polymer hybrid type aluminum Electrolytic Capacitors Aluminum Electrolytic Capacitors With Conductive Polymer Solid Electrolyte	POLYMER HYBRID
Chip Type Aluminum Electrolytic Capacitors	CHIP ALUMINUM
Miniature Type Aluminum Electrolytic Capacitors	MINIATURE ALUMINUM
Large Capacitance Aluminum Electrolytic Capacitors	LARGE ALUMINUM
Aluminum Electrolytic Capacitors for Audio	FOR AUDIO ALUMINUM

Chip Type Audio Use Capacitors

GREEN
CAP

SMD

For
Audio

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

For higher grade

RVO
(PURECAP)



RVO



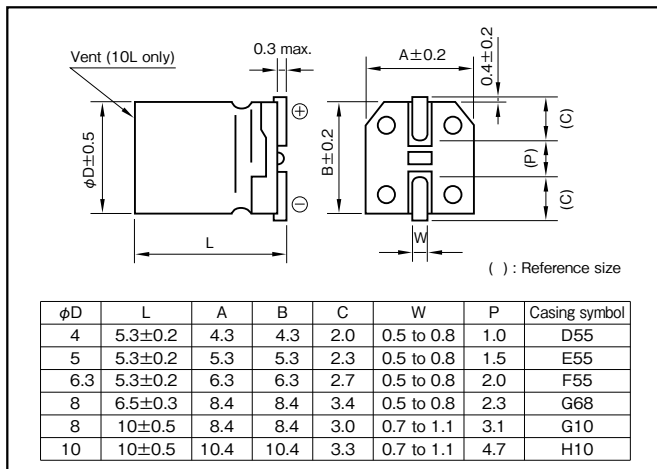
Marking color : Black print (except height : 10mm)
White print on a brown sleeve (φ8×10L, φ10×10L)

Specifications

Item	Performance							
Category temperature range (°C)	-40 to +85							
Tolerance at rated capacitance (%)	±20 (20°C,120Hz)							
Leakage current (μA)	Less than 0.01CV or 3 whichever is larger (after 2 minutes) C : Rated capacitance (μF) ; V: Rated voltage (V) (20°C)							
Tangent of loss angle (tanδ)	Rated voltage (V)	6.3	10	16	25	35	50	
	tanδ (max.)	0.28	0.24	0.20	0.14	0.12	0.10	
(20°C,120Hz)								
Characteristics at high and low temperature	Rated voltage (V)	6.3	10	16	25	35	50	
	Impedance ratio (max.)	Z-25°C/Z+20°C	3	3	2	2	2	2
		Z-40°C/Z+20°C	8	5	4	3	3	3
(120Hz)								
Endurance (85°C) (Applied ripple current)	Test time	2000 hours						
	Leakage current	The initial specified value or less						
	Percentage of capacitance change	Within ±20% of initial value						
	Tangent of the loss angle	200% or less of the initial specified value						
Shelf life (85°C)	Test time : 1000hours ; other items are same as the endurance. Voltage application treatment : According to JIS C5101-4 4.1							
Applicable standards	JIS C5101-1 1998, -18 1999 (IEC 60384-1 1992, -18 1993)							

Outline Drawing

Unit : mm



Coefficient of Frequency for Rated Ripple Current

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

Part numbering system (example : 6.3V1000μF)

RVO	—	6	V	102	M	H10	P2U	*	—
Series code		Rated voltage symbol		Rated capacitance symbol	Capacitance tolerance symbol	Casing symbol		Taping symbol	

- * If it is for car audio, should add "N".
(However, in the case of 10V or more, should delete "M".)

• Soldering conditions are described on page 15. • Land pattern size are described on page 13. • The taping specifications are described on page 16.

Standard Ratings

Rated voltage (V)	6.3		10		16		25		35		50	
	Case	Rated ripple current	Case	Rated ripple current	Case	Rated ripple current	Case	Rated ripple current	Case	Rated ripple current	Case	Rated ripple current
Rated capacitance (μF)	φD×L (mm)	(mArms)	φD×L (mm)	(mArms)	φD×L (mm)	(mArms)	φD×L (mm)	(mArms)	φD×L (mm)	(mArms)	φD×L (mm)	(mArms)
0.33	—	—	—	—	—	—	—	—	—	—	4×5.3	6
0.47	—	—	—	—	—	—	—	—	—	—	4×5.3	7
1	—	—	—	—	—	—	—	—	—	—	4×5.3	10
2.2	—	—	—	—	—	—	—	—	—	—	4×5.3	15
3.3	—	—	—	—	—	—	—	—	4×5.3	17	4×5.3	19
4.7	—	—	—	—	4×5.3	18	4×5.3	19	4×5.3	20	5×5.3	26
10	—	—	4×5.3	23	4×5.3	26	5×5.3	32	5×5.3	34	6.3×5.3	44
22	4×5.3	31	5×5.3	40	5×5.3	44	6.3×5.3	55	6.3×5.3	59	8×6.5	124
33	5×5.3	44	5×5.3	49	6.3×5.3	63	6.3×5.3	67	8×6.5	124	8×6.5	124
47	5×5.3	53	6.3×5.3	68	6.3×5.3	76	8×6.5	124	8×6.5	124	8×10	200
100	6.3×5.3	90	6.3×5.3	99	8×6.5	124	8×6.5	137	8×10	200	10×10	366
220	8×6.5	149	8×6.5	149	8×10	200	8×10	235	10×10	366	—	—
330	8×6.5	160	8×10	226	8×10	245	10×10	366	—	—	—	—
470	8×10	251	10×10	366	10×10	366	—	—	—	—	—	—
1000	10×10	423	—	—	—	—	—	—	—	—	—	—

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

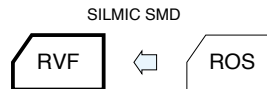
Chip Type, For Audio, High Grade (SILMIC) Capacitors

GREEN
CAP

SMD

For
Audio

- Silk fiber paper products used surface mount device.
- Completely new audio products for the high-grade paper using silk fiber paper.
- Silk "flexibility" to reduce the vibration energy of the music, in the sense of high-frequency peak, a significant decrease in roughness of the midrange and bass increase.



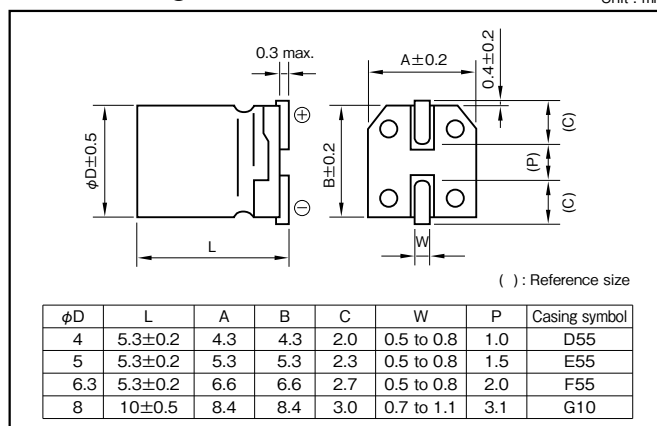
Marking color : Black print

Specifications

Item	Performance			
Category temperature range (°C)	-40 to +85			
Tolerance at rated capacitance (%)	±20 (20°C,120Hz)			
Leakage current (μA)	Less than 0.01CV or 3 whichever is larger (after 2 minutes) C : Rated capacitance (μF) , V : Rated voltage (V) (20°C)			
Tangent of loss angle (tanδ)	Rated voltage (V)	10	16	50
	tanδ (max.)	0.32	0.26	0.12
	(20°C,120Hz)			
Characteristics at high and low temperature	Rated voltage (V)	10	16	50
	Impedance ratio (max.)	Z-25°C/Z+20°C	3	2
		Z-40°C/Z+20°C	8	4
	(120Hz)			
Endurance (85°C)	Test time	2000 hours		
	Leakage current	The initial specified value or less		
	Percentage of capacitance change	Within ±20% of initial value		
	Tangent of the loss angle	200% or less of the initial specified value		
Shelf life (85°C)	Test time : 500hours ; other items are same as the endurance. Voltage application treatment : According to JIS C5101-4 4.1			
Applicable standards	JIS C5101-1 1998, -18 1999 (IEC 60384-1 1992, -18 1993)			

Outline Drawing

Unit : mm



- Soldering conditions are described on page 15.
- Land pattern size are described on page 13.
- The taping specifications are described on page 16.

Standard Ratings

Rated capacitance (µF)	10		16		50	
	Case	Rated ripple current	Case	Rated ripple current	Case	Rated ripple current
	φD×L (mm)	(mAmps)	φD×L (mm)	(mAmps)	φD×L (mm)	(mAmps)
1	—	—	—	—	4×5.3	7
2.2	—	—	—	—	5×5.3	11
3.3	—	—	—	—	6.3×5.3	16
4.7	—	—	4×5.3	10	6.3×5.3	19
10	5×5.3	15	5×5.3	16	8×10	41
22	6.3×5.3	25	6.3×5.3	28	—	—
33	6.3×5.3	31	8×10	50	—	—
47	8×10	54	8×10	60	—	—
100	8×10	79	8×10	87	—	—

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

Coefficient of Frequency for Rated Ripple Current

Frequency (Hz)	50	120	1k	10k-100k
Rated voltage (V)				
10 to 16	0.80	1	1.15	1.25
50	0.80	1	1.35	1.50

Part numbering system (example : 16V100µF)

RVF	—	16	V	100	M	E55	U*	—	□
Series code		Rated voltage symbol		Rated capacitance symbol	Capacitance tolerance symbol	Casing symbol			Taping symbol

* If it is for car audio, should add "N".

Chip Type, For Audio, High Grade Capacitors

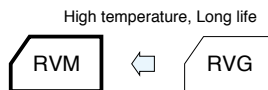
GREEN
CAP

SMD

105°C
2000hours

For
Audio

- New developed Al-Foil and Electrolyte for Audio grade allow lower distortion.
- New range of bright and smooth sound is achieved in SMD area.
- Guarantees 2000 hours 105°C.



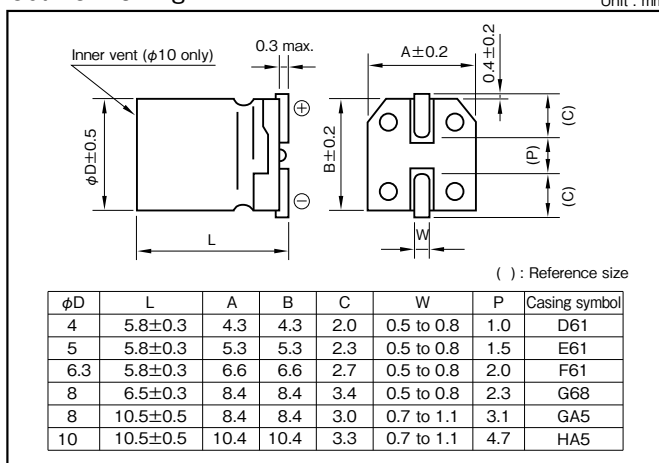
Marking color : Black print

Specifications

Item	Performance						
Category temperature range (°C)	-55 to +105						
Tolerance at rated capacitance (%)	±20 (20°C,120Hz)						
Leakage current (μA)	Less than 0.01CV or 3 whichever is larger (after 2 minutes) C : Rated capacitance (μF), V: Rated voltage (V) (20°C)						
Tangent of loss angle (tanδ)							
	Rated voltage (V)	6.3	10	16	25	35	50
	tanδ (max.)	0.28	0.24	0.20	0.16	0.13	0.12
	(20°C,120Hz)						
Characteristics at high and low temperature							
	Rated voltage (V)	6.3	10	16	25	35	50
	Impedance ratio (max.)	Z-25°C/Z+20°C	2	2	2	2	2
		Z-55°C/Z+20°C	8	4	4	3	3
	(120Hz)						
Endurance (105°C)							
	Test time	2000 hours					
	Leakage current	The initial specified value or less					
	Percentage of capacitance change	Within ±30% of initial value					
	Tangent of the loss angle	300% or less of the initial specified value					
Shelf life (105°C)	Test time : 1000hours ; other items are same as the endurance. Voltage application treatment : According to JIS C5101-4 4.1						
Applicable standards	JIS C5101-1 1998, -18 1999 (IEC 60384-1 1992, -18 1993)						

Outline Drawing

Unit : mm



Coefficient of Frequency for Rated Ripple Current

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

Part numbering system (example : 6.3V220µF)

RVM	—	6	V	221	M	G68	PU*	—	□
Series code		Rated voltage symbol		Rated capacitance symbol	Capacitance tolerance symbol	Casing symbol			Taping symbol

* If it is for car audio, should add "N".

- Soldering conditions are described on page 15.
- Land pattern size are described on page 13.
- The taping specifications are described on page 16.

Standard Ratings

Rated voltage (V)	6.3		10		16		25		35		50	
Item	Case	Rated ripple current	Case	Rated ripple current	Case	Rated ripple current	Case	Rated ripple current	Case	Rated ripple current	Case	Rated ripple current
Rated capacitance (µF)	φD×L (mm)	(mAmps)	φD×L (mm)	(mAmps)	φD×L (mm)	(mAmps)	φD×L (mm)	(mAmps)	φD×L (mm)	(mAmps)	φD×L (mm)	(mAmps)
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						
					8×10.5	150						
					10×10.5	174	10×10.5	194	10×10.5	216	—	—
220	8×10.5	127	8×10.5	137	10×10.5	213	—	—	—	—	—	—
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°C, 120Hz.

Chip Type Audio Use Capacitors

GREEN
CAP

SMD

For
Audio

- New developed Al-Foil and Electrolyte for Audio grade allow lower distortion.
- New range of bright and smooth sound is achieved in SMD area.



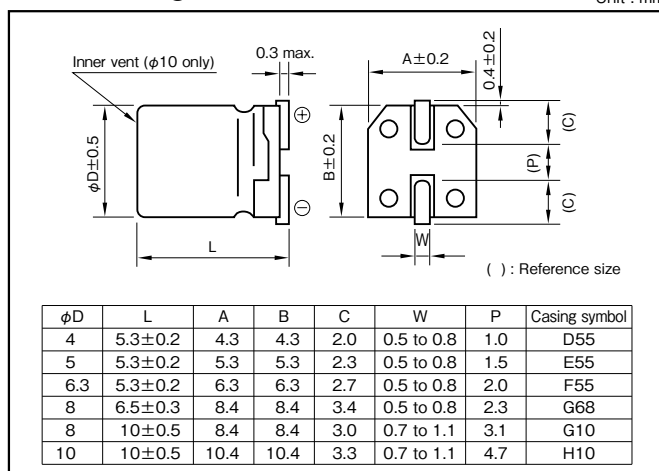
Marking color : Black print

Specifications

Item	Performance					
Category temperature range (°C)	-40 to +85					
Tolerance at rated capacitance (%)	±20 (20°C,120Hz)					
Leakage current (μA)	Less than 0.01CV or 3 whichever is larger (after 2 minutes) C : Rated capacitance (μF) ; V : Rated voltage (V) (20°C)					
Tangent of loss angle (tanδ)	Rated voltage (V)	6.3	10	16	25	35
	tanδ (max.)	0.28	0.24	0.20	0.16	0.14
Characteristics at high and low temperature	(20°C,120Hz)					
	Rated voltage (V)	6.3	10	16	25	35
	Impedance ratio (max.)	Z-25°C/Z+20°C	4	3	2	2
		Z-40°C/Z+20°C	8	5	4	3
Endurance (85°C) (Applied ripple current)	(120Hz)					
	Test time	2000 hours				
	Leakage current	The initial specified value or less				
	Percentage of capacitance change	Within ±20% of initial value				
	Tangent of the loss angle	200% or less of the initial specified value				
Shelf life (85°C)	Test time : 500hours ; other items are same as the endurance. Voltage application treatment : According to JIS C5101-4 4.1					
Applicable standards	JIS C5101-1 1998, -18 1999 (IEC 60384-1 1992, -18 1993)					

Outline Drawing

Unit : mm



- Soldering conditions are described on page 15.
- Land pattern size are described on page 13.
- The taping specifications are described on page 16.

Coefficient of Frequency for Rated Ripple Current

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

Part numbering system (example : 16V47 μF)

RVG	—	16	V	470	M	F55	U*	—
Series code		Rated voltage symbol		Rated capacitance symbol	Capacitance tolerance symbol	Casing symbol		Taping symbol

* If it is for car audio, should add "N".

Standard Ratings

Rated voltage (V)	6.3			10			16			25			35		
	Case		Rated ripple current	Case		Rated ripple current	Case		Rated ripple current	Case		Rated ripple current	Case		Rated ripple current
	φD×L (mm)	(mm)	(mArms)	φD×L (mm)	(mm)	(mArms)	φD×L (mm)	(mm)	(mArms)	φD×L (mm)	(mm)	(mArms)	φD×L (mm)	(mm)	(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°C, 120Hz

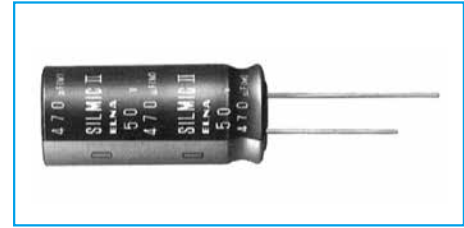
NOTE : Design, Specifications are subject to change without notice.
It is recommended that you shall obtain technical specifications from ELNA to ensure that the component is suitable for your use.

■ SILMIC series Silk fiber using audio purpose capacitor

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

For examples ;

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



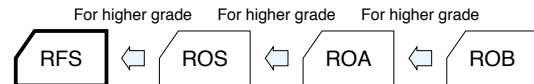
Marking color : White print on a brown sleeve

Miniature High Grade Capacitors for Audio(SILMIC II)

GREEN
CAP

For
Audio

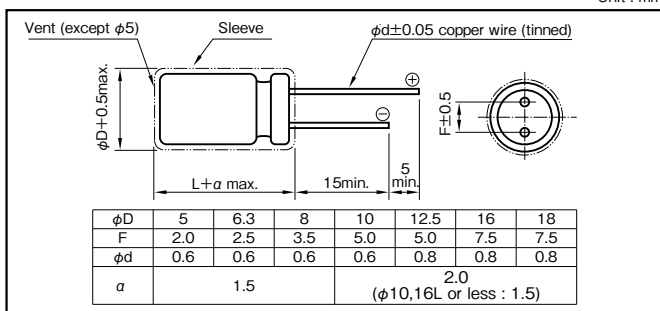
- All lead wires oxygen-free copper for extremely low distortion. (Third high frequency distortion 10kHz,0.1A,-120dB or less)
- "SILMIC II" mark on sleeve.



Specifications

Item	Performance									
Category temperature range (°C)	-40 to +85									
Tolerance at rated capacitance (%)	±20 (20°C,120Hz)									
Leakage current (μA)	Less than 0.01CV or 3 whichever is larger (after 5 minutes) C : Rated capacitance (μF) ; V : Rated voltage (V) (20°C)									
Tangent of loss angle (tanδ)	Rated voltage (V)		6.3	10	16	25	35	50	63	100
	tanδ (max.)		0.20	0.17	0.13	0.10	0.10	0.08	0.08	0.08
	0.02 is added to every 1000μF increase over 1000μF (20°C,120Hz)									
Endurance (85°C) (Applied ripple current)	Test time		1000 hours							
	Leakage current		The initial specified value or less							
	Percentage of capacitance change		Within ±20% of initial value							
	Tangent of the loss angle		150% or less of the initial specified value							
Shelf life (85°C)	Test time : 1000hours ; other items are same as the endurance. Voltage application treatment : According to JIS C5101-4 4.1									
Applicable standards	JIS C5101-1, -4 1998 (IEC 60384-1 1992, -4 1985)									

Outline Drawing



Coefficient of Frequency for Rated Ripple Current

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

Part numbering system (example : 25V100µF)

RFS	—	25	V	101	M	H4	#5	*	—	□
Series code		Rated voltage symbol		Rated capacitance symbol	Capacitance tolerance symbol	Casing symbol				Taping (Forming) symbol

- * If it is for car audio, should add "N".
(However, in the case of 100V , should delete "M.")

Case symbol

Case φD×L (mm)	Casing Symbol	Case φD×L (mm)	Casing Symbol	Case φD×L (mm)	Casing Symbol	Case φD×L (mm)	Casing Symbol
5×11	E3	10×12.5	H3	12.5×20	I5	16×31.5	J7
6.3×11	F3	10×16	H4	12.5×25	I6	16×35.5	J8
8×11.5	G3	10×20	H5	16×25	J6	18×35.5	K8
						18×40	K9

Standard Ratings

Rated capacitance (µF)	6.3		10		16		25		35		50		63		100	
	Case φD×L (mm)	Rated ripple current (mA)	Case φD×L (mm)	Rated ripple current (mA)	Case φD×L (mm)	Rated ripple current (mA)	Case φD×L (mm)	Rated ripple current (mA)	Case φD×L (mm)	Rated ripple current (mA)	Case φD×L (mm)	Rated ripple current (mA)	Case φD×L (mm)	Rated ripple current (mA)	Case φD×L (mm)	Rated ripple current (mA)
3.3	—	—	—	—	—	—	—	—	—	—	5×11	25	5×11	30	—	—
4.7	—	—	—	—	—	—	—	—	—	—	5×11	35	5×11	35	—	—
10	—	—	—	—	5×11	35	5×11	35	5×11	35	5×11	35	5×11	35	—	—
22	—	—	5×11	50	5×11	55	5×11	60	5×11	60	5×11	60	5×11	60	—	—
33	5×11	55	5×11	65	5×11	70	5×11	70	5×11	70	5×11	70	5×11	70	—	—
47	5×11	65	5×11	75	5×11	85	5×11	90	5×11	90	5×11	90	5×11	90	—	—
100	8×11.5	135	8×11.5	145	8×11.5	155	8×11.5	165	8×11.5	175	8×11.5	185	8×11.5	195	—	—
220	10×12.5	240	10×12.5	250	10×12.5	260	10×12.5	270	10×12.5	280	10×12.5	290	10×12.5	300	—	—
330	10×16	290	10×16	300	10×16	310	10×16	320	10×16	330	10×16	340	10×16	350	—	—
470	10×20	390	10×20	400	10×20	410	10×20	420	10×20	430	10×20	440	10×20	450	—	—
1000	12.5×20	710	12.5×20	720	12.5×20	730	12.5×20	740	12.5×20	750	12.5×20	760	12.5×20	770	—	—
2200	—	—	16×35.5	1500	16×35.5	1510	16×35.5	1520	16×35.5	1530	16×35.5	1540	16×35.5	1550	—	—
3300	—	—	18×40	1980	18×40	1990	18×40	2000	18×40	2010	18×40	2020	18×40	2030	—	—

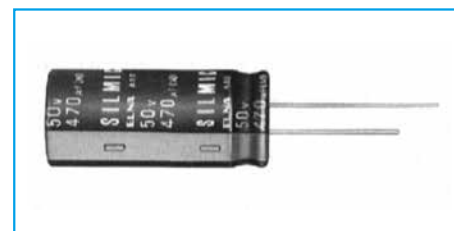
(Note) Rated ripple current : 85°C, 120Hz

■ SILMIC series Silk fiber using audio purpose capacitor

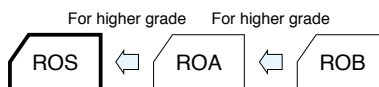
High Grade Capacitors for Audio(SILMIC)

GREEN
CAPFor
Audio

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



Marking color : White print on a brown sleeve

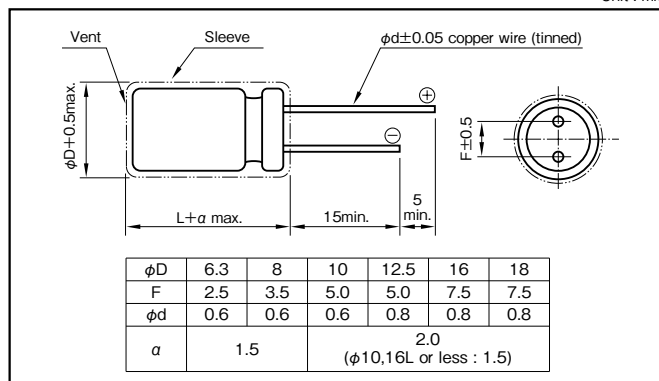


Specifications

Item	Performance						
Category temperature range (°C)	-40 to +85						
Tolerance at rated capacitance (%)	±20 (20°C,120Hz)						
Leakage current (μA)	Less than 0.01CV or 3 whichever is larger (after 5 minutes) C : Rated capacitance (μF) ; V: Rated voltage (V) (20°C)						
Tangent of loss angle (tanδ)	Rated voltage (V)	16	25	35	50	63	100
	tanδ (max.)	0.13	0.10	0.10	0.08	0.08	0.08
	0.02 is added to every 1000μF increase over 1000μF (20°C,120Hz)						
Endurance (85°C) (Applied ripple current)	Test time	1000 hours					
	Leakage current	The initial specified value or less					
	Percentage of capacitance change	Within ±20% of initial value					
	Tangent of the loss angle	150% or less of the initial specified value					
Shelf life (85°C)	Test time : 1000hours ; other items are same as the endurance. Voltage application treatment : According to JIS C5101-4 4.1						
Applicable standards	JIS C5101-1, -4 1998 (IEC 60384-1 1992, -4 1985)						

Outline Drawing

Unit : mm



Coefficient of Frequency for Rated Ripple Current

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

Part numbering system (example : 25V100µF)

ROS	—	25	V	101	M	H4	#5	*	—	□
Series code		Rated voltage symbol		Rated capacitance symbol	Capacitance tolerance symbol	Casing symbol				Taping (Forming) symbol

* If it is for car audio, should add "N".
(However, in the case of 100V , should delete "M.")

Case symbol

Case φD×L (mm)	Casing Symbol	Case φD×L (mm)	Casing Symbol	Case φD×L (mm)	Casing Symbol	Case φD×L (mm)	Casing Symbol
6.3×11	F3	10×16	H4	12.5×25	I6	16×35.5	J8
8×11.5	G3	10×20	H5	16×25	J6	18×35.5	K8
10×12.5	H3	12.5×20	I5	16×31.5	J7	18×40	K9

Standard Ratings

Rated voltage (V)	16		25		35		50		63		100	
	Case φD×L (mm)	Rated ripple current (mAmps)	Case φD×L (mm)	Rated ripple current (mAmps)	Case φD×L (mm)	Rated ripple current (mAmps)	Case φD×L (mm)	Rated ripple current (mAmps)	Case φD×L (mm)	Rated ripple current (mAmps)	Case φD×L (mm)	Rated ripple current (mAmps)
10	—	—	—	—	6.3×11	55	8×11.5	75	8×11.5	75	10×16	95
22	6.3×11	70	6.3×11	80	8×11.5	95	10×12.5	130	10×16	140	10×20	155
33	6.3×11	90	8×11.5	120	10×12.5	140	10×16	175	10×20	190	12.5×20	220
47	8×11.5	125	8×11.5	140	10×12.5	170	10×16	210	10×20	225	12.5×25	285
100	10×12.5	215	10×16	270	10×20	295	12.5×20	380	12.5×25	415	16×25	485
220	10×20	385	12.5×20	505	12.5×25	550	16×25	720	16×31.5	785	18×40	930
330	12.5×20	545	12.5×25	675	16×25	785	16×31.5	965	16×35.5	1010	—	—
470	12.5×25	710	16×25	940	16×31.5	1030	16×35.5	1210	18×35.5	1295	—	—
1000	16×31.5	1315	16×35.5	1575	18×35.5	1690	18×40	1985	—	—	—	—
2200	18×40	2150	—	—	—	—	—	—	—	—	—	—

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

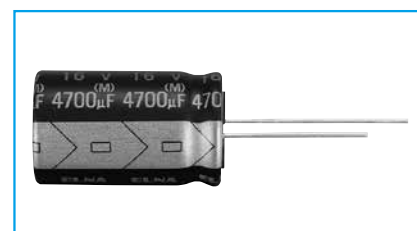
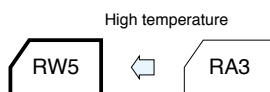
105°C Miniature Capacitors for Audio

GREEN
CAP

105°C
1000hours

For
Audio

- With the same size as that for Series RJ5 miniaturized standard capacitors, a high resolution sound quality grade has been realized.
- Guarantees 1000 hours at 105°C



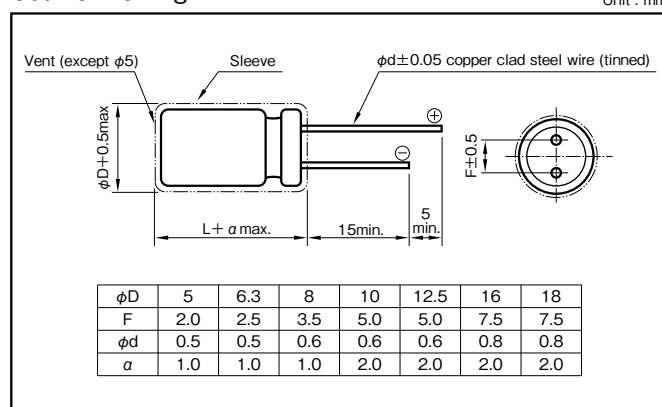
Marking color : Gold print on a black sleeve

Specifications

Item	Performance														
Category temperature range (°C)	-55 to +105														
Tolerance at rated capacitance (%)	±20 (20°C, 120Hz)														
Leakage current (μA)	Less than 0.03CV or 4 whichever is larger (after 1 minutes) C : Rated capacitance (μF) , V : Rated voltage (V) (20°C)														
Tangent of loss angle (tanδ)	<table><tr><td>Rated voltage (V)</td><td>16</td><td>25</td></tr><tr><td>tanδ (max.)</td><td>0.24</td><td>0.20</td></tr></table>			Rated voltage (V)	16	25	tanδ (max.)	0.24	0.20						
	Rated voltage (V)	16	25												
tanδ (max.)	0.24	0.20													
	0.02CV is added to every 1000μF increase over 1000μF (20°C, 120Hz)														
Characteristics at high and low temperature	<table><tr><td colspan="2">Rated voltage (V)</td><td>16</td><td>25</td></tr><tr><td rowspan="2">Impedance ratio (max.)</td><td>Z-25°C/Z+20°C</td><td>3</td><td>2</td></tr><tr><td>Z-40°C/Z+20°C</td><td>6</td><td>4</td></tr></table>			Rated voltage (V)		16	25	Impedance ratio (max.)	Z-25°C/Z+20°C	3	2	Z-40°C/Z+20°C	6	4	
	Rated voltage (V)		16	25											
Impedance ratio (max.)	Z-25°C/Z+20°C	3	2												
	Z-40°C/Z+20°C	6	4												
	(120Hz)														
Endurance (105°C) (Applied ripple current)	<table><tr><td>Test time</td><td colspan="2">1000 hours</td></tr><tr><td>Leakage current</td><td colspan="2">The initial specified value or less</td></tr><tr><td>Percentage of capacitance change</td><td colspan="2">Within ±20% of initial value</td></tr><tr><td>Tangent of the loss angle</td><td colspan="2">200% or less of the initial specified value</td></tr></table>			Test time	1000 hours		Leakage current	The initial specified value or less		Percentage of capacitance change	Within ±20% of initial value		Tangent of the loss angle	200% or less of the initial specified value	
	Test time	1000 hours													
	Leakage current	The initial specified value or less													
	Percentage of capacitance change	Within ±20% of initial value													
Tangent of the loss angle	200% or less of the initial specified value														
Shelf life (105°C)	Test time : 1000hours ; other items are same as the endurance. Voltage application treatment : According to JIS C5101-4 4.1														
Applicable standards	JIS C5101-1, -4 1998 (IEC 60384-1 1992, -4 1985)														

Outline Drawing

Unit : mm



Coefficient of Frequency for Rated Ripple Current

Rated Capacitance (μF)	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

Part numbering system (example : 16V3300μF)

RW5	—	16	V	332	M	I6	#*	—	□
Series code		Rated voltage symbol		Rated capacitance symbol	Capacitance tolerance symbol	Casing symbol			Taping (Forming) symbol

* If it is for car audio, should add "N".

Standard Ratings

Rated capacitance (μF)	16			25		
	Case φD×L (mm)	Casing symbol	Rated ripple current (mA rms)	Case φD×L (mm)	Casing symbol	Rated ripple current (mA rms)
100	—	—	—	5×11.5	E3	125
220	6.3×11.5	F3	190	6.3×11.5	F3	200
330	6.3×11.5	F3	225	8×12	G3	310
470	8×12	G3	323	10×12.5	H3	429
1000	10×12.5	H3	500	10×16	H4	610
2200	10×20	H5	710	12.5×25	I6	1180
				16×20	J5	1230
				18×16	K4	1200
3300	12.5×25	I6	1200	16×25	J6	1440
	16×20	J5	1250	18×20	K5	1400
4700	16×25	J6	1500	16×25	J6	1570
	18×20	K5	1460	18×20	K5	1530
6800	16×25	J6	1600	16×35.5	J8	1850
	18×20	K5	1560	18×31.5	K7	1870
10000	16×35.5	J8	1930	18×40	K9	2000
15000	18×40	K9	2210	—	—	—

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

MEMO

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)

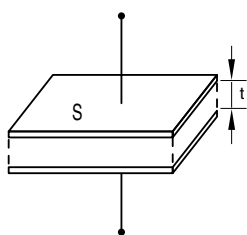


Fig.1-1

C, called the capacitance of capacitor, is expressed by the following expression with the electrode area $S[m^2]$, the electrode spacing $t[m]$ and the dielectric constant of dielectric “ ϵ ”:

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

ϵ_0 : Dielectric constant in vacuum ($=8.85 \times 10^{-12} F/m$)

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.

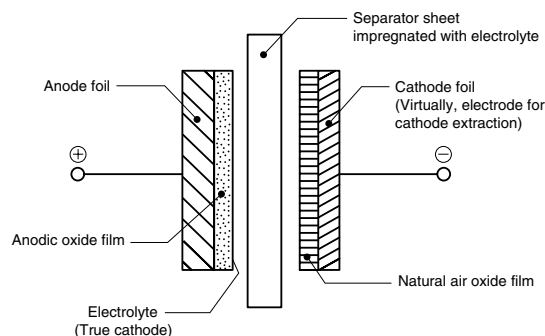
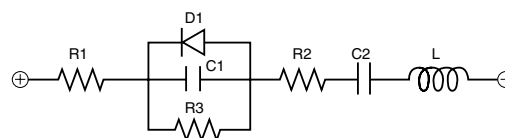


Fig.1-2

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 Estimation of life with minimal ripple current (negligible).

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

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

Where L : Life at temperature T

L_0 : Life at temperature T_0

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

2-2 Estimation of life considering the ripple current.

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

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

Where I : Ripple current (Arms)

R : ESR (Ω)

With increase in the temperature of the capacitor:

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

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

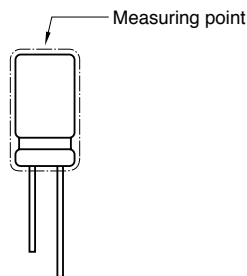
I : Ripple current (Arms)

R : ESR (Ω)

A : Surface area of the capacitor (cm²)

H : Radiation coefficient (Approx. 1.5 to 2.0 × 10⁻³W/cm²×°C)

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



Test results:

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

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

Where L_d : Life at DC operation (h)

K : Ripple acceleration factor

(K=2, within allowable ripple current)

(K=4, if exceeding allowable ripple current)

T₀ : Upper category temperature (°C)

T : Operating temperature (°C)

ΔT : Temperature increase at capacitor core (deg.)

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

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

Where L_r : Life at the upper category temperature with the rated ripple current (h)

ΔT₀ : Temperature increase at capacitor core, at the upper category temperature (deg.)

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

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

Where I₀ : Rated ripple current at the upper category temperature (Arms)

I : Applied ripple current (Arms)

ΔT₀ of each category highest temperature

Aluminum Electrolytic Capacitors	85	: 10deg
	105 to 135	: 5deg
	150	: 3deg
Polymer hybrid type aluminum Electrolytic Capacitors	105	: 15deg
	125	: 10deg
	135	: 10deg

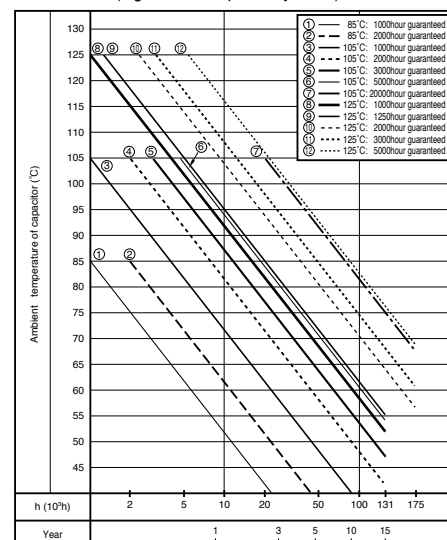
Since it is actually difficult to measure the temperature increase at the capacitor core, the following table is provided for conversion from the surface temperature increase to the core temperature increase.

Table 2-1

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

The life expectancy formula shall in principle be applied to the temperature range between the ambient temperature of +40°C and upper category temperature. The expected life time shall be about fifteen years at maximum as a guide in terms of deterioration of the sealant.

(Fig. 2-1 Life Expectancy Chart)



2-3 Practical Examples of Life Expectancy

As practical examples of life expectancy, we introduce 250V 560 μ F in the LAT Series considering the effect of high-frequency component. Figures 2-2 to 2-4 show the simulated ripple current waveforms when the high-frequency component for switching is superimposed on the commercial frequency component.



Fig.2-2 Ripple Current Waveform of Capacitor

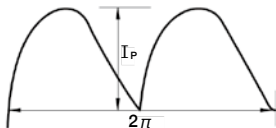


Fig.2-3 Low-frequency component

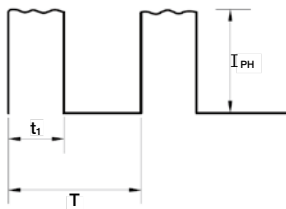


Fig.2-4 High-frequency component

Each of the above may be obtained as the effective ripple current value. Assuming that the ripple current waveform of the low-frequency component is generally approximated to the full-wave rectification waveform as shown in Fig.2-3, we obtain the effective ripple current value I_L as follows:

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

Since the ripple current waveform of the high-frequency component is approximated to the rectangular as shown in Fig.2-4, the effective current value of high-frequency component I_H is given by

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

The reason why the ripple current affects the life is due to the heat generated by the ESR (R) of capacitor.

That is, ΔT by heat generation can be expressed by

$$\Delta T \propto I^2 \times R \text{ from Expression (2).}$$

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

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

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

Data A (Test piece and basic data)

Product name	: 250V 560 μ F ϕ 30x30 L, Series LAT
L_r	= 2000 hours
K	= 4
T_0	= 105°C
ΔT_0	= 5deg
I_0	= 1.80Arms at 105°C, 120Hz

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

Data B

I_L	= 2.4Arms at 120Hz, $T=45^\circ\text{C}$
I_{H1}	= 0.36Arms at 1kHz (corresponding to 15% of the commercial frequency component)
I_{H2}	= 0.72Arms at 10kHz (corresponding to 30% of the commercial frequency component)
I_{H3}	= 1.2Arms at 30kHz (corresponding to 50% of the commercial frequency component)

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

$$I = 2.4/1 = 2.4A$$

$$I_1 = \sqrt{(2.4)^2 + (0.36/1.32)^2} \doteq 2.42A$$

$$I_2 = \sqrt{(2.4)^2 + (0.72/1.45)^2} \doteq 2.45A$$

$$I_3 = \sqrt{(2.4)^2 + (1.2/1.50)^2} \doteq 2.53A$$

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

The ESR of aluminum electrolytic capacitor is frequency dependent.

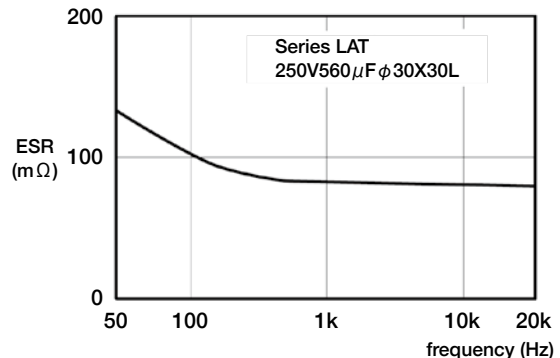


Fig.2-5 Frequency Characteristics of ESR

Figure 2-5 shows a typical example of frequency characteristics of ESR, indicating that the ESR decreases with increasing frequencies. Therefore, the high-frequency component has less effect on the heat generation of capacitor than low-frequency component.

Next, we calculate the expected life according to each condition to compare with the case with no high-frequency component.

For the case with no high-frequency component:

$$L = 2000 \times 2 \left(\frac{105-45}{10} \right) \times 4 \left[1 - \left(\frac{2.4}{1.80} \right)^2 \right] \times \frac{5}{10} \doteq 74,658 \text{ hours}$$

For the case with high-frequency component:

$$L = 2000 \times 2 \left(\frac{105-45}{10} \right) \times 4 \left[1 - \left(\frac{2.42}{1.80} \right)^2 \right] \times \frac{5}{10} \doteq 73,479 \text{ hours}$$

$$73,479/74,658=0.984, \text{ about a 1.6\% reduction in life}$$

$$L = 2000 \times 2 \left(\frac{105-45}{10} \right) \times 4 \left[1 - \left(\frac{2.48}{1.80} \right)^2 \right] \times \frac{5}{10} \doteq 70,822 \text{ hours}$$

$$70,822/74,658=0.949, \text{ about a 5.1\% reduction in life}$$

$$L = 2000 \times 2 \left(\frac{105-45}{10} \right) \times 4 \left[1 - \left(\frac{2.61}{1.80} \right)^2 \right] \times \frac{5}{10} \doteq 65,105 \text{ hours}$$

$$65,105/74,658=0.872, \text{ about a 12.8\% reduction in life}$$

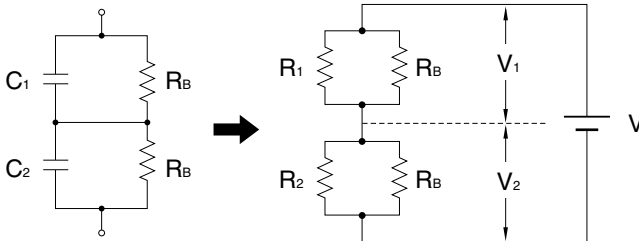
As described above, there may be cases where the effect of larger high-frequency component on the life cannot be ignored; thus high-frequency component exceeding 30% with respect to the current with fundamental frequency should be considered.

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 To calculate Balance when connecting in series

3-1 Circuit layout

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



Following are the preconditions of the circuit.

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

3-2 Formulas to calculate [R_B]

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

$$V_1 \left[\frac{1}{R_1} + \frac{1}{R_B} \right] = V_2 \left[\frac{1}{R_2} + \frac{1}{R_B} \right] \quad (2)$$

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

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

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

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

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

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

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

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

Accordingly, balance resistance R shall be the following formula.

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

3-3 Calculation Example

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

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

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

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

Balance resistance R_B will be.

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

4 Regarding Recovery Voltage

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

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

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

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

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

5 Electrode Foil Development Technology

5-1 Corrosion inhibition of cathode foil

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

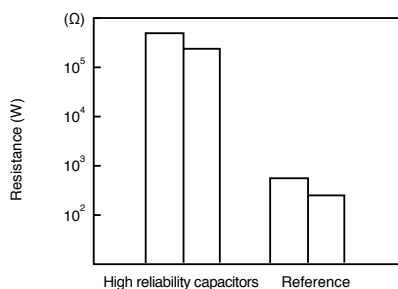


Fig. 3-1

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.

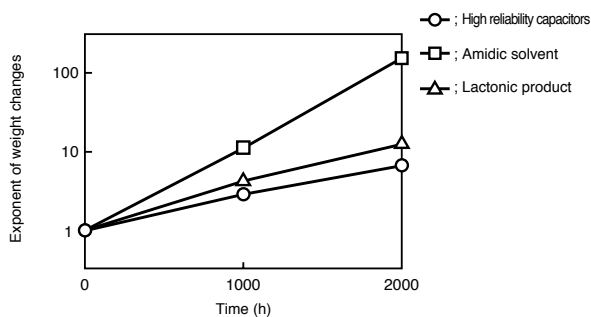


Fig. 3-2

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.

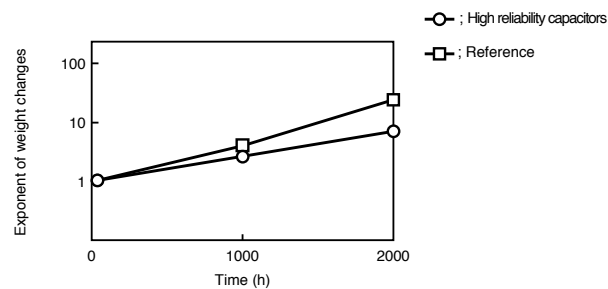


Fig. 3-3

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.

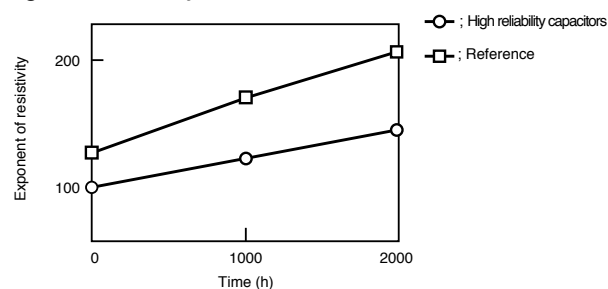


Fig. 3-4

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.

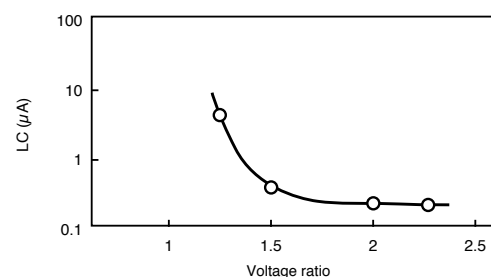


Fig. 3-5

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

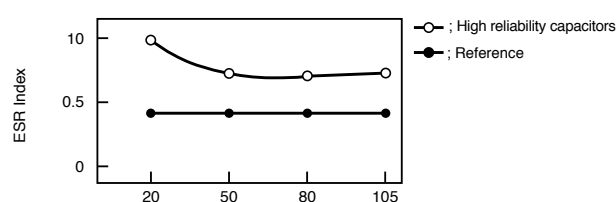


Fig. 3-6 ESR Index of Anode Foil

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