

Aluminum Electrolytic Capacitor





COMPANY BRIEF

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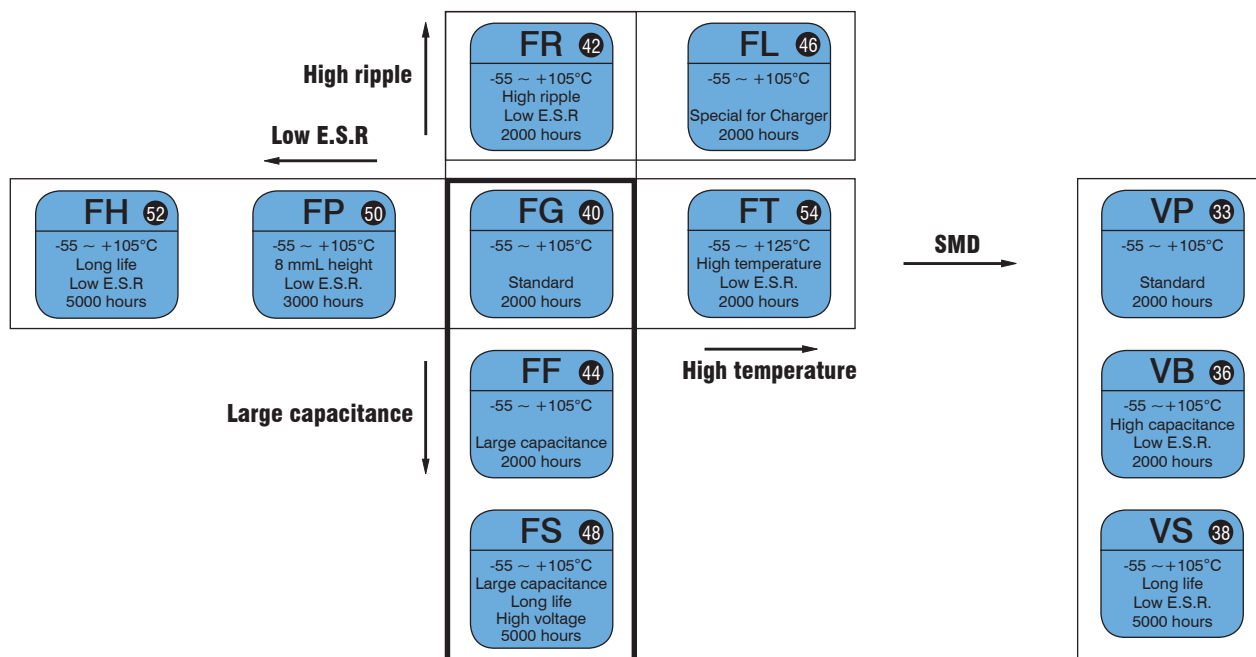
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ALUMINUM ELECTROLYTIC CAPACITORS

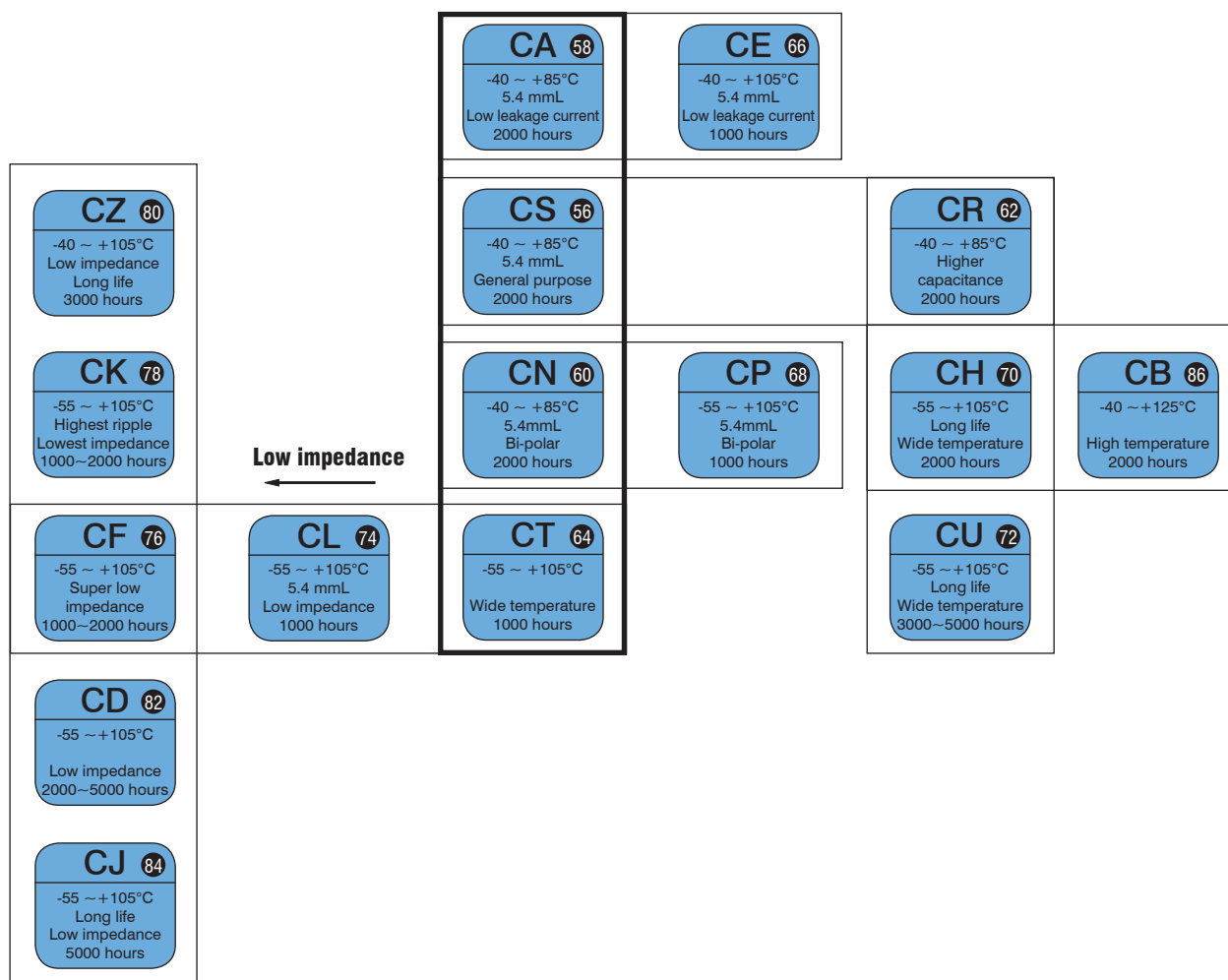
Classification	Series	Features · Application	Standard Type	Miniature Sized	Low Impedance	Long Life	Temperature Range (°C)	Load Life (Hour)	Capacitance Range (μF)	Rated Voltage Range (V.D.C.)	Page
Aluminum solid electrolytic capacitor with Conductive polymer	VP	Standard	●				-55~+105	2000	22~1500	2.5~25	33
	VB	High capacitance & Low E.S.R.		●			-55~+105	2000	33~1200	2.5~25	36
	VS	Long life & Low E.S.R.		●	●		-55~+105	5000	27~470	4~25	38
	FG	Standard	●				-55~+105	2000	22~2200	2.5~25	40
	FR	Higher ripple & Low E.S.R.					-55~+105	2000	270~2700	2.5~6.3	42
	FF	Large capacitance		●			-55~+105	2000	10~2200	6.3~63	44
	FL	Special for Charger	●				-55~+105	2000	22~2200	6.3~16	46
	FS	Large capacitance & Long life & High Voltage			●		-55~+105	5000	39~680	20~50	48
	FP	8mm height & Low E.S.R.		●	●		-55~+105	3000	10~1200	2.5~25	50
	FH	Long life & Low E.S.R.			●		-55~+105	5000	100~1800	2.5~16	52
	FT	125°C / 2000hrs & Low E.S.R.			●		-55~+125	2000	10~1000	6.5~25	54
CHIP	Surface Mounting Device	CS	●	●			-40~+85	2000	1~220	4~50	56
		CA	●	●			-40~+85	2000	1~100	6.3~50	58
		CN	●	●			-40~+85	2000	1~47	6.3~50	60
		CR	●				-40~+85	2000	3.3~1500	4~100	62
		CT	●	●			-55~+105	1000	1~1500	6.3~50	64
		CE	●				-40~+105	1000	1~100	6.3~50	66
		CP	●				-55~+105	1000	1~47	6.3~50	68
		CH	●		●		-55~+105	2000	1~470	4~50	70
		CU			●		-55~+105	3000~5000	1~1000	6.3~50	72
		CL		●	●		-55~+105	1000	1~100	6.3~50	74
		CF		●	●	●	-55~+105	1000~2000	1~1500	6.3~50	76
		CK			●		-55~+105	1000~2000	4.7~1500	6.3~50	78
		CZ			●	●	-40~+105	3000	10~1000	6.3~50	80
		CD			●	●	-55~+105	2000~5000	4.7~1500	6.3~50	82
		CJ			●	●	-55~+105	5000	10~470	6.3~50	84
		CB		●			-40~+125	2000	10~330	10~50	86
RADIAL	Miniature Size	SV		●			-40~+85	1000	1~330	4~50	87
		ST		●			-55~+105	1000	1~100	4~50	89
		NT		●			-40~+85	1000	1~47	6.3~50	90
		SS		●			-40~+85	1000	1~330	4~63	91
		SH	●	●			-55~+105	1000	1~220	6.3~50	92
		SL		●	●		-55~+105	1000	4.7~220	6.3~50	93
		SA		●	●	●	-40~+105	5000	1~270	6.3~50	95
		NS		●			-40~+85	1000	1~100	6.3~50	97
	Standard	SK	●				-40~+85	2000	1~22000	6.3~450	98
		TK	●				-55~+105	2000	1~68000	6.3~450	101
		NK	●				-40~+85	2000	1~6800	6.3~100	105
		LK	●				-40~+85	2000	10~1000	10~63	107
	Low Impedance	MZ		●	●		-40~+105	2000	470~4700	6.3~25	109
		TE			●	●	-40~+105	2000~6000	15~15000	6.3~100	111
		TQ			●	●	-40~+105	5000~6000	47~8200	6.3~35	115
		TT			●	●	-40~+105	4000~10000	15~8200	6.3~100	117
		TV			●	●	-55~+105	4000~10000	10~15000	6.3~100	121

Classification	Series	Features · Application	Standard Type	Miniature Sized	Low Impedance	Long Life	Temperature Range (°C)	Load Life (Hour)	Capacitance Range (μF)	Rated Voltage Range (V.D.C.)	Page
RADIAL	Low Impedance	TU	Low impedance, Long life		●	●	-40~+105	6000~10000	8.2~8200	6.3~100	124
		TP	High temperature and high reliability			●	-55~+105	6000~20000	1~4700	10~35	127
		WL	Low impedance, miniature sized	●	●		-55~+105	1000~2000	4.7~10000	6.3~63	129
		WJ	Ultra low impedance		●		-40~+105	2000	100~4700	6.3~25	134
		WG	Low impedance, high ripple current	●	●	●	-55~+105	2000~3000	47~4700	10~100	136
		TL	Low impedance, high reliability		●	●	-40~+105	2000~5000	10~5600	6.3~63	138
		TZ	Low impedance, high reliability		●	●	-55~+105	2000~5000	10~15000	6.3~63	140
		TC	High voltage, Specially size	●			-40~+105	2000	22~120	400~500	142
		TH	Low impedance, high voltage		●	●	-40~+105	2000~3000	2.2~220	160~450	144
		TX	Low impedance, high voltage, long life		●	●	-40~+105	5000	3.3~330	160~450	146
		TJ	Long life, Specially size			●	-40~+105	5000	33~100	350~450	148
		TF	High ripple current, high voltage, long life			●	-40~+105	8000~10000	6.8~220	160~450	149
		TR	Higher ripple, Long life			●	-40~+105	10000~12000	6.8~560	160~450	151
		TA	Long life, Specially size			●	-40~+105	10000	33~100	350~450	153
	Special Equipment	WB	High temperature, 125°C	●			-55~+125	2000	10~1000	10~50	154
		WE	High temperature, Long life			●	-40~+125	2000~5000	1~4700	10~450	155
		WF	High tem, Low impedance, Ultra long life		●	●	-40~+125	3000~5000	470~6800	25~63	157
		WH	High temperature, 130°C			●	-40~+130	1000~4000	22~4700	10~50	159
		TW	LED Lighting, Ultra long life	●	●		-40~+105	12000~20000	1~33	160~400	161
		NC	Bi-polar, for twinkling light	●			-40~+85	1000	1500~2200	13	163
		RV	No spark with DC overvoltage	●			-25~+105	2000	22~220	200~400	164
LARGE CAN	Snap-in Terminal	LS	General purpose	●			-40~+85	2000	82~100000	16~500	166
		HS	Wide temperature range	●	●		-40~+105	2000	47~56000	16~500	170
		HM	Small case than HS	●			-25~+105	2000	68~3300	160~450	174
		LT	Long life, high ripple current			●	-40~+85	3000	82~33000	16~450	176
		LB	Long life, high ripple current			●	-40~+85	3000	330~270000	16~550	179
		LL	Long life,high voltage,high ripple current			●	-40~+85	5000	47~2200	160~450	182
		HT	Long life, wide temperature range			●	-40~+105	3000	47~33000	16~450	184
		HB	Long life, wide temperature range			●	-40~+105	3000	390~250000	16~500	187
		HV	No sparks with DC overvoltage			●	-25~+105	3000	68~1500	200~400	190
		HL	Long life 5000hrs. wide temperature range		●	●	-40~+105	5000	47~1800	200~450	192
		HF	High voltage, long life			●	-40~+105	7000	47~2200	160~450	194
		HX	High voltage,long life 10000hrs			●	-40~+105	10000	39~1500	200~450	196
	Screw Terminal	KP	High ripple current	●			-40~+85	2000	270~680000	6.3~450	198
		MP	Hight voltage, high reliability			●	-40~+85	5000	1000~18000	350~450	202
		GP	High reliability, A1 can with threaded stud mounting			●	-40~+85	5000	1000~18000	350~450	204
		UP	High reliability, A1 can with threaded stud mounting			●	-40~+85	10000	1000~15000	350~450	206
		WP	High ripple current, high reliability	●			-25~+85	2000	390~39000	160~550	208
		QP	High ripple current, high reliability	●			-25~+105	2000	820~22000	160~500	211
		RP	High ripple, wide temperature range	●			-40~+105	2000	1000~330000	10~450	214
		XP	Long life 5000hrs. high reliability		●	●	-40~+105	5000	680~33000	200~450	217
		BP	High reliability, A1 can with threaded stud mounting			●	-40~+105	5000	1000~15000	350~450	219
		JP	High voltage, high reliability			●	-40~+85	10000	1000~15000	350~450	221
		EP	High voltage, high reliability			●	-40~+105	10000	1000~15000	350~450	223

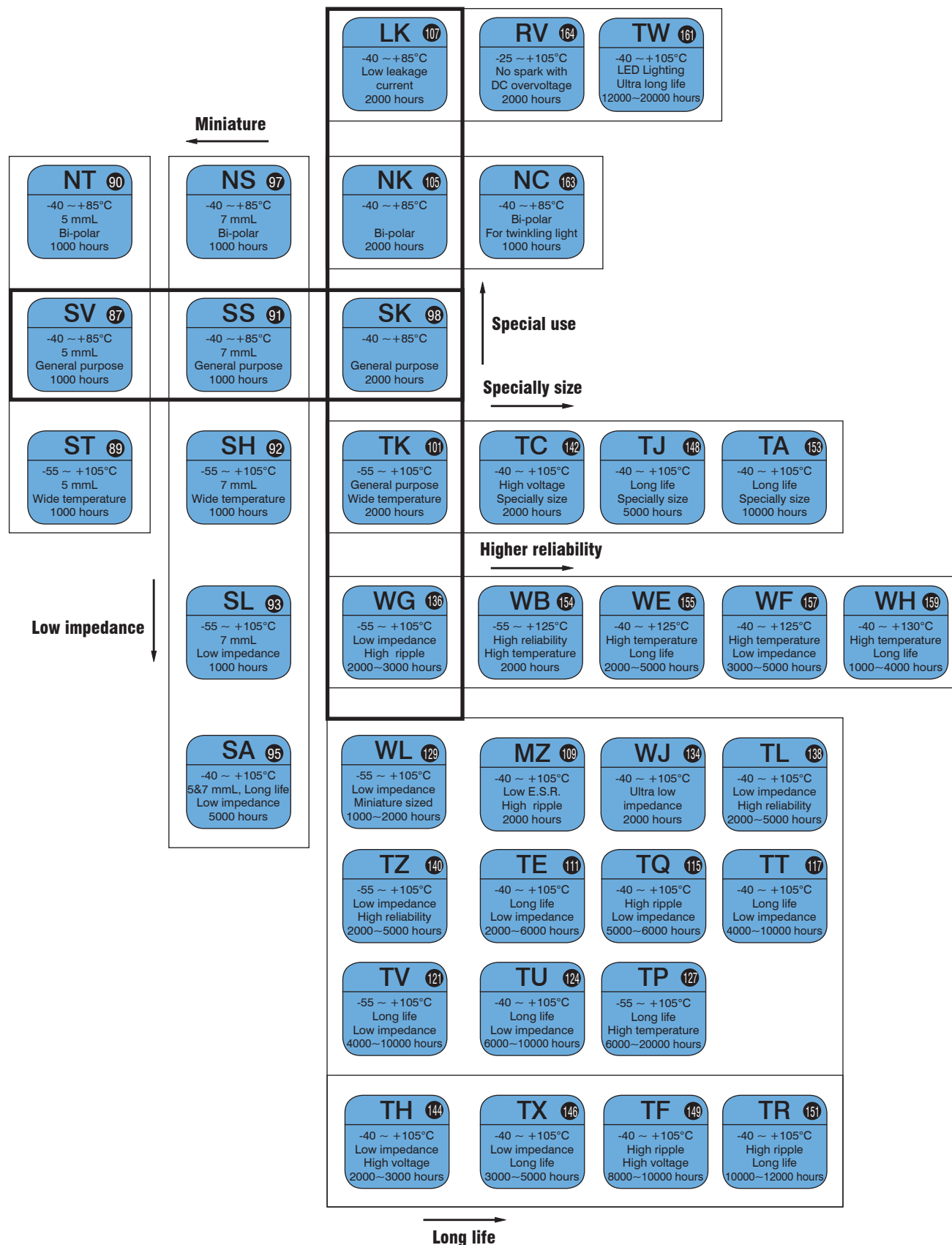
Solid Cap (Aluminum Solid Electrolytic Capacitor With Conductive Polymer)



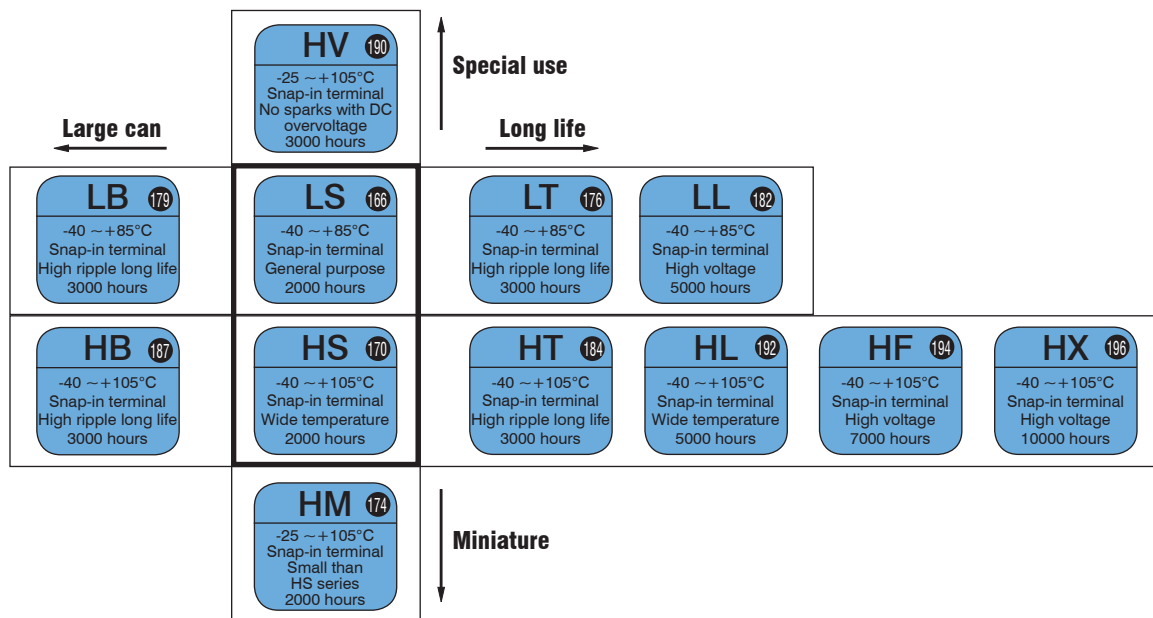
Chip Type (Surface Mounted Device)



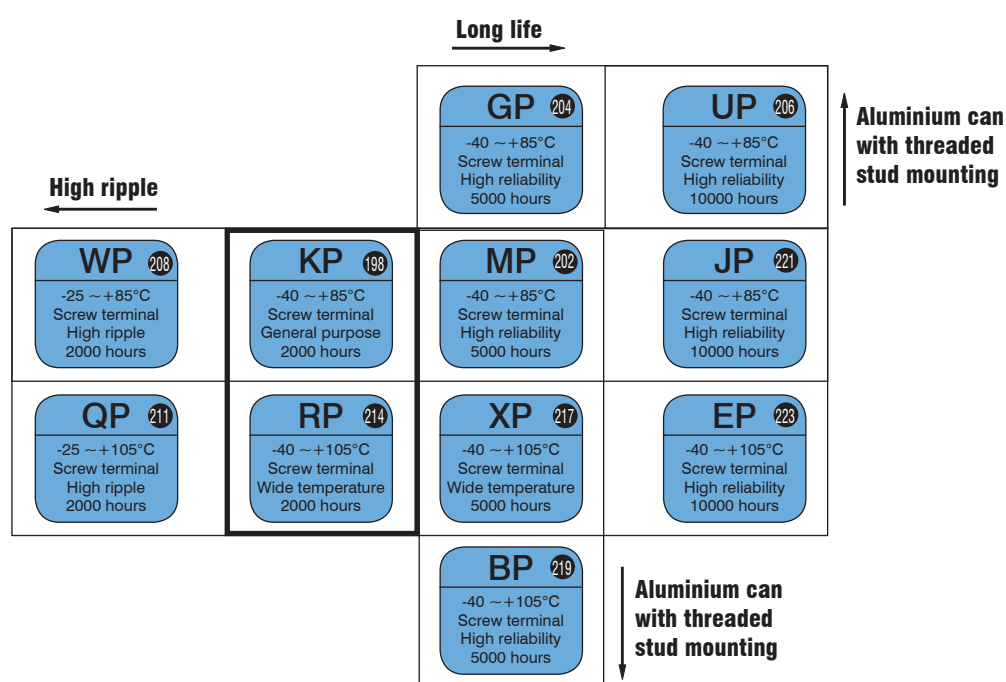
Miniature Type



Large Can Type (Snap-in terminal)



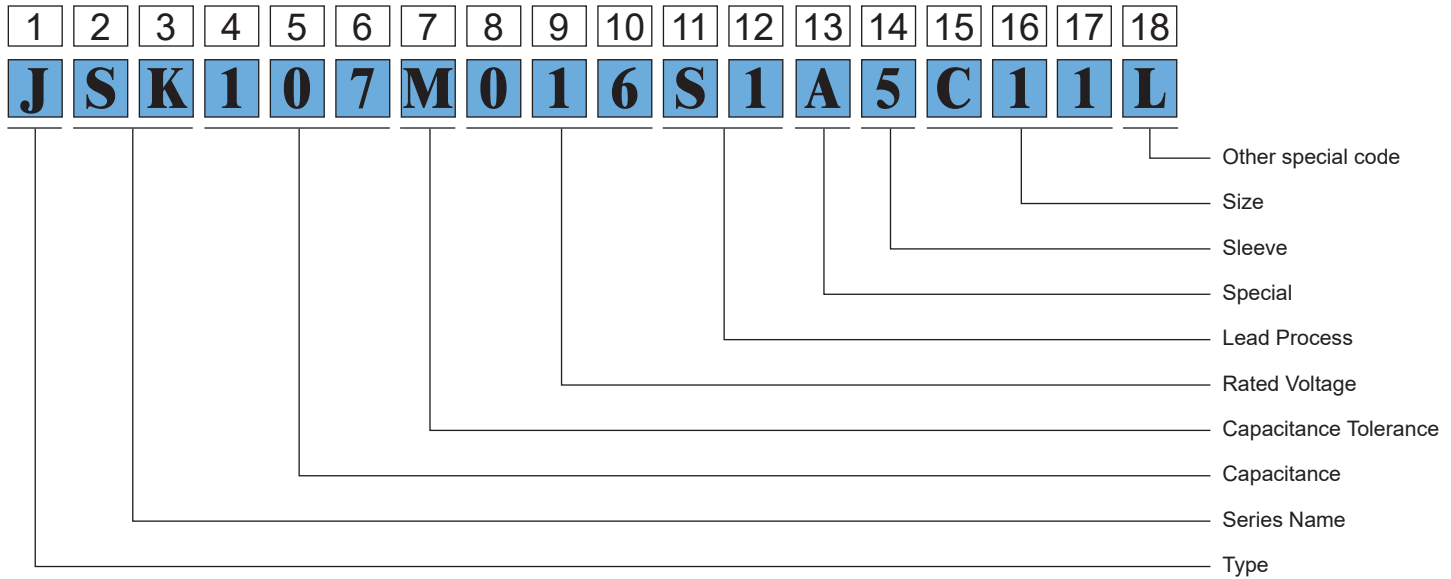
Screw Terminal Type



Recommended Applications	Conductive Polymer Aluminum Solid Capacitor	SURFACE MOUNT	RADIAL LEAD TYPE 6.3~100V	RADIAL LEAD TYPE 160~500V	SNAP-IN TYPE	SCREW TYPE
Lighting Equipment	FG、FF	CB	TV、TT、TU	TH、TA、TW、TJ、TX、TR	—	—
Network Communication	FG、FF	CK、CH、CU、CB	TL、TE、TT、TU	TJ、TX、TF、TA、TR	—	—
Ethernet Router / Switch	FG	CH、CK	WL、TT	—	—	—
Charger	FG、FF、FR、FL	CS、CR、CT、CH、CK、CU	WL、TL	TK	—	—
Power Supply	FG、FF、FR、FT	CS、CR、CT、CH、CK、CU	TK、TE	TK、TX、TJ	—	—
UPS	—	CH	—	—	HM、HF、LB、HB	KP、MP、GP、UP、WP、QP、RP、XP、BP、JP、EP
Control Panel	—	CS、CR、CT、CH	TK、WL	TK	—	—
Intelligent Electric Meters Intelligent Water Meter Intelligent Gas Meter	—	CK、CU、CH	TK、TE、TT	TK、TX、TJ、TC、TH	HS、HT	—
Audio	—	CS、CR、CH、CK、CU、CP	WL、TK、SK	—	LS、HS、HT、LB、HB	—
Automotive	—	CK、CU、CH	SK、TK、SL、TL、TE、WE、WF	—	—	—
Inverter / Converter (Industrial)	—	CH、CK、CU	—	TX、TR	HT、HL、HX、HF、LB、HB	KP、MP、GP、UP、WP、QP、RP、XP、BP、JP、EP
Inverter (Home Appliances)	—	CH、CK、CU	TK	TF、TA、TR	HS、HT、HL、HX、LT、LL	KP、MP、GP、UP、WP、QP、RP、XP、BP、JP、EP
Servo system	—	CH、CU	—	TX、TJ、TR	HL、HX	KP、MP、GP、UP、WP、QP、RP、XP、BP、JP、EP
Press processing Industrial Equipment	—	—	—	—	HL、HX	KP、MP、GP、UP、WP、QP、RP、XP、BP、JP、EP
Electric Car Equipment Charging pile	—	CH	—	—	HS、HL、HX	KP、MP、GP、UP、WP、QP、RP、XP、BP、JP、EP
Printer Facsimile Machine	—	CH、CK、CU、CF	TK	TC、TH、TX、TJ	HV、HS、HM	—
Elevator	—	CH	SK、TK、TV、TT、TE	TK、TX、TJ、TF、TA	HS、LS、HM、HL、HX、LL	—
Mainboard	—	CS、CR、CT、CH	SK、TK	SK、TK	—	—
Video	—	CF、CS、CL	SK、TL	—	—	—
Commercial and residential Power distribution/ Regulation equipment	—	—	—	—	HT	—
Medical	—	—	—	—	—	KP

PARTS NUMBER SYSTEM

JAMICON



Code 1 Type

Code	Model Type
J	Jamicon Radial Type (PET sleeve)
V	SMD (V-chip) Type (Nylon coating)
T	Jamicon Snap-in Type (PET sleeve)
P	Conductive Polymer Aluminum Solid Capacitor
N	Screw Type (PVC sleeve)
C	Jamicon Radial and Snap-in Type (PVC sleeve)
H	Snap-in Type (No Insulating base, PET sleeve)
M	Radial Type 8φ pitch=2.5mm (PET sleeve)

Code 2~3 Series Name (as content page 2 to page 3)

Code 4~6 Capacitance

Capacitance (μF)	0.47	4.7	47	470	4700	47000	470000	4700000	47000000	470000000
Product code	474	475	476	477	478	479	47A	47B	47C	47D

Code 7 Capacitance Tolerance

A : -8~+32%	B : -5~+10%	C : +10~+30%	D : -40~+0%	W : -15~+0%	X : -15~+5%
G : -30~+0%	H : -5~+15%	I : -20~+0%	J : -5~+5%	Q : -10~+30%	R : -0~+20%
M : -20~+20%	N : -30~+30%	O : -20~+10%	P : -0~+30%	K : -10~+10%	L : -15~+15%
S : -0~+50%	T : -10~+50%	U : -10~+75%	V : -10~+20%	E : -12~+20%	F : -5~+20%
Y : -10~+150%	Z : -20~+80%				

Code 8~10 Rated Voltage

Rated voltage (WV)	2.5	5	6.3	63	100	450
Product code	2R5	005	6R3	063	100	450

Code 11~12 Lead Process

Code processing form	Code 11	Code 12	Description
Standard	A	1	Screw type standard type
	S	0	Standard SMD type
Ammo tape	T	1	Standard Dip & Snap-in type
		2	Standard ammo tape (pitch 5mm for dia.~13mm)
		4	Ammo tape with straight lead (available for dia.4~8mm)
Reel tape	R	1	Ammo formed tape with pitch 2.5mm (available for dia.4~5mm)
		2	Standard reel tape (pitch 5mm for dia.~10mm)
		3	Reel tape with straight lead (available for dia.4~8mm)
Straight cut	C	3	Reel formed tape with pitch 2.5mm (available for dia.4~5mm)
		5	Straight cut lead with L : 3.2±0.5mm
		7	Straight cut lead with L : 4.0±0.5mm
Kink (Crimp) cut	K	2	Straight cut lead with L : 5.0±0.5mm
Formed cut	F	6	Kink cut lead with L : 4.5±0.5mm
			Formed cut lead with L : 4.0±0.5mm (pitch : 5mm)

Code 13 Special Specification

A	Standard	J	SMD is 25pes each row, the bend of SNAP-IN terminal foot is 90°	S	Spacer special DIP special requirement	2	Life & ESR special
B	DF (tanδ) special	K	Above life specified in catalog	T	Length of body special fortolerance	3	Life & impedance special
C	ESR special	L	Pins or wire diameter	U	Pack special	4	Life & Ripple current special
D	Impedance special	M	Customer requirements	V	Sleeve special	5	Life & LC special
E	Ripple current special	N	Pitch special	W	Capacitance special	6	Life & rubber cover or capacitor cover plate
F	LC special	O	LC & ESR or impedance special	X	DF & LC & ESR or impedance special	7	DF & ESR or impedance special
G	GUM or special for capacitor cover plate or non-salient point in bottom	P	Under life specified in catalog	Y	RC & LC & ESR or impedance special	8	DF & RC special
H	Customer requirements	Q	DF & Ripple current & ESR or impedance special	Z	Frquency & ESR or impedance special	9	DF & LC special
I	RC & LC special	R	Shelf is 1000hrs	1	Life & DF special	0	RC & ESR or impedance special

Code 14 Sleeve Code (please contact us if the sleeve code in the form cannot corresponding with your requirement.)

Code	Series	Color
5	NT,SS,SA,NS,SK,NK,TE,TQ,TT,TV,TP,WJ,TR,TW,WE,RV,WH,LS,HS,HM,LB,HB,HF,HX KP,MP,GP,UP,WP,QP,RP,XP,BP,JP,EP	Black with white printing
6	SV,TU,WF	Black with golden printing
7	LT,HT	Green with white printing
9	MZ	Green with silvery printing
A	LK,WB	Green with black printing
B	TL,TZ,TH,LL,HL,HV	Brown with white printing
C	SL,WL,TF	Green with golden printing
M	SH,TK,ST,TC	Black with blue printing
U	WG	Dark purple with white printing
Z	TX,TJ,TA	Brown with silvery printing
N	CS,CA,CN,CR,CT,CE,CP,CH,CU,CL,CF,CK,CZ,CD,CJ,CB FG,FP,FR,FF,FS,FH,FT,FL,VP,VB,VS	SMD standard pack & POLYMER
Q	NC	Blue with black printing

Code 15~17 Case Size (please contact us if the case size is required and not shown in the table.)

Code 15 Diameter

Code	A	B	C	D	E	F	G	8	H
Case size	3	4	5	5.5	6.3	7.3	8	8.2	10
Code	9	J	K	L	M	N	7	P	Q
Case size	10.2	12	12.5	13	16	18	18.5	20	22
Code	R	S	T	U	V	W	X	Y	Z
Case size	25	30	35	40	45	51	64	77	90

Code 16~17 Length

For ECAP-DIP & POLYMER-DIP & SNAP-IN & SCREW TYPE:

Code	05	07	09	10	1A	11	1B	12	1C	13
Length	05	07	09	10	10.5	11	11.5	12	12.5	13
Code	14	15	16	17	18	20	25	30	3B	32
Length	14	15	16	17	18	20	25	30	31.5	32
Code	35	3F	36	40	45	50	55	60	65	70
Length	35	35.5	36	40	45	50	55	60	65	70
Code	75	80	90	96	A0	B5	C1	D0	E4	F5
Length	75	80	90	96	100	115	121	130	144	155

For V-CHIP SMD

Code	01	02	03	04	05	06	07	08
Length	5.4	6.2	10.2	7.7	13.5	16、16.5	12.5	5.8

For POLYMER SMD

Code	A1	A2	A3	A4	A5	A6	A7	A8	A9
Length	5.8	6.0	6.7	7.7	10.2	10.4	12.0	12.2	9.0

Code 18 Other special code

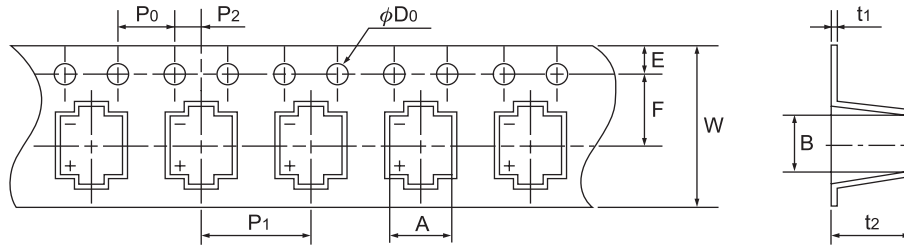
H: Intelligent instrument	R: Medical	X: Weekly date code
L: Jamicon	S: Auto grade	6: Industrial equipment / inverter

LEAD STYLE & TAPING SPECIFICATION

JAMICON

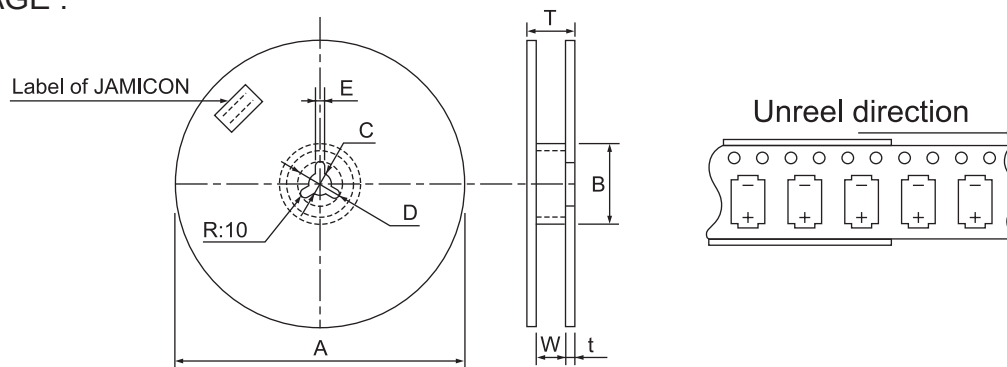
● CHIP TYPE (CS, CA, CN, CR, CT, CE, CP, CH, CU, CL, CF, CK, CZ, CD, CJ, CB, VP, VB, VS Series)

● TAPING :



D x L	W ±0.3	A ±0.2	B ±0.2	P0 ±0.1	P1 ±0.1	P2 ±0.1	F ±0.1	φD0 ±0.1	t1 ±0.1	E ±0.1	t2 ±0.2
4x5.4	12.0	4.7	4.7	4.0	8.0	2.0	5.5	1.5	0.4	1.75	5.7
5x5.4	12.0	5.7	5.7	4.0	12.0	2.0	5.5	1.5	0.4	1.75	5.7
6.3x5.4	16.0	7.0	7.0	4.0	12.0	2.0	7.5	1.5	0.4	1.75	5.7
4x5.8	12.0	4.7	4.7	4.0	8.0	2.0	5.5	1.5	0.4	1.75	6.3
5x5.8	12.0	5.7	5.7	4.0	12.0	2.0	5.5	1.5	0.4	1.75	6.4
6.3x5.8	16.0	7.0	7.0	4.0	12.0	2.0	7.5	1.5	0.4	1.75	6.4
6.3x7.7	16.0	7.0	7.0	4.0	12.0	2.0	7.5	1.5	0.4	1.75	8.2
8x6.2	16.0	8.7	8.7	4.0	12.0	2.0	7.5	1.5	0.4	1.75	6.8
8x9	24.0	8.7	8.7	4.0	16.0	2.0	11.5	1.5	0.4	1.75	10.0
8x10.2	24.0	8.7	8.7	4.0	16.0	2.0	11.5	1.5	0.4	1.75	11.0
10x10.2	24.0	10.7	10.7	4.0	16.0	2.0	11.5	1.5	0.4	1.75	11.0
12.5x13.5	32.0	13.4	13.4	4.0	24.0	2.0	14.2	1.5	0.4	1.75	14.0
12.5x16	32.0	13.4	13.4	4.0	24.0	2.0	14.3	1.5	0.4	1.75	16.2
16x16.5	44.0	17.5	17.5	4.0	28.0	2.0	20.2	1.5	0.4	1.75	16.7

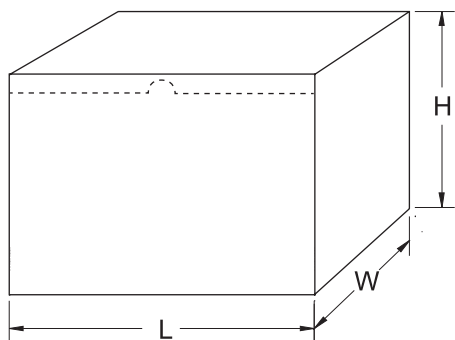
● PACKAGE :



Unit : mm

D x L	A ±2.0	B min	C ±0.5	D ±0.8	E ±0.5	W ±1.0	T ±1.0	t ±0.5
φ4 φ5	380	50	13	21	2.0	14.0	20.0	3.0
φ6.3	380	50	13	21	2.0	18.0	24.0	3.0
8x6.2	380	50	13	21	2.0	18.0	24.0	3.0
8x9	380	50	13	21	2.0	26.0	32.0	3.0
8x10.2	380	50	13	21	2.0	26.0	32.0	3.0
10x10.2	380	50	13	21	2.0	26.0	32.0	3.0
12.5x13.5	380	84	13	42	2.0	32.0	36.0	2.0
12.5x16	380	84	13	42	2.0	32.0	36.0	2.0
16x16.5	380	84	13	42	2.0	44.0	48.0	2.0

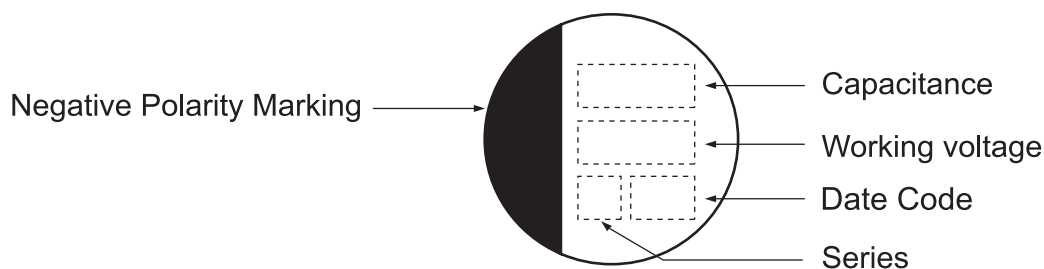
● PACKING VOLUME INNER BOX :



D x L	L	W	H
φ4	390	195	395
φ5	390	195	395
φ6.3	390	225	395
8 x 6.2	390	225	395
8 x 10.2	390	245	395
8 x 10.4	390	245	395
10 x 10.2	390	245	395
10 x 12.2	390	245	395
12.5 x 13.5	390	255	405
12.5 x 16.0	390	255	405
16 x 16.5	390	255	405

D x L	Pcs / Reel	Reel / Inner Box	Pcs / Inner Box
4 x 5.4	2,000	10	20,000
5 x 5.4	1,000	10	10,000
6.3 x 5.4	1,000	10	10,000
4 x 5.8	2,000	10	20,000
5 x 5.8	1,000	10	10,000
6.3 x 5.8	1,000	10	10,000
6.3 x 7.7	1,000	10	10,000
8 x 6.2	1,000	10	10,000
8 x 10.2	500	8	4,000
8 x 10.4	500	8	4,000
10 x 10.2	500	8	4,000
10 x 12.2	400	8	3,200
12.5 x 13.5	200	6	1,200
12.5 x 16.0	150	6	900
16 x 16.5	125	6	625

● MARKING (Non-Conductive polymer)



● RADIAL TYPE

● SPECIFICATION

Lead taping is designed for automatic insertion equipment. Capacitor with case size of 18mm x 36mm or smaller are available in taping type.

■ DIMENSIONS ($\phi 4 \sim \phi 10$)

(mm)

Item	Symbol	Case Size														Tolerance	Remark
		4 x 5	5 x 5	6.3x5	8 x 5	4 x 7	5 x 7	6.3x7	8 x 7	5 x 11	6.3x11	8 x 11	10x12.5	10x16	10x20		
Lead wire diameter	d	0.45						0.5			0.6					± 0.05	
Body height	A	6.0				8.0				12.5		12.5	14	17.5	21.5	max	
Intervals of bodies	P	12.7														± 1.0	
Intervals of punched holes	P0	12.7														± 0.2	
Distance between holes and lead wire	P1	3.85														± 0.7	Fig 1. Fig 2. Fig 3.
		5.35	5.1	5.1			5.35	5.1	5.1			5.1					Fig 5.
		5.6	5.35	5.1	5.1	5.6	5.35	5.1	4.6	5.35	5.1	4.6			Fig 6.		
Distance between holes and bodies	P2	6.35														± 1.0	
Distance between lead and lead	F	5.0														+0.6 -0.2	Fig 1. Fig 2. Fig 3.
		2.0	2.5	2.5			2.0	2.5	2.5			2.5					Fig 5.
		1.5	2.0	2.5	2.5	1.5	2.0	2.5	3.5	2.0	2.5	3.5			Fig 6.		
Base tape width	W	18.0														± 0.5	
Adhesive tape width	W0	8.0														min	
Deviation between holes and base tape	W1	9.0														± 0.5	
Deviation between adhesive and base tape	W2	2.0														max	
Distance between body bottom and tape center	H	18.5														± 0.5	
Lead wire clinched hight	H0	16.0														± 0.5	
Punched hole diameter	D0	4.0														± 0.3	
Base and adhesive tape thickness	t	0.6														± 0.3	
Deviation of body alignment	Δh	0.2														max	
Deviation of body alignment	ΔP	0.2														max	

Fig 1. :Code T1($\phi 4 \sim \phi 6.3$)

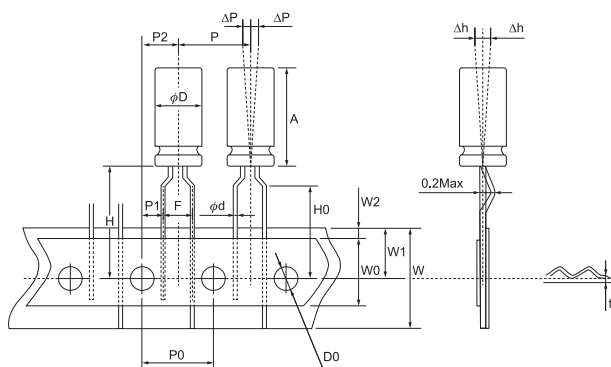


Fig 2. :Code T1($\phi 8$)(P3=2.0~2.7, $\theta=110^\circ \pm 15^\circ$)

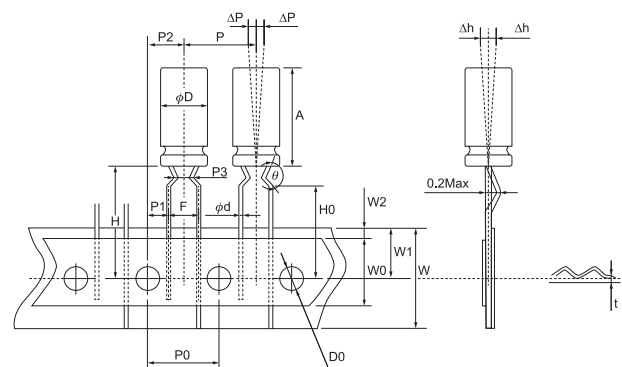


Fig 3. : Code T1($\phi 10 \sim \phi 12.5$)

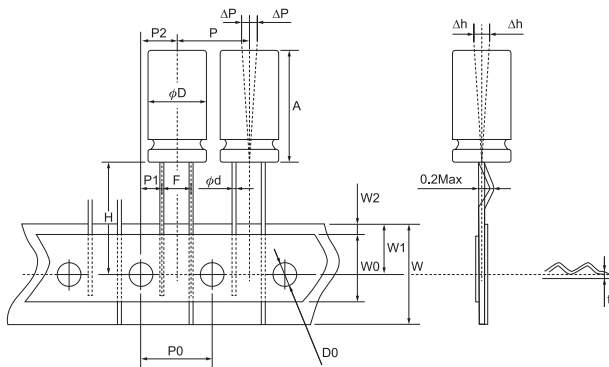
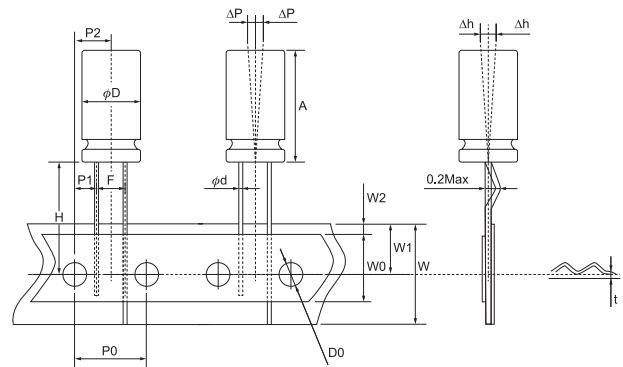


Fig 4. : Code T1($\phi 16 \sim \phi 18$)



DIMENSIONS ($\phi 12.5 \sim \phi 18$)

(mm)

Item	Symbol	Case Size							Tolerance	Remark
		12.5 x 20	12.5 x 25	12.5 x 30	16 x 25	16 x 32	16 x 36	18 x 36		
Lead wire diameter	d	0.6			0.8				± 0.05	
Body height	A	22	27	32	27	34	38	38	max	
Intervals of bodies	P	15.0			30.0				± 1.0	Fig 3. Fig 4
Intervals of punched holes	P0	15.0			15.0				± 0.2	
Distance between holes and lead wire	P1	5.0			3.75				± 0.7	
Distance between holes and bodies	P2	7.5			7.5				± 1.3	
Distance between lead and lead	F	5.0			7.5				+0.6 -0.2	
Base tape width	W	18.0			18.0				± 0.5	
Adhesive tape width	W0	8.0			8.0				min	
Deviation between holes and base tape	W1	9.0			9.0				± 0.5	
Deviation between adhesive and base tape	W2	2.0			2.0				max	
Distance between body bottom and tape center	H	18.5			18.5				± 0.5	
Punched hole diameter	D0	4.0			4.0				± 0.3	
Base and adhesive tape thickness	t	0.6			0.6				± 0.3	
Deviation of body alignment	Δh	0.2			0.2				max	
Deviation of body alignment	ΔP	0.2			0.2				max	

Fig 5. : Code T * ($\phi 4 \sim \phi 5$)

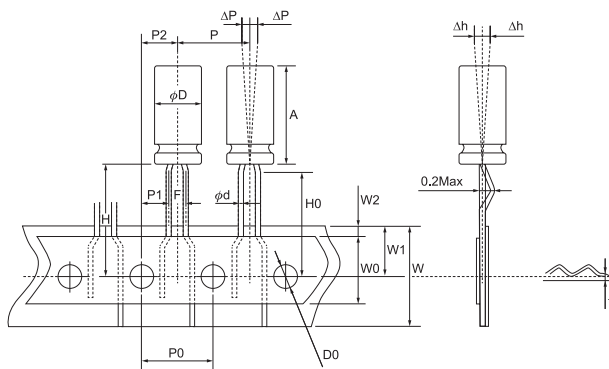
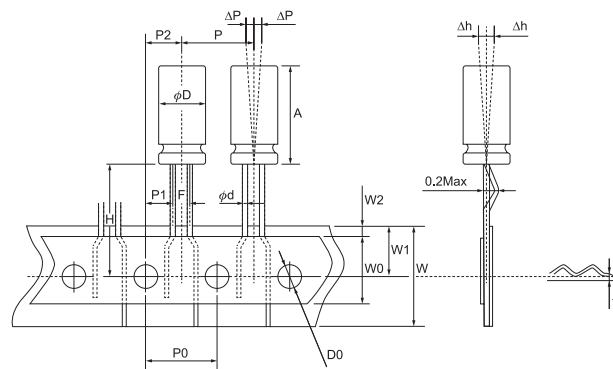


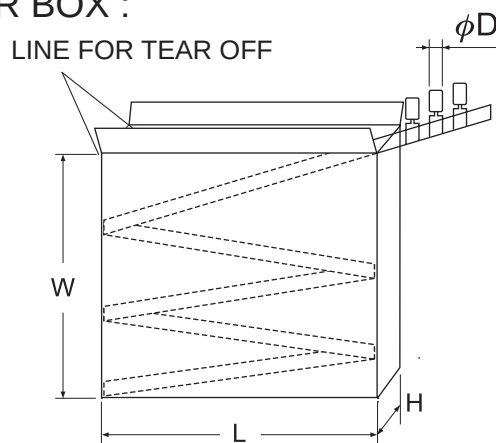
Fig 6. : Code T * ($\phi 4 \sim \phi 8$)



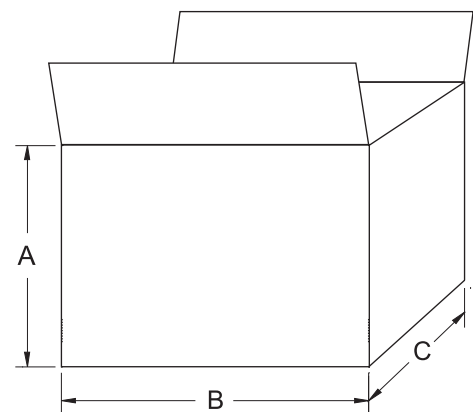
● PACKING (Lead Taping)

Available for various automatic equipment. Choosing the ordinal the polarity of capacitor's lead depends on customer's request.

■ INNER BOX :

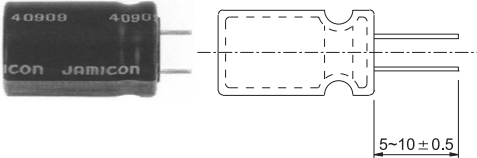
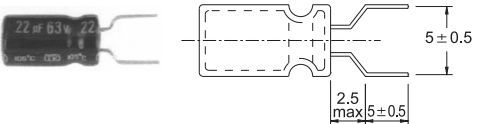
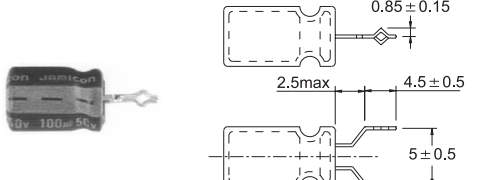
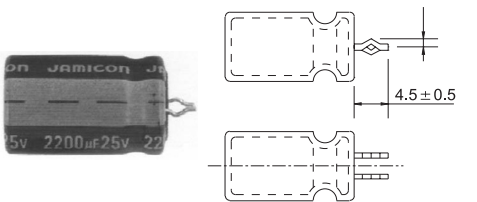


■ PACKING CARTON :



D×L	INNER BOX				PACKING CARTON				
	W±10(mm)	L±10(mm)	H±10(mm)	Quantity(Pcs)	A±10(mm)	B±10(mm)	C±10(mm)	Inner Box	Quantity(Pcs)
4φ	275	330	50	3,000	290	345	278	5	15,000
5φ	230	330	50	2,000	248	345	280	5	10,000
6.3φ	275	330	50	2,000	290	345	278	5	10,000
8φ x 5~16L	230	330	50	1,000	248	345	280	5	5,000
8φ x 20L	230	330	58	1,000	245	345	320	5	5,000
10φ x 10~17L	230	330	50	600	248	345	280	5	3,000
10φ x 20~25L	230	330	58	600	245	345	320	5	3,000
10φ x 30L	230	330	65	600	245	345	290	4	2,400
12.5φ x 32L below	235	335	65	400	248	352	290	4	1,600
12.5φ x 36L below	235	335	74	400	248	352	325	4	1,600
16φ x 32L below	275	335	65	300	297	355	290	4	1,200
16φ x 36L below	275	335	74	300	297	355	337	4	1,200
18φ x 20~32L below	288	340	63	260	305	360	280	4	1,040

● Lead Style

Item List		Code	Lead Diameter (mm)	Case Size DxL(mm)	Range	Dimensions
Lead Style	Lead Cut	C*	0.5~0.8	5 x 11 } 18 x 40	$\phi 5 \sim \phi 18$	 5~10 ± 0.5
	Lead Forming Cut	FF	0.5~0.6	5 x 11 } 8 x 11.5	$\phi 5 \sim \phi 8$	 5 ± 0.5 2.5 max 5 ± 0.5
	Snap-in	F8	0.5~0.6	5 x 11 } 8 x 11.5	$\phi 5 \sim \phi 8$	 0.85 ± 0.15 2.5 max 4.5 ± 0.5 5 ± 0.5
		K2	0.6~0.8	10 x 12.5 } 18 x 40	$\phi 10 \sim \phi 18$	 1.0 ± 0.20 4.5 ± 0.5

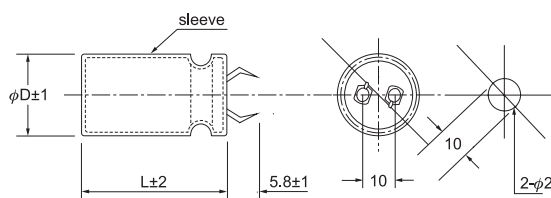
● Terminals of Snap-in type

■ Terminal Type (Part Number Code 11, Code 12, Code 13)

Code : S1A ($\phi 22 \sim 35$)



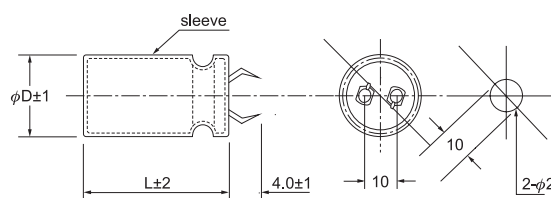
Location of P.C.B. holes



Code : S1G ($\phi 22 \sim 35$)



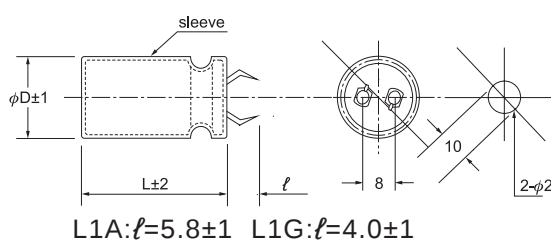
Location of P.C.B. holes



Code : L1* ($\phi 22 \sim 35$)



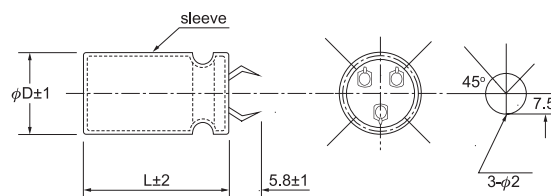
Location of P.C.B. holes



Code : LAA ($\phi 25 \sim 30$)



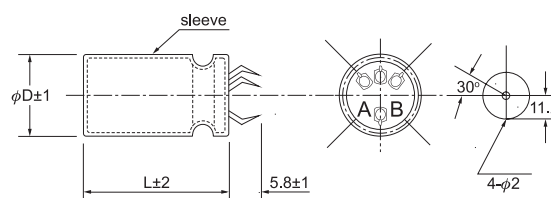
Location of P.C.B. holes



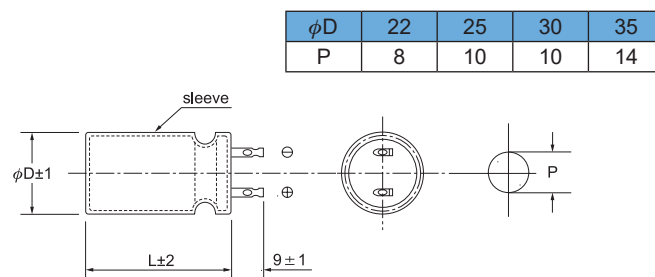
Code : L4A ($\phi 35 \sim 45$)



Location of P.C.B. holes



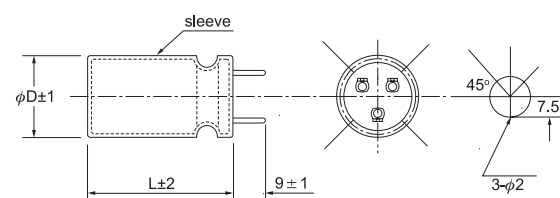
Code : LTA ($\phi 22 \sim 35$)



Code : LBA ($\phi 25 \sim 30$)



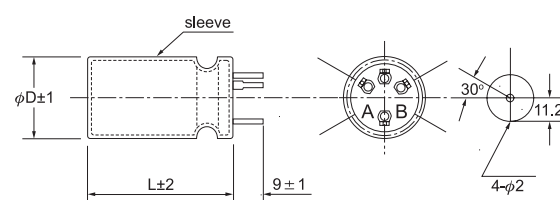
Location of P.C.B. holes



Code : LCA ($\phi 35$)



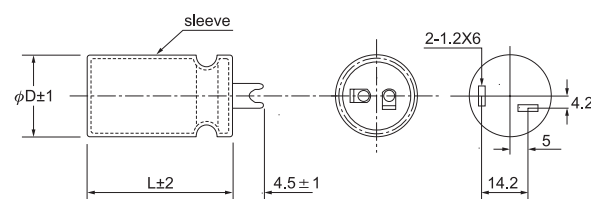
Location of P.C.B. holes



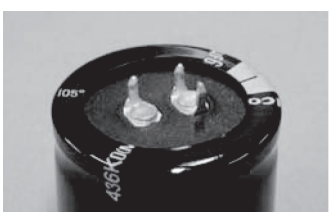
Code : LLG ($\phi 30 \sim 35$)



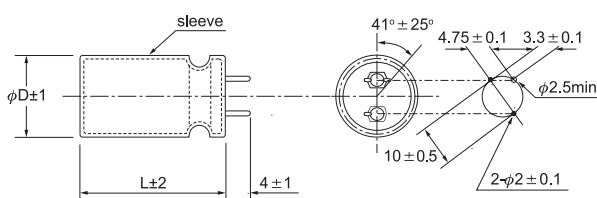
Location of P.C.B. holes



Code : L3G ($\phi 25 \sim 35$)



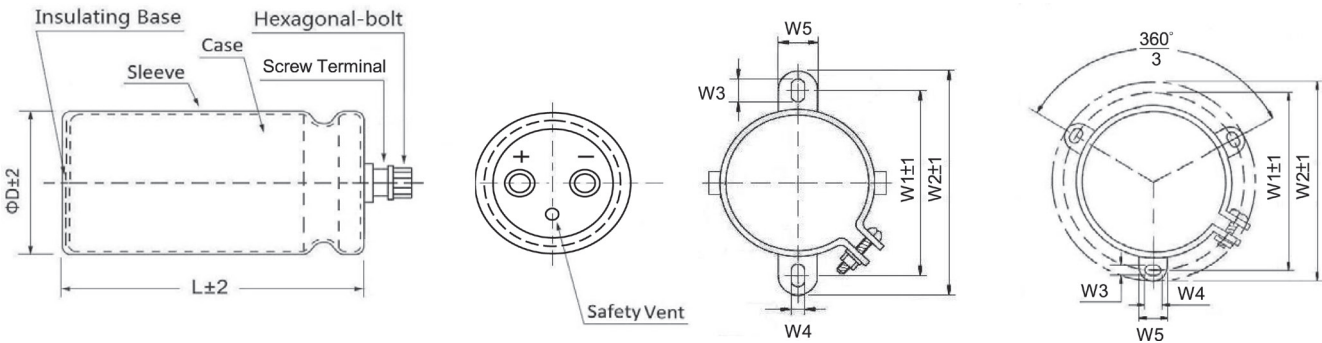
Location of P.C.B. holes



- Screw type
- Dimensions (φ35~90)

φD	W1	W2	W3	W4	W5
35	48.0	58.0	6.0	3.5	10
51	63.5	73.0	5.0	7.0	14
64	76.2	85.1	5.0	7.0	14
77	88.9	98.4	5.0	7.0	14
90	101.6	111.1	5.0	7.0	14

(▲ φ35) (▲ φ51, φ64, φ77, φ90)



PRECAUTIONS AND GUIDELINES OF ALUMINUM ELECTROLYTIC CAPACITOR (NON-CONDUCTIVE POLYMER)

A. Designing Device Circuits

1. Selecting

Select the capacitors to suit installation of circuit and operating conditions, and use the capacitors to meet the performance limits prescribed in this catalog or the product specifications.

2. Electrical Characteristic

- a. Aluminum Electrolytic Capacitors are polarized. Please do not apply either reverse voltage or AC voltage to polarized capacitors. Using reversed polarity causes a short circuit or venting. Before use, please refer to this catalog, product specifications or capacitor body to identify the polarity marking. Use a bi-polar for a type of non-conductive polymer aluminum electrolytic capacitor for a circuit where the polarity is occasionally reversed. However, note that even a bi-polar aluminum electrolytic capacitor must not be used for AC voltage applications.
- b. Do not apply a DC voltage which exceeds the specified rated voltage.
DC voltage + peak voltage of a superimposed ripple voltage $\leq$ specified rated voltage. A surge voltage value, is prescribed in this catalog, but it is a restricted for especially short periods of time.
- c. Do not apply over-current which exceeds the specified rated ripple current. An exceed ripple current can increase the rate of heating within the capacitor, which may occur failure mode as shorten lifetime, open vent, short circuit etc. The rated ripple current has been specified at a certain frequency. The rated ripple current at several frequencies must be calculated by multiplying the rated ripple current at the original frequency using the frequency multipliers for each product series
- d. For general purpose used capacitor, do not use capacitors in circuits where heavy charge and discharge cycles are frequently repeated. Frequent and sharp heavy discharging cycles will result in decreasing capacitance and damage to the capacitors due to generated heat. Specified capacitors can be designed to meet the requirements of charging-discharging cycles, frequency, operating temperature, etc. Please contact us if you need to install our product in this frequently repeated charge and discharge circuit.

3. Ambient Temperature

Do not apply over temperature which exceeds the maximum operating temperature. Applied under an ambient temperature which exceeds the maximum operating temperature, can considerably shorten the life or cause the capacitor to vent.

4. The life of Capacitor

Select the capacitors to meet the service life of a device. Please be reminded that, the result using the life calculating formula is not guaranteed. During your design stage, please select capacitor which is higher than your actual required life value. Apart from this, if your life calculation is exceeds 15 years, please consider 15 years as the maximum life level.

5. Failure mode of capacitors

Non-solid aluminum electrolytic capacitors, in general, have a lifetime which ends in an open circuit, but depending on conditions of usage or products type, failure mode of capacitors will be venting.

6. Insulating between positive and negative polar

Electrically isolate the following parts of a capacitor from the negative terminal, the positive terminal and the outer casing. The dummy terminal of a non-conductive polymer aluminum capacitor, which is designed for mounting stability, so is isolated with positive and negative terminal too.

7. The sleeve cover

The outer sleeve of a non conductive polymer capacitor is not assured as an insulator (Except for screw type), so please don't use it as an insulator. Please contact our sales representative if you need any more details in this area.

8. Condition of application

Do not use / expose capacitors to the following conditions.

- a. Spray directly by water, salty water, Oil, or storage in damp location.
- b. Direct sunlight.
- c. Storage in location with toxic gases, such as hydrogen sulfide , sulfurous acid , nitrous acid , chlorine or its compounds , and ammonium.
- d. Ozone , ultraviolet rays or radiation condition.
- e. Severe vibration or mechanical shock conditions beyond the limits prescribed in the catalogs or the product specification.

9. Mounting

a. Non conductive polymer capacitor

The paper separators and the electrolytic-conductive electrolytes in a non conductive polymer aluminum electrolytic capacitor are flammable. Leaking electrolyte on a printed circuit board can gradually erode the circuit on PC board, possibly causing smoke or burning.

Verify the following points when designing a PC board.

- Provide the appropriate holes spacing on the PC board to match with the terminal pitch of the capacitor.
- Make the following open space over the vent so that the vent can operate correctly.

$\leq \phi 16\text{mm}$: 2mm and above

$\phi 18 \sim \phi 35\text{mm}$: 3mm and above

$\geq \phi 40\text{mm}$: 5mm and above

- Do not place any wires or circuit traces over the vent of the capacitor.
- If Install a capacitor with the vent touching the PC board, needs an appropriate ventilation hole in PC board for vent open.
- Do not pass any circuit traces under the seal side of a capacitor. The trace must pass 1 or 2mm to the side of the capacitor.
- Avoid placing any heat-generating object adjacent to a capacitor or even on the reverse side of the PC board.
- Do not pass any via holes underneath a capacitor on double sided PC board.
- In designing double sided PC board do not locate any copper trace under the seal side of a capacitor.

b. Screw type capacitor

Do not tighten the screw of the terminals and mounting clamps over the specified torque prescribed in the catalog or the production specification. Do not mount the terminal side of a screw mount capacitor downwards

c. Chip type capacitor

For a surface mount capacitor design the solder point, please follow the dimension prescribed in the catalogs or the product specification.

10. Others in safety application

Using capacitor for applications which always consider safety. Consult with our company sales representative before use in applications which can affect human life. (Space equipment, aerial equipment, nuclear equipment, medical equipment, vehicle control equipment, etc)

11. Others

- a. The electrical characteristic of capacitors vary in respect to temperature and frequency, design the device circuit by taking these changes into consideration.
- b. Capacitors mounted in parallel need the current to flow equally through the individual capacitors.
- c. Capacitors mounted in series require resistors in parallel with the individual capacitors to balance the voltage, or can install parallel protect resistor with it.

B. Notice of Installing Capacitors

1. Installing

- a. Used capacitors are not reusable, except in the case that the capacitor are detached from a device for periodic inspection to measure their electrical characteristics.
- b. If the capacitors have self charged, discharge in the capacitors through a resistor of approximately $1k\Omega$ before use.
- c. If the capacitors are stored at a temperature of 35°C or more and more than 75%RH, over the storage limit prescribed in the catalogs or the product specification, the leakage current may increase. In this case, they can be reformed by applying the rated voltage through a resistor of approximately $1k\Omega$.
- d. Verify the specification of the capacitor before installing (rated capacitance and voltage)
- e. Verify the polarity of the capacitors.
- f. Do not use the capacitors if they have been dropped on the floor.
- g. Do not deform the cases of capacitors.
- h. Verify that the lead pitch of the capacitor fits the holes spacing in the PC board before installing the capacitors. Some standard pre-formed leads are available for this fitting.
- i. For radial or snap in terminals, insert the terminals into PC board and press the capacitor downward until the bottom of the capacitor body reaches PC board surface.
- j. Do not apply any mechanical force in excess of the limits prescribed in the catalogs or the product specifications of the capacitors. Please notice that, the capacitors may be damaged by mechanical shocks caused by the vacuum / insertion head, component checker or centering operation of an automatic mounting or insertion machine.

2. Soldering heat and Solderability

- a. When soldering with a soldering iron
 - Soldering conditions (temperature and time) should be within the limits prescribed in the catalogs or the product specifications.
 - If the terminal pitch of a capacitor does not fit the terminal hole spacing of the PC board, can reform the terminals in a manner to minimize a mechanical stress into the body of the capacitor.
 - Do not touch the capacitor body with the hot tip of the soldering iron.
- b. Flow soldering
 - Do not dips the body of a capacitor into the solder bath only dip the terminals in. The soldering must be done on the reverse side of PC board.
 - Soldering conditions (preheat, solder temperature and dipping time) should be within the limits prescribed in the catalogs or the product specifications.
 - Do not apply flux to any part of capacitors other than their terminals.
 - Make sure the capacitors do not come into contact with any other components while soldering.
- c. Reflow soldering
 - Soldering conditions (preheat, solder temperature and soldering time) should be within the limits prescribed in the catalogs or the product specifications.
 - When setting the temperature infrared heaters, consider that the infrared absorption causes material to be discolored and change in appearance.
 - The limit of reflow time is prescribed in the catalogs or the product specifications.
 - Make sure capacitors do not come into contact with copper traces.
 - Vapor phase soldering (VPS) is not used.
- d. Do not re-use surface mount capacitors which have already been soldered.
- e. Reflow soldering only for chip type capacitor, others types are not allowed.

3. Handling after soldering

Do not apply any mechanical stress to the capacitor after soldering onto the PC board.

- a. Do not lean or twist the body of the capacitor after soldering the capacitors onto the PC board.
- b. Do not use the capacitor for lifting or carrying the assembly board.
- c. Do not hit or poke the capacitor after soldering to PC board. When stacking the assembly board, be careful that other components do not touch the aluminum electrolytic capacitors.
- d. Do not drop the assembly PC board.

4. Cleaning PC boards

- a. Do not wash capacitors by using the following cleaning agents.
 - Halogenated solvents; cause capacitors to fail due to corrosion.
 - Alkali system solvents; corrode (dissolve) an aluminum case.
 - Petroleum and terpene system solvents; cause the rubber seal material to deteriorate.
 - Xylene; causes the rubber seal material to dereriorate.
 - Acetone; erases the marking.
 - Ultrasound cleaning will accelerate damaging capacitors.
- b. Wash capacitors by using the following agents if need.
 - Ethyl alcohol
 - Buthyl alcohol
 - Methyl alcohol
 - Propyl alcohol
 - Be sure not to expose the capacitor under solvent rich conditions or keep capacitor with an air dryer (temperature should be less than the maximum rate category temperature of the capacitor) over 10 minutes, and be sure the PC board is dried.

5. Fumigation treatment

In many cases when exporting or importing electronic devices, wooden pallet packaging is used. Fumigation treatment is using halogenated chemical, if capacitor body touch with the chemicals, such status is same as cleaning PC board, halogen ion can cause capacitors to fail due to corrosion.

Our company is all using non-fumigation packaging to do exporting or importing.

Customer if need do any exporting or importing electronic devices, semi-product and aluminum electrolytic capacitor, please notice whether with or without fumigation treatment.

Final outer packaging, even using chipboard pallet with plastic bag cover, inner product still have a possible be polluted by halogen gas. Please notice.

C. The Operation notice of Devices

1. Do not touch terminals of capacitor directly with bare hands.
2. Do not short-circuit the terminal of a capacitor by letting it come into contact with any conductive object. Also, do not spill electri-conductive liquid such as acid or alkaline solution over the capacitor.
3. Do not use capacitor in circumstance where they would be subject to exposure to the following materials exist or expose.
 - a. Spay directly by water, salty water, Oil, or storage in damp location.
 - b. Direct sunlight.
 - c. Storage in location with toxic gases, such as hydrogen sulfide , sulfurous acid , nitrous acid , chlorine or its compounds , and ammonium.
 - d. Ozone , ultraviolet rays or radiation condition.
 - e. Severe vibration or mechanical shock conditions beyond the limits prescribed in the catalogs or the product specification.

D. Maintenance Inspection Notice

1. Make periodic inspections of capacitors that have been used in industrial applications. Before inspection, turn off the power supply and carefully discharge the electricity in the capacitors. When measuring the capacitors with a meter, do not apply any mechanical stress to the terminals of the capacitors.

2. The following item should be checked during the periodic inspections.

- Visual appearance : venting and electrolyte leakage.
- Electrical characteristics : leakage current(LC), capacitance(CAP), DF and other characteristics prescribed in our catalogs or product specifications.

We recommend replacing the capacitors if the parts are out of the specification.

E. In Case of Emergency

- a. For reducing the effect of inner gas pressure exploded, a higher capacitor is with vent mark on top. When venting, it will discharge odors or smoke, please immediately turn off or unplug the main power supply of the device. If we do not switch off the power, PC board may be damaged by the capacitor short-circuit failure, the worst is burn out the device. The gas which comes out from the pressure vent of a capacitor, it is not smoke by flammable, this is the vaporized electrolyte.
- b. When venting, inner capacitor blows out gas with a temperature of over 100°C, never expose the face close to a venting capacitor. If yours eyes should inadvertently become exposed to the spouting gas or you inhale It, immediately flush the open eyes with large amounts of water and gargle with water respectively. If electrolyte is on the skin, wash the electrolyte away from the skin with soap and plenty of water.

F. Storage

We recommend the following condition for storage.

1. Store the capacitor indoors at a temperature of 5 ~35°C and a relative humidity ≤75%.
The storage period is 1 years after production, and 2 years for Chip Type.
2. Please keep capacitor in the original package.
3. Please do not keep the capacitors in places,
 - a. Spray directly by water, high temperature high humidity, or storage in damp location.
 - b. Spray directly by oil, or with oily gas location.
 - c. Spray directly by salt water, or salty location.
 - d. Storage in location with toxic gases, such as hydrogen sulfide , sulfurous acid , nitrous acid , chlorine or its compounds , and ammonium.
 - e. Full with ammonium gas, alkaline toxic gas location.
 - f. With acidic and alkaline solvent location.
 - g. Directly sunlight, ozone , ultraviolet rays or radiation condition.
 - h. Severe vibration or mechanical shock conditions beyond the limits prescribed in the catalogs or the product specification.

G. Disposal

Please consult with a local industrial waste disposal specialist when disposing of aluminum.

Electrolytic capacitors. If burning, please burn it with high temperature (more than 800C).

Low temperature burning, can generate halogen gas which can affect human healthy. Besides that, in order to reduce exploding, please make a hole at the vent or damage it before burning.

H. Catalogs

The ESR value in the catalogs, measure area is the closet area to the capacitor body.

Specifications in catalogs may be subject to change without notice. Catalog data are typical.

This value does not guarantee the performance.

THE PROPER USAGE METHOD OF CONDUCTIVE POLYMER SOLID ALUMINUM ELECTROLYTIC CAPACITOR

1. Lifetime Estimation

Subject series : FR/FH/FG/FF/FS/FL/FT/FP/VB/VP/VS

Conductive polymer aluminum solid capacitors are finite life electronic components like aluminum electrolytic capacitors. The lifetime is affected by ambient temperature, humidity, ripple current and surge voltage.

The lifetime of aluminum electrolytic capacitors is affected mainly by the loss of electrolyte as the result of the liquid electrolyte evaporating through the rubber seal materials, resulting in capacitance drop and $\tan\delta$ rise. On the other hand, the lifetime of conductive polymer aluminum solid capacitors is affected mainly by oxidation degradation of the conductive polymer caused by osmose of oxygen or the thermal degradation of the conductive polymer by ambient temperature or self-heating, resulting in ESR rise and $\tan\delta$ rise. The infiltration rate of the oxygen is depend on the temperature as the liquid electrolyte evaporation and the relationship follows the Arrhenius's Law, too. Similarly, thermal degradation of the conductive polymer by self-heating follows the Arrhenius's Law, too. Therefore, the lifetime estimation has been using the theory of lifetime increasing by 10 times at every 20°C reducing of the ambient temperature.

1. Lifetime Estimation

Equation (1) can be used for estimating the lifetime of the conductive polymer aluminum solid capacitors based on the ambient temperature and the rise of internal temperature due to ripple current.

$$L_x = L_0 \times 10^{(T_0 - T_x)/20} \text{-----(1)}$$

L_x : Estimation of actual lifetime (hour)

L_0 : Specified lifetime with the rated voltage at the upper limit of the category temperature (hour)

T_0 : Maximum category temperature (°C)

T_x : Actual ambient temperature of the capacitor (°C)

Longer lifetime is expected by lowering the ripple current and the ambient temperature.

Please consult us about lifetime equations for the series of the category temperature 125°C.

Subject series : FT

An approximate value of ripple current-caused ΔT can be calculated using Equation (2)

$$\Delta T = \Delta T_0 \times (I_x / I_0)^2 \text{-----(2)}$$

ΔT_0 : Rise in internal temperature due to the rated ripple current (20°C) The product that the maximum category temperature is less than 105°C

I_x : Operating ripple current (Arms) actually flowing in the capacitor.

I_0 : Rated ripple current (Arms), frequency compensated, at the upper limit of the category temperature range.

Please contact us about the product that the maximum category temperature is more than 125°C.

To determine more accurate values of ΔT , they can be actually measured using a thermocouple.

2. Rated Ripple Current Frequency Multipliers

Self-heat rise is generated by the ripple current even though the conductive polymer aluminum solid capacitors have low ESR compared to liquid based electrolyte aluminum electrolytic capacitor. Longer lifetime is expected by lowering the ripple current and the ambient temperature.

Table 1 shows Frequency Multipliers of Rated ripple current.

Frequency Multipliers

Frequency [Hz]	120	1k	10k	50k	100k~500k
SMD type	0.05	0.3	0.55	0.7	1
Radial lead type	0.1	0.35	0.6	0.8	1

Conductive polymer aluminum solid capacitors have super low ESR characteristic in high-frequency range. On the whole, ESR in low-frequency range relatively rises. Therefore, they can use only I ripple current in low-frequency range.

3. Restriction of calculated lifetime

- (1) The result calculated by the estimated lifetime formula, it is not guaranteed lifetime by Nippon Chemi-Con Corporation.
- (2) When designer calculate the lifetime of apparatus, please include an ample margin in consideration to the estimated lifetime of a capacitor.
- (3) When calculated lifetime result are over 15 years by using the estimated lifetime formula, please consider 15 years to be a maximum in considering that the sealing rubber characteristics vary during the lifetime.
- (4) If 15 years or more may be required as an expected lifetime, please consult us.

II. About failure and shelf-life

Failure rate(failure rate level) subject to 0.5 %/1000 h of JIS C 5003 (Credibility level 60%)

The main failure mode of polymer solid aluminum electrolytic capacitor of is shown below.

1. Random failure

The main cause of failure mold is short-circuit due to heat stress, electrical stressing and mechanical stress in using environment or welding.

- (1) applied voltage more than rated voltage.
- (2) applied reverse voltage.
- (3) Excessive mechanical stress.
- (4) Applying fast charging and discharging that more than specifications and cause surge current.

a. If the short circuit current flows through the solid capacitor will cause the following phenomenon.

- (1) When the electric current is less after short-circuit ($\phi 10$: about below 1 A, $\phi 8$: about below 0.5 A, $\phi 6.3$: about below 0.2 A) PC-CON body will have little heat but appearance is normal even continuous electricity.
- (2) When the short circuit current value exceeds the above numerical, internal temperature will increased, encapsulation adhesive pad summoned and the odorous gases to overflow.

b. In order to ensure the safety in case of occurs short circuit, please take the following countermeasures.

- (1) Cut off the main power supply and stop using immediately if overflow the odorous gases.
- (2) Due to the different conditions , the odorous gases occurrence generally takes a few seconds to several minutes, When using protection circuits we recommend to start protect function in this period.
- (3) Cleaned immediately if the gas enters into eye, gargle immediately if inhalation into mouth.
- (4) Don't lick the electrolyte if electrolyte contact with the skin please washing with soap immediately.
- (5) PC - CON including combustible material, current value greatly after the short circuit and short circuit parts will have a possibility of spark. In order to protect safety, please pay attention to the design structure and use protection circuit.

2. The wear failure (Shelf life)

Electrical characteristics can make a big change when more than the guarantee time of durability and high temperature and high humidity test, electrolyte will insulation (degradation) formation of open mode eventually.

Even used within the prescribed scope of electrical and mechanical properties, it may also reducing capacitance and increase ESR, so please take care when design.

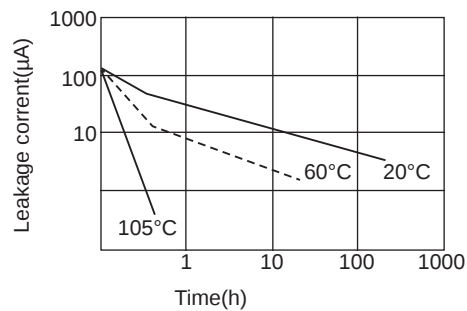
III. Leak Current

The leak current of conductive polymer solid aluminum electrolytic capacitor will increase due to the mechanical stress.

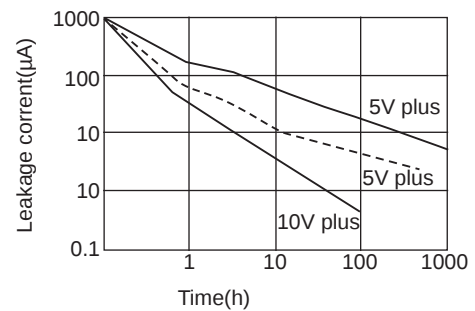
In this case, if the solid capacitor apply voltage below the high using temperature, the repairing effect of leak current will reducing gradually.

If the solid capacitor applies rated voltage within the high using temperature, the repairing speed of leak current will faster.

Conductive polymer solid aluminum electrolytic capacitor
Repairing character of leak current
10 μ F/16 V.DC (apply 16 V.DC)



Conductive polymer solid aluminum electrolytic capacitor
Repairing character of leak current
33 μ F/10 V.DC (ambient temperature 65°C)
(Test voltage 10V.DC)



※ In order to show more clearly said repair of leakage current, we use the sample of apply stress to PC-CON that increased leak current on purp.

IV. The limited of faster charging and discharging

Faster charging and discharging will lead to large surge current and then result in short-circuit or increase leak current.

When the surge current value as below, we recommend to use protection circuit in order to maintain high reliability.

- (1) more than 10 A.
- (2) exceed rated ripple current 10times.

V. Correct mounting

1. About the soldering iron soldering

- (a) Avoiding applying stress on PC - CON body when it need to process lead due to unconformity between lead gap and circuit board gap of plug-in mounting.
- (b) Avoiding applying excessive stress on PC - CON body when soldering.
- (c) When need to take out PC-CON after soldering, please melt molten solder sufficient, implement under the condition of not put stress on the PC - CON body.
- (d) Don't let the tip of the soldering iron to touch the PC - CON body.

2. Wave-soldering

- (a) Do not have wave soldering to SMD product.
- (b) Do not dip the PC-CON body into dissolved soldering flux.
- (c) Welding parts only limited between the circuit board and the opposite side of the PC - CON.
- (d) Don't splash other place expectation rosin.
- (e) Avoiding other parts lie down and touching PC-CON when soldering.

3. Reflow soldering

- (a) Do not have reflow soldering to plug-in mounting product .
- (b) Please consult us when use VPS for soldering.

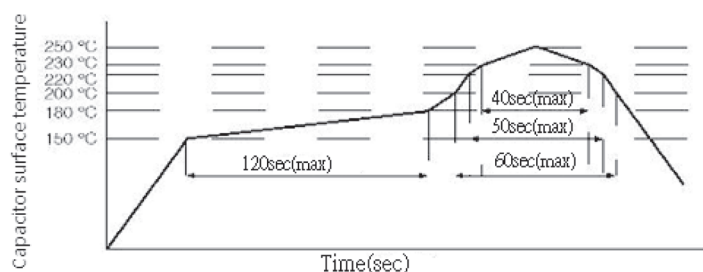
4. Precaution after soldering

Take care for not to apply the following excessive stress for polymer solid aluminum electrolytic capacitor.

- (a) Do not tilt down or distorted capacitor.
- (b) Mobile circuit board can not handle PC - CON.
- (c) Do not crash PC-CON.
- (d) Do not make the PC - CON touch PCB circuit boards and other components when stacked.

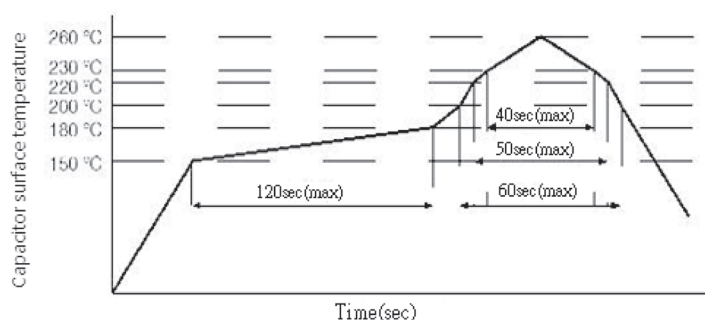
5. Recommended conditions for solder

< peak temperature 250 °C lead-free reflow soldering >



Reflow soldering under the condition of the following reflow soldering up to 2 times

< peak temperature 260 °C lead-free reflow soldering >



Reflow soldering under the condition of the following reflow soldering up to 1 times

6. Solder iron temperature : less than 400°C±10°C : working hours : within 5s

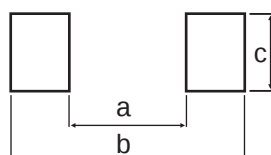
Wave-soldering

	Temperature	Time	Number of Time
Preheat	120°C below(ambient temperature)	less than 120s	once
Welding Condition	260°C+5°C below	less than 10+1s	less than twice*1

*1 : For 2 times, solder dipping time total of 10 + 1 seconds.

7. Recommend the bonding pad size

Unit : mm



Size Code	a	b	c
φ5.0	1.4	7.4	1.6
φ6.3	2.1	9.1	1.6
φ8.0	2.8	11.1	1.9
φ10.0	4.3	13.1	1.9

PRECAUTIONS FOR CONDUCTIVE POLYMER SOLID ALUMINUM ELECTROLYTIC CAPACITOR

1. Device circuits design considerations

1. Prohibited to use circuit

Conductive Polymer Solid Aluminum Electrolytic Capacitor (The following is called capacitor) may cause the leak current occur changing due to the heat stress in welding. Please avoid to use in the below circuit.

- ① High resistance voltage holding circuit.
- ② Coupled circuits.
- ③ The other circuits that affected leakage current larger

2. Circuit design

Please design circuit on the basis of confirming the following content.

- ① As the change of temperature and frequency, electric property of capacitor will changes. Please design circuit after confirming those changes.
- ② When more than 2 capacitors in parallel, please consider the balance of current when design circuit.
- ③ When more than 2 capacitors in series, as the difference of load voltage, it may load overvoltage, so please consulting us when using.
- ④ Please don't install heating components around the capacitor and the back of the printed wiring board.

3. Using capacitors for significantly safety-oriented applications

Consult us about capacitors for a device application affecting human safety (① Aviation and aerospace ② Nuclear ③ Medical) or for any device whose failure will make an impact on society.

4. Polarity

Our company conductive polymer capacitor is the solid aluminum electrolytic capacitor with polarity. Never apply a reverse voltage or AC voltage.

Connecting with wrong polarity will short-circuit in initial State. About polarity, please confirm product catalogue or the diagram in the product specifications.

5. Operating voltage

Do not apply an over-voltage that exceeds rated voltage, Because even if to load the voltage that more than the rated voltage only for an instant, it can also lead to increased leakage current and short-circuit. The total peak value of the ripple voltage plus the DC voltage must not exceed the rated voltage of the capacitors. In the work, it doesn't need to reduce the voltage. Although capacitors specify a surge voltage, in the temperature range, under the rated voltage, whatever is the environment temperature; it also has limited and does not assure long-term use.

6. Ripple current

Do not apply an overcurrent that exceeds the rated ripple current specified for the capacitors. Excessive ripple current will increase heat production within the capacitors, shortening the life and short-circuit.

7. Operating temperature

If use beyond working temperature range of environment, can lead to aging and failure performance, please use in working temperature range.

8. Charging and discharging

Don not use capacitor in the circuit of rapid charge and discharge repeatedly. If capacitors are used in the circuits that repeat a charge and discharge, capacitance will decrease and/or the capacitors will be damaged by internal heat generation. When the peak of current value more that 20A, we recommend to use protect circuit in order to keep the reliability.

9. Leakage current

Sometime the leakage current will increase, but if load voltage in working temperature, it will decrease gradually though self-healing effect. In addition, the more closely to the limit temperature, the faster of the reduce speed of leakage current. The reasons for leakage current increase as below :

- ① Weldding
- ② High temperature without load, high temperature and high humidity, rapid temperature change test and so on.

10.Failure mode

- ① Reduce the failure rate by reducing the surrounding temperature, ripple current and load voltage.
- ② Electrostatic capacity decreases caused by product temperature rise and opening mode wear caused by ESR rise which are the main failure mode.

Sometimes it will occur short-circuit mode due to the overvoltage and large current.

- ③ Lead to short-circuit due to load the voltage that more than rated voltage, when the current is larger, the shell will expansion or peeling off, give out bad smell due to the internal pressure rising.
- ④ The constitute material of products containing flammable materials, the short-circuit parts will fire may due to the spark. The install ways, location, graphic design of the product, please consider the following importance points of design to ensure the absolute safety.

* Setting up protection circuit and protection devices to ensure that equipment safety.

* Setting up long circuit etc. , so that the devices will stabilization even of a single fault.

11.The insulation of the capacitor

The outer sleeve of a capacitor does not assure electrical insulation Please have electrical insulation between the capacitor sleeve and cathode terminal and anode terminal and circuit board.

12.Operating conditions

Do not use/expose capacitors to the following conditions:

- ① Direct contact with water, salt water or oil, or high condensation environment.
- ② Direct sunlight.
- ③ Toxic gases such as hydrogen sulfide, sulfurous acid, nitrous acid, chlorine and its compounds, bromine and its compounds and ammonium.
- ④ Ozone, ultraviolet rays or radiation.
- ⑤ Extreme vibration or mechanical shock that exceeds limits in the catalogs or product specifications.

13.Capacitor Mounting

- ① SMD product (mould SMD, SMD) solder graphics of the Capacitor printed wiring board, Please refer to the provisions of the catalogue or specifications for graphic design.
- ② For radial lead type capacitors, please make sure the terminal spacing of a capacitor equals the holes spacing on the PC board.
- ③ Do not print any copper trace under the seal (terminal) side of a capacitor. Copper traces should be 1 mm (preferably 2mm or more) spaced apart from the side of the capacitor body.
- ④ In designing a double-sided PC board, do not locate any through-hole via or unnecessary hole underneath a capacitor.
- ⑤ In designing a double-sided PC board, do not print any circuit pattern underneath a capacitor.

II. Installation

1. Assembling

- ① Do not try to reuse the capacitors once assembled and electrified.
- ② Capacitors may have been spontaneously recharged with time by a recovery voltage phenomenon. In this case, discharge the capacitors through a resistor of approximately 1kΩ. before use.
- ③ If non-solid aluminum electrolytic capacitors have been stored at any conditions more than 35°C and 75%RH for long storage periods of time more than the limits specified in the catalogs or product specifications, they may have high leakage current. In this case, discharge by applying the rated voltage through a resistor of approximately 1kΩ.
- ④ Confirm the rated capacitance and voltage of capacitors before installation.
- ⑤ Confirm the polarity of capacitors before installation.
- ⑥ Do not try to use the capacitors that were dropped to the floor and so forth.
- ⑦ Do not deform the can case of a capacitor.
- ⑧ Make sure that the terminal spacing of a capacitor equals the holes spacing on the PC board before installing the capacitor.
- ⑨ Do not apply excessive mechanical force to capacitors more than the limits prescribed in the catalogs or product

specifications. If apply excessive force, the terminal will break off or deformation and affect install, even cause short-circuit, break line, increase LC and damage package. Avoid excessive mechanical force while the capacitors are in the process of vacuum-picking, placing and positioning by automatic mounting machines or cutting the lead wires by automatic insertion machines.

2. Soldering and heat resistance

Ensure that the soldering conditions meet the specifications recommended by Nippon Chemi-Con. Note that the leakage current may increase or capacitance may decrease due to thermal stresses that occur during soldering, etc. Furthermore, the leakage current which rose gradually decreases, when voltage is applied at below the category upper limit temperature. Additionally the self repairing action is faster when voltage near the rated voltage rather than at a higher voltage is applied at below the category's upper temperature limit.

1) Verify the following before using a soldering iron:

- ① That the soldering conditions (temperature and time) are within the ranges specified in the catalog or product specifications.
- ② That the tip of the soldering iron does not come into contact with the capacitor itself.

2) Verify the following when flow soldering:

- ① Do not dip the body of a capacitor into the solder bath only dip the terminals in. The soldering must be done on the reverse side of PC board.
- ② Soldering conditions should be within the limits prescribed in the catalog or the product specifications.
- ③ Do not apply flux to any part of capacitors other than their terminals.
- ④ Make sure the capacitors do not come into contact with any other components while soldering. Please note the SMD product (SMD type) non-corresponding wave-soldering.

3) Verify the following when reflow soldering:

- ① Soldering conditions (preheat, solder temperature and soldering time) should be within the limits prescribed in the catalogs or the product specification.
- ② The heat level should be appropriate. (Note that the thermal stress on the capacitor varies depending on the type and position of the heater in the reflow oven and the color and material of the capacitor)
Except for the surface mount type, reflow soldering must not be used for the other capacitors.
- 4) Do not reuse a capacitor that has already been soldered to PC board and then removed. When using a new capacitor in the same location, remove the flux, etc. first, and then use a soldering iron to solder on the new capacitor in accordance with the specifications.

3. Handling After Soldering

Do not apply any mechanical stress to the capacitor after soldering onto the PC board.

- ① Do not lean or twist the body of the capacitor after soldering the capacitors onto the PC board.
- ② Do not use the capacitors for lifting or carrying the assembly board.
- ③ Do not hit or poke the capacitor after soldering to PC board. When stacking the assembly board, be careful that other components do not touch the aluminum electrolytic capacitors.
- ④ Do not drop the assembled board.

4. Cleaning PC boards

1) Do not wash capacitors by using the following cleaning agents. Solvent resistant capacitors are only suitable for washing using the cleaning conditions prescribed in the catalog or the product specification. In particular, ultrasonic cleaning will accelerate damage to capacitors.

- * Halogenated solvents → cause capacitors to fail due to corrosion.
- * Alkali system solvents → corrode (dissolve) an aluminum case.
- * Petroleum system solvents → cause the rubber seal material to deteriorate.
- * Xylene → causes the rubber seal material to deteriorate
- * Acetone → erases the markings

CFC alternatives or the other cleaners above; please consult with us.

2) Verify the following points when washing capacitors.

- ① Monitor conductivity, pH, specific gravity and the water content of cleaning agents. Contamination adversely affects

these characteristics.

- ② Be sure not to expose the capacitors under solvent rich conditions or keep capacitors inside a closed container. In addition, please dry the solvent sufficiently on the PCboard and the capacitor with an air knife (temperature should be less than the maximum rated category temperature of the capacitor) for 10 minutes. Aluminum electrolytic capacitors can be characteristically and catastrophically damaged by halogen ions, particularly by chlorine ions, though the degree of the damage mainly depends upon the characteristics of the electrolyte and rubber seal material. When halogen ions come into contact with the capacitors, the foil corrodes when a voltage is applied. This corrosion causes an extremely high leakage current which results venting and an open circuit.
- 3) Verify the following when reflow soldering:
 - ① Higher alcohol cleaning agents. Using these cleaning agents, capacitors are capable of with- standing immersion or ultrasonic cleaning for 10 minutes at a maximum liquid temperature of 60°C. Find optimum condition for washing, rinsing, and drying. Be sure not to rub the marking off the capacitor which can be caused by contact with other components or the PC board. Note that shower cleaning adversely affects the markings on the sleeve.
 - ② Non-Halogenated Solvent Cleaning. Immersion, ultrasonic or vapor cleaning for 5 minutes. However, from an environmental point of view, these types of solvent will be banned in near future. We would recommend not using them if at all possible.
 - ③ Isopropyl Alcohol (IPA). IPA (Isopropyl Alcohol) is one of the most acceptable cleaning agents; it is necessary to maintain a flux content in the cleaning liquid at a maximum limit of 2 Wt.%.)

5. Precautions for using adhesives and coating materials

- 1) Do not use any adhesive and coating materials containing.
- 2) Verify the following before using adhesive and coating material.
 - ① Remove flux and dust left over between the rubber seal and the PC board before applying adhesive or coating materials to the capacitor.
 - ② Dry and remove any residual cleaning agents before applying adhesive and coating materials to the capacitors. Do not cover over the whole surface of the rubber seal with the adhesive or coating materials.
 - ③ For permissible heat conditions for curing adhesives or coating materials, please consult with us.
 - ④ Covering over the whole surface of the capacitor rubber seal with resin may result in a hazardous condition because the inside pressure cannot be completely released. Also, a large amount of halogen ions in resins will cause the capacitors to fail because the halogen ions penetrate into the rubber seal and the inside of the capacitor.
 - ⑤ Some coating materials, it cannot be implemented to the capacitor.

6. Fumigation

In many cases when exporting or importing electronic devices, such as capacitors, wooden packaging is used. In order to control insects it may become necessary to fumigate the shipment. Precautions during "Fumigation" using halogenated chemical such as Methyl Bromide must be taken. Halogen gas can penetrate packaging materials such as cardboard boxes and vinyl bags. Penetration of the halogenated gas can cause corrosion of Electrolytic capacitors. Nippon Chemi-Con gives consideration to the packaging materials not to require the Fumigation. Verify whether the assembled PC board, products and capacitors themselves are subjected to Fumigation during their transportation or not.

III. The Operation of Devices

1. Do not touch the capacitor terminals directly.

2. Do not short-circuit the terminal of a capacitor by letting it come into contact with any conductive object.

Also, do not spill electric-conductive liquid such as acid or alkaline solution over the capacitor.

3. Please make sure the assembly of the complete circuit of capacitor installation environment.

Do not use capacitors in circumstances where they would be subject to exposure to the following materials

- ① Oil, water, salty water or damp location.
- ② Direct sunlight.
- ③ Ozone, ultraviolet rays or radiation.
- ④ Toxic gases such as hydrogen sulfide, sulfurous acid, nitrous acid, chlorine or its compounds, and ammonium.
- ⑤ Severe vibration or mechanical shock conditions beyond the limits prescribed in the catalog or product specification.

IV. Maintenance Inspection

1. Make periodic inspections of capacitors that have been used in industrial applications.

Before inspection, turn off the power supply and carefully discharge the electricity in the capacitors. Verify the polarity when measuring the capacitors with a volt-ohm meter. Do not apply any mechanical stress to the terminals of the capacitors.

2. The following items should be checked during the periodic inspections.

- ① Significant damage in appearance.
- ② Electrical characteristics: leakage current, capacitance, $\tan\delta$ and other characteristics prescribed in the catalog or product specification.

We recommend replacing the capacitors if the parts are out of specification.

V. Contingencies

- 1) If gas has vented from the capacitor during use, there is a short circuit and burning, or the capacitor discharges an odor or smoke, turn off the main power supply to the equipment or unplug the power cord.
- 2) If there is a problem with the capacitor or a fire breaks out, the capacitor may produce a burning gas or reactive gas from the outer resin, etc. If this happens, keep your hands and face away from the gas. If vented gas is inhaled or comes into contact with your eyes, flush your eyes immediately with water and/or gargle. If vented gas comes into contact with the skin wash the affected area thoroughly with soap and water.

VI. Storage

We recommend the following conditions for storage.

- 1) Store capacitors in a cool, dry place. Store at a temperature between 5 and 35°C, with a humidity of 75% or less. (table-1 Maximum storage term)

The duration, please refer to the table below.

	Before the bag is opened	After the bag is opened
SMD (Resin-Molded chip type)	within six months after delivery	Within 30 days after the bag is opened
Radial lead type	within one year after delivery	Within 7 days after the bag is opened

- ① SMD products are sealed in a PE plastic bag. Use all capacitors in desposit period once the bag is opened.
- ② If the bag have open and need to storage, please return unused capacitors to the bag, and seal it with a zipper.
- ③ Be sure to follow our recommendations for reflow soldering.
- 2) Store the capacitors in a location free from direct contact with water, salt water, and oil.
- 3) Store in a location where the capacitor is not exposed to toxic gas, such as hydrogen sulfide, sulfurous acid, nitrous acid, chlorine or chlorine compounds, bromine or other halogen gases, methyl bromide or other halogen compounds, ammonia, or similar.
- 4) Store in a location where the capacitor is not exposed to ozone, ultraviolet radiation, or other radiation.
- 5) It is recommended to store capacitors in their original packaging wherever possible.

VII. Disposal

Please consult with a local industrial waste disposal specialist when disposing of aluminum electrolytic capacitors.

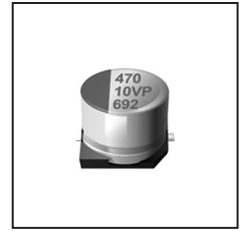
VIII. Regarding compliance for EU REACH Regulation

- 1) According to the content of REACH handbook (Guidance on requirements for substances in articles which is published on 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). Reference: Electrolytic Condenser Investigation Society: "Study of REACH Regulation in EU about Electrolytic Capacitor" (publicized on 13 March 2008)
- 2) Jamicon develops the products without substance of very high concern (SVHC).

IX. Catalogs

Specifications in the catalogs are subject to change without notice. Test data shown in the catalogs are not assured as the whole performance values, but typical values.

- Endurance: 105°C, 2000hrs
- Recommended Applications: Standard SMD type product
- Corresponding product to RoHS



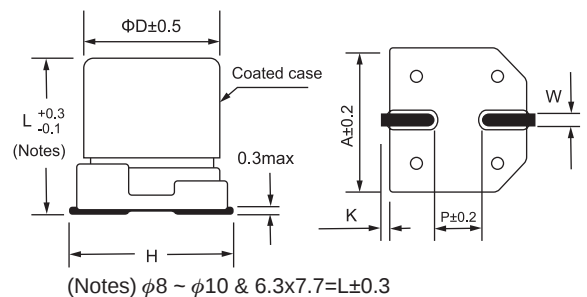
SPECIFICATION

Item	Characteristic							
Operation Temperature Range	-55 ~ +105°C							
Rated Working Voltage	2.5 ~ 25VDV							
Capacitance Tolerance (120Hz 20°C)	±20%							
Leakage Current (2min)	The initial specified value in Characteristic list							
Surge Voltage (20°C)	W.V.	2.5	4	6.3	10	16	20	25
	S.V.	2.8	4.6	7.2	11.5	18.4	23	28.7
Tangent of loss angle (120Hz)	The initial specified value or loss (in Characteristic list)							
Impedance Ratio	Impedance ratio at 100kHz							
	Rated Voltage (V)	2.5	4	6.3	10	16	20	25
	-25°C / +20°C	≤1.15						
	-55°C / +20°C	≤1.25						
Endurance	After applying rated voltage for 2000 hours at 105°C, the capacitor shall meet the following requirement							
	Appearance	No significant damage						
	Capacitance Change	≤ ±20% of initial value						
	Dissipation Factor	≤150% of initial specified value						
	ESR	≤150% of initial specified value						
	Leakage current	≤ initial specified value						
Bias Humidity Test	After subjecting 90 to 95% RH for 1000 hours at 60°C, the capacitors shall meet the requirement as Endurance							
Resistance to Soldering Heat *	Capacitance Change	≤ ±10% of initial value						
	Dissipation Factor	≤130% of initial specified value						
	Equivalent Series Resistance	≤130% of initial specified value						
	Leakage Current	≤ initial specified value						

* For any doubt about measured values, measure the leakage current again after the following voltage treatment.
Voltage treatment: Applying DC rated voltage to the capacitors for 2 hours at 105°C.

DIMENSIONS (mm)

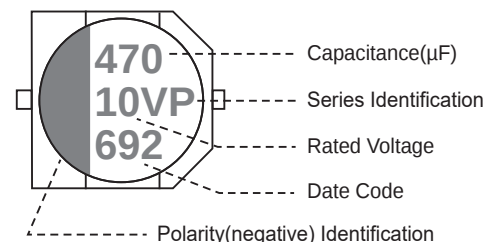
SIZE	φD x L	A	H (max)	W	P	K
CA1	5 x 5.8	5.3	6.5	0.65±0.15	1.5±0.2	0.35+0.15/-0.2
EA1	6.3 x 5.8	6.6	7.8	0.65±0.15	1.8±0.2	0.35+0.15/-0.2
EA4	6.3 x 7.7	6.6	7.8	0.65±0.15	1.8±0.2	0.35+0.15/-0.2
GA6	8 x 10.4	8.3	10	0.9±0.2	3.1±0.2	0.7±0.2
HA5	10 x 10.2	10.3	12	0.9±0.2	4.6±0.2	0.7±0.2
HA8	10 x 12.2	10.3	12	0.9±0.2	4.6±0.2	0.7±0.2



MULTIPLIER FOR RIPPLE CURRENT

Frequency(Hz)	120≤F<1k	1k≤F<10k	10k≤F<100k	100k≤F<500k
Coefficient	0.05	0.30	0.70	1.00

MARKING : Case with red printing



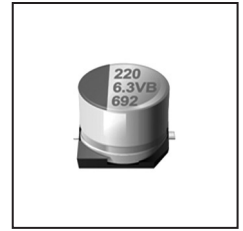
● CASE SIZE & CHARACTERISTICS LIST

Rated Voltage (V.DC)	Rated Capacitance (μF)	Case size		Leakage Current (μA)	Tangent of loss angle (max)	E. S. R. at 100kHz (mΩ)	Allowable ripple current (mA.rms)
		φD	L				
		(mm)					
2.5	180	5	5.8	300	0.12	30	1970
		6.3	5.8	300	0.12	25	2200
	220	6.3	5.8	300	0.12	25	2500
	390	6.3	7.7	300	0.12	23	2720
	470	6.3	7.7	300	0.12	23	2720
	1000	8	10.4	500	0.12	18	3950
	1200	10	10.2	600	0.12	12	4000
	1500	10	10.2	750	0.12	13	4000
		10	12.2	750	0.12	12	5500
4	100	6.3	5.8	300	0.12	26	2450
	150	6.3	5.8	300	0.12	26	2450
	330	6.3	7.7	300	0.12	25	2650
	560	8	10.4	448	0.12	18	3950
	820	8	10.4	656	0.12	18	3950
		10	12.2	656	0.12	10	5500
	1200	10	10.2	960	0.12	12	4000
		10	12.2	960	0.12	10	5500
	6.3	47	5	5.8	300	0.12	35
68		6.3	5.8	300	0.12	27	2400
82		6.3	5.8	300	0.12	27	2400
100		5	5.8	300	0.12	35	1380
		6.3	5.8	300	0.12	27	2400
120		6.3	5.8	300	0.12	27	2400
220		6.3	5.8	300	0.12	27	2400
		6.3	7.7	300	0.12	25	2650
330		6.3	5.8	415	0.12	27	2400
		6.3	7.7	415	0.12	25	2650
470		6.3	7.7	592	0.12	25	2650
		8	10.4	592	0.12	21	3610
680		8	10.4	857	0.12	21	3610
		10	10.2	857	0.12	12	3650
820		8	10.4	1033	0.12	21	3610
		10	10.2	1033	0.12	12	3650
		10	12.2	1033	0.12	10	5500
1000		8	10.4	1260	0.12	21	3610
		10	12.2	1260	0.12	10	5500
10		22	5	5.8	300	0.12	40
	33	5	5.8	300	0.12	40	1270
	47	5	5.8	300	0.12	40	1270
		6.3	5.8	300	0.12	31	2250
	56	6.3	5.8	300	0.12	31	2250
	100	6.3	5.8	300	0.12	31	2250
		6.3	7.7	300	0.12	27	2560
	150	6.3	7.7	300	0.12	27	2560
	390	8	10.4	780	0.12	22	3020
	470	10	10.2	940	0.12	14	3500
		10	12.2	940	0.12	12	5300
	560	10	12.2	1120	0.12	12	5300
	1000	10	12.2	2000	0.12	13	5300

● CASE SIZE & CHARACTERISTICS LIST

Rated Voltage (V.DC)	Rated Capacitance (μF)	Case size		Leakage Current (μA)	Tangent of loss angle (max)	E. S. R. at 100kHz (mΩ)	Allowable ripple current (mA.rms)
		φD	L				
		(mm)					
16	22	5	5.8	300	0.12	90	1210
	33	6.3	5.8	300	0.12	37	2050
	39	6.3	5.8	300	0.12	37	2050
	47	6.3	5.8	300	0.12	50	1600
	82	6.3	7.7	300	0.12	30	2420
	100	6.3	7.7	320	0.12	30	2420
	120	6.3	7.7	384	0.12	30	2420
	150	8	10.4	480	0.12	23	3490
	180	8	10.4	576	0.12	23	3490
	220	8	10.4	704	0.12	23	3490
		10	12.2	704	0.12	14	5050
	270	8	10.4	864	0.12	23	3490
	330	10	10.2	1056	0.12	16	3100
		10	12.2	1056	0.12	14	5050
	390	8	10.4	1248	0.12	23	3000
	470	10	10.2	1504	0.12	16	3100
		10	12.2	1504	0.12	14	5050
	560	10	12.2	1792	0.12	14	5050
	680	10	12.2	2176	0.12	14	5050
	820	10	12.2	2624	0.12	14	5050
20	22	6.3	5.8	300	0.12	50	1650
	47	6.3	7.7	300	0.12	45	2000
	100	8	10.4	480	0.12	24	3320
	150	10	12.2	600	0.12	21	4220
25	22	6.3	5.8	300	0.12	65	900
		6.3	7.7	300	0.12	50	1800
	27	6.3	5.8	300	0.12	60	1270
	47	6.3	5.8	300	0.12	65	1300
		6.3	7.7	300	0.12	45	1800
	68	6.3	7.7	340	0.12	45	1800
	100	8	10.4	500	0.12	35	3320
	150	8	10.4	750	0.12	35	3320
	180	10	10.2	900	0.12	30	3100
	220	8	10.4	1100	0.12	35	3320
	270	10	10.2	1350	0.12	30	3320
	330	10	12.2	1650	0.12	28	3500

- Endurance: 105°C, 2000hrs
- Recommended Applications: High capacitance & Ultra low ESR Series
- Corresponding product to RoHS



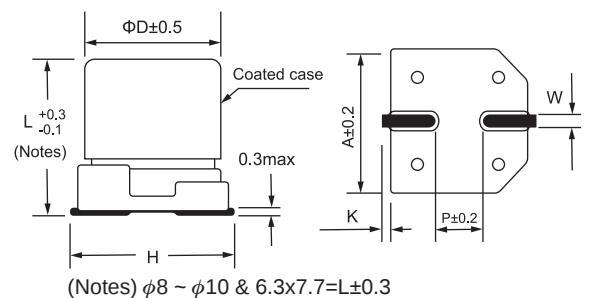
SPECIFICATION

Item	Characteristic							
Operation Temperature Range	-55 ~ +105°C							
Rated Working Voltage	2.5 ~ 25VDC							
Capacitance Tolerance (120Hz 20°C)	±20%							
Leakage Current (2min)	The initial specified value in Characteristic list							
Surge Voltage (20°C)	W.V.	2.5	4	6.3	10	16	20	25
	S.V.	2.8	4.6	7.2	11.5	18.4	23	28.7
Tangent of loss angle (120Hz)	The initial specified value or loss (in Characteristic list)							
Impedance Ratio	Impedance ratio at 100kHz							
	Rated Voltage (V)	2.5	4	6.3	10	16	20	25
	-25°C / +20°C	≤1.15						
	-55°C / +20°C	≤1.25						
Endurance	After applying rated voltage for 2000 hours at 105°C, the capacitor shall meet the following requirement							
	Appearance	No significant damage						
	Capacitance Change	≤ ±20% of initial value						
	Dissipation Factor	≤150% of initial specified value						
	ESR	≤150% of initial specified value						
	Leakage current	≤ initial specified value						
Bias Humidity Test	After subjecting 90 to 95% RH for 1000 hours at 60°C, the capacitors shall meet the requirement as Endurance							
Resistance to Soldering Heat *	Capacitance Change	≤ ±10% of initial value						
	Dissipation Factor	≤130% of initial specified value						
	Equivalent Series Resistance	≤130% of initial specified value						
	Leakage Current	≤ initial specified value						

* For any doubt about measured values, measure the leakage current again after the following voltage treatment.
Voltage treatment: Applying DC rated voltage to the capacitors for 2 hours at 105°C.

DIMENSIONS (mm)

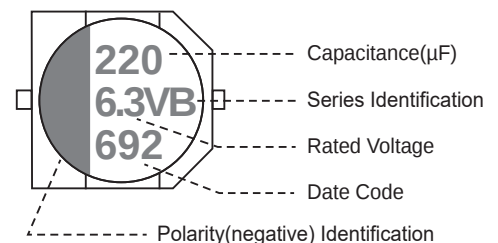
SIZE	φD x L	A	H (max)	W	P	K
EA1	6.3 x 5.8	6.6	7.8	0.65±0.15	1.8±0.2	0.35+0.15/-0.2
EA4	6.3 x 7.7	6.6	7.8	0.65±0.15	1.8±0.2	0.35+0.15/-0.2
GA6	8 x 10.4	8.3	10	0.9±0.2	3.1±0.2	0.7±0.2
HA5	10 x 10.2	10.3	12	0.9±0.2	4.6±0.2	0.7±0.2
HA8	10 x 12.2	10.3	12	0.9±0.2	4.6±0.2	0.7±0.2



MULTIPLIER FOR RIPPLE CURRENT

Frequency(Hz)	120≤F<1k	1k≤F<10k	10k≤F<100k	100k≤F<500k
Coefficient	0.05	0.30	0.70	1.00

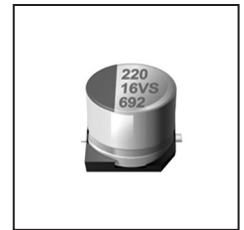
MARKING : Case with red printing



● CASE SIZE & CHARACTERISTICS LIST

Rated Voltage (V.DC)	Rated Capacitance (μF)	Case size		Leakage Current (μA)	Tangent of loss angle (max)	E. S. R. at 100kHz (mΩ)	Allowable ripple current (mA.rms)
		φD	L				
		(mm)					
2.5	330	6.3	5.8	300	0.12	15	3160
	390	6.3	5.8	300	0.12	15	3160
	470	6.3	5.8	300	0.12	15	3160
	560	6.3	5.8	300	0.12	16	3500
		6.3	7.7	300	0.12	13	3600
	820	8	10.4	410	0.12	12	4210
4	270	6.3	5.8	300	0.12	15	3160
	330	6.3	5.8	300	0.12	15	3160
	470	8	10.4	376	0.12	15	4520
	560	8	10.4	448	0.12	15	4520
6.3	100	6.3	5.8	300	0.12	24	2500
	120	6.3	5.8	300	0.12	24	2500
	150	6.3	5.8	300	0.12	22	3160
	220	6.3	5.8	300	0.12	22	3160
	330	6.3	5.8	415	0.12	22	3390
		6.3	7.7	415	0.12	18	3500
		8	10.4	415	0.12	15	4210
	470	6.3	7.7	592	0.12	18	3500
		8	10.4	592	0.12	15	4210
	560	8	10.4	705	0.12	15	4210
		10	10.2	705	0.12	12	5025
	820	8	10.4	1033	0.12	15	4210
		10	10.2	1033	0.12	12	5025
	1200	10	10.2	1512	0.12	12	5025
	10	120	6.3	5.8	300	0.12	22
150		6.3	7.7	300	0.12	21	2880
330		8	10.4	660	0.12	17	4000
470		10	10.2	940	0.12	12	5025
16	68	6.3	5.8	300	0.12	25	2440
		6.3	7.7	300	0.12	24	2700
	100	6.3	5.8	320	0.12	25	2440
		6.3	7.7	320	0.12	24	2700
	180	6.3	7.7	576	0.12	22	3320
		8	10.4	576	0.12	18	3890
	220	8	10.4	704	0.12	18	3890
	270	8	10.4	864	0.12	18	3890
	330	10	10.2	1056	0.12	16	4350
470	10	12.2	1504	0.12	10	6100	
25	33	6.3	7.7	300	0.12	45	2500
	47	6.3	7.7	300	0.12	45	2500

- Endurance: 105°C, 5000hrs
- Recommended Applications: Long life & Ultra low ESR Series
- Corresponding product to RoHS



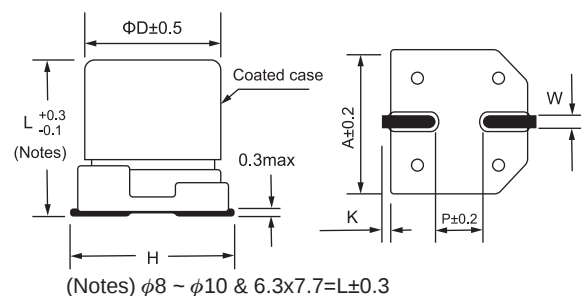
SPECIFICATION

Item	Characteristic						
Operation Temperature Range	-55 ~ +105°C						
Rated Working Voltage	4 ~ 25VDC						
Capacitance Tolerance (120Hz 20°C)	±20%						
Leakage Current (2min)	The initial specified value in Characteristic list						
Surge Voltage (20°C)	W.V.	4	6.3	10	16	20	25
	S.V.	4.6	7.2	11.5	18.4	23	28.7
Tangent of loss angle (120Hz)	The initial specified value or loss (in Characteristic list)						
Impedance Ratio	Impedance ratio at 100kHz						
	Rated Voltage (V)	4	6.3	10	16	20	25
	-25°C / +20°C	≤1.15					
	-55°C / +20°C	≤1.25					
Endurance	After applying rated voltage for 5000 hours at 105°C, the capacitor shall meet the following requirement						
	Appearance	No significant damage					
	Capacitance Change	≤ ±20% of initial value					
	Dissipation Factor	≤ 150% of initial specified value					
	ESR	≤ 150% of initial specified value					
	Leakage current	≤ initial specified value					
Bias Humidity Test	After subjecting 90 to 95% RH for 1000 hours at 60°C, the capacitors shall meet the requirement as Endurance						
Resistance to Soldering Heat *	Capacitance Change	≤ ±10% of initial value					
	Dissipation Factor	≤ 130% of initial specified value					
	Equivalent Series Resistance	≤ 130% of initial specified value					
	Leakage Current	≤ initial specified value					

* For any doubt about measured values, measure the leakage current again after the following voltage treatment.
Voltage treatment: Applying DC rated voltage to the capacitors for 2 hours at 105°C.

DIMENSIONS (mm)

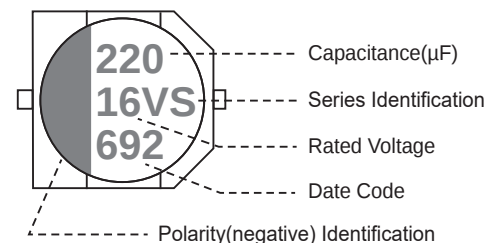
SIZE	φD x L	A	H (max)	W	P	K
EA1	6.3 x 5.8	6.6	7.8	0.65±0.15	1.8±0.2	0.35+0.15/-0.2
EA4	6.3 x 7.7	6.6	7.8	0.65±0.15	1.8±0.2	0.35+0.15/-0.2
GA6	8 x 10.4	8.3	10	0.9±0.2	3.1±0.2	0.7±0.2
HA5	10 x 10.2	10.3	12	0.9±0.2	4.6±0.2	0.7±0.2
HA8	10 x 12.2	10.3	12	0.9±0.2	4.6±0.2	0.7±0.2



MULTIPLIER FOR RIPPLE CURRENT

Frequency(Hz)	120≤F<1k	1k≤F<10k	10k≤F<100k	100k≤F<500k
Coefficient	0.05	0.30	0.70	1.00

MARKING : Case with red printing



● CASE SIZE & CHARACTERISTICS LIST

Rated Voltage (V.DC)	Rated Capacitance (μF)	Case size		Leakage Current (μA)	Tangent of loss angle (max)	E. S. R. at 100kHz (mΩ)	Allowable ripple current (mA.rms)
		φD	L				
		(mm)					
4	150	6.3	5.8	300	0.12	22	2570
	330	6.3	5.8	300	0.12	22	2800
	470	6.3	7.7	376	0.12	20	2800
6.3	100	6.3	5.8	300	0.12	22	2800
	120	6.3	5.8	300	0.12	22	2800
	220	6.3	5.8	300	0.12	22	2800
	470	10	10.2	592	0.12	20	4130
10	47	6.3	5.8	300	0.12	27	2300
	56	6.3	5.8	300	0.12	27	2300
	68	6.3	5.8	300	0.12	27	2300
	120	6.3	5.8	300	0.12	27	2300
	470	8	10.4	940	0.12	22	3000
16	39	6.3	5.8	300	0.12	30	2200
	68	6.3	5.8	300	0.12	30	2200
	330	10	12.2	1056	0.12	14	3800
20	27	6.3	5.8	300	0.12	40	2450
	180	10	10.2	720	0.12	25	3200
25	150	8	10.4	750	0.12	30	1350
	220	10	10.2	1100	0.12	38	1800
	330	10	12.2	1650	0.12	30	2800

- Endurance: 105°C, 2000hrs
- Recommended Applications: Standard
- Corresponding product to RoHS

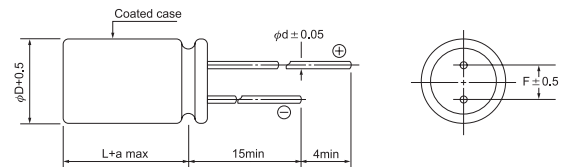


● SPECIFICATION

Item	Characteristic									
Operation Temperature Range	-55 ~ +105°C									
Rated Working Voltage	2.5 ~ 25VDC									
Capacitance Tolerance (120Hz 20°C)	±20%									
Leakage Current (2min)	I≤0.2CV or 300(μA) I : Leakage Current (μA) C : Rated Capacitance (μF) V : Working Voltage (V) Whichever is greater after 2 minutes									
Surge Voltage (20°C)	W.V.	2.5	4	6.3	6.8	7.5	10	16	25	
	S.V.	2.8	4.6	7.2	7.8	8.6	11.5	18.4	28.7	
Tangent of loss angle (120Hz)	The initial specified value or loss (in Characteristic list)									
Impedance Ratio	Impedance ratio at 100kHz									
	Rated Voltage (V)	2.5	4	6.3	6.8	7.5	10	16	25	
	-25°C / +20°C	≤1.15								
	-55°C / +20°C	≤1.25								
Endurance	After applying rated voltage for 2000 hours at 105°C, the capacitor shall meet the following requirement									
	Appearance	No significant damage								
	Capacitance Change	≤±20% of initial value								
	Dissipation Factor	≤150% of initial specified value								
	ESR	≤150% of initial specified value								
	Leakage current	≤ initial specified value								
Bias Humidity Test	After subjecting 90 to 95% RH for 1000 hours at 60°C, the capacitors shall meet the requirement as Endurance									
Surge voltage test	After subjecting to 1000 cycles each consisting of charge with the surge voltage specified at normal temperature for 30 seconds through a protective resistor and discharge for 5 minutes 30 seconds,the capacitors shall meet the requirement as Endurance									
Failure rate(MAX)	1%per 1,000 hours (confidence level 60% at 105°C)									

● DIMENSIONS (mm)

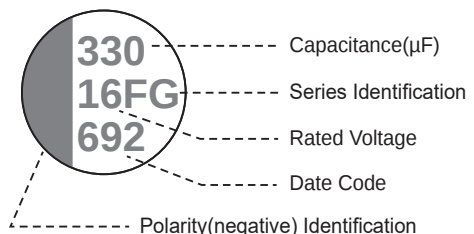
SIZE	$\phi D \times L$	F	ϕd	a
C07	5 x 7	2.0	0.5	1.5
C09	5 x 9	2.0	0.5	1.0
E01	6.3 x 5.4	2.5	0.45	1.0
E06	6.3 x 6	2.5	0.5	1.5
E07	6.3 x 7	2.5	0.5	1.5
E08	6.3 x 8	2.5	0.6	1.0
E09	6.3 x 9	2.5	0.5	1.0
E11	6.3 x 11	2.5	0.5	1.0
G08	8 x 8	3.5	0.6	1.5
G1B	8 x 11.5	3.5	0.6	1.0
G12	8 x 12	3.5	0.6	1.0
G15	8 x 15	3.5	0.6	1.5
H1A	10 x 10.5	5.0	0.6	1.0
H1C	10 x 12.5	5.0	0.6	1.0



● MULTIPLIER FOR RIPPLE CURRENT

Frequency(Hz)	120 ≤ F < 1k	1k ≤ F < 10k	10k ≤ F < 100k	100k ≤ F < 500k
Coefficient	0.05	0.30	0.70	1.00

● MARKING : Case with red printing



● CASE SIZE & CHARACTERISTICS LIST

Rated Voltage (V.DC)	Rated Capacitance (μF)	Case size		Tangent of loss angle (max)	E. S. R. at 100kHz (mΩ)	Allowable ripple current (mA.rms)
		φD (mm)	L (mm)			
2.5	560	6.3	6	0.08	10	4000
		6.3	8	0.08	20	3160
	820	6.3	8	0.08	20	3160
		8	11.5	0.08	7	5600
	1500	10	12.5	0.08	7	5600
	2200	10	12.5	0.08	7	5600
4	560	6.3	8	0.08	20	3160
	680	6.3	8	0.08	20	3160
		8	11.5	0.08	7	5600
	820	6.3	9	0.08	20	3160
		10	12.5	0.08	7	5600
	1000	8	11.5	0.08	7	5600
		10	12.5	0.08	7	5600
	1500	8	11.5	0.08	7	5600
6.3	47	6.3	5.4	0.08	30	1810
	100	6.3	5.4	0.08	40	1810
	180	6.3	5.4	0.08	30	1810
	220	5	7	0.08	11	3500
		6.3	5.4	0.08	30	1810
		6.3	6	0.08	15	3160
	270	5	7	0.08	11	3500
		6.3	7	0.08	11	3500
	330	5	7	0.08	11	3500
		6.3	5.4	0.08	30	1810
		6.3	6	0.08	22	3390
	390	5	9	0.08	11	3500
		6.3	9	0.08	8	3500
	450	5	9	0.08	11	3500
		6.3	6	0.08	22	3390
	470	5	9	0.08	28	3190
		6.3	6	0.08	22	3390
		6.3	8	0.08	10	3800
		8	8	0.08	8	4200
	560	6.3	8	0.08	10	4000
		8	8	0.08	12	4800
	680	6.3	9	0.08	8	3500
		8	11.5	0.08	7	5600
	820	6.3	9	0.08	8	3500
		8	11.5	0.08	7	5600
		10	10.5	0.08	8	5050
		10	12.5	0.08	7	5600
	1000	8	8	0.08	10	4770
		8	11.5	0.08	7	5600
	1200	8	11.5	0.08	7	5600
		10	10.5	0.08	8	5050
	1500	8	11.5	0.08	7	5600
		10	10.5	0.08	8	5050
		10	12.5	0.08	7	5600
	2200	10	12.5	0.08	7	5600
6.8	180	5	7	0.08	20	2300
	220	5	7	0.08	20	2500
	270	5	7	0.08	20	2500
	330	5	9	0.08	15	3100
	390	5	9	0.08	15	3100
	450	6.3	6	0.08	15	3100
	680	6.3	9	0.08	11	3500
	820	6.3	9	0.08	11	3500
	1000	6.3	11	0.08	10	4200

Rated Voltage (V.DC)	Rated Capacitance (μF)	Case size		Tangent of loss angle (max)	E. S. R. at 100kHz (mΩ)	Allowable ripple current (mA.rms)
		φD (mm)	L (mm)			
7.5	270	5	9	0.08	15	2690
	390	5	9	0.08	15	3100
	470	5	9	0.08	15	3100
	500	5	9	0.08	12	3100
	680	6.3	9	0.08	12	3500
10	68	6.3	5.4	0.08	30	1810
	100	5	7	0.08	11	3500
		6.3	5.4	0.08	27	2320
	150	6.3	5.4	0.08	30	2200
	180	6.3	8	0.08	25	2820
	220	6.3	8	0.08	25	2820
	270	6.3	8	0.08	25	2820
	330	6.3	8	0.08	25	2820
		8	8	0.08	11	3500
	470	6.3	9	0.08	25	2820
		8	11.5	0.08	8	5600
		10	10.5	0.08	8	5050
	560	8	11.5	0.08	8	5600
		10	12.5	0.08	8	6100
	680	8	11.5	0.08	8	5600
		10	12.5	0.08	8	6100
	820	8	11.5	0.08	8	5600
		10	12.5	0.08	8	6100
	1200	10	12.5	0.08	8	6100
	1500	10	12.5	0.08	8	6100
16	22	5	7	0.12	30	2200
		6.3	5.4	0.12	30	2200
	33	6.3	5.4	0.12	24	2490
	47	6.3	5.4	0.12	35	1650
		6.3	6	0.12	25	2610
	68	6.3	5.4	0.12	35	1650
	100	6.3	5.4	0.12	24	2490
		6.3	8	0.12	24	2820
	150	6.3	8	0.12	25	2820
		8	8	0.12	22	3150
	180	6.3	8	0.12	25	2820
		8	8	0.12	16	3500
	270	6.3	9	0.12	20	3100
		8	8	0.12	15	3800
		8	11.5	0.12	11	5000
		10	10.5	0.12	14	5050
	330	6.3	9	0.12	20	3100
		8	11.5	0.12	11	5000
		10	10.5	0.12	14	5050
		10	12.5	0.12	10	6100
	470	8	11.5	0.12	11	5000
		10	10.5	0.12	14	5050
		10	12.5	0.12	10	6100
	560	8	11.5	0.12	11	5000
		10	10.5	0.12	11	5050
		10	12.5	0.12	10	6100
	680	8	11.5	0.12	11	5000
		10	12.5	0.12	10	6100
	820	8	12	0.12	10	5000
		10	12.5	0.12	10	5000
	1000	8	15	0.12	10	5000
		10	12.5	0.12	14	5050
25	33	6.3	8	0.12	35	1650
	47	6.3	8	0.12	35	1650
	68	8	8	0.12	35	2980

SOLID CAPACITOR

FR Series

Aluminum Solid Electrolytic Capacitor
With Conductive Polymer

JAMICON

- Endurance: 105°C, 2000hrs
- Recommended Applications: High ripple & low ESR Series
- Corresponding product to RoHS

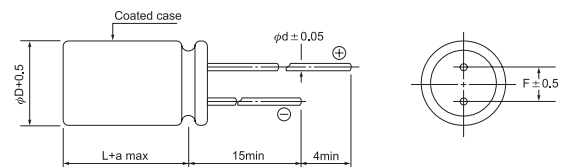


SPECIFICATION

Item	Characteristic			
Operation Temperature Range	-55 ~ +105°C			
Rated Working Voltage	2.5 ~ 6.3VDC			
Capacitance Tolerance (120Hz 20°C)	±20%			
Leakage Current (2min)	I≤0.2CV or 300(μA) Whichever is greater after 2 minutes I : Leakage Current (μA) C : Rated Capacitance (μF) V : Working Voltage (V)			
Surge Voltage (20°C)	W.V.	2.5	4	6.3
	S.V.	2.8	4.6	7.2
Tangent of loss angle (120Hz)	The initial specified value or loss (in Characteristic list)			
Impedance Ratio	Impedance ratio at 100kHz			
	Rated Voltage (V)	2.5	4	6.3
	-25°C / +20°C	≤1.15		
	-55°C / +20°C	≤1.25		
Endurance	After applying rated voltage for 2000 hours at 105°C, the capacitor shall meet the following requirement			
	Appearance	No significant damage		
	Capacitance Change	≤ ±20% of initial value		
	Dissipation Factor	≤150% of initial specified value		
	ESR	≤150% of initial specified value		
	Leakage current	≤ initial specified value		
Bias Humidity Test	After subjecting 90 to 95% RH for 1000 hours at 60°C, the capacitors shall meet the requirement as Endurance			
Surge voltage test	After subjecting to 1000 cycles each consisting of charge with the surge voltage specified at normal temperature for 30 seconds through a protective resistor and discharge for 5 minutes 30 seconds,the capacitors shall meet the requirement as Endurance			
Failure rate(MAX)	1%per 1,000 hours (confidence level 60% at 105°C)			

DIMENSIONS (mm)

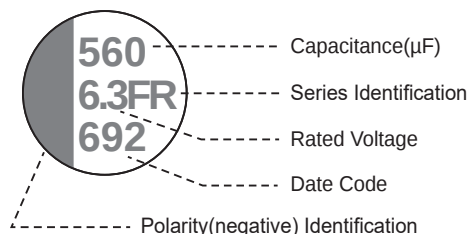
SIZE	$\phi D \times L$	F	ϕd	a
E08	6.3 x 8	2.5	0.6	1.0
G08	8 x 8	3.5	0.6	1.5
G1B	8 x 11.5	3.5	0.6	1.0
H1C	10 x 12.5	5.0	0.6	1.0



MARKING : Case with red printing

MULTIPLIER FOR RIPPLE CURRENT

Frequency(Hz)	$120 \leq F < 1k$	$1k \leq F < 10k$	$10k \leq F < 100k$	$100k \leq F < 500k$
Coefficient	0.05	0.30	0.70	1.00



● CASE SIZE & CHARACTERISTICS LIST

Rated Voltage (V.DC)	Rated Capacitance (μF)	Case size		Tangent of loss angle (max)	E. S. R. at 100kHz (mΩ)	Allowable ripple current (mA.rms)
		φD	L			
		(mm)				
2.5	560	6.3	8	0.10	7	5000
		8	8	0.10	7	6100
	680	8	8	0.10	7	6100
		8	11.5	0.10	7	6100
	820	6.3	8	0.10	7	5000
		8	8	0.10	7	6100
		8	11.5	0.10	7	6100
	1000	8	8	0.10	7	6100
		8	11.5	0.10	7	6100
	1500	8	11.5	0.10	7	6100
2700	10	12.5	0.10	8	5600	
4	560	6.3	8	0.10	7	5000
		8	8	0.10	7	6100
		8	11.5	0.10	7	6100
	680	8	8	0.10	7	6100
		8	11.5	0.10	7	6100
	1000	8	8	0.10	7	6100
		8	11.5	0.10	7	6100
		10	12.5	0.10	7	6100
	1200	8	8	0.10	7	6100
	1500	8	11.5	0.10	7	6100
1800	10	12.5	0.10	9	6500	
6.3	270	6.3	8	0.10	8	4700
	330	6.3	8	0.10	8	4700
	470	6.3	8	0.10	8	4700
		8	8	0.10	8	5700
	560	6.3	8	0.10	8	4700
		8	8	0.10	8	5700
	680	8	8	0.10	8	5700
		8	11.5	0.10	7	5700
	820	8	8	0.10	8	5700
		8	11.5	0.10	7	5700
	1000	8	8	0.10	8	5700
		8	11.5	0.10	7	5700
		10	12.5	0.10	7	6100
	1500	8	11.5	0.10	7	5700
		10	12.5	0.10	7	6100

- Endurance: 105°C, 2000hrs
- Recommended Applications: High ripple & low ESR Series
- Corresponding product to RoHS

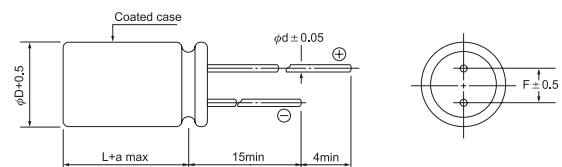


SPECIFICATION

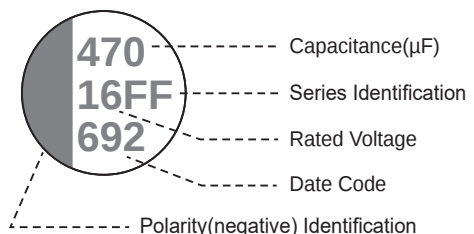
Item	Characteristic									
Operation Temperature Range	-55 ~ +105°C									
Rated Working Voltage	6.3 ~ 63VDC									
Capacitance Tolerance (120Hz 20°C)	±20%									
Leakage Current (2min)	I≤0.2CV or 300(μA) I : Leakage Current (μA) C : Rated Capacitance (μF) V : Working Voltage (V) Whichever is greater after 2 minutes									
Surge Voltage (20°C)	W.V.	6.3	10	16	25	32	35	50	63	
	S.V.	7.2	11.5	18.4	28.7	37	40	57.5	72.5	
Tangent of loss angle (120Hz)	The initial specified value or loss (in Characteristic list)									
Impedance Ratio	Impedance ratio at 100kHz									
	Rated Voltage (V)	6.3	10	16	25	32	35	50	63	
	-25°C / +20°C	≤1.15								
	-55°C / +20°C	≤1.25								
Endurance	After applying rated voltage for 2000 hours at 105°C, the capacitor shall meet the following requirement									
	Appearance	No significant damage								
	Capacitance Change	≤±20% of initial value								
	Dissipation Factor	≤150% of initial specified value								
	ESR	≤150% of initial specified value								
	Leakage current	≤ initial specified value								
Bias Humidity Test	After subjecting 90 to 95% RH for 1000 hours at 60°C, the capacitors shall meet the requirement as Endurance									
Surge voltage test	After subjecting to 1000 cycles each consisting of charge with the surge voltage specified at normal temperature for 30 seconds through a protective resistor and discharge for 5 minutes 30 seconds,the capacitors shall meet the requirement as Endurance									
Failure rate(MAX)	1%per 1,000 hours (confidence level 60% at 105°C)									

DIMENSIONS (mm)

SIZE	$\phi D \times L$	F	ϕd	a
E01	6.3 x 5.4	2.5	0.45	1.0
E06	6.3 x 6	2.5	0.5	1.5
E08	6.3 x 8	2.5	0.6	1.0
E11	6.3 x 11	2.5	0.5	1.0
G08	8 x 8	3.5	0.6	1.5
G1B	8 x 11.5	3.5	0.6	1.0
H1A	10 x 10.5	5.0	0.6	1.0
H1C	10 x 12.5	5.0	0.6	1.0
H13	10 x 13	5.0	0.6	1.0
H16	10 x 16	5.0	0.6	1.0



MARKING : Case with red printing



MULTIPLIER FOR RIPPLE CURRENT

Frequency(Hz)	$120 \leq F < 1k$	$1k \leq F < 10k$	$10k \leq F < 100k$	$100k \leq F < 500k$
Coefficient	0.05	0.30	0.70	1.00

CASE SIZE & CHARACTERISTICS LIST

Rated Voltage (V.DC)	Rated Capacitance (μF)	Case size		Tangent of loss angle (max)	E. S. R. at 100kHz (mΩ)	Allowable ripple current (mA.rms)
		φD (mm)	L (mm)			
6.3	150	6.3	5.4	0.12	30	1810
	680	6.3	8	0.12	28	2800
	1000	8	8	0.12	10	3000
		8	11.5	0.12	8	4860
	1500	8	11.5	0.12	8	4860
		10	10.5	0.12	8	5000
		10	12.5	0.12	7	5000
	1800	10	12.5	0.12	7	5000
	2200	10	11.5	0.12	7	5600
		10	12.5	0.12	7	5600
10	560	8	8	0.12	12	3000
	680	8	8	0.12	12	3000
		8	11.5	0.12	12	4000
	820	8	11.5	0.12	12	4000
	1000	10	12.5	0.12	12	4360
16	470	8	11.5	0.12	12	4000
	560	8	11.5	0.12	12	4000
	820	10	12.5	0.12	11	4000
	1000	10	12.5	0.12	11	4200
25	22	6.3	5.4	0.12	60	1200
	47	6.3	5.4	0.12	60	1200
		6.3	8	0.12	35	1200
	68	6.3	6	0.12	35	1200
		8	8	0.12	30	1500
	100	6.3	8	0.12	35	1500
		8	8	0.12	30	1500
	120	6.3	8	0.12	35	1500
		8	8	0.12	30	1500
	150	8	8	0.12	28	1600
	220	6.3	11	0.12	20	2000
		8	8	0.12	28	2280
	270	8	11.5	0.12	28	2800
	330	8	11.5	0.12	25	2800
		10	10.5	0.12	25	2800
	470	10	12.5	0.12	25	3050
	560	10	12.5	0.12	25	3050
	680	8	15	0.12	20	2500
		10	13	0.12	20	3500
	820	10	16	0.12	20	3500
	1000	10	16	0.12	20	3500

Rated Voltage (V.DC)	Rated Capacitance (μF)	Case size		Tangent of loss angle (max)	E. S. R. at 100kHz (mΩ)	Allowable ripple current (mA.rms)
		φD (mm)	L (mm)			
32	22	6.3	8	0.12	60	990
	47	6.3	8	0.12	60	990
	100	8	8	0.12	50	1200
	150	8	8	0.12	50	1500
35	10	6.3	8	0.12	60	990
	22	6.3	8	0.12	60	990
	33	6.3	6	0.12	70	990
		6.3	8	0.12	60	990
	47	6.3	8	0.12	60	990
	68	6.3	8	0.12	60	990
	100	6.3	8	0.12	50	1200
		8	8	0.12	50	2000
		8	11.5	0.12	35	2300
	150	8	11.5	0.12	35	2300
	220	8	11.5	0.12	35	2400
		10	10.5	0.12	35	2400
	270	10	12.5	0.12	25	2500
	330	10	12.5	0.12	25	2500
50	33	8	8	0.12	48	1300
	47	8	8	0.12	48	1300
		8	11.5	0.12	45	1500
	68	8	11.5	0.12	45	1500
	100	10	10.5	0.12	40	2200
		10	12.5	0.12	40	2200
63	120	10	12.5	0.12	40	2200
	10	6.3	8	0.12	80	900
	33	8	8	0.12	65	1100
	47	8	8	0.12	65	1100
	56	10	12.5	0.12	55	1500
	100	10	12.5	0.12	50	2000

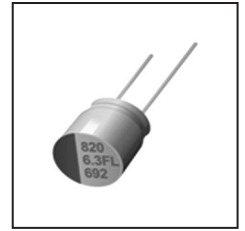
SOLID CAPACITOR

FL Series

Aluminum Solid Electrolytic Capacitor
With Conductive Polymer

JAMICON

- Endurance: 105°C, 2000hrs
- Recommended Applications: Special charger series
- Corresponding product to RoHS

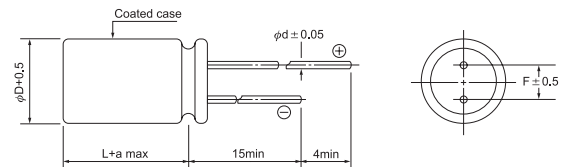


SPECIFICATION

Item	Characteristic					
Operation Temperature Range	-55 ~ +105°C					
Rated Working Voltage	6.3 ~ 16VDC					
Capacitance Tolerance (120Hz 20°C)	±20%					
Leakage Current (2min)	I≤0.2CV or 300(μA) I : Leakage Current (μA) C : Rated Capacitance (μF) V : Working Voltage (V) Whichever is greater after 2 minutes					
Surge Voltage (20°C)	W.V.	6.3	6.8	7.5	10	16
	S.V.	7.2	7.8	8.6	11.5	18.4
Tangent of loss angle (120Hz)	The initial specified value or loss (in Characteristic list)					
Impedance Ratio	Impedance ratio at 100kHz					
	Rated Voltage (V)	6.3	6.8	7.5	10	16
	-25°C / +20°C	≤1.15				
	-55°C / +20°C	≤1.25				
Endurance	After applying rated voltage for 2000 hours at 105°C, the capacitor shall meet the following requirement					
	Appearance	No significant damage				
	Capacitance Change	≤±20% of initial value				
	Dissipation Factor	≤150% of initial specified value				
	ESR	≤150% of initial specified value				
	Leakage current	≤ initial specified value				
Bias Humidity Test	After subjecting 90 to 95% RH for 1000 hours at 60°C, the capacitors shall meet the requirement as Endurance					
Surge voltage test	After subjecting to 1000 cycles each consisting of charge with the surge voltage specified at normal temperature for 30 seconds through a protective resistor and discharge for 5 minutes 30 seconds,the capacitors shall meet the requirement as Endurance					
Failure rate(MAX)	1%per 1,000 hours (confidence level 60% at 105°C)					

DIMENSIONS (mm)

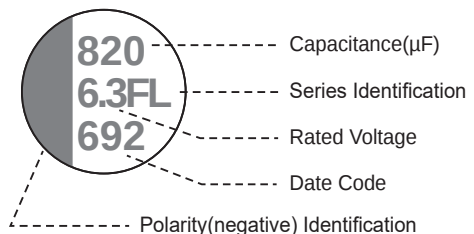
SIZE	$\phi D \times L$	F	ϕd	a
C07	5 x 7	2.0	0.5	1.5
C09	5 x 9	2.0	0.5	1.0
E01	6.3 x 5.4	2.5	0.45	1.0
E06	6.3 x 6	2.5	0.5	1.5
E07	6.3 x 7	2.5	0.5	1.5
E08	6.3 x 8	2.5	0.6	1.0
E09	6.3 x 9	2.5	0.5	1.0
E11	6.3 x 11	2.5	0.5	1.0
G08	8 x 8	3.5	0.6	1.5
G1B	8 x 11.5	3.5	0.6	1.0
H1A	10 x 10.5	5.0	0.6	1.0
H1C	10 x 12.5	5.0	0.6	1.0



MULTIPLIER FOR RIPPLE CURRENT

Frequency(Hz)	$120 \leq F < 1k$	$1k \leq F < 10k$	$10k \leq F < 100k$	$100k \leq F < 500k$
Coefficient	0.05	0.30	0.70	1.00

MARKING : Case with red printing

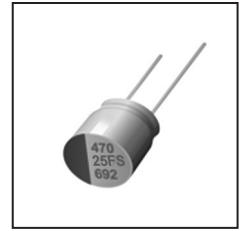


● CASE SIZE & CHARACTERISTICS LIST

Rated Voltage (V.DC)	Rated Capacitance (μF)	Case size		Tangent of loss angle (max)	E. S. R. at 100kHz (mΩ)	Allowable ripple current (mA.rms)
		φD (mm)	L (mm)			
6.3	47	6.3	5.4	0.08	30	1810
	100	6.3	5.4	0.08	40	1810
	180	6.3	5.4	0.08	30	1810
	220	5	7	0.08	11	3500
		6.3	5.4	0.08	30	1810
		6.3	6	0.08	15	3160
	270	5	7	0.08	11	3500
	330	5	7	0.08	11	3500
		6.3	5.4	0.08	30	1810
		6.3	6	0.08	22	3390
	390	5	9	0.08	11	3500
		6.3	9	0.08	8	3500
	450	5	9	0.08	11	3500
		6.3	6	0.08	22	3390
	470	5	9	0.08	28	3190
		6.3	6	0.08	22	3390
		6.3	8	0.08	10	3800
		8	8	0.08	8	4200
	560	6.3	8	0.08	10	4000
		8	8	0.08	12	4800
	680	6.3	9	0.08	8	3500
		8	11.5	0.08	7	5600
		6.3	9	0.08	8	3500
		8	11.5	0.08	7	5600
	820	8	11.5	0.08	7	5600
		10	10.5	0.08	8	5050
		10	12.5	0.08	7	5600
		8	8	0.08	14	4770
	1000	8	11.5	0.08	7	5600
		8	11.5	0.08	7	5600
	1200	8	11.5	0.08	7	5600
		10	10.5	0.08	8	5050
		10	12.5	0.08	7	5600
	1500	8	11.5	0.08	7	5600
		10	10.5	0.08	8	5050
		10	12.5	0.08	7	5600
	2200	10	12.5	0.08	7	5600
6.8	180	5	7	0.08	20	2300
	220	5	7	0.08	20	2500
	270	5	7	0.08	20	2500
	330	5	9	0.08	15	3100
	390	5	9	0.08	15	3100
	680	6.3	9	0.08	11	3500
	820	6.3	9	0.08	11	3500
	1000	6.3	11	0.08	10	4200

Rated Voltage (V.DC)	Rated Capacitance (μF)	Case size		Tangent of loss angle (max)	E. S. R. at 100kHz (mΩ)	Allowable ripple current (mA.rms)
		φD (mm)	L (mm)			
7.5	270	5	9	0.08	15	2690
	390	5	9	0.08	15	3100
	470	5	9	0.08	15	3100
	500	5	9	0.08	12	3100
	680	6.3	9	0.08	12	3500
10	68	6.3	5.4	0.08	30	1810
	100	5	7	0.08	11	3500
		6.3	5.4	0.08	27	2320
	150	6.3	5.4	0.08	30	2200
	180	6.3	8	0.08	25	2820
	220	6.3	8	0.08	25	2820
	270	6.3	8	0.08	25	2820
	330	6.3	8	0.08	25	2820
		8	8	0.08	11	3500
	470	6.3	9	0.08	25	2820
		8x	11.5	0.08	8	5600
		10	10.5	0.08	8	5050
		8	11.5	0.08	8	5600
	560	10	12.5	0.08	8	6100
		8	11.5	0.08	8	5600
	680	10	12.5	0.08	8	6100
		8	11.5	0.08	8	5600
	820	10	12.5	0.08	8	6100
		10	12.5	0.08	8	6100
	1200	10	12.5	0.08	8	6100
	1500	10	12.5	0.08	8	6100
16	22	5	7	0.12	30	2200
		6.3	5.4	0.12	30	2200
	33	6.3	5.4	0.12	24	2490
		6.3	5.4	0.12	35	1650
	47	6.3	6	0.12	25	2610
		6.3	5.4	0.12	35	1650
	68	6.3	5.4	0.12	24	2490
		6.3	8	0.12	24	2820
	100	6.3	8	0.12	25	2820
		8	8	0.12	22	3150
	150	6.3	8	0.12	25	2820
		8	8	0.12	16	3500
	270	6.3	9	0.12	20	3100
		8	8	0.12	15	3800
		8	11.5	0.12	11	5000
		10	10.5	0.12	14	5050

- Endurance: 105°C, 5000hrs
- Recommended Applications: Ultra low ESR & Large capacitance Series
- Corresponding product to RoHS

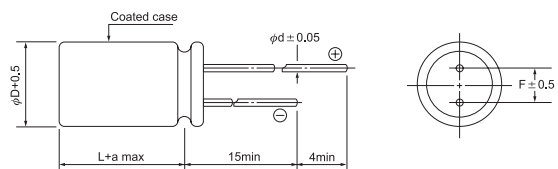


SPECIFICATION

Item	Characteristic				
Operation Temperature Range	-55 ~ +105°C				
Rated Working Voltage	20 ~ 50VDC				
Capacitance Tolerance (120Hz 20°C)	±20%				
Leakage Current (2min)	I≤0.2CV or 300(μA) I : Leakage Current (μA) C : Rated Capacitance (μF) V : Working Voltage (V) Whichever is greater after 2 minutes				
Surge Voltage (20°C)	W.V.	20	25	35	50
	S.V.	23	28.7	40	57.5
Tangent of loss angle (120Hz)	The initial specified value or loss (in Characteristic list)				
Impedance Ratio	Impedance ratio at 100kHz				
	Rated Voltage (V)	20	25	35	50
	-25°C / +20°C	≤1.15			
	-55°C / +20°C	≤1.25			
Endurance	After applying rated voltage for 2000/5000 hours at 105°C, the capacitor shall meet the following requirement				
	Appearance	No significant damage			
	Capacitance Change	≤±20% of initial value			
	Dissipation Factor	≤150% of initial specified value			
	ESR	≤150% of initial specified value			
	Leakage current	≤ initial specified value			
Bias Humidity Test	After subjecting 90 to 95% RH for 1000 hours at 60°C, the capacitors shall meet the requirement as Endurance				
Surge voltage test	After subjecting to 1000 cycles each consisting of charge with the surge voltage specified at normal temperature for 30 seconds through a protective resistor and discharge for 5 minutes 30 seconds,the capacitors shall meet the requirement as Endurance				
Failure rate(MAX)	0.5%/per 1,000 hours (confidence level 60% at 105°C)				

DIMENSIONS (mm)

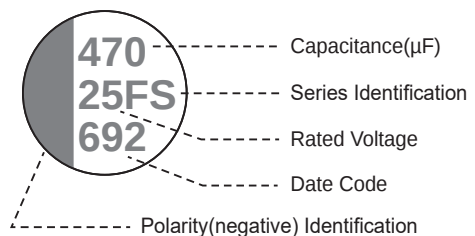
SIZE	$\phi D \times L$	F	ϕd	a
G08	8 x 8	3.5	0.6	1.5
G1B	8 x 11.5	3.5	0.6	1.0
H1B	10 x 11.5	5.0	0.6	1.0
H1C	10 x 12.5	5.0	0.6	1.0



MULTIPLIER FOR RIPPLE CURRENT

Frequency(Hz)	$120 \leq F < 1k$	$1k \leq F < 10k$	$10k \leq F < 100k$	$100k \leq F < 500k$
Coefficient	0.05	0.30	0.70	1.00

MARKING : Case with red printing



● CASE SIZE & CHARACTERISTICS LIST

Rated Voltage (V.DC)	Rated Capacitance (μF)	Case size		Tangent of loss angle (max)	E. S. R. at 100kHz (mΩ)	Allowable ripple current (mA.rms)
		ϕD	L			
		(mm)				
20	390	8	11.5	0.12	25	1760
	680	10	11.5	0.12	25	2800
25	150	8	11.5	0.12	25	1760
	220	8	11.5	0.12	25	1760
	270	8	11.5	0.12	25	1760
	330	10	12.5	0.12	25	2050
	390	10	12.5	0.12	25	2050
	470	10	12.5	0.12	25	2050
35	39	8	8	0.12	50	1500
	56	8	8	0.12	50	1500
	100	8	8	0.12	50	1500
		8	11.5	0.12	35	1760
	150	8	11.5	0.12	35	1760
	220	8	11.5	0.12	35	1760
50	270	10	12.5	0.12	25	2050
	47	8	11.5	0.12	38	1760
	56	8	11.5	0.12	38	1760
	82	10	12.5	0.12	35	2050
	100	10	12.5	0.12	35	2050

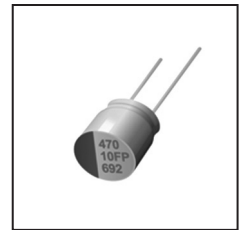
SOLID CAPACITOR

FP Series

Aluminum Solid Electrolytic Capacitor
With Conductive Polymer

JAMICON

- Endurance: 105°C, 3000hrs
- Recommended Applications: standard
- Corresponding product to RoHS

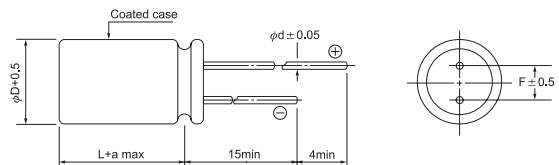


SPECIFICATION

Item	Characteristic							
Operation Temperature Range	-55 ~ +105°C							
Rated Working Voltage	2.5 ~ 25VDC							
Capacitance Tolerance (120Hz 20°C)	±20%							
Leakage Current (2min)	I≤0.2CV or 300(μA) Whichever is greater after 2 minutes I : Leakage Current (μA) C : Rated Capacitance (μF) V : Working Voltage (V)							
Surge Voltage (20°C)	W.V.	2.5	4	6.3	10	16	20	25
	S.V.	2.8	4.6	7.2	11.5	18.4	23	28.7
Tangent of loss angle (120Hz)	The initial specified value or loss (in Characteristic list)							
Impedance Ratio	Impedance ratio at 100kHz							
	Rated Voltage (V)	2.5	4	6.3	10	16	20	25
	-25°C / +20°C	≤1.15						
	-55°C / +20°C	≤1.25						
Endurance	After applying rated voltage for 3000 hours at 105°C, the capacitor shall meet the following requirement							
	Appearance	No significant damage						
	Capacitance Change	≤ ±20% of initial value						
	Dissipation Factor	≤150% of initial specified value						
	ESR	≤150% of initial specified value						
	Leakage current	≤ initial specified value						
Bias Humidity Test	After subjecting 90 to 95% RH for 1000 hours at 60°C, the capacitors shall meet the requirement as Endurance							
Surge voltage test	After subjecting to 1000 cycles each consisting of charge with the surge voltage specified at normal temperature for 30 seconds through a protective resistor and discharge for 5 minutes 30 seconds,the capacitors shall meet the requirement as Endurance							
Failure rate(MAX)	1%per 1,000 hours (confidence level 60% at 105°C)							

DIMENSIONS (mm)

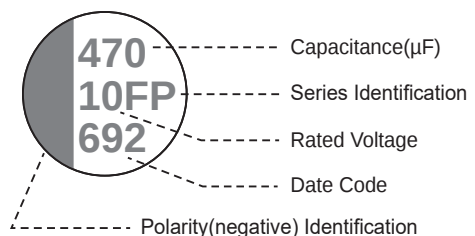
SIZE	$\phi D \times L$	F	ϕd	a
E08	6.3 x 8	2.5	0.6	1.0
G08	8 x 8	3.5	0.6	1.5



MULTIPLIER FOR RIPPLE CURRENT

Frequency(Hz)	$120 \leq F < 1k$	$1k \leq F < 10k$	$10k \leq F < 100k$	$100k \leq F < 500k$
Coefficient	0.05	0.30	0.70	1.00

MARKING : Case with red printing



● CASE SIZE & CHARACTERISTICS LIST

Rated Voltage (V.DC)	Rated Capacitance (μF)	Case size		Tangent of loss angle (max)	E. S. R. at 100kHz (mΩ)	Allowable ripple current (mA.rms)
		ϕD	L			
		(mm)				
2.5	560	6.3	8	0.08	8	4200
		8	8	0.08	8	5600
	820	6.3	8	0.08	8	4200
		8	8	0.08	8	5600
	1200	8	8	0.08	8	5600
6.3	470	6.3	8	0.08	8	4200
		8	8	0.08	8	5600
	560	6.3	8	0.08	8	4200
		8	8	0.08	8	5600
	820	8	8	0.08	8	5600
10	220	6.3	8	0.08	25	2820
		8	8	0.08	11	3500
	270	6.3	8	0.08	25	2820
		6.3	8	0.08	25	2820
	330	8	8	0.08	11	3500
		8	8	0.08	11	3500
	470	8	8	0.08	11	3500
560	8	8	0.08	10	5000	
16	100	6.3	8	0.12	25	2820
	150	6.3	8	0.12	25	2820
	220	6.3	8	0.12	25	2820
	270	8	8	0.12	11	3500
	330	8	8	0.12	11	3500
	470	8	8	0.12	11	4200
	560	8	8	0.12	11	4200
25	10	6.3	8	0.12	80	1200
	22	6.3	8	0.12	35	1650
	33	6.3	8	0.12	35	1650
	56	8	8	0.12	35	1980
	68	8	8	0.12	35	1980

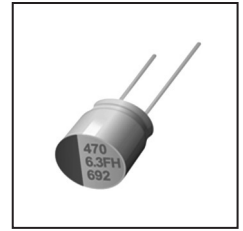
SOLID CAPACITOR

FH Series

Aluminum Solid Electrolytic Capacitor
With Conductive Polymer

JAMICON

- Endurance: 105°C, 5000hrs
- Recommended Applications: Long life & Ultra low ESR Series
- Corresponding product to RoHS

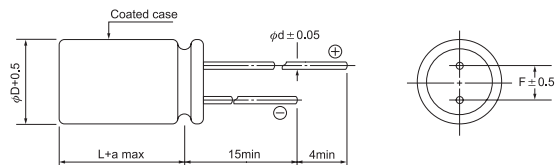


SPECIFICATION

Item	Characteristic					
Operation Temperature Range	-55 ~ +105°C					
Rated Working Voltage	2.5 ~ 16VDC					
Capacitance Tolerance (120Hz 20°C)	±20%					
Leakage Current (2min)	I≤0.2CV or 300(μA) Whichever is greater after 2 minutes I : Leakage Current (μA) C : Rated Capacitance (μF) V : Working Voltage (V)					
Surge Voltage (20°C)	W.V.	2.5	4	6.3	10	16
	S.V.	2.8	4.6	7.2	11.5	18.4
Tangent of loss angle (120Hz)	The initial specified value or loss (in Characteristic list)					
Impedance Ratio	Impedance ratio at 100kHz					
	Rated Voltage (V)	2.5	4	6.3	10	16
	-25°C / +20°C	≤1.15				
	-55°C / +20°C	≤1.25				
Endurance	After applying rated voltage for 5000 hours at 105°C, the capacitor shall meet the following requirement					
	Appearance	No significant damage				
	Capacitance Change	≤±20% of initial value				
	Dissipation Factor	≤150% of initial specified value				
	ESR	≤150% of initial specified value				
	Leakage current	≤ initial specified value				
Bias Humidity Test	After subjecting 90 to 95% RH for 1000 hours at 60°C, the capacitors shall meet the requirement as Endurance					
Surge voltage test	After subjecting to 1000 cycles each consisting of charge with the surge voltage specified at normal temperature for 30 seconds through a protective resistor and discharge for 5 minutes 30 seconds,the capacitors shall meet the requirement as Endurance					
Failure rate(MAX)	1%per 1,000 hours (confidence level 60% at 105°C)					

DIMENSIONS (mm)

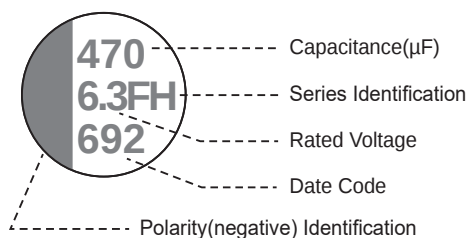
SIZE	$\phi D \times L$	F	ϕd	a
E01	6.3 x 5.4	2.5	0.45	1.0
E08	6.3 x 8	2.5	0.6	1.0
G08	8 x 8	3.5	0.6	1.5
G1B	8 x 11.5	3.5	0.6	1.0
G15	8 x 15	3.5	0.6	1.5
H1C	10 x 12.5	5.0	0.6	1.0



MULTIPLIER FOR RIPPLE CURRENT

Frequency(Hz)	$120 \leq F < 1k$	$1k \leq F < 10k$	$10k \leq F < 100k$	$100k \leq F < 500k$
Coefficient	0.05	0.30	0.70	1.00

MARKING : Case with red printing



● CASE SIZE & CHARACTERISTICS LIST

Rated Voltage (V.DC)	Rated Capacitance (μF)	Case size		Tangent of loss angle (max)	E. S. R. at 100kHz (mΩ)	Allowable ripple current (mA.rms)
		ϕD	L			
		(mm)				
2.5	330	6.3	8	0.12	8	3500
	560	6.3	5.4	0.12	16	3000
		6.3	8	0.12	7	3500
	820	6.3	8	0.12	7	3500
		8	8	0.12	7	5000
4	560	6.3	8	0.12	8	3500
		8	8	0.12	8	6100
	680	8	11.5	0.12	7	6100
	1500	10	12.5	0.12	7	6100
6.3	220	6.3	5.4	0.12	45	1700
	330	6.3	8	0.12	10	3500
	470	6.3	8	0.12	10	3500
		8	8	0.12	10	3500
	560	6.3	8	0.12	10	3500
	820	8	11.5	0.12	8	3500
	1200	8	11.5	0.12	8	3500
	1500	10	12.5	0.12	8	4500
1800	10	12.5	0.12	8	5000	
10	220	6.3	8	0.12	15	2500
	270	6.3	8	0.12	15	2800
	330	8	11.5	0.12	10	3500
	560	8	11.5	0.12	10	5000
	680	8	11.5	0.12	10	5000
16	100	6.3	5.4	0.12	24	2490
		6.3	8	0.12	30	2490
	180	6.3	8	0.12	25	2490
	220	8	11.5	0.12	15	3000
	270	6.3	8	0.12	24	2500
		6.3	8	0.12	15	3500
		8	8	0.12	15	3500
		8	11.5	0.12	15	3500
	330	8	8	0.12	15	3500
	470	8	11.5	0.12	15	3500
		10	12.5	0.12	15	4200
	560	8	11.5	0.12	12	3500
		10	12.5	0.12	10	6100
	680	8	15	0.12	11	3500
	820	10	12.5	0.12	11	4000
	1000	10	12.5	0.12	11	4000

- Endurance: 125°C, 2000hrs
- Recommended Applications: High temperature resistant products
- Corresponding product to RoHS

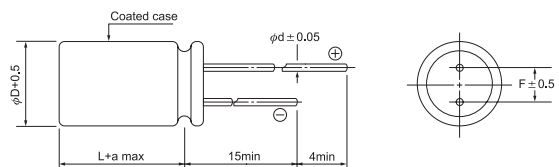


SPECIFICATION

Item	Characteristic					
Operation Temperature Range	-55 ~ +125°C					
Rated Working Voltage	6.3 ~ 25VDC					
Capacitance Tolerance (120Hz 20°C)	±20%					
Leakage Current (2min)	I≤0.2CV or 300(μA) I : Leakage Current (μA) C : Rated Capacitance (μF) V : Working Voltage (V) Whichever is greater after 2 minutes					
Surge Voltage (20°C)	W.V.	6.3	10	16	20	25
	S.V.	7.2	11.5	18.4	23	28.7
Tangent of loss angle (120Hz)	The initial specified value or loss (in Characteristic list)					
Impedance Ratio	Impedance ratio at 100kHz					
	Rated Voltage (V)	6.3	10	16	20	25
	-25°C / +20°C	≤1.15				
	-55°C / +20°C	≤1.25				
Endurance	After applying rated voltage for 2000 hours at 125°C, the capacitor shall meet the following requirement					
	Appearance	No significant damage				
	Capacitance Change	≤ ±20% of initial value				
	Dissipation Factor	≤150% of initial specified value				
	ESR	≤150% of initial specified value				
	Leakage current	≤ initial specified value				
Bias Humidity Test	After subjecting 90 to 95% RH for 1000 hours at 60°C, the capacitors shall meet the requirement as Endurance					
Surge voltage test	After subjecting to 1000 cycles each consisting of charge with the surge voltage specified at normal temperature for 30 seconds through a protective resistor and discharge for 5 minutes 30 seconds,the capacitors shall meet the requirement as Endurance					
Failure rate(MAX)	1%per 1,000 hours (confidence level 60% at 105°C)					

DIMENSIONS (mm)

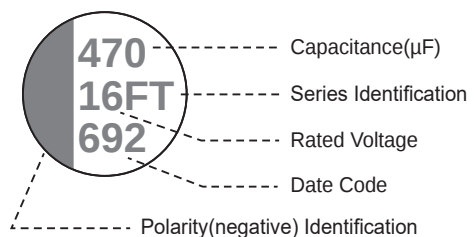
SIZE	$\phi D \times L$	F	ϕd	a
E06	6.3 x 6	2.5	0.5	1.5
E08	6.3 x 8	2.5	0.6	1.0
G08	8 x 8	3.5	0.6	1.5
G1B	8 x 11.5	3.5	0.6	1.0
G15	8 x 15	3.5	0.6	1.5
H1C	10 x 12.5	5.0	0.6	1.0



MULTIPLIER FOR RIPPLE CURRENT

Frequency(Hz)	$120 \leq F < 1k$	$1k \leq F < 10k$	$10k \leq F < 100k$	$100k \leq F < 500k$
Coefficient	0.05	0.30	0.70	1.00

MARKING : Case with red printing



● CASE SIZE & CHARACTERISTICS LIST

Rated Voltage (V.DC)	Rated Capacitance (μF)	Case size		Leakage Current (uA)	Tangent of loss angle (max)	E. S. R. at 100kHz (mΩ)	Allowable ripple current (mA.rms)	
		φD	L				Tx:125°C	Tx:105°C
		(mm)						
6.3	180	6.3	6	300	0.12	45	537	1700
	220	6.3	6	300	0.12	45	537	1700
	270	6.3	6	340	0.12	45	810	2560
	330	6.3	6	415	0.12	45	810	2560
	470	6.3	8	592	0.12	35	810	2560
		8	8	592	0.12	15	810	2560
	560	8	8	705	0.12	15	1332	4210
	680	8	8	856	0.12	15	1721	5440
	820	8	8	1033	0.12	15	1721	5440
1000	8	11.5	1260	0.12	15	1721	5440	
10	180	6.3	8	360	0.12	45	537	1700
	220	8	8	440	0.12	35	810	2560
	270	8	8	540	0.12	35	810	2560
	330	6.3	8	660	0.12	45	537	1700
		8	8	660	0.12	35	810	2560
	470	8	8	940	0.12	35	810	2560
	560	8	8	1120	0.12	35	810	2560
	680	8	11.5	1360	0.12	15	1332	4210
16	82	6.3	8	300	0.12	50	512	1620
	100	6.3	8	320	0.12	50	512	1620
	120	6.3	8	384	0.12	50	670	2120
	150	6.3	8	480	0.12	50	670	2120
	180	8	8	576	0.12	20	1151	3640
	220	8	8	704	0.12	20	1151	3640
	270	8	11.5	864	0.12	20	1493	4720
	330	8	11.5	1056	0.12	20	1151	3640
		10	12.5	1056	0.12	16	1493	4720
470	10	12.5	1504	0.12	16	1493	4720	
20	47	6.3	8	300	0.12	60	458	1450
	56	6.3	8	300	0.12	60	598	1890
	68	6.3	8	300	0.12	60	598	1890
	82	6.3	8	328	0.12	60	1050	3320
	100	8	11.5	400	0.12	24	1050	3320
	120	8	11.5	480	0.12	24	1367	4320
	150	8	11.5	600	0.12	24	1367	4320
25	10	6.3	8	300	0.12	60	458	1450
	22	6.3	8	300	0.12	60	458	1450
	33	6.3	8	300	0.12	60	458	1450
	47	6.3	8	300	0.12	60	598	1890
	56	6.3	8	300	0.12	60	598	1890
	68	6.3	8	340	0.12	60	1050	3320
	82	6.3	8	410	0.12	60	1050	3320
	100	8	11.5	500	0.12	24	1050	3320
		10	12.5	500	0.12	20	1367	4320
	150	8	11.5	750	0.12	24	1367	4320
	220	8	11.5	1100	0.12	24	1050	3320
	270	8	15	1350	0.12	20	1367	4320
330	10	12.5	1650	0.12	20	1367	4320	

Features

- Height : 5.4mm.
- Load life : 85°C 2000 hours.
- Corresponding product to RoHS

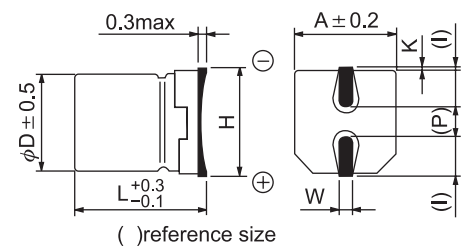


SPECIFICATION

Item	Characteristic							
Operation Temperature Range	-40 ~ +85°C							
Rated Working Voltage	4 ~ 50VDC							
Capacitance Tolerance (120Hz 20°C)	±20%(M)							
Leakage Current (20°C)	I ≤0.01CV or 3 (μA) I : Leakage Current (μA) C : Rated Capacitance (μF) *Whichever is greater after 2 minutes V : Working Voltage (V)							
Surge Voltage (20°C)	W.V.	4	6.3	10	16	25	35	50
	S.V.	5	8	13	20	32	44	63
Dissipation Factor (tan δ) (120Hz 20°C)	W.V.	4	6.3	10	16	25	35	50
	tan δ	0.35	0.26	0.20	0.16	0.14	0.12	0.12
Low Temperature Stability	Impedance ratio at 120Hz							
	Rated Voltage (V)		4	6.3	10	16	25	35 ~ 50
	-25°C / +20°C		7	4	3	2	2	2
	-40°C / +20°C		15	8	6	4	4	3
Load Life	After 2000 hours application of W.V. and +85°C ripple current value, the capacitor shall meet the following limits. (DC + ripple peak voltage ≤ rate working voltage)							
	Capacitance Change	≤ ±20% of initial value						
	Dissipation Factor	≤200% of initial specified value						
	Leakage current	≤initial specified value						
Shelf Life	At +85°C, no voltage application after 1000 hours, the capacitor shall meet the limits for load life characteristics. (With voltage treatment)							
Resistance to Soldering Heat	Capacitors placed on a 250°C hot plate for 30 seconds with their electrode terminals facing downward will fulfill the folowing conditions after being cooled to room temperature.							
	Capacitance Change	≤ ±10% of initial value						
	Dissipation Factor	≤initial specified value						
	Leakage current	≤initial specified value						

DIMENSIONS (mm)

D	L	A	H	I	W	P	K
4.0	5.4	4.3	5.5MAX	1.8	0.65±0.1	1.0	0.35 ^{+0.15} _{-0.20}
5.0	5.4	5.3	6.5MAX	2.2	0.65±0.1	1.5	0.35 ^{+0.15} _{-0.20}
6.3	5.4	6.6	7.8MAX	2.6	0.65±0.1	2.1	0.35 ^{+0.15} _{-0.20}



● CASE SIZE & MAX RIPPLE CURRENT

Case size : D x L (mm)
Max ripple current : mA(rms) 85°C 120Hz

μF	V(DC) Item	4		6.3		10		16		25		35		50	
		DxL	R.C.	DxL	R.C.	DxL	R.C.	DxL	R.C.	DxL	R.C.	DxL	R.C.	DxL	R.C.
1.0														4x5.4	9
2.2														4x5.4	13
3.3														4x5.4	16
4.7										4x5.4	17	4x5.4	19	5x5.4	21
10								4x5.4	24	5x5.4	29	5x5.4	31	6.3x5.4	36
22				4x5.4	27	5x5.4	36	5x5.4	40	6.3x5.4	49	6.3x5.4	55		
33		4x5.4	29	5x5.4	38	5x5.4	44	6.3x5.4	55	6.3x5.4	60				
47		4x5.4	35	5x5.4	46	6.3x5.4	60	6.3x5.4	65						
100		5x5.4	60	6.3x5.4	70	6.3x5.4	80	6.3x5.4	90						
220		6.3x5.4	80												

- Height : 5.4mm.
- Load life : 85°C 2000 hours.
- Low leakage current (0.5 μ A to 2.0 μ A max.)
- Corresponding product to RoHS

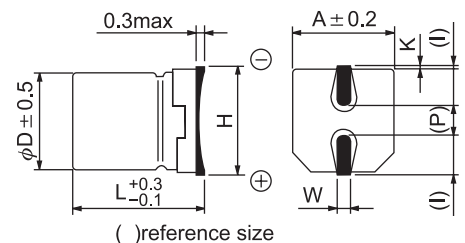


SPECIFICATION

Item	Characteristic						
Operation Temperature Range	-40 ~ +85°C						
Rated Working Voltage	6.3 ~ 50VDC						
Capacitance Tolerance (120Hz 20°C)	±20%(M)						
Leakage Current (20°C)	I ≤0.002CV or 0.5 (μA) *Whichever is greater after 2 minutes				I : Leakage Current (μA) C : Rated Capacitance (μF) V : Working Voltage (V)		
Surge Voltage (20°C)	W.V.	6.3	10	16	25	35	50
	S.V.	8	13	20	32	44	63
Dissipation Factor (tan δ) (120Hz 20°C)	W.V.	6.3	10	16	25	35	50
	tan δφ	0.24	0.20	0.16	0.14	0.12	0.10
Low Temperature Stability	Impedance ratio at 120Hz						
	Rated Voltage (V)	6.3	10	16	25	35	50
	-25°C / +20°C	4	3	2	2	2	2
	-40°C / +20°C	8	6	4	4	3	3
Load Life	After 2000 hours application of W.V. and +85°C ripple current value, the capacitor shall meet the following limits. (DC + ripple peak voltage ≤ rate working voltage)						
	Capacitance Change	≤ ±25% of initial value					
	Dissipation Factor	≤200% of initial specified value					
	Leakage current	≤initial specified value					
Shelf Life	At +85°C, no voltage application after 1000 hours, the capacitor shall meet the limits for load life characteristics. (With voltage treatment)						
Resistance to Soldering Heat	Capacitors placed on a 250°C hot plate for 30 seconds with their electrode terminals facing downward will fulfill the folowing conditions after being cooled to room temperature.						
	Capacitance Change	≤ ±10% of initial value					
	Dissipation Factor	≤initial specified value					
	Leakage current	≤initial specified value					

DIMENSIONS (mm)

D	L	A	H	I	W	P	K
4.0	5.4	4.3	5.5MAX	1.8	0.65±0.1	1.0	0.35 $\begin{smallmatrix} +0.15 \\ -0.20 \end{smallmatrix}$
5.0	5.4	5.3	6.5MAX	2.2	0.65±0.1	1.5	0.35 $\begin{smallmatrix} +0.15 \\ -0.20 \end{smallmatrix}$
6.3	5.4	6.6	7.8MAX	2.6	0.65±0.1	2.1	0.35 $\begin{smallmatrix} +0.15 \\ -0.20 \end{smallmatrix}$



● CASE SIZE & MAX RIPPLE CURRENT

Case size : D x L (mm)
Max ripple current : mA(rms) 85°C 120Hz

μF	V(DC) Item	6.3		10		16		25		35		50	
		DxL	R.C.	DxL	R.C.	DxL	R.C.	DxL	R.C.	DxL	R.C.	DxL	R.C.
1.0												4x5.4	10
2.2												4x5.4	15
3.3												4x5.4	18
4.7								4x5.4	19	4x5.4	20	5x5.4	23
10						4x5.4	25	5x5.4	28	5x5.4	30	6.3x5.4	34
22		4x5.4	31	5x5.4	35	5x5.4	39	6.3x5.4	52	6.3x5.4	54		
33		5x5.4	39	5x5.4	43	6.3x5.4	57	6.3x5.4	63				
47		5x5.4	47	6.3x5.4	59	6.3x5.4	68						
100		6.3x5.4	71	6.3x5.4	76								

- Height : 5.4mm.
- Load life : 85°C 2000 hours.
- Non polarity series using in polarity circuits
- Corresponding product to RoHS

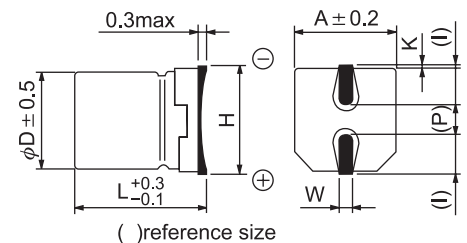


SPECIFICATION

Item	Characteristic						
Operation Temperature Range	-40 ~ +85°C						
Rated Working Voltage	6.3 ~ 50VDC						
Capacitance Tolerance (120Hz 20°C)	±20%(M)						
Leakage Current (20°C)	I ≤0.05CV or 10 (μA) *Whichever is greater after 2 minutes I : Leakage Current (μA) C : Rated Capacitance (μF) V : Working Voltage (V)						
Surge Voltage (20°C)	W.V.	6.3	10	16	25	35	50
	S.V.	8	13	20	32	44	63
Dissipation Factor (tan δ) (120Hz 20°C)	W.V.	6.3	10	16	25	35	50
	tan δφ	0.26	0.22	0.20	0.20	0.20	0.18
Low Temperature Stability	Impedance ratio at 120Hz						
	Rated Voltage (V)	6.3	10	16	25	35	50
	-25°C / +20°C	4	3	2	2	2	2
	-40°C / +20°C	8	6	4	4	3	3
Load Life	After 2000 hours application of W.V. and +85°C ripple current value, the capacitor shall meet the following limits. (DC + ripple peak voltage ≤ rate working voltage) (The polarity need to exchange every 250 hours)						
	Capacitance Change	≤±25% of initial value					
	Dissipation Factor	≤200% of initial specified value					
	Leakage current	≤initial specified value					
Shelf Life	At +85°C, no voltage application after 1000 hours, the capacitor shall meet the limits for load life characteristics. (With voltage treatment)						
Resistance to Soldering Heat	Capacitors placed on a 250°C hot plate for 30 seconds with their electrode terminals facing downward will fulfill the folowing conditions after being cooled to room temperature.						
	Capacitance Change	≤±10% of initial value					
	Dissipation Factor	≤initial specified value					
	Leakage current	≤initial specified value					

DIMENSIONS (mm)

D	L	A	H	I	W	P	K
4.0	5.4	4.3	5.5MAX	1.8	0.65±0.1	1.0	0.35 ^{+0.15} _{-0.20}
5.0	5.4	5.3	6.5MAX	2.2	0.65±0.1	1.5	0.35 ^{+0.15} _{-0.20}
6.3	5.4	6.6	7.8MAX	2.6	0.65±0.1	2.1	0.35 ^{+0.15} _{-0.20}



● CASE SIZE & MAX RIPPLE CURRENT

Case size : D x L (mm)
Max ripple current : mA(rms) 85°C 120Hz

V(DC) μF Item	6.3		10		16		25		35		50	
	DxL	R.C.	DxL	R.C.	DxL	R.C.	DxL	R.C.	DxL	R.C.	DxL	R.C.
1.0											4x5.4	7
2.2									4x5.4	10	5x5.4	12
3.3							5x5.4	13	5x5.4	14	5x5.4	14
4.7					4x5.4	14	5x5.4	16	5x5.4	17	6.3x5.4	19
10			4x5.4	19	5x5.4	23	6.3x5.4	27	6.3x5.4	28		
22	5x5.4	29	6.3x5.4	36	6.3x5.4	39						
33	6.3x5.4	41	6.3x5.4	45	6.3x5.4	48						
47	6.3x5.4	49										

Features

- Higher Capacitance in larger case sizes.
- For general purposes series with 85°C 2000 hours.
- Corresponding product to RoHS

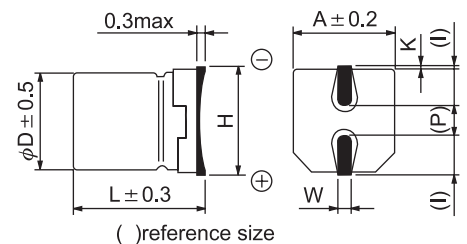


SPECIFICATION

Item	Characteristic									
Operation Temperature Range	-40 ~ +85°C									
Rated Working Voltage	4 ~ 100VDC									
Capacitance Tolerance (120Hz 20°C)	±20%(M)									
Leakage Current (20°C)	I ≤0.01CV or 3 (μA) *Whichever is greater after 2 minutes I : Leakage Current (μA) C : Rated Capacitance (μF) V : Working Voltage (V)									
Surge Voltage (20°C)	W.V.	4	6.3	10	16	25	35	50	63	100
	S.V.	5	8	13	20	32	44	63	79	125
Dissipation Factor (tan δ) (120Hz 20°C)	Add 0.02 per 1000 μF for more then 1000 μF									
	W.V.	4	6.3	10	16	25	35	50	63	100
	tan δ	0.35	0.28	0.24	0.20	0.16	0.14	0.12	0.12	0.10
Low Temperature Stability	Impedance ratio at 120Hz									
	Rated Voltage (V)	4	6.3	10	16	25	35	50	63	100
	-25°C / +20°C	7	4	3	2	2	2	2	2	2
	-40°C / +20°C	15	8	6	4	4	3	3	3	3
Load Life	After 2000 hours application of W.V. and +85°C ripple current value, the capacitor shall meet the following limits. (DC + ripple peak voltage ≤ rate working voltage)									
	Capacitance Change	≤ ±20% of initial value								
	Dissipation Factor	≤200% of initial specified value								
	Leakage current	≤initial specified value								
Shelf Life	At +85°C, no voltage application after 1000 hours, the capacitor shall meet the limits for load life characteristics. (With voltage treatment)									
Resistance to Soldering Heat	Capacitors placed on a 250°C hot plate for 30 seconds with their electrode terminals facing downward will fulfill the folowing conditions after being cooled to room temperature.									
	Capacitance Change	≤ ±10% of initial value								
	Dissipation Factor	≤initial specified value								
	Leakage current	≤initial specified value								

DIMENSIONS (mm)

D	L	A	H	I	W	P	K
8.0	6.2	8.3	9.5MAX	3.4	0.65±0.1	2.2	0.35 ^{+0.15} _{-0.20}
8.0	10.2	8.3	10.0MAX	3.4	0.90±0.2	3.1	0.70±0.2
10.0	10.2	10.3	12.0MAX	3.5	0.90±0.2	4.6	0.70±0.2



● CASE SIZE & MAX RIPPLE CURRENT

Case size : D x L (mm)
Max ripple current : mA(rms) 85°C 120Hz

μF	V(DC) Item	4		6.3		10	
		DxL	R.C.	DxL	R.C.	DxL	R.C.
100						8x6.2	130
220				8x6.2	150	8x6.2	190
330		8x6.2	140	8x6.2	180	8x10.2	290
470		8x10.2	210	8x10.2	260	10x10.2	420
1000		8x10.2	300	10x10.2	460	10x10.2	610
1500		10x10.2	440	10x10.2	560		

μF	V(DC) Item	16		25		35	
		DxL	R.C.	DxL	R.C.	DxL	R.C.
33						8x6.2	120
47				8x6.2	100	8x6.2	140
100		8x6.2	140	8x6.2	150	8x10.2	250
220		8x10.2	260	8x10.2	270	10x10.2	440
330		8x10.2	310	10x10.2	450	10x10.2	540
470		10x10.2	450				

μF	V(DC) Item	50		63		100	
		DxL	R.C.	DxL	R.C.	DxL	R.C.
3.3						8x6.2	41
4.7						8x10.2	60
10						8x10.2	85
22		8x6.2	110	8x10.2	120	10x10.2	150
33		8x6.2	130	8x10.2	140	10x10.2	180
47		8x10.2	190	10x10.2	190		
100		10x10.2	310	10x10.2	280		
220		10x10.2	460				

Features

- 105°C 1000hours.
- For high density mounting.
- Corresponding product to RoHS

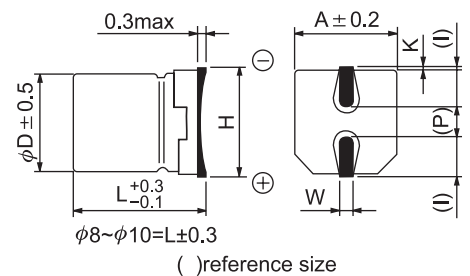


SPECIFICATION

Item	Characteristic							
Operation Temperature Range	-55 ~ +105°C							
Rated Working Voltage	6.3 ~ 50VDC							
Capacitance Tolerance (120Hz 20°C)	±20%(M)							
Leakage Current (20°C)	I ≤0.01CV or 3 (μA) *Whichever is greater after 2 minutes I : Leakage Current (μA) C : Rated Capacitance (μF) V : Working Voltage (V)							
Surge Voltage (20°C)	W.V.	6.3	10	16	25	35	50	
	S.V.	8	13	20	32	44	63	
Dissipation Factor (tan δ) (120Hz 20°C)	W.V.	6.3	10	16	25	35	50	
	tan δ	φ4 ~ φ6.3	0.30	0.22	0.16	0.14	0.12	
		φ8 ~ φ10	0.35	0.26	0.20	0.16	0.14	
Low Temperature Stability	Impedance ratio at 120Hz							
	Rated Voltage (V)	6.3	10	16	25	35	50	
	-25°C / +20°C	4	3	2	2	2	2	
	-40°C / +20°C	8	6	4	4	3	3	
Load Life	After 1000 hours application of W.V. and +105°C ripple current value, the capacitor shall meet the following limits. (DC + ripple peak voltage ≤ rated working voltage)							
	Capacitance Change	≤ ±30% of initial value for 6.3 W.V., ≤ ±25% of initial value for 10~50 W.V.						
	Dissipation Factor	≤200% of initial specified value						
	Leakage current	≤initial specified value						
Shelf Life	At +105°C, no voltage application after 1000 hours, the capacitor shall meet the limits for load life characteristics. (With voltage treatment)							
Resistance to Soldering Heat	Capacitor placed on a 250°C hot plate for 30 seconds with their electrode terminals facing downward will fulfill the following conditions after being cooled to room temperature.							
	Capacitance Change	≤ ±10% of initial value						
	Dissipation Factor	≤initial specified value						
	Leakage current	≤initial specified value						

DIMENSIONS (mm)

D	L	A	H	I	W	P	K
4.0	5.4	4.3	5.5MAX	1.8	0.65±0.1	1.0	0.35 ^{+0.15} _{-0.20}
5.0	5.4	5.3	6.5MAX	2.2	0.65±0.1	1.5	0.35 ^{+0.15} _{-0.20}
6.3	5.4	6.6	7.8MAX	2.6	0.65±0.1	2.1	0.35 ^{+0.15} _{-0.20}
8.0	6.2	8.3	9.5MAX	3.4	0.65±0.1	2.2	0.35 ^{+0.15} _{-0.20}
8.0	10.2	8.3	10.0MAX	3.4	0.90±0.2	3.1	0.70 ^{+0.15} _{-0.20}
10.0	10.2	10.3	12.0MAX	3.5	0.90±0.2	4.6	0.70 ^{+0.15} _{-0.20}



● CASE SIZE & MAX RIPPLE CURRENT

Case size : D x L (mm)
Max ripple current : mA(rms) 105°C 120Hz

μF	V(DC) Item	6.3		10		16		25		35		50	
		DxL	R.C.	DxL	R.C.	DxL	R.C.	DxL	R.C.	DxL	R.C.	DxL	R.C.
1.0												4x5.4	8
2.2												4x5.4	11
3.3												4x5.4	14
4.7								4x5.4	14	4x5.4	15	5x5.4	19
10						4x5.4	19	5x5.4	23	5x5.4	25	6.3x5.4	31
22		4x5.4	23	5x5.4	29	5x5.4	32	6.3x5.4	39	6.3x5.4	42	8x6.2	60
33		5x5.4	32	5x5.4	35	6.3x5.4	45	6.3x5.4	48	6.3x5.4 8x6.2	50 70	8x10.2	90
47		5x5.4	38	6.3x5.4	48	6.3x5.4	55	6.3x5.4 8x6.2	60 75	8x10.2	100	8x10.2 10x10.2	110 120
100		6.3x5.4	65	6.3x5.4 8x6.2	70 90	6.3x5.4 8x10.2	80 120	8x10.2	140	8x10.2 10x10.2	150 170	8x10.2 10x10.2	160 180
220		6.3x5.4	95	8x10.2	160	8x10.2 10x10.2	180 210	8x10.2 10x10.2	200 230	8x10.2 10x10.2	220 250	10x10.2	270
330		8x10.2	170			8x10.2 10x10.2	220 260	8x10.2 10x10.2	250 290	10x10.2	300		
470				8x10.2 10x10.2	230 270	8x10.2 10x10.2	270 300	10x10.2	340				
1000		8x10.2 10x10.2	290 340										
1500		10x10.2	410										

Features

- Height:5.4mm.
- Load life:105°C, 1000hours.
- Low leakage current (0.5μA to 2.0μA max.)
- Corresponding product to RoHS

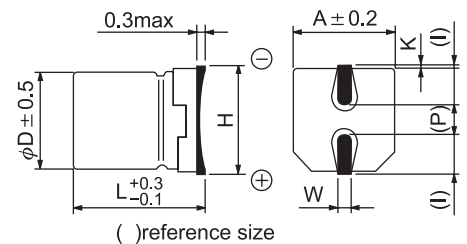


SPECIFICATION

Item	Characteristic						
Operation Temperature Range	-40 ~ +105°C						
Rated Working Voltage	6.3 ~ 50VDC						
Capacitance Tolerance (120Hz 20°C)	±20%(M)						
Leakage Current (20°C)	I ≤0.002CV or 0.5 (μA) *Whichever is greater after 2 minutes				I : Leakage Current (μA) C : Rated Capacitance (μF) V : Working Voltage (V)		
Surge Voltage (20°C)	W.V.	6.3	10	16	25	35	50
	S.V.	8	13	20	32	44	63
Dissipation Factor (tan δ) (120Hz 20°C)	W.V.	6.3	10	16	25	35	50
	tan δ	0.24	0.20	0.16	0.14	0.12	0.10
Low Temperature Stability	Impedance ratio at 120Hz						
	Rated Voltage (V)	6.3	10	16	25	35	50
	-25°C / +20°C	4	3	2	2	2	2
	-40°C / +20°C	8	6	4	4	3	3
Load Life	After 1000 hours application of W.V. and +105°C ripple current value, the capacitor shall meet the following limits. (DC + ripple peak voltage ≤ rate working voltage)						
	Capacitance Change	≤ ±25% of initial value					
	Dissipation Factor	≤200% of initial specified value					
	Leakage current	≤initial specified value					
Shelf Life	At +105°C, no voltage application after 1000 hours, the capacitor shall meet the limits for load life characteristics. (With voltage treatment)						
Resistance to Soldering Heat	Capacitor placed on a 250°C hot plate for 30 seconds with their electrode terminals facing downward will fulfill the folowing conditions after being cooled to room temperature.						
	Capacitance Change	≤ ±10% of initial value					
	Dissipation Factor	≤initial specified value					
	Leakage current	≤initial specified value					

DIMENSIONS (mm)

D	L	A	H	I	W	P	K
4.0	5.4	4.3	5.5MAX	1.8	0.65±0.1	1.0	0.35 ^{+0.15} _{-0.20}
5.0	5.4	5.3	6.5MAX	2.2	0.65±0.1	1.5	0.35 ^{+0.15} _{-0.20}
6.3	5.4	6.6	7.8MAX	2.6	0.65±0.1	2.1	0.35 ^{+0.15} _{-0.20}



● CASE SIZE & MAX RIPPLE CURRENT

Case size : D x L (mm)
Max ripple current : mA(rms) 105°C 120Hz

μF	V(DC) Item	6.3		10		16		25		35		50	
		DxL	R.C.	DxL	R.C.	DxL	R.C.	DxL	R.C.	DxL	R.C.	DxL	R.C.
1.0												4x5.4	8
2.2												4x5.4	12
3.3												4x5.4	14
4.7								4x5.4	14	4x5.4	15	5x5.4	19
10						4x5.4	20	5x5.4	24	5x5.4	26	6.3x5.4	32
22		4x5.4	24	5x5.4	30	5x5.4	33	6.3x5.4	41	6.3x5.4	44		
33		5x5.4	33	5x5.4	36	6.3x5.4	46	6.3x5.4	50				
47		5x5.4	39	6.3x5.4	50	6.3x5.4	55						
100		6.3x5.4	65	6.3x5.4	70								

Features

- Height:5.4mm.
- Load life:105°C, 1000hours.
- CP series is Bi-Polar type
- Corresponding product to RoHS

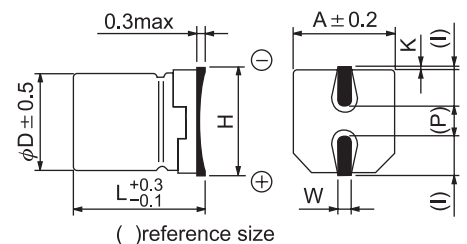


SPECIFICATION

Item	Characteristic						
Operation Temperature Range	-55 ~ +105°C						
Rated Working Voltage	6.3 ~ 50VDC						
Capacitance Tolerance (120Hz 20°C)	±20%(M)						
Leakage Current (20°C)	I ≤0.05CV or 10 (μA) *Whichever is greater after 2 minutes I : Leakage Current (μA) C : Rated Capacitance (μF) V : Working Voltage (V)						
Surge Voltage (20°C)	W.V.	6.3	10	16	25	35	50
	S.V.	8	13	20	32	44	63
Dissipation Factor (tan δ) (120Hz 20°C)	W.V.	6.3	10	16	25	35	50
	tan δ	0.26	0.22	0.20	0.20	0.20	0.18
Low Temperature Stability	Impedance ratio at 120Hz						
	Rated Voltage (V)	6.3	10	16	25	35	50
	-25°C / +20°C	4	3	2	2	2	2
	-40°C / +20°C	8	6	4	4	3	3
Load Life	After 1000 hours application of W.V. and +105°C ripple current value, the capacitor shall meet the following limits. (DC + ripple peak voltage ≤ rate working voltage) (The polarity need to exchange every 250 hours)						
	Capacitance Change	≤ ±25% of initial value					
	Dissipation Factor	≤200% of initial specified value					
	Leakage current	≤initial specified value					
Shelf Life	At +105°C, no voltage application after 500 hours, the capacitor shall meet the limits for load life characteristics. (With voltage treatment)						
Resistance to Soldering Heat	Capacitor placed on a 250°C hot plate for 30 seconds with their electrode terminals facing downward will fulfill the folowing conditions after being cooled to room temperature.						
	Capacitance Change	≤ ±10% of initial value					
	Dissipation Factor	≤initial specified value					
	Leakage current	≤initial specified value					

DIMENSIONS (mm)

D	L	A	H	I	W	P	K
4.0	5.4	4.3	5.5MAX	1.8	0.65±0.1	1.0	0.35 ^{+0.15} _{-0.20}
5.0	5.4	5.3	6.5MAX	2.2	0.65±0.1	1.5	0.35 ^{+0.15} _{-0.20}
6.3	5.4	6.6	7.8MAX	2.6	0.65±0.1	2.1	0.35 ^{+0.15} _{-0.20}



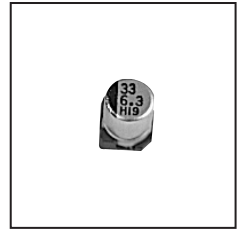
● CASE SIZE & MAX RIPPLE CURRENT

Case size : D x L (mm)
Max ripple current : mA(rms) 105°C 120Hz

μF	V(DC) Item	6.3		10		16		25		35		50	
		DxL	R.C.	DxL	R.C.	DxL	R.C.	DxL	R.C.	DxL	R.C.	DxL	R.C.
1.0												4x5.4	6
2.2										4x5.4	9	5x5.4	10
3.3								5x5.4	12	5x5.4	13	5x5.4	13
4.7						4x5.4	12	5x5.4	14	5x5.4	15	6.3x5.4	17
10				4x5.4	17	5x5.4	21	6.3x5.4	24	6.3x5.4	25		
22		5x5.4	26	6.3x5.4	32	6.3x5.4	35						
33		6.3x5.4	36	6.3x5.4	40	6.3x5.4	43						
47		6.3x5.4	43										

Features

- Load life : 105°C 2000 hours.
- Corresponding product to RoHS

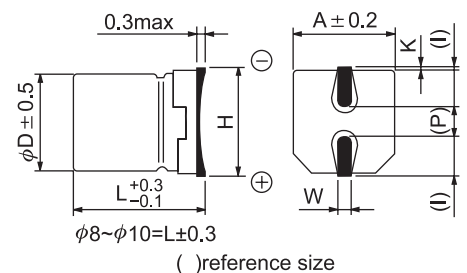


SPECIFICATION

Item	Characteristic							
Operation Temperature Range	-55 ~ +105°C							
Rated Working Voltage	4 ~ 50VDC							
Capacitance Tolerance (120Hz 20°C)	±20%(M)							
Leakage Current (20°C)	I ≤0.01CV or 3 (μA) *Whichever is greater after 2 minutes I : Leakage Current (μA) C : Rated Capacitance (μF) V : Working Voltage (V)							
Surge Voltage (20°C)	W.V.	4	6.3	10	16	25	35	50
	S.V.	5	8	13	20	32	44	63
Dissipation Factor (tan δ) (120Hz 20°C)	W.V.	4	6.3	10	16	25	35	50
	tan δ	φ4 ~ φ6.3	0.50	0.30	0.22	0.16	0.14	0.12
		φ8 ~ φ10	0.50	0.35	0.26	0.20	0.16	0.14
Low Temperature Stability	Impedance ratio at 120Hz							
	Rated Voltage (V)		4	6.3	10	16	25	35 ~ 50
	-25°C / +20°C		7	4	3	2	2	2
	-40°C / +20°C		15	8	6	4	4	3
Load Life	After 2000 hours application of W.V. and +105°C ripple current value, the capacitor shall meet the following limits. (DC + ripple peak voltage ≤ rate working voltage)							
	Capacitance Change	≤ ±25% of initial value (4WV ±35%)						
	Dissipation Factor	≤200% of initial specified value						
	Leakage current	≤initial specified value						
Shelf Life	At +105°C, no voltage application after 1000 hours, the capacitor shall meet the limits for load life characteristics. (With voltage treatment)							
Resistance to Soldering Heat	Capacitor placed on a 250°C hot plate for 30 seconds with their electrode terminals facing downward will fulfill the folowing conditions after being cooled to room temperature.							
	Capacitance Change	≤ ±10% of initial value						
	Dissipation Factor	≤initial specified value						
	Leakage current	≤initial specified value						

DIMENSIONS (mm)

D	L	A	H	I	W	P	K
4.0	5.4	4.3	5.5MAX	1.8	0.65±0.1	1.0	0.35 ^{+0.15} _{-0.20}
5.0	5.4	5.3	6.5MAX	2.2	0.65±0.1	1.5	0.35 ^{+0.15} _{-0.20}
6.3	5.4	6.6	7.8MAX	2.6	0.65±0.1	2.1	0.35 ^{+0.15} _{-0.20}
8.0	6.2	8.3	9.5MAX	3.4	0.65±0.1	2.2	0.35 ^{+0.15} _{-0.20}
8.0	10.2	8.3	10.0MAX	3.4	0.90±0.2	3.1	0.70 ^{+0.15} _{-0.20}
10.0	10.2	10.3	12.0MAX	3.5	0.90±0.2	4.6	0.70 ^{+0.15} _{-0.20}



● CASE SIZE & MAX RIPPLE CURRENT

Case size : D x L (mm)
Max ripple current : mA(rms) 105°C 120Hz

μF	V(DC) Item	4		6.3		10		16		25		35		50	
		DxL	R.C.	DxL	R.C.	DxL	R.C.	DxL	R.C.	DxL	R.C.	DxL	R.C.	DxL	R.C.
1.0														4x5.4	8
2.2														4x5.4	12
3.3														4x5.4	15
4.7										4x5.4	15	4x5.4	18	5x5.4	20
6.8										4x5.4	18	5x5.4	22	5x5.4	24
10								4x5.4	20	5x5.4	25	5x5.4	26	6.3x5.4	33
22		4x5.4	20	4x5.4	24	5x5.4	30	5x5.4	34	6.3x5.4	42	6.3x5.4	45	8x10.2	75
33		4x5.4	25	4x5.4	30	5x5.4	37	6.3x5.4	48	6.3x5.4	50	8x6.2	70	8x10.2	90
47		4x5.4	30	5x5.4	41	6.3x5.4	50	6.3x5.4	55	8x6.2	75	8x10.2	100	10x10.2	120
100		5x5.4	49	6.3x5.4	70	6.3x5.4	75	8x10.2	120	8x10.2	140	10x10.2	170		
150		6.3x5.4	70	8x6.2	95	8x6.2	110	8x10.2	150	8x10.2	170				
220		6.3x5.4	85	8x10.2	140	8x10.2	160	10x10.2	210	10x10.2	230				
330		8x10.2	140	8x10.2	170	8x10.2	200	10x10.2	260						
470		8x10.2	170	8x10.2	200	10x10.2	270								

Features

- Load life : 105°C 3000~5000 hours.
- For high density mounting.
- Corresponding product to RoHS

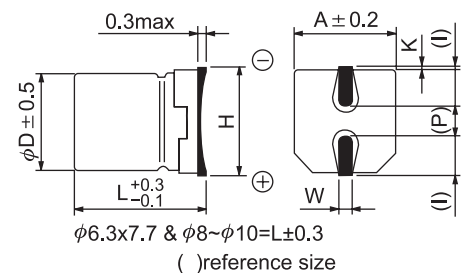


SPECIFICATION

Item	Characteristic						
Operation Temperature Range	-55 ~ +105°C						
Rated Working Voltage	6.3 ~ 50VDC						
Capacitance Tolerance (120Hz 20°C)	±20%(M)						
Leakage Current (20°C)	I ≤0.01CV or 3 (μA) Whichever is greater after 2 minutes I : Leakage Current (μA) C : Rated Capacitance (μF) V : Working Voltage (V)						
Surge Voltage (20°C)	W.V.	6.3	10	16	25	35	50
	S.V.	8	13	20	32	44	63
Dissipation Factor (tan δ) (120Hz 20°C)	Add 0.02 per 1000 μF for more than 1000 μF						
	W.V.	6.3	10	16	25	35	50
	tan δ	0.28	0.24	0.20	0.16	0.13	0.12
Low Temperature Stability	Impedance ratio at 120Hz						
	Rated Voltage (V)	6.3	10	16	25	35	50
	-25°C / +20°C	4	3	2	2	2	2
	-55°C / +20°C	10	7	5	3	3	3
Load Life	After hours (φD≤6.3mm 3000 hours , φD≥8mm 5000 hours) application of W.V. and +105°C ripple current value, the capacitor shall meet the following limits. (DC + ripple peak voltage ≤ rate working voltage)						
	Capacitance Change	≤ ±30% of initial value					
	Dissipation Factor	≤300% of initial specified value					
	Leakage current	≤initial specified value					
Shelf Life	At +105°C, no voltage application after 1000 hours, the capacitor shall meet the limits for load life characteristics. (With voltage treatment)						
Resistance to Soldering Heat	Capacitor placed on a 250°C hot plate for 30 seconds with their electrode terminals facing downward will fulfill the folowing conditions after being cooled to room temperature.						
	Capacitance Change	≤ ±10% of initial value					
	Dissipation Factor	≤initial specified value					
	Leakage current	≤initial specified value					

DIMENSIONS (mm)

D	L	A	H	I	W	P	K
4.0	5.4	4.3	5.5MAX	1.8	0.65±0.1	1.0	0.35 ^{+0.15} _{-0.20}
5.0	5.4	5.3	6.5MAX	2.2	0.65±0.1	1.5	0.35 ^{+0.15} _{-0.20}
6.3	5.4	6.6	7.8MAX	2.6	0.65±0.1	2.1	0.35 ^{+0.15} _{-0.20}
6.3	7.7	6.6	7.8MAX	2.6	0.65±0.1	2.1	0.35 ^{+0.15} _{-0.20}
8.0	10.2	8.3	10.0MAX	3.4	0.9±0.2	3.1	0.70±0.20
10.0	10.2	10.3	12.0MAX	3.5	0.9±0.2	4.6	0.70±0.20



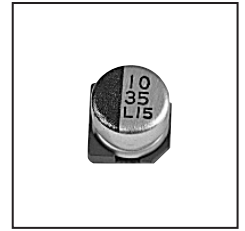
● CASE SIZE & MAX RIPPLE CURRENT

Case size : D x L (mm)
Max ripple current : mA(rms) 105°C 120Hz

V(DC) Item μF	6.3		10		16		25		35		50	
	DxL	R.C.	DxL	R.C.	DxL	R.C.	DxL	R.C.	DxL	R.C.	DxL	R.C.
1.0											4x5.4	7
2.2											4x5.4	11
3.3											4x5.4	13
4.7									4x5.4	17	5x5.4	18
10					4x5.4	18	5x5.4	23	5x5.4	25	6.3x5.4	30
22	4x5.4	23	5x5.4	28	5x5.4	30	6.3x5.4	39	6.3x5.4	43	6.3x7.7	60
33	5x5.4	31	5x5.4	34	6.3x5.4	43	6.3x5.4	48	6.3x7.7	70	8x10.2	90
47	5x5.4	38	6.3x5.4	47	6.3x5.4	50	6.3x7.7	75	8x10.2	100	8x10.2	120
100	6.3x5.4	65	6.3x7.7	85	6.3x7.7	95	8x10.2	140	10x10.2	170	10x10.2	180
220	6.3x7.7	120	8x10.2	170	10x10.2	210	10x10.2	230	10x10.2	260		
330	8x10.2	190	10x10.2	230	10x10.2	260	10x10.2	290				
470	10x10.2	260	10x10.2	280	10x10.2	330						
1000	10x10.2	380										

Features

- Load Life : 105°C 1000hours.
- For high density mounting.
- Low impedance at 100kHz.
- Corresponding product to RoHS

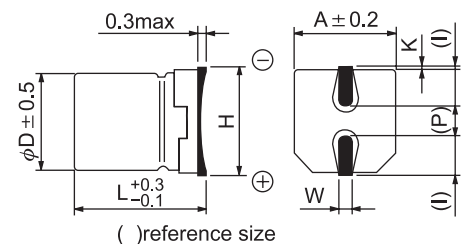


SPECIFICATION

Item	Characteristic						
Operation Temperature Range	-55 ~ +105°C						
Rated Working Voltage	6.3 ~ 50VDC						
Capacitance Tolerance (120Hz 20°C)	±20%(M)						
Leakage Current (20°C)	I ≤0.01CV or 3 (μA) I : Leakage Current (μA) C : Rated Capacitance (μF) *Whichever is greater after 2 minutes V : Working Voltage (V)						
Surge Voltage (20°C)	W.V.	6.3	10	16	25	35	50
	S.V.	8	13	20	32	44	63
Dissipation Factor (tan δ) (120Hz 20°C)	W.V.	6.3	10	16	25	35	50
	tan δ	0.22	0.19	0.16	0.14	0.12	0.12
Low Temperature Stability	Impedance ratio at 120Hz						
	Rated Voltage (V)	6.3	10	16	25	35	50
	-25°C / +20°C	2	2	2	2	2	2
	-55°C / +20°C	5	4	4	3	3	3
Load Life	After 1000 hours application of W.V. and +105°C ripple current value, the capacitor shall meet the following limits. (DC + ripple peak voltage ≤ rate working voltage)						
	Capacitance Change	≤ ±30% of initial value for 6.3 W.V., ≤ ±20% of initial value for 10~50 W.V.					
	Dissipation Factor	≤200% of initial specified value					
	Leakage current	≤initial specified value					
Shelf Life	At +105°C, no voltage application after 1000 hours, the capacitor shall meet the limits for load life characteristics. (With voltage treatment)						
Resistance to Soldering Heat	Capacitor placed on a 250°C hot plate for 30 seconds with their electrode terminals facing downward will fulfill the folowing conditions after being cooled to room temperature.						
	Capacitance Change	≤ ±10% of initial value					
	Dissipation Factor	≤initial specified value					
	Leakage current	≤initial specified value					

DIMENSIONS (mm)

D	L	A	H	I	W	P	K
4.0	5.4	4.3	5.5MAX	1.8	0.65±0.1	1.0	0.35 ^{+0.15} _{-0.20}
5.0	5.4	5.3	6.5MAX	2.2	0.65±0.1	1.5	0.35 ^{+0.15} _{-0.20}
6.3	5.4	6.6	7.8MAX	2.6	0.65±0.1	2.1	0.35 ^{+0.15} _{-0.20}



● CASE SIZE & MAX RIPPLE CURRENT

Case size : D x L (mm)
 Max impedance : Ω 20°C 100kHz
 Max ripple current : mA(rms) 105°C 100kHz

μF	V(DC) Item	6.3			10			16			25			35			50		
		DxL	IMP.	R.C.	DxL	IMP.	R.C.	DxL	IMP.	R.C.	DxL	IMP.	R.C.	DxL	IMP.	R.C.	DxL	IMP.	R.C.
1.0														4x5.4	3.9	60	4x5.4	4.9	30
2.2														4x5.4	3.6	60	4x5.4	4.5	30
3.3														4x5.4	3.0	60	4x5.4	3.7	30
4.7											4x5.4	3.1	60	4x5.4	2.5	60	5x5.4	3.1	41
6.8											4x5.4	2.7	60	5x5.4	2.2	60	6.3x5.4	2.7	55
10								4x5.4	3.3	60	5x5.4	2.4	65	5x5.4	1.9	70	6.3x5.4	2.4	70
22		4x5.4	3.2	60	5x5.4	2.2	65	5x5.4	1.8	85	6.3x5.4	1.3	110	6.3x5.4	1.0	120			
33		5x5.4	2.4	65	5x5.4	1.7	75	6.3x5.4	1.4	120	6.3x5.4	1.0	140						
47		5x5.4	2.0	80	6.3x5.4	1.4	110	6.3x5.4	1.1	140									
68		6.3x5.4	1.5	110	6.3x5.4	1.1	130												
100		6.3x5.4	1.2	130	6.3x5.4	0.9	150												

Features

- Load Life : 105°C 1000~2000 hours.
- For high density mounting.
- Low impedance at 100kHz.
- Corresponding product to RoHS

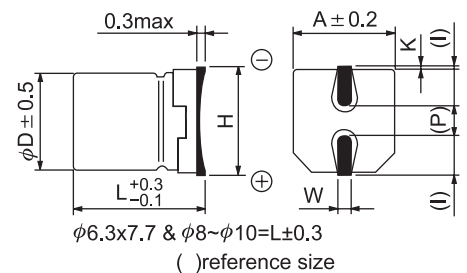


SPECIFICATION

Item	Characteristic							
Operation Temperature Range	-55 ~ +105°C							
Rated Working Voltage	6.3 ~ 50VDC							
Capacitance Tolerance (120Hz 20°C)	±20%(M)							
Leakage Current (20°C)	I ≤0.01CV or 3 (μA) *Whichecer is greater after 2 minutes I : Leakage Current (μA) C : Rated Capacitance (μF) V : Working Voltage (V)							
Surge Voltage (20°C)	W.V.		6.3	10	16	25	35	50
	S.V.		8	13	20	32	44	63
	Add 0.02 per 1000 μF for more than 1000 μF							
Dissipation Factor (tan δ) (120Hz 20°C)	W.V.		6.3	10	16	25	35	50
	tan δ	φ4 ~ φ6.3	0.24	0.20	0.16	0.14	0.12	0.12
		φ8 ~ φ10	0.28	0.24	0.20	0.16	0.14	0.14
Low Temperature Stability	Impedance ratio at 120Hz							
	Rated Voltage (V)		6.3	10	16	25	35	50
	-25°C / +20°C		3	2	2	2	2	2
	-55°C / +20°C		5	4	4	3	3	3
Load Life	After hours (φD≤6.3mm 1000 hours, φD≥8mm 2000 hours) application of W.V. and +105°C ripple current value, the capacitor shall meet the following limits. (DC + ripple peak voltage ≤ rate working voltage)							
	Capacitance Change		± 25% of initial value					
	Dissipation Factor		≤200% of initial specified value					
	Leakage current		≤initial specified value					
Shelf Life	At +105°C, no voltage application after 1000 hours, the capacitor shall meet the limits for load life characteristics. (With voltage treatment)							
Resistance to Soldering Heat	Capacitor placed on a 250°C hot plate for 30 seconds with their electrode terminals facing downward will fulfill the folowing conditions after being cooled to room temperature.							
	Capacitance Change		± 10% of initial value					
	Dissipation Factor		≤initial specified value					
	Leakage current		≤initial specified value					

DIMENSIONS (mm)

D	L	A	H	I	W	P	K
4.0	5.4	4.3	5.5MAX	1.8	0.65±0.1	1.0	0.35 ^{+0.15} _{-0.20}
5.0	5.4	5.3	6.5MAX	2.2	0.65±0.1	1.5	0.35 ^{+0.15} _{-0.20}
6.3	5.4	6.6	7.8MAX	2.6	0.65±0.1	2.1	0.35 ^{+0.15} _{-0.20}
6.3	7.7	6.6	7.8MAX	2.6	0.65±0.1	2.1	0.35 ^{+0.15} _{-0.20}
8.0	10.2	8.3	10.0MAX	3.4	0.90±0.2	3.1	0.70±0.2
10.0	10.2	10.3	12.0MAX	3.5	0.90±0.2	4.6	0.70±0.2

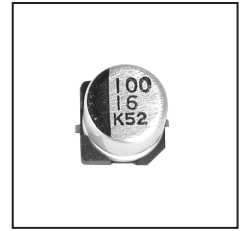


● CASE SIZE & MAX RIPPLE CURRENT

Case size : D x L (mm)
 Max impedance : Ω 20°C 100kHz
 Max ripple current : mA(rms) 105°C 100kHz

μF	V(DC) Item			6.3			10			16			25			35			50		
	DxL	IMP.	R.C.	DxL	IMP.	R.C.	DxL	IMP.	R.C.	DxL	IMP.	R.C.	DxL	IMP.	R.C.	DxL	IMP.	R.C.	DxL	IMP.	R.C.
1.0																			4x5.4	5.00	30
2.2																			4x5.4	5.00	30
3.3																			4x5.4	5.00	30
4.7																4x5.4	1.80	80	5x5.4	1.52	85
6.8																5x5.4	1.20	120	5x5.4	1.20	120
10										4x5.4	1.80	80	4x5.4	1.80	80	5x5.4	0.76	150	6.3x5.4	0.88	165
15										4x5.4	1.80	80	5x5.4	0.76	150	5x5.4	0.76	150	6.3x5.4	0.88	165
22				4x5.4	1.80	80	5x5.4	0.76	150	5x5.4	0.76	150	5x5.4	0.76	150	5x5.4	0.76	150	6.3x5.4	0.88	165
27	4x5.4	1.80	80	5x5.4	0.76	150	5x5.4	0.76	150	6.3x5.4	0.44	230	6.3x5.4	0.44	230	6.3x5.4	0.44	230	6.3x7.7	0.68	185
33	5x5.4	0.76	150	5x5.4	0.76	150	6.3x5.4	0.44	230	6.3x5.4	0.44	230	6.3x5.4	0.44	230	6.3x5.4	0.44	230	6.3x7.7	0.68	185
47	5x5.4	0.76	150	6.3x5.4	0.44	230	6.3x5.4	0.44	230	6.3x5.4	0.44	230	6.3x5.4	0.44	230	6.3x5.4	0.44	230	6.3x7.7	0.68	185
56	5x5.4	0.76	150	6.3x5.4	0.44	230	6.3x5.4	0.44	230	6.3x5.4	0.44	230	6.3x5.4	0.44	230	6.3x7.7	0.34	280	8x10.2	0.34	300
68	6.3x5.4	0.44	230	6.3x5.4	0.44	230	6.3x5.4	0.44	230	6.3x5.4	0.44	230	6.3x5.4	0.44	230	6.3x7.7	0.34	280	8x10.2	0.34	300
100	6.3x5.4	0.44	230	6.3x5.4	0.44	230	6.3x5.4	0.44	230	6.3x7.7	0.34	280	8x10.2	0.17	450	8x10.2	0.17	450	10x10.2	0.18	670
150	6.3x5.4	0.44	230	6.3x5.4	0.44	230	6.3x7.7	0.34	280	8x10.2	0.17	450	8x10.2	0.17	450	8x10.2	0.17	450	10x10.2	0.18	670
220	6.3x5.4	0.44	230	6.3x7.7	0.34	280	6.3x7.7	0.34	280	8x10.2	0.17	450	8x10.2	0.17	450	8x10.2	0.17	450	10x10.2	0.18	670
330	6.3x7.7	0.34	280	8x10.2	0.17	450	8x10.2	0.17	450	8x10.2	0.17	450	10x10.2	0.09	670						
470	8x10.2	0.17	450	8x10.2	0.17	450	8x10.2	0.17	450	10x10.2	0.09	670									
680	8x10.2	0.17	450	10x10.2	0.09	670	10x10.2	0.09	670												
1000	8x10.2	0.17	450	10x10.2	0.09	670															
1500	10x10.2	0.09	670																		

- Load life : 105°C 1000~2000 hours.
- For high density mounting.
- Impedance Lower than CF series
- Corresponding product to RoHS

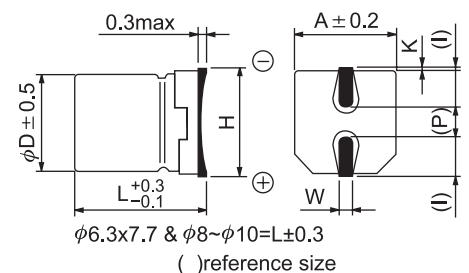


SPECIFICATION

Item	Characteristic							
Operation Temperature Range	-55 ~ +105°C							
Rated Working Voltage	6.3 ~ 50VDC							
Capacitance Tolerance (120Hz 20°C)	±20%(M)							
Leakage Current (20°C)	I ≤0.01CV or 3 (μA) *Whichever is greater after 2 minutes I : Leakage Current (μA) C : Rated Capacitance (μF) V : Working Voltage (V)							
Surge Voltage (20°C)	W.V.	6.3	10	16	25	35	50	
	S.V.	8	13	20	32	44	63	
Dissipation Factor (tan δ) (120Hz 20°C)	Add 0.02 per 1000 μF for more than 1000 μF							
	W.V.		6.3	10	16	25	35	50
	tan δφ	φ4 ~ φ6.3	0.24	0.20	0.16	0.14	0.12	0.12
		φ8 ~ φ10	0.28	0.24	0.20	0.16	0.14	0.14
Low Temperature Stability	Impedance ratio at 120Hz							
	Rated Voltage (V)		6.3	10	16	25	35	50
	-40°C / +20°C		3	2	2	2	2	2
	-55°C / +20°C		5	4	4	3	3	3
Load Life	After hours (φD≤6.3mm 1000 hours, φD≥8mm 2000 hours) application of W.V. and +105°C ripple current value, the capacitor shall meet the following limits. (DC + ripple peak voltage ≤ rate working voltage)							
	Capacitance Change	≤±25% of initial value						
	Dissipation Factor	≤200% of initial specified value						
	Leakage current	≤initial specified value						
Shelf Life	At +105°C, no voltage application after 1000 hours, the capacitor shall meet the limits for load life characteristics. (With voltage treatment)							
Resistance to Soldering Heat	Capacitors placed on a 250°C hot plate for 30 seconds with their electrode terminals facing downward will fulfill the following conditions after being cooled to room temperature.							
	Capacitance Change	≤±10% of initial value						
	Dissipation Factor	≤initial specified value						
	Leakage current	≤initial specified value						

DIMENSIONS (mm)

D	L	A	H	I	W	P	K
4.0	5.4	4.3	5.5MAX	1.8	0.65±0.1	1.0	0.35 ^{+0.15} _{-0.20}
5.0	5.4	5.3	6.5MAX	2.2	0.65±0.1	1.5	0.35 ^{+0.15} _{-0.20}
6.3	5.4	6.6	7.8MAX	2.6	0.65±0.1	2.1	0.35 ^{+0.15} _{-0.20}
6.3	7.7	6.6	7.8MAX	2.6	0.65±0.1	2.1	0.35 ^{+0.15} _{-0.20}
8.0	10.2	8.3	10.0MAX	3.4	0.90±0.2	3.1	0.70±0.20
10.0	10.2	10.3	12.0MAX	3.5	0.90±0.2	4.6	0.70±0.20



● CASE SIZE & MAX RIPPLE CURRENT

Case size : D x L (mm)
 Max impedance : Ω 20°C 100kHz
 Max ripple current : mA(rms) 105°C 100kHz

μF	V(DC) Item	6.3			10			16			25			35			50		
		DxL	IMP.	R.C.	DxL	IMP.	R.C.	DxL	IMP.	R.C.	DxL	IMP.	R.C.	DxL	IMP.	R.C.	DxL	IMP.	R.C.
4.7														4x5.4	1.45	90	4x5.4	2.55	64
10											4x5.4	1.45	90	5x5.4	0.70	170	6.3x5.4	0.52	215
15								4x5.4	1.45	90	5x5.4	0.70	170	5x5.4	0.70	170	6.3x5.4	0.52	215
22					4x5.4	1.45	90	5x5.4	0.70	170	5x5.4	0.70	170	5x5.4	0.70	170	6.3x5.4	0.52	215
27		4x5.4	1.45	90	5x5.4	0.70	170	5x5.4	0.76	150	6.3x5.4	0.39	250	6.3x5.4	0.39	250	6.3x7.7	0.44	243
33		5x5.4	0.70	170	5x5.4	0.70	170	6.3x5.4	0.39	250	6.3x5.4	0.39	250	6.3x5.4	0.39	250	6.3x7.7	0.44	243
47		5x5.4	0.70	170	6.3x5.4	0.39	250	6.3x5.4	0.39	250	6.3x5.4	0.39	250	6.3x5.4	0.39	250	6.3x7.7	0.44	243
56		5x5.4	0.70	170	6.3x5.4	0.39	250	6.3x5.4	0.39	250	6.3x5.4	0.39	250	6.3x7.7	0.30	300	8x10.2	0.22	400
68		6.3x5.4	0.39	250	6.3x5.4	0.39	250	6.3x5.4	0.39	250	6.3x5.4	0.39	250	6.3x7.7	0.30	300	8x10.2	0.22	400
100		6.3x5.4	0.39	250	6.3x5.4	0.39	250	6.3x5.4	0.39	250	6.3x7.7	0.30	300	8x10.2	0.15	600	8x10.2	0.22	400
150		6.3x5.4	0.39	250	6.3x5.4	0.39	250	6.3x7.7	0.30	300	8x10.2	0.15	600	8x10.2	0.15	600	10x10.2	0.13	585
220		6.3x5.4	0.39	250	6.3x7.7	0.30	300	6.3x7.7	0.30	300	8x10.2	0.15	600	8x10.2	0.15	600	10x10.2	0.13	585
330		6.3x7.7	0.30	300	8x10.2	0.15	600	8x10.2	0.15	600	8x10.2	0.15	600	10x10.2	0.08	850			
470		8x10.2	0.15	600	8x10.2	0.15	600	8x10.2	0.15	600	10x10.2	0.08	850						
680		8x10.2	0.15	600	10x10.2	0.08	850	10x10.2	0.08	850									
1000		8x10.2	0.15	600	10x10.2	0.08	850												
1500		10x10.2	0.08	850															

Features

- Load Life : 105°C, 3000hours.
- For high density mounting.
- Low impedance at 100kHz
- Corresponding product to RoHS

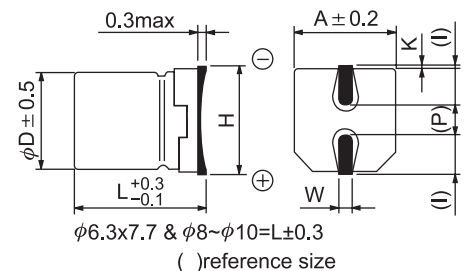


SPECIFICATION

Item	Characteristic						
Operation Temperature Range	-40 ~ +105°C						
Rated Working Voltage	6.3 ~ 50VDC						
Capacitance Tolerance (120Hz 20°C)	±20%(M)						
Leakage Current (20°C)	I ≤0.01CV or 3 (μA) *Whichever is greater after 2 minutes I : Leakage Current (μA) C : Rated Capacitance (μF) V : Working Voltage (V)						
Surge Voltage (20°C)	W.V.	6.3	10	16	25	35	50
	S.V.	8	13	20	32	44	63
Dissipation Factor (tan δ) (120Hz 20°C)	W.V.	6.3	10	16	25	35	50
	tan δ	0.28	0.24	0.22	0.16	0.13	0.12
Low Temperature Stability	Impedance ratio at 120Hz						
	Rated Voltage (V)	6.3	10	16	25	35	50
	-25°C / +20°C	4	3	2	2	2	2
	-40°C / +20°C	10	7	5	3	3	3
Load Life	After 3000 hours application of W.V. and +105°C ripple current value, the capacitor shall meet the following limits. (DC + ripple peak voltage ≤ rate working voltage)						
	Capacitance Change	≤ ±30% of initial value					
	Dissipation Factor	≤300% of initial specified value					
	Leakage current	≤initial specified value					
Shelf Life	At +105°C, no voltage application after 1000 hours, the capacitor shall meet the limits for load life characteristics. (With voltage treatment)						
Resistance to Soldering Heat	Capacitor placed on a 250°C hot plate for 30 seconds with their electrode terminals facing downward will fulfill the folowing conditions after being cooled to room temperature.						
	Capacitance Change	≤ ±10% of initial value					
	Dissipation Factor	≤initial specified value					
	Leakage current	≤initial specified value					

DIMENSIONS (mm)

D	L	A	H	I	W	P	K
4.0	5.4	4.3	5.5MAX	1.8	0.65±0.1	1.0	0.35 ^{+0.15} _{-0.20}
5.0	5.4	5.3	6.5MAX	2.2	0.65±0.1	1.5	0.35 ^{+0.15} _{-0.20}
6.3	5.4	6.6	7.8MAX	2.6	0.65±0.1	2.1	0.35 ^{+0.15} _{-0.20}
6.3	7.7	6.6	7.8MAX	2.6	0.65±0.1	2.1	0.35 ^{+0.15} _{-0.20}
8.0	10.2	8.3	10.0MAX	3.4	0.90±0.2	3.1	0.70±0.2
10.0	10.2	10.3	12.0MAX	3.5	0.90±0.2	4.6	0.70±0.2



● CASE SIZE & MAX RIPPLE CURRENT

Case size : D x L (mm)
 Max impedance : Ω 20°C 100kHz
 Max ripple current : mA(rms) 105°C 100kHz

μF	6.3			10			16			25			35			50		
	DxL	IMP.	R.C.	DxL	IMP.	R.C.	DxL	IMP.	R.C.	DxL	IMP.	R.C.	DxL	IMP.	R.C.	DxL	IMP.	R.C.
10													5x5.4	1.30	95	6.3x5.4	2.00	70
22							5x5.4	1.30	95				5x5.4	0.70	140	6.3x5.4	2.00	70
33				5x5.4	1.30	95	6.3x5.4	0.70	140	6.3x5.4	0.70	140	6.3x7.7	0.70	140	6.3x7.7	1.60	100
47	5x5.4	1.30	95	6.3x5.4	0.70	140	6.3x5.4	0.70	140	6.3x5.4	0.70	230	6.3x7.7	0.70	230	6.3x7.7	1.60	100
										6.3x7.7	0.70	230				8x10.2	0.34	350
100	6.3x5.4	0.70	140	6.3x5.4	0.70	140	6.3x5.4	0.70	140	6.3x7.7	0.70	230	6.3x7.7	0.70	230	8x10.2	0.34	350
							6.3x7.7	0.70	230	8x10.2	0.16	600	8x10.2	0.16	600	10x10.2	0.18	670
150	6.3x5.4	0.70	140	6.3x5.4	0.70	140	6.3x7.7	0.70	230	8x10.2	0.16	600	8x10.2	0.16	600	10x10.2	0.18	670
220	6.3x5.4	0.70	230	6.3x7.7	0.70	230	6.3x7.7	0.70	230	8x10.2	0.16	600	8x10.2	0.16	600	10x10.2	0.18	670
				8x10.2	0.70	600	8x10.2	0.16	600				10x10.2	0.08	850			
330	6.3x7.7	0.70	230	8x10.2	0.16	600	8x10.2	0.16	600	8x10.2	0.15	600	10x10.2	0.08	850			
	8x10.2	0.16	600							10x10.2	0.08	850						
470	8x10.2	0.16	600	8x10.2	0.16	600	8x10.2	0.16	600									
1000	10x10.2	0.08	850															

Features

- Load Life : 105°C 2000~5000hours.
- For high density mounting.
- Low impedance at 100kHz.
- Corresponding product to RoHS

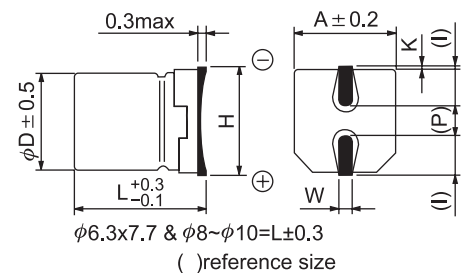


SPECIFICATION

Item	Characteristic						
Operation Temperature Range	-55 ~ +105°C						
Rated Working Voltage	6.3 ~ 50VDC						
Capacitance Tolerance (120Hz 20°C)	±20%(M)						
Leakage Current (20°C)	I ≤0.01CV or 3 (μA) *Whichever is greater after 2 minutes I : Leakage Current (μA) C : Rated Capacitance (μF) V : Working Voltage (V)						
Surge Voltage (20°C)	W.V.	6.3	10	16	25	35	50
	S.V.	8	13	20	32	44	63
Dissipation Factor (tan δ) (120Hz 20°C)	W.V.	6.3	10	16	25	35	50
	tan δ	0.28	0.24	0.20	0.16	0.13	0.12
Low Temperature Stability	Impedance ratio at 120Hz						
	Rated Voltage (V)	6.3	10	16	25	35	50
	-25°C / +20°C	3	3	2	2	2	2
	-55°C / +20°C	7	7	5	3	3	3
Load Life	After 5000 hours (φD≤6.3mm 2000 hours) application of W.V. and +105°C ripple current value, the capacitor shall meet the following limits. (DC + ripple peak voltage ≤ rate working voltage)						
	Capacitance Change	≤±30% of initial value					
	Dissipation Factor	≤300% of initial specified value					
	Leakage current	≤initial specified value					
Shelf Life	At +105°C, no voltage application after 1000 hours, the capacitor shall meet the limits for load life characteristics. (With voltage treatment)						
Resistance to Soldering Heat	Capacitor placed on a 250°C hot plate for 30 seconds with their electrode terminals facing downward will fulfill the folowing conditions after being cooled to room temperature.						
	Capacitance Change	≤±10% of initial value					
	Dissipation Factor	≤initial specified value					
	Leakage current	≤initial specified value					

DIMENSIONS (mm)

D	L	A	H	I	W	P	K
4.0	5.4	4.3	5.5MAX	1.8	0.65±0.1	1.0	0.35 ^{+0.15} _{-0.20}
5.0	5.4	5.3	6.5MAX	2.2	0.65±0.1	1.5	0.35 ^{+0.15} _{-0.20}
6.3	5.4	6.6	7.8MAX	2.6	0.65±0.1	2.1	0.35 ^{+0.15} _{-0.20}
6.3	7.7	6.6	7.8MAX	2.6	0.65±0.1	2.1	0.35 ^{+0.15} _{-0.20}
8.0	10.2	8.3	10.0MAX	3.4	0.90±0.2	3.1	0.70±0.20
10.0	10.2	10.3	12.0MAX	3.5	0.90±0.2	4.6	0.70±0.20



● CASE SIZE & MAX RIPPLE CURRENT

Case size : D x L (mm)
 Max impedance : Ω 20°C 100kHz
 Max ripple current : mA(rms) 105°C 100kHz

μF	V(DC) Item	6.3			10			16			25			35			50		
		DxL	IMP.	R.C.	DxL	IMP.	R.C.	DxL	IMP.	R.C.	DxL	IMP.	R.C.	DxL	IMP.	R.C.	DxL	IMP.	R.C.
4.7																	5x5.4	1.52	85
10														5x5.4	0.76	150	6.3x5.4	0.88	165
22								5x5.4	0.76	150	5x5.4	0.76	150	5x5.4	0.76	150	6.3x5.4	0.88	165
33		5x5.4	0.76	150	5x5.4	0.76	150	6.3x5.4	0.44	230	6.3x5.4	0.44	230	6.3x5.4	0.44	230	6.3x7.7	0.68	185
47		5x5.4	0.76	150	6.3x5.4	0.44	230	6.3x5.4	0.44	230	6.3x5.4	0.44	230	6.3x5.4	0.44	230	6.3x7.7	0.68	185
100		6.3x5.4	0.44	230	6.3x5.4	0.44	230	6.3x5.4	0.44	230	6.3x7.7	0.34	280	8x10.2	0.17	450	8x10.2	0.34	300
150		6.3x5.4	0.44	230	6.3x5.4	0.44	230	6.3x7.7	0.34	280	8x10.2	0.17	450	8x10.2	0.17	450	10x10.2	0.18	670
220		6.3x5.4	0.44	230	6.3x7.7	0.34	280	6.3x7.7	0.34	280	8x10.2	0.17	450	8x10.2	0.17	450	10x10.2	0.18	670
330		6.3x7.7	0.34	280	8x10.2	0.17	450	8x10.2	0.17	450	8x10.2	0.17	450	10x10.2	0.09	670			
470		8x10.2	0.17	450	8x10.2	0.17	450	8x10.2	0.17	450	10x10.2	0.09	670						
1000		8x10.2	0.17	450	10x10.2	0.09	670												
1500		10x10.2	0.09	670															

Features

- Load Life : 105°C 5000hours.
- For high density mounting.
- Low impedance at 100kHz.
- Corresponding product to RoHS

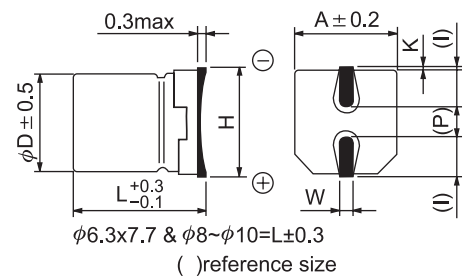


SPECIFICATION

Item	Characteristic						
Operation Temperature Range	-55 ~ +105°C						
Rated Working Voltage	6.3 ~ 50VDC						
Capacitance Tolerance (120Hz 20°C)	±20%(M)						
Leakage Current (20°C)	I ≤0.01CV or 3 (μA) *Whichever is greater after 2 minutes I : Leakage Current (μA) C : Rated Capacitance (μF) V : Working Voltage (V)						
Surge Voltage (20°C)	W.V.	6.3	10	16	25	35	50
	S.V.	8	13	20	32	44	63
Dissipation Factor (tan δ) (120Hz 20°C)	W.V.	6.3	10	16	25	35	50
	tan δ	0.32	0.28	0.26	0.16	0.14	0.14
Low Temperature Stability	Impedance ratio at 120Hz						
	Rated Voltage (V)	6.3	10	16	25	35	50
	-25°C / +20°C	3	3	2	2	2	2
	-55°C / +20°C	7	7	5	3	3	3
Load Life	After 5000 hours application of W.V. and +105°C ripple current value, the capacitor shall meet the following limits. (DC + ripple peak voltage ≤ rate working voltage)						
	Capacitance Change	≤ ±30% of initial value					
	Dissipation Factor	≤300% of initial specified value					
	Leakage current	≤initial specified value					
Shelf Life	At +105°C, no voltage application after 1000 hours, the capacitor shall meet the limits for load life characteristics. (With voltage treatment)						
Resistance to Soldering Heat	Capacitor placed on a 250°C hot plate for 30 seconds with their electrode terminals facing downward will fulfill the folowing conditions after being cooled to room temperature.						
	Capacitance Change	≤ ±10% of initial value					
	Dissipation Factor	≤initial specified value					
	Leakage current	≤initial specified value					

DIMENSIONS (mm)

D	L	A	H	I	W	P	K
4.0	5.4	4.3	5.5MAX	1.8	0.65±0.1	1.0	0.35 ^{+0.15} _{-0.20}
5.0	5.4	5.3	6.5MAX	2.2	0.65±0.1	1.5	0.35 ^{+0.15} _{-0.20}
6.3	5.4	6.6	7.8MAX	2.6	0.65±0.1	2.1	0.35 ^{+0.15} _{-0.20}
6.3	7.7	6.6	7.8MAX	2.6	0.65±0.1	2.1	0.35 ^{+0.15} _{-0.20}
8.0	10.2	8.3	10.0MAX	3.4	0.90±0.2	3.1	0.70±0.20
10.0	10.2	10.3	12.0MAX	3.5	0.90±0.2	4.6	0.70±0.20



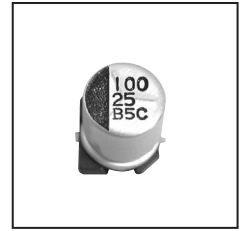
● CASE SIZE & MAX RIPPLE CURRENT

Case size : D x L (mm)
 Max impedance : Ω 20°C 100kHz
 Max ripple current : mA(rms) 105°C 100kHz

μF	6.3			10			16			25			35			50		
	DxL	IMP.	R.C.	DxL	IMP.	R.C.	DxL	IMP.	R.C.	DxL	IMP.	R.C.	DxL	IMP.	R.C.	DxL	IMP.	R.C.
10													5x5.4	2.20	95			
22							5x5.4	2.20	95	5x5.4	2.20	95	6.3x5.4	1.10	140			
33				5x5.4	2.20	95	6.3x5.4	1.10	140	6.3x5.4	1.10	140	6.3x7.7	1.00	230			
47	5x5.4	2.20	95	6.3x5.4	1.10	140	6.3x5.4	1.10	140	6.3x5.4	1.10	140	6.3x7.7	1.00	230	8x10.2	0.53	350
100	6.3x5.4	1.10	140	6.3x5.4	1.10	140	6.3x7.7	1.10	140	6.3x7.7	1.00	230	8x10.2	0.22	600	8x10.2	0.32	560
220	6.3x5.4	1.00	230	6.3x7.7	0.34	280	6.3x7.7	0.34	280	8x10.2	0.22	600	10x10.2	0.16	850	10x10.2	0.35	670
330	6.3x7.7	1.00	230	8x10.2	0.22	450	8x10.2	0.22	600	10x10.2	0.16	850						
470	8x10.2	0.22	600															

Features

- Load Life : 125°C 2000 hours.
- For high density mounting.
- Corresponding product to RoHS

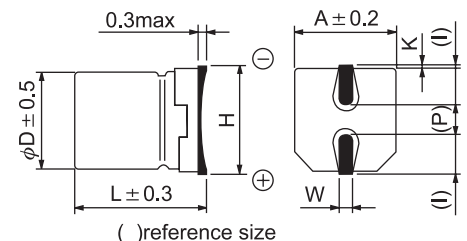


SPECIFICATION

Item	Characteristic					
Operation Temperature Range	-40 ~ +125°C					
Rated Working Voltage	10 ~ 50VDC					
Capacitance Tolerance (120Hz 20°C)	±20%(M)					
Leakage Current (20°C)	I ≤0.01CV or 3 (μA) *Whichever is greater after 2 minutes I : Leakage Current (μA) C : Rated Capacitance (μF) V : Working Voltage (V)					
Surge Voltage (20°C)	W.V.	10	16	25	35	50
	S.V.	13	20	32	44	63
Dissipation Factor (tan δ) (120Hz 20°C)	W.V.	10	16	25	35	50
	tan δ	0.32	0.24	0.21	0.18	0.18
Low Temperature Stability	Impedance ratio at 120Hz					
	Rated Voltage (V)	10	16	25	35	50
	-25°C / +20°C	4	3	2	2	2
	-40°C / +20°C	12	8	6	4	4
Load Life	After 2000 hours application of W.V. and +125°C ripple current value, the capacitor shall meet the following limits. (DC + ripple peak voltage ≤ rate working voltage)					
	Capacitance Change	≤ ±30% of initial value				
	Dissipation Factor	≤300% of initial specified value				
	Leakage current	≤initial specified value				
Shelf Life	At +125°C, no voltage application after 1000 hours, the capacitor shall meet the limits for load life characteristics. (With voltage treatment)					
Resistance to Soldering Heat	Capacitors placed on a 250°C hot plate for 30 seconds with their electrode terminals facing downward will fulfill the folowing conditions after being cooled to room temperature.					
	Capacitance Change	≤ ±10% of initial value				
	Dissipation Factor	≤initial specified value				
	Leakage current	≤initial specified value				

DIMENSIONS (mm)

D	L	A	H	I	W	P	K
8.0	10.2	8.3	10.0MAX	3.4	0.90±0.2	3.1	0.70±0.20
10.0	10.2	8.3	12.0MAX	3.5	0.90±0.2	4.6	0.70±0.20



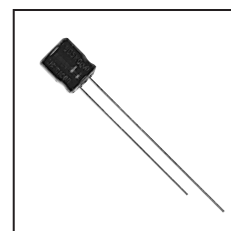
() reference size

CASE SIZE & MAX RIPPLE CURRENT

Case size : D x L (mm)
 Max ripple current : mA(rms) 125°C 120Hz

μF	V(DC)	10		16		25		35		50	
	Item	DxL	R.C.	DxL	R.C.	DxL	R.C.	DxL	R.C.	DxL	R.C.
10										8x10.2	34
22										8x10.2	50
33										8x10.2	60
47								8x10.2	75	10x10.2	85
100				8x10.2	70	8x10.2	75	10x10.2	120		
220		8x10.2	90	10x10.2	120	10x10.2	120				
330		10x10.2	120								

- For general purposes series with 5mm height
- Corresponding product to RoHS

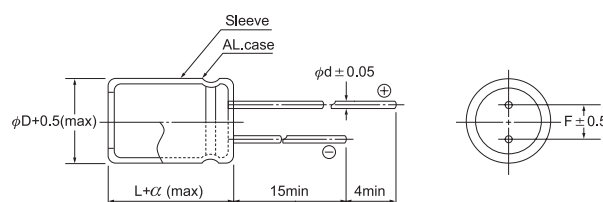


SPECIFICATION

Item	Characteristic							
Operation Temperature Range	-40 ~ +85°C							
Rated Working Voltage	4 ~ 50VDC							
Capacitance Tolerance (120Hz 20°C)	±20%(M)							
Leakage Current (20°C)	I ≤0.01CV or 3 (μA) *Whichever is greater after 2 minutes I : Leakage Current (μA) C : Rated Capacitance (μF) V : Working Voltage (V)							
Surge Voltage (20°C)	W.V.	4	6.3	10	16	25	35	50
	S.V.	5	8	13	20	32	44	63
Dissipation Factor (tan δ) (120Hz 20°C)	W.V.	4	6.3	10	16	25	35	50
	tan δ	0.35	0.24	0.20	0.16	0.14	0.12	0.10
Low Temperature Stability	Impedance ratio at 120Hz							
	Rated Voltage (V)	4	6.3	10	16	25	35	50
	-25°C / +20°C	7	4	3	2	2	2	2
	-40°C / +20°C	15	8	6	4	4	3	3
Load Life	After 1000 hours application of W.V. and +85°C ripple current value, the capacitor shall meet the following limits. (DC + ripple peak voltage ≤ rate working voltage)							
	Capacitance Change	≤±20% of initial value						
	Dissipation Factor	≤200% of initial specified value						
	Leakage current	≤initial specified value						
Shelf Life	At + 85°C no voltage application after 1000 hours the capacitor shall meet the limits for load life characteristics. (with voltage treatment)							

DIMENSIONS (mm)

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



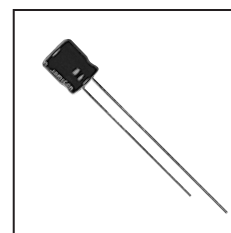
● CASE SIZE & MAX RIPPLE CURRENT

Case size : D x L (mm)
Max ripple current : mA(rms) 85°C 120Hz

μF	V(DC) Item	4		6.3		10		16		25		35		50	
		DxL	R.C.	DxL	R.C.	DxL	R.C.	DxL	R.C.	DxL	R.C.	DxL	R.C.	DxL	R.C.
1.0												→		4x5	9
2.2												→		4x5	14
3.3												→		4x5	17
4.7							→	4x5	16	4x5	17	4x5	19	4x5	20
6.8					→	4x5	17	4x5	19	4x5	21	5x5	26	6.3x5	32
10			→	4x5	19	4x5	21	4x5	24	4x5	25	5x5	31	6.3x5	39
15			→	4x5	24	4x5	26	5x5	33	5x5	35	6.3x5	44	6.3x5	48
22	4x5	24	4x5	29	4x5(5x5)	31(36)	5x5	40	5x5(6.3x5)	43(49)	6.3x5	55	6.3x5(8x5)	60(70)	
33	4x5	29	4x5(5x5)	35(40)	4x5(5x5)	38(44)	5x5(6.3x5)	49(55)	6.3x5	60	6.3x5(8x5)	65(75)	8x5	85	
47	4x5	35	5x5	48	5x5(6.3x5)	50(60)	6.3x5	65	6.3x5(8x5)	70(85)	8x5	90			
68	5x5	47	6.3x5	65	6.3x5	70	6.3x5	80	8x5	100					
100	6.3x5	65	6.3x5	80	6.3x5(8x5)	90(100)	6.3x5(8x5)	100(110)	8x5	120					
220	6.3x5	100	8x5	140	8x5	150									
330	8x5	140	8x5	170											

All blank voltage on sleeve marking is the same voltage as" → "point to.

- Wide temperature range series with 5mm height.
- Corresponding product to RoHS

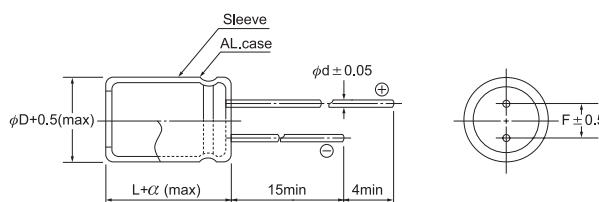


SPECIFICATION

Item	Characteristic							
Operation Temperature Range	-55 ~ +105°C							
Rated Working Voltage	4 ~ 50VDC							
Capacitance Tolerance (120Hz 20°C)	±20%(M)							
Leakage Current (20°C)	I ≤0.01CV or 3 (μA) *Whichever is greater after 2 minutes						I : Leakage Current (μA) C : Rated Capacitance (μF) V : Working Voltage (V)	
Surge Voltage (20°C)	W.V.	4	6.3	10	16	25	35	50
	S.V.	5	8	13	20	32	44	63
Dissipation Factor (tan δ) (120Hz 20°C)	W.V.	4	6.3	10	16	25	35	50
	tan δ	0.37	0.28	0.24	0.20	0.16	0.13	0.12
Low Temperature Stability	Impedance ratio at 120Hz							
	Rated Voltage (V)	4	6.3	10	16	25	35	50
	-25°C / +20°C	6	3	3	2	2	2	2
	-40°C / +20°C	12	8	5	4	3	3	3
Load Life	After 1000 hours application of W.V. and +105°C ripple current value, the capacitor shall meet the following limits. (DC + ripple peak voltage ≤ rate working voltage)							
	Capacitance Change	≤ ±25% of initial value						
	Dissipation Factor	≤200% of initial specified value						
	Leakage current	≤initial specified value						
Shelf Life	At + 105°C no voltage application after 1000 hours the capacitor shall meet the limits for load life characteristics. (with voltage treatment)							

DIMENSIONS (mm)

ϕD	4	5	6.3
F	1.5	2.0	2.5
d	0.45	0.45	0.45
α	1.0	1.0	1.0



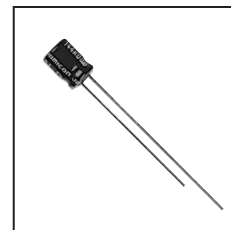
CASE SIZE & MAX RIPPLE CURRENT

Case size : D x L (mm)
Max ripple current : mA(rms) 105°C 120Hz

μF	V(DC)	4		6.3		10		16		25		35		50	
Item		DxL	R.C.	DxL	R.C.	DxL	R.C.	DxL	R.C.	DxL	R.C.	DxL	R.C.	DxL	R.C.
1.0														4x5	8
2.2														4x5	11
3.3														4x5	14
4.7										4x5	14	4x5	15	5x5	19
10								4x5	19	5x5	23	5x5	25	6.3x5	31
22		4x5	19	4x5	23	5x5	29	5x5	32	6.3x5	39	6.3x5	42		
33		5x5	26	5x5	32	5x5	35	6.3x5	45	6.3x5	48				
47		5x5	32	5x5	38	6.3x5	48	6.3x5	55						
100		6.3x5	55	6.3x5	65										

All blank voltage on sleeve marking is the same voltage as " → " point to.

- Non polarity series with 5mm height
- Corresponding product to RoHS

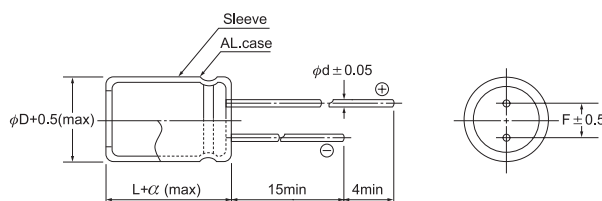


SPECIFICATION

Item	Characteristic						
Operation Temperature Range	-40 ~ +85°C						
Rated Working Voltage	6.3 ~ 50VDC						
Capacitance Tolerance (120Hz 20°C)	±20%(M)						
Leakage Current (20°C)	I ≤0.05CV or 10 (μA) *Whichever is greater after 2 minutes I : Leakage Current (μA) C : Rated Capacitance (μF) V : Working Voltage (V)						
Surge Voltage (20°C)	W.V.	6.3	10	16	25	35	50
	S.V.	8	13	20	32	44	63
Dissipation Factor (tan δ) (120Hz 20°C)	W.V.	6.3	10	16	25	35	50
	tan δ	0.24	0.20	0.17	0.17	0.15	0.15
Low Temperature Stability	Impedance ratio at 120Hz						
	Rated Voltage (V)	6.3	10	16	25	35	50
	-25°C / +20°C	4	3	2	2	2	2
	-40°C / +20°C	10	8	6	4	3	3
Load Life	After 1000 hours application of W.V. and +85°C ripple current value, the capacitor shall meet the following limits. (DC + ripple peak voltage ≤ rate working voltage) (The polarity need to exchange every 250 hours)						
	Capacitance Change	≤ ±20% of initial value					
	Dissipation Factor	≤200% of initial specified value					
	Leakage current	≤initial specified value					
Shelf Life	At +85°C no voltage application after 500 hours the capacitor shall meet the limits for load life characteristics. (with voltage treatment)						

DIMENSIONS (mm)

ϕD	4	5	6.3
F	1.5	2.0	2.5
d	0.45	0.45	0.45
α	1.0	1.0	1.0



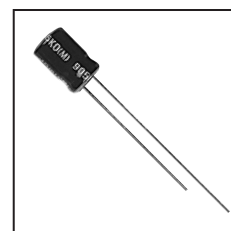
CASE SIZE & MAX RIPPLE CURRENT

Case size : D x L (mm)
Max ripple current : mA(rms) 85°C 120Hz

μF	V(DC) Item	6.3		10		16		25		35		50	
		DxL	R.C.	DxL	R.C.	DxL	R.C.	DxL	R.C.	DxL	R.C.	DxL	R.C.
1.0										→		4x5	8.4
2.2										→		5x5	13
3.3										→		5x5	17
4.7				→		4x5	12	5x5	16	5x5	18	6.3x5	20
10		4x5	14	4x5	17	5x5	23	6.3x5	27	6.3x5	29		
22		5x5	28	6.3x5	33	6.3x5	37						
33		6.3x5	37	6.3x5	41	6.3x5	49						
47		6.3x5	45										

All blank voltage on sleeve marking is the same voltage as "→" point to.

- For general purposes series with 7mm height
- Corresponding product to RoHS

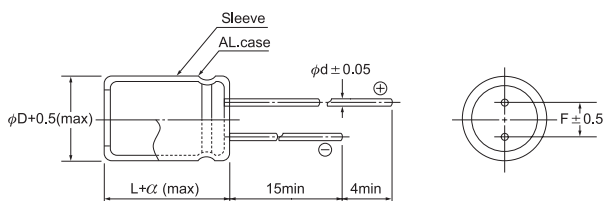


SPECIFICATION

Item	Characteristic								
Operation Temperature Range	-40 ~ +85°C								
Rated Working Voltage	4 ~ 63VDC								
Capacitance Tolerance (120Hz 20°C)	±20%(M)								
Leakage Current (20°C)	I ≤0.01CV or 3 (μA) *Whichever is greater after 2 minutes I : Leakage Current (μA) C : Rated Capacitance (μF) V : Working Voltage (V)								
Surge Voltage (20°C)	W.V.	4	6.3	10	16	25	35	50	63
	S.V.	5	8	13	20	32	44	63	79
Dissipation Factor (tan δ) (120Hz 20°C)	W.V.	4	6.3	10	16	25	35	50	50~63
	tan δ	0.35	0.24	0.20	0.16	0.14	0.12	0.10	0.10
Low Temperature Stability	Impedance ratio at 120Hz								
	Rated Voltage (V)		4	6.3	10	16	25	35	50~63
	-25°C / +20°C		6	4	3	2	2	2	2
	-40°C / +20°C		12	8	6	4	4	3	3
Load Life	After 1000 hours application of W.V. and +85°C ripple current value, the capacitor shall meet the following limits. (DC + ripple peak voltage ≤ rate working voltage)								
	Capacitance Change		≤ ±20% of initial value						
	Dissipation Factor		≤200% of initial specified value						
	Leakage current		≤initial specified value						
Shelf Life	At +85°C no voltage application after 1000 hours the capacitor shall meet the limits for load life characteristics. (with voltage treatment)								

DIMENSIONS (mm)

ϕD	4	5	6.3	8
F	1.5	2.0	2.5	3.5
d	0.45	0.45	0.45	0.50
α	1.0	1.0	1.0	1.0



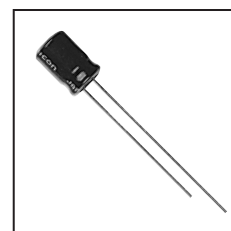
CASE SIZE & MAX RIPPLE CURRENT

Case size : D x L (mm)
Max ripple current : mA(rms) 85°C 120Hz

μF	V(DC)		4		6.3		10		16		25		35		50		63	
	Item		DxL	R.C.	DxL	R.C.	DxL	R.C.	DxL	R.C.	DxL	R.C.	DxL	R.C.	DxL	R.C.	DxL	R.C.
1.0															4x7	12	4x7	12
2.2															4x7	18	4x7	18
3.3															4x7	22	5x7	25
4.7											4x7	22	4x7	24	4x7	26	6.3x7	34
10									4x7	30	4x7	32	5x7	39	6.3x7	49	6.3x7	49
22											5x7	55	6.3x7	65	8x7	85		
33			4x7	37	4x7	44	4x7	49	5x7	60	6.3x7	75	8x7	95	8x7	100		
47			4x7	44	5x7	60	5x7	65	5x7	75	8x7	100	8x7	110				
100			5x7	70	6.3x7	100	6.3x7	110	6.3x7	120	8x7	150						
220			6.3x7	120	8x7	170	8x7	190	8x7	210								
330			8x7	170	8x7	210												

All blank voltage on sleeve marking is the same voltage as " → "point to.

- Wide temperature range series with 7mm height.
- Corresponding product to RoHS

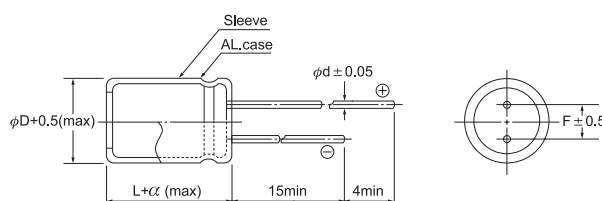


SPECIFICATION

Item	Characteristic						
Operation Temperature Range	-55 ~ +105°C						
Rated Working Voltage	6.3 ~ 50VDC						
Capacitance Tolerance (120Hz 20°C)	±20%(M)						
Leakage Current (20°C)	I ≤0.01CV or 3 (μA) *Whichever is greater after 2 minutes				I : Leakage Current (μA) C : Rated Capacitance (μF) V : Working Voltage (V)		
Surge Voltage (20°C)	W.V.	6.3	10	16	25	35	50
	S.V.	8	13	20	32	44	63
Dissipation Factor (tan δ) (120Hz 20°C)	W.V.	6.3	10	16	25	35	50
	tan δ	0.24	0.21	0.18	0.15	0.13	0.12
Low Temperature Stability	Impedance ratio at 120Hz						
	Rated Voltage (V)	6.3	10	16	25	35	50
	-25°C / +20°C	3	2	2	2	2	2
	-40°C / +20°C	6	5	4	3	3	3
Load Life	After 1000 hours application of W.V. and +105°C ripple current value, the capacitor shall meet the following limits. (DC + ripple peak voltage ≤ rate working voltage)						
	Capacitance Change	≤ ±25% of initial value					
	Dissipation Factor	≤200% of initial specified value					
	Leakage current	≤initial specified value					
Shelf Life	At +105°C no voltage application after 1000 hours the capacitor shall meet the limits for load life characteristics. (with voltage treatment)						

DIMENSIONS (mm)

ϕD	4	5	6.3	8
F	1.5	2.0	2.5	3.5
d	0.45	0.45	0.45	0.50
α	1.0	1.0	1.0	1.0



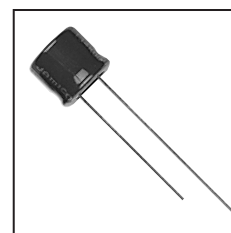
CASE SIZE & MAX RIPPLE CURRENT

Case size : D x L (mm)
Max ripple current : mA(rms) 105°C 120Hz

μF	V(DC)		6.3		10		16		25		35		50	
	Item		DxL	R.C.	DxL	R.C.	DxL	R.C.	DxL	R.C.	DxL	R.C.	DxL	R.C.
1.0											→	4x7	11	
2.2											→	4x7	19	
3.3											→	4x7	24	
4.7									→	4x7	24	5x7	29	
10					→	4x7	29	5x7	33	5x7	36	6.3x7	45	
22			4x7	34	5x7	41	5x7	46	6.3x7	51	6.3x7	60	8x7	75
33			5x7	46	5x7	50	6.3x7	65	6.3x7	70	8x7	85		
47			5x7	55	6.3x7	70	6.3x7	75	8x7	95				
100			6.3x7	90	6.3x7	100	6.3x7	110						
220			8x7	160	8x7	170								

All blank voltage on sleeve marking is the same voltage as "→" point to.

- High ripple current, low impedance series with 7mm height.
- Corresponding product to RoHS

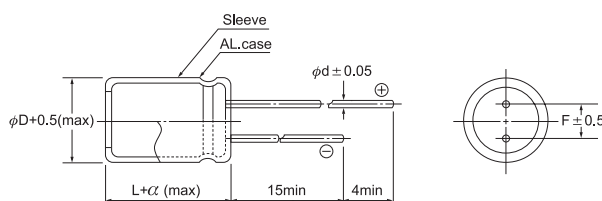


SPECIFICATION

Item	Characteristic						
Operation Temperature Range	-55 ~ +105°C						
Rated Working Voltage	6.3 ~ 50VDC						
Capacitance Tolerance (120Hz 20°C)	±20%(M)						
Leakage Current (20°C)	I ≤0.01CV or 3 (μA) *Whichever is greater after 3 minutes				I : Leakage Current (μA) C : Rated Capacitance (μF) V : Working Voltage (V)		
Surge Voltage (20°C)	W.V.	6.3	10	16	25	35	50
	S.V.	8	13	20	32	44	63
Dissipation Factor (tan δ) (120Hz 20°C)	W.V.	6.3	10	16	25	35	50
	tan δ	0.22	0.19	0.16	0.14	0.12	0.10
Low Temperature Stability	Impedance ratio at 120Hz						
	Rated Voltage (V)	6.3	10	16	25	35	50
	-25°C / +20°C	3	3	3	2	2	2
	-55°C / +20°C	6	6	6	4	4	4
Load Life	After 1000 hours application of W.V. and +105°C ripple current value, the capacitor shall meet the following limits. (DC + ripple peak voltage ≤ rate working voltage)						
	Capacitance Change	≤ ±20% of initial value					
	Dissipation Factor	≤200% of initial specified value					
	Leakage current	≤initial specified value					
Shelf Life	At +105°C no voltage application after 1000 hours the capacitor shall meet the limits for load life characteristics. (with voltage treatment)						

DIMENSIONS (mm)

φD	4	5	6.3	8
F	1.5	2.0	2.5	3.5
d	0.45	0.45	0.45	0.50
α	1.0	1.0	1.0	1.0



RIPPLE CURRENT COEFFICIENTS

Temperature(°C)	65	75	85	95	105
Multiplier	2.12	1.92	1.69	1.50	1.00

Frequency(Hz)	60	120	400	1k	10k	100k
W.V.	Multiplier					
6.3~16V	0.45	0.60	0.83	0.94	0.98	1.00
25~35V	0.38	0.50	0.75	0.90	0.97	1.00
50V	0.36	0.46	0.70	0.88	0.94	1.00

● CASE SIZE & MAX RIPPLE CURRENT

Case size : D x L (mm)
 Max impedance : Ω 100kHz
 Max ripple current : mA(rms) 105°C 100kHz

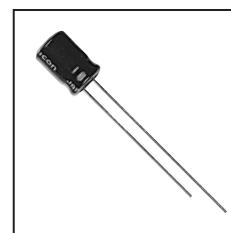
μF	V(DC)	6.3			10				
	Item	DxL	IMP.		R.C.	DxL	IMP.		R.C.
			20°C	-10°C			20°C	-10°C	
15				→	4x7	1.592	4.775	80	
22		4x7	1.191	3.572	80	4x7	1.184	3.552	95
27		4x7	1.051	3.153	90	4x7	1.045	3.135	100
33		4x7	0.926	2.778	100	4x7	0.921	2.763	110
39		4x7	0.839	2.518	110	5x7	0.835	2.505	140
47		5x7	0.629	1.886	130	5x7	0.568	1.705	160
56		5x7	0.561	1.682	150	5x7	0.507	1.521	170
68		5x7	0.489	1.467	160	6.3x7	0.442	1.326	210
82		6.3x7	0.450	1.351	200	6.3x7	0.407	1.222	230
100		6.3x7	0.406	1.219	220	6.3x7	0.367	1.102	260
120		6.3x7	0.346	1.039	250	6.3x7	0.313	0.939	280
150		6.3x7	0.283	0.850	280	8x7	0.256	0.768	370
180		8x7	0.246	0.739	350				
220		8x7	0.210	0.630	390				

μF	V(DC)	16			25				
	Item	DxL	IMP.		R.C.	DxL	IMP.		R.C.
			20°C	-10°C			20°C	-10°C	
10		4x7	1.416	4.249	75	4x7	1.332	3.995	95
15		4x7	1.039	3.116	90	4x7	0.977	2.930	110
18		4x7	0.897	2.692	100	5x7	0.851	2.552	140
22		4x7	0.772	2.317	100	5x7	0.726	2.179	150
27		5x7	0.682	2.046	130	6.3x7	0.641	1.923	190
33		5x7	0.601	1.802	140	6.3x7	0.565	1.695	210
39		6.3x7	0.545	1.634	180	6.3x7	0.512	1.537	220
47		6.3x7	0.482	1.446	190	6.3x7	0.453	1.360	250
56		6.3x7	0.430	1.290	210	8x7	0.404	1.213	310
68		6.3x7	0.375	1.125	230	8x7	0.352	1.057	340
82		6.3x7	0.345	1.036	260				
100		6.3x7	0.312	0.935	280				

μF	V(DC)	35			50				
	Item	DxL	IMP.		R.C.	DxL	IMP.		R.C.
			20°C	-10°C			20°C	-10°C	
4.7				→	4x7	2.758	8.274	90	
6.8				→	5x7	2.383	7.149	110	
10		5x7	0.998	2.994	110	6.3x7	0.499	1.496	150
15		5x7	0.732	2.195	140	6.3x7	0.366	1.097	180
18		6.3x7	0.638	1.913	170	6.3x7	0.319	0.956	200
22		6.3x7	0.544	1.633	180	8x7	0.272	0.816	240
27		6.3x7	0.480	1.441	200	8x7	0.240	0.720	270
33		8x7	0.423	1.270	250	8x7	0.212	0.635	290
39		8x7	0.384	1.151	270				
47		8x7	0.340	1.019	300				

All blank voltage on sleeve marking is the same voltage as " → "point to.

- Endurance : 105°C, 5000hrs
- Recommended Applications : Apply to the requirement of long life, low impedance, high reliability, etc.
- Corresponding product to RoHS

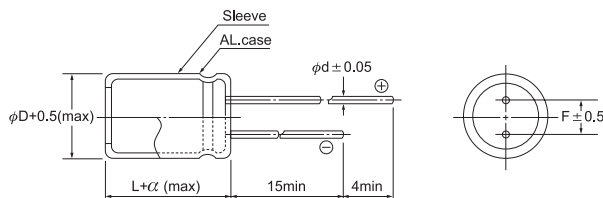


SPECIFICATION

Item	Characteristic						
Operation Temperature Range	-40 ~ +105°C						
Rated Working Voltage	6.3 ~ 50VDC						
Capacitance Tolerance (120Hz 20°C)	±20%(M)						
Leakage Current (20°C)	I ≤0.03CV or 3 (μA) *Whichever is greater after 2 minutes				I : Leakage Current (μA) C : Rated Capacitance (μF) V : Working Voltage (V)		
Surge Voltage (20°C)	W.V.	6.3	10	16	25	35	50
	S.V.	8	13	20	32	44	63
Dissipation Factor (tan δ) (120Hz 20°C)	W.V.	6.3	10	16	25	35	50
	tan δ	0.50	0.40	0.35	0.30	0.25	0.25
Low Temperature Stability	Impedance ratio at 120Hz						
	Rated Voltage (V)	6.3	10	16	25	35	50
	-25°C / +20°C	4	3	2	2	2	2
	-40°C / +20°C	8	6	4	3	3	3
Load Life	After 5000 hours application of W.V. and +105°C ripple current value, the capacitor shall meet the following limits. (DC + ripple peak voltage ≤ rate working voltage)						
	Capacitance Change	≤ ±30% of initial value					
	Dissipation Factor	≤200% of initial specified value					
	Leakage current	≤initial specified value					
Shelf Life	At +105°C no voltage application after 1000 hours the capacitor shall meet the following limits. (with voltage treatment)						
	Capacitance Change	≤ ±25% of initial value					
	Dissipation Factor	≤200% of initial specified value					
	Leakage current	≤initial specified value					

DIMENSIONS (mm)

ϕD	4	5	6.3	8
F	1.5	2.0	2.5	3.5
d	0.45	0.45	0.45	0.50
α	1.0	1.0	1.0	1.0



RIPPLE CURRENT COEFFICIENTS

Temperature(°C)	≤ 50	70	85	105
Multiplier	1.90	1.75	1.40	1.00

Frequency(Hz)	120	1k	10k	100k
1~3.3 μF	0.20	0.66	0.90	1.00
4.7~6.8 μF	0.35	0.70	0.90	1.00
10~150 μF	0.40	0.75	0.90	1.00
220~270 μF	0.50	0.85	0.94	1.00

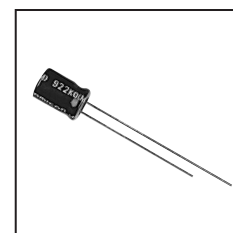
● CASE SIZE & MAX RIPPLE CURRENT

Case size : D x L (mm)
 Max impedance : Ω 20°C 100kHz
 Max ripple current : mA(rms) 105°C 100kHz

μF	V(DC) Item	6.3			10			16		
		DxL	IMP.	R.C.	DxL	IMP.	R.C.	DxL	IMP.	R.C.
15								4x5	5.4	37
22					4x5	5.4	37	4x7	4.5	44
								5x5	3.1	57
33		4x5	5.4	37	4x7	4.5	44	5x7	2.5	70
					5x5	3.1	57			
47		4x7	4.5	44	5x7	2.5	70	6.3x5	1.7	82
56		5x5	3.1	57						
68					6.3x5	1.7	82	6.3x7	1.3	116
82		5x7	2.5	70						
100		6.3x5	1.7	82	6.3x7	1.3	116	8x5	1.5	110
150		6.3x7	1.3	116	8x5	1.5	110	8x7	0.9	162
220		8x5	1.5	110	8x7	0.9	162			
270		8x7	0.9	162						

μF	V(DC) Item	25			35			50		
		DxL	IMP.	R.C.	DxL	IMP.	R.C.	DxL	IMP.	R.C.
1								4x5	19	18
2.2								4x5	14	22
3.3								4x5	11	26
4.7					4x5	5.4	37	4x7	9	30
								5x5	6	40
6.8					4x7	4.5	44	5x7	4.8	50
10		4x5	5.4	37	5x5	3.1	57	6.3x5	2.9	63
					5x7	2.5	70			
15		4x7	4.5	44				6.3x7	2.2	90
		5x5	3.1	57						
22		5x7	2.5	70	6.3x5	1.7	82	8x5	2.6	84
					6.3x7	1.3	116	8x7	1.6	120
33		6.3x5	1.7	82	8x5	1.5	110			
47					8x7	0.9	162			
56		6.3x7	1.3	116						
68		8x5	1.5	110						
100		8x7	0.9	162						

- Non polarity series with 7mm height.
- Corresponding product to RoHS

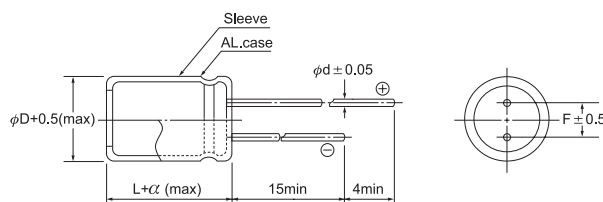


SPECIFICATION

Item	Characteristic						
Operation Temperature Range	-40 ~ +85°C						
Rated Working Voltage	6.3 ~ 50VDC						
Capacitance Tolerance (120Hz 20°C)	±20%(M)						
Leakage Current (20°C)	I ≤0.05CV or 10 (μA) *Whichever is greater after 2 minutes				I : Leakage Current (μA) C : Rated Capacitance (μF) V : Working Voltage (V)		
Surge Voltage (20°C)	W.V.	6.3	10	16	25	35	50
	S.V.	8	13	20	32	44	63
Dissipation Factor (tan δ) (120Hz 20°C)	W.V.	6.3	10	16	25	35	50
	tan δ	0.24	0.20	0.17	0.15	0.12	0.12
Low Temperature Stability	Impedance ratio at 120Hz						
	Rated Voltage (V)	6.3	10	16	25	35	50
	-25°C / +20°C	4	3	2	2	2	2
	-40°C / +20°C	10	8	6	4	3	3
Load Life	After 1000 hours application of W.V. and +85°C ripple current value, the capacitor shall meet the following limits. (DC + ripple peak voltage ≤ rate working voltage) (The polarity need to exchange every 250 hours)						
	Capacitance Change	≤±20% of initial value					
	Dissipation Factor	≤150% of initial specified value					
	Leakage current	≤initial specified value					
Shelf Life	At +85°C no voltage application after 500 hours the capacitor shall meet the following limits. (with voltage treatment)						
	Capacitance Change	≤±20% of initial value					
	Dissipation Factor	≤200% of initial specified value					
	Leakage current	≤200% of initial specified value					

DIMENSIONS (mm)

ϕD	4	5	6.3	8
F	1.5	2.0	2.5	3.5
d	0.45	0.45	0.45	0.5
α	1.0	1.0	1.0	1.0



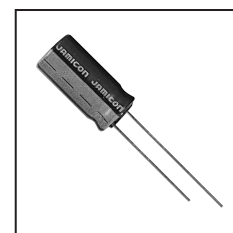
CASE SIZE & MAX RIPPLE CURRENT

Case size : D x L (mm)
Max ripple current : mA(rms) 85°C 120Hz

μF	V(DC)	6.3		10		16		25		35		50	
	Item	DxL	R.C.	DxL	R.C.	DxL	R.C.	DxL	R.C.	DxL	R.C.	DxL	R.C.
1.0												4x7	9
2.2										4x7	14	5x7	16
3.3										5x7	19	5x7	19
4.7						4x7	17	5x7	20	5x7	23	6.3x7	26
10				4x7	23	5x7	28	6.3x7	34	6.3x7	38	8x7	44
22		5x7	35	5x7	38	6.3x7	47	6.3x7	50	8x7	65	8x7	65
33		5x7	43	6.3x7	55	6.3x7	60	8x7	70	8x7	80		
47		6.3x7	60	6.3x7	65	6.3x7	70	8x7	85				
100		8x7	100	8x7	110	8x7	120						

All blank voltage on sleeve marking is the same voltage as " → " point to.

- SK series has high value of CV for general purposes.
- Corresponding product to RoHS



SPECIFICATION

Item	Characteristic														
Operation Temperature Range	-40 ~ +85°C							-40 ~ +85°C				-25 ~ +85°C			
Rated Working Voltage	6.3 ~ 100VDC							160 ~ 400VDC				450VDC			
Capacitance Tolerance (120Hz 20°C)	±20%(M)														
Leakage Current (20°C)	6.3~100 VDC I ≤0.01CV or 4 (μA)							160~450 VDC I ≤0.03CV +40 (μA) max							
	*Whichever is greater after 3 minutes I : Leakage Current(μA) C : Rated Capacitance(μF) V : Working Voltage(V)														
Surge Voltage (20°C)	W.V.	6.3	10	16	25	35	50	63	100	160	200	250	350	400	450
	S.V.	8	13	20	32	44	63	79	125	200	250	300	400	450	500
Dissipation Factor (tan δ) (120Hz 20°C)	Add 0.02 per 1000 μF for more than 1000 μF														
	W.V.	6.3	10	16	25	35	50	63	100	160	200	250	350	400	450
	tan δ	0.22	0.19	0.16	0.14	0.12	0.10	0.10	0.08	0.15	0.15	0.15	0.20	0.20	0.20
Low Temperature Stability	Impedance ratio at 120Hz														
	Rated Voltage (V)		6.3	10	16	25	35~100	160~250	350~400	450					
	-25°C / +20°C		4	3	2	2	2	3	6	15					
	-40°C / +20°C		8	6	4	3	3	6	6	—					
Load Life	After 2000 hours application of W.V. and +85°C ripple current value, the capacitor shall meet the following limits. (DC + ripple peak voltage ≤ rated working voltage)														
	Capacitance Change		≤ ±20% of initial value												
	Dissipation Factor		≤ 150% of initial specified value												
	Leakage current		≤ initial specified value												
Shelf Life	At +85°C no voltage application after 1000 hours the capacitor shall meet the following limits. (with voltage treatment)														
	Capacitance Change		≤ ±20% of initial value												
	Dissipation Factor		≤ 200% of initial specified value												
	Leakage current		≤ 200% of initial specified value												

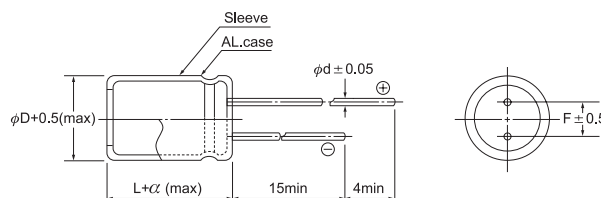
DIMENSIONS (mm)

φD	5	6.3	8	10	12.5	16	18	22	25
F	2.0	2.5	3.5	5.0	5.0	7.5	7.5	10.0	12.5
d	0.5	0.5	0.6	0.6	0.6	0.8	0.8	1.0	1.0
α	1.5	1.5	1.5	1.5	2.0	2.0	2.0	2.0	2.0

RIPPLE CURRENT COEFFICIENTS

Temperature(°C)	65	75	85
Multiplier	1.25	1.14	1.00

Frequency(Hz)	60	120	1k	≥10k
W.V.	Multiplier			
6.3~25V	0.85	1.00	1.10	1.20
35~100V	0.80	1.00	1.15	1.25
160~250V	0.75	1.00	1.25	1.40
350~450V	0.70	1.00	1.30	1.50



● CASE SIZE & MAX RIPPLE CURRENT

Case size : D x L (mm)
Max ripple current : mA(rms) 85°C 120Hz

μF	V(DC) Item	6.3		10		16	
		DxL	R.C.	DxL	R.C.	DxL	R.C.
47					→	5x11	130
100		5x11	160	5x11	170	6.3x11	210
220		5x11	240	5x11	250	6.3x11	310
		6.3x11	270	6.3x11	290	8x11	370
330		6.3x11	330	6.3x11	350	8x11	450
		8x11	380	8x11	410	10x12.5	470
470		6.3x11	390	6.3x11	420	8x11	540
		8x11	460	8x11	490	10x12.5	560
1000		8x11	670	10x12.5	760	10x16	920
		10x12.5	700	10x16	840	10x20	1010
2200		10x16	1110	10x20	1310	12.5x20	1510
		10x20	1220	12.5x20	1390	12.5x25	1660
3300		10x20	1440	12.5x20	1630	12.5x25	1930
		12.5x20	1530	12.5x25	1800	16x25	1940
4700		12.5x20	1730	12.5x25	2020	16x25	2160
		12.5x25	1910	16x25	2030	16x32	2390
6800		12.5x25	2160	16x25	2270	16x32	2650
		16x25	2170	16x32	2510	18x36	2980
8200		16x25	2280	16x32	2630	16x36	2910
		16x32	2520	18x36	2960	18x40	3280
10000		16x25	2390	16x36	2900	18x36	3230
		16x32	2640	18x36	3090	18x40	3400
15000		16x36	3050	18x36	3360	22x40	4090
		18x36	3260	18x40	3540	22x50	4520
22000		18x40	3680	22x50	4650	25x50	5120

μF	V(DC) Item	25		35		50	
		DxL	R.C.	DxL	R.C.	DxL	R.C.
10		5x11	60	5x11	70	5x11	75
22		5x11	95	5x11	100	5x11	110
33		5x11	110	5x11	120	5x11	140
		6.3x11	130	6.3x11	140	6.3x11	150
47		5x11	140	5x11	150	6.3x11	180
		6.3x11	160	6.3x11	170	8x11	210
100		6.3x11	230	6.3x11	240	8x11	310
		8x11	260	8x11	290	10x12.5	330
220		8x11	390	8x11	420	10x12.5	490
		10x12.5	410	10x12.5	450	10x16	540
330		8x11	480	10x12.5	550	10x16	670
		10x12.5	510	10x16	610	10x20	730
470		10x12.5	600	10x16	720	10x20	820
		10x16	670	10x20	800	12.5x20	930
1000		10x20	1080	12.5x20	1240	12.5x25	1500
		12.5x20	1150	12.5x25	1370	16x25	1510
2200		12.5x25	1760	16x25	1890	16x36	2390
		16x25	1770	16x32	2090	18x36	2550
3300		16x25	2040	16x36	2530	18x36	2890
		16x32	2260	18x36	2700	18x40	3050
4700		16x32	2500	18x36	2960	22x45	3880
		18x36	2810	18x40	3120		
6800		18x36	3100	22x45	4020		
		18x40	3270			25x50	4730
8200		22x45	4000	22x50	4350		
10000		22x50	4330	25x50	4800		
15000		25x50	4970				

All blank voltage on sleeve marking is the same voltage as" → "point to.

● CASE SIZE & MAX RIPPLE CURRENT

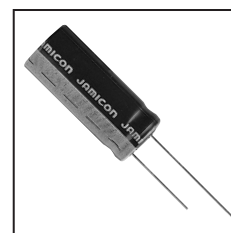
Case size : D x L (mm)
Max ripple current : mA(rms) 85°C 120Hz

μF	V(DC) Item	63		100	
		DxL	R.C.	DxL	R.C.
10		5x11	75	6.3x11	95
22		5x11	110	6.3x11	140
		6.3x11	130	8x11	160
33		6.3x11	150	8x11	200
		8x11	180	10x12.5	210
47		6.3x11	180	10x12.5	250
		8x11	210	10x16	280
100		10x12.5	330	10x20	450
		10x16	370	12.5x20	480
220		10x16	540	12.5x25	790
		10x20	600	16x25	790
330		10x20	730	12.5x25	960
		12.5x20	780	16x25	970
470		12.5x20	930	16x25	1160
		12.5x25	1030	16x32	1280
1000		16x25	1510	18x40	2220
		16x32	1670	22x35	2340
2200		22x35	2830	25x50	3900
3300		22x50	3760		
4700		25x50	4370		

μF	V(DC) Item	160		200		250	
		DxL	R.C.	DxL	R.C.	DxL	R.C.
1		6.3x11	25	6.3x11	27	6.3x11	29
2.2		6.3x11	37	6.3x11	39	6.3x11	43
3.3		6.3x11	45	6.3x11	48	8x11	60
4.7		6.3x11	55	8x11	65	8x11	75
10		8x11	90	10x12.5	100	10x16	120
22		10x16	160	10x20	190	12.5x20	220
33		10x20	210	12.5x20	250	12.5x20	270
47		12.5x20	270	12.5x20	290	12.5x25	350
100		12.5x25	440	16x25	470	16x32	570
220		16x36	760	18x40	920		
		22x30	850	22x30	910	22x35	1060
330		18x40	1050				
		22x30	1040	22x40	1260	22x45	1450
470		22x40	1400	22x45	1590	25x45	1850
560		22x45	1610	22x50	1820	25x50	2120
680		22x50	1860	25x50	2150		
820		25x50	2200				

μF	V(DC) Item	350		400		450	
		DxL	R.C.	DxL	R.C.	DxL	R.C.
1		8x11	29	8x11	30	8x11	29
2.2		8x11	43	8x11	44	10x12.5	45
3.3		10x12.5	55	10x12.5	55	10x16	60
4.7		10x12.5	65	10x16	75	10x18	75
10		10x20	120	12.5x20	130	12.5x20	130
22		12.5x20	190	12.5x25	210	16x25	210
33		12.5x25	250	16x25	260	16x32	280
47		16x25	300	16x32	350	18x36	380
				22x30	410		
100		18x36	550	18x36	570	18x36	550
		22x35	610	22x40	670		
150		22x40	790	25x50	970		
220		22x50	1060				

- High temperature 105°C and high reliability
- Corresponding product to RoHS



SPECIFICATION

Item	Characteristic														
Operation Temperature Range	-55 ~ +105°C					-40 ~ +105°C					-25 ~ +105°C				
Rated Working Voltage	6.3 ~ 100VDC					160 ~ 400VDC					450VDC				
Capacitance Tolerance (120Hz 20°C)	±20%(M)														
Leakage Current (20°C)	6.3~100 VDC I ≤0.01CV or 4 (μA)								160~450 VDC I ≤0.03CV +40 (μA)max						
	*Whichever is greater after 3 minutes I : Leakage Current(μA) C : Rated Capacitance(μF) V : Working Voltage(V)														
Surge Voltage (20°C)	W.V.	6.3	10	16	25	35	50	63	100	160	200	250	350	400	450
	S.V.	8	13	20	32	44	63	79	125	200	250	300	400	450	500
Dissipation Factor (tan δ) (120Hz 20°C)	Add 0.02 per 1000 μF for more than 1000 μF														
	W.V.	6.3	10	16	25	35	50	63	100	160	200	250	350	400	450
	tan δ	0.24	0.20	0.17	0.15	0.12	0.10	0.10	0.08	0.15	0.15	0.15	0.20	0.20	0.20
Low Temperature Stability	Impedance ratio at 120Hz														
	Rated Voltage (V)			6.3	10	16	25	35~100	160~250	350~400	450				
	-25°C / +20°C			4	3	2	2	2	3	6	15				
	-40°C / +20°C			10	8	6	4	3	4	10	—				
Load Life	After 2000 hours application of W.V. and +105°C ripple current value, the capacitor shall meet the following limits. (DC + ripple peak voltage ≤ rate working voltage)														
	Capacitance Change			≤±25% of initial value for 6.3~16 W.V., ≤±20% of initial value for 25~450 W.V.											
	Dissipation Factor			≤200% of initial specified value											
	Leakage current			≤initial specified value											
Shelf Life	At +105°C no voltage application after 1000 hours the capacitor shall meet the limits for load life characteristics. (with voltage treatment)														

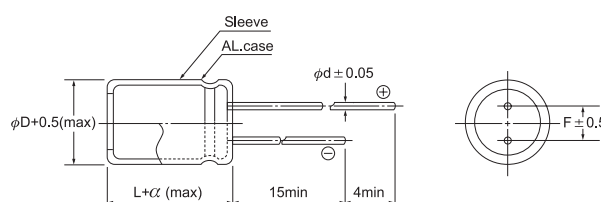
DIMENSIONS (mm)

ϕD	5	6.3	8	10	12.5	16	18	20	22	25
F	2.0	2.5	3.5	5.0	5.0	7.5	7.5	10.0	10.0	12.5
d	0.5	0.5	0.6	0.6	0.6	0.8	0.8	0.8	1.0	1.0
α	1.5	1.5	1.5	1.5	2.0	2.0	2.0	2.0	2.0	2.0

RIPPLE CURRENT COEFFICIENTS

Temperature(°C)	65	85	105
Multiplier	1.75	1.40	1.00

Frequency(Hz)	60	120	1k	$\geq 10k$
W.V.	Multiplier			
6.3~25V	0.85	1.00	1.10	1.20
35~100V	0.80	1.00	1.15	1.25
160~250V	0.75	1.00	1.25	1.40
350~450V	0.70	1.00	1.30	1.80



● CASE SIZE & MAX RIPPLE CURRENT

Case size : D x L (mm)
Max ripple current : mA(rms) 105°C 120Hz

μF	V(DC) Item	6.3		10		16	
		DxL	R.C.	DxL	R.C.	DxL	R.C.
47					→	5x11	90
100		5x11	110	5x11	120	5x11	130
220		5x11	160	5x11	180	6.3x11	220
330		6.3x11	220	6.3x11	250	6.3x11	270
470		6.3x11	270	6.3x11	290	8x11	310
1000		8x11	460	10x12.5	560	8x11	370
						10x12.5	600
						10x16	670
2200		10x16	810	10x16	880	12.5x20	1180
				10x20	970		
3300		10x20	1050	12.5x20	1280	12.5x25	1510
4700		12.5x20	1350	12.5x25	1590	16x25	1830
						16x25	2040
6800		12.5x25	1680	16x25	1940	16x32	2120
						16x36	2430
10000		16x25	2020	16x32	2210	18x36	2590
				16x36	2330		
15000		16x32	2200	16x36	2540	18x40	2960
		16x36	2320	18x36	2710	20x40	3040
						22x40	3390
22000		18x36	2660	18x40	3050	22x50	3740
		18x40	2810	20x40	3130		
33000		22x40	3230	22x50	3840	25x50	4200
		22x50	3560				
47000		22x50	3700	25x50	4260		
68000		22x50	3820				

μF	V(DC) Item	25		35		50	
		DxL	R.C.	DxL	R.C.	DxL	R.C.
1					→	5x11	17
2.2					→	5x11	25
3.3					→	5x11	31
4.7					→	5x11	36
10		5x11	43	5x11	49	5x11	55
22		5x11	65	5x11	70	5x11	80
33		5x11	80	5x11	90	5x11	95
47		5x11	95	5x11	110	6.3x11	130
68		5x11	110	6.3x11	140	6.3x11	160
100		5x11	140	6.3x11	170	8x11	220
		6.3x11	160				
		6.3x11	230				
220		8x11	270	8x11	300	10x12.5	370
330		8x11	330	10x12.5	410	10x16	500
470		10x12.5	440	10x16	550	10x20	660
1000		10x16	710	12.5x20	1000	12.5x25	1210
		10x20	790				
2200		12.5x25	1370	16x25	1640	16x32	1850
						16x36	1950
3300		16x25	1730	16x32	1960	18x36	2360
				16x36	2070		
4700		16x32	1990	16x36	2260		
				18x36	2410		
6800		16x36	2330	18x40	2780	22x50	3490
		18x36	2480				
10000		18x40	2820	22x50	3540	25x50	3930
		20x40	2890				
15000		22x50	3620	22x50	3750		
22000		25x50	4080				

All blank voltage on sleeve marking is the same voltage as" → "point to.

● CASE SIZE & MAX RIPPLE CURRENT

Case size : D x L (mm)
Max ripple current : mA(rms) 105°C 120Hz

μF	V(DC) Item	63		100	
		DxL	R.C.	DxL	R.C.
10		5x11	55	5x11	60
				6.3x11	65
22		5x11	80	6.3x11	100
33		6.3x11	110	8x11	140
47		6.3x11	130	8x15	190
				10x12.5	190
68		8x11	180	10x12.5	230
100		8x11	220	10x16	310
		10x12.5	250	10x20	340
220		10x16	410	12.5x20	570
				12.5x25	630
330		10x20	550	12.5x25	780
470		12.5x20	750	16x25	950
1000		16x25	1310	18x36	1630
				18x40	1720
2200		18x36	2080	22x50	2730
4700		22x50	3220		
6800		25x50	3740		

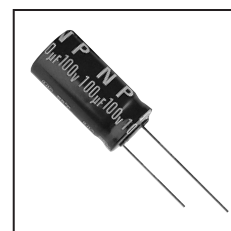
μF	V(DC) Item	160		200		250	
		DxL	R.C.	DxL	R.C.	DxL	R.C.
1		6.3x11	18	6.3x11	19	6.3x11	21
2.2		6.3x11	26	6.3x11	28	6.3x11	31
3.3		6.3x11	32	6.3x11	34	6.3x11	37
						8x11	44
4.7		6.3x11	38	6.3x11	41	8x11	50
				8x11	48		
10		8x11	65	8x11	70	10x12.5	85
				10x12.5	80	10x16	95
22		10x12.5	110	10x16	130	10x20	150
		10x16	120	10x20	140	12.5x20	170
33		10x16	150	10x20	170	10x25	210
		10x20	160	12.5x20	200	12.5x20	210
47		10x20	190	12.5x20	240	12.5x20	260
		12.5x20	220			12.5x25	280
68		12.5x20	260	12.5x25	310	16x25	350
100		12.5x25	350	16x25	390	16x25	420
						16x32	440
220		16x32	560	16x36	640	18x36	740
		16x36	590	18x40	720		
330		18x36	770	18x40	880	20x40	980
		18x40	820				
470		18x40	970	22x40	1130	22x50	1360
		22x40	1050				
1000		25x50	1820				

● CASE SIZE & MAX RIPPLE CURRENT

Case size : D x L (mm)
Max ripple current : mA(rms) 105°C 120Hz

μF	V(DC) Item	350		400		450	
		DxL	R.C.	DxL	R.C.	DxL	R.C.
1		8x11	21	8x11	21	10x12.5	22
2.2		8x11	31	8x11	32	8x11	29
				10x12.5	35	10x20	39
3.3		8x11	37	8x11	39	10x16	44
		10x12.5	42	10x12.5	43	12.5x20	55
4.7		8x11	45	8x11	46	10x16	50
		10x12.5	50	10x16	55	12.5x20	65
10		10x16	80	10x16	85	10x20	85
		10x20	90	12.5x20	100	16x25	110
22		12.5x20	150	12.5x25	170	12.5x25	160
		12.5x25	170			16x32	170
33		12.5x20	180	16x25	220	16x32	200
		16x25	210	16x32	220	18x36	230
47		16x25	250	16x25	270	16x36	260
		16x36	270	18x36	300		
68		16x32	310	16x32	320	18x36	330
100		18x36	430	18x36	440	18x40	420
		18x40	450	20x40	480		
220		22x50	820	25x50	880	25x50	800
330		25x50	1080				

- Standard non polarity series for using in polarity reversal circuits.
- Corresponding product to RoHS

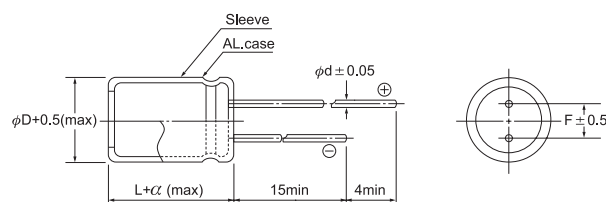


SPECIFICATION

Item	Characteristic									
Operation Temperature Range	-40 ~ +85°C									
Rated Working Voltage	6.3 ~ 100VDC									
Capacitance Tolerance (120Hz 20°C)	±20%(M)									
Leakage Current (20°C)	I ≤0.04CV +4 (μA) *Whichever is greater after 5 minutes I : Leakage Current (μA) C : Rated Capacitance (μF) V : Working Voltage (V)									
Surge Voltage (20°C)	W.V.	6.3	10	16	25	35	50	63	100	
	S.V.	8	13	20	32	44	63	79	125	
Dissipation Factor (tan δ) (120Hz 20°C)	Add 0.02 per 1000 μF for more than 1000 μF									
	W.V.	6.3	10	16	25	35	50	63	100	
	tan δ	0.24	0.20	0.17	0.15	0.12	0.12	0.12	0.12	0.12
Low Temperature Stability	Impedance ratio at 120Hz									
	Rated Voltage (V)		6.3	10	16	25	35	50	63	100
	-25°C / +20°C		4	3	2	2	2	2	2	2
	-40°C / +20°C		10	8	6	4	4	3	3	3
Load Life	After 2000 hours application of W.V. and +85°C ripple current value, the capacitor shall meet the following limits. (DC + ripple peak voltage ≤ rate working voltage) (The polarity need to exchange every 250 hours)									
	Capacitance Change		≤ ±20% of initial value							
	Dissipation Factor		≤ 150% of initial specified value							
	Leakage current		≤ initial specified value							
Shelf Life	At +85°C no voltage application after 500 hours the capacitor shall meet the following limits. (with voltage treatment)									
	Capacitance Change		≤ ±20% of initial value							
	Dissipation Factor		≤ 200% of initial specified value							
	Leakage current		≤ 200% of initial specified value							

DIMENSIONS (mm)

ϕD	5	6.3	8	10	12.5	16	18
F	2.0	2.5	3.5	5.0	5.0	7.5	7.5
d	0.5	0.5	0.6	0.6	0.6	0.8	0.8
α	1.5	1.5	1.5	1.5	2.0	2.0	2.0



● CASE SIZE & MAX RIPPLE CURRENT

Case size : D x L (mm)
Max ripple current : mA(rms) 85°C 120Hz

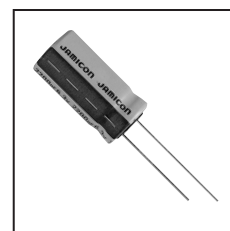
μF	V(DC) Item	6.3		10		16	
		DxL	R.C.	DxL	R.C.	DxL	R.C.
10					→	5x11	47
22				5x11	65	6.3x11	80
33		5x11	70	6.3x11	90	8x11	110
47		6.3x11	100	6.3x11	110	8x11	140
100		8x11	170	8x11	180	10x16	230
220		10x12.5	260	10x16	310	10x20	380
330		10x16	350	10x20	420	12.5x20	460
470		10x20	460	12.5x20	500	12.5x25	600
1000		12.5x25	740	16x32	950	16x32	1030
2200		16x32	1240	16x36	1350	16x32	1450
3300		16x25	1540	16x32	1500	18x36	1900
4700		16x32	1660	18x36	2000		
6800		18x36	2120				

μF	V(DC) Item	25		35		50	
		DxL	R.C.	DxL	R.C.	DxL	R.C.
1					→	5x11	18
2.2					→	5x11	26
3.3					→	6.3x11	37
4.7		5x11	34	5x11	38	6.3x11	44
10		6.3x11	55	6.3x11	65	8x11	75
22		8x11	100	8x11	110	10x12.5	120
33		8x11	120	10x12.5	140	10x16	160
47		10x12.5	150	10x16	190	10x20	210
100		10x20	270	12.5x20	300	12.5x25	330
220		12.5x20	400	12.5x25	490	16x32	580
330		16x25	570	16x25	640	16x36	750
470		16x32	760	16x32	840	16x32	840
1000		16x32	1100	16x36	1300		
2200		18x36	1730				

μF	V(DC) Item	63		100	
		DxL	R.C.	DxL	R.C.
10		8x11	75	10x16	85
22		10x16	130	12.5x20	140
33		10x20	170	12.5x25	190
47		12.5x20	210	16x25	240
100		16x25	350	16x32	390
220		16x32	580	18x36	650
330		18x36	800	18x36	800
470		18x36	950	18x40	1000

All blank voltage on sleeve marking is the same voltage as" → "point to.

- Standard low leakage current series.
- Suitable for Hi-Fi pre-amplifiers and TV oscillation loop circuits.
- Corresponding product to RoHS

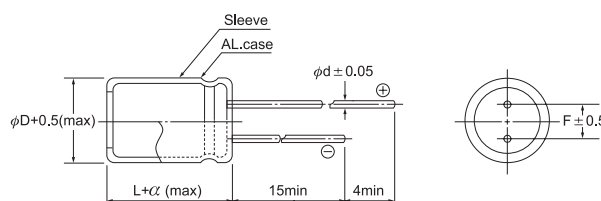


SPECIFICATION

Item	Characteristic						
Operation Temperature Range	-40 ~ +85°C						
Rated Working Voltage	10 ~ 63VDC						
Capacitance Tolerance (120Hz 20°C)	±20%(M) +30% -10%(Q)						
Leakage Current (20°C)	I ≤0.002CV or 1 (μA) whichever is greater after 2 minutes				I : Leakage Current (μA) C : Rated Capacitance (μF) V : Working Voltage (V)		
Surge Voltage (20°C)	W.V.	10	16	25	35	50	63
	S.V.	13	20	32	44	63	79
Dissipation Factor (tan δ) (120Hz 20°C)	W.V.	10	16	25	35	50	63
	tan δ	0.20	0.16	0.14	0.12	0.10	0.10
Low Temperature Stability	Impedance ratio at 120Hz						
	Rated Voltage (V)	10	16	25	35	50	63
	-25°C / +20°C	4	4	4	4	4	4
	-40°C / +20°C	8	8	8	8	8	8
Load Life	After 2000 hours application of W.V. and +85°C ripple current value, the capacitor shall meet the following limits. (DC + ripple peak voltage ≤ rate working voltage)						
	Capacitance Change	≤ ±15% of initial value					
	Dissipation Factor	≤ 150% of initial specified value					
	Leakage current	≤ initial specified value					
Shelf Life	At +85°C no voltage application after 1000 hours the capacitor shall meet the limits for load life characteristics. (with voltage treatment)						

DIMENSIONS (mm)

ϕD	5	6.3	8	10	12.5
F	2.0	2.5	3.5	5.0	5.0
d	0.5	0.5	0.6	0.6	0.6
α	1.5	1.5	1.5	1.5	2.0



● CASE SIZE & MAX RIPPLE CURRENT

Case size : D x L (mm)
Max ripple current : mA(rms) 85°C 120Hz

μF	V(DC) Item	10		16		25	
		DxL	R.C.	DxL	R.C.	DxL	R.C.
10			→	5x11	48	6.3x11	60
22		5x11	65	6.3x11	80	8x11	100
33		6.3x11	90	6.3x11	100	8x11	130
47		6.3x11	110	8x11	140	10x12.5	160
100		8x11	180	10x12.5	210	10x16	250
220		10x16	310	10x20	390	12.5x20	410
330		10x20	420	12.5x20	470	12.5x25	560
470		12.5x20	500	12.5x20	560		
1000		12.5x25	810				

μF	V(DC) Item	35		50		63	
		DxL	R.C.	DxL	R.C.	DxL	R.C.
10		6.3x11	65	8x11	80	8x11	80
22		8x11	110	10x12.5	130	10x16	140
33		10x12.5	140	10x16	170	10x16	170
47		10x12.5	170	10x16	210	10x20	230
100		10x20	300	12.5x20	330	12.5x25	360
220		12.5x25	490				

All blank voltage on sleeve marking is the same voltage as" → "point to.

- Has a high ripple current, low IMP & low ESR and long life characteristics.
- Suitable for output of M/B and switching power supplies.
- Corresponding product to RoHS

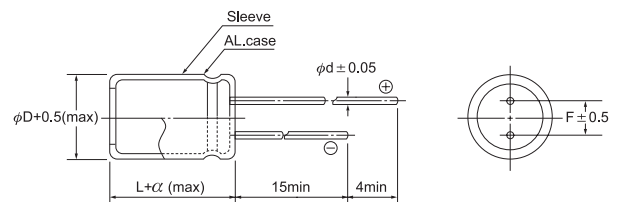


SPECIFICATION

Item	Characteristic				
Operation Temperature Range	-40 ~ +105°C				
Rated Working Voltage	6.3 ~ 25VDC				
Capacitance Tolerance (120Hz 20°C)	±20%(M)				
Leakage Current (20°C)	I ≤0.03CV or 3 (μA) *Whichever is greater after 2 minutes			I : Leakage Current (μA) C : Rated Capacitance (μF) V : Working Voltage (V)	
Surge Voltage (20°C)	W.V.	6.3	10	16	25
	S.V.	8	13	20	32
Dissipation Factor (tan δ) (120Hz 20°C)	Add 0.02 per 1000 μF for more than 1000 μF				
	W.V.	6.3	10	16	25
	tan δ	0.22	0.19	0.16	0.16
Low Temperature Stability	Impedance ratio at 120Hz				
	Rated Voltage (V)	6.3	10	16	25
	-25°C / +20°C	2	2	2	2
	-40°C / +20°C	3	3	3	3
Load Life	After 2000 hours application of W.V. and +105°C ripple current value, the capacitor shall meet the following limits. (DC + ripple peak voltage ≤ rate working voltage)				
	Capacitance Change	≤±25% of initial value			
	Dissipation Factor	≤200% of initial specified value			
	Leakage current	≤initial specified value			
Shelf Life	At +105°C no voltage application after 1000 hours, the capacitor shall meet the limits for load life characteristics. (with voltage treatment)				

DIMENSIONS (mm)

ϕD	8	10	12.5
F	3.5	5.0	5.0
d	0.6	0.6	0.6
α	1.5	1.5	2.0



RIPPLE CURRENT COEFFICIENTS

Temperature(°C)	≤ 65	85	105
Multiplier	2.1	1.7	1.0

Frequency(Hz)	120	1k	10k	$\geq 100k$
Multiplier	0.50	0.80	0.90	1.00

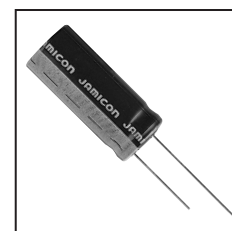
● CASE SIZE & MAX RIPPLE CURRENT

Case size : D x L (mm)
 Max E.S.R. : Ω 20°C 100kHz
 Max ripple current : mA(rms) 105°C 100kHz

μF	V(DC) Item	6.3			10		
		DxL	E.S.R.	R.C.	DxL	E.S.R.	R.C.
680					8x14	0.036	1230
820		8x11	0.036	1230			
1000		8x16	0.028	1560	8x16	0.028	1660
					10x12.5	0.028	1700
1200		8x16	0.028	1710			
1500		8x20	0.018	2040	8x20	0.019	2150
		10x12.5	0.020	1760	10x16	0.019	2200
1800		10x16	0.018	2140	10x20	0.013	2660
2200		10x20	0.015	2530	10x23	0.012	3000
3300		10x23	0.012	3110			
3900		10x26	0.012	3480			
4700		12.5x26	0.014	3810			

μF	V(DC) Item	16			25		
		DxL	E.S.R.	R.C.	DxL	E.S.R.	R.C.
470		8x11	0.036	1160	10x16	0.019	2030
680		8x16	0.028	1610			
		10x12.5	0.028	1640			
1000		8x20	0.019	2160			
		10x16	0.019	2210			
1500		10x20	0.013	2830			
1800		10x23	0.012	3300			

- Features : Low Impedance, high ripple current long life
- Recommended Applications : Used switching regulator applications in computers. Especially for high frequency.
- Corresponding product to RoHS

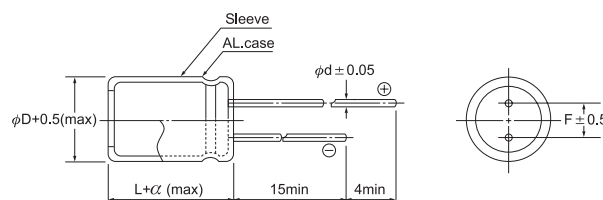


SPECIFICATION

Item	Characteristic									
Operation Temperature Range	-40 ~ +105°C									
Rated Working Voltage	6.3 ~ 100VDC									
Capacitance Tolerance (120Hz 20°C)	±20% (M)									
Leakage Current (20°C)	I ≤0.01CV or 3(μA) Whichever is greater after 2 minutes I : Leakage Current (μA) C : Rated Capacitance (μF) V : Working Voltage (V)									
Surge Voltage (20°C)	W.V.	6.3	10	16	25	35	50	63	100	
	S.V.	8	13	20	32	44	63	79	125	
Dissipation Factor (tan δ) (120Hz 20°C)	Add 0.02 per 1000 μF for more than 1000 μF									
	W.V.	6.3	10	16	25	35	50	63	100	
	tan δ	0.22	0.19	0.16	0.14	0.12	0.10	0.09	0.08	
Low Temperature Stability	Impedance ratio at 120Hz									
	Rated Voltage (V)	6.3	10	16	25	35	50	63	100	
	-25°C / +20°C	4	3	2	2	2	2	2	2	
	-40°C / +20°C	8	6	4	3	3	3	3	3	
Load Life	After 3000~6000 hours application of W.V. at +105°C, the capacitor shall meet the following limits. (DC + ripple peak voltage ≤ rate working voltage)									
	Dφ	5~6.3φ		8~10φx12.5		10x15~12φ		12.5~18φ		
	Life (hours)	3000hrs		4000hrs		5000hrs		6000hrs		
	Capacitance Change	≤ ±25% of initial value								
	Dissipation Factor	≤200% of initial specified value								
	Leakage current	≤initial specified value								
Shelf Life	At +105°C no voltage application after 1000 hours, the capacitor shall meet the limits for load life characteristics. (with voltage treatment)									

DIMENSIONS (mm)

ϕD	5	6.3	8	10	13	16	18
F	2.0	2.5	3.5	5.0	5.0	7.5	7.5
d	0.5	0.5	0.6	0.6	0.6	0.8	0.8
α	1.5	1.5	1.5	1.5	2.0	2.0	2.0



RIPPLE CURRENT COEFFICIENTS

Temperature(°C)	≤50	70	85	105
Coefficient	1.90	1.75	1.40	1.00

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

● CASE SIZE & MAX RIPPLE CURRENT

Case size : D x L (mm)
 Max impedance : Ω 20°C 100kHz
 Max ripple current : mA(rms) 105°C 100kHz

μF	V(DC) Item	6.3			10			16		
		DxL	IMP.	R.C.	DxL	IMP.	R.C.	DxL	IMP.	R.C.
100					5x11	0.580	210	5x11	0.580	210
								6.3x11	0.230	250
120								6.3x11	0.220	340
150		5x11	0.580	210						
220					6.3x11	0.220	340	6.3x11	0.185	469
								8x11	0.150	582
330		6.3x11	0.220	340				8x11	0.130	640
		6.3x11	0.160	510	8x11	0.130	640	8x15	0.087	840
470								8x20	0.078	950
								10x12.5	0.080	865
								10x16	0.060	1210
680		8x11	0.130	640	8x15	0.087	840	8x20	0.069	1050
								10x16	0.060	1210
820		10x12.5	0.080	865	10x12.5	0.080	865			
		8x15	0.087	840	8x20	0.069	1050	8x20	0.069	1050
1000					10x16	0.060	1210	10x16	0.060	1210
								10x20	0.046	1400
								12.5x16	0.049	1450
1200		8x20	0.069	1050	10x20	0.046	1400	10x25	0.042	1650
		10x16	0.060	1210						
1500		8x20	0.069	1050	10x25	0.042	1650	10x30	0.031	1910
		10x16	0.060	1210	12.5x16	0.049	1450	12.5x20	0.035	1900
		10x20	0.046	1400				16x16	0.042	1940
1800		12.5x16	0.049	1450						
		10x20	0.046	1400	10x30	0.031	1910	12.5x25	0.027	2230
2200		10x25	0.042	1650	12.5x20	0.042	1900	18x16	0.043	2210
					16x16	0.042	1940			
2700		10x30	0.031	1910	18x16	0.043	2210	12.5x30	0.024	2650
		16x16	0.042	1940				16x20	0.027	2530
3300		10x25	0.042	1650	10x30	0.031	1910	12.5x35	0.020	2880
		12.5x20	0.035	1900	12.5x25	0.027	2230			
3900		12.5x25	0.027	2230	12.5x30	0.024	2650	12.5x40	0.017	3350
		18x16	0.043	2210	16x20	0.027	2530	16x25	0.021	2930
								18x20	0.026	2860
4700		12.5x30	0.024	2650	12.5x35	0.020	2880	16x32	0.017	3450
								18x25	0.019	3140
5600		12.5x35	0.020	2880	12.5x40	0.017	3350	16x36	0.015	3610
		16x20	0.027	2530	16x25	0.021	2930	18x32	0.015	4170
					18x20	0.026	2860			
6800		12.5x40	0.017	3350	16x32	0.017	3450	16x40	0.013	4080
		16x25	0.021	2930	18x25	0.019	3140			
		18x20	0.026	2860						
8200		16x32	0.017	3450	16x36	0.015	3610	18x36	0.014	4220
					18x32	0.015	4170			
10000		16x36	0.015	3610	16x40	0.013	4080	18x40	0.012	4280
		18x25	0.017	3140	18x36	0.014	4220			
12000		18x32	0.015	4170	18x40	0.012	4280			
15000		18x36	0.014	4220						

● CASE SIZE & MAX RIPPLE CURRENT

Case size : D x L (mm)
 Max impedance : Ω 20°C 100kHz
 Max ripple current : mA(rms) 105°C 100kHz

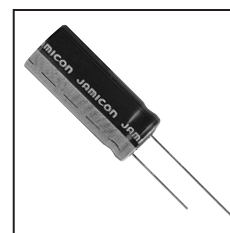
μF	V(DC) Item	25			35			50		
		DxL	IMP.	R.C.	DxL	IMP.	R.C.	DxL	IMP.	R.C.
10								5x11	1.200	135
22								5x11	0.700	180
33					5x11	0.580	210	6.3x11	0.490	245
47		5x11	0.580	210	6.3x11	0.390	275	6.3x11	0.520	300
56					6.3x11	0.220	340	6.3x11	0.300	295
68					6.3x11	0.170	500			
82					6.3x11	0.160	540			
100		6.3x11	0.220	340	8x11	0.150	580	8x11	0.170	555
120								8x15	0.120	730
150		8x11	0.160	640	8x11	0.130	640	10x12.5	0.120	760
180								8x20	0.091	910
220		8x11	0.130	640	8x15	0.087	840	10x16	0.084	1050
270					10x12.5	0.080	865			
330					8x20	0.069	1050	10x20	0.060	1220
470		8x15	0.087	840	10x16	0.060	1210	10x20	0.058	1400
560		10x12.5	0.080	865	10x20	0.046	1400	10x25	0.055	1440
680		8x20	0.069	1050	10x20	0.046	1400	10x30	0.043	1690
820		10x12.5	0.070	1050	12.5x16	0.049	1450	12.5x20	0.045	1660
1000		10x16	0.060	1210				16x16	0.055	1690
1200					10x25	0.042	1650	12.5x25	0.034	1950
1500		10x20	0.046	1400	10x30	0.031	1910	18x16	0.054	1930
1800		12.5x16	0.049	1450	12.5x20	0.035	1900	12.5x30	0.030	2310
2200					16x16	0.042	1940			
2700		10x25	0.042	1650	12.5x20	0.035	1900	12.5x35	0.025	2510
3300								16x20	0.034	2210
3900		10x30	0.031	1910	12.5x25	0.027	2230	12.5x40	0.021	2920
4700		12.5x20	0.035	1900	18x16	0.043	2210	16x25	0.025	2555
5600		16x16	0.042	1940				18x20	0.036	2490
		18x16	0.043	2210	12.5x30	0.024	2650	16x32	0.022	3010
					16x20	0.027	2530	18x25	0.026	2740
		12.5x20	0.035	1900	12.5x35	0.020	2880	16x36	0.019	3150
		12.5x25	0.027	2230						
		12.5x30	0.024	2650	12.5x40	0.017	3350	16x40	0.016	3710
		16x20	0.027	2530	16x25	0.021	2930	18x32	0.021	3635
					18x20	0.026	2860			
		12.5x35	0.020	2880	16x32	0.017	3450	18x36	0.017	3680
		18x20	0.026	2860	18x25	0.019	3140			
		12.5x40	0.017	3350	16x36	0.015	3610	18x40	0.014	3800
		16x25	0.021	2930	18x32	0.015	4170			
		16x32	0.017	3450	16x40	0.013	4080			
		18x25	0.019	3140	18x36	0.014	4220			
		18x32	0.015	4170	18x40	0.012	4280			
		18x36	0.014	4220						
		18x40	0.012	4280						

● CASE SIZE & MAX RIPPLE CURRENT

Case size : D x L (mm)
 Max impedance : Ω 20°C 100kHz
 Max ripple current : mA(rms) 105°C 100kHz

μF	V(DC) Item	63			100		
		DxL	IMP.	R.C.	DxL	IMP.	R.C.
15		5x11	2.300	55			
22					6.3x11	0.850	200
27					8x12	0.630	232
33		6.3x11	1.200	115			
39					8x15	0.450	300
47					10x12.5	0.430	288
56		8x12	0.630	232	8x20	0.330	362
68					10x16	0.310	357
82		8x15	0.450	300	10x20	0.210	466
		10x12.5	0.430	288	12.5x16	0.230	466
100					10x25	0.200	531
120		8x20	0.330	362	10x30	0.150	663
		10x16	0.310	357	12.5x20	0.160	690
150					16x16	0.140	795
180		10x20	0.210	466	12.5x25	0.120	784
		12.5x16	0.230	466	18x16	0.120	920
220		10x25	0.200	531	12.5x30	0.100	905
					16x20	0.091	1040
270		10x30	0.150	663	12.5x35	0.083	1050
		12.5x20	0.160	690	16x25	0.073	1250
		16x16	0.140	795			
330		12.5x25	0.120	784	12.5x40	0.071	1180
					18x20	0.080	1240
390		18x16	0.120	920	16x32	0.054	1570
					18x25	0.057	1490
470		12.5x30	0.100	905	16x36	0.045	1790
		16x20	0.091	1040	18x32	0.047	1630
560		12.5x35	0.083	1050	16x40	0.040	2020
		16x25	0.073	1250			
680		12.5x40	0.071	1180	18x36	0.040	1790
		18x20	0.080	1240			
820		16x32	0.054	1570	18x40	0.036	2330
		18x25	0.057	1490			
1000		16x36	0.045	1790			
		18x32	0.047	1630			
1200		16x40	0.040	2020			

- High temperature 105°C, 5000~6000hours
- Recommended Applications : AV (TV, Video, Audio) Monitor/Computer/OA/HA Communication, Converter/Inverter, Adapter, SMPS
- Corresponding product to RoHS

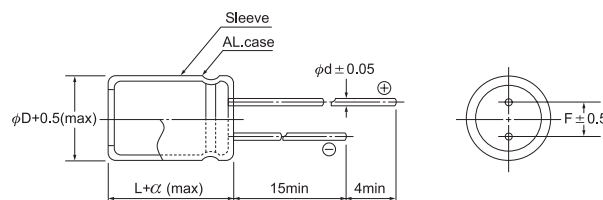


● SPECIFICATION

Item	Characteristic					
Operation Temperature Range	-40 ~ +105°C					
Rated Working Voltage	6.3 ~ 35VDC					
Capacitance Tolerance (120Hz 20°C)	±20% (M)					
Leakage Current (20°C)	I ≤0.01CV or 3(μA) Whichever is greater after 2 minutes I : Leakage Current (μA) C : Rated Capacitance (μF) V : Working Voltage (V)					
Surge Voltage (20°C)	W.V.	6.3	10	16	25	35
	S.V.	8	13	20	32	44
Dissipation Factor (tan δ) (120Hz 20°C)	Add 0.02 per 1000 μF for more than 1000 μF					
	W.V.	6.3	10	16	25	35
	tan δ	0.22	0.19	0.16	0.14	0.12
Low Temperature Stability	Impedance ratio at 120Hz					
	Rated Voltage (V)	6.3	10	16	25	35
	-25°C / +20°C	2	2	2	2	2
	-40°C / +20°C	3	3	3	3	3
Load Life	After 5000~6000 hours application of W.V. at +105°C, the capacitor shall meet the following limits. (DC + ripple peak voltage ≤ rate working voltage)					
	Dφ	5~6.3φ			8~16φ	
	Life (hours)	5000hrs			6000hrs	
	* If dimension is down size, Endurance will be less 1000 hours than standard.					
	Capacitance Change	≤ ±30% of initial value for 6.3~10W.V., ≤ ±25% of initial value for 16~35W.V.				
	Dissipation Factor	≤200% of initial specified value				
	Leakage current	≤initial specified value				
Shelf Life	At +105°C no voltage application after 500 hours, the capacitor shall meet the limits for load life characteristics. (with voltage treatment)					

● DIMENSIONS (mm)

ϕD	5	6	8	10	12.5	16
F	2.0	2.5	3.5	5.0	5.0	7.5
d	0.5	0.5	0.6	0.6	0.6	0.8
α	1.5	1.5	1.5	1.5	2.0	2.0



● RIPPLE CURRENT COEFFICIENTS

Temperature(°C)	≤ 65	85	105
Coefficient	2.00	1.50	1.00

Frequency(Hz)	120	1k	10k	100k
47~150 μF	0.40	0.75	0.90	1.00
220~560 μF	0.50	0.85	0.94	1.00
680~1800 μF	0.60	0.87	0.95	1.00
2200~3900 μF	0.75	0.90	0.95	1.00
4700~8200 μF	0.85	0.95	0.98	1.00

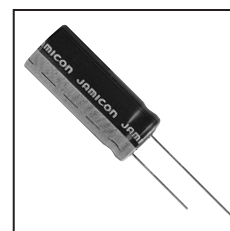
● CASE SIZE & MAX RIPPLE CURRENT

Case size : D x L (mm)
 Max impedance : Ω 20°C 100kHz
 Max ripple current : mA(rms) 105°C 100kHz

μF	V(DC) Item	6.3			10			16		
		DxL	IMP.	R.C.	DxL	IMP.	R.C.	DxL	IMP.	R.C.
100								5x11	0.240	330
150					5x11	0.240	330			
220		5x11	0.240	330				6.3x11	0.110	500
330					6.3x11	0.110	500			
470		6.3x11	0.110	500				8x12	0.062	900
680					8x12	0.062	900	8x15	0.048	1210
820		8x12	0.062	900				10x12.5	0.053	1240
1000					8x15	0.048	1210	8x20	0.041	1410
					10x12.5	0.053	1240	10x16	0.038	1650
1200		8x15	0.048	1210						
		10x12.5	0.053	1240						
1500		8x20	0.041	1410	8x20	0.041	1410	10x20	0.026	1960
					10x16	0.038	1650			
1800		10x16	0.038	1650	10x20	0.026	1960	10x25	0.023	2250
2200		10x20	0.026	1960	10x25	0.023	2250	12.5x20	0.023	2480
2700		10x25	0.023	2250				12.5x25	0.020	2900
3300					12.5x20	0.023	2480	12.5x30	0.017	3450
								16x20	0.018	3250
3900		12.5x20	0.023	2480	12.5x25	0.020	2900	12.5x35	0.016	3570
4700		12.5x25	0.020	2900	12.5x30	0.017	3450	16x25	0.017	3630
					16x20	0.018	3250			
5600		12.5x30	0.017	3450	12.5x35	0.016	3570			
6800		12.5x35	0.016	3570	16x25	0.017	3630			
		16x20	0.018	3250						
8200		16x25	0.017	3630						

μF	V(DC) Item	25			35		
		DxL	IMP.	R.C.	DxL	IMP.	R.C.
47					5x11	0.240	330
68		5x11	0.240	330			
100					6.3x11	0.110	500
150		6.3x11	0.110	500			
220					8x12	0.062	900
270					8x15	0.048	1210
330		8x12	0.062	900	10x12.5	0.053	1240
390		8x15	0.048	1210	8x20	0.041	1410
470		10x12.5	0.053	1240	10x16	0.038	1650
560		8x20	0.041	1410	10x20	0.026	1960
680		10x16	0.038	1650	10x25	0.023	2250
820		10x20	0.026	1960			
1000		10x25	0.023	2250	12.5x20	0.023	2480
1200					12.5x25	0.020	2900
1500		12.5x20	0.023	2480	12.5x30	0.017	3450
					16x20	0.018	3250
1800		12.5x25	0.020	2900	12.5x35	0.016	3570
2200		12.5x30	0.017	3450	16x25	0.017	3630
		16x20	0.018	3250			
2700		12.5x35	0.016	3570			
3300		16x25	0.017	3630			

- High temperature 105°C, 4000~10000hours
- Recommended Applications : Applicable for SMPS, Adaptor, Charger, Monitor/Computer
- Corresponding product to RoHS

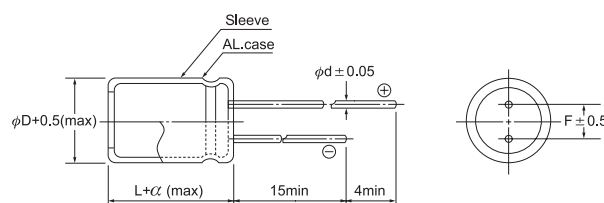


● SPECIFICATION

Item	Characteristic								
Operation Temperature Range	-40 ~ +105°C								
Rated Working Voltage	6.3 ~ 100VDC								
Capacitance Tolerance (120Hz 20°C)	±20% (M)								
Leakage Current (20°C)	I ≤0.01CV or 3(μA) Whichever is greater after 2 minutes I : Leakage Current (μA) C : Rated Capacitance (μF) V : Working Voltage (V)								
Surge Voltage (20°C)	W.V.	6.3	10	16	25	35	50	63	100
	S.V.	8	13	20	32	44	63	79	125
Dissipation Factor (tan δ) (120Hz 20°C)	Add 0.02 per 1000 μF for more than 1000 μF								
	W.V.	6.3	10	16	25	35	50	63	100
	tan δ	0.22	0.19	0.16	0.14	0.12	0.10	0.09	0.08
Low Temperature Stability	Impedance ratio at 120Hz								
	Rated Voltage (V)	6.3	10	16	25	35	50	63	100
	-25°C / +20°C	4	3	2	2	2	2	2	2
	-40°C / +20°C	8	6	4	3	3	3	3	3
Load Life	After 4000~10000 hours application of W.V. at +105°C, the capacitor shall meet the following limits. (DC + ripple peak voltage ≤ rate working voltage)								
	Dφ	5~6.3φ			8~10φ		12.5~18φ		
	6.3~10(V)	4000hrs			6000hrs		8000hrs		
	16~100(V)	5000hrs			7000hrs		10000hrs		
	Capacitance Change	≤ ±25% of initial value							
	Dissipation Factor	≤200% of initial specified value							
	Leakage current	≤initial specified value							
Shelf Life	At +105°C no voltage application after 1000 hours, the capacitor shall meet the limits for load life characteristics. (with voltage treatment)								

● DIMENSIONS (mm)

ϕD	5	6.3	8	10	12.5	16	18
F	2.0	2.5	3.5	5.0	5.0	7.5	7.5
d	0.5	0.5	0.6	0.6	0.6	0.8	0.8
α	1.5	1.5	1.5	1.5	2.0	2.0	2.0



● RIPPLE CURRENT COEFFICIENTS

Temperature(°C)	≤ 50	70	85	105
Coefficient	1.90	1.75	1.40	1.00

Frequency(Hz)	120	1k	10k	100k
15~180 μF	0.40	0.75	0.90	1.00
220~560 μF	0.50	0.85	0.94	1.00
680~1800 μF	0.60	0.87	0.95	1.00
2200~3900 μF	0.75	0.90	0.95	1.00
4700 μF Higher	0.85	0.95	0.98	1.00

● CASE SIZE & MAX RIPPLE CURRENT

Case size : D x L (mm)
 Max impedance : Ω 20°C 100kHz
 Max ripple current : mA(rms) 105°C 100kHz

μF	V(DC) Item	6.3			10			16		
		DxL	IMP.	R.C.	DxL	IMP.	R.C.	DxL	IMP.	R.C.
56								5x11	0.580	210
100					5x11	0.580	210			
120								6.3x11	0.220	340
150		5x11	0.580	210						
220					6.3x11	0.220	340			
330		6.3x11	0.220	340				8x11	0.130	640
470					8x11	0.130	640	8x15	0.087	840
								10x12.5	0.080	865
680		8x11	0.130	640	8x15	0.087	840	8x20	0.069	1050
					10x12.5	0.080	865	10x15	0.060	1210
820		10x12.5	0.080	865						
1000		8x15	0.087	840	8x20	0.069	1050	10x20	0.046	1400
					10x15	0.060	1210	12.5x16	0.049	1450
1200		8x20	0.069	1050	10x20	0.046	1400	10x25	0.042	1650
		10x15	0.060	1210						
1500		10x20	0.046	1400	10x25	0.042	1650	10x30	0.031	1910
					12.5x16	0.049	1450	12.5x20	0.035	1900
1800		12.5x16	0.049	1450						
2200		10x25	0.042	1650	10x30	0.031	1910	12.5x25	0.027	2230
					12.5x20	0.035	1900			
2700		10x30	0.031	1910				12.5x30	0.024	2650
								16x20	0.027	2530
3300		12.5x20	0.035	1900	12.5x25	0.027	2230	12.5x35	0.020	2880
3900		12.5x25	0.027	2230	12.5x30	0.024	2650	12.5x40	0.017	3350
					16x20	0.027	2530	16x25	0.021	2930
								18x20	0.026	2860
4700		12.5x30	0.024	2650	12.5x35	0.020	2880	16x32	0.017	3450
								18x25	0.019	3140
5600		12.5x35	0.020	2880	12.5x40	0.017	3350	16x36	0.015	3610
		16x20	0.027	2530	16x25	0.021	2930	18x32	0.015	4170
					18x20	0.026	2860			
6800		12.5x40	0.017	3350	16x32	0.017	3450	16x40	0.013	4080
		16x25	0.021	2930	18x25	0.019	3140			
		18x20	0.026	2860						
8200		16x32	0.017	3450	16x36	0.015	3610	18x36	0.014	4220
					18x32	0.015	4170			

● CASE SIZE & MAX RIPPLE CURRENT

Case size : D x L (mm)
 Max impedance : Ω 20°C 100kHz
 Max ripple current : mA(rms) 105°C 100kHz

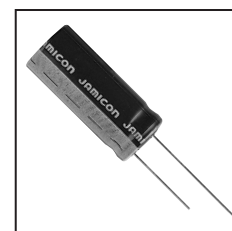
μF	V(DC) Item	25			35			50		
		DxL	IMP.	R.C.	DxL	IMP.	R.C.	DxL	IMP.	R.C.
22								5x11	0.700	180
33					5x11	0.580	210	6.3x11	0.490	245
47		5x11	0.580	210				6.3x11	0.520	300
56					6.3x11	0.220	340	6.3x11	0.300	295
100		6.3x11	0.220	340				8x11	0.170	555
120								8x15	0.120	730
150					8x11	0.130	640	10x12.5	0.120	760
180								8x20	0.091	910
220		8x11	0.130	640	8x15	0.087	840	10x16	0.084	1050
					10x12.5	0.080	865			
270					8x20	0.069	1050	10x20	0.060	1220
								12.5x16	0.061	1260
330		8x15	0.087	840	10x15	0.060	1210	10x25	0.055	1440
		10x12.5	0.080	865						
470		8x20	0.069	1050	10x20	0.046	1400	10x30	0.043	1690
		10x15	0.060	1210	12.5x16	0.049	1450	12.5x20	0.045	1660
								16x16	0.055	1690
560					10x25	0.042	1650	12.5x25	0.034	1950
								18x16	0.054	1930
680		10x20	0.046	1400	10x30	0.031	1910	12.5x30	0.030	2310
		12.5x16	0.049	1450	12.5x20	0.035	1900			
820		10x25	0.042	1650				12.5x35	0.025	2510
								16x20	0.034	2210
1000		10x30	0.031	1910	12.5x25	0.027	2230	12.5x40	0.021	2920
		12.5x20	0.035	1900				16x25	0.025	2555
								18x20	0.036	2490
1200					12.5x30	0.024	2650	16x32	0.022	3010
					16x20	0.027	2530	18x25	0.026	2740
1500		12.5x25	0.027	2230	12.5x35	0.020	2880	16x36	0.019	3150
1800		12.5x30	0.024	2650	12.5x40	0.017	3350	16x40	0.016	3710
		16x20	0.027	2530	16x25	0.021	2930	18x32	0.021	3635
					18x20	0.026	2860			
2200		12.5x35	0.020	2880	16x32	0.017	3450	18x36	0.017	3680
		18x20	0.026	2860	18x25	0.019	3140			
2700		12.5x40	0.017	3350	16x36	0.015	3610	18x40	0.014	3800
		16x25	0.021	2930	18x32	0.015	4170			
3300		16x32	0.017	3450	16x40	0.013	4080			
		18x25	0.019	3140	18x36	0.014	4220			
3900		16x36	0.015	3610	18x40	0.012	4280			
		18x32	0.015	4170						
4700		16x40	0.013	4080						
		18x36	0.014	4220						
5600		18x40	0.012	4280						

● CASE SIZE & MAX RIPPLE CURRENT

Case size : D x L (mm)
 Max impedance : Ω 20°C 100kHz
 Max ripple current : mA(rms) 105°C 100kHz

μF	V(DC) Item	63			100		
		DxL	IMP.	R.C.	DxL	IMP.	R.C.
15		5x11	2.300	55	6.3x11	1.200	115
27					8x12	0.630	232
33		6.3x11	1.200	115			
39					8x15	0.450	300
47					10x12.5	0.430	288
56		8x12	0.630	232	8x20	0.330	362
68					10x16	0.310	357
82		8x15	0.450	300	10x20	0.210	466
		10x12.5	0.430	288	12.5x16	0.230	466
100					10x25	0.200	531
120		8x20	0.330	362	10x30	0.150	663
		10x16	0.310	357	12.5x20	0.160	690
150					16x16	0.140	795
180		10x20	0.210	466	12.5x25	0.120	784
		12.5x16	0.230	466	18x16	0.120	920
220		10x25	0.200	531	12.5x30	0.100	905
					16x20	0.091	1040
270		10x30	0.150	663	12.5x35	0.083	1050
		12.5x20	0.160	690	16x25	0.073	1250
		16x16	0.140	795			
330		12.5x25	0.120	784	12.5x40	0.071	1180
		18x16	0.120	920	18x20	0.080	1240
390					16x32	0.054	1570
					18x25	0.057	1490
470		12.5x30	0.100	905	16x36	0.045	1790
		16x20	0.091	1040	18x32	0.047	1630
560		12.5x35	0.083	1050	16x40	0.040	2020
		16x25	0.073	1250			
680		12.5x40	0.071	1180	18x36	0.040	1790
		18x20	0.080	1240			
820		16x32	0.054	1570	18x40	0.036	2330
		18x25	0.057	1490			
1000		16x36	0.045	1790			
		18x32	0.047	1630			
1200		16x40	0.040	2020			

- Endurance: 105°C, 4000~10000hours
- Recommended Applications : Applicable for SMPS, Adaptor, Charger, Monitor/Computer
- Corresponding product to RoHS

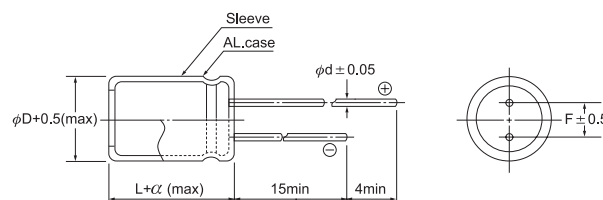


SPECIFICATION

Item	Characteristic									
Operation Temperature Range	-55 ~ +105°C									
Rated Working Voltage	6.3 ~ 100VDC									
Capacitance Tolerance (120Hz 20°C)	±20% (M)									
Leakage Current (20°C)	I ≤0.01CV or 3(μA) Whichever is greater after 2 minutes I : Leakage Current (μA) C : Rated Capacitance (μF) V : Working Voltage (V)									
Surge Voltage (20°C)	W.V.	6.3	10	16	25	35	50	63	100	
	S.V.	8	13	20	32	44	63	79	125	
Dissipation Factor (tan δ) (120Hz 20°C)	Add 0.02 per 1000 μF for more than 1000 μF									
	W.V.	6.3	10	16	25	35	50	63	100	
	tan δ	0.22	0.19	0.16	0.14	0.12	0.14	0.14	0.14	
Low Temperature Stability	Impedance ratio at 120Hz									
	Rated Voltage (V)	6.3	10	16	25	35	50	63	100	
	-25°C / +20°C	4	3	2	2	2	2	2	2	
	-40°C / +20°C	8	6	4	3	3	3	3	3	
Load Life	After 4000~10000 hours application of W.V. at +105°C, the capacitor shall meet the following limits. (DC + ripple peak voltage ≤ rate working voltage)									
	Dφ	5~6.3φ			8~10φ			12.5~18φ		
	6.3~10(V)	4000hrs			6000hrs			8000hrs		
	16~100(V)	5000hrs			7000hrs			10000hrs		
	Capacitance Change	≤ ±25% of initial value								
	Dissipation Factor	≤200% of initial specified value								
	Leakage current	≤initial specified value								
Shelf Life	At +105°C no voltage application after 1000 hours, the capacitor shall meet the limits for load life characteristics. (with voltage treatment)									

DIMENSIONS (mm)

ϕD	5	6.3	8	10	12.5	16	18
F	2.0	2.5	3.5	5.0	5.0	7.5	7.5
d	0.5	0.5	0.6	0.6	0.6	0.8	0.8
α	1.5	1.5	1.5	1.5	2.0	2.0	2.0



RIPPLE CURRENT COEFFICIENTS

Temperature(°C)	≤ 50	70	85	105
Coefficient	1.90	1.75	1.40	1.00

Frequency(Hz)	120	1k	10k	100k
22~180 μF	0.40	0.75	0.90	1.00
220~560 μF	0.50	0.85	0.94	1.00
680~1800 μF	0.60	0.87	0.95	1.00
2200~3900 μF	0.75	0.90	0.95	1.00
$\geq 4700\mu F$	0.85	0.95	0.98	1.00

● CASE SIZE & MAX RIPPLE CURRENT

Case size : D x L (mm)
 Max impedance : Ω 20°C 100kHz
 Max ripple current : mA(rms) 105°C 100kHz

μF	V(DC) Item	6.3			10			16		
		DxL	IMP.	R.C.	DxL	IMP.	R.C.	DxL	IMP.	R.C.
56								5x11	0.720	210
100					5x11	0.720	210	6.3x11	0.380	340
150		5x11	0.720	210						
220					6.3x11	0.380	340	8x11	0.200	640
330		6.3x11	0.380	340				8x15	0.160	701
470					8x11	0.200	640	8x15	0.160	840
680		8x11	0.200	640	8x15	0.160	840	10x15	0.084	1210
820		8x15	0.160	840						
1000		10x12	0.120	865	10x15	0.084	1210	10x20	0.062	1400
1500		8x20	0.110	1050	10x20	0.062	1400	10x25	0.052	1650
		10x15	0.084	1210						
2200		10x20	0.062	1400	10x25	0.052	1650	12.5x25	0.034	2230
2700		10x25	0.052	1650	12.5x20	0.046	1900	12.5x30	0.030	2650
3300		12.5x20	0.046	1900	12.5x25	0.034	2230	12.5x35	0.027	2880
3900		12.5x25	0.034	2230	12.5x30	0.030	2650	12.5x40	0.024	3350
4700		12.5x30	0.030	2650	12.5x35	0.027	2880	16x32	0.028	3450
5600		12.5x35	0.027	2880	12.5x40	0.024	3350	16x36	0.018	3610
					16x25	0.028	2930	18x32	0.015	4170
6800		12.5x40	0.024	3350	16x32	0.025	3450	18x36	0.014	4220
		16x25	0.028	2930						
8200		16x32	0.025	3450	16x36	0.018	3610			
10000		16x36	0.018	3610	18x36	0.014	4220			
12000		18x32	0.015	4170						
15000		18x36	0.014	4220						

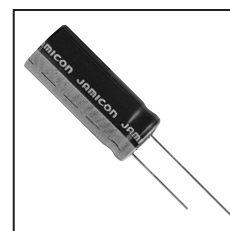
μF	V(DC) Item	25			35			50		
		DxL	IMP.	R.C.	DxL	IMP.	R.C.	DxL	IMP.	R.C.
10								5x11	3.500	120
22								5x11	2.300	210
33					5x11	0.720	210	6.3x11	1.200	340
47		5x11	0.720	210	6.3x11	0.380	340	6.3x11	1.200	340
100		6.3x11	0.380	340				8x11	0.630	555
120								8x15	0.450	730
150		8x11	0.200	640	8x11	0.200	640	8x20	0.330	910
220		8x11	0.200	640	8x15	0.160	840	10x16	0.310	1050
330		8x15	0.160	840	10x20	0.062	1400	10x20	0.210	1400
470		10x15	0.084	1210	10x25	0.052	1650	10x30	0.150	1690
								12.5x20	0.160	1660
560								12.5x25	0.120	1950
680		10x20	0.062	1400	10x30	0.044	1910	12.5x30	0.100	2310
					12.5x20	0.046	1900			
820		10x25	0.052	1650	12.5x25	0.045	2230	12.5x35	0.083	2510
1000		12.5x20	0.046	1900	12.5x25	0.045	2230	16x25	0.073	2555
1200					12.5x30	0.030	2650	16x32	0.054	3010
1500		12.5x25	0.034	2230	12.5x35	0.027	2880	16x36	0.045	3150
1800					12.5x40	0.024	3350	18x32	0.047	3635
2200		12.5x35	0.027	2880	16x32	0.025	3450	18x36	0.040	3680
2700		16x25	0.028	2930	16x36	0.022	3610	18x40	0.036	3800
3300		16x32	0.025	3450	18x36	0.020	4220			
3900		18x32	0.015	4170						
4700		18x36	0.014	4280						

● CASE SIZE & MAX RIPPLE CURRENT

Case size : D x L (mm)
 Max impedance : Ω 20°C 100kHz
 Max ripple current : mA(rms) 105°C 100kHz

μF	V(DC) Item	63			100		
		DxL	IMP.	R.C.	DxL	IMP.	R.C.
10		5x11	2.300	55	6.3x11	5.000	55
15					6.3x11	5.000	70
22					8x11	2.700	85
33		6.3x11	1.200	115	8x11	2.500	95
47					8x15	1.800	150
56		8x11	0.630	232	8x20	1.500	200
68					10x15	1.300	230
82					10x20	1.200	250
100					10x20	0.950	330
120		10x16	0.310	357	10x25	0.800	400
150					12.5x20	0.900	460
180		10x20	0.210	466			
220		10x25	0.200	531	12.5x25	0.600	640
270		10x30	0.150	663			
		12.5x20	0.160	690			
330		12.5x25	0.120	784	16x25	0.570	720
470		12.5x30	0.100	905	16x32	0.550	770
					18x25	0.500	840
560		12.5x35	0.083	1050			
680		12.5x40	0.071	1180	18x36	0.180	1400
820		16x32	0.054	1570	18x40	0.130	1850
1000		16x36	0.045	1790	18x40	0.130	1850
1200		16x40	0.040	2020			

- Endurance: 105°C, 6000~10000hours
- Recommended Applications : Applicable for AV (TV, Viodeo, Audio), OA/HA/Communication, SMPS, Adapter, Monitor/Computer, Converter/Inverter
- Corresponding product to RoHS

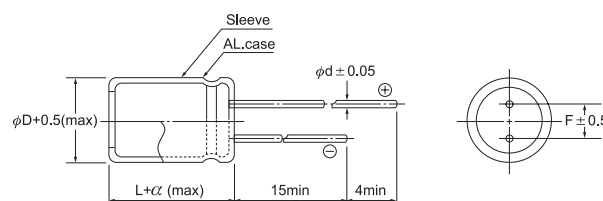


● SPECIFICATION

Item	Characteristic									
Operation Temperature Range	-40 ~ +105°C									
Rated Working Voltage	6.3 ~ 100VDC									
Capacitance Tolerance (120Hz 20°C)	±20% (M)									
Leakage Current (20°C)	I ≤0.01CV or 3(μA) Whichever is greater after 2 minutes I : Leakage Current (μA) C : Rated Capacitance (μF) V : Working Voltage (V)									
Surge Voltage (20°C)	W.V.	6.3	10	16	25	35	50	63	80	100
	S.V.	8	13	20	32	44	63	79	100	125
Dissipation Factor (tan δ) (120Hz 20°C)	Add 0.02 per 1000 μF for more than 1000 μF									
	W.V.	6.3	10	16	25	35	50	63	80	100
	tan δ	0.22	0.19	0.16	0.14	0.12	0.10	0.09	0.08	0.08
Low Temperature Stability	Impedance ratio at 120Hz									
	Rated Voltage (V)	6.3	10	16	25	35	50	63	80	100
	-25°C / +20°C	4	3	2	2	2	2	2	2	2
	-40°C / +20°C	8	6	4	3	3	3	3	3	3
Load Life	After applying rated voltage with rated ripple current for6000~10000 hours at 105°C, the capacitors shall meet the following requirements.									
	Dφ	5~6.3φ			8φ			10~18φ		
	Life (hours)	6000hrs			8000hrs			10000hrs		
	Capacitance Change	≤ ±30% of initial value for 6.3~10W.V., ≤ ±25% of initial value for 16~100W.V.								
	Dissipation Factor	≤200% of initial specified value								
	Leakage current	≤initial specified value								
Shelf Life	At +105°C no voltage application after 1000 hours, the capacitor shall meet the limits for load life characteristics. (with voltage treatment)									

● DIMENSIONS (mm)

ϕD	5	6.3	8	10	12.5	16	18
F	2.0	2.5	3.5	5.0	5.0	7.5	7.5
d	0.5	0.5	0.6	0.6	0.6	0.8	0.8
α	1.5	1.5	1.5	1.5	2.0	2.0	2.0



● RIPPLE CURRENT COEFFICIENTS

Temperature(°C)	≤ 50	70	85	105
Coefficient	1.90	1.75	1.40	1.00

Frequency(Hz)	120	1k	10k	100k
8.2~33 μF	0.42	0.70	0.90	1.00
47~270 μF	0.50	0.73	0.92	1.00
330~680 μF	0.55	0.77	0.94	1.00
820~1800 μF	0.60	0.80	0.96	1.00
2200~8200 μF	0.70	0.85	0.98	1.00

● CASE SIZE & MAX RIPPLE CURRENT

Case size : D x L (mm)
 Max impedance : Ω 20°C 100kHz
 Max ripple current : mA(rms) 105°C 100kHz

μF	V(DC) Item	6.3			10			16		
		DxL	IMP.	R.C.	DxL	IMP.	R.C.	DxL	IMP.	R.C.
100								5x11	0.242	345
150					5x11	0.242	345			
220		5x11	0.242	345				6.3x11	0.103	540
330					6.3x11	0.103	540			
470		6.3x11	0.103	540				8x12	0.062	945
680					8x12	0.062	945	8x16	0.050	1250
820		8x12	0.062	945				10x12.5	0.043	1330
1000					8x16	0.050	1250	8x20	0.032	1500
					10x12.5	0.043	1330	10x16	0.031	1760
1200		8x16	0.050	1250						
		10x12.5	0.043	1330						
1500		8x20	0.032	1500	8x20	0.032	1500	10x20	0.022	1960
					10x16	0.031	1760			
1800		10x16	0.031	1760	10x20	0.022	1960	10x25	0.020	2250
2200		10x20	0.022	1960	10x25	0.020	2250	12.5x20	0.019	2480
2700		10x25	0.020	2250				12.5x25	0.017	2900
3300					12.5x20	0.019	2480	12.5x30	0.014	3450
								16x20	0.017	3250
3900		12.5x20	0.019	2480	12.5x25	0.017	2900	12.5x35	0.013	3570
4700		12.5x25	0.017	2900	12.5x30	0.014	3450	16x25	0.014	3630
					16x20	0.017	3250			
5600		12.5x30	0.014	3450	12.5x35	0.013	3570			
6800		16x20	0.017	3250	16x25	0.014	3630			
		12.5x35	0.013	3570						
8200		16x25	0.014	3630						

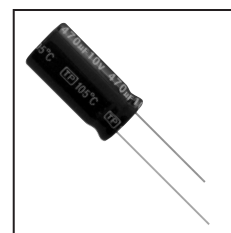
μF	V(DC) Item	25			35			50		
		DxL	IMP.	R.C.	DxL	IMP.	R.C.	DxL	IMP.	R.C.
27								5x11	0.340	238
47					5x11	0.220	345			
56								6.3x11	0.140	385
68		5x11	0.242	345						
100					6.3x11	0.094	540	8x12	0.074	724
120								8x16	0.061	950
150		6.3x11	0.103	540				10x12.5	0.061	979
180								8x20	0.046	1190
220					8x12	0.056	945	10x16	0.042	1370
270					8x16	0.050	1250	10x20	0.030	1580
330		8x12	0.062	945	10x12.5	0.041	1330	10x25	0.028	1870
390		8x16	0.050	1250	8x20	0.032	1500			
470		10x12.5	0.043	1330	10x16	0.030	1760	12.5x20	0.027	2050
560		8x20	0.032	1500	10x20	0.025	1960	12.5x25	0.023	2410
680		10x16	0.031	1760	10x25	0.023	2250	12.5x30	0.021	2860
820		10x20	0.022	1960				12.5x35	0.019	2960
								16x20	0.023	2730
1000		10x25	0.020	2250	12.5x20	0.025	2480	16x25	0.021	3010
1200					12.5x25	0.022	2900			
1500		12.5x20	0.019	2480	12.5x30	0.018	3450			
					16x20	0.020	3250			
1800		12.5x25	0.017	2900	12.5x35	0.018	3570			
2200		12.5x30	0.014	3450	16x25	0.015	3630			
		16x20	0.017	3250						
2700		12.5x35	0.013	3570						
3300		16x25	0.014	3630						

● CASE SIZE & MAX RIPPLE CURRENT

Case size : D x L (mm)
 Max impedance : Ω 20°C 100kHz
 Max ripple current : mA(rms) 105°C 100kHz

μF	V(DC) Item	63			80			100		
		DxL	IMP.	R.C.	DxL	IMP.	R.C.	DxL	IMP.	R.C.
8.2								5x11	1.400	163
12					5x11	1.400	163			
18		5x11	1.000	173				6.3x11	0.570	267
33					6.3x11	0.570	267	8x12	0.360	462
47		6.3x11	0.560	278				8x16	0.250	585
56					8x12	0.360	462	10x12.5	0.230	624
68					8x16	0.250	585	8x20	0.190	735
82		8x12	0.264	525	10x12.5	0.230	624	10x16	0.170	780
100		8x16	0.192	688	8x20	0.190	735	10x20	0.120	1040
								12.5x16	0.130	975
120		10x12.5	0.180	725	10x16	0.170	780	10x25	0.110	1170
150		8x20	0.144	861				12.5x20	0.085	1430
180		10x16	0.132	998	10x20	0.120	1040			
					12.5x16	0.130	975			
220					10x25	0.110	1170	12.5x25	0.060	1620
270		10x20	0.094	1200	12.5x20	0.085	1430	12.5x30	0.051	1950
		12.5x16	0.098	1200				16x20	0.058	1750
330		10x25	0.083	1410	12.5x25	0.060	1620	12.5x35	0.043	2140
390		12.5x20	0.072	1570	12.5x30	0.051	1950	12.5x40	0.036	2340
					16x20	0.058	1750	16x25	0.044	2210
								18x20	0.054	1950
470		12.5x25	0.052	1990	12.5x35	0.043	2140	16x32	0.033	2400
								18x25	0.038	2270
560		12.5x30	0.042	2410	12.5x40	0.036	2340	16x36	0.029	2600
		16x20	0.052	2100	16x25	0.044	2210	18x32	0.031	2470
					18x20	0.054	1950			
680		12.5x35	0.040	2620	16x32	0.033	2400	16x40	0.027	2860
								18x36	0.027	2860
820		12.5x40	0.032	2940	16x36	0.029	2600	18x40	0.026	3510
		16x25	0.038	2730	18x25	0.038	2270			
		18x20	0.046	2500						
1000					16x40	0.027	2860			
					18x32	0.031	2470			
1200		16x32	0.029	2990	18x36	0.027	2860			
		18x25	0.037	2800						
1500		16x36	0.025	3040	18x40	0.026	3510			
		18x32	0.030	3300						
1800		16x40	0.023	3570						
		18x36	0.024	3570						
2200		18x40	0.022	3670						

- High temperature 105°C and high reliability.
- Corresponding product to RoHS

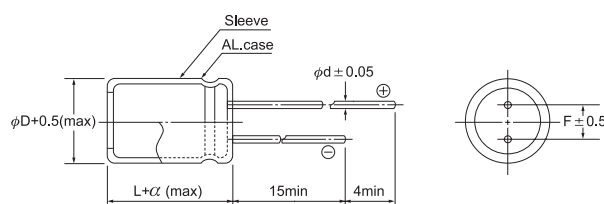


SPECIFICATION

Item	Characteristic				
Operation Temperature Range	-55 ~ +105°C				
Rated Working Voltage	10 ~ 35VDC				
Capacitance Tolerance (120Hz 20°C)	±20%(M)				
Leakage Current (20°C)	I ≤0.01CV or 3 (μA) *Whichever is greater after 2 minutes I : Leakage Current (μA) C : Rated Capacitance (μF) V : Working Voltage (V)				
Surge Voltage (20°C)	W.V.	10	16	25	35
	S.V.	13	20	32	44
Dissipation Factor (tan δ) (120Hz 20°C)	Add 0.02 per 1000 μF for more than 1000 μF				
	W.V.	10	16	25	35
	tan δ	0.20	0.16	0.14	0.12
Low Temperature Stability	Impedance ratio at 120Hz				
	Rated Voltage (V)	10	16	25	35
	-25°C / +20°C	3	2	2	2
	-55°C / +20°C	4	4	4	4
Load Life	After hours (φD≤10mm 6000 hours, φD≥12.5mm 10000 hours, φD≥16mm 20000 hours) application of W.V. and +105°C ripple current value, the capacitor shall meet the following limits. (DC + ripple peak voltage ≤ rate working voltage)				
	Capacitance Change	≤±30% of initial value			
	Dissipation Factor	≤300% of initial specified value			
	Leakage current	≤initial specified value			
Shelf Life	At +105°C no voltage application after 1000 hours, the capacitor shall meet the limits for load life characteristics. (with voltage treatment)				

DIMENSIONS (mm)

ϕD	10	12.5	16	18
F	5.0	5.0	7.5	7.5
d	0.6	0.6	0.8	0.8
α	1.5	2.0	2.0	2.0



RIPPLE CURRENT COEFFICIENTS

Temperature(°C)	≤ 65	85	105
Multiplier	2.12	1.69	1.00

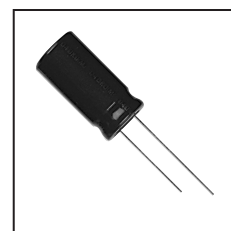
Frequency(Hz)	120	1k	10k	100k
Multiplier	0.75	0.80	0.90	1.00

● CASE SIZE & MAX RIPPLE CURRENT

Case size : D x L (mm)
Max ripple current : mA(rms) 105°C 100kHz

V(DC) Item μF	10		16		25		35	
	DxL	R.C.	DxL	R.C.	DxL	R.C.	DxL	R.C.
1							10x12.5	60
2.2							10x12.5	90
3.3							10x12.5	110
4.7							10x12.5	140
10							10x12.5	300
22							10x12.5	350
33							10x12.5	380
47							10x12.5	420
100					10x12.5	420	10x20	670
220			10x16	520	12.5x20	860	12.5x25	1080
330	10x16	510	10x20	680	12.5x25	1170	16x25	1330
470	10x20	680	12.5x20	1000	16x25	1500	16x32	1690
1000	12.5x25	1050	16x25	1410	16x32	1640	18x40	2170
2200	16x32	1740	18x36	2120				
3300	18x36	2050	18x40	2160				
4700	18x40	2290						

- Smaller case sizes than WG series.
- Lower impedance at high frequency and high ripple current.
- Suitable for output of Motherboard and Switching power supplies.
- Corresponding product to RoHS

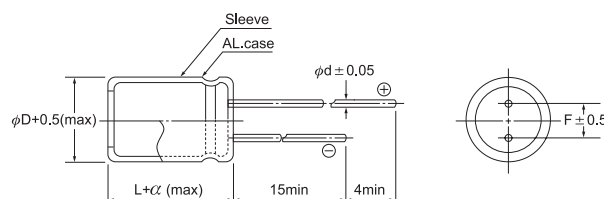


SPECIFICATION

Item	Characteristic						
Operation Temperature Range	-55 ~ +105°C						
Rated Working Voltage	6.3 ~ 50VDC						
Capacitance Tolerance (120Hz 20°C)	±20%(M)						
Leakage Current (20°C)	I ≤0.01CV or 3 (μA) *Whichever is greater after 3 minutes				I : Leakage Current (μA) C : Rated Capacitance (μF) V : Working Voltage (V)		
Surge Voltage (20°C)	W.V.	6.3	10	16	25	35	50
	S.V.	8	13	20	32	44	63
Dissipation Factor (tan δ) (120Hz 20°C)	Add 0.02 per 1000 μF for more than 1000 μF						
	W.V.	6.3	10	16	25	35	50
	tan δ	0.22	0.19	0.16	0.14	0.12	0.10
Low Temperature Stability	Impedance ratio at 120Hz						
	Rated Voltage (V)		6.3~16			25~50	
	-25°C / +20°C		3			2	
	-55°C / +20°C		6			4	
Load Life	After hours (φD≤8mm 1000 hours, φD≥10mm 2000 hours) application of W.V. and +105°C ripple current value, the capacitor shall meet the following limits. (DC + ripple peak voltage ≤ rate working voltage)						
	Capacitance Change	≤ ±20% of initial value					
	Dissipation Factor	≤200% of initial specified value					
	Leakage current	≤initial specified value					
Shelf Life	At +105°C no voltage application after 1000 hours the capacitor shall meet the limits for load life characteristics. (with voltage treatment)						

DIMENSIONS (mm)

ϕD	5	6.3	8	10	12.5	16	18
F	2.0	2.5	3.5	5.0	5.0	7.5	7.5
d	0.5	0.5	0.6	0.6	0.6	0.8	0.8
α	1.5	1.5	1.5	1.5	2.0	2.0	2.0



RIPPLE CURRENT COEFFICIENTS

Temperature(°C)	65	75	85	95	105
Multiplier	2.12	1.92	1.69	1.50	1.00

Frequency(Hz)	60	120	400	1k	10k	100k
W.V.	Multiplier					
6.3~16V	0.45	0.60	0.83	0.94	0.98	1.00
25~35V	0.38	0.50	0.75	0.90	0.97	1.00
50V	0.36	0.46	0.70	0.88	0.94	1.00

● CASE SIZE & MAX RIPPLE CURRENT

Case size : D x L (mm)
 Max impedance : Ω 100kHz
 Max ripple current : mA(rms) 105°C 100kHz

μF	V(DC)	6.3			10				
	Item	DxL	IMP.		R.C.	DxL	IMP.		R.C.
			20°C	-10°C			20°C	-10°C	
100				→	5x11	0.312	0.937	230	
120				→	5x11	0.266	0.798	250	
150		5x11	0.219	0.656	250	5x11	0.218	0.653	
180		5x11	0.190	0.571	270	5x15	0.189	0.568	
				→	6.3x11	0.189	0.568	350	
220		5x11	0.162	0.487	300	5x15	0.161	0.484	
				→	6.3x11	0.161	0.484	390	
270		5x15	0.148	0.444	380	5x15	0.147	0.442	
		6.3x11	0.148	0.444	380	6.3x11	0.147	0.442	
330		5x15	0.130	0.389	420	6.3x15	0.129	0.387	
		6.3x11	0.130	0.389	420	8x11	0.129	0.387	
390		6.3x15	0.117	0.351	520	6.3x15	0.116	0.349	
		8x11	0.117	0.351	530	8x11	0.116	0.349	
470		6.3x15	0.106	0.319	570	6.3x15	0.106	0.317	
		8x11	0.106	0.319	580	8x11	0.106	0.317	
560		6.3x15	0.094	0.283	620	6.3x15	0.094	0.281	
		8x11	0.094	0.283	630	8x11	0.094	0.281	
680		6.3x15	0.084	0.252	680	8x15	0.083	0.250	
		8x11	0.084	0.252	700	10x12.5	0.083	0.250	
820		8x15	0.077	0.230	860	8x15	0.076	0.228	
		10x12.5	0.077	0.230	900	10x12.5	0.076	0.228	
1000		8x15	0.069	0.206	950	8x20	0.068	0.204	
		10x12.5	0.069	0.206	990	10x16	0.068	0.204	
1200		8x20	0.059	0.178	1180	10x20	0.059	0.177	
		10x16	0.059	0.178	1210	12.5x15	0.059	0.148	
1500		10x20	0.036	0.107	1450	10x25	0.035	0.106	
		12.5x15	0.036	0.089	1390	12.5x18	0.035	0.089	
1800		10x20	0.031	0.094	1590	10x25	0.031	0.094	
		12.5x15	0.031	0.078	1520	12.5x18	0.031	0.078	
2200		10x25	0.028	0.083	1880	10x28	0.027	0.082	
		12.5x18	0.028	0.069	1770	16x15	0.027	0.068	
2700		10x28	0.025	0.075	2140	12.5x20	0.025	0.062	
		16x15	0.025	0.063	1870	16x15	0.025	0.062	
3300		12.5x20	0.023	0.058	2150	12.5x25	0.023	0.057	
		16x15	0.023	0.058	2010	18x15	0.023	0.057	
3900		12.5x25	0.022	0.055	2520	12.5x30	0.022	0.055	
		18x15	0.022	0.055	2190	16x20	0.022	0.055	
4700		12.5x30	0.021	0.053	2860	12.5x35	0.021	0.053	
		16x20	0.021	0.053	2520	16x25	0.021	0.053	
5600		12.5x35	0.020	0.050	3060	12.5x40	0.020	0.049	
		16x25	0.020	0.050	2900	18x20	0.020	0.049	
6800		12.5x40	0.019	0.047	3450	16x32	0.019	0.047	
		18x20	0.019	0.047	2850	18x25	0.019	0.047	
8200		16x32	0.018	0.045	3540	16x36	0.018	0.044	
		18x25	0.018	0.045	3260	18x32	0.018	0.044	
10000		16x36	0.017	0.043	3880				
		18x32	0.017	0.043	3740	18x36	0.017	0.042	

All blank voltage on sleeve marking is the same voltage as" → "point to.

● CASE SIZE & MAX RIPPLE CURRENT

Case size : D x L (mm)
 Max impedance : Ω 100kHz
 Max ripple current : mA(rms) 105°C 100kHz

μF	V(DC) Item	16			25				
		DxL	IMP.		R.C.	DxL	IMP.		R.C.
			20°C	-10°C			20°C	-10°C	
47				→	5x11	0.283	0.085	220	
56		5x11	0.253	0.759	190	5x11	0.253	0.758	240
68		5x11	0.221	0.662	210	5x11	0.220	0.661	270
82		5x11	0.203	0.610	230	5x15	0.203	0.609	340
				→	6.3x11	0.203	0.609	330	
100		5x11	0.183	0.550	250	5x15	0.183	0.549	370
				→	6.3x11	0.183	0.549	370	
120		5x15	0.156	0.469	320	5x15	0.156	0.468	410
		6.3x11	0.156	0.469	320	6.3x11	0.156	0.468	400
150		5x15	0.128	0.383	360	6.3x15	0.128	0.383	510
		6.3x11	0.128	0.383	350	8x11	0.128	0.383	520
180		5x15	0.111	0.333	390	6.3x15	0.111	0.333	560
		6.3x11	0.111	0.333	390	8x11	0.111	0.333	570
220		5x15	0.095	0.284	430	6.3x15	0.095	0.284	620
		6.3x11	0.095	0.284	430	8x11	0.095	0.284	630
270		6.3x15	0.086	0.259	550	8x15	0.086	0.259	790
		8x11	0.086	0.259	550	10x12.5	0.086	0.259	830
330		6.3x15	0.076	0.227	600	8x15	0.076	0.227	870
		8x11	0.076	0.227	610	10x12.5	0.076	0.227	910
390		8x15	0.068	0.205	750	8x20	0.068	0.205	1080
		10x12.5	0.068	0.205	790	10x16	0.068	0.205	1100
470		8x15	0.062	0.186	820	8x20	0.062	0.186	1180
		10x12.5	0.062	0.186	860	10x16	0.062	0.186	1210
560		8x20	0.055	0.165	1020	8x20	0.055	0.165	1290
		10x16	0.055	0.165	1050	10x16	0.055	0.165	1320
680		8x20	0.049	0.147	1120	10x20	0.049	0.147	1610
		10x16	0.049	0.147	1150	12.5x15	0.049	0.122	1550
820		8x20	0.045	0.134	1230	10x25	0.045	0.134	1950
		10x16	0.045	0.134	1270	12.5x18	0.045	0.112	1830
1000		10x20	0.040	0.120	1540	10x28	0.040	0.120	2270
		12.5x15	0.040	0.100	1480	16x15	0.040	0.100	1980
1200		10x25	0.035	0.104	1870	12.5x20	0.035	0.104	2320
		12.5x18	0.035	0.087	1750	16x15	0.035	0.087	2170
1500		10x28	0.029	0.088	2100	12.5x25	0.029	0.074	2710
		16x15	0.029	0.074	1830	18x15	0.029	0.074	2480
1800		12.5x20	0.026	0.065	2140	12.5x30	0.026	0.065	3230
		16x15	0.026	0.065	2000	16x20	0.026	0.065	2840
2200		12.5x25	0.023	0.057	2500	12.5x35	0.023	0.057	3470
		18x15	0.023	0.057	2170	16x25	0.023	0.057	3290
2700		12.5x30	0.021	0.052	2890	12.5x40	0.021	0.052	3910
		16x20	0.021	0.052	2540	18x20	0.021	0.052	3240
3300		12.5x35	0.019	0.048	3130	16x32	0.019	0.047	4100
		16x25	0.019	0.048	2970	18x25	0.019	0.047	3770
3900		12.5x40	0.018	0.046	3500	16x36	0.018	0.046	4530
		18x20	0.018	0.046	2900	18x32	0.018	0.046	4360
4700		16x32	0.016	0.040	3560				
		18x25	0.016	0.040	3280	18x36	0.016	0.040	4720
5600		16x36	0.015	0.038	3880				
		18x32	0.015	0.038	3740				

All blank voltage on sleeve marking is the same voltage as " → "point to.

● CASE SIZE & MAX RIPPLE CURRENT

Case size : D x L (mm)
 Max impedance : Ω 100kHz
 Max ripple current : mA(rms) 105°C 100kHz

μF	V(DC)	35			50				
	Item	DxL	IMP.		R.C.	DxL	IMP.		R.C.
			20°C	-10°C			20°C	-10°C	
4.7				→	5x11	1.061	3.182	85	
6.8				→	5x11	0.916	2.749	100	
10		5x11	0.832	2.495	110	5x11	0.831	130	
15		5x11	0.610	1.829	130	5x11	0.609	150	
18		5x11	0.531	1.594	150	5x11	0.531	170	
22		5x11	0.454	1.361	160	5x11	0.453	190	
27		5x11	0.400	1.201	180	5x11	0.400	210	
33		5x11	0.353	1.058	200	5x11	0.353	230	
39		5x11	0.320	0.096	210	5x15	0.320	290	
				→	6.3x11	0.320	0.959	280	
47		5x11	0.283	0.849	230	5x15	0.283	310	
				→	6.3x11	0.283	0.849	310	
56		5x15	0.252	0.757	290	5x15	0.252	340	
		6.3x11	0.252	0.757	290	6.3x11	0.252	340	
68		5x15	0.220	0.660	320	6.3x15	0.220	430	
		6.3x11	0.220	0.660	320	8x11	0.220	430	
82		5x15	0.203	0.608	360	6.3x15	0.203	470	
		6.3x11	0.203	0.608	350	8x11	0.203	480	
100		6.3x15	0.183	0.549	450	8x15	0.183	590	
		8x11	0.183	0.549	450	10x12.5	0.183	620	
120		6.3x15	0.109	0.327	490	8x15	0.109	650	
		8x11	0.109	0.327	500	10x12.5	0.109	680	
150		6.3x15	0.089	0.268	550	8x20	0.089	820	
		8x11	0.089	0.268	550	10x16	0.089	840	
180		8x15	0.078	0.233	680	8x20	0.078	900	
		10x12.5	0.078	0.233	720	10x16	0.078	920	
220		8x15	0.066	0.198	750	8x20	0.066	1000	
		10x12.5	0.066	0.198	790	10x16	0.066	1020	
270		8x20	0.060	0.181	950	10x20	0.060	1250	
		10x16	0.060	0.181	970	12.5x15	0.060	1200	
330		8x20	0.053	0.159	1050	10x25	0.053	1530	
		10x16	0.053	0.159	1080	12.5x18	0.053	1430	
390		10x20	0.048	0.143	1290	10x25	0.048	1660	
		12.5x15	0.048	0.119	1240	12.5x18	0.048	1560	
470		10x20	0.043	0.130	1420	12.5x20	0.043	1790	
		12.5x15	0.043	0.108	1360	16x15	0.043	1680	
560		10x25	0.038	0.115	1710	12.5x25	0.038	2150	
		12.5x18	0.038	0.096	1610	18x15	0.038	1870	
680		10x28	0.034	0.103	1990	12.5x30	0.034	2580	
		16x15	0.034	0.086	1730	16x20	0.034	2260	
820		10x30	0.031	0.094	2250	12.5x35	0.031	2880	
		16x15	0.031	0.078	1900	16x25	0.031	2730	
1000		12.5x25	0.028	0.070	2480	12.5x40	0.028	3390	
		18x15	0.028	0.070	2150	18x20	0.028	2800	
1200		12.5x30	0.024	0.061	2940	16x32	0.024	3660	
		16x20	0.024	0.061	2590	18x25	0.024	3370	
1500		12.5x35	0.021	0.051	3160	16x36	0.021	4040	
		16x25	0.021	0.051	3000	18x32	0.021	3890	
1800		12.5x40	0.018	0.045	3690				
		18x20	0.018	0.045	3050				
2200		16x32	0.016	0.040	3810				
		18x25	0.016	0.040	3510				

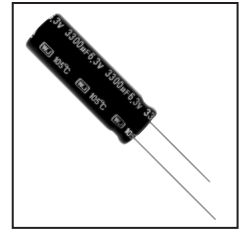
All blank voltage on sleeve marking is the same voltage as" → "point to.

● CASE SIZE & MAX RIPPLE CURRENT

Case size : D x L (mm)
 Max impedance : Ω 100kHz
 Max ripple current : mA(rms) 105°C 100kHz

μF	V(DC) Item	63			
		DxL	IMP.		R.C.
			20°C	-10°C	
10		5x11	0.997	2.991	130
22		5x11	0.544	1.632	190
		6.3x11	0.544	1.632	210
33		5x15	0.423	1.269	260
		6.3x11	0.423	1.269	260
47		8x11	0.339	1.018	360
68		8x15	0.220	0.660	490
100		10x12.5	0.183	0.548	620
220		10x20	0.094	0.283	1130
330		10x30	0.076	0.227	1660
470		12.5x25	0.062	0.155	1970
680		12.5x35	0.039	0.098	2760
1000		16x25	0.032	0.080	3020

- Enabled high ripple current Ultra low impedance at high frequency range.
- For computer motherboard.
- Corresponding product to RoHS

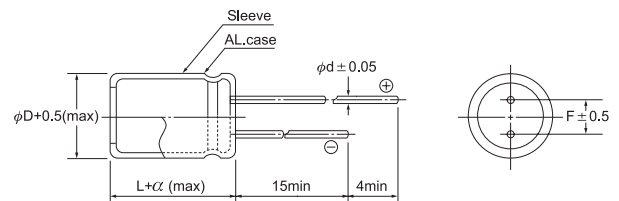


SPECIFICATION

Item	Characteristic				
Operation Temperature Range	-40 ~ +105°C				
Rated Working Voltage	6.3 ~ 25VDC				
Capacitance Tolerance (120Hz 20°C)	±20%(M)				
Leakage Current (20°C)	I ≤0.01CV or 3 (μA) *Whichever is greater after 2 minutes I : Leakage Current (μA) C : Rated Capacitance (μF) V : Working Voltage (V)				
Surge Voltage (20°C)	W.V.	6.3	10	16	25
	S.V.	8	13	20	32
Dissipation Factor (tan δ) (120Hz 20°C)	Add 0.02 per 1000 μF for more than 1000 μF				
	W.V.	6.3	10	16	25
	tan δ	0.22	0.19	0.16	0.16
Low Temperature Stability	Impedance ratio at 120Hz				
	Rated Voltage (V)	6.3	10	16	25
	-25°C / +20°C	2	2	2	2
	-40°C / +20°C	3	3	3	3
Load Life	After 2000 hours application of W.V. and +105°C ripple current value, the capacitor shall meet the following limits. (DC + ripple peak voltage ≤ rate working voltage)				
	Capacitance Change	≤ ±30% of initial value			
	Dissipation Factor	≤200% of initial specified value			
	Leakage current	≤initial specified value			
Shelf Life	At +105°C no voltage application after 1000 hours the capacitor shall meet the limits for load life characteristics. (with voltage treatment)				

DIMENSIONS (mm)

ϕD	5	6.3	8	10	12.5	16
F	2.0	2.5	3.5	5.0	5.0	7.5
d	0.5	0.5	0.6	0.6	0.6	0.8
α	1.5	1.5	1.5	1.5	2.0	2.0



RIPPLE CURRENT COEFFICIENTS

Temperature(°C)	65	75	85	95	105
Multiplier	2.12	1.92	1.69	1.50	1.00

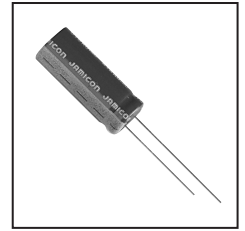
Frequency(Hz)	60	120	400	1k	10k	100k
W.V.	Multiplier					
10~16V	0.45	0.60	0.83	0.94	0.98	1.00
25V	0.38	0.50	0.75	0.90	0.97	1.00

● CASE SIZE & MAX RIPPLE CURRENT

Case size : D x L (mm)
 Max impedance : Ω 20°C 100kHz
 Max ripple current : mA(rms) 105°C 100kHz

μF	V(DC) Item	6.3			10			16			25		
		DxL	IMP.	R.C.	DxL	IMP.	R.C.	DxL	IMP.	R.C.	DxL	IMP.	R.C.
100		5x11	0.099	320	5x11	0.092	340	5x11	0.073	400	5x15	0.047	620
											6.3x11	0.047	610
120		5x11	0.085	350	5x11	0.078	380	5x15	0.062	510	6.3x11	0.040	670
								6.3x11	0.062	500			
150		5x11	0.069	390				5x15	0.051	570	6.3x15	0.033	860
								6.3x11	0.051	560	8x11	0.033	880
180		5x11	0.060	430	5x15	0.056	530	6.3x11	0.044	610	8x11	0.029	960
					6.3x11	0.056	520						
220					5x15	0.042	590				8x11	0.025	1060
					6.3x11	0.042	580						
270		6.3x11	0.047	600	6.3x11	0.038	640	6.3x15	0.035	860	8x15	0.022	1320
								8x11	0.035	880	10x12.5	0.022	1390
330		6.3x11	0.041	660	6.3x15	0.033	810	8x11	0.030	1390	8x15	0.020	1460
					8x11	0.033	830				10x12.5	0.020	1530
390		6.3x15	0.030	830	6.3x15	0.030	890	8x15	0.027	1380	8x20	0.018	1810
		8x11	0.030	850	8x11	0.030	900	10x12.5	0.027	1370	10x16	0.018	1850
470		6.3x15	0.026	910	8x11	0.029	1320	8x15	0.025	1390	8x20	0.019	1980
		8x11	0.026	930				10x12.5	0.025	1770	10x16	0.019	2030
560		8x11	0.023	1320	8x11	0.025	1400	8x20	0.022	1720	10x16	0.022	2220
								10x16	0.022	1760			
680		8x11	0.021	1380	8x15	0.023	1330	8x20	0.020	2250	10x20	0.020	2700
					10x12.5	0.023	1760	10x16	0.020	2250	12.5x15	0.020	2710
820		8x15	0.022	1380	10x12.5	0.022	1770	8x20	0.018	2280	10x25	0.018	2840
		10x12.5	0.022	1350				10x16	0.018	2270	12.5x15	0.018	2620
1000		10x12.5	0.020	1700	8x20	0.020	2250	10x20	0.018	2920	12.5x20	0.021	3150
					10x16	0.020	2270	12.5x15	0.018	2930	16x15	0.021	3170
1200		8x20	0.021	1770	10x20	0.021	2250	10x25	0.017	2950	12.5x20	0.018	3380
		10x16	0.021	1810	12.5x15	0.021	2260	12.5x15	0.017	2680	16x15	0.018	3400
1500		10x20	0.021	2230	10x25	0.021	2290	10x25	0.018	2760	12.5x25	0.015	3650
		12.5x15	0.021	2240	12.5x15	0.021	2260	16x15	0.018	2960			
1800		10x20	0.021	2280	10x25	0.021	2940	12.5x20	0.018	3160	12.5x30	0.013	3980
		12.5x15	0.021	2200	12.5x15	0.021	2770	16x15	0.018	3120	16x20	0.013	4010
2200		10x20	0.021	2980	10x25	0.020	3000	12.5x25	0.018	3130	12.5x35	0.014	4170
		12.5x15	0.021	2720	16x15	0.020	3270				16x25	0.014	4220
2700		10x25	0.021	2920	12.5x20	0.021	3150	12.5x30	0.017	3370	12.5x40	0.012	4600
		16x15	0.021	3070	16x15	0.021	3230	16x20	0.017	3320			
3300		12.5x20	0.019	3190	12.5x25	0.021	3330	12.5x35	0.017	3500	16x32	0.013	4810
		16x15	0.019	3150				16x25	0.019	3640			
3900		12.5x25	0.018	3170	12.5x30	0.020	3370	12.5x40	0.019	3980	16x36	0.013	5100
		18x15	0.018	3170	16x20	0.020	3330						
4700		12.5x30	0.016	3160	12.5x35	0.019	3360	16x32	0.018	4200			
		16x20	0.016	3240	16x25	0.019	3310						

- High ripple current, low E.S.R. and long life.
- Suitable for output of switching power supplies.
- Corresponding product to RoHS

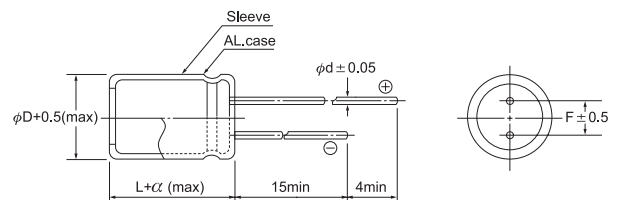


SPECIFICATION

Item	Characteristic							
Operation Temperature Range	-55 ~ +105°C							
Rated Working Voltage	10 ~ 100VDC							
Capacitance Tolerance (120Hz 20°C)	±20%(M) +50% -10%(T)							
Leakage Current (20°C)	I ≤0.01CV *after 3 minutes				I : Leakage Current (μA) C : Rated Capacitance (μF) V : Working Voltage (V)			
Surge Voltage (20°C)	W.V.	10	16	25	35	50	63	100
	S.V.	13	20	32	44	63	79	125
Dissipation Factor (tan δ) (120Hz 20°C)	Add 0.02 per 1000 μF for more than 1000 μF							
	W.V.	10	16	25	35	50	63	100
	tan δ	0.12	0.10	0.09	0.08	0.07	0.06	0.06
Low Temperature Stability	Impedance ratio at 120Hz							
	Rated Voltage (V)		10~16			25~100		
	-25°C / +20°C		3			2		
	-55°C / +20°C		6			4		
Load Life	After hours (φD≤8mm 2000 hours, φD≥10mm 3000 hours) application of W.V. and +105°C ripple current value, the capacitor shall meet the following limits. (DC + ripple peak voltage ≤ rate working voltage)							
	Capacitance Change	≤±20% of initial value						
	Dissipation Factor	≤200% of initial specified value						
	Leakage current	≤initial specified value						
Shelf Life	At +105°C no voltage application after 1000 hours the capacitor shall meet the following limits. (with voltage treatment)							
	Capacitance Change	≤±20% of initial value						
	Dissipation Factor	≤200% of initial specified value						
	Leakage current	≤200% of initial specified value						

DIMENSIONS (mm)

ϕD	8	10	12.5	16	18
F	3.5	5.0	5.0	7.5	7.5
d	0.6	0.6	0.6	0.8	0.8
α	1.5	1.5	2.0	2.0	2.0



RIPPLE CURRENT COEFFICIENTS

Temperature(°C)	65	75	85	95	105
Multiplier	2.12	1.92	1.69	1.50	1.00

Frequency(Hz)	60	120	400	1k	10k	100k
W.V.	Multiplier					
10~16V	0.45	0.60	0.83	0.94	0.98	1.00
25~35V	0.38	0.50	0.75	0.90	0.97	1.00
50~100V	0.36	0.46	0.70	0.88	0.94	1.00

● CASE SIZE & MAX RIPPLE CURRENT

Case size : D x L (mm)
 Max impedance : Ω 20°C 100kHz
 Max ripple current : A(rms) 105°C 100kHz

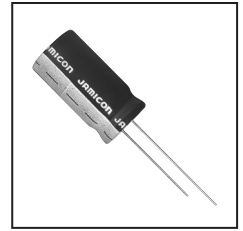
μF	V(DC) Item	10			16			25		
		DxL	IMP.	R.C.	DxL	IMP.	R.C.	DxL	IMP.	R.C.
100				→	8x11	0.348	0.27	8x11	0.330	0.34
220		8x11	0.190	0.36	8x15	0.180	0.44	10x16	0.170	0.59
330		8x15	0.152	0.50	10x16	0.144	0.57	10x18	0.136	0.76
470		10x16	0.124	0.62	10x18	0.118	0.71	10x20	0.112	0.95
680		10x18	0.098	0.78	10x20	0.093	0.90	12.5x20	0.088	1.21
1000		10x20	0.080	1.00	12.5x20	0.076	1.16	12.5x25	0.072	1.62
2200		12.5x25	0.046	1.61	12.5x30	0.043	1.89	12.5x40	0.041	2.70
3300		12.5x30	0.038	2.00	12.5x40	0.036	2.44	16x40	0.034	3.04
4700		12.5x40	0.032	2.50	16x40	0.031	2.64			

All blank voltage on sleeve marking is the same voltage as " → " point to.

μF	V(DC) Item	35			50		
		DxL	IMP.	R.C.	DxL	IMP.	R.C.
47				→	8x11	0.453	0.29
68		8x11	0.374	0.30	8x15	0.352	0.39
100		8x15	0.311	0.40	10x16	0.292	0.49
220		10x18	0.161	0.66	10x20	0.151	0.80
330		10x25	0.129	0.93	12.5x20	0.121	1.04
470		12.5x20	0.105	1.07	12.5x25	0.099	1.37
680		12.5x25	0.083	1.42	12.5x30	0.078	1.79
1000		12.5x30	0.068	1.87	12.5x40	0.064	2.48
2200		16x40	0.039	2.83			

μF	V(DC) Item	63			100		
		DxL	IMP.	R.C.	DxL	IMP.	R.C.
47		8x15	0.424	0.35	10x25	0.368	0.44
68		10x16	0.330	0.43	12.5x20	0.286	0.51
100		10x18	0.274	0.55	12.5x25	0.238	0.68
220		12.5x20	0.142	0.92	16x36	0.123	1.19
330		12.5x25	0.113	1.24	18x40	0.098	1.64
470		12.5x30	0.093	1.61			
680		16x36	0.073	2.09			

- Low impedance and long life with standing 5000 hours load life.
- Suitable for electronic ballast, adaptor and switching power.
- Corresponding product to RoHS

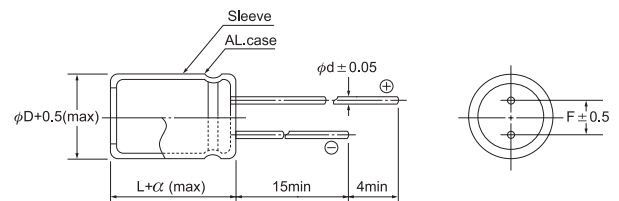


SPECIFICATION

Item	Characteristic							
Operation Temperature Range	-40 ~ +105°C							
Rated Working Voltage	6.3 ~ 63VDC							
Capacitance Tolerance (120Hz 20°C)	±20%(M)							
Leakage Current (20°C)	I ≤0.01CV or 3 (μA) Whichever is greater after 2 minutes				I : Leakage Current (μA) C : Rated Capacitance (μF) V : Working Voltage (V)			
Surge Voltage (20°C)	W.V.	6.3	10	16	25	35	50	63
	S.V.	8	13	20	32	44	63	79
Dissipation Factor (tan δ) (120Hz 20°C)	Add 0.02 per 1000 μF for more than 1000 μF							
	W.V.	6.3	10	16	25	35	50	63
	tan δ	0.22	0.19	0.16	0.14	0.12	0.10	0.09
Low Temperature Stability	Impedance ratio at 120Hz							
	Rated Voltage (V)	6.3	10	16	25	35	50	63
	-25°C / +20°C	2	2	2	2	2	2	2
	-40°C / +20°C	3	3	3	3	3	3	3
Load Life	After hours (φ5~6.3mm 2000 hours, φ8mm 3000 hours, φD≥10mm 5000 hours) application of W.V. and +105°C ripple current value, the capacitor shall meet the following limits. (DC + ripple peak voltage ≤ rate working voltage)							
	Capacitance Change	≤ ±25% of initial value						
	Dissipation Factor	≤200% of initial specified value						
	Leakage current	≤initial specified value						
Shelf Life	At + 105°C no voltage application after 1000 hours the capacitor shall meet the following limits. (with voltage treatment)							
	Capacitance Change	≤ ±20% of initial value						
	Dissipation Factor	≤200% of initial specified value						
	Leakage current	≤200% of initial specified value						

DIMENSIONS (mm)

φD	5	6.3	8	10	12.5	16
F	2.0	2.5	3.5	5.0	5.0	7.5
d	0.5	0.5	0.6	0.6	0.6	0.8
α	1.5	1.5	1.5	1.5	2.0	2.0



RIPPLE CURRENT COEFFICIENTS

Temperature(°C)	65	75	85	95	105
Multiplier	2.12	1.92	1.69	1.50	1.00

Frequency(Hz)	60	120	400	1k	10k	100k
W.V.	Multiplier					
6.3~16V	0.45	0.60	0.83	0.94	0.98	1.00
25~35V	0.38	0.50	0.75	0.90	0.97	1.00
50~63V	0.36	0.46	0.70	0.88	0.94	1.00

● CASE SIZE & MAX RIPPLE CURRENT

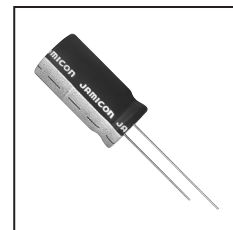
Case size : D x L (mm)
 Max impedance : Ω 20°C 100kHz
 Max ripple current : A(rms) 105°C 100kHz

μF	V(DC) ϕD	6.3			10			16		
		DxL	IMP.	R.C.	DxL	IMP.	R.C.	DxL	IMP.	R.C.
10								5x11	1.300	0.09
56								5x11	0.300	0.25
100		5x11	0.300	0.25	5x11	0.300	0.25	6.3x11	0.250	0.36
120		6.3x11	0.280	0.26	6.3x11	0.280	0.26	6.3x11	0.130	0.41
220		6.3x11	0.130	0.41	6.3x11	0.130	0.41	8x11	0.120	0.58
330		8x11	0.110	0.54	8x11	0.110	0.54	8x11	0.072	0.76
470	8x11	0.072	0.76	8x11	0.072	0.76	8x11	8x15	0.056	1.00
								10x12.5	0.053	1.03
680	8x15	0.056	1.00	8x15	0.056	1.00	8x20	8x20	0.041	1.25
								10x16	0.038	1.43
820	8x20	0.050	1.05	8x20	0.050	1.05	10x20	10x20	0.036	1.45
1000	8x20	0.041	1.25	8x20	0.041	1.25	10x20	10x20	0.023	1.82
1200	10x16	0.038	1.43	10x16	0.038	1.43	10x25	10x25	0.022	2.15
1500	10x20	0.023	1.82	10x20	0.023	1.82	12.5x20	0.021	2.36	2.77
2200	12.5x20	0.021	2.36	12.5x20	0.021	2.36	12.5x25	0.018	3.40	
3300	12.5x25	0.018	2.77	12.5x25	0.018	2.77	12.5x35	0.015	3.46	
3900	12.5x30	0.016	3.29	12.5x30	0.016	3.29	16x25	0.016	3.46	
4700	16x20	0.018	3.14	16x20	0.018	3.14				
5600	12.5x35	0.015	3.40	12.5x35	0.015	3.40				
	16x25	0.016	3.46	16x25	0.016	3.46				

μF	V(DC) ϕD	25			35		
		DxL	IMP.	R.C.	DxL	IMP.	R.C.
10		5x11	1.030	0.13	5x11	0.800	0.17
33		5x11	0.500	0.21	5x11	0.300	0.25
47		5x11	0.300	0.25	6.3x11	0.280	0.27
56		5x11	0.280	0.26	6.3x11	0.130	0.41
100		6.3x11	0.130	0.41	8x11	0.125	0.50
120		6.3x15	0.130	0.49	8x11	0.120	0.59
150		8x11	0.110	0.54	8x11	0.072	0.76
220	8x11	0.072	0.76	8x15	0.056	1.00	
				10x12.5	0.053	1.03	
330	8x15	0.056	1.00	10x16	0.038	1.43	
							10x12.5
470	8x20	0.041	1.25	10x20	0.023	1.82	
							10x16
560	10x20	0.036	1.50	10x25	0.022	2.15	
680	10x20	0.023	1.82	12.5x20	0.021	2.36	
820	10x25	0.022	2.15	12.5x20	0.020	2.45	
1000	12.5x20	0.021	2.36	12.5x25	0.018	2.77	
1200	12.5x20	0.019	2.46	12.5x30	0.016	3.29	
				16x20	0.018	3.14	
1500	12.5x25	0.018	2.77	12.5x35	0.015	3.40	
1800	12.5x30	0.016	3.29	16x25	0.016	3.46	
	16x20	0.018	3.14				
2200	12.5x35	0.015	3.40				

μF	V(DC) ϕD	50			63		
		DxL	IMP.	R.C.	DxL	IMP.	R.C.
22		5x11	0.340	0.24	6.3x11	0.726	0.22
33		6.3x11	0.320	0.28	6.3x15	0.564	0.30
47		6.3x11	0.310	0.34	8x11	0.453	0.38
56		6.3x11	0.140	0.39	8x11	0.404	0.42
100		8x11	0.074	0.72	10x16	0.264	0.54
120		8x15	0.061	0.95	10x16	0.220	0.73
150		10x12.5	0.061	0.98	10x16	0.187	0.80
180		8x20	0.046	1.19	10x20	0.153	0.90
220		10x16	0.042	1.37	10x25	0.133	1.08
330		10x25	0.028	1.87	12.5x20	0.113	1.33
470		12.5x20	0.027	2.05	12.5x25	0.091	1.66
560		12.5x25	0.023	2.41	16x25	0.074	2.19
680		12.5x30	0.021	2.86	16x25	0.059	2.24
820	12.5x35	0.019	2.96	16x32	0.054	2.72	
	16x20	0.023	2.73				
1000	16x25	0.021	3.01	16x36	0.048	3.17	

- Low impedance and long life with standing 5000 hours load life.
- Suitable for electronic ballast, adaptor and switching power.
- Corresponding product to RoHS

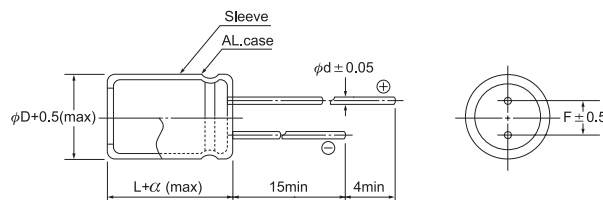


SPECIFICATION

Item	Characteristic							
Operation Temperature Range	-55 ~ +105°C							
Rated Working Voltage	6.3 ~ 63VDC							
Capacitance Tolerance (120Hz 20°C)	±20%(M)							
Leakage Current (20°C)	I ≤0.01CV or 3 (μA) Whichever is greater after 2 minutes						I : Leakage Current (μA) C : Rated Capacitance (μF) V : Working Voltage (V)	
Surge Voltage (20°C)	W.V.	6.3	10	16	25	35	50	63
	S.V.	8	13	20	32	44	63	79
Dissipation Factor (tan δ) (120Hz 20°C)	Add 0.02 per 1000 μF for more than 1000 μF							
	W.V.	6.3	10	16	25	35	50	63
	tan δ	0.22	0.19	0.16	0.14	0.12	0.10	0.09
Low Temperature Stability	Impedance ratio at 120Hz							
	Rated Voltage (V)	6.3	10	16	25	35	50	63
	-25°C / +20°C	2	2	2	2	2	2	2
	-55°C / +20°C	3	3	3	3	3	3	3
Load Life	After hours (φ5~6.3mm 2000 hours, φ8mm 3000 hours, φD≥10mm 5000 hours) application of W.V. and +105°C ripple current value, the capacitor shall meet the following limits. (DC + ripple peak voltage ≤ rate working voltage)							
	Capacitance Change	≤ ±20% of initial value						
	Dissipation Factor	≤200% of initial specified value						
	Leakage current	≤initial specified value						
Shelf Life	At + 105°C no voltage application after 1000 hours the capacitor shall meet the following limits. (with voltage treatment)							
	Capacitance Change	≤ ±20% of initial value						
	Dissipation Factor	≤150% of initial specified value						
	Leakage current	≤200% of initial specified value						

DIMENSIONS (mm)

ϕD	5	6.3	8	10	12.5	16	18
F	2.0	2.5	3.5	5.0	5.0	7.5	7.5
d	0.5	0.5	0.6	0.6	0.6	0.8	0.8
α	1.5	1.5	1.5	1.5	2.0	2.0	2.0



RIPPLE CURRENT COEFFICIENTS

Temperature(°C)	65	75	85	95	105
Multiplier	2.12	1.92	1.69	1.50	1.00

Frequency(Hz)	60	120	400	1k	10k	100k
W.V.	Multiplier					
6.3~16V	0.45	0.60	0.83	0.94	0.98	1.00
25~35V	0.38	0.50	0.75	0.90	0.97	1.00
50~63V	0.36	0.46	0.70	0.88	0.94	1.00

● CASE SIZE & MAX RIPPLE CURRENT

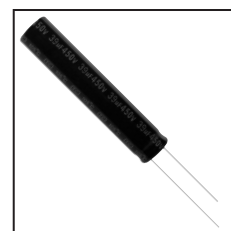
Case size : D x L (mm)
 Max impedance : Ω 100kHz
 Max ripple current : A(rms) 105°C 100kHz

μF	V(DC) ϕD	6.3			10			16		
		DxL	IMP.		DxL	IMP.		DxL	IMP.	
			20°C	-10°C		20°C	-10°C		20°C	-10°C
47								5x11	0.568	1.421
68								5x11	0.500	1.250
100					5x11	0.500	1.250	6.3x11	0.367	0.918
220		6.3x11	0.308	0.769	6.3x11	0.249	0.623	8x11	0.190	0.474
330		6.3x11	0.246	0.615	8x11	0.169	0.423	10x12.5	0.114	0.285
470		8x11	0.178	0.446	8x11	0.139	0.346	10x12.5	0.093	0.233
680		10x12.5	0.081	0.203	10x12.5	0.077	0.194	10x16	0.074	0.184
1000		8x20	0.066	0.166	10x16	0.063	0.158	10x20	0.060	0.150
1200		10x16	0.058	0.144	10x20	0.055	0.137	10x25	0.052	0.130
1500		10x20	0.049	0.123	10x25	0.047	0.116	12.5x20	0.044	0.111
2200		10x25	0.038	0.094	12.5x20	0.036	0.090	12.5x25	0.034	0.086
3300		12.5x20	0.032	0.079	12.5x25	0.030	0.075	16x25	0.029	0.057
4700		12.5x30	0.027	0.067	16x25	0.025	0.051	16x32	0.024	0.048
6800		16x25	0.024	0.048	16x32	0.023	0.045	18x36	0.022	0.043
10000		16x32	0.022	0.043	18x36	0.021	0.041	18x40	0.019	0.039
15000		18x36	0.020	0.041	18x40	0.019	0.039			

μF	V(DC) ϕD	25			35		
		DxL	IMP.		DxL	IMP.	
			20°C	-10°C		20°C	-10°C
10					5x11	1.498	3.745
22					5x11	0.817	2.043
33					5x11	0.636	1.589
47		5x11	0.539	1.348	6.3x11	0.510	1.275
68		6.3x11	0.419	1.049	6.3x11	0.397	0.991
100		6.3x11	0.349	0.871	8x11	0.330	0.824
220		8x11	0.180	0.450	10x12.5	0.128	0.319
330		10x12.5	0.108	0.270	10x16	0.102	0.255
470		10x16	0.088	0.221	10x20	0.084	0.209
680		10x20	0.070	0.175	12.5x20	0.066	0.165
1000		12.5x20	0.057	0.143	12.5x25	0.054	0.135
1200		12.5x20	0.050	0.124	12.5x30	0.047	0.117
1500		12.5x25	0.042	0.105	16x25	0.040	0.079
2200		16x25	0.032	0.065	16x32	0.031	0.077
3300		16x32	0.027	0.054	18x36	0.026	0.064
4700		18x36	0.023	0.046			

μF	V(DC) ϕD	50			63		
		DxL	IMP.		DxL	IMP.	
			20°C	-10°C		20°C	-10°C
10		5x11	1.331	3.992	5x11	1.331	3.992
22		5x11	0.726	2.177	6.3x11	0.726	1.814
33		6.3x11	0.564	1.411	6.3x15	0.564	1.411
47		6.3x11	0.453	1.132	8x11	0.453	1.132
68		8x11	0.352	0.880	10x12.5	0.264	0.660
100		8x20	0.220	0.549	10x16	0.220	0.549
220		10x16	0.113	0.283	10x25	0.113	0.283
330		10x20	0.091	0.227	12.5x20	0.091	0.227
470		12.5x20	0.074	0.186	12.5x25	0.074	0.186
680		12.5x25	0.059	0.147	16x25	0.059	0.117
1000		16x25	0.048	0.096	16x36	0.048	0.096
1200		16x32	0.042	0.083	18x36	0.042	0.083
1500		16x36	0.035	0.071	18x40	0.035	0.071
2200		18x36	0.027	0.055			
3300		18x40	0.023	0.046			

- 105°C high-temperature and high voltage 400~500WV, life 2000hrs.
- Specially Size, 10~18mm diameter.
- For LCD-TV and LCD-Monitor power.
- Corresponding product to RoHS

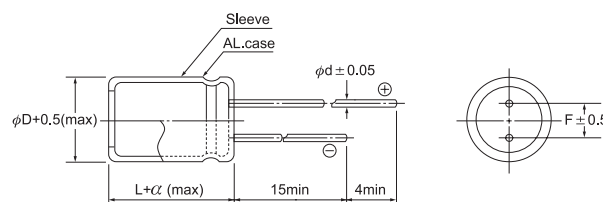


SPECIFICATION

Item	Characteristic			
Operation Temperature Range	-40 ~ +105°C			
Rated Working Voltage	400 ~ 500VDC			
Capacitance Tolerance (120Hz 20°C)	±20%(M)			
Leakage Current (20°C)	I ≤0.03CV + 40 (μA) max Whichever is greater after 3 minutes		I : Leakage Current (μA) C : Rated Capacitance (μF) V : Working Voltage (V)	
Surge Voltage (20°C)	W.V.	400	450	500
	S.V.	450	500	550
Dissipation Factor (tan δ) (120Hz 20°C)	W.V.	400	450	500
	tan δ	0.20	0.20	0.20
Low Temperature Stability	Impedance ratio at 120Hz			
	Rated Voltage (V)	400	450	500
	-25°C / +20°C	6	15	15
	-40°C / +20°C	10	—	—
Load Life	After 2000 hours application of W.V. and +105°C ripple current value, the capacitor shall meet the following limits. (DC + ripple peak voltage ≤ rate working voltage)			
	Capacitance Change	≤ ±20% of initial value		
	Dissipation Factor	≤200% of initial specified value		
	Leakage current	≤initial specified value		
Shelf Life	At + 105°C no voltage application after 1000 hours. the capacitors shall meet limits for load life characteristics. (With voltage treatment)			

DIMENSIONS (mm)

ϕD	10	12.5	16	18
F	5.0	5.0	7.5	7.5
d	0.6	0.6	0.8	0.8
α	2.0	2.5	2.0	2.0



RIPPLE CURRENT COEFFICIENTS

Temperature(°C)	65	85	105
Multiplier	1.75	1.40	1.00

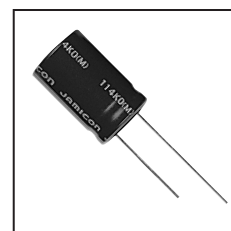
Frequency (Hz)	60	120	1k	$\geq 10k$
W.V.	Multiplier			
400~500	0.70	1.00	1.30	1.80

● CASE SIZE & MAX RIPPLE CURRENT

Case size : D x L (mm)
Max ripple current : mA(rms) 105°C 120Hz

μF	V(DC) Item	400		450		500	
		DxL	R.C.	DxL	R.C.	DxL	R.C.
22		10x30	150	10x35	153	12.5x35	158
33		10x40	192	10x45	198	12.5x45	162
39		10x45	235	10x50	250	12.5x50	168
		12.5x35	250	12.5x40	265		
47		10x50	285	12.5x45	305	16x40	175
		12.5x40	282	16x35	290		
68		12.5x45	340	16x35	490	16x45	180
		16x35	330				
82		12.5x50	365	16x40	490	16x50	190
		16x35	385				
100		16x40	468	16x50	640	18x45	200
120		16x40	550	16x50	650	18x50	220

- High ripple current, low E.S.R. and long life
- Suitable for electronic ballast, adaptor and switching power
- Corresponding product to RoHS

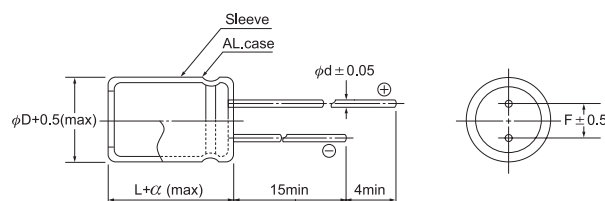


SPECIFICATION

Item	Characteristic						
Operation Temperature Range	-40 ~ +105°C				-25 ~ +105°C		
Rated Working Voltage	160 ~ 400VDC				450VDC		
Capacitance Tolerance (120Hz 20°C)	±20%(M)						
Leakage Current (20°C)	I ≤0.06CV + 10 (μA) Whichever is greater after 2 minutes				I : Leakage Current (μA) C : Rated Capacitance (μF) V : Working Voltage (V)		
Surge Voltage (20°C)	W.V.	160	200	250	400	450	
	S.V.	200	250	300	450	500	
Dissipation Factor (tan δ) (120Hz 20°C)	W.V.	160	200	250	400	450	
	tan δ	0.15	0.15	0.15	0.24	0.24	
Low Temperature Stability	Impedance ratio at 120Hz						
	Rated Voltage (V)		160 ~ 250			400	450
	-25°C / +20°C		3			6	6
	-40°C / +20°C		4			6	—
Load Life	After hours (φD≤8mm 2000 hours, φD≥10mm 3000 hours) application of W.V. and +105°C ripple current value, the capacitor shall meet the following limits. (DC + ripple peak voltage ≤ rate working voltage)						
	Capacitance Change		≤±20% of initial value				
	Dissipation Factor		≤200% of initial specified value				
	Leakage current		≤initial specified value				
Shelf Life	At +105°C, no voltage application after 1000 hours, the capacitor shall meet the limits for load life characteristics. (With voltage treatment)						

DIMENSIONS (mm)

ϕD	10	12.5	16	18
F	5.0	5.0	7.5	7.5
d	0.6	0.6	0.8	0.8
α	1.5	2.0	2.0	2.0



RIPPLE CURRENT COEFFICIENTS

Temperature(°C)	65	75	85	95	105
Multiplier	1.80	1.65	1.50	1.25	1.00

Frequency (Hz)	120	1k	10k	100k
W.V.	Multiplier			
160~450	0.50	0.80	0.90	1.00

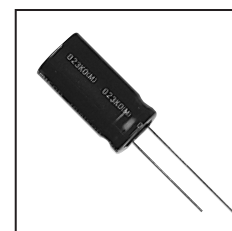
● CASE SIZE & MAX RIPPLE CURRENT

Case size : D x L (mm)
 Max impedance : Ω 20°C 100kHz
 Max ripple current : mA(rms) 105°C 100kHz

μF	V(DC) Item	160			200			250		
		DxL	IMP.	R.C.	DxL	IMP.	R.C.	DxL	IMP.	R.C.
4.7								10x16	3.45	150
10		10x16	1.47	220	10x16	1.47	220	10x20	2.70	240
22		10x20	0.80	350	10x20	0.80	350	12.5x20	1.47	380
33		10x20	0.62	430	12.5x20	0.62	460	12.5x25	1.15	510
47		12.5x20	0.50	550	12.5x25	0.50	610	16x25	0.92	610
68		12.5x20	0.39	660	12.5x25	0.39	730	16x32	0.71	810
100		16x25	0.32	890	16x32	0.32	980	18x36	0.59	1110
220		16x36	0.17	1540	18x36	0.17	1640	18x40	0.31	1730

μF	V(DC) Item	400			450		
		DxL	IMP.	R.C.	DxL	IMP.	R.C.
2.2					10x16	4.94	110
3.3		10x20	2.60	170	10x20	4.11	150
4.7		10x25	2.20	220	12.5x20	3.47	190
10		12.5x25	1.72	340	12.5x25	2.72	300
22		16x25	0.94	510	16x32	1.48	500
33		16x32	0.73	690	16x32	1.15	620
47		16x32	0.59	820	18x32	0.92	780
68		16x32	0.46	990			
100		18x32	0.38	1280			
120		18x36	0.32	1480			
150		18x40	0.26	1740			
180		18x40	0.23	1910			

- High ripple current, low E.S.R. and long life
- Suitable for electronic ballast, adaptor and switching power
- Corresponding product to RoHS

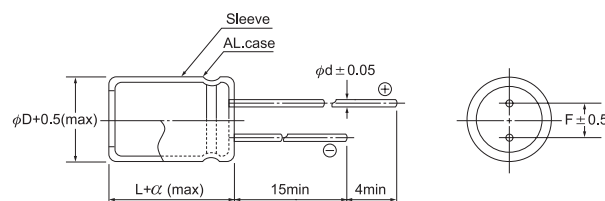


SPECIFICATION

Item	Characteristic							
Operation Temperature Range	-40 ~ +105°C					-25 ~ +105°C		
Rated Working Voltage	160 ~ 400VDC					450VDC		
Capacitance Tolerance (120Hz 20°C)	±20%(M)							
Leakage Current (20°C)	I ≤0.06CV + 10 (μA) Whichever is greater after 2 minutes					I : Leakage Current (μA) C : Rated Capacitance (μF) V : Working Voltage (V)		
Surge Voltage (20°C)	W.V.	160	200	250	350	400	450	
	S.V.	200	250	300	400	450	500	
Dissipation Factor (tan δ) (120Hz 20°C)	W.V.	160	200	250	350	400	450	
	tan δ	0.15	0.15	0.15	0.24	0.24	0.24	
Low Temperature Stability	Impedance ratio at 120Hz							
	Rated Voltage (V)		160 ~ 250			350 ~ 400		450
	-25°C / +20°C		3			6		6
	-40°C / +20°C		4			6		—
Load Life	After hours (φD≤8mm 3000 hours φD≥10mm 5000 hours) application of W.V. and +105°C ripple current value, the capacitor shall meet the following limits. (DC + ripple peak voltage ≤ rate working voltage)							
	Capacitance Change		≤ ±20% of initial value					
	Dissipation Factor		≤200% of initial specified value					
	Leakage current		≤initial specified value					
Shelf Life	At + 105°C no voltage application after 1000 hours. The rated voltage shall be applied to the capacitors for a minimum of 30 minutes, at least 24 hrs and not more than 48 hrs before measurement. Cap & DF shall meet the limits for load life characteristics, Leakage current ≤500% of the initial specified value							

DIMENSIONS (mm)

ϕD	10	12.5	16	18
F	5.0	5.0	7.5	7.5
d	0.6	0.6	0.8	0.8
α	1.5	2.0	2.0	2.0



RIPPLE CURRENT COEFFICIENTS

Temperature(°C)	65	75	85	95	105
Multiplier	1.80	1.65	1.50	1.25	1.00

Frequency (Hz)	120	1k	10k	100k
W.V.	Multiplier			
160~450	0.50	0.80	0.90	1.00

● CASE SIZE & MAX RIPPLE CURRENT

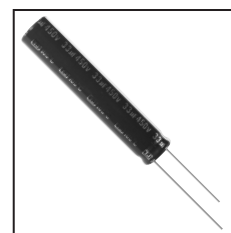
Case size : D x L (mm)
 Max impedance : Ω 20°C 100kHz
 Max ripple current : mA(rms) 105°C 100kHz

μF	V(DC) Item	160			200			250		
		DxL	IMP.	R.C.	DxL	IMP.	R.C.	DxL	IMP.	R.C.
10							→	10x20	3.18	240
22		10x20	1.47	350	10x20	1.47	350	12.5x20	1.74	380
33		10x20	1.15	430	12.5x20	1.15	460	12.5x25	1.35	510
47		12.5x20	0.92	550	12.5x20	0.92	550	12.5x25	1.08	610
68		12.5x25	0.71	730	12.5x25	0.71	730	16x25	0.84	730
100		16x25	0.59	890	16x25	0.59	890	16x32	0.70	980
150		16x32	0.41	1210	16x32	0.41	1210	18x32	0.49	1290
220		16x32	0.31	1460	18x36	0.31	1640	18x40	0.36	1730
330		18x36	0.25	2010						

μF	V(DC) Item	350			400			450		
		DxL	IMP.	R.C.	DxL	IMP.	R.C.	DxL	IMP.	R.C.
3.3							→	10x20	4.47	150
4.7							→	12.5x20	3.77	190
10		10x20	2.94	220	10x20	2.94	290	12.5x25	2.95	300
22		12.5x20	1.60	340	12.5x25	1.60	460	16x25	1.61	450
33		12.5x25	1.25	460	12.5x25	1.25	620	16x32	1.25	620
47		16x25	1.00	560	16x25	1.00	740	18x32	1.01	780
68		16x32	0.78	740	16x32	0.78	990	18x36	0.78	990
100		18x36	0.65	1010	18x36	0.65	1350			

All blank voltage on sleeve marking is the same voltage as" → "point to.

- 105°C high-temperature and high voltage 350~450WV, life 5000hrs.
- Specially Size, 10~16mm diameter.
- For LCD-TV and LCD-Monitor power.
- Corresponding product to RoHS

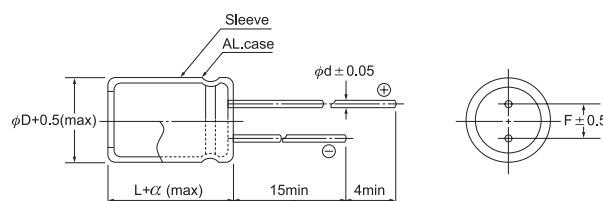


SPECIFICATION

Item	Characteristic			
Operation Temperature Range	-40 ~ +105°C			
Rated Working Voltage	350 ~ 450VDC			
Capacitance Tolerance (120Hz 20°C)	±20%(M)			
Leakage Current (20°C)	I ≤0.06CV + 10 (μA) max Whichever is greater after 2 minutes		I : Leakage Current (μA) C : Rated Capacitance (μF) V : Working Voltage (V)	
Surge Voltage (20°C)	W.V.	350	400	450
	S.V.	400	450	500
Dissipation Factor (tan δ) (120Hz 20°C)	W.V.	350	400	450
	tan δ	0.24	0.24	0.24
Low Temperature Stability	Impedance ratio at 120Hz			
	Rated Voltage (V)	350	400	450
	-25°C / +20°C	6	6	6
	-40°C / +20°C	6	6	—
Load Life	After 5000 hours application of W.V. and +105°C ripple current value, the capacitor shall meet the following limits. (DC + ripple peak voltage ≤ rate working voltage)			
	Capacitance Change	≤ ±20% of initial value		
	Dissipation Factor	≤200% of initial specified value		
	Leakage current	≤initial specified value		
Shelf Life	At + 105°C no voltage application after 1000 hours. the capacitors shall meet the limits for load life characteristics. (With voltage treatment)			

DIMENSIONS (mm)

φD	10	12.5	16
F	5.0	5.0	7.5
d	0.6	0.6	0.8
α	2.0	2.5	2.0



RIPPLE CURRENT COEFFICIENTS

Temperature(°C)	65	75	85	95	105
Multiplier	1.80	1.65	1.50	1.25	1.00

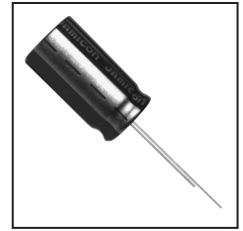
Frequency (Hz)	120	1k	10k	100k
W.V.	Multiplier			
350~450	0.50	0.80	0.90	1.00

CASE SIZE & MAX RIPPLE CURRENT

V(DC)		350		400		450	
μF	Item	DxL	R.C.	DxL	R.C.	DxL	R.C.
33				10x40	260	12.5x35	300
39		12.5x30	270	10x45	300	12.5x40	360
				12.5x35	310		
47		10x45	300	10x50	330	12.5x50	370
		12.5x35	320	12.5x40	350		
68		12.5x45	400	12.5x45	400	16x40	440
		16x30	430	16x35	420		
82		12.5x50	450	16x40	550	16x45	620
		16x35	500				
100		16x40	530	16x45	720	16x50	760

Case size : D x L (mm)
Max ripple current : mA(rms) 105°C 120Hz

- Endurance: 105°C 8,000 to 10,000 Hours
- Suitable for electronic ballast, adaptor and switching power
- Corresponding product to RoHS

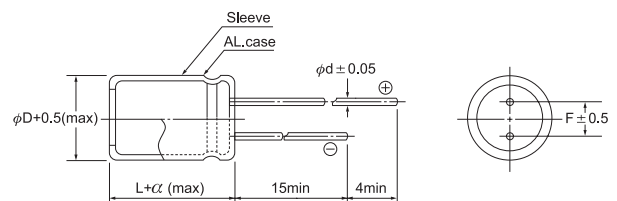


SPECIFICATION

Item	Characteristic						
Operation Temperature Range	-40 ~ +105°C					-25 ~ +105°C	
Rated Working Voltage	160 ~ 400VDC					450VDC	
Capacitance Tolerance (120Hz 20°C)	±20%(M)						
Leakage Current (20°C)	I ≤0.06CV +10 (μA) Whichever is greater after 2 minutes					I : Leakage Current (μA) C : Rated Capacitance (μF) V : Working Voltage (V)	
Surge Voltage (20°C)	W.V.	160	200	250	350	400	450
	S.V.	200	250	300	400	450	500
Dissipation Factor (tan δ) (120Hz 20°C)	W.V.	160	200	250	350	400	450
	tan δ	0.15	0.15	0.15	0.24	0.24	0.24
Low Temperature Stability	Impedance ratio at 120Hz						
	Rated Voltage (V)	160 ~ 250			350 ~ 400		450
	-25°C / +20°C	3			6		6
	-40°C / +20°C	4			6		—
Load Life	After hours (φD=10mm 8000 hours φD≥12.5mm 10000 hours) application of W.V. and +105°C ripple current value, the capacitor shall meet the following limits. (DC + ripple peak voltage ≤ rate working voltage)						
	Capacitance Change	≤ ±20% of initial value					
	Dissipation Factor	≤200% of initial specified value					
	Leakage current	≤initial specified value					
Shelf Life	At + 105°C no voltage application after 1000 hours. the capacitors shall meet the limits for load life characteristics. (With voltage treatment)						

DIMENSIONS (mm)

ϕD	10	12.5	16	18
F	5.0	5.0	7.5	7.5
d	0.6	0.6	0.8	0.8
α	1.5	2.0	2.0	2.0



RIPPLE CURRENT COEFFICIENTS

Temperature(°C)	65	75	85	95	105
Multiplier	1.80	1.65	1.50	1.25	1.00

Frequency (Hz)	120	1k	10k	100k
W.V.	Multiplier			
160~450	0.50	0.80	0.90	1.00

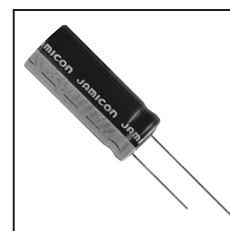
● CASE SIZE & MAX RIPPLE CURRENT

Case size : D x L (mm)
Max ripple current : mA(rms) 105°C 100kHz

μF	V(DC) Item	160		200		250	
		DxL	R.C.	DxL	R.C.	DxL	R.C.
10		10x16	250	10x16	250	10x20	280
22		10x20	500	10x20	500	12.5x20	600
33		10x20	500	12.5x20	600	12.5x20	600
47		12.5x20	660	12.5x20	660	12.5x25	720
						16x20	720
68		12.5x25	760	12.5x25	760	16x25	920
		16x20	760	16x20	760	18x20	920
100		16x25	1120	16x25	1120	16x32	1200
		18x20	1120	18x20	1120	18x25	1200
150		16x32	1360	16x32	1360	18x32	1500
		18x25	1360	18x25	1360		
220		16x32	1400	18x32	1700		
		18x25	1400				

μF	V(DC) Item	350		400		450	
		DxL	R.C.	DxL	R.C.	DxL	R.C.
6.8		10x16	220	10x16	220	10x20	150
10		10x20	280	10x20	280	12.5x20	320
22		12.5x20	350	12.5x25	430	16x25	560
				16x20	430	18x20	560
33		16x20	500	16x25	640	16x32	700
				18x20	640	18x25	700
47		16x25	660	16x32	840	18x32	880
		18x20	660	18x25	840		
68		16x32	850	18x32	1000	18x36	1150
		18x25	850				

- Endurance : 105°C 10000~12000hours
- Recommended Applications : Electronic lighting and power
- Corresponding product to RoHS

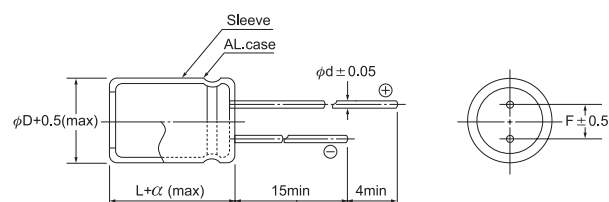


SPECIFICATION

Item	Characteristic						
Operation Temperature Range	-40 ~ +105°C						
Rated Working Voltage	160 ~ 450VDC						
Capacitance Tolerance (120Hz 20°C)	±20% (M)						
Leakage Current (20°C)	I ≦0.04CV + 100 (μA) *Whichever is greater after 2 minutes				I : Leakage Current (μA) C : Rated Capacitance (μF) V : Working Voltage (V)		
Surge Voltage (20°C)	W.V.	160	200	250	350	400	450
	S.V.	200	250	300	400	450	500
Dissipation Factor (tan δ) (120Hz 20°C)	W.V.	160	200	250	350	400	450
	tan δ	0.15	0.15	0.15	0.20	0.20	0.20
Low Temperature Stability	Impedance ratio at 120Hz						
	Rated Voltage (V)	160	200	250	350	400	450
	-25°C / +20°C	3	3	3	5	5	6
	-40°C / +20°C	6	6	6	6	6	8
Load Life	After 10000~12000 hours application of W.V. at +105°C, the capacitor shall meet the following limits. (DC + ripple peak voltage ≦ rate working voltage)						
	Dφ	10φ			≧12.5φ		
	Life (hours)	10000hrs			12000hrs		
	Capacitance Change	≦±20% of initial value					
	Dissipation Factor	≦200% of initial specified value					
	Leakage current	≦initial specified value					
Shelf Life	At +105°C no voltage application after 1000 hours, the capacitor shall meet the limits for load life characteristics. (with voltage treatment)						

DIMENSIONS (mm)

ϕD	10	12.5	16	18
F	5.0	5.0	7.5	7.5
d	0.6	0.6	0.8	0.8
α	1.5	2.0	2.0	2.0



RIPPLE CURRENT COEFFICIENTS

Temperature(°C)	≤ 50	70	85	105
Coefficient	1.90	1.75	1.40	1.00

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

● CASE SIZE & MAX RIPPLE CURRENT

Case size : D x L (mm)
Max ripple current : mA(rms) 105°C 100kHz

μF	V(DC) Item	160		200		250		350	
		DxL	R.C.	DxL	R.C.	DxL	R.C.	DxL	R.C.
6.8								10x16	280
10						10x16	320	10x20	350
15									
22				10x16	500	10x20	500	12.5x20	650
33		10x16	500	10x20	520	12.5x20	800	12.5x25	900
47		10x20	580	12.5x20	660	12.5x20	980	16x25	1000
68		12.5x20	720	12.5x25	720			16x32	1100
100		12.5x25	970	16x25	1120	16x25	1530		
150		16x25	1120	16x32	1620	18x25	1940		
220		16x32	1300	18x32	2080	18x36	2753		
330		18x36	1380			18x50	3912		
390				18x50	3380				
560		18x50	2086						

μF	V(DC) Item	400		450	
		DxL	R.C.	DxL	R.C.
6.8		10x16	140		
10		10x20	180	10x20	180
15				12.5x20	380
22		12.5x20	430	12.5x25	500
33		16x25	520	16x25	560
47		16x32	700	16x36	880
68		18x32	870	16x36	1110
100		18x50	1290	18x50	1560

- 105°C high-temperature and high voltage 350~450WV, life 10000hrs.
- Specially Size, 12.5~16mm diameter.
- For LCD-TV and LCD-Monitor power.
- Corresponding product to RoHS

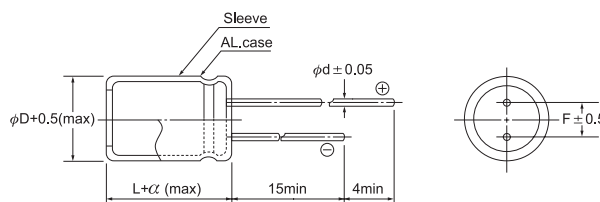


SPECIFICATION

Item	Characteristic			
Operation Temperature Range	-40 ~ +105°C			
Rated Working Voltage	350 ~ 450VDC			
Capacitance Tolerance (120Hz 20°C)	±20%(M)			
Leakage Current (20°C)	I ≤0.06CV +10 (μA) max Whichever is greater after 2 minutes		I : Leakage Current (μA) C : Rated Capacitance (μF) V : Working Voltage (V)	
Surge Voltage (20°C)	W.V.	350	400	450
	S.V.	400	450	500
Dissipation Factor (tan δ) (120Hz 20°C)	W.V.	350	400	450
	tan δ	0.24	0.24	0.24
Low Temperature Stability	Impedance ratio at 120Hz			
	Rated Voltage (V)	350	400	450
	-25°C / +20°C	6	6	6
	-40°C / +20°C	6	6	—
Load Life	After 10000 hours application of W.V. and +105°C ripple current value, the capacitor shall meet the following limits. (DC + ripple peak voltage ≤ rate working voltage)			
	Capacitance Change	≤ ±20% of initial value		
	Dissipation Factor	≤200% of initial specified value		
	Leakage current	≤initial specified value		
Shelf Life	At +105°C no voltage application after 1000 hours, the capacitor shall meet the limits for load life characteristics. (with voltage treatment)			

DIMENSIONS (mm)

ϕD	12.5	16
F	5.0	7.5
d	0.6	0.8
α	2.5	2.0



RIPPLE CURRENT COEFFICIENTS

Temperature(°C)	65	75	85	95	105
Multiplier	1.80	1.65	1.50	1.25	1.00

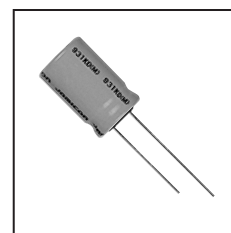
Frequency (Hz)	120	1k	10k	100k
W.V.	Multiplier			
350~450	0.50	0.80	0.90	1.00

CASE SIZE & MAX RIPPLE CURRENT

Case size : D x L (mm)
Max ripple current : mA(rms) 105°C 100kHz

μF	V(DC)	350		400		450	
	Item	DxL	R.C.	DxL	R.C.	DxL	R.C.
33				12.5x30	600	12.5x40	700
39				12.5x35	650	12.5x45	700
47		12.5x35	600	12.5x45	800	12.5x50	880
68		12.5x45	800	12.5x50	900	16x40	1100
82		12.5x50	950	16x40	1100	16x45	1250
100		16x40	1100	16x50	1300	16x50	1550

- High reliability withstanding 2000 hours load life at 125°C.
- Corresponding product to RoHS

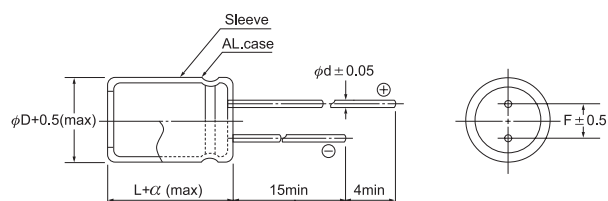


SPECIFICATION

Item	Characteristic					
Operation Temperature Range	-55 ~ +125°C					
Rated Working Voltage	10 ~ 50VDC					
Capacitance Tolerance (120Hz 20°C)	±20%(M)					
Leakage Current (20°C)	I ≤0.01CV or 2 (μA) Whichever is greater after 2 minutes			I : Leakage Current (μA) C : Rated Capacitance (μF) V : Working Voltage (V)		
Surge Voltage (20°C)	W.V.	10	16	25	35	50
	S.V.	13	20	32	44	63
Dissipation Factor (tan δ) (120Hz 20°C)	W.V.	10	16	25	35	50
	tan δ	0.20	0.16	0.14	0.12	0.10
Low Temperature Stability	Impedance ratio at 120Hz					
	Rated Voltage (V)	10	16	25	35	50
	-25°C / +20°C	3	2	2	2	2
	-40°C / +20°C	8	6	4	4	4
Load Life	After 2000 hours application of W.V. and +125°C ripple current value, the capacitor shall meet the following limits. (DC + ripple peak voltage ≤ rate working voltage)					
	Capacitance Change	≤ ±25% of initial value				
	Dissipation Factor	≤200% of initial specified value				
	Leakage current	≤initial specified value				
Shelf Life	At +125°C no voltage application after 1000 hours, the capacitor shall meet the limits for load life characteristics. (with voltage treatment)					

DIMENSIONS (mm)

ϕD	6.3	8	10	12.5
F	2.5	3.5	5.0	5.0
d	0.5	0.6	0.6	0.6
α	1.5	1.5	1.5	2.0



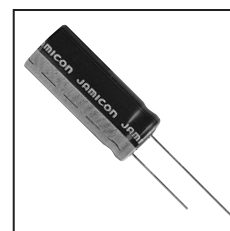
CASE SIZE & MAX RIPPLE CURRENT

Case size : D x L (mm)
Max ripple current : mA(rms) 125°C 120Hz

μF	10		16		25		35		50	
	DxL	R.C.	DxL	R.C.	DxL	R.C.	DxL	R.C.	DxL	R.C.
10								→	8x11	70
22				→	6.3x11	70	8x11	100	8x11	110
33		→	6.3x11	75	8x11	110	8x11	120	8x11	130
47	6.3x11	80	6.3x11	90	8x11	130	8x11	140	8x11	150
100	6.3x11	120	8x11	170	8x11	230	10x12.5	270	10x12.5	290
220	8x11	230	10x12.5	330	10x12.5	460	10x16	530	10x20	590
333	10x12.5	360	10x12.5	400	10x16	620	10x20	720	12.5x20	900
470	10x12.5	430	10x16	530	10x20	820	12.5x20	970	12.5x20	960
1000	10x20	760	12.5x20	970	12.5x25	1170				

All blank voltage on sleeve marking is the same voltage as " → "point to.

- Endurance : 125°C, 2000~5000hrs
- Recommended Applications : Applicable for Electronic Ballast, Lighting Ballast
- Corresponding product to RoHS



SPECIFICATION

Item	Characteristic												
Operation Temperature Range	-40 ~ +125°C						-25 ~ +125°C						
Rated Working Voltage	10 ~ 63VDC						160 ~ 450VDC						
Capacitance Tolerance (120Hz 20°C)	±20% (M)												
Leakage Current (20°C)	I =0.01CV or 3 μA						I =0.1CV+40μA(CV≤1000) I =0.04CV+100μA(CV>1000)						
	Whichever is greater after 2 minutes												
	I : Leakage Current(μA) C : Rated Capacitance(μF) V : Working Voltage(V)												
Surge Voltage (20°C)	W.V.	10	16	25	35	50	63	160	200	250	350	400	450
	S.V.	13	20	32	44	63	79	200	250	300	400	450	500
Dissipation Factor (tan δ) (120Hz 20°C)	Add 0.02 per 1000 μF for more than 1000 μF												
	W.V.	10	16	25	35	50	63	160	200	250	350	400	450
	tan δ	0.19	0.16	0.14	0.12	0.14	0.14	0.20	0.20	0.20	0.24	0.24	0.24
Low Temperature Stability	Impedance ratio at 120Hz												
	Rated Voltage (V)	10	16	25	35	50	63	160	200	250	350	400	450
	-25°C / +20°C	3	2	2	2	2	2	3	3	3	6	6	6
	-40°C / +20°C	6	4	4	4	4	3	—	—	—	—	—	—
Load Life	After 2000~5000 hours application of W.V. at +125°C, the capacitor shall meet the following limits.												
	Rated Voltage Range	10~63VDC						160~450VDC					
	Dφ	8φ		10φ		≥12.5φ		2000hrs					
	Life (hours)	2000hrs		3000hrs		5000hrs							
	Capacitance Change	≤ ±30% of initial value						Within±20% of initial value					
	Dissipation Factor	≤300% of initial specified value						≤200% of initial specified value					
	Leakage current	≤initial specified value						≤initial specified value					
Shelf Life	At +125°C no voltage application after 1000 hours the capacitor shall meet the following limits. (With voltage treatment)												
	Rated Voltage Range	10~63VDC						160~450VDC					
	Capacitance Change	≤ ±30% of initial value						Within±20% of initial value					
	Dissipation Factor	≤300% of initial specified value						≤200% of initial specified value					
	Leakage current	≤500% of initial specified value						≤500% of initial specified value					

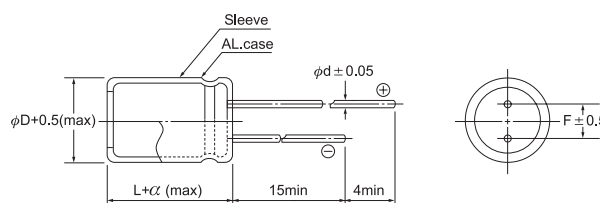
DIMENSIONS (mm)

φD	8	10	12.5	16	18
F	3.5	5.0	5.0	7.5	7.5
d	0.6	0.6	0.6	0.8	0.8
α	1.5	1.5	2.0	2.0	2.0

RIPPLE CURRENT COEFFICIENTS

Temperature(°C)	≤70	85	105	125
Coefficient	1.9	1.75	1.40	1.00

Frequency(Hz)		120	1k	10k	50~100k
10~63WV	CAP ≤ 10	0.40	0.75	0.90	1.00
	10 < CAP ≤ 100	0.50	0.85	0.95	1.00
	100 < CAP ≤ 1000	0.60	0.85	0.96	1.00
	1000 < CAP	0.75	0.90	0.98	1.00
10~63WV	CAP ≤ 33	1.00	1.50	1.75	1.80
	CAP ≤ 47	1.00	1.30	1.40	1.50



● CASE SIZE & MAX RIPPLE CURRENT

Case size : D x L (mm)
Max ripple current : mA(rms) 125°C 100kHz

μF	V(DC) Item	10		16		25	
		DxL	R.C.	DxL	R.C.	DxL	R.C.
100						8x11	340
220		8x11	340	8x11	340	10x12.5	500
330		10x12.5	500	10x12.5	500	10x16	630
470		10x16	630	10x20	770	10x20	770
1000		10x20	770	12.5x20	920	12.5x25	1250
2200		12.5x25	1250	16x25	1380	16x32	1450
3300		16x25	1380	16x32	1450		
4700		16x32	1450	16x32	1720		

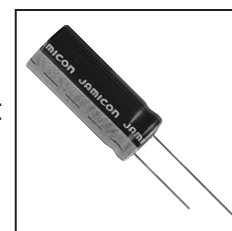
μF	V(DC) Item	35		50		63	
		DxL	R.C.	DxL	R.C.	DxL	R.C.
47				8x11	245	8x11	245
100		10x12.5	340	10x12.5	415	10x15	455
220		10x16	500	10x20	491	12.5x20	665
330		10x20	770	12.5x20	665	12.5x25	995
470		12.5x20	920	12.5x25	995	16x25	1000
1000		16x25	1380	16x32	1280		

Case size : D x L (mm)
Max ripple current : mA(rms) 125°C 120Hz

μF	V(DC) Item	160		200		250	
		DxL	R.C.	DxL	R.C.	DxL	R.C.
2.2						8x11	28
3.3		8x11	28	8x11	28	10x12.5	32
4.7		10x12.5	40	10x12.5	40	10x16	45
10		10x16	60	10x20	78	10x20	78
22		10x20	115	10x25	126	12.5x20	128
33		10x25	154	12.5x20	157	12.5x25	171
47		12.5x20	187	12.5x25	204	16x25	225
68		12.5x25	245	16x20	250	16x32	292
100		16x25	329	16x25	329		
150		16x32	434				

μF	V(DC) Item	350		400		450	
		DxL	R.C.	DxL	R.C.	DxL	R.C.
1.0		8x11	25	10x12.5	28	8x16	25
2.2		10x12.5	32	10x16	35	10x16	32
3.3		10x16	45	10x16	42	10x20	40
4.7		10x20	53	10x20	53	10x25	58
10		10x25	85	10x25	86	12.5x20	86
22		12.5x25	139	12.5x30	142	16x25	154
33		16x25	189	16x25	189	16x32	203
47		16x32	243	16x32	243		

- Endurance : 125°C, 3000~5000hrs
- Recommended Applications : Applicable for Electronic Ballast, Lighting Ballast
- Corresponding product to RoHS

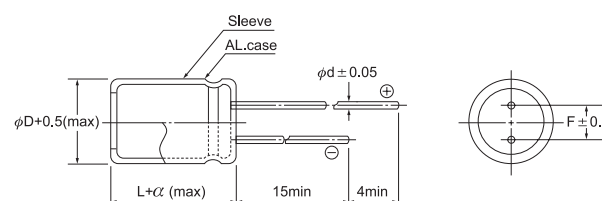


● SPECIFICATION

Item	Characteristic				
Operation Temperature Range	-40 ~ +125°C				
Rated Working Voltage	25 ~ 63VDC				
Capacitance Tolerance (120Hz 20°C)	±20% (M)				
Leakage Current (20°C)	I =0.03CV or 4 μA Whichever is greater after 1 minutes			I : Leakage Current (μA) C : Rated Capacitance (μF) V : Working Voltage (V)	
Surge Voltage (20°C)	W.V.	25	35	50	63
	S.V.	32	44	63	79
Dissipation Factor (tan δ) (120Hz 20°C)	Add 0.02 per 1000 μF for more than 1000 μF				
	W.V.	25	35	50	63
	tan δ	0.14	0.12	0.14	0.14
Low Temperature Stability	Impedance ratio at 120Hz				
	Rated Voltage (V)	25	35	50	63
	-25°C / +20°C	2	2	2	2
	-40°C / +20°C	4	4	4	4
Load Life	After 3000~5000 hours application of W.V. at +125°C, the capacitor shall meet the following limits. (DC + ripple peak voltage ≤ rate working voltage)				
	L(height)	L≤20mm		L≥25mm	
	Life	3000hrs		5000hrs	
	Capacitance Change	≤±30% of initial value			
	Dissipation Factor	≤300% of initial specified value			
	Leakage current	≤initial specified value			
Shelf Life	At +125°C no voltage application after 1000 hours, the capacitor shall meet the limits for load life characteristics. (with voltage treatment)				

● DIMENSIONS (mm)

ϕD	12.5	16	18
F	5.0	7.5	7.5
d	0.6	0.8	0.8
α	2.0	2.0	2.0



● RIPPLE CURRENT COEFFICIENTS

Temperature(°C)	≤ 70	85	105	125
Coefficient	1.9	1.75	1.40	1.00

Frequency(Hz)		120	1k	10k	100k
25~63VV	CAP:47~560 μF	0.50	0.85	0.94	1.00
	CAP:620~1800 μF	0.60	0.87	0.95	1.00
	CAP:2200~3900 μF	0.75	0.90	0.95	1.00
	CAP:4700~6800 μF	0.85	0.95	0.98	1.00

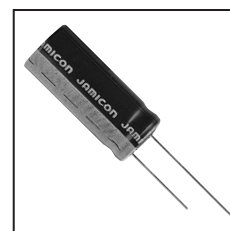
● CASE SIZE & MAX RIPPLE CURRENT

Case size : D x L (mm)
 Max impedance : Ω 20°C 100kHz
 Max ripple current : mA(rms) 125°C 100kHz

μF	V(DC) Item	25			35			50		
		DxL	IMP.	R.C.	DxL	IMP.	R.C.	DxL	IMP.	R.C.
470								12.5x20	0.095	1500
680					12.5x20	0.046	1820	12.5x25	0.078	1900
820								16x20	0.073	2040
1000					12.5x25	0.040	2280	12.5x35	0.064	2510
								16x25	0.061	2620
								18x20	0.069	2240
1200		12.5x20	0.046	1820	12.5x30	0.031	2560	12.5x40	0.058	2870
					16x20	0.036	2280	16x30	0.057	2940
								18x25	0.059	2750
1500					12.5x35	0.027	2970	16x36	0.053	3300
					18x20	0.036	2490			
1800		12.5x25	0.040	2280	12.5x40	0.023	3340	18x30	0.056	3140
		16x20	0.036	2280	16x25	0.028	2860			
2200		13x30	0.031	2560	16x30	0.025	3160	16x40	0.050	3720
					18x25	0.026	3010	18x36	0.052	3510
2700		12.5x35	0.027	2970	16x36	0.022	3590	18x40	0.048	3940
		16x25	0.028	2860	18x30	0.022	3390			
		18x20	0.036	2490						
3300		12.5x40	0.023	3340	16x40	0.018	3970			
		16x30	0.025	3160	18x36	0.020	3840			
3900		16x36	0.022	3590						
		18x25	0.026	3010						
4700		18x30	0.022	3390	18x40	0.017	4230			
5600		16x40	0.018	3970						
		18x36	0.020	3840						
6800		18x40	0.017	4230						

μF	V(DC) Item	63		
		DxL	IMP.	R.C.
470		16x20	0.105	1790
680		16x25	0.085	2030
		18x20	0.095	1910
820		16x30	0.073	2330
1000		16x36	0.064	2580
		18x25	0.069	2280
1200		16x40	0.056	2900
		18x30	0.061	2580
1500		18x36	0.055	2890
1800		18x40	0.050	3210

- Endurance : 130°C, 1000~4000hrs
- Recommended Applications : Applicable for Electronic Ballast, Lighting Ballast
- Corresponding product to RoHS

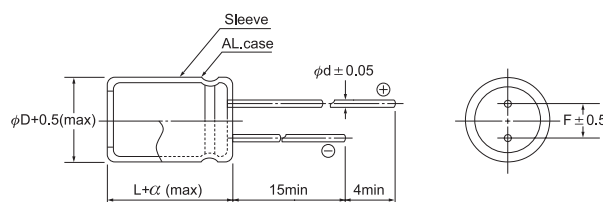


SPECIFICATION

Item	Characteristic					
Operation Temperature Range	-40 ~ +130°C					
Rated Working Voltage	10 ~ 50VDC					
Capacitance Tolerance (120Hz 20°C)	±20% (M)					
Leakage Current (20°C)	I =0.03CV or 4 μA			I : Leakage Current (μA)		
	Whichever is greater after 1 minutes			C : Rated Capacitance (μF)		
				V : Working Voltage (V)		
Surge Voltage (20°C)	W.V.	10	16	25	35	50
	S.V.	13	20	32	44	63
Dissipation Factor (tan δ) (120Hz 20°C)	Add 0.02 per 1000 μF for more than 1000 μF					
	W.V.	10	16	25	35	50
	tan δ	0.20	0.16	0.14	0.12	0.10
Low Temperature Stability	Impedance ratio at 120Hz					
	Rated Voltage (V)	10	16	25	35	50
	-25°C / +20°C	3	2	2	2	2
	-40°C / +20°C	6	4	4	4	4
Load Life	After 1000~4000 hours application of W.V. at +130°C, the capacitor shall meet the following limits. (DC + ripple peak voltage ≤ rate working voltage)					
	Dφ	5~6.3φ		8~10φ		≥12.5φ
	Life	1000hrs		2000hrs		4000hrs
	Capacitance Change	≤±30% of initial value				
	Dissipation Factor	≤300% of initial specified value				
	Leakage current	≤initial specified value				
Shelf Life	At +130°C no voltage application after 1000 hours, the capacitor shall meet the limits for load life characteristics. (with voltage treatment)					

DIMENSIONS (mm)

ϕD	5	6.3	8	10	12.5	16	18
F	2.0	2.5	3.5	5.0	5.0	7.5	7.5
d	0.5	0.5	0.6	0.6	0.6	0.8	0.8
α	1.5	1.5	1.5	1.5	2.0	2.0	2.0



RIPPLE CURRENT COEFFICIENTS

Temperature(°C)	≤ 70	85	105	130
Coefficient	1.9	1.75	1.40	1.00

Frequency(Hz)		120	1k	10k	$\geq 100k$
10~50WV	22~47 μF	0.55	0.75	0.90	1.00
	68~330 μF	0.70	0.85	0.95	1.00
	470~1500 μF	0.75	0.90	0.98	1.00
	2200~4700 μF	0.80	0.95	1.00	1.00

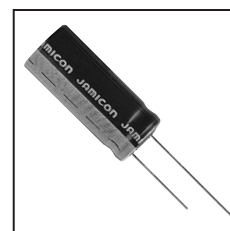
● CASE SIZE & MAX RIPPLE CURRENT

Case size : D x L (mm)
Max ripple current : mA(rms) 130°C 100kHz

μ F	V(DC) Item	10		16		25		35	
		DxL	R.C.	DxL	R.C.	DxL	R.C.	DxL	R.C.
47						5x11	130		
68						6.3x11	170		
100								8x11	360
220						8x11	360	10x12.5	620
330		8x11	360	8x11	360	10x12.5	620	10x16	800
470		10x12.5	620	10x12.5	620	10x20	800	10x20	960
1000		10x20	960	10x20	960	12.5x25	1100	10x12.5	1430
2200		12.5x25	1430	12.5x25	1430	16x30	2300	16x35	2550
3300		16x25	1900	16x30	2300	16x35	2500	18x35	2800
4700		16x30	2300	16x35	2550				

μ F	V(DC) Item	50	
		DxL	R.C.
22		5x11	200
33		6.3x11	250
47		8x11	300
		6.3x12	260
100		10x12.5	520
220		10x20	890
330		12.5x20	1000
470		12.5x25	1200
1000		16x30	2180
2200		18x40	2800

- Endurance : 105°C, 12000~20000hrs
- Recommended Applications : For LED Lighting
- Corresponding product to RoHS

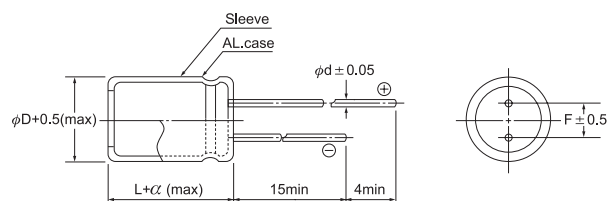


SPECIFICATION

Item	Characteristic			
Operation Temperature Range	-40 ~ +105°C			
Rated Working Voltage	160 ~ 400VDC			
Capacitance Tolerance (120Hz 20°C)	±20% (M)			
Leakage Current (20°C)	CV≤1000	CV > 1000	I : Leakage Current (μA) C : Rated Capacitance (μF) V : Working Voltage (V)	
	I =0.1CV+40 μA(1 minute)	I =0.04CV+100 μA(1 minute)		
	I =0.03CV+15 μA(5 minute)	I =0.02CV+25 μA(5 minute)		
Surge Voltage (20°C)	W.V.	160	200	400
	S.V.	200	250	450
Dissipation Factor (tan δ) (120Hz 20°C)	W.V.	160	200	400
	tan δ	0.24	0.24	0.24
Low Temperature Stability	Impedance ratio at 120Hz			
	Rated Voltage (V)	160	200	400
	-25°C / +20°C	3	3	6
	-40°C / +20°C	8	8	10
Load Life	After 12000~20000 hours application of W.V. at +105°C, the capacitor shall meet the following limits. (DC + ripple peak voltage ≤ rate working voltage)			
	φDxL	6.3x11, 8x9,10x9	8x11,10x12.5	10x16
	Life	12000hrs	15000hrs	20000hrs
	Capacitance Change	≤ ±30% of initial value		
	Dissipation Factor	≤300% of initial specified value		
	Leakage current	≤initial specified value		
Shelf Life	At +105°C no voltage application after 1000 hours, the capacitor shall meet the limits for load life characteristics. (with voltage treatment)			

DIMENSIONS (mm)

φD	6.3	8	10
F	2.5	3.5	5.0
d	0.5	0.6	0.6
α	2.0	2.0	2.0



RIPPLE CURRENT COEFFICIENTS

Temperature(°C)	≤50	70	85	105
Coefficient	1.90	1.75	1.40	1.00

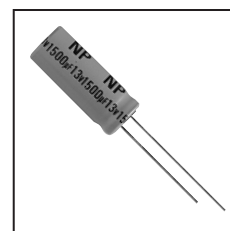
Frequency(Hz)		120	1k	10k	≥100k
Coefficient	1~5.6μF	1.00	1.60	1.80	2.00
	6.8~18μF	1.00	1.50	1.70	1.90
	22~33μF	1.00	1.40	1.60	1.80

● CASE SIZE & MAX RIPPLE CURRENT

Case size : D x L (mm)
Max ripple current : mA(rms) 105°C 120Hz

μF	V(DC) Item	160		200		400	
		DxL	R.C.	DxL	R.C.	DxL	R.C.
1.0						6.3x11	24
1.2						8x9	28
1.5						8x9	30
1.8						8x9	33
2.2				6.3x11	36	8x9	36
						8x11	40
2.7						8x11	43
3.3				6.3x11	42	8x11	47
						10x9	48
3.9						10x12.5	57
4.7				6.3x11	49	10x12.5	61
5.6		6.3x11	52	8x9	56		
6.8				8x9	62	10x16	85
8.2				8x9	66		
10		8x9	70	8x11	80		
12				10x9	88		
15		8x11	92				
		10x9	95				
18				10x12.5	113		
22		10x12.5	121				
27				10x16	149		
33		10x16	158				

- Suitable for the direction light of automobile and motorcycle.
- Corresponding product to RoHS

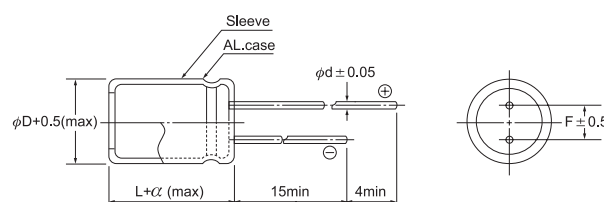


SPECIFICATION

Item	Characteristic
Operation Temperature Range	-40 ~ +85°C
Rated Working Voltage	13VDC
Capacitance Tolerance (120Hz 20°C)	±10%(K) ±20%(M) +20% -10%(V)
Leakage Current (20°C)	$I \leq 1000 (\mu A)$ Under 100Ω resistor series and rated voltage applied whichever after 3 minutes. I : Leakage Current (μA) C : Rated Capacitance(μF) V : Working Voltage (V)
Dissipation Factor (tan δ) (120Hz 20°C)	$\tan \delta \leq 0.50$

DIMENSIONS (mm)

ϕD	10	12.5
F	5.0	5.0
d	0.6	0.6
α	1.5	2.0

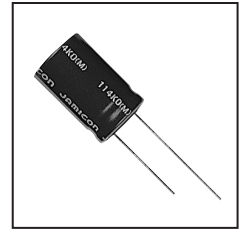


CASE SIZE & MAX RIPPLE CURRENT

Case size: D x L (mm)

μF	V(DC)	13
	Item	DxL
1500		10x25
1700		12.5x20
2200		12.5x25

- No sparks with specified DC overvoltage applied.
- Withstanding 2000 hours application of rate ripple current at 105°C
- Corresponding product to RoHS

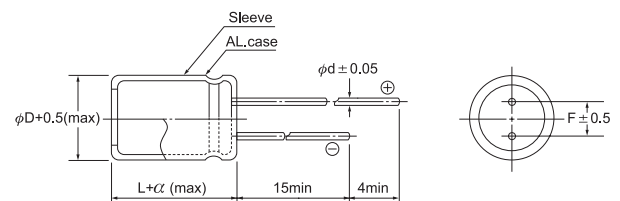


SPECIFICATION

Item	Characteristic		
Operation Temperature Range	-25 ~ +105°C		
Rated Working Voltage	200 ~ 400VDC		
Capacitance Tolerance (120Hz 20°C)	±20%(M)		
Leakage Current (20°C)	I ≤0.06CV + 10 μA *Whichever is greater after 2 minutes I : Leakage Current (μA) C : Rated Capacitance (μF) V : Working Voltage (V)		
Surge Voltage (20°C)	W.V.	200	400
	S.V.	250	450
Dissipation Factor (tan δ) (120Hz 20°C)	W.V.	200	400
	tan δ	0.15	0.24
Low Temperature Stability	Impedance ratio at 120Hz		
	Rated Voltage (V)	200	400
	-25°C / +20°C	4	6
Load Life	After 2000 hours application of W.V. and +105°C ripple current value, the capacitor shall meet the following limits. (DC + ripple peak voltage ≤ rate working voltage)		
	Capacitance Change	≤ ±20% of initial value	
	Dissipation Factor	≤200% of initial specified value	
	Leakage current	≤initial specified value	
Shelf Life	At +105°C no voltage application after 1000 hours, the capacitor shall meet the limits for load life characteristics. (with voltage treatment)		

DIMENSIONS (mm)

φD	16	18
F	7.5	7.5
d	0.8	0.8
α	2.0	2.0



RIPPLE CURRENT COEFFICIENTS

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

Frequency(Hz)	60	120	1k	10k	100k
W.V.	Multiplier				
200V	0.80	1.00	1.30	1.40	1.60
400V	0.75	1.00	1.50	1.75	1.85

● CASE SIZE & MAX RIPPLE CURRENT

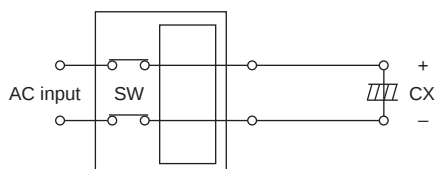
Case size : D x L (mm)
Max ripple current : mA(rms) 105°C 120Hz

μF	V(DC) Item	200		400	
		DxL	R.C.	DxL	R.C.
22				16x25	170
33				16x25	210
39				16x32	260
47				18x25	250
56				16x32	280
68				16x40	340
82				18x32	330
100				18x36	380
120				18x40	440
150		16x25	400		
180		16x32	480		
220		18x25	470		
		16x32	540		
		18x25	520		
		16x40	660		
		18x32	630		
		18x36	730		
		18x40	770		

■ DC OVERVOLTAGE TEST CONDITION

The vent will be operated and the capacity shall become an open circuit without burning the material when the following excess DC voltage is applied.

Rated Voltage	Current	Test DC Voltage
200 VDC	4A	300 / 375 VDC
400 VDC	2A	500 / 600 VDC



Constant DC voltage/current power supply

- Withstanding 2000 hours application of high ripple current at 85°C.
- Corresponding product to RoHS

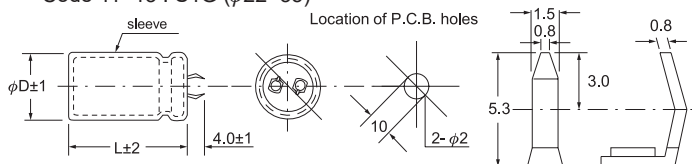


SPECIFICATION

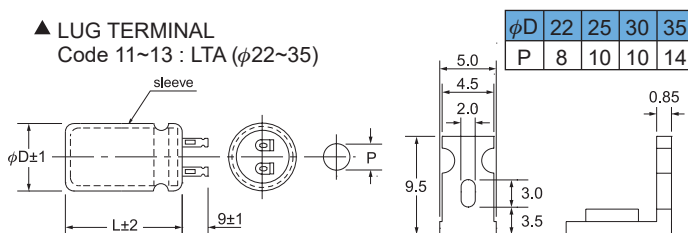
Item	Characteristic																
Operation Temperature Range	-40 ~ +85°C																
Rated Working Voltage	16 ~ 500VDC																
Capacitance Tolerance (120Hz 20°C)	±20%(M)																
Leakage Current (20°C)	I ≤0.02CV or 3 (mA) *Whichever is smaller after 5 minutes I : Leakage Current(μA) C : Rated Capacitance(μF) V : Working Voltage(V)																
Surge Voltage (20°C)	W.V.	16	25	35	50	63	80	100	160	180	200	250	350	350	400	450	500
	S.V.	20	32	44	63	79	100	125	200	225	250	300	400	400	450	500	550
Dissipation Factor (tan δ) (120Hz 20°C)	Rated Voltage (V)		16		25		35		50		63		80		100		≥160
	Capacitance		≤47,000	≥56,000	≤33,000	≥47,000	≤22,000	≥33,000	≤6,800	≥10,000	≤6,800	≥10,000	≤2,200	≥3,300	≤3,300	≥4,700	—
	tan δ		0.50	0.60	0.40	0.50	0.35	0.40	0.30	0.35	0.25	0.35	0.20	0.25	0.20	0.25	0.15
Low Temperature Stability	Impedance ratio at 120Hz																
	Rated Voltage (V)			16~100				160~250				350~500					
	-25°C / +20°C			4				6				8					
	-40°C / +20°C			15				—				—					
Load Life	After 2000 hours application of W.V. and +85°C ripple current value, the capacitor shall meet the following limits. (DC + ripple peak voltage ≤ rate working voltage)																
	Capacitance Change			≤ ± 15% of initial value													
	Dissipation Factor			≤ 175% of initial specified value													
	Leakage current			≤ initial specified value													
Shelf Life	At +85°C, no voltage application after 1000 hours, the capacitor shall meet the limits for load life characteristics. (With voltage treatment)																

TERMINAL TYPE

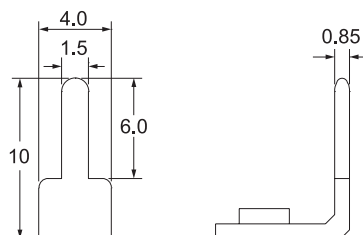
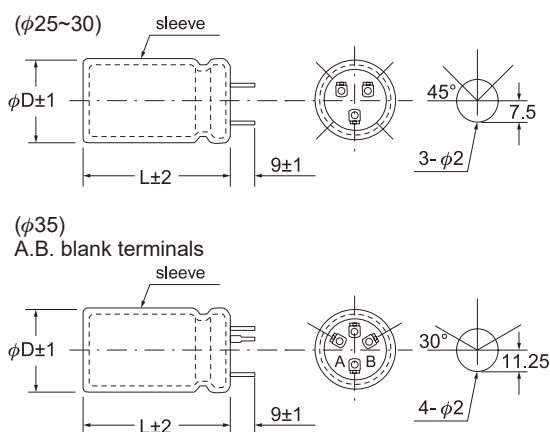
▲ P.C.B. TERMINAL (SNAP IN) Code 11~13 : S1G (φ22~35)



▲ LUG TERMINAL Code 11~13 : LTA (φ22~35)



▲ P.C.B. TERMINAL Code 11~13 : LBA (φ25~30), LCA (φ35)



RIPPLE CURRENT COEFFICIENTS

Temperature(°C)	40	60	70	85
Multiplier	1.80	1.40	1.20	1.00

Frequency(Hz)	60	120	400	1k	10k
W.V.	Multiplier				
≤100V	0.80	1.00	1.10	1.20	1.20
≥160V	0.80	1.00	1.10	1.30	1.40

※ For φ45 dimension, refer to page 16.

● CASE SIZE & MAX RIPPLE CURRENT

Case size : D x L (mm)
Max ripple current : A (rms)
(R.C.) : 85°C 120Hz

μF	V(DC) φD	16					25					35				
		22	25	30	35	45	22	25	30	35	45	22	25	30	35	45
3300												25				
												2.04				
4700							25					30	25			
							2.25					2.41	2.23			
6800		25					30	25				35	30	25		
		2.40					2.69	2.56				2.82	2.70	2.66		
10000		30	25				35	30	25			45	35	30	25	
		2.81	2.67				3.09	2.97	2.92			3.34	3.06	3.04	3.28	
15000		40	30	25			45	35	30	25			50	35	30	
		3.43	3.11	3.07			3.70	3.39	3.37	3.63			4.06	3.67	3.98	
22000			45	30	25			45	35	30				45	40	
			4.25	3.78	4.09			4.48	4.25	4.61				4.94	5.41	
33000				45	35				50	40					50	
				5.48	5.67				6.05	6.33					7.27	
56000																55
																10.27
68000											55					60
											11.47					11.73
82000						50					60					
						10.83					13.06					
100000						60										L(mm)
						12.90										R.C.

μF	V(DC) φD	50					63					80					100				
		22	25	30	35	45	22	25	30	35	45	22	25	30	35	45	22	25	30	35	45
1000												25					30	25			
												1.50					1.71	1.63			
1200																	35	30			
																	2.01	1.93			
1500							25					30	25				35	30	25		
							1.66					1.88	1.79				2.11	2.03	2.00		
1800																	45	35	30		
																	2.59	2.37	2.35		
2200		25					30	25				40	30	25			50	40	30	25	
		1.92					2.08	1.98				2.45	2.22	2.19			2.84	2.64	2.47	2.66	
3300		30	25				35	30	25			50	40	30	25			50	40	30	
		2.35	2.24				2.51	2.41	2.38			3.05	2.83	2.65	2.86			3.25	3.11	3.19	
4700		35	30	25			45	35	30	25			50	40	30				50	40	
		2.72	2.62	2.58			3.04	2.79	2.77	2.99			3.36	3.21	3.30				3.65	3.82	
6800		50	40	30	25			50	35	30				50	40					50	
		3.45	3.20	3.00	3.23			3.53	3.19	3.46				3.80	3.98					4.48	
10000			50	35	30				45	40											
			3.70	3.35	3.64				3.72	4.08											
12000																					60
																					5.83
15000				50	40					50						55					70
				4.61	4.83					5.30						6.29					6.96
18000					45																
					5.55																
22000					50						55					65					
					6.42						6.95					8.17					
27000											65										
											8.26										
33000						55															
						8.51															
39000						65															L(mm)
						9.26															R.C.

● CASE SIZE & MAX RIPPLE CURRENT

Case size : D x L (mm)
 Max ripple current : A (rms)
 (R.C.) : 85°C 120Hz

μF	V(DC) φD	160					180					200					250				
		22	25	30	35	45	22	25	30	35	45	22	25	30	35	45	22	25	30	35	45
220												25					25				
												1.25					1.31				
270												25					30	25			
												1.67					1.57	1.57			
330							25					30	25				35	30			
							1.31					1.66	1.66				1.85	1.87			
390	25						30	25				30	25				35	30	25		
	1.44						1.54	1.54				1.80	1.80				2.01	2.03	2.10		
470	30	25					30	25				35	30	25			40	35	25	25	
	1.70	1.70					1.69	1.69				2.11	2.13	2.21			2.34	2.38	2.31	2.54	
560	35	30					35	30	25			40	35	25			50	40	30	25	
	1.99	2.23					1.97	1.99	2.06			2.44	2.48	2.41			2.82	2.74	2.71	2.78	
680	40	30	25				40	35	25			45	35	30	25			45	35	30	
	2.32	2.21	2.29				2.30	2.34	2.27			2.83	2.73	2.85	2.92			3.19	3.18	3.28	
820	45	35	30				45	40	30	25			40	30	25			50	40	30	
	2.68	2.58	2.70				2.67	2.72	2.68	2.75			3.17	3.13	3.21			3.67	3.69	3.60	
1000	50	40	30	25				45	35	25			50	35	30				45	35	
	3.11	3.02	2.98	3.05				3.16	3.15	3.04			3.87	3.68	3.80				4.28	4.22	
1200		45	35	30				50	40	30				40	35				50	40	
		3.49	3.48	3.59				3.63	3.65	3.56				4.26	4.42				4.91	4.88	
1500			40	35					45	35					40					50	
			4.11	4.26					4.15	4.09					5.02					5.74	
1800			45	35						40					50						
			4.73	4.67						4.73					6.04						
2200																					50
																					5.81
2700																50					60
																6.44					6.94
3300										50						60					
										6.44						7.68					
3900					50					60											
					7.00					7.55											
4700					60																L(mm)
					8.29																R.C.

● CASE SIZE & MAX RIPPLE CURRENT

Case size : D x L (mm)
Max ripple current : A (rms)
(R.C.) : 85°C 120Hz

μF	V(DC) φD	350					400					450					500				
		22	25	30	35	45	22	25	30	35	45	22	25	30	35	45	22	25	30	35	45
82							25					30	25				35	30	25		
							0.76					0.83	0.83				0.73	0.74	0.76		
100		25					30	25				35	30	25			40	30	25		
		0.73					0.91	0.91				0.97	0.98	1.02			0.85	0.81	0.84		
120		30	25				30	25				40	30	25			45	35	30		
		0.86	0.86				1.00	1.00				1.13	1.08	1.12			0.99	0.95	0.99		
150		30	25				35	30	25			45	35	30			50	40	35	30	
		0.96	0.96				1.19	1.20	1.25			1.33	1.28	1.34			1.15	1.12	1.18	1.22	
180		35	30	25			40	35	25			50	40	30	25			45	40	30	
		1.13	1.14	1.18			1.38	1.40	1.37			1.53	1.49	1.47	1.50			1.30	1.37	1.33	
220		40	35	25			50	40	30	25			45	35	30			50	45	35	
		1.32	1.34	1.30			1.69	1.64	1.62	1.66			1.73	1.72	1.78			1.50	1.59	1.57	
270		50	40	30	25			45	35	30				40	35				50	45	
		1.61	1.57	1.55	1.59			1.92	1.91	1.97				2.02	2.10				1.84	1.92	
330			45	35	30			50	40	30				45	35					45	
			1.82	1.82	1.88			2.22	2.23	2.18				2.35	2.32						2.13
390			50	40	30				45	35					40						50
			2.08	2.10	2.04				2.55	2.52					2.66						2.42
470				40	35					40					45						
				2.30	2.38					2.92					3.07						
560				50	40					45											
				2.76	2.75					3.34											
680					45					50						50					
					3.18					3.85						3.70					
820											50					55					
											4.06					4.22					
1000						50					55										
						4.14					4.66										
1500						60															L(mm)
						4.43															R.C.

- Withstanding 2000 hours application of high ripple current at 105°C.
- Corresponding product to RoHS

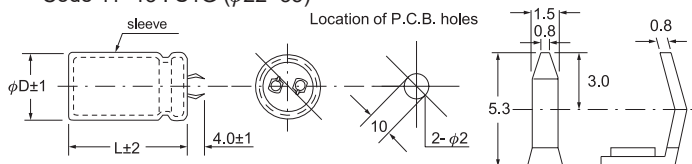


SPECIFICATION

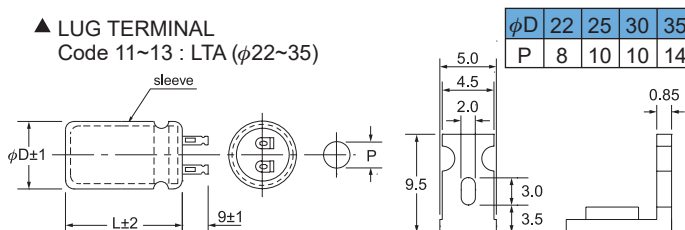
Item	Characteristic															
Operation Temperature Range	-40 ~ +105°C															
Rated Working Voltage	16 ~ 500VDC															
Capacitance Tolerance (120Hz 20°C)	±20%(M)															
Leakage Current (20°C)	I ≤0.02CV or 3 (mA) *Whichever is smaller after 5 minutes I : Leakage Current(μA) C : Rated Capacitance(μF) V : Working Voltage(V)															
Surge Voltage (20°C)	W.V.	16	25	35	50	63	80	100	160	180	200	250	350	400	450	500
	S.V.	20	32	44	63	79	100	125	200	225	250	300	400	450	500	550
Dissipation Factor (tan δ) (120Hz 20°C)	Rated Voltage (V)	16		25		35		50		63		80		100		≥160
	Capacitance	≤33,000	≥47,000	≤33,000	≥47,000	≤22,000	≥27,000	≤6,800	≥10,000	≤6,800	≥10,000	≤3,300	≥4,700	≤3,300	≥4,700	—
	tan δ	0.50	0.60	0.40	0.50	0.35	0.40	0.30	0.35	0.25	0.35	0.20	0.25	0.20	0.25	0.15
Low Temperature Stability	Impedance ratio at 120Hz															
	Rated Voltage (V)	16		25		35		50		63~100		160~250		350~500		
	-25°C / +20°C	6		6		6		4		3		4		6		
	-40°C / +20°C	15		15		10		8		6		—		—		
Load Life	After 2000 hours application of W.V. and +105°C ripple current value, the capacitor shall meet the following limits. (DC + ripple peak voltage ≤ rate working voltage)															
	Capacitance Change		±20% of initial value													
	Dissipation Factor		≤175% of initial specified value													
	Leakage current		≤initial specified value													
Shelf Life	At +105°C, no voltage application after 1000 hours, the capacitor shall meet the limits for load life characteristics. (With voltage treatment)															

TERMINAL TYPE

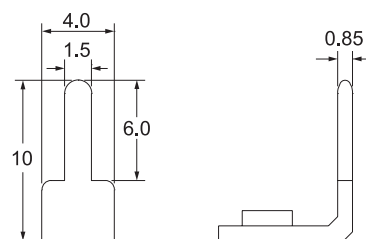
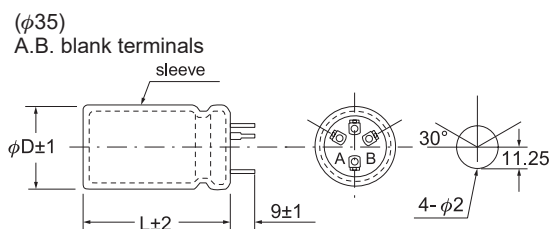
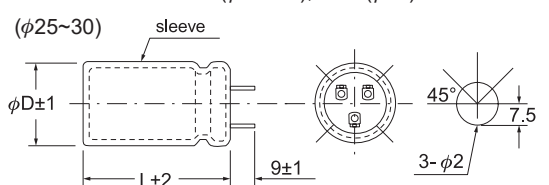
▲ P.C.B. TERMINAL (SNAP IN)
Code 11~13 : S1G (φ22~35)



▲ LUG TERMINAL
Code 11~13 : LTA (φ22~35)



▲ P.C.B. TERMINAL
Code 11~13 : LBA (φ25~30), LCA (φ35)



RIPPLE CURRENT COEFFICIENTS

Temperature(°C)	40	60	70	85	105
Multiplier	2.50	2.20	2.00	1.80	1.00

Frequency(Hz)	60	120	400	1k	10k
W.V.	Multiplier				
≤100V	0.80	1.00	1.10	1.20	1.20
≥160V	0.80	1.00	1.10	1.30	1.40

※ For φ45 dimension, refer to page 16.

● CASE SIZE & MAX RIPPLE CURRENT

Case size : D x L (mm)
 Max ripple current : A (rms)
 (R.C.) : 105°C 120Hz

μF	V(DC) φD	16					25					35					50				
		22	25	30	35	45	22	25	30	35	45	22	25	30	35	45	22	25	30	35	45
1500																	25				
																	1.05				
2200												25					30	25			
												1.17					1.31	1.25			
3300							25					30	25				35	30	25		
							1.34					1.43	1.36				1.58	1.52	1.50		
4700	25						30	25				35	30	25			45	35	30	25	
	1.36						1.58	1.51				1.65	1.58	1.56			1.90	1.74	1.73	1.86	
6800	35	30					35	30	25			50	40	30	25			50	35	30	
	1.74	1.67					1.85	1.78	1.75			2.09	1.94	1.82	1.96			2.19	1.98	2.15	
10000	45	35	25				45	35	30	25			50	35	30				45	40	
	2.09	1.92	1.77				2.19	2.01	2.00	2.15			2.24	2.03	2.20				2.39	2.62	
15000		45	35	30				45	35	30				50	40					50	
		2.29	2.17	2.36				2.54	2.41	2.61				2.79	2.92					3.52	
22000			45	35					45	40											55
			2.86	2.97					3.24	3.55											4.62
27000																50					65
																4.49					5.49
33000				50					50							55					
				4.21					4.78							5.16					
47000					50					50											
					5.24					5.24											
56000					55					60											L(mm)
					5.65					6.17											R.C.

μF	V(DC) φD	63					80					100					160				
		22	25	30	35	45	22	25	30	35	45	22	25	30	35	45	22	25	30	35	45
330																	25				
																	0.88				
390																	30	25			
																	1.03	1.03			
470																	30	25			
																	1.14	1.13			
560																	35	30	25		
																	1.32	1.33	1.38		
680																	40	35	25		
																	1.55	1.57	1.53		
820																	45	40	30	25	
																	1.79	1.82	1.80	1.84	
1000	25						30	25				30	25					45	35	25	
	0.91						1.04	0.99				1.11	1.06					2.12	2.12	2.04	
1200																		50	35	30	
																		2.43	2.32	2.39	
1500	30	25					35	30	25			40	35	25					45	35	
	1.14	1.08					1.28	1.23	1.21			1.44	1.39	1.29					2.88	2.84	
1800																				40	
																				3.28	
2200	35	30	25				50	40	30	25		45	35								
	1.40	1.35	1.33				1.72	1.60	1.50	1.61		1.77	1.68								
3300	45	40	30	25				50	40	30			45	35							50
	1.77	1.72	1.61	1.73				1.97	1.78	1.93			2.07	2.15							4.52
3900																					55
																					5.11
4700		50	35	30				50	40					45							
		2.03	1.84	2.00				2.11	2.31					2.52							
6800			45	40					50												
			2.20	2.41					2.72												
8200																60					
																3.27					
10000				50												65					
				2.87												3.73					
12000										60											
										3.95											
15000					60					65											
					3.95					4.57											
18000					65																L(mm)
					4.48																R.C.

● CASE SIZE & MAX RIPPLE CURRENT

Case size : D x L (mm)
 Max ripple current : A (rms)
 (R.C.) : 105°C 120Hz

μF	V(DC) φD	180					200					250				
		22	25	30	35	45	22	25	30	35	45	22	25	30	35	45
220							25					30	25			
							0.85					0.91	0.91			
270	25						25					35	25			
	0.80						0.94					1.07	1.01			
330	30	25					30	25				35	30	25		
	0.95	0.95					1.12	1.12				1.19	1.20	1.24		
390	30	25					35	25				40	35	25		
	1.03	1.04					1.31	1.22				1.37	1.39	1.35		
470	35	30	25				40	30	25			50	40	30	25	
	1.21	1.22	1.27				1.52	1.45	1.50			1.66	1.61	1.59	1.63	
560	40	30	25				45	35	30				45	35	25	
	1.40	1.34	1.39				1.75	1.68	1.76				1.85	1.85	1.78	
680	45	35	30	25			50	40	30	25			50	35	30	
	1.63	1.57	1.64	1.68			2.02	1.96	1.94	1.98			2.14	2.04	2.10	
820	50	40	30	25				45	35	30				45	35	
	1.88	1.83	1.80	1.85				2.27	2.26	2.33				2.49	2.45	
1000		45	35	30				50	40	30					40	
		2.12	2.12	2.18				2.63	2.64	2.58					2.86	
1200			40	30					45	35					45	
			2.45	2.39					3.04	3.00					3.29	
1500			50	35						45					50	
			2.91	2.74						3.58					3.68	
1800				40						50						
				3.17						4.10						
2200																55
																4.29
2700											50					65
											4.43					5.10
3300					55							60				
					4.70						5.28					
3900					65											L(mm)
					5.48											R.C.

● CASE SIZE & MAX RIPPLE CURRENT

Case size : D x L (mm)
 Max ripple current : A (rms)
 (R.C.) : 105°C 120Hz

μF	V(DC) φD	350					400					450					500				
		22	25	30	35	45	22	25	30	35	45	22	25	30	35	45	22	25	30	35	45
47												25					25				
												0.39					0.27				
68							25					30	25				30	25			
							0.47					0.50	0.50				0.35	0.35			
82		25					30	25				35	30				35	30			
		0.43					0.56	0.56				0.59	0.60				0.41	0.41			
100		30	25				30	25				40	35	25			40	35	30		
		0.51	0.51				0.61	0.61				0.69	0.70	0.68			0.47	0.48	0.50		
120		30	25				35	30	25			45	35	30	25		50	40	35	25	
		0.55	0.55				0.72	0.73	0.75			0.80	0.77	0.80	0.82		0.57	0.56	0.59	0.56	
150		35	30	25			40	35	30				45	35	30			45	40	30	
		0.66	0.67	0.69			0.85	0.86	0.90				0.96	0.96	0.99			0.66	0.69	0.68	
180		40	35	30			45	40	30	25			50	35	30			50	40	35	
		0.77	0.78	0.82			0.98	1.00	0.99	1.01			1.10	1.05	1.08			0.75	0.76	0.79	
220		50	40	30	25			45	35	30				40	35				45	40	
		0.94	0.91	0.90	0.92			1.17	1.16	1.20				1.22	1.27				0.88	0.92	
270			45	35	30			50	40	30				50	40				50	45	
			1.07	1.06	1.10			1.35	1.36	1.33				1.49	1.48				1.02	1.07	
330			50	40	30				45	35					45					50	
			1.23	1.24	1.21				1.58	1.56					1.72					1.23	
390				45	35					40					50						
				1.42	1.40					1.79					1.96						
470					40					45											
					1.62					2.07											
560					45					50											
					1.86					2.36											
680																55					
																2.49					
820										50						65					
										2.72						2.93					
1000						55				60											
						2.59				3.24											
2200						65															L(mm)
						4.12															R.C.

- Small case sized than HS series.
- Withstanding 2000 hours application of high ripple current at 105°C.
- Corresponding product to RoHS

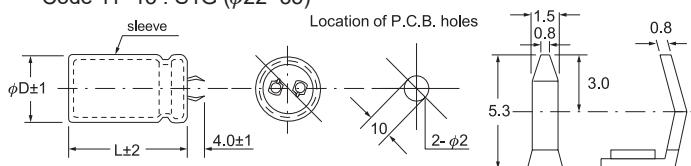


SPECIFICATION

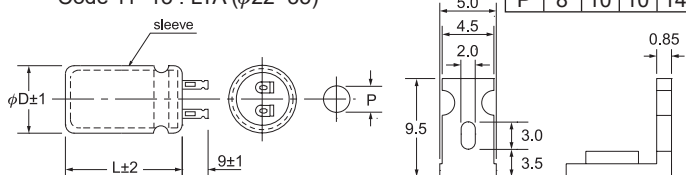
Item	Characteristic						
Operation Temperature Range	-25 ~ +105°C						
Rated Working Voltage	160 ~ 450VDC						
Capacitance Tolerance (120Hz 20°C)	±20%(M)						
Leakage Current (20°C)	I ≤0.02CV or 3 (mA) *Whichever is smaller after 5 minutes I : Leakage Current(μA) C : Rated Capacitance(μF) V : Working Voltage(V)						
Surge Voltage (20°C)	W.V.	160	200	250	350	400	450
	S.V.	200	250	300	400	450	500
Dissipation Factor (tan δ) (120Hz 20°C)	Rated Voltage (V)	160	200	250	350	400	450
	tan δ	0.15	0.15	0.15	0.15	0.15	0.15
Low Temperature Stability	Impedance ratio at 120Hz						
	Rated Voltage (V)	160~250			350~450		
	-25°C / +20°C	4			6		
Load Life	After 2000 hours application of W.V. and +105°C ripple current value, the capacitor shall meet the following limits. (DC + ripple peak voltage ≤ rate working voltage)						
	Capacitance Change	≤ ±20% of initial value					
	Dissipation Factor	≤ 175% of initial specified value					
	Leakage current	≤ initial specified value					
Shelf Life	At +105°C, no voltage application after 1000 hours, the capacitor shall meet the limits for load life characteristics. (With voltage treatment)						

TERMINAL TYPE

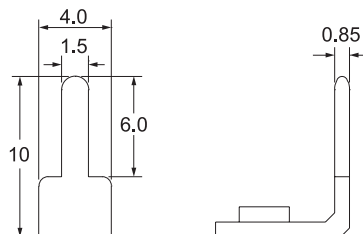
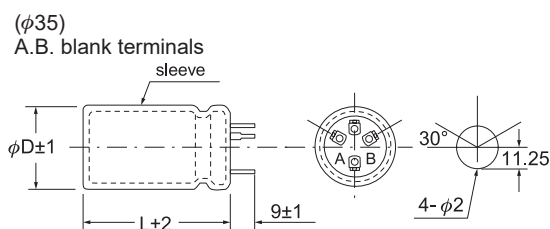
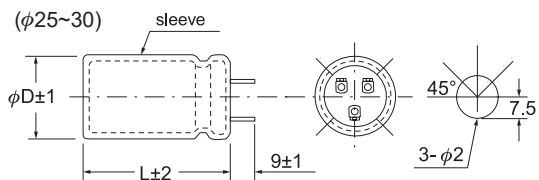
▲ P.C.B. TERMINAL (SNAP IN) Code 11~13 : S1G (φ22~35)



▲ LUG TERMINAL Code 11~13 : LTA (φ22~35)



▲ P.C.B. TERMINAL Code 11~13 : LBA (φ25~30), LCA (φ35)



RIPPLE CURRENT COEFFICIENTS

Temperature(°C)	40	60	70	85	105
Multiplier	2.50	2.20	2.00	1.80	1.00

Frequency(Hz)	60	120	400	1k	10k
W.V.	Multiplier				
≥160V	0.80	1.00	1.10	1.30	1.40

● CASE SIZE & MAX RIPPLE CURRENT

Case size : D x L (mm)
Max ripple current : A(rms) 105°C 120Hz

μF	$V(\text{DC})$ ϕD	160				200				250			
		22	25	30	35	22	25	30	35	22	25	30	35
220										25			
										0.89			
270										25			
										0.94			
330										30	25		
										1.12	1.12		
390						25				35	25		
						1.29				1.30	1.21		
470	25					30				40	30	25	
	1.44					1.44				1.42	1.36	1.41	
560	30					30	25			45	35	25	
	1.48					1.48	1.48			1.54	1.49	1.44	
680	30	25				40	30			50	40	30	25
	1.63	1.63				1.84	1.75			1.78	1.73	1.71	1.75
820	35	30	25			45	35	25			45	35	30
	1.84	1.85	1.92			2.05	1.98	1.92			1.93	1.92	1.98
1000	40	35	25			50	45	30	25			40	30
	2.10	2.13	2.07			2.31	2.37	2.22	2.28			2.19	2.13
1200		40	30	25			50	35	30			45	35
		2.30	2.27	2.33			2.54	2.42	2.49			2.35	2.32
1500		45	35	30				40	30				45
		2.42	2.41	2.49				2.55	2.49				2.56
1800		50	40	30				45	40				50
		2.56	2.58	2.52				2.71	2.82				2.71
2200			45	35					45				
			2.89	2.85					3.16				
2700			50	40									
			3.13	3.11									
3300				50									L(mm)
				3.77									R.C.

μF	$V(\text{DC})$ ϕD	350				400				450			
		22	25	30	35	22	25	30	35	22	25	30	35
68										25			
										0.47			
82										30			
										0.55			
100						25				30	25		
						0.61				0.61	0.61		
120	25					30				35	30		
	0.58					0.72				0.71	0.72		
150	30					30	25			40	30	25	
	0.71					0.80	0.80			0.85	0.81	0.84	
180	30	25				35	30			45	40	30	
	0.73	0.73				0.89	0.90			0.93	0.95	0.93	
220	35	30				45	35	25			45	30	25
	0.87	0.87				1.10	1.06	1.03			1.10	1.03	1.06
270	40	30	25			50	40	30	25		50	40	30
	0.96	0.92	0.95			1.21	1.18	1.16	1.19		1.21	1.22	1.19
330	45	40	30				45	35	30			45	35
	1.12	1.15	1.13				1.37	1.37	1.41			1.42	1.40
390		45	35				50	40	30			50	40
		1.31	1.31				1.56	1.58	1.54			1.61	1.60
470		50	35	30				45	35				45
		1.42	1.36	1.40				1.72	1.69				1.75
560			45	35				50	40				50
			1.55	1.53				1.85	1.84				1.88
680			50	40					45				
			1.79	1.78					2.12				
820				45									L(mm)
				1.97									R.C.

- Same case sized as LS series.
- Withstanding 3000 hours application of high ripple current at 85°C.
- Corresponding product to RoHS

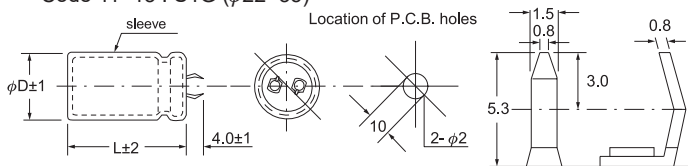


SPECIFICATION

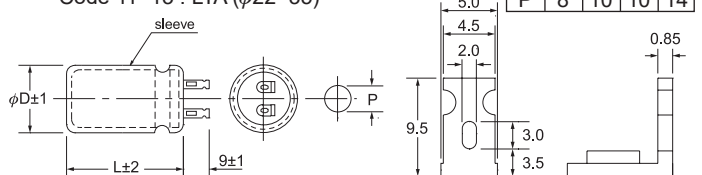
Item	Characteristic															
Operation Temperature Range	-40 ~ +85°C															
Rated Working Voltage	16 ~ 450VDC															
Capacitance Tolerance (120Hz 20°C)	±20%(M)															
Leakage Current (20°C)	I ≤0.02CV or 3 (mA) *Whichever is smaller after 5 minutes I : Leakage Current(μA) C : Rated Capacitance(μF) V : Working Voltage(V)															
Surge Voltage (20°C)	W.V.	16	25	35	50	63	80	100	160	180	200	250	350	400	450	
	S.V.	20	32	44	63	79	100	125	200	225	250	300	400	450	500	
Dissipation Factor (tan δ) (120Hz 20°C)	Rated Voltage (V)			16	25	35		50		63		80		100		≥160
	Capacitance			—	—	≤22,000	≥33,000	≤6,800	≥10,000	≤6,800	≥10,000	≤2,200	≥3,300	≤3,300	≥4,700	—
	tan δ			0.50	0.40	0.35	0.40	0.30	0.35	0.25	0.35	0.20	0.25	0.20	0.25	0.15
Low Temperature Stability	Impedance ratio at 120Hz															
	Rated Voltage (V)				16~100				160~250				350~450			
	-25°C / +20°C				4				6				8			
	-40°C / +20°C				15				—				—			
Load Life	After 3000 hours application of W.V. and +85°C ripple current value, the capacitor shall meet the following limits. (DC + ripple peak voltage ≤ rate working voltage)															
	Capacitance Change			≤±15% of initial value												
	Dissipation Factor			≤175% of initial specified value												
	Leakage current			≤initial specified value												
Shelf Life	At +85°C, no voltage application after 1000 hours, the capacitor shall meet the limits for load life characteristics. (With voltage treatment)															

TERMINAL TYPE

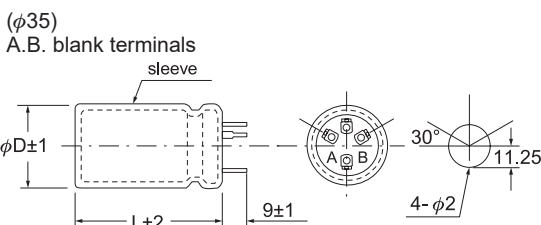
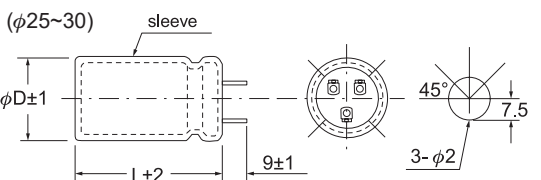
▲ P.C.B. TERMINAL (SNAP IN) Code 11~13 : S1G (φ22~35)



▲ LUG TERMINAL Code 11~13 : LTA (φ22~35)



▲ P.C.B. TERMINAL Code 11~13 : LBA (φ25~30), LCA (φ35)



RIPPLE CURRENT COEFFICIENTS

Temperature(°C)	40	60	70	85
Multiplier	1.80	1.40	1.20	1.00

Frequency(Hz)	60	120	400	1k	10k
W.V.	Multiplier				
≤100V	0.80	1.00	1.10	1.20	1.20
≥160V	0.80	1.00	1.10	1.30	1.40

● CASE SIZE & MAX RIPPLE CURRENT

Case size : D x L (mm)
Max ripple current : A(rms) 85°C 120Hz

μF	$V(\text{DC})$ ϕD	16				25				35			
		22	25	30	35	22	25	30	35	22	25	30	35
3300										25			
										2.04			
4700						25				30	25		
						2.25				2.41	2.23		
6800	25					30	25			35	30	25	
	2.40					2.69	2.56			2.82	2.70	2.66	
10000	30	25				35	30	25		45	35	30	25
	2.81	2.67				3.09	2.97	2.92		3.34	3.06	3.04	3.28
15000	40	30	25			45	35	30	25		50	35	30
	3.43	3.11	3.07			3.70	3.39	3.37	3.63		4.06	3.67	3.98
22000		45	30	25		45	35	30				45	40
		4.25	3.78	4.09		4.48	4.25	4.61				4.94	5.41
33000			45	35				50	40			L(mm)	50
			5.48	5.67				6.05	6.33			R.C.	7.27

μF	$V(\text{DC})$ ϕD	50				63				80				100			
		22	25	30	35	22	25	30	35	22	25	30	35	22	25	30	35
1000										25				30	25		
										1.50				1.71	1.63		
1200														35	30		
														2.01	1.93		
1500						25				30	25			35	30	25	
						1.66				1.88	1.79			2.11	2.03	2.00	
1800														45	35	30	
														2.59	2.37	2.35	
2200	25					30	25			40	30	25		50	40	30	25
	1.92					2.08	1.98			2.45	2.22	2.19		2.84	2.64	2.47	2.42
3300	30	25				35	30	25		50	40	30	25		50	40	30
	2.35	2.24				2.51	2.41	2.38		3.05	2.83	2.65	2.86		3.25	3.11	3.19
4700	35	30	25			45	35	30	25		50	40	30			50	40
	2.72	2.62	2.58			3.04	2.79	2.77	2.99		3.36	3.21	3.30			3.65	3.82
6800	50	40	30	25			50	35	30			50	40				50
	3.45	3.20	3.00	3.23			3.53	3.19	3.46			3.80	3.98				4.48
10000		50	35	30				45	40								
		3.70	3.35	3.64				3.72	4.08								
15000			50	40					50								L(mm)
			4.61	4.83					5.30								R.C.

● CASE SIZE & MAX RIPPLE CURRENT

Case size : D x L (mm)
Max ripple current : A(rms) 85°C 120Hz

μF	$\frac{V(\text{DC})}{\phi D}$	160				180				200				250			
		22	25	30	35	22	25	30	35	22	25	30	35	22	25	30	35
220										25				25			
										1.25				1.31			
270										25				30	25		
										1.67				1.57	1.57		
330						25				30	25			35	30		
						1.31				1.66	1.66			1.85	1.87		
390	25					30	25			30	25			35	30	25	
	1.44					1.54	1.54			1.80	1.80			2.01	2.03	2.10	
470	30	25				30	25			35	30	25		40	35	25	25
	1.70	1.70				1.69	1.69			2.11	2.13	2.21		2.34	2.38	2.31	2.54
560	35	30				35	30	25		40	35	25		50	40	30	25
	1.99	2.23				1.97	1.99	2.06		2.44	2.48	2.41		2.82	2.74	2.71	2.78
680	40	30	25			40	35	25		45	35	30	25		45	35	30
	2.32	2.21	2.29			2.30	2.34	2.27		2.83	2.73	2.85	2.92		3.19	3.18	3.28
820	45	35	30			45	40	30	25		40	30	25		50	40	30
	2.68	2.58	2.70			2.67	2.72	2.68	2.75		3.17	3.13	3.21		3.67	3.69	3.60
1000	50	40	30	25		45	35	25		50	35	30				45	35
	3.11	3.02	2.98	3.05		3.16	3.15	3.04		3.87	3.68	3.80				4.28	4.22
1200		45	35	30		50	40	30			40	35				50	40
		3.49	3.48	3.59		3.63	3.65	3.56			4.26	4.42				4.91	4.88
1500			40	35			45	35				40					50
			4.11	4.26			4.15	4.09				5.02					5.74
1800			45	35				40				50					L(mm)
			4.73	4.67				4.73				6.04					R.C.

μF	$\frac{V(\text{DC})}{\phi D}$	350				400				450			
		22	25	30	35	22	25	30	35	22	25	30	35
82						25				30	25		
						0.76				0.83	0.83		
100	25					30	25			35	30	25	
	0.73					0.91	0.91			0.97	0.98	1.02	
120	30	25				30	25			40	30	25	
	0.86	0.86				1.00	1.00			1.13	1.08	1.12	
150	30	25				35	30	25		45	35	30	
	0.96	0.96				1.19	1.20	1.25		1.33	1.28	1.34	
180	35	30	25			40	35	25		50	40	30	25
	1.13	1.14	1.18			1.38	1.40	1.37		1.53	1.49	1.47	1.50
220	40	35	25			50	40	30	25		45	35	30
	1.32	1.34	1.30			1.69	1.64	1.62	1.66		1.73	1.72	1.78
270	50	40	30	25		45	35	30				40	35
	1.61	1.57	1.55	1.59		1.92	1.91	1.97				2.02	2.10
330		45	35	30		50	40	30				45	35
		1.82	1.82	1.88		2.22	2.23	2.18				2.35	2.32
390		50	40	30			45	35					40
		2.08	2.10	2.04			2.55	2.52					2.66
470			40	35				40					45
			2.30	2.38				2.92					3.07
560			50	40				45					
			2.76	2.75				3.34					
680				45				50					L(mm)
				3.18				3.85					R.C.

- Same case sized as LS series.
- Withstanding 3000 hours application of high ripple current at 85°C
- Corresponding product to RoHS.

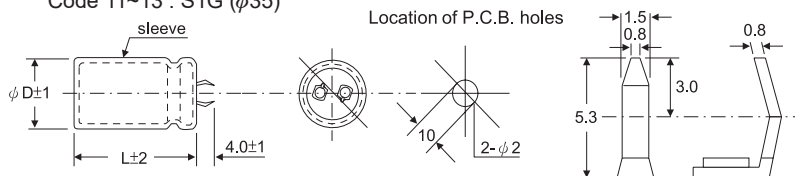


● SPECIFICATION

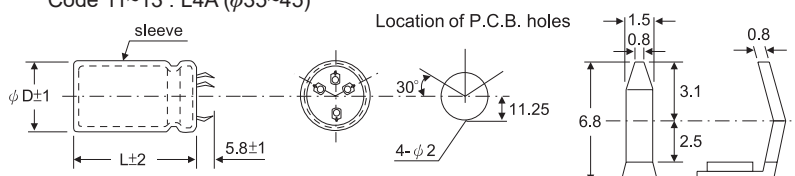
Item	Characteristic																
Operation Temperature Range	-40 ~ +85°C									-25 ~ +85°C							
Rated Working Voltage	16 ~ 450VDC									500 ~ 550VDC							
Capacitance Tolerance (120Hz 20°C)	±20% (M)																
Leakage Current (20°C)	I ≤0.02CV or 5 (mA) *Whichever is smaller after 5 minutes I : Leakage Current(μA) C : Rated Capacitance(μF) V : Working Voltage(V)																
Surge Voltage (20°C)	W.V.	16	25	35	50	63	80	100	160	180	200	250	350	400	450	500	550
	S.V.	20	32	44	63	79	100	125	200	225	250	300	400	450	500	550	600
Dissipation Factor (tan δ) (120Hz 20°C)	Rated Voltage (V)			16	25	35	50	63		80		100		160~450		500	550
	Capacitanc			—	—	—	—	≤27,000	>27,000	≤15,000	>15,000	—		—		—	—
	tan δ	φ35	0.80	0.60	0.50	0.40	0.35	0.40	0.25	0.30	0.25		0.15		0.20	0.20	
		φ40	0.90	0.70	0.60	0.45	0.35	0.40	0.25	0.30	0.25		0.15		0.20	0.20	
		φ45	1.00	0.80	0.70	0.50	0.35	0.40	0.25	0.30	0.25		0.15		0.20	0.20	
φ50		1.20	1.00	0.75	0.55	0.35	0.40	0.25	0.30	0.25		0.15		0.20	0.20		
Low Temperature Stability	Impedance ratio at 120Hz																
	Rated Voltage (V)					16~100				160~250				350~550			
	-25°C / +20°C					4				6				8			
	-40°C / +20°C					15				—				—			
Load Life	After 3000 hours application of WV at +85°C the capacitor shall meet the following limits.																
	Rated Voltage Range				≤ ±20% of initial value												
	Capacitance Change				≤175% of initial specified value												
	Dissipation Factor				≤initial specified value												
Shelf Life	At +85°C no voltage application after 1000 hours , the capacitor shall meet the limits for load life characteristics. (With voltage treatment)																

● TERMINAL TYPE

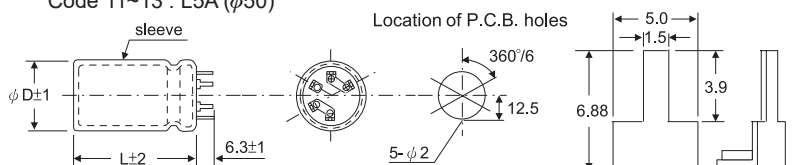
▲ P.C.B. TERMINAL (SNAP IN) Code 11~13 : S1G (φ35)



▲ P.C.B. TERMINAL (SNAP IN) Code 11~13 : L4A (φ35~45)



▲ P.C.B. TERMINAL Code 11~13 : L5A (φ50)



● RIPPLE CURRENT COEFFICIENTS

Temperature(°C)	40	60	70	85
Multiplier	1.80	1.40	1.20	1.00

Frequency(Hz)	60	120	400	1k	10k
W.V.	Multiplier				
≤100V	0.80	1.00	1.10	1.20	1.20
>100V	0.80	1.00	1.10	1.30	1.40

● CASE SIZE & MAX RIPPLE CURRENT

Case size : D x L (mm)
Max ripple current : A(rms) 85°C 120Hz

μF	V(DC) φD	15				25				35				50			
		35	40	45	50	35	40	45	50	35	40	45	50	35	40	45	50
27000										60				80	51	50	
										7.97				9.14	8.16	8.23	
33000										60				80	61	60	50
										7.97				9.41	9.11	9.18	10.73
39000										60	51			90	81	70	60
										8.00	8.22			9.99	10.44	9.92	11.52
47000										80	61	50		100	91	70	60
										9.56	9.74	8.88		10.59	11.18	10.09	11.88
56000						60	51			90	81	60	50		101	90	80
						8.81	9.12			10.53	10.83	9.76	10.97		11.77	11.31	12.75
68000						80	61	50		100	91	70	60			100	90
						10.62	10.48	9.66		11.07	11.64	11.08	12.23			12.50	13.70
82000		60	51			90	71	60	50		101	90	80				100
		10.25	10.38			11.35	11.02	10.26	12.54		12.33	12.07	13.22				14.50
100000		80	61	50		100	81	70	60			100	90				
		11.15	11.60	10.84		12.06	12.41	11.63	13.68			12.81	14.22				
120000		80	81	60	50		91	80	80				100				
		12.39	12.47	11.10	13.47		13.75	12.96	15.38				15.02				
150000			91	70	60		101	90	90								
			13.55	12.23	14.83		14.10	13.36	16.29								
180000			101	80	80			100	100								
			14.92	13.61	16.05			14.61	17.31								
220000				90	90												
				15.16	17.35												
270000					100												
					17.81												
																	L (mm) R.C.

μF	V(DC) φD	63				80				100				160			
		35	40	45	50	35	40	45	50	35	40	45	50	35	40	45	50
3300														60	51		
														6.33	6.38		
3900														80	61	50	
														7.43	7.48	7.37	
4700														90	81	60	50
														8.38	8.37	7.85	8.40
5600														100	81	60	60
														8.30	8.37	7.86	9.12
6800										60	51				101	80	70
										7.22	7.45				8.34	8.02	9.82
8200										70	61	50				90	80
										8.07	8.40	8.28				8.24	10.04
10000						60				90	71	60	50			100	90
						7.26				9.21	8.67	8.63	9.00			8.75	10.46
12000						70	51	50		100	81	70	60				100
						8.26	7.77	8.26		8.83	8.92	8.94	10.34				12.00
15000		60	51			80	61	60			101	80	70				
		7.74	8.46			8.91	8.52	9.06			10.30	9.91	10.96				
18000		80	61	50		90	81	70	50			90	80				
		9.63	9.47	9.33		10.34	10.61	10.64	10.13			10.25	11.12				
22000		90	71	60		100	91	80	60				100				
		10.27	9.94	9.89		10.18	10.49	10.58	11.36				12.59				
27000		100	81	70	50		101	90	80								
		10.44	10.94	10.97	11.15		11.75	11.90	12.43								
33000			101	80	60			100	90								
			12.08	11.62	11.67			12.26	13.44								
39000				90	70				100								
				11.93	12.22				14.71								
47000				100	80												
				12.67	13.19												
56000					100												
					14.05												
																	L (mm) R.C.

● CASE SIZE & MAX RIPPLE CURRENT

Case size : D x L (mm)
Max ripple current : A(rms) 85°C 120Hz

μF	V(DC) φD	180				200				250				350			
		35	40	45	50	35	40	45	50	35	40	45	50	35	40	45	50
1000														60	51		
														3.84	3.86		
1200														80	61	50	50
														4.67	4.46	4.39	5.22
1500														80	71	60	60
														5.09	5.20	5.18	6.03
1800										60	51			100	81	80	80
										4.56	4.59			6.03	5.90	6.26	3.97
2200	60					60	51			80	61	50			101	90	90
	4.91					5.69	5.47			5.29	5.06	4.98			7.03	7.12	7.93
2700	70	61				70	61	50		80	81	60	50			100	100
	5.06	5.14				5.83	5.91	5.83		5.86	6.34	5.95	6.86			8.06	8.98
3300	80	61	50			80	61	60	50	100	81	70	60				
	5.58	5.68	5.59			6.48	6.19	6.58	7.58	7.17	7.01	7.03	7.97				
3900	90	71	60	50		90	71	60	60		101	80	70				
	5.78	6.56	6.16	7.06		7.22	6.99	6.96	8.87		8.19	7.87	8.57				
4700	100	81	70	60			91	70	70			90	80				
	6.18	6.74	6.33	7.89			7.84	7.45	9.90			8.84	9.69				
5600		101	80	70			101	80	70			100	90				
		7.85	7.55	8.37			8.13	7.82	10.26			9.82	10.84				
6800			90	80				90	80				100				
			8.45	8.51				8.13	11.66				12.16				
7500								100	90								
								8.26	12.54								
8200			100	90					100								
			8.64	8.74					13.36								
10000				100													L (mm)
				9.27													R.C.

μF	V(DC) φD	400				450				500				550			
		35	40	45	50	35	40	45	50	35	40	45	50	35	40	45	50
330														60	51		
														2.52	2.62		
390										60	51			70	61	50	
										2.83	2.94			2.83	2.97	2.93	
470										60	51	50		80	71	60	50
										2.59	2.71	2.88		3.18	3.36	3.35	3.19
560						60				80	61	60	50	90	81	70	60
						2.94				3.66	3.13	3.33	3.54	3.52	3.75	3.76	3.61
680						70	51	50		80	81	70	60	100	91	80	70
						3.39	3.19	3.39		3.25	4.52	4.53	4.13	3.92	4.19	4.23	4.08
820	60	51				80	61	60	50	100	81	80	70		101	90	80
	3.55	3.58				3.95	3.77	4.01	5.04	4.04	3.95	4.20	4.57		4.27	4.33	4.55
1000	80	61	50	50		90	81	70	60		101	90	80			100	90
	4.26	4.26	4.29	4.77		4.39	4.50	4.51	5.03		4.82	4.88	5.13			4.14	5.07
1200	80	61	60	60		100	81	80	80			100	90				100
	4.56	4.56	5.07	5.51		4.80	4.70	4.99	5.83			5.61	5.79				5.56
1500	100	81	80	80			101	90	90				100				
	5.51	5.52	6.14	6.66			5.80	5.88	6.70				6.64				
1800		101	90	90				100	100								
		6.67	6.92	7.51				6.75	7.51								
2200			100	100													L (mm)
			7.46	8.50													R.C.

- Withstanding 5000 hours application of high ripple current at 85°C.
- Corresponding product to RoHS

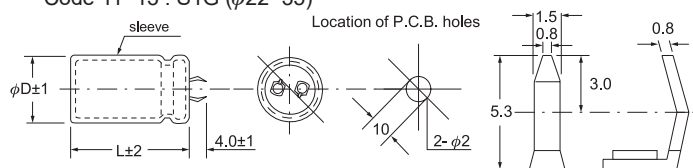


● SPECIFICATION

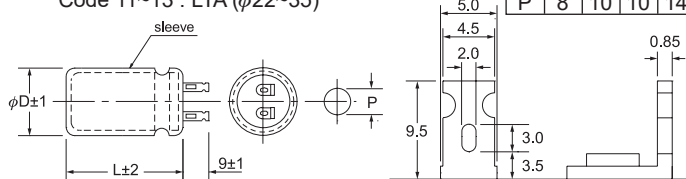
Item	Characteristic									
Operation Temperature Range	-40 ~ +85°C									
Rated Working Voltage	160 ~ 450VDC									
Capacitance Tolerance (120Hz 20°C)	±20%(M)									
Leakage Current (20°C)	I ≤0.02CV or 3 (mA) *Whichever is smaller after 5 minutes I : Leakage Current(μA) C : Rated Capacitance(μF) V : Working Voltage(V)									
Surge Voltage (20°C)	W.V.	160	200	250	350	385	400	420	450	
	S.V.	200	250	300	400	420	450	470	500	
Dissipation Factor (tan δ) (120Hz 20°C)	Rated Voltage (V)	160	200	250	350	385	400	420	450	
	tan δ	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	
Low Temperature Stability	Impedance ratio at 120Hz									
	Rated Voltage (V)	160~250					350~450			
	-25°C / +20°C	4					6			
Load Life	After 5000 hours application of W.V. and +85°C ripple current value, the capacitor shall meet the following limits. (DC + ripple peak voltage ≤ rate working voltage)									
	Capacitance Change	≤±20% of initial value								
	Dissipation Factor	≤175% of initial specified value								
	Leakage current	≤initial specified value								
Shelf Life	At +85°C, no voltage application after 1000 hours, the capacitor shall meet the limits for load life characteristics. (With voltage treatment)									

● TERMINAL TYPE

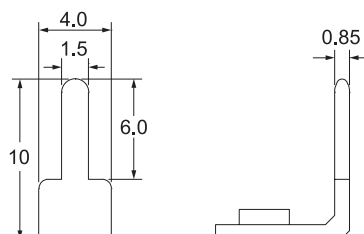
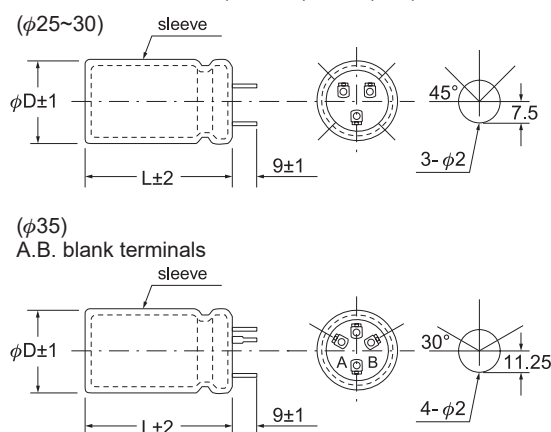
▲ P.C.B. TERMINAL (SNAP IN) Code 11~13 : S1G (φ22~35)



▲ LUG TERMINAL Code 11~13 : LTA (φ22~35)



▲ P.C.B. TERMINAL Code 11~13 : LBA (φ25~30), LCA (φ35)



● RIPPLE CURRENT COEFFICIENTS

Temperature(°C)	40	60	70	85
Multiplier	1.80	1.40	1.20	1.00

Frequency(Hz)	60	120	400	1k	10k
W.V.	Multiplier				
≥160V	0.80	1.00	1.10	1.30	1.40

● CASE SIZE & MAX RIPPLE CURRENT

Case size : D x L (mm)
Max ripple current : A(rms) 85°C 120Hz

μF	V(DC) ϕD	160				200				250				350			
		22	25	30	35	22	25	30	35	22	25	30	35	22	25	30	35
68														25			
														0.63			
100														30	25		
														0.81	0.82		
150										25				40	30		
										0.94				1.13	1.03		
220	25					25				30	25			50	40	30	
	1.13					1.13				1.24	1.24			1.44	1.44	1.44	
330	30					30	25			40	30				50	40	30
	1.44					1.44	1.55			1.65	1.65				1.96	1.96	1.96
470	35	30				40	30	25			40	30				50	40
	1.85	1.85				1.96	1.96	1.96			2.16	2.06				2.58	2.58
560											45	35	25				45
											2.50	2.50	2.50				2.88
680	45	35	30			40	30					40	30				50
	2.47	2.47	2.47			2.58	2.47					2.78	2.78				3.12
1000		45	35	30			40	35					40				
		3.19	3.19	3.19			3.40	3.61					3.71				
1500			45	40				45									
			4.33	4.33				4.74									
2200				50													L(mm)
				5.97													R.C.

μF	V(DC) ϕD	385				400				420				450			
		22	25	30	35	22	25	30	35	22	25	30	35	22	25	30	35
47														25			
														0.53			
68	25					25								30	25		
	0.63					0.63								0.67	0.68		
100	30	25				30	25			30	25			40	30	25	
	0.81	0.82				0.81	0.82			0.81	0.82			0.91	0.89	0.93	
120						35	30			40	30						
						0.95	0.95			0.97	0.97						
150	40	30				40	35	25		45	35	25		50	40	30	
	1.13	1.03				1.13	1.13	1.13		1.11	1.14	1.15		1.20	1.24	1.13	
180							40	30		50	35	30			45	35	30
							1.24	1.24		1.30	1.25	1.30			1.34	1.34	1.34
220	50	40	30			40	35				40	35				40	30
	1.44	1.44	1.44			1.44	1.55				1.45	1.50				1.55	1.55
270						45	35	25			50	35	30			45	35
						1.65	1.65	1.65			1.70	1.67	1.76			1.85	1.85
330		50	40	30			45	35				45	35				40
		1.96	1.96	1.96			2.06	2.06				2.02	2.04				2.16
390							50	40				50	40				
							2.27	2.27				2.29	2.29				
470			50	40				45					45				50
			2.58	2.58				2.68					2.66				2.78
560				45				50					50				
				2.88				2.99					3.02				
680				50													L(mm)
				3.12													R.C.

- Same case sized as HS series.
- Withstanding 3000 hours application of high ripple current at 105°C
- Corresponding product to RoHS.

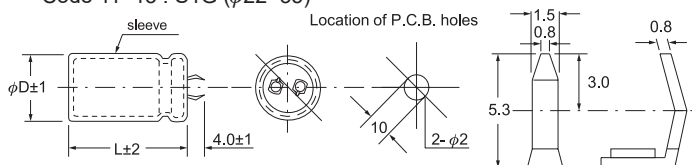


SPECIFICATION

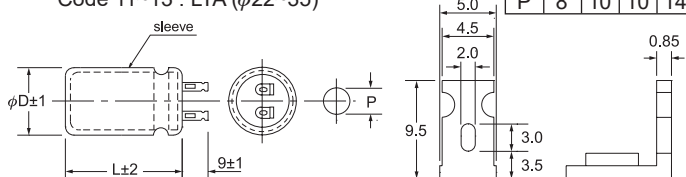
Item	Characteristic														
Operation Temperature Range	-40 ~ +105°C														
Rated Working Voltage	16 ~ 450VDC														
Capacitance Tolerance (120Hz 20°C)	±20%(M)														
Leakage Current (20°C)	I ≤0.02CV or 3 (mA) *Whichever is smaller after 5 minutes I : Leakage Current(μA) C : Rated Capacitance(μF) V : Working Voltage(V)														
Surge Voltage (20°C)	W.V.	16	25	35	50	63	80	100	160	180	200	250	350	400	450
	S.V.	20	32	44	63	79	100	125	200	225	250	300	400	450	500
Dissipation Factor (tan δ) (120Hz 20°C)	Rated Voltage (V)			16	25	35	50		63		80		100		≥160
	Capacitance			—	—	—	≤6,800	≥10,000	≤6,800	≥10,000	≤3,300	≥4,700	≤3,300	≥4,700	—
	tan δ			0.50	0.40	0.35	0.30	0.35	0.25	0.35	0.20	0.25	0.20	0.25	0.15
Low Temperature Stability	Impedance ratio at 120Hz														
	Rated Voltage (V)			16	25	35	50	63~100	160~250	350~450					
	-25°C / +20°C			6	6	6	4	3	4	6					
	-40°C / +20°C			15	15	10	8	6	—	—					
Load Life	After 3000 hours application of W.V. and +105°C ripple current value, the capacitor shall meet the following limits. (DC + ripple peak voltage ≤ rate working voltage)														
	Capacitance Change			≤±20% of initial value											
	Dissipation Factor			≤175% of initial specified value											
	Leakage current			≤initial specified value											
Shelf Life	At +105°C, no voltage application after 1000 hours, the capacitor shall meet the limits for load life characteristics. (With voltage treatment)														

TERMINAL TYPE

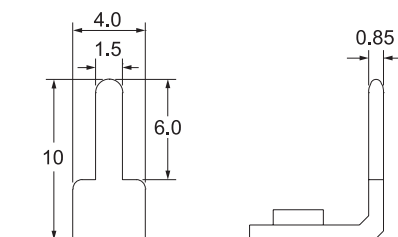
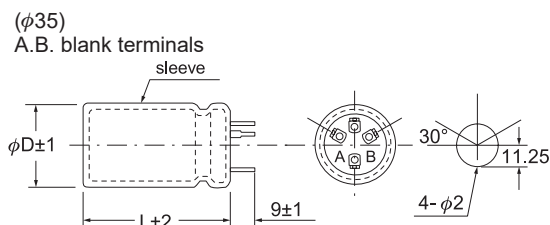
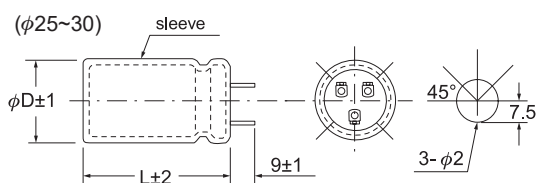
▲ P.C.B. TERMINAL (SNAP IN) Code 11~13 : S1G (φ22~35)



▲ LUG TERMINAL Code 11~13 : LTA (φ22~35)



▲ P.C.B. TERMINAL Code 11~13 : LBA (φ25~30), LCA (φ35)



RIPPLE CURRENT COEFFICIENTS

Temperature(°C)	40	60	70	85	105
Multiplier	2.50	2.20	2.00	1.80	1.00

Frequency(Hz)	60	120	400	1k	10k
W.V.	Multiplier				
≤100V	0.80	1.00	1.10	1.20	1.20
≥160V	0.80	1.00	1.10	1.30	1.40

● CASE SIZE & MAX RIPPLE CURRENT

Case size : D x L (mm)
Max ripple current : A(rms) 105°C 120Hz

μF	V(DC) φD	16				25				35				50			
		22	25	30	35	22	25	30	35	22	25	30	35	22	25	30	35
1500														25			
														1.05			
2200										25				30	25		
										1.17				1.31	1.25		
3300						25				30	25			35	30	25	
						1.34				1.43	1.36			1.58	1.52	1.50	
4700	25					30	25			35	30	25		45	35	30	25
	1.36					1.58	1.51			1.65	1.58	1.56		1.90	1.74	1.73	1.86
6800	35	30				35	30	25		50	40	30	25		50	35	30
	1.74	1.67				1.85	1.78	1.75		2.09	1.94	1.82	1.96		2.19	1.98	2.15
10000	45	35	25			45	35	30	25		50	35	30			45	40
	2.09	1.92	1.77			2.19	2.01	2.00	2.15		2.24	2.03	2.20			2.39	2.62
15000		45	35	30		45	35	30				50	40				50
		2.29	2.17	2.36		2.54	2.41	2.61				2.79	2.92				3.52
22000			45	35			45	40									
			2.86	2.97			3.24	3.55									
33000				50				50									L(mm)
				4.21				4.78									R.C.

μF	V(DC) φD	63				80				100				160			
		22	25	30	35	22	25	30	35	22	25	30	35	22	25	30	35
330														25			
														0.88			
390														30	25		
														1.03	1.03		
470														30	25		
														1.14	1.13		
560														35	30	25	
														1.32	1.33	1.38	
680														40	35	25	
														1.55	1.57	1.53	
820														45	40	30	25
														1.79	1.82	1.80	1.84
1000	25					30	25			30	25				45	35	25
	0.91					1.04	0.99			1.11	1.06				2.12	2.12	2.04
1200															50	35	30
															2.43	2.32	2.39
1500	30	25				35	30	25		40	35	25				45	35
	1.14	1.08				1.28	1.23	1.21		1.44	1.39	1.29				2.88	2.84
1800																	40
																	3.28
2200	35	30	25			50	40	30	25		45	35					
	1.40	1.35	1.33			1.72	1.60	1.50	1.61		1.77	1.68					
3300	45	40	30	25		50	40	30				45	35				
	1.77	1.72	1.61	1.73		1.97	1.78	1.93				2.07	2.15				
4700		50	35	30			50	40					45				
		2.03	1.84	2.00			2.11	2.32					2.52				
6800			45	40				50									
			2.20	2.41				2.72									
10000				50													L(mm)
				2.87													R.C.

● CASE SIZE & MAX RIPPLE CURRENT

Case size : D x L (mm)
Max ripple current : A(rms) 105°C 120Hz

μF	$V(\text{DC})$ ϕD	180				200				250			
		22	25	30	35	22	25	30	35	22	25	30	35
220						25				30	25		
						0.85				0.91	0.91		
270	25					25				35	25		
	0.80					0.94				1.07	1.01		
330	30	25				30	25			35	30	25	
	0.95	0.95				1.12	1.12			1.19	1.20	1.24	
390	30	25				35	25			40	35	25	
	1.03	1.04				1.31	1.22			1.37	1.39	1.35	
470	35	30	25			40	30	25		50	40	30	25
	1.21	1.22	1.27			1.52	1.45	1.50		1.66	1.61	1.59	1.63
560	40	30	25			45	35	30			45	35	25
	1.40	1.34	1.39			1.75	1.68	1.76			1.85	1.85	1.78
680	45	35	30	25		45	40	30	25		50	35	30
	1.63	1.57	1.64	1.68		1.92	1.96	1.94	1.98		2.14	2.04	2.10
820	50	40	30	25		45	35	30				45	35
	1.88	1.83	1.80	1.85		2.27	2.26	2.33				2.49	2.45
1000		45	35	30		50	40	30					40
		2.12	2.12	2.18		2.63	2.64	2.58					2.86
1200			40	30			45	35					45
			2.45	2.39			3.04	3.00					3.29
1500			50	35				45					50
			2.91	2.74				3.58					3.68
1800				40				50					L(mm)
				3.17				4.10					R.C.

μF	$V(\text{DC})$ ϕD	350				400				450			
		22	25	30	35	22	25	30	35	22	25	30	35
47										25			
										0.39			
68						25				30	25		
						0.47				0.50	0.50		
82	25					30	25			35	30		
	0.43					0.56	0.56			0.59	0.60		
100	30	25				30	25			40	35	25	
	0.51	0.51				0.61	0.61			0.69	0.70	0.68	
120	30	25				35	30	25		45	35	30	25
	0.55	0.55				0.72	0.73	0.75		0.80	0.77	0.80	0.82
150	35	30	25			40	35	30			45	35	30
	0.66	0.67	0.69			0.85	0.86	0.90			0.96	0.96	0.99
180	40	35	30			45	40	30	25		50	35	30
	0.77	0.78	0.82			0.98	1.00	0.99	1.01		1.10	1.05	1.08
220	50	40	30	25		45	35	30				40	35
	0.94	0.91	0.90	0.92		1.17	1.16	1.20				1.22	1.27
270		45	35	30		50	40	30				50	40
		1.07	1.06	1.10		1.35	1.36	1.33				1.49	1.48
330		50	40	30			45	35					45
		1.23	1.24	1.21			1.58	1.56					1.72
390			45	35				40					50
			1.42	1.40				1.79					1.96
470				40				45					
				1.62				2.07					
560				45				50					L(mm)
				1.86				2.36					R.C.

LARGE CAN TYPE

- Withstanding 3000 hours application of high ripple current at 105°C.
- Corresponding product to RoHS.

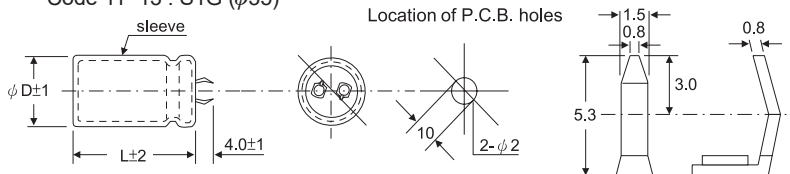


SPECIFICATION

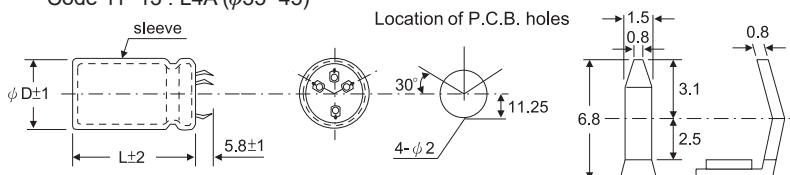
Item	Characteristic															
Operation Temperature Range	-40 ~ +105°C									-25 ~ +105°C						
Rated Working Voltage	16 ~ 450VDC									500VDC						
Capacitance Tolerance (120Hz 20°C)	±20% (M)															
Leakage Current (20°C)	I ≤0.02CV or 5 (mA) *Whichever is smaller after 5 minutes I : Leakage Current(μA) C : Rated Capacitance(μF) V : Working Voltage(V)															
Surge Voltage (20°C)	W.V.	16	25	35	50	63	80	100	160	180	200	250	350	400	450	500
	S.V.	20	32	44	63	79	100	125	200	225	250	300	400	450	500	550
Dissipation Factor (tan δ) (120Hz 20°C)	Rated Voltage (V)			16	25	35	50	63		80		100		160~450		500
	Capacitance			—	—	—	—	≤27,000	>27,000	≤15,000	>15,000	—		—		—
	tan δ	φ35	0.80	0.60	0.50	0.40	0.35	0.40	0.25	0.30	0.25	0.15		0.20		
		φ40	0.90	0.70	0.60	0.45	0.35	0.40	0.25	0.30	0.25	0.15		0.20		
		φ45	1.00	0.80	0.70	0.50	0.35	0.40	0.25	0.30	0.25	0.15		0.20		
		φ50	1.20	1.00	0.75	0.55	0.35	0.40	0.25	0.30	0.25	0.15		0.20		
Low Temperature Stability	Impedance ratio at 120Hz															
	Rated Voltage (V)				16~100				160~250				350~500			
	-25°C / +20°C				4				6				8			
	-40°C / +20°C				15				—				—			
Load Life	After 3000 hours application of WV at +105°C the capacitor shall meet the following limits.															
	Rated Voltage Range			≤ ±20% of initial value												
	Capacitance Change			≤ 175% of initial specified value												
	Dissipation Factor			≤ initial specified value												
Shelf Life	At +105°C no voltage application after 1000 hours , the capacitor shall meet the limits for load life characteristics. (With voltage treatment)															

TERMINAL TYPE

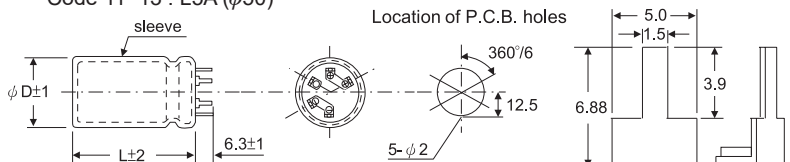
▲ P.C.B. TERMINAL (SNAP IN) Code 11~13 : S1G (φ35)



▲ P.C.B. TERMINAL (SNAP IN) Code 11~13 : L4A (φ35~45)



▲ P.C.B. TERMINAL Code 11~13 : L5A (φ50)



RIPPLE CURRENT COEFFICIENTS

Temperature(°C)	40	60	70	85	105
Multiplier	2.50	2.20	2.00	1.80	1.00

Frequency(Hz)	60	120	400	1k	10k
W.V.	Multiplier				
≤100V	0.80	1.00	1.10	1.20	1.20
>100V	0.80	1.00	1.10	1.30	1.40

● CASE SIZE & MAX RIPPLE CURRENT

Case size : D x L (mm)
Max ripple current : A(rms) 105°C 120Hz

μF	$\frac{V(\text{DC})}{\phi D}$	16				25				35				50			
		35	40	45	50	35	40	45	50	35	40	45	50	35	40	45	50
15000														60	51		
														5.17	4.91		
18000														60	61		
														5.44	6.03		
22000														80	61		
														6.83	5.64		
27000										60	51			80	71	60	
										5.71	5.70			6.30	6.68	6.30	
33000										70	61			100	81	70	60
										6.46	6.80			7.33	6.40	7.44	8.67
39000						60	51			80	71	50			101	80	70
						6.26	6.09			6.78	7.27	6.20			7.26	6.62	9.31
47000						60	51			100	81	60	50			90	80
						6.57	6.69			8.23	8.09	7.03	8.53			7.66	9.52
56000						80	61	50			91	70	60			100	90
						7.78	7.22	6.65			8.88	8.56	9.31			8.76	9.94
68000		60	51			90	81	60	50		101	80	80				100
		6.85	7.39			8.62	9.00	7.91	8.57		9.28	9.56	11.14				10.91
82000		80	61			100	81	70	50			100	90				
		8.16	7.70			8.94	8.99	8.43	8.71			11.07	11.33				
100000		80	71	50			101	80	60				100				
		8.15	8.67	7.59			9.87	9.86	9.95				11.92				
120000		100	81	60	50			100	80								
		8.84	9.11	8.54	9.23			10.74	11.28								
150000			101	70	60												
			10.07	9.18	10.19												
180000				80	80				100								
				10.06	11.47				12.47								
220000				100	90												
				10.84	12.01												
250000					100												
					12.67												
																	L (mm) R.C.

μF	$\frac{V(\text{DC})}{\phi D}$	63				80				100				160			
		35	40	45	50	35	40	45	50	35	40	45	50	35	40	45	50
2200														60	51		
														3.36	3.39		
2700														70	61	50	
														3.83	3.89	3.83	
3300														80	71	60	50
														4.32	4.41	4.39	4.33
3900														90	81	70	60
														4.95	5.08	5.09	5.07
4700										60	51			100	91	80	70
										4.10	4.13			5.23	5.39	5.43	5.44
5600										70	61				101	90	80
										4.62	4.69				5.61	5.68	5.72
6800										80	61	50				100	90
										5.40	5.17	5.09				5.90	5.97
8200						60	51			90	81	60	60				100
						4.64	4.67			5.56	6.18	5.80	6.65				6.11
10000						70	61	50		100	81	70	60				
						5.48	5.57	5.48		6.45	6.83	6.84	7.08				
12000		60	51			80	71	60	50		101	80	70				
		4.74	4.78			6.11	6.24	6.21	6.13		7.63	7.33	7.66				
15000		70	51			100	81	70	60			100	80				
		5.20	4.90			6.91	6.76	6.77	6.74			8.30	8.34				
18000		80	61	50	50		101	80	80				100				
		6.05	5.79	5.70	6.07		7.11	6.83	7.25				9.24				
22000		90	81	60	60			100	90								
		7.06	7.24	6.80	7.23			7.92	8.02								
27000			91	70	60				100								
			8.07	7.68	7.64				8.82								
33000			101	80	80												
			7.91	7.61	8.08												
39000				100	90												
				8.66	8.76												
47000					100												
					9.51												
																	L (mm) R.C.

● CASE SIZE & MAX RIPPLE CURRENT

Case size : D x L (mm)
Max ripple current : A(rms) 105°C 120Hz

μF	V(DC) φD	180				200				250				350			
		35	40	45	50	35	40	45	50	35	40	45	50	35	40	45	50
820														60	51		
														2.76	2.78		
1000														70	61	50	50
														2.99	3.03	2.99	3.58
1200														80	71	60	50
														3.26	3.32	3.31	3.70
1500										70				100	81	70	60
										3.20				4.57	3.81	3.82	4.19
1800		60	51			60	51			80	61	50			101	80	80
		3.27	3.30			3.27	3.06			3.72	3.56	3.50			5.24	5.04	5.84
2200		70	61	50		80	61	50		80	81	60	50			100	100
		3.87	3.93	3.88		4.11	3.65	3.60		3.97	4.29	4.03	4.42			6.15	6.72
2700		80	71	60	50	80	81	60		100	81	70	60				
		4.39	4.49	4.46	4.41	4.56	4.58	4.30		4.86	4.76	4.77	5.10				
3300		90	81	70	60	90	71	70	50		101	80	70				
		4.74	4.87	4.88	4.86	4.93	4.78	5.08	5.23		5.59	5.38	5.81				
3900		100	91	80	70	100	81	80	60			90	80				
		5.20	5.35	5.40	5.41	6.06	5.51	5.85	5.92			6.16	6.21				
4700			101	90	80		101	90	80			100	100				
			5.65	5.72	5.76		6.42	6.50	7.07			6.82	7.22				
5600				100	90			100	90								
				5.95	6.02			7.44	7.83								
6800					100				100								L (mm)
					6.26				9.04								R.C.

μF	V(DC) φD	400				450				500			
		35	40	45	50	35	40	45	50	35	40	45	50
390										60	51		
										1.60	1.61		
470						60				70	61	50	
						2.03				1.88	1.91	1.88	
560						70	51			80	71	60	50
						2.37	2.23			2.18	2.23	2.22	2.32
680		60	51			80	61	50	50	100	81	70	60
		2.37	2.39			2.78	2.66	2.62	3.03	2.66	2.60	2.61	2.75
820		70	61	50	50	90	71	60	60		101	80	70
		2.79	2.83	2.79	3.42	3.22	3.11	3.10	3.59		2.88	3.04	3.22
1000		80	61	60	60		91	70	70			90	80
		3.27	3.13	3.32	4.07		3.84	3.65	4.22			3.53	3.77
1200		100	81	70	60		101	80	80			100	90
		3.96	3.88	3.88	4.45		4.41	4.24	4.90			4.06	4.35
1500			101	80	80			90	90				100
			4.79	4.60	5.62			4.65	6.12				4.74
1800				100	100			100	100				L (mm)
				5.57	6.80			5.24	6.04				R.C.

- No sparks with specified DC overvoltage applied.
- Withstanding 3000 hours application of rate ripple current at 105°C.
- Corresponding product to RoHS

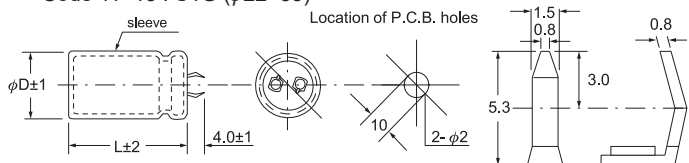


SPECIFICATION

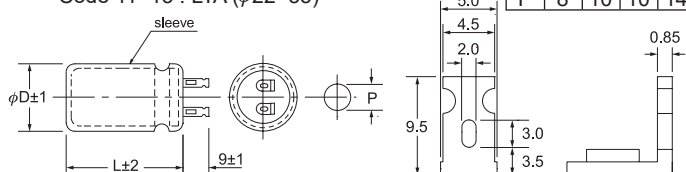
Item	Characteristic		
Operation Temperature Range	-25 ~ +105°C		
Rated Working Voltage	200 , 400VDC		
Capacitance Tolerance (120Hz 20°C)	±20%(M)		
Leakage Current (20°C)	I ≤0.02CV or 3 (mA) *Whichever is smaller after 5 minutes I : Leakage Current(μA) C : Rated Capacitance(μF) V : Working Voltage(V)		
Surge Voltage (20°C)	W.V.	200	400
	S.V.	250	450
Dissipation Factor (tan δ) (120Hz 20°C)	≤0.15		
Low Temperature Stability	Impedance ratio at 120Hz		
	Rated Voltage (V)	200	400
	-25°C / +20°C	4	6
DC Overvoltage Test	When an excessive DC voltage is applied to the capacitors under the test condition on next page, the vent shall operate and then the capacitors shall become open-circuit without burning material.		
Load Life	After 3000 hours application of W.V. and +105°C ripple current value, the capacitor shall meet the following limits. (DC + ripple peak voltage ≤ rate working voltage)		
	Capacitance Change	≤ ±20% of initial value	
	Dissipation Factor	≤ 175% of initial specified value	
	Leakage current	≤ initial specified value	
Shelf Life	At +105°C, no voltage application after 1000 hours, the capacitor shall meet the limits for load life characteristics. (With voltage treatment)		

TERMINAL TYPE

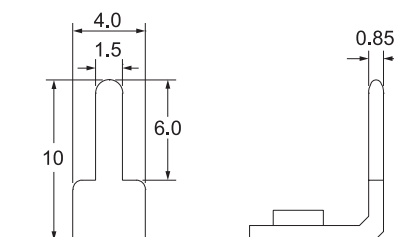
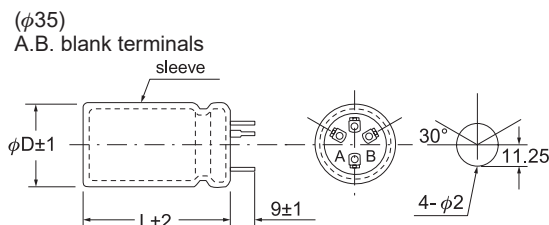
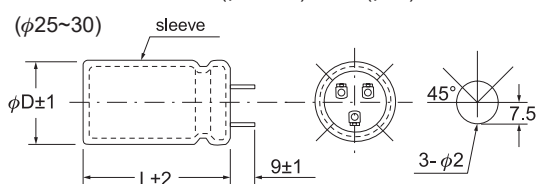
▲ P.C.B. TERMINAL (SNAP IN) Code 11~13 : S1G (φ22~35)



▲ LUG TERMINAL Code 11~13 : LTA (φ22~35)



▲ P.C.B. TERMINAL Code 11~13 : LBA (φ25~30), LCA (φ35)



RIPPLE CURRENT COEFFICIENTS

Temperature(°C)	40	60	70	85	105
Multiplier	2.50	2.20	2.00	1.80	1.00

Frequency(Hz)	60	120	400	1k	10k
W.V.	Multiplier				
200V	0.80	1.00	1.10	1.30	1.40
400V	0.80	1.00	1.10	1.30	1.40

● CASE SIZE & MAX RIPPLE CURRENT

Case size : D x L (mm)
Max ripple current : A(rms) 105°C 120Hz

μF	$\frac{V(\text{DC})}{\phi D}$	200				400			
		22	25	30	35	22	25	30	35
68						25			
						0.46			
82						30	25		
						0.55	0.52		
100						35	30		
						0.65	0.62		
120						40	30	25	
						0.76	0.68	0.67	
150						45	35	30	
						0.89	0.82	0.81	
180						50	40	30	25
						1.03	0.95	0.89	0.91
220							45	35	30
							1.11	1.04	1.08
270		25					50	40	35
		0.89					1.28	1.22	1.27
330		30	25					45	35
		1.06	1.01					1.42	1.40
390		35	30					50	40
		1.24	1.18					1.62	1.61
470		40	30	25					45
		1.44	1.30	1.34					1.86
560		45	35	30					
		1.65	1.51	1.58					
680		50	40	35					
		1.91	1.76	1.85					
820			50	35	30				
			2.13	2.03	2.03				
1000				45	35				
				2.50	2.38				
1200				50	40				
				2.86	2.75				
1500					45				L(mm)
					3.11				R.C.

● DC Overvoltage Test Condition

The vent will be operated and the capacity shall become an open circuit without burning the material when the following excess DC voltage is applied.

Rated Voltage	Capacitance	Current	Test DC Voltage
200 VDC	< 330 μF	4A	300 / 375 VDC
	$330 \leq C < 470 \mu\text{F}$	5A	
	$\geq 470 \mu\text{F}$	7A	
400 VDC	< 100 μF	2A	500 / 600 VDC
	$100 \leq C < 220 \mu\text{F}$	4A	
	$\geq 220 \mu\text{F}$	7A	

- Withstanding 5000 hours application of high ripple current at 105°C.
- Corresponding product to RoHS

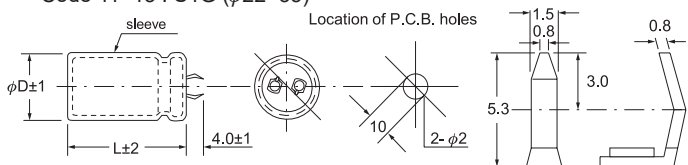


SPECIFICATION

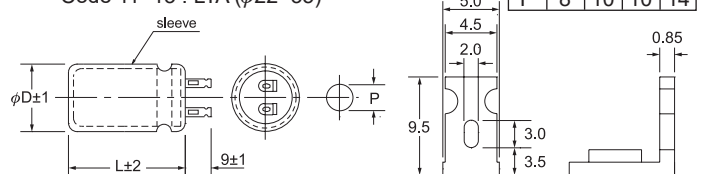
Item	Characteristic				
Operation Temperature Range	-40 ~ +105°C				
Rated Working Voltage	200 ~ 450VDC				
Capacitance Tolerance (120Hz 20°C)	±20%(M)				
Leakage Current (20°C)	I ≤0.02CV or 3 (mA) *Whichever is smaller after 5 minutes I : Leakage Current(μA) C : Rated Capacitance(μF) V : Working Voltage(V)				
Surge Voltage (20°C)	W.V.	200	250	400	450
	S.V.	250	300	450	500
Dissipation Factor (tan δ) (120Hz 20°C)	Rated Voltage (V)	200	250	400	450
	tan δ	0.15	0.15	0.15	0.15
Low Temperature Stability	Impedance ratio at 120Hz				
	Rated Voltage (V)	200~250		400~450	
	-25°C / +20°C	4		6	
Load Life	After 5000 hours application of W.V. and +105°C ripple current value, the capacitor shall meet the following limits. (DC + ripple peak voltage ≤ rate working voltage)				
	Capacitance Change	≤±20% of initial value			
	Dissipation Factor	≤175% of initial specified value			
	Leakage current	≤initial specified value			
Shelf Life	At +105°C, no voltage application after 1000 hours, the capacitor shall meet the limits for load life characteristics. (With voltage treatment)				

TERMINAL TYPE

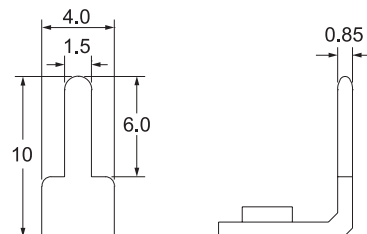
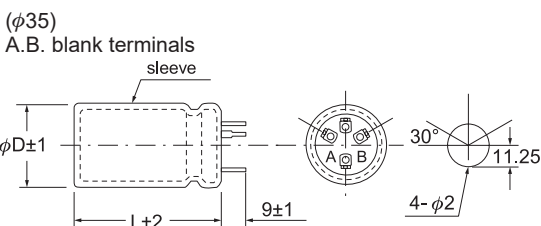
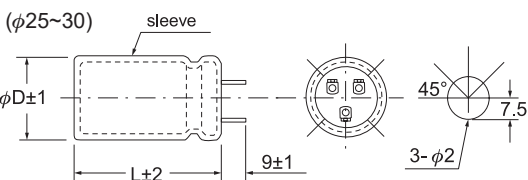
▲ P.C.B. TERMINAL (SNAP IN) Code 11~13 : S1G ($\phi 22 \sim 35$)



▲ LUG TERMINAL Code 11~13 : LTA ($\phi 22 \sim 35$)



▲ P.C.B. TERMINAL Code 11~13 : LBA ($\phi 25 \sim 30$), LCA ($\phi 35$)



RIPPLE CURRENT COEFFICIENTS

Temperature(°C)	40	60	70	85	105
Multiplier	2.50	2.20	2.00	1.80	1.00

Frequency(Hz)	60	120	400	1k	10k
W.V.	Multiplier				
$\geq 200V$	0.80	1.00	1.10	1.30	1.40

● CASE SIZE & MAX RIPPLE CURRENT

Case size : D x L (mm)
Max ripple current : A(rms) 105°C 120Hz

μF	V(DC) ϕD	200							250							
		22		25		30		35		22		25		30		35
150										25						
										0.69						
180									25	30		25				
									0.76	0.82		0.82				
220		25							30	35		30				
		0.85							0.91	0.97		0.98				
270		30		25					30	35	25	30				
		1.02		1.02					1.01	1.07	1.01	1.08				
330		30	35	25	30				35	40	30	35		25		
		1.12	1.20	1.12	1.21				1.19	1.26	1.20	1.28		1.24		
390		35	35	30	35		25		40	45	35	40	30	35		
		1.31	1.31	1.32	1.40		1.37		1.37	1.44	1.39	1.47	1.45	1.54		
470		40	45	30	35	25	30		50		40	45	30	35		25
		1.52	1.60	1.45	1.54	1.50	1.61		1.66		1.61	1.70	1.59	1.69		1.63
560		45	50	35	40	30	35				45		35	40		30
		1.75	1.83	1.68	1.78	1.76	1.87				1.85		1.85	1.95		1.91
680				40	50	30	35	25			50		40	45		30
				1.96	2.16	1.94	2.06	1.98			1.94		2.15	2.26		2.10
820				45		35	40	30					45	50		35
				2.27		2.26	2.39	2.33					2.49	2.60		2.45
1000					40	45	35	35					55			40
					2.64	2.78	2.74	2.74					3.00			2.86
1200					45	50	40	45							50	55
					3.04	3.19	3.17	3.33							3.44	3.58
1500							45	50							55	
							3.72	3.75							4.00	
1800								50								L(mm)
								4.10								R.C.

μF	V(DC) φD	400							450						
		22		25		30		35	22		25		30		35
47										25					
										0.39					
56									25	30					
									0.42	0.46					
68		25							30	35	25				
		0.47							0.50	0.54	0.50				
82		25	30						30	35	25	30			
		0.52	0.56						0.55	0.59	0.55	0.60			
100		30	35	25	30				35	40	30	35		25	
		0.62	0.66	0.62	0.66				0.65	0.69	0.66	0.70		0.68	
120		35	40	30	35		25		40	50	35	40	25	30	25
		0.72	0.76	0.73	0.77		0.75		0.76	0.84	0.77	0.81	0.75	0.80	0.82
150		40	45	30	40	25	30		50		40	45	30	35	30
		0.85	0.90	0.81	0.92	0.84	0.90		0.94		0.91	0.96	0.90	0.96	0.99
180		45	50	35	40	30	35	25			45		35	40	30
		0.98	1.03	0.95	1.06	0.99	1.06	1.01			1.05		1.05	1.11	1.08
220		50		40	50	30	35	30					40	45	30
		1.14		1.11	1.22	1.09	1.16	1.20					1.22	1.29	1.19
270			45		35	45	30	35					45	50	35
			1.29		1.29	1.43	1.33	1.41					1.43	1.49	1.41
330					40	50	35	40					50		40
					1.51	1.66	1.56	1.65					1.65		1.64
390					45		35	45							45
					1.72		1.70	1.88							1.87
470							40	50							
							1.97	2.16							
560							45								L(mm)
							2.26								R.C.

- Withstanding 7000 hours application of high ripple current at 105°C.
- Corresponding product to RoHS

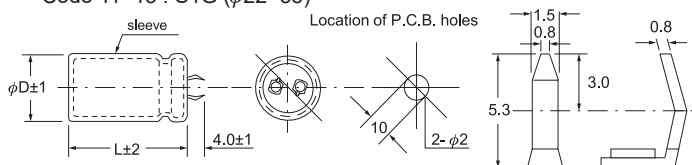


SPECIFICATION

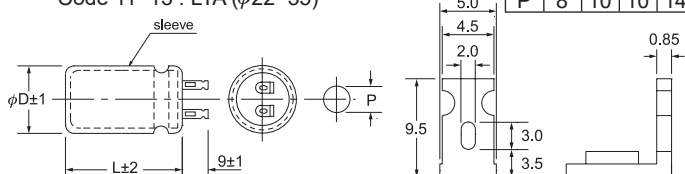
Item	Characteristic						
Operation Temperature Range	-40 ~ +105°C						
Rated Working Voltage	160 ~ 450VDC						
Capacitance Tolerance (120Hz 20°C)	±20%(M)						
Leakage Current (20°C)	I ≤0.02CV or 3 (mA) *Whichever is smaller after 5 minutes I : Leakage Current(μA) C : Rated Capacitance(μF) V : Working Voltage(V)						
Surge Voltage (20°C)	W.V.	160	200	250	350	400	450
	S.V.	200	250	300	400	450	500
Dissipation Factor (tan δ) (120Hz 20°C)	Rated Voltage	160	200	250	350	400	450
	tan δ	0.15	0.15	0.15	0.15	0.15	0.15
Low Temperature Stability	Impedance ratio at 120Hz						
	Rated Voltage	160 ~ 250V			350 ~ 450V		
	-25°C / +20°C	4			6		
Load Life	After 7000 hours application of W.V. and +105°C ripple current value, the capacitor shall meet the following limits. (DC + ripple peak voltage ≤ rate working voltage)						
	Capacitance Change	≤ ±20% of initial value					
	Dissipation Factor	≤ 175% of initial specified value					
	Leakage current	≤ initial specified value					
Shelf Life	At +105°C, no voltage application after 1000 hours, the capacitor shall meet the limits for load life characteristics. (With voltage treatment)						

TERMINAL TYPE

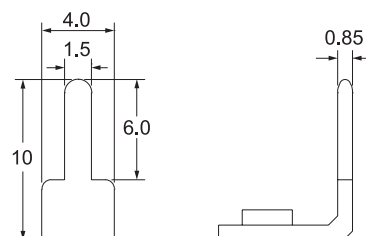
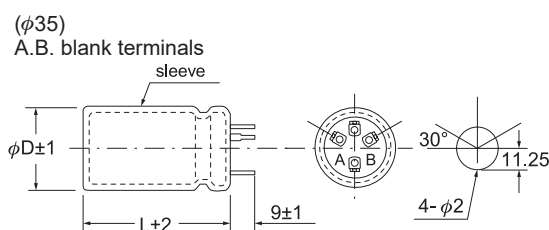
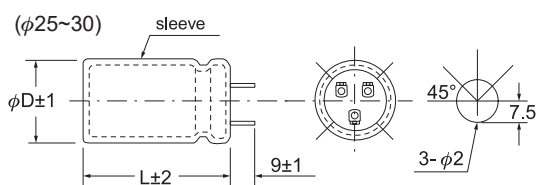
▲ P.C.B. TERMINAL (SNAP IN) Code 11~13 : S1G ($\phi 22 \sim 35$)



▲ LUG TERMINAL Code 11~13 : LTA ($\phi 22 \sim 35$)



▲ P.C.B. TERMINAL Code 11~13 : LBA ($\phi 25 \sim 30$), LCA ($\phi 35$)



RIPPLE CURRENT COEFFICIENTS

Temperature(°C)	40	60	70	85	105
Multiplier	2.50	2.20	2.00	1.80	1.00

Frequency(Hz)	60	120	400	1k	10k
W.V.	Multiplier				
$\geq 160V$	0.80	1.00	1.10	1.30	1.40

● CASE SIZE & MAX RIPPLE CURRENT

Case size : D x L (mm)
Max ripple current : A(rms) 105°C 120Hz

μF	V(DC) φD	160				200				250			
		22	25	30	35	22	25	30	35	22	25	30	35
180										25			
										0.84			
220						25				30			
						0.89				0.92			
270						30				35	25		
						1.06				1.09	1.02		
330	25					30	25			40	30		
	1.13					1.17	1.17			1.27	1.21		
390	30					35	30			45	35	25	
	1.27					1.30	1.31			1.39	1.34	1.30	
470	30	25				40	30	25		50	40	30	
	1.39	1.39				1.51	1.44	1.49		1.60	1.56	1.54	
560	35	30				45	35	30			45	35	
	1.55	1.56				1.65	1.59	1.66			1.70	1.70	
680	40	35	25				40	30			50	40	30
	1.80	1.83	1.78				1.86	1.83			1.97	1.98	1.93
820	50	40	30				45	35				45	35
	2.08	2.02	2.00				2.04	2.03				2.17	2.14
1000		45	35					45	30				40
		2.35	2.35					2.50	2.32				2.50
1200		50	40	30				50	40				50
		2.56	2.57	2.51				2.71	2.70				2.84
1500			45	35					45				
			2.90	2.86					3.04				
1800			50	40					50				
			3.32	3.30					3.48				
2200				50									L(mm)
				3.85									R.C.

μF	V(DC) φD	350				400				450			
		22	25	30	35	22	25	30	35	22	25	30	35
47										25			
										0.45			
56										30			
										0.53			
68						25				30	25		
						0.56				0.58	0.58		
82						30				35	30		
						0.66				0.68	0.69		
100	25					30	25			40	30	25	
	0.63					0.67	0.67			0.74	0.70	0.73	
120	30	25				35	30			45	35	30	
	0.74	0.74				0.79	0.80			0.85	0.82	0.85	
150	35	30				40	30	25			40	35	
	0.88	0.89				0.94	0.89	0.92			0.97	1.02	
180	40	30	25			45	35	30			45	35	30
	1.02	0.98	1.01			1.08	1.04	1.09			1.12	1.11	1.15
220	45	35	30				40	35				40	35
	1.09	0.99	1.10				1.12	1.17				1.19	1.24
270		40	35				50	40	30			50	40
		1.24	1.30				1.36	1.37	1.34			1.46	1.45
330		45	35	30				45	35				45
		1.44	1.44	1.48				1.60	1.57				1.68
390			40	35				50	40				50
			1.58	1.63				1.73	1.72				1.82
470			50	40					45				
			1.90	1.89					1.99				
560				40					50				
				1.97					2.16				
680				50									L(mm)
				2.38									R.C.

- Withstanding 10000 hours application of high rate ripple current at 105°C.
- Corresponding product to RoHS

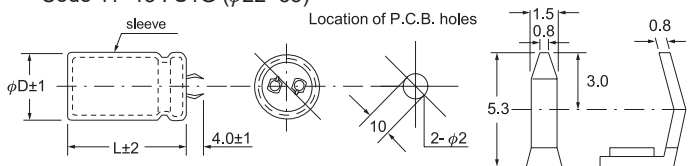


SPECIFICATION

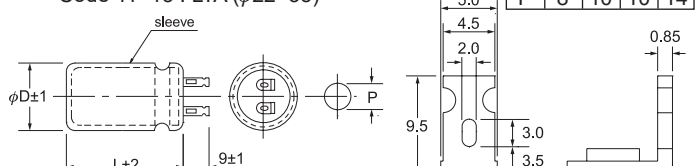
Item	Characteristic				
Operation Temperature Range	-40 ~ +105°C				
Rated Working Voltage	200 ~ 450VDC				
Capacitance Tolerance (120Hz 20°C)	±20%(M)				
Leakage Current (20°C)	I ≤0.02CV or 3 (mA) *Whichever is smaller after 5 minutes I : Leakage Current(μA) C : Rated Capacitance(μF) V : Working Voltage(V)				
Surge Voltage (20°C)	W.V.	200	250	400	450
	S.V.	250	300	450	500
Dissipation Factor (tan δ) (120Hz 20°C)	Rated Voltage	200	250	400	450
	tan δ	0.15	0.15	0.25	0.25
Low Temperature Stability	Impedance ratio at 120Hz				
	Rated Voltage	200 ~ 250V		400 ~ 450V	
	-25°C / +20°C	4		6	
Load Life	After 10000 hours application of W.V. and +105°C the capacitor shall meet the following limits. (DC + ripple peak voltage ≤ rate working voltage)				
	Capacitance Change	≤ ±20% of initial value			
	Dissipation Factor	≤175% of initial specified value			
	Leakage current	≤initial specified value			
Shelf Life	At +105°C, no voltage application after 1000 hours, the capacitor shall meet the limits for load life characteristics. (With voltage treatment)				

TERMINAL TYPE

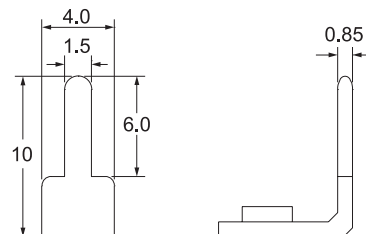
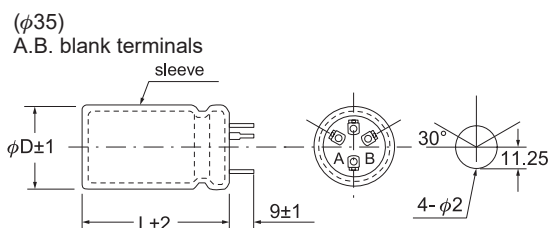
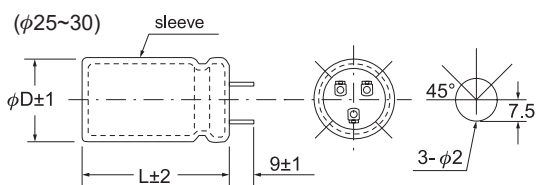
▲ P.C.B. TERMINAL (SNAP IN) Code 11~13 : S1G ($\phi 22 \sim 35$)



▲ LUG TERMINAL Code 11~13 : LTA ($\phi 22 \sim 35$)



▲ P.C.B. TERMINAL Code 11~13 : LBA ($\phi 25 \sim 30$), LCA ($\phi 35$)



RIPPLE CURRENT COEFFICIENTS

Temperature(°C)	40	60	70	85	105
Multiplier	2.50	2.20	2.00	1.80	1.00

Frequency(Hz)	60	120	400	1k	10k
W.V.	Multiplier				
$\geq 200V$	0.80	1.00	1.10	1.30	1.40

● CASE SIZE & MAX RIPPLE CURRENT

Case size : D x L (mm)
Max ripple current : A(rms) 105°C 120Hz

μF	V(DC) φD	200				250			
		22	25	30	35	22	25	30	35
150						25			
						0.62			
180						30	25		
						0.73	0.70		
220		25				35	30		
		0.76				0.86	0.83		
270		30	25			40	30		
		0.90	0.86			1.00	0.92		
330		35	30			45	35	25	
		1.05	1.01			1.16	1.07	1.03	
390		35	30	25		50	40	30	
		1.15	1.10	1.13		1.32	1.23	1.20	
470		45	35	25			45	35	30
		1.40	1.29	1.24			1.42	1.39	1.40
560		50	40	30			50	40	35
		1.59	1.48	1.44			1.62	1.58	1.60
680			45	35	30			45	40
			1.70	1.67	1.67			1.83	1.85
820			50	40	30			50	45
			1.94	1.92	1.83			2.09	2.11
1000				45	35				50
				2.22	2.15				2.43
1200				50	40				
				2.53	2.44				
1500					40				L(mm)
					2.85				R.C.

μF	V(DC) φD	400				450			
		22	25	30	35	22	25	30	35
39						25			
						0.32			
47						30	25		
						0.38	0.36		
56		25				35	30		
		0.37				0.43	0.43		
68		30				40	30		
		0.44				0.50	0.46		
82		35	25			40	35	25	
		0.51	0.47			0.55	0.54	0.51	
100		40	30			50	40	30	
		0.60	0.55			0.67	0.62	0.60	
120		45	35	25			45	35	30
		0.70	0.64	0.62			0.72	0.69	0.70
150		50	40	30	25		50	40	30
		0.82	0.76	0.74	0.75		0.83	0.81	0.78
180			45	35	30			45	35
			0.87	0.85	0.86			0.93	0.91
220			50	40	30			50	40
			1.00	0.99	0.94			1.07	1.05
270				45	35				45
				1.15	1.11				1.21
330				50	40				
				1.32	1.28				
390					45				
					1.45				
470					50				L(mm)
					1.66				R.C.

- High ripple current characteristic.
- Long life for 2000 hours at 85°C.
- Corresponding product to RoHS

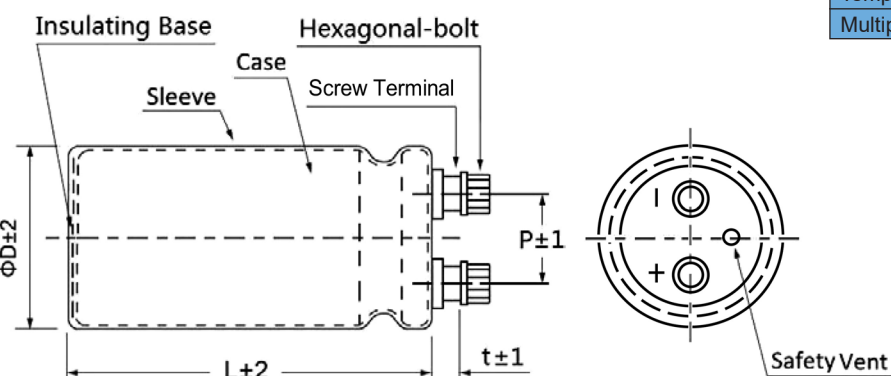


SPECIFICATION

Item	Characteristic																
Operation Temperature Range	-40 ~ +85°C								-25 ~ +85°C								
Rated Working Voltage	6.3 ~ 100VDC								160 ~ 450VDC								
Capacitance Tolerance (120Hz 20°C)	±20%(M)																
Leakage Current (20°C)	I ≤0.02CV or 5 (mA) *Whichever is smaller after 5 minutes I : Leakage Current(μA) C : Rated Capacitance(μF) V : Working Voltage(V)																
Surge Voltage (20°C)	W.V.	6.3	10	16	25	35	50	63	80	100	160	200	250	350	400	450	
	S.V.	8	13	20	32	44	63	79	100	125	200	250	300	400	450	500	
Dissipation Factor (tan δ) (120Hz 20°C)	W.V.	6.3	10	16	25	35	50	63	80	100	160	200	250	350	400	450	
	tan δ	φ35	0.75	0.75	0.60	0.40	0.30	0.25	0.20	0.20	0.15	0.15	0.15	0.15	0.20	0.20	0.20
		φ51	1.00	1.00	0.70	0.50	0.50	0.30	0.25	0.20	0.20	0.15	0.15	0.15	0.20	0.20	0.20
		φ64	1.30	1.30	0.80	0.70	0.60	0.50	0.30	0.25	0.25	0.20	0.20	0.20	0.25	0.25	0.25
		φ77	1.50	1.50	1.00	0.80	0.70	0.60	0.40	0.30	0.25	0.20	0.20	0.20	0.25	0.25	0.25
		φ90	1.50	1.50	1.00	0.80	0.70	0.60	0.40	0.30	0.25	0.20	0.20	0.20	0.25	0.25	0.25
Low Temperature Stability	Impedance ratio at 120Hz																
	Rated Voltage (V)		6.3~100								160~450						
	-25°C / +20°C										8						
	-40°C / +20°C		12														
Load Life	After 2000 hours application of W.V. and +85°C ripple current value, the capacitor shall meet the following limits. (DC + ripple peak voltage ≤ rate working voltage)																
	Capacitance Change		≤ ±15% of initial value														
	Dissipation Factor		≤175% of initial specified value														
	Leakage current		≤initial specified value														
Shelf Life	At +85°C, no voltage application after 1000 hours, the capacitor shall meet the limits for load life characteristics. (With voltage treatment)																

TERMINAL TYPE

ϕD	P	t	Hexagonal-bolt
35	12.7	6.3	M5 × 0.8 × 10
51	21.8	6.3	M5 × 0.8 × 10
64	28.2	6.3	M5 × 0.8 × 10
77	31.4	5.8	M5 × 0.8 × 10
90	31.4	5.8	M5 × 0.8 × 10



RIPPLE CURRENT COEFFICIENTS

Frequency(Hz)	60	120	1k	10k	100k
W.V.	Multiplier				
6.3 ~ 35V	0.90	1.00	1.05	1.10	1.10
50 ~ 100V	0.90	1.00	1.10	1.15	1.15
160 ~ 450V	0.80	1.00	1.20	1.40	1.40

Temperature(°C)	≤ 60	70	85
Multiplier	1.80	1.60	1.00

● CASE SIZE & MAX RIPPLE CURRENT

Case size : D x L (mm)
Max ripple current : A(rms) 85°C 120Hz

μF	V(DC) Item	6.3		10		16	
		DxL	R.C.	DxL	R.C.	DxL	R.C.
22000						35x50	4.16
33000				35x50	4.14	35x60	5.51
39000				35x50	4.50	35x80	6.80
47000		35x50	4.94	35x60	5.35	35x80	7.47
56000		35x60	4.96	35x80	6.63	35x100	9.03
68000		35x60	5.47	35x80	7.31	35x121	9.88
82000		35x80	6.82	35x80	8.02	35x121	10.85
100000		35x80	7.53	35x121	9.21	51x80	10.86
120000		35x121	9.15	51x80	9.23	51x90	11.74
150000		51x80	9.51	51x80	10.32	51x121	12.48
180000		51x80	10.42	51x90	11.50	51x121	13.67
220000		51x100	12.39	51x121	13.66	64x100	14.75
270000		64x100	13.68	51x121	15.13	64x115	17.37
330000		64x100	15.12	64x121	17.25	77x121	18.19
390000		64x121	16.97	64x121	18.75	77x121	19.78
470000		64x121	18.63	77x121	19.25		
560000		77x121	18.80	77x121	21.01		
680000		77x121	20.71				

μF	V(DC) Item	25		35		50	
		DxL	R.C.	DxL	R.C.	DxL	R.C.
6800						35x50	3.26
8200						35x50	3.58
10000				35x50	3.53	35x60	4.27
12000				35x50	3.87	35x60	4.68
15000				35x60	3.96	35x80	5.94
18000		35x50	3.35	35x60	4.34	35x80	6.51
22000		35x60	4.01	35x80	4.93	35x121	6.70
27000		35x80	5.04	35x80	5.46	35x121	7.42
33000		35x80	5.58	35x121	7.20	51x80	7.55
39000		35x80	6.06	35x121	7.83	51x80	8.20
47000		35x121	7.54	51x80	8.26	51x100	9.80
56000		35x121	8.23	51x80	9.02	51x100	10.70
68000		51x100	9.13	51x100	10.35	64x100	11.34
82000		51x100	10.03	51x100	11.36	64x100	12.46
100000		51x121	11.26	64x100	11.48	64x144	12.81
120000		51x121	12.33	64x121	13.13	64x144	14.03
150000		64x100	12.68	64x144	15.42	77x144	15.86
180000		64x100	13.89	64x144	16.89		
220000		64x144	16.05	77x144	17.79		
270000		77x115	17.80				
330000		77x144	20.38				

● CASE SIZE & MAX RIPPLE CURRENT

Case size : D x L (mm)
Max ripple current : A(rms) 85°C 120Hz

μF	V(DC) Item	63		80		100	
		DxL	R.C.	DxL	R.C.	DxL	R.C.
2200						35x50	2.15
2700						35x50	2.38
3300						35x50	2.64
3900						35x60	3.10
4700				35x50	2.72	35x80	3.87
5600		35x50	2.97	35x60	3.22	35x80	4.22
6800		35x50	3.28	35x80	4.03	35x100	5.15
8200		35x60	3.89	35x80	4.42	35x121	5.83
10000		35x80	4.77	35x100	5.41	51x80	6.03
12000		35x80	5.23	35x121	6.47	51x80	6.60
15000		35x100	5.88	51x80	7.63	51x121	8.86
18000		35x121	6.16	51x80	8.35	51x121	9.71
22000		51x80	7.73	51x100	8.76	64x100	9.79
27000		51x80	8.56	51x100	9.70	64x100	10.85
33000		51x100	8.76	64x100	10.22	64x144	12.80
39000		51x121	10.22	64x100	11.11	77x115	13.11
47000		64x100	11.88	64x144	14.33	77x144	14.81
56000		64x100	12.96	64x144	15.64		
68000		64x144	13.63	77x144	16.27		
100000		77x144	15.86				

μF	V(DC) Item	160		200		250	
		DxL	R.C.	DxL	R.C.	DxL	R.C.
470						35x50	1.66
560						35x50	1.81
680				35x50	1.99	35x50	1.99
820				35x50	2.19	35x60	2.37
1000				35x60	2.62	35x80	2.87
1200		35x50	2.64	35x60	2.87	35x80	3.15
1500		35x60	3.20	35x80	3.52	35x100	3.49
1800		35x70	3.63	35x80	3.85	35x100	3.83
2200		35x80	4.26	35x100	4.23	51x70	4.28
2700		35x100	4.68	35x121	4.72	51x70	4.74
3300		35x121	5.22	51x70	5.24	51x90	5.38
3900		51x70	5.70	51x70	5.70	51x115	6.23
4700		51x70	6.26	51x90	6.42	64x96	7.06
5600		51x90	7.00	51x115	7.47	64x96	7.71
6800		51x90	7.72	51x130	8.70	64x115	9.19
8200		51x115	9.04	64x96	9.33	64x115	10.09
10000		64x96	10.30	64x96	10.30	64x130	11.76
12000		64x96	11.29	77x96	12.56	77x115	13.01
15000		64x130	13.83	77x96	14.04	77x130	14.70
18000		64x130	15.15	77x130	16.80	77x155	17.40
22000		77x130	18.57	77x155	20.07	90x157	20.19
27000		77x130	20.58	90x131	21.62		
33000		90x131	23.90	90x157	25.85		
39000		90x157	28.10				

● CASE SIZE & MAX RIPPLE CURRENT

Case size : D x L (mm)
Max ripple current : A(rms) 85°C 120Hz

μF	V(DC) Item	350		400		450	
		DxL	R.C.	DxL	R.C.	DxL	R.C.
270						35x50	1.45
330				35x80	1.97	35x80	1.97
390		35x50	1.74	35x80	2.14	35x80	2.14
470		35x80	2.35	35x80	2.35	35x80	2.35
560		35x80	2.57	35x80	2.57	35x100	2.63
680		35x80	2.83	35x100	2.90	35x100	2.90
820		35x100	3.18	35x100	3.18	51x70	3.26
1000		35x100	3.51	51x70	3.60	51x70	3.60
1200		51x70	3.94	51x70	3.94	51x90	4.39
1500		51x70	4.41	51x90	4.91	51x115	5.17
1800		51x90	5.38	51x90	5.38	51x130	5.64
2200		51x90	5.95	51x130	6.23	64x96	6.40
2700		51x130	6.91	64x96	7.09	64x115	7.25
3300		51x130	7.63	64x115	8.01	64x130	8.22
3900		64x115	8.71	64x130	8.94	77x115	9.40
4700		64x130	9.81	77x115	10.32	77x130	10.88
5600		77x115	11.26	77x130	11.87	77x155	12.83
6800		77x130	13.08	77x155	14.14	90x157	14.60
8200		77x155	15.53	90x157	16.03	90x157	16.03
10000		90x157	17.71	90x157	17.71	90x196	19.53
12000		90x157	19.40	90x196	21.40	90x236	23.28
15000		90x196	23.93	90x236	26.02		
18000		90x236	28.51				

- High temperature 85°C, high ripple current and high reliability.
- Long life for 5000 hours.
- Corresponding product to RoHS



SPECIFICATION

Item	Characteristic			
Operation Temperature Range	-40 ~ +85°C			
Rated Working Voltage	350 ~ 450VDC			
Capacitance Tolerance (120Hz 20°C)	±20%(M)			
Leakage Current (20°C)	I ≤0.02CV or 5 (mA) I : Leakage Current(μA)			

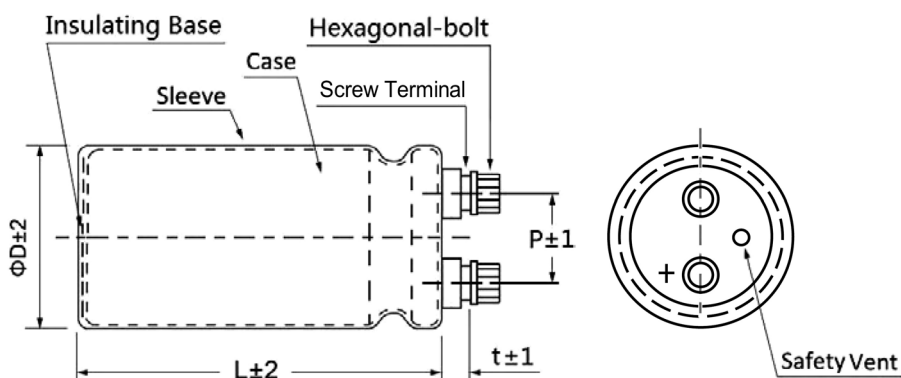
TERMINAL TYPE

ϕD	P	t	Hexagonal-bolt
51	22.2	6.3	M5 $\times$ 0.8 $\times$ 10
64	28.5	6.3	M5 $\times$ 0.8 $\times$ 10
77	31.8	5.8	M5 $\times$ 0.8 $\times$ 10
90	31.6	5.8	M6 $\times$ 1.0 $\times$ 10

RIPPLE CURRENT COEFFICIENTS

Frequency(Hz)	60	120	300	1k	$\geq 10k$
Multiplier	0.70	1.00	1.10	1.30	1.40

Temperature(°C)	40	60	85
Multiplier	1.89	1.67	1.00



● CASE SIZE & MAX RIPPLE CURRENT

Case size : D x L (mm)
Max ripple current : A(rms) 85°C 120Hz

μF	$V(\text{DC})$ ϕD	350				400				450			
		51	64	77	90	51	64	77	90	51	64	77	90
1000						75				75			
						4.76				4.99			
1200	75					75				96			
	5.21					5.21				6.09			
1500	75					96				115			
	5.82					6.48				7.38			
1800	96					96				130			
	7.10					7.10				8.54			
2200	96					130					96		
	7.85					8.99					8.93		
2700	130						96				115		
	9.97						9.64				10.69		
3300	130						115				130		
	11.02						11.53				12.48		
3900		115					130				155	115	
		12.53					13.23				14.68	13.56	
4700		130					155	115			195	130	
		14.53					15.72	14.10			17.91	15.69	
5600		155	115				195	130				155	
		17.16	15.39				19.06	16.23				18.51	
6800		195	130					155					157
		21.00	17.88					19.33					21.21
8200			155						157				157
			21.22						22.64				23.29
10000				157					157				196
				25.00					25.00				28.37
12000				157					196				236
				27.39					30.22				33.80
15000				196					236				
				33.78					36.74				
18000				236									L(mm)
				40.25									R.C.

- High temperature 85°C, high ripple current and high reliability.
- Aluminum can with threaded stud mounting.
- Long life for 5000 hours.
- Corresponding product to RoHS



● SPECIFICATION

Item	Characteristic			
Operation Temperature Range	-40 ~ +85°C			
Rated Working Voltage	350 ~ 450VDC			
Capacitance Tolerance (120Hz 20°C)	±20%(M)			
Leakage Current (20°C)	I ≤0.02CV or 5 (mA) I : Leakage Current(μA)			

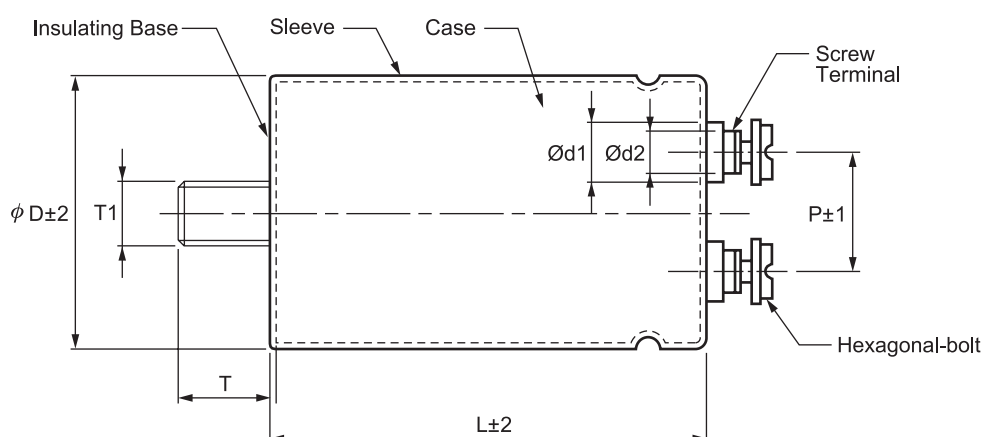
● TERMINAL TYPE

φD	P	d1(max)	d2	T	T1	Hexagonal-bolt
51	22.0	11	7.88	16	12	M5 × 0.8 × 10
64	28.5	12	7.88	16	12	M5 × 0.8 × 10
77	31.8	12	7.88	16	12	M5 × 0.8 × 10
90	31.6	14	13.0	17	12	M6 × 1.0 × 10

● RIPPLE CURRENT COEFFICIENTS

Frequency(Hz)	60	120	300	1k	≥10k
Multiplier	0.70	1.00	1.10	1.30	1.40

Temperature(°C)	40	60	85
Multiplier	1.89	1.67	1.00



● CASE SIZE & MAX RIPPLE CURRENT

Case size : D x L (mm)
Max ripple current : A(rms) 85°C 120Hz

μF	$V(\text{DC})$ ϕD	350				400				450			
		51	64	77	90	51	64	77	90	51	64	77	90
1000						75				75			
						6.66				7.00			
1200	75					75				96			
	7.29					7.29				8.53			
1500	75					96				115			
	8.15					9.08				10.3			
1800	96					96				130			
	9.94					9.94				12.0			
2200	96					130					96		
	11.0					12.6					12.5		
2700	130						96				115	96	
	14.0						13.5				15.0	14.6	
3300	130						115				130	96	
	15.4						16.1				17.5	16.2	
3900		115					130				155	115	
		17.5					18.5				20.6	19.0	
4700		130					155	115			195	130	
		20.3					22.0	19.7			25.1	22.0	
5600		155	115				195	130				155	
		24.0	21.6				26.7	22.7				25.9	
6800		195	130					155					157
		29.4	25.0					27.1					29.7
8200			155						157				157
			29.7						31.7				32.6
10000				157					157				196
				35.0					35.0				39.7
12000				157					196				236
				38.3					42.3				47.3
15000				196					236				
				47.3					51.4				
18000				236									L(mm)
				56.4									R.C.

- High temperature 85°C, high ripple current and high reliability.
- Aluminum can with threaded stud mounting.
- Long life for 10000 hours.
- Corresponding product to RoHS



SPECIFICATION

Item	Characteristic			
Operation Temperature Range	-40 ~ +85°C			
Rated Working Voltage	350 ~ 450VDC			
Capacitance Tolerance (120Hz 20°C)	±20%(M)			
Leakage Current (20°C)	I ≤0.02CV or 5 (mA) I : Leakage Current(μA)			

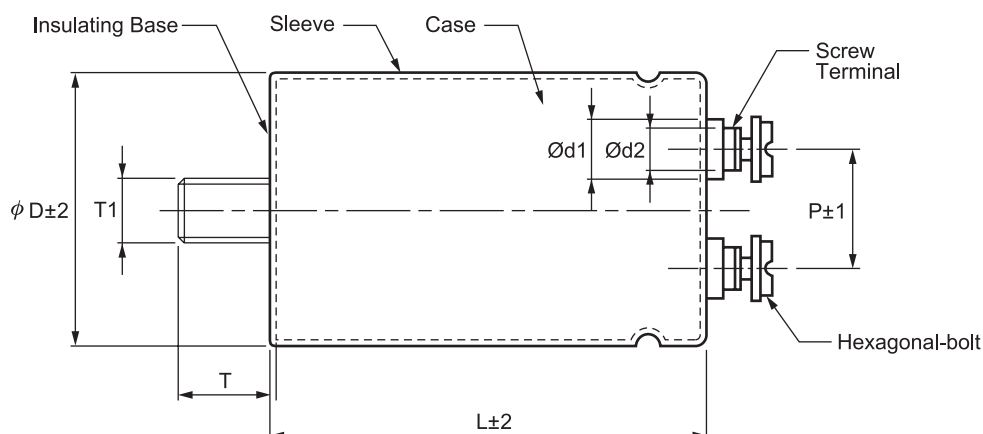
TERMINAL TYPE

ϕD	P	d1(max)	d2	T	T1	Hexagonal-bolt
51	22.0	11	7.88	16	12	M5 × 0.8 × 10
64	28.5	12	7.88	16	12	M5 × 0.8 × 10
77	31.8	12	7.88	16	12	M5 × 0.8 × 10
90	31.6	14	13.0	17	12	M6 × 1.0 × 10

RIPPLE CURRENT COEFFICIENTS

Frequency(Hz)	60	120	300	1k	$\geq 10k$
Multiplier	0.70	1.00	1.10	1.30	1.40

Temperature(°C)	40	60	85
Multiplier	1.89	1.67	1.00



● CASE SIZE & MAX RIPPLE CURRENT

Case size : D x L (mm)
Max ripple current : A(rms) 85°C 120Hz

μF	$V(\text{DC})$ ϕD	350				400				450			
		51	64	77	90	51	64	77	90	51	64	77	90
1000	75					75				96			
	7.99					6.39				8.30			
1200	75					96				115			
	8.75					7.79				9.86			
1500	96					115				130			
	10.9					9.45				11.6			
1800	96					130					96		
	11.9					10.9					12.3		
2200	130						96				115		
	15.1						11.6				14.7		
2700		96					115				130	115	
		16.1					13.9				17.2	17.5	
3300		115					130				155	130	
		19.2					16.3				20.5	20.4	
3900		130					155	115			195		
		22.1					19.1	18.0			24.8		
4700		155	115				195	130				155	
		26.2	24.7				23.3	20.8				25.4	
5600		195	130				195	155				195	157
		30.8	28.4				24.6	23.7				30.7	29.3
6800			155						157				196
			32.7						27.7				35.7
8200				157					157				196
				38.0					30.4				39.2
10000				157					196				236
				42.0					35.7				45.4
12000				196					236				
				50.8					42.6				
15000				236									L(mm)
				59.5									R.C.

- High temperature 85°C, high ripple current and high reliability.
- Long life for 2000 hours.
- Corresponding product to RoHS



SPECIFICATION

Item	Characteristic								
Operation Temperature Range	-25 ~ +85°C								
Rated Working Voltage	160 ~ 550VDC								
Capacitance Tolerance (120Hz 20°C)	±20%(M)								
Leakage Current (20°C)	I ≤0.02CV or 5 (mA) I : Leakage Current(μA)								

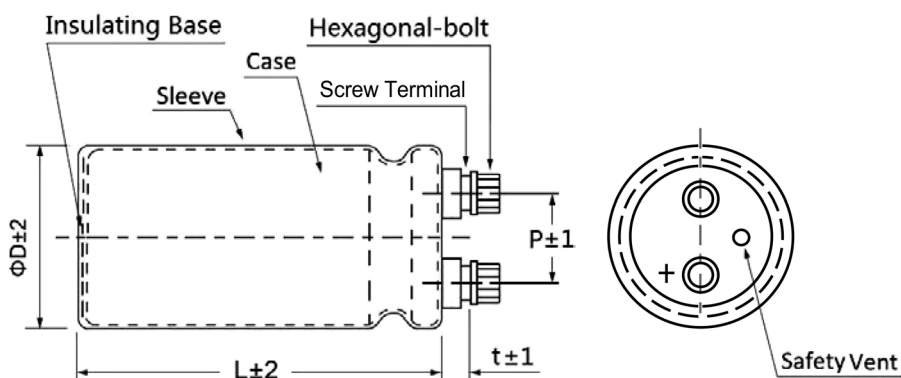
TERMINAL TYPE

ϕD	P	t	Hexagonal-bolt
51	22.2	6.3	M5 × 0.8 × 10
64	28.5	6.3	M5 × 0.8 × 10
77	31.8	5.8	M5 × 0.8 × 10
90	31.6	5.8	M6 × 1.0 × 10

RIPPLE CURRENT COEFFICIENTS

Frequency(Hz)	60	120	300	1k	$\geq 10k$
Multiplier	0.70	1.00	1.10	1.30	1.40

Temperature(°C)	40	60	85
Multiplier	1.89	1.67	1.00



● CASE SIZE & MAX RIPPLE CURRENT

Case size : D x L (mm)
Max ripple current : A(rms) 85°C 120Hz

μF	$V(\text{DC})$ ϕD	160				200				250			
		51	64	77	90	51	64	77	90	51	64	77	90
2200										75			
										5.64			
2700										75			
										6.25			
3300						75				96			
						6.91				7.69			
3900	75					75				115			
	7.51					7.51				9.07			
4700	75					96					96		
	8.25					9.18					9.79		
5600	96					115					96		
	10.02					10.86					10.68		
6800	96					130					115		
	11.04					12.65					12.73		
8200	115						96				115		
	13.15						12.93				13.98		
10000			96				100				130		
			14.27				14.53				16.30		
12000			96					96				115	
			15.64					16.82				18.15	
15000			130					96				130	
			19.96					18.80				21.40	
18000			130					130				155	
			21.87					23.44				25.33	
22000				130				155					157
				25.91				28.00					29.67
27000				130					131				
				28.71					30.39				
33000					131				157				
					33.60				36.33				
39000					157								L(mm)
					39.50								R.C.

● CASE SIZE & MAX RIPPLE CURRENT

Case size : D x L (mm)
Max ripple current : A(rms) 85°C 120Hz

μF	$\frac{V(\text{DC})}{\phi D}$	350				400				450			
		51	64	77	90	51	64	77	90	51	64	77	90
820										75			
										4.31			
1000						75				80			
						4.76				4.89			
1200	75					80				96			
	5.21					5.36				5.80			
1500	80					96				115			
	5.99					6.48				7.03			
1800	96					96				130			
	7.10					7.10				8.14			
2200	96					130					100		
	7.85					9.00					8.86		
2700	130						96				115		
	9.97						9.64				10.43		
3300	130	96					115				130		
	11.02	10.66					11.53				12.17		
3900		115					130	96				115	
		12.53					13.23	11.90				12.85	
4700		130	96					115				130	
		14.53	13.07					14.10				14.87	
5600			115					130				155	
			15.39					16.23				17.54	
6800			130					155					157
			17.89					19.32					20.62
8200			155						157				157
			21.22						22.64				22.64
10000				157					157				196
				25.00					25.00				27.58
12000				157					196				236
				27.39					30.22				32.87
15000				196					236				
				33.78					36.74				
18000				236									L(mm)
				40.25									R.C.

μF	$\frac{V(\text{DC})}{\phi D}$	500				550			
		51	64	77	90	51	64	77	90
390						75			
						2.70			
470	75								
	2.96								
560						96	96		
						3.60	4.00		
680	96					115	115		
	3.97					4.30	4.76		
820	115					130	130		
	4.72					4.99	5.52		
1000	130	96							
	5.52	5.34							
1200								96	
								6.04	
1500		115	96					115	
		7.08	6.75					7.28	
1800		130						130	
		8.18						8.41	
2200			115					155	
			8.82					10.05	
2700			155						
			11.13						
3300									157
									13.15
3900				157					L(mm)
				14.29					R.C.

- High temperature 105°C, high ripple current and high reliability.
- Long life for 2000 hours.
- Corresponding product to RoHS



SPECIFICATION

Item	Characteristic							
Operation Temperature Range	-25 ~ +105°C							
Rated Working Voltage	160 ~ 500VDC							
Capacitance Tolerance (120Hz 20°C)	±20%(M)							
Leakage Current (20°C)	I ≤0.02CV or 5 (mA) I : Leakage Current(μA)							

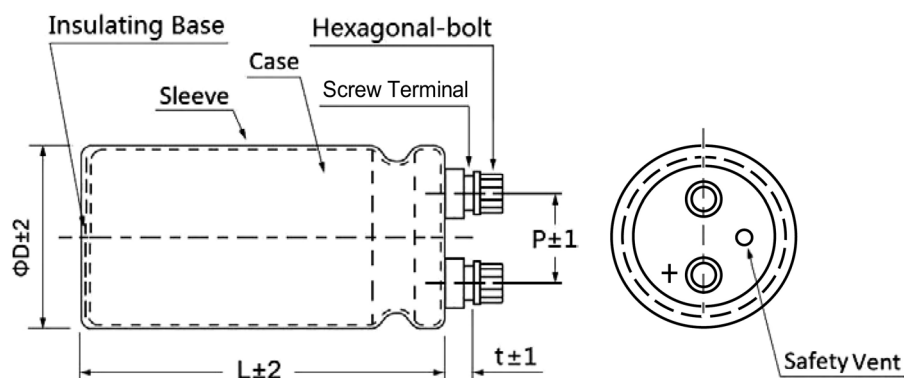
TERMINAL TYPE

ϕD	P	t	Hexagonal-bolt
51	22.2	6.3	M5 $\times$ 0.8 $\times$ 10
64	28.5	6.3	M5 $\times$ 0.8 $\times$ 10
77	31.8	5.8	M5 $\times$ 0.8 $\times$ 10
90	31.6	5.8	M6 $\times$ 1.0 $\times$ 10

RIPPLE CURRENT COEFFICIENTS

Frequency(Hz)	60	120	300	1k	$\geq 10k$
Multiplier	0.70	1.00	1.10	1.30	1.40

Temperature(°C)	40	60	85	105
Multiplier	2.44	2.16	2.00	1.00



● CASE SIZE & MAX RIPPLE CURRENT

Case size : D x L (mm)
Max ripple current : A(rms) 105°C 120Hz

μF	V(DC) φD	160				200				250			
		51	64	77	90	51	64	77	90	51	64	77	90
2200										75			
										4.53			
2700													
3300						80				96			
						5.23				6.18			
3900											96		
											6.69		
4700	80					96					115		
	6.81					6.76					7.94		
5600	96						96					96	
	8.05						7.99					8.91	
6800			96				115					115	
			8.80				9.52					10.60	
8200			96					96				130	
			9.66					10.27				12.27	
10000				96				115				155	
				11.34				12.24				14.65	
15000				130					131				157
				15.81					16.47				17.81
22000					131								
					19.87								

μF	V(DC) φD	350				400				450			
		51	64	77	90	51	64	77	90	51	64	77	90
1000		75				75				96			
		4.08				4.08				4.54			
1200		75				96				115			
		4.47				4.97				5.39			
1500		96				96				115			
		5.56				5.56				6.02			
1800		96											
		6.09											
2200		115					96				115		
		7.29					7.65				8.28		
2700			96										
			8.48										
3300			115				130				130		
			10.13				10.70				10.70		
3900			115				155					121	
			11.02				12.59					12.50	
4700			130					130				144	
			12.77					14.16				14.81	
5600				130				155					145
				15.46				16.70					15.49
6800				130					157				196
				17.03					16.83				19.50
8200				155					157				196
				18.11					18.48				21.41
10000					157				196				
					21.94				22.52				

● CASE SIZE & MAX RIPPLE CURRENT

Case size : D x L (mm)
Max ripple current : A(rms) 105°C 120Hz

μF	V(DC) ϕD	500			
		51	64	77	90
820		115			
		3.86			
1000		130	96		
		4.50	4.37		
1200			115		
			5.18		
1500			130	96	
			6.12	5.66	
1800				115	
				6.69	
2700				155	
				9.33	
3900					157
					11.70
6800					236
					18.54

- High temperature 105°C, high ripple current and high reliability.
- Long life for 2000 hours.
- Corresponding product to RoHS

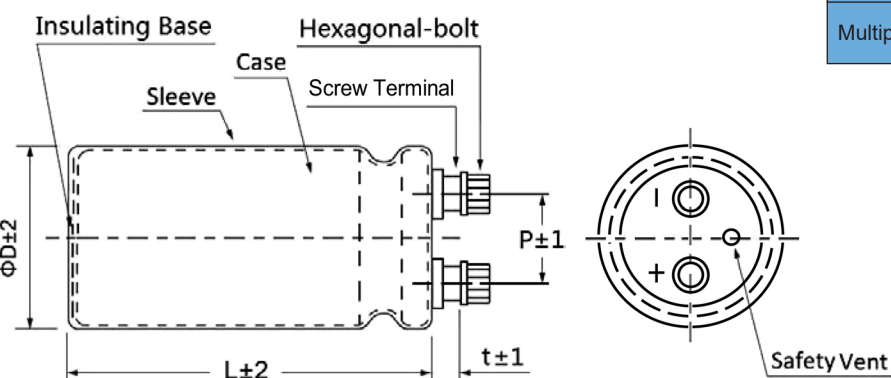


SPECIFICATION

Item	Characteristic														
Operation Temperature Range	-40 ~ +105°C							-25 ~ +105°C							
Rated Working Voltage	10 ~ 100VDC							160 ~ 450VDC							
Capacitance Tolerance (120Hz 20°C)	±20%(M)														
Leakage Current (20°C)	I ≤0.02CV or 5 (mA) *Whichever is smaller after 5 minutes I : Leakage Current(μA) C : Rated Capacitance(μF) V : Working Voltage(V)														
Surge Voltage (20°C)	W.V.	10	16	25	35	50	63	100	160	200	250	350	400	450	
	S.V.	13	20	32	44	63	79	125	200	250	300	400	450	500	
Dissipation Factor (tan δ) (120Hz 20°C)		W.V.	10	16	25	35	50	63	100	160	200	250	350	400	450
		ϕ35	≤96	0.80	0.70	0.35	0.30	0.25	0.20	0.15	0.15	0.15	0.15	0.15	0.15
		≥100	0.80	0.70	0.40	0.35	0.30	0.25	0.15	0.15	0.15	0.15	0.15	0.15	0.15
	ϕ51	≤96	1.00	0.90	0.40	0.45	0.35	0.25	0.15	0.15	0.15	0.15	0.15	0.15	0.15
		≥100	1.00	0.90	0.50	0.50	0.40	0.30	0.15	0.15	0.15	0.15	0.15	0.15	0.15
	ϕ64	≤96	1.20	1.00	0.60	0.55	0.40	0.30	0.20	0.15	0.15	0.15	0.15	0.15	0.15
		≥100	1.20	1.00	0.80	0.60	0.45	0.35	0.20	0.15	0.15	0.15	0.15	0.15	0.15
	ϕ77	≥96	2.00	1.20	1.00	0.70	0.50	0.40	0.25	0.15	0.15	0.15	0.15	0.15	0.15
	ϕ90	≥96	2.00	1.20	1.00	0.70	0.50	0.40	0.25	0.15	0.15	0.15	0.15	0.15	0.15
Low Temperature Stability	Impedance ratio at 120Hz														
	Rated Voltage (V)		10~100						160~450						
	-25°C / +20°C								8						
	-40°C / +20°C		12												
Load Life	After 2000 hours application of W.V. and +105°C ripple current value, the capacitor shall meet the following limits. (DC + ripple peak voltage ≤ rate working voltage)														
	Capacitance Change		±20% of initial value												
	Dissipation Factor		≤200% of initial specified value												
	Leakage current		≤initial specified value												
Shelf Life	At +105°C no voltage application after 1000 hours, the capacitor shall meet the limits for load life characteristics. (with voltage treatment)														

TERMINAL TYPE

ϕD	P	t	Hexagonal-bolt
35	12.7	6.3	M5 × 0.8 × 10
51	21.8	6.3	M5 × 0.8 × 10
64	28.2	6.3	M5 × 0.8 × 10
77	31.4	5.8	M5 × 0.8 × 10
90	31.4	5.8	M5 × 0.8 × 10



RIPPLE CURRENT COEFFICIENTS

Frequency(Hz)	60	120	1k	10k	100k
W.V.	Multiplier				
10 ~ 35V	0.90	1.00	1.05	1.10	1.10
50 ~ 100V	0.90	1.00	1.10	1.15	1.15
160 ~ 450V	0.80	1.00	1.20	1.30	1.35

Temperature(°C)		45	55	70	85	105
Multiplier	≦250V	3.00	2.50	2.00	1.40	1.00
	≧350V	2.50	2.00	1.50	1.20	1.00

● CASE SIZE & MAX RIPPLE CURRENT

Case size : D x L (mm)
Max ripple current : A(rms) 105°C 120Hz

μF	V(DC) Item	10		16		25	
		DxL	R.C.	DxL	R.C.	DxL	R.C.
22000				35x50	3.25	35x60	4.59
33000		35x50	3.72	35x60	4.31	35x80	6.39
47000		35x60	4.81	35x80	5.84	35x90	8.04
56000		35x70	5.61	35x90	6.72	51x70	8.31
68000		35x80	6.57	51x70	6.66	51x90	10.21
100000		51x70	7.67	51x90	9.00	64x96	11.28
150000		51x90	10.46	64x96	11.22	64x115	12.94
220000		64x96	13.53	64x115	14.69	77x115	14.83
330000		64x115	17.92	77x115	18.24	90x131	19.94

μF	V(DC) Item	35		50		63	
		DxL	R.C.	DxL	R.C.	DxL	R.C.
6800						35x70	3.31
8200				35x60	3.18	35x80	3.86
10000				35x70	3.75	35x90	4.50
15000		35x60	4.09	35x80	4.88	51x70	4.95
22000		35x80	5.63	51x70	5.57	51x90	6.68
33000		51x70	6.56	51x90	7.60	64x96	8.73
47000		51x80	8.29	64x96	9.48	64x115	10.43
56000		51x90	9.53	64x96	10.34	77x96	10.96
68000		51x115	11.11	64x115	11.62	77x115	13.03
100000		64x115	12.20	77x115	14.14	90x131	17.36
150000		77x115	13.90	90x131	19.02		
220000		90x131	17.42				

μF	V(DC) Item	100		160		200	
		DxL	R.C.	DxL	R.C.	DxL	R.C.
1000				35x50	1.50	35x60	1.62
1500				35x60	1.98	35x70	2.12
2200				35x70	2.57	35x90	2.88
3300				35x90	3.52	51x80	3.49
4700				51x80	4.54	51x90	4.38
5600		35x90	4.59	51x90	5.22	64x96	5.34
6800		51x70	5.16	64x96	5.89	64x115	6.37
8200		51x80	6.00	64x96	6.46	77x96	6.85
10000		51x90	6.97	77x96	7.56	77x115	8.16
15000		64x96	7.57	77x130	10.54	90x131	10.98
22000		77x96	8.69	90x131	13.30		
33000		77x130	12.11				
47000		90x131	15.05				

● CASE SIZE & MAX RIPPLE CURRENT

Case size : D x L (mm)
Max ripple current : A(rms) 105°C 120Hz

μF	V(DC) Item	250		350	
		DxL	R.C.	DxL	R.C.
1000		35x70	1.73	51x65	2.40
1500		35x90	2.38	51x70	3.03
2200		51x70	2.94	51x96	4.21
3300		51x90	4.01	64x96	5.47
3900		64x96	4.46	64x115	6.43
4700		64x115	5.29	64x130	7.45
5600		77x96	5.94	77x115	7.94
6800		77x115	7.07	77x130	9.23
8200		77x130	8.18	77x155	10.95
10000		77x155	9.76	90x157	12.25
15000		90x157	11.87		

μF	V(DC) Item	400		450	
		DxL	R.C.	DxL	R.C.
1000		51x70	2.47	51x90	2.94
1500		51x90	3.38	51x115	4.02
2200		64x96	4.46	64x115	5.17
3300		64x130	6.24	64x130	6.69
3900		64x155	7.34	77x121	7.82
4700		77x130	7.97	77x144	9.26
5600		77x155	9.39	90x145	11.06
6800		90x157	10.94	90x196	13.93
8200		90x157	12.01		
10000		90x196	14.64		

- High temperature 105°C, high ripple current and high reliability.
- Long life for 5000 hours.
- Corresponding product to RoHS



SPECIFICATION

Item	Characteristic					
Operation Temperature Range	-40 ~ +105°C					
Rated Working Voltage	200 ~ 450VDC					
Capacitance Tolerance (120Hz 20°C)	±20%(M)					
Leakage Current (20°C)	I ≤0.02CV or 5 (mA) *Whichever is smaller after 5 minutes I : Leakage Current(μA) C : Rated Capacitance(μF) V : Working Voltage(V)					
Surge Voltage (20°C)	W.V.	200	250	350	400	450
	S.V.	250	300	400	450	500
Dissipation Factor (tan δ)(MAX) (120Hz 20°C)	W.V.	200	250	350	400	450
	tan δ	0.20	0.20	0.15	0.15	0.15
Low Temperature Stability	Impedance ratio at 120Hz					
	Rated Voltage (V)	200~450				
	-25°C / +20°C	8				
Load Life	After 5000 hours application of W.V. and +105°C ripple current value, the capacitor shall meet the following limits. (DC + ripple peak voltage ≤ rate working voltage)					
	Capacitance Change	≤ ±20% of initial value				
	Dissipation Factor	≤200% of initial specified value				
	Leakage current	≤initial specified value				
Shelf Life	At +105°C no voltage application after 1000 hours, the capacitor shall meet the limits for load life characteristics. (with voltage treatment)					

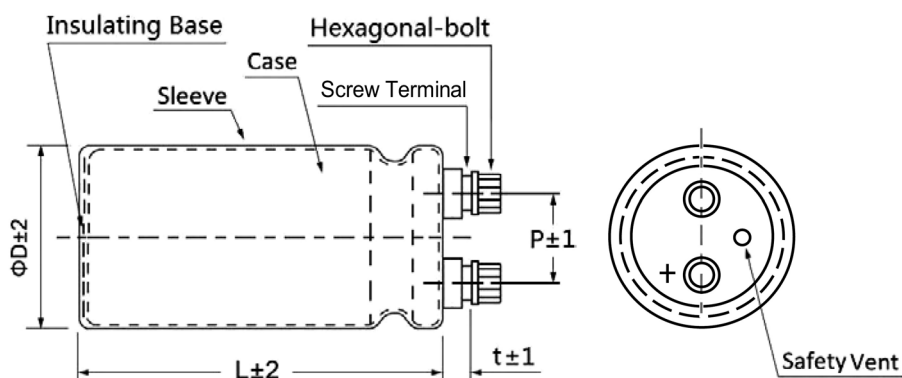
TERMINAL TYPE

ϕD	P	t	Hexagonal-bolt
51	22.2	6.3	M5 × 0.8 × 10
64	28.5	6.3	M5 × 0.8 × 10
77	31.8	5.8	M5 × 0.8 × 10
90	31.6	5.8	M6 × 1.0 × 10

RIPPLE CURRENT COEFFICIENTS

Frequency(Hz)	60	120	300	1k	$\geq 10k$
Multiplier	0.70	1.00	1.10	1.30	1.40

Temperature(°C)	40	60	85	105
Multiplier	2.44	2.16	2.00	1.00



● CASE SIZE & MAX RIPPLE CURRENT

Case size : D x L (mm)
Max ripple current : A(rms) 105°C 120Hz

μF	V(DC) ϕD	200				250				350			
		51	64	77	90	51	64	77	90	51	64	77	90
680													
1000										75			
1200										3.06			
1500						80				75			
1800						2.41				3.35			
2200	80					100				96			
2700	2.92					3.21				4.17			
3300										96			
3900										4.57			
4700										130			
5600										5.78			
6800	100										96		
8200	3.94										6.00		
10000							100				115		
12000							4.47				7.18		
15000											130		
22000											8.24		
33000											155	115	
			100				121				9.79	8.95	
			5.13				5.80				195	130	
											11.87	10.30	
								121				155	
								7.15				12.27	
													157
													13.86
				121					145				157
				8.31					9.39				15.31
													196
													18.50
													236
				144					171				22.50
				10.98					12.36				
					145				236				
					11.40				17.30				
					236								
					17.34								
													L(mm)
													R.C.

μF	V(DC) ϕD	400				450			
		51	64	77	90	51	64	77	90
1000		75				96			
1200		3.40				4.25			
1500		96				115			
1800		4.14				5.05			
2200		115				130			
2700		5.02				5.97			
3300		130					96		
3900		5.81					6.20		
4700		130	96				115		
5600		6.43	6.22				7.41		
6800			115				130	115	
8200			7.45				8.67	8.69	
10000			130				155	130	
12000			8.69				10.37	10.14	
			155	115			195		
			10.23	9.18			12.53		
			195	130				155	
			12.47	10.62				13.07	
			195	155				195	157
			13.61	12.53				15.82	14.89
					157				196
					14.73				18.10
					157				196
					16.17				19.88
					196				236
					19.70				23.88
					236				L(mm)
					23.48				R.C.

- High temperature 105°C, high ripple current and high reliability.
- Aluminum can with threaded stud mounting.
- Long life for 5000 hours.
- Corresponding product to RoHS



SPECIFICATION

Item	Characteristic			
Operation Temperature Range	-40 ~ +105°C			
Rated Working Voltage	350 ~ 450VDC			
Capacitance Tolerance (120Hz 20°C)	±20%(M)			
Leakage Current (20°C)	I ≤0.02CV or 5 (mA) I : Leakage Current(μA)			

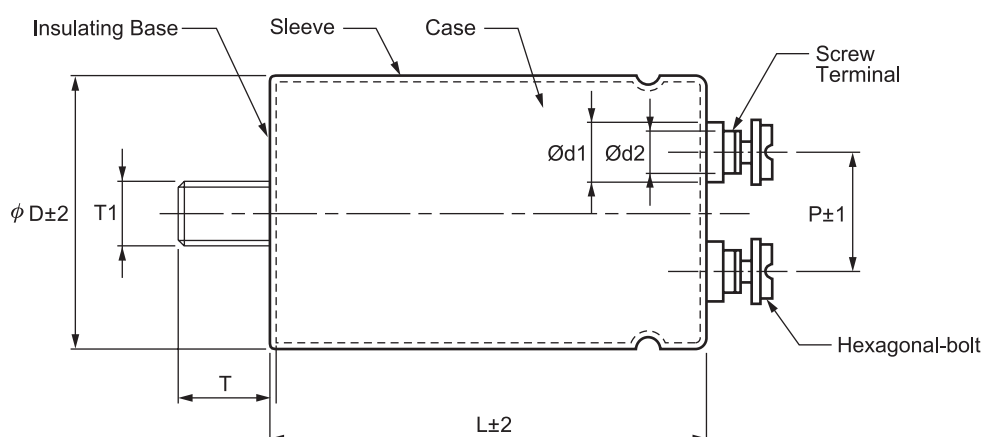
TERMINAL TYPE

ϕD	P	d1(max)	d2	T	T1	Hexagonal-bolt
51	22.0	11	7.88	16	12	M5 $\times$ 0.8 $\times$ 10
64	28.5	12	7.88	16	12	M5 $\times$ 0.8 $\times$ 10
77	31.8	12	7.88	16	12	M5 $\times$ 0.8 $\times$ 10
90	31.6	14	13.0	17	12	M6 $\times$ 1.0 $\times$ 10

RIPPLE CURRENT COEFFICIENTS

Frequency(Hz)	60	120	300	1k	$\geq 10k$
Multiplier	0.70	1.00	1.10	1.30	1.40

Temperature(°C)	40	60	85	105
Multiplier	2.44	2.16	2.00	1.00



● CASE SIZE & MAX RIPPLE CURRENT

Case size : D x L (mm)
Max ripple current : A(rms) 105°C 120Hz

μF	$\frac{V(\text{DC})}{\phi D}$	350				400				450			
		51	64	77	90	51	64	77	90	51	64	77	90
1000		75				75				96			
		4.3				4.3				4.8			
1200		75				96				115			
		4.7				5.2				5.7			
1500		96				115				130			
		5.8				6.3				6.7			
1800		96				130					96		
		6.4				7.3					6.9		
2200		130					96				115		
		8.1					7.6				8.2		
2700			96				115				130	115	
			8.4				9.1				9.6	9.8	
3300			115				130				155	130	
			10.1				10.6				11.5	11.4	
3900			130				155	115			195		
			11.5				12.5	11.8			13.9		
4700			155	115			195	130				155	
			13.7	12.9			15.2	13.6				14.7	
5600			195	130			195	155				195	157
			16.6	14.9			16.6	16.1				17.8	16.6
6800				144					157				196
				17.1					18.3				20.1
6800				155									
				17.7									
8200					157				157				196
					20.1				20.1				22.1
10000					157				196				236
					22.1				24.4				26.6
12000					196				236				
					26.8				29.1				
15000					236								
					32.5								

- High temperature 85°C, high ripple current and high reliability.
- Long life for 10000 hours.
- Corresponding product to RoHS



● SPECIFICATION

Item	Characteristic			
Operation Temperature Range	-40 ~ +85°C			
Rated Working Voltage	350 ~ 450VDC			
Capacitance Tolerance (120Hz 20°C)	±20%(M)			
Leakage Current (20°C)	I ≤0.02CV or 5 (mA) I : Leakage Current(μA)			

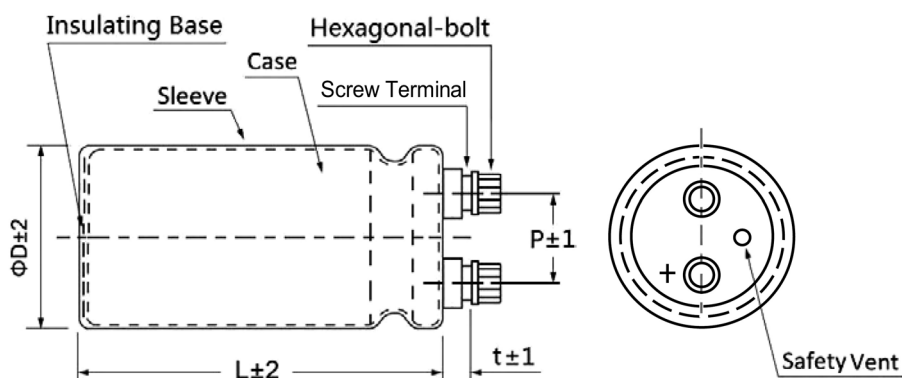
● TERMINAL TYPE

φD	P	t	Hexagonal-bolt
51	22.2	6.3	M5 × 0.8 × 10
64	28.5	6.3	M5 × 0.8 × 10
77	31.8	5.8	M5 × 0.8 × 10
90	31.6	5.8	M6 × 1.0 × 10

● RIPPLE CURRENT COEFFICIENTS

Frequency(Hz)	60	120	300	1k	≥10k
Multiplier	0.70	1.00	1.10	1.30	1.40

Temperature(°C)	40	60	85
Multiplier	1.89	1.67	1.00



● CASE SIZE & MAX RIPPLE CURRENT

Case size : D x L (mm)
Max ripple current : A(rms) 85°C 120Hz

μF	$V(\text{DC})$ ϕD	350				400				450			
		51	64	77	90	51	64	77	90	51	64	77	90
1000		75				75				96			
		5.7				4.6				5.9			
1200		75				96				115			
		6.3				5.6				7.0			
1500		96				115				130			
		7.8				6.7				8.3			
1800		96				130					96		
		8.5				7.8					8.7		
2200		130					96				115		
		10.8					8.3				10.5		
2700			96				115				130	115	
			11.5				9.9				12.2	12.5	
3300			115				130				155	130	
			13.7				11.6				14.6	14.5	
3900			130				155	115			195		
			15.8				13.6	12.8			17.7		
4700			155	115			195	130				155	
			18.7	17.6			16.6	14.9				18.1	
5600			195	130			195	155				195	157
			22.0	20.3			17.6	17.0				21.9	21.0
6800				155					157				196
				23.4					19.8				25.4
8200					157				157				196
					27.2				21.7				28.0
10000					157				196				236
					30.0				25.5				32.4
12000					196				236				
					36.3				30.4				
15000					236								
					42.5								

- High temperature 105°C, high ripple current and high reliability.
- Long life for 10000 hours.
- Corresponding product to RoHS



● SPECIFICATION

Item	Characteristic			
Operation Temperature Range	-40 ~ +105°C			
Rated Working Voltage	350 ~ 450VDC			
Capacitance Tolerance (120Hz 20°C)	±20%(M)			
Leakage Current (20°C)	I ≤0.02CV or 5 (mA) I : Leakage Current(μA)			

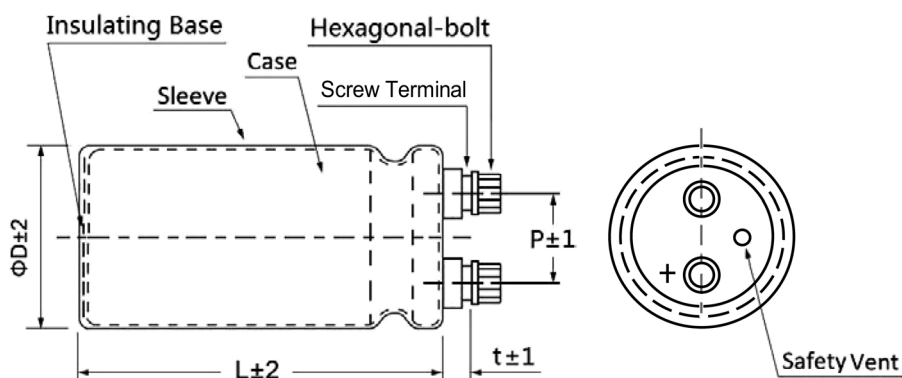
● TERMINAL TYPE

ϕD	P	t	Hexagonal-bolt
51	22.2	6.3	M5 × 0.8 × 10
64	28.5	6.3	M5 × 0.8 × 10
77	31.8	5.8	M5 × 0.8 × 10
90	31.6	5.8	M6 × 1.0 × 10

● RIPPLE CURRENT COEFFICIENTS

Frequency(Hz)	60	120	300	1k	$\geq 10k$
Multiplier	0.70	1.00	1.10	1.30	1.40

Temperature(°C)	40	60	85	105
Multiplier	2.44	2.16	2.00	1.00

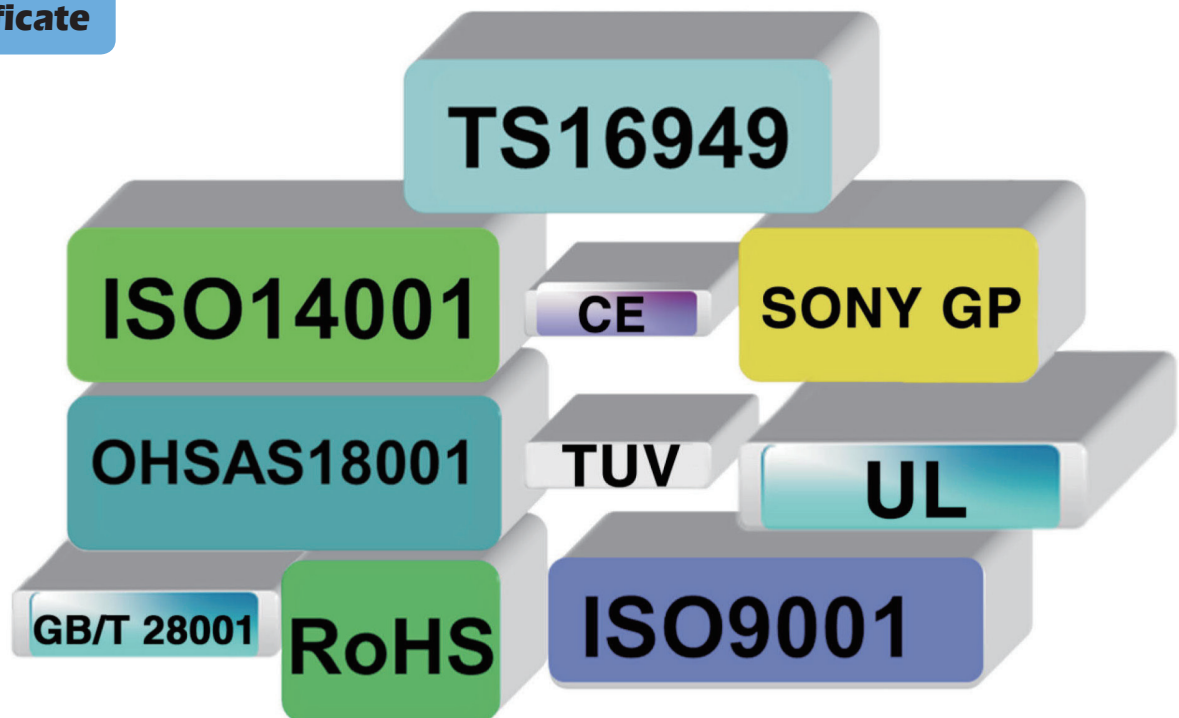


● CASE SIZE & MAX RIPPLE CURRENT

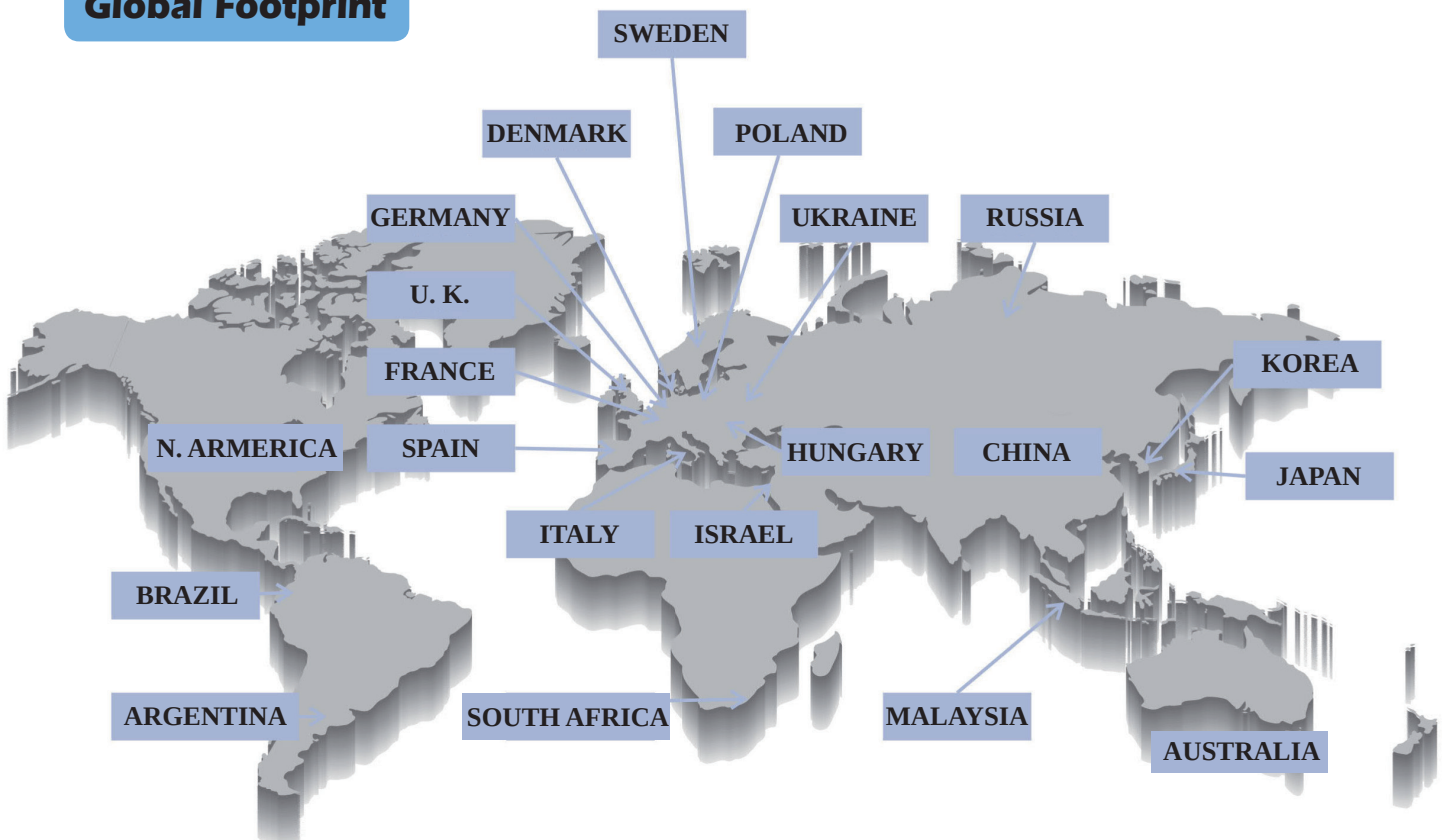
Case size : D x L (mm)
Max ripple current : A(rms) 105°C 120Hz

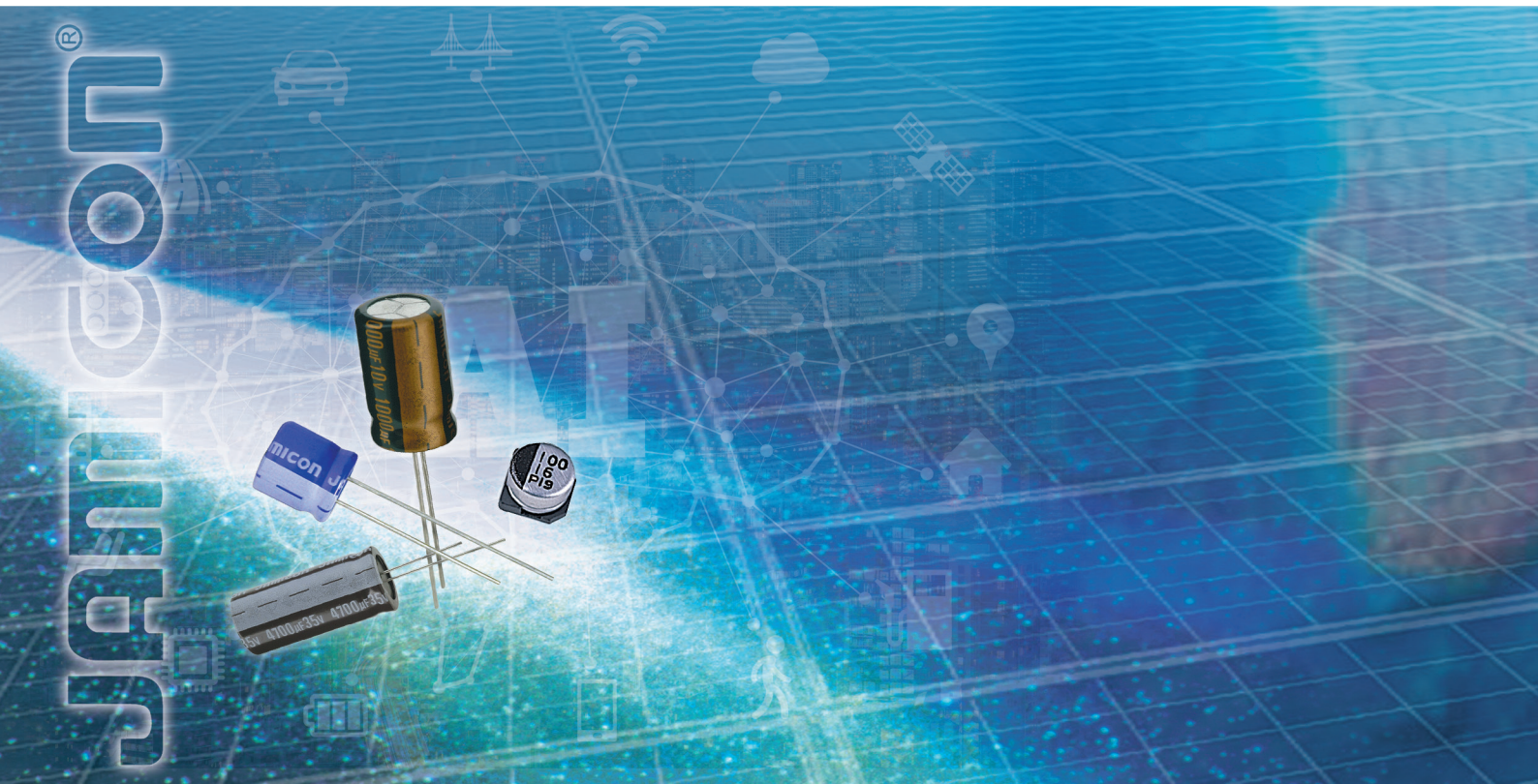
μF	$V(\text{DC})$ ϕD	350				400				450			
		51	64	77	90	51	64	77	90	51	64	77	90
1000		75				75				96			
		5.6				5.6				6.2			
1200		75				96				115			
		6.1				6.8				7.4			
1500		96				115				130			
		7.6				8.2				8.7			
1800		96				130					115		
		8.3				9.5					9.7		
2200		130					96				115		
		10.5					9.7				10.7		
2700			96				115				130	115	
			10.9				11.8				12.5	12.7	
3300			115				130				155	130	
			13.1				13.8				14.9	14.8	
3900			130				155	115			195		
			15.0				16.2	15.3			18.0		
4700			155	115			195	130				155	
			17.8	16.8			19.8	17.7				19.1	
5600			195	130			195	155				195	157
			21.6	19.3			21.6	20.9				23.2	21.5
6800				144					157				196
				22.3					23.7				26.2
8200					157				157				196
					26.1				26.1				28.8
10000					157				196				236
					28.8				31.8				34.5
12000					196				236				
					34.8				37.8				
15000					236								
					42.3								

Certificate



Global Footprint





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