UUcap®

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⚠ CAUTION FOR SAFETY	TO USE UUcap® PRODUCT CORRECTLY AND SAFETY,PLEASE READ "APPLICATION GUIDELINES" VERY CAREFULLY . PLEASE ASK FOR OUR PRODUCT SPECIFICATIONS OF THE PRODUCTS AND CONFIRM THEY ARE SUITABLE FOR THE APPLICATION BEFORE PURCHASE AND/OR USE.

2005 CATALOG



WWW.UUCAP.COM

UUcap®

- Aluminum Chip Type
- Radial Lead Type
- Snap-IN Type
- Screw Terminal Type
- Tantalum Capacitor

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■ TANTALUM ELECTROLYTIC CAPACITORS

SMD TYPE 43

LEAD WIRE TYPE 46

■ APPLICATION GUIDELINES

Correct application and strict adherence to the important information listend below, will be ensure optimum performance of the capacitors over their entire specified life.

1.POLARITY

If you should reverse the polarities of a aluminum electrolytic capacitor, it would lead to short-circuited circuitry and may further result in an explosion if the unit is kept energized. SAMWHA offers unit of φ6.3 or more with safety vent design as the standard type in order to prevent possible accidents that may take place if the unit should be connected with its polarities reversed. It is advisable to use non-polar capacitors for a DC circuit where the polarity is to be reversed.

2.OVER VOLTAGE

Do not apply overvoltage. When overvoltage is applied to the capacitor, leakage current increase drastically, causing heat generation, short-circuit or breakage.

3.RIPPLE LOAD

The rated ripple current given for certain conditions(Temperature, Frequence)shall not be exceeded. If so, early failure may result. The sum of DC-bias and maximum amplitude of ripple voltage shall be within rated voltage and 0V. Electrolytic capacitors are not normally designed for AC application.

4.TEMPERATURE RANGE

Use the electrolytic capacitors according to the specified operating temperature range. Usage at room temperature will ensure longer life.

5.CHARGE/DISCHARGE

If used in circuits in which charge and discharge are frequently repeated,the capacitance value may drop, or the capacitor may be damaged. Please consult our technical department for assistance in these applications.

6. FOR SERIES CONNECTION

Aluminum electrolytic capacitors may be connected in series, but when doing so it should be noted that the voltage distribution willbe according to their leakage currents This phenomenon may induce irregularities in voltage load and cause maximum ratingsto be exceeded, this could have drastic consequences especially with high voltage capacitors. Series connected electrolytic capacitors should therefore be supplied the voltages shall be proportionally distributed by balancing resistors.

7. FOR PARALLEL CONNECTION

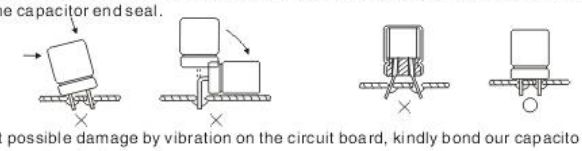
When you install more that 2 capacitors in parallel, consider the balance of current flowing into the capacitors.

8. LEAD STRESS

Do not apply excessive force to the lead wires or terminals. If excessive force is applied to the lead wires and/or terminals,they may break and cause an open circuit. After mounting,avoid holding or applying force to the capacitor.Do not twist or carry the PC board by grasping the capacitor body after the capacitor are soldered to the PC board.

9. MOUNTING

The distance between the terminal holes on the circuit board should be the same as that between the lead wires or terminals of the capacitor. Excessive force in mounting on circuit boards should be avoided.
Improper insertion of the lead wires in circuit board may cause connection with the internal elements.
The main chemical solution of the electrolyte and the separator paper used in the capacitors are combustible.The electrolyte is conductive. When it comes in contact with the PC board, there is a possibility of pattern corrosion or short circuit between the circuit pattern which could in result smoking or catching fire. Do not locate any circuit pattern beneath the capacitor end seal.



In order to prevent possible damage by vibration on the circuit board, kindly bond our capacitors on the circuit board or use any fastening devies.
There should not be any cicuit pattern or circuit wire above the capacitor safety vent.
Unless otherwise specified, following space should be made above the capacitor safety vent .

Case diameter	φ6.3 ~ φ16	φ18 ~ φ35	φ40 ~
space	2mm min.	3mm min.	5mm min.

If the capacitor safety vent is placed toward circuit board, the hole should be made to match the capacitor vent position.
Do not install serew terminal capacitor with end seal side down.When you install a screw terminal capacitor ina horizontal mount, the positive terminal must be in the upper position.

10.SOLDERING

In the dip soldering process of Pc board with aluninum electrolytic capacitors mounted,secondary shrinking or crack of the sleeve may be observed when solder temperature is too high and /or dipping time is too long.
If the lead wire of other components or pattern of bothsided PC board is close to the capacitor terminal the similar failure may be also originated.
Please avoid having flux adhere to any portion except the terminal. Solder iron does not touch any portion of capacitor body.

11. Cleaning of the circuit board after slodering

Aluminum electrolytic capacitors may be damaged when used with certain types of flux cleaning solvents commonly used to clean printed circuited board. Solvent such as chloroethane and trichloro ethylene can penetrate into the capacitor body and destroy capacitor functions. When using a latex–based adhesive on the capacitor' srubber end seal for adhesion to a printed circuit board, corrosion – may occur depending on the kind of solvent in the adhesive.Select an adhesive as an organic solvent with dissolved polymer that is not halogenated hydrocarbon.The following UUcap capacitor series less than 200V effctively resist the following halogenous cleaning agents.

12.INSULATION MATERIAL

Sleeve material
The standard sleeve material is polyvinyl chloride,it exposed to xylene, toluene,etc.and then subjected tohigh heat, the sleeve may crack.
Case and cathode terminal
The case of capacitor is not insulated from the cathode terminal.
Dummy terminals for snap–in type
Dummy terminals are not insulated from the element.
Dummy terminals are for added stability only ,and should never be electrically connected to either the positive or negative terminal.

13.STORAGE

Do not store the capacitors in high temperature and high humidity conditions. Avoid direct sunlight . (Recommendable conditions:5to35℃,45to75%RH)Store the capacitors in the package.
Capacitors should not be direct contact with water, brine or oil.
Capacitors must not be exposed to toxic gases such as hydrogen sulfide, sulfurous acid, nitrous acid, chlorine,or ammonium.
When the capacitor is stored for a long time without applying voltage, leakage current tends to increase, due to deterioration of aluminum oxide film. This returns to normal by applying voltage.
Apply voltage(Aging)before use if the capacitor is stored long time.
It is recommended to apply DC working voltage to the capacitor for 30 minutes through 1kΩ of protective seriesresistor.

14.IN AN EMERGENCY

If some gas blow out from the capacitor due to operation of safety vent, immediately turn off the main switch or pull out the plug from the power source.
When the safety vent operates, do not draw your face the safety vent since gas which in over 100℃ will be emitted.
If your eyes entered or breathed the gas, immediately wash out your eyes and mouth with pure water.
Do not touch electrolyte. If your skin is exposed to electrolyte, please wash it away using soap and water.

PART NUMBERING SYSTEM OF ALUMINUM ELECTROLYTIC CAPACITORS

■ LEAD WIRE TYPE
BULK

□□	□□	□□□	□	□	□	□
SERIES	RATED VOLTAGE	CAPACITANCE	CAP. TOLERANCE	Fig-1	Fig-2	Fig-3

TAPING

□□	□□	□□□	□	□	□
SERIES	RATED VOLTAGE	CAPACITANCE	CAP. TOLERANCE	Fig-1	Fig-4

■ SNAP-IN TYPE/SCREW TERMINAL TYPE

□□	□□	□□□	□	□	□
SERIES	RATED VOLTAGE	CAPACITANCE	CAP. TOLERANCE	Fig-5	Fig-6

Fig-1 TAPING or BULK

CODE	
T	TAPING
B	BULK

Fig-2 FORMING

CODE	
S	NON FORMING
F	FORMING

Fig-3 FORMING

CODE	
MC	KINK FORMING
CC	STRAIGHT CUT
FC	FORMING CUT

Fig-4 TAPING or BULK

CODE	
A	2.5mmPITCH
B	5.0mmPITCH

Fig-5 FORMING

CODE	
UN	SNAP-IN TYPE
LI	PCB TERMINAL TYPE

Fig-6 CASE SIZES

CODE	CASE SIZE	CODE	CASE SIZE
22A	22x25	30A	30x25
22B	22x30	30B	30x30
22C	22x35	30C	30x35
22D	22x40	30D	30x40
22E	22x45	30E	30x45
22F	22x50	30F	30x50
25A	25.4x25	35A	35x25
25B	25.4x30	35B	35x30
25C	25.4x35	35C	35x35
25D	25.4x40	35D	35x40
25E	25.4x45	35E	35x45
25F	25.4x50	35F	35x50

CAP. TOLERANCE

CODE	CAP. TOLERANCE(%)
K	-10~+10
M	-20~+20
Q	-10~+30
T	-10~+50

RATED VOLTAGE

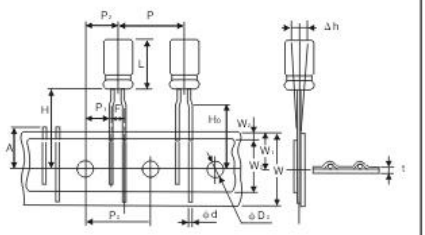
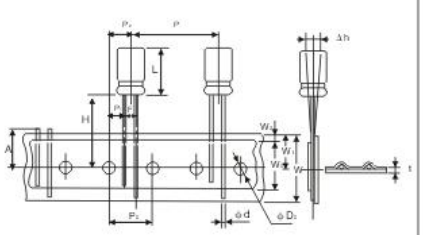
CODE	RATED VOLTAGE
0D	2.0V
0G	4.0V
0J	6.3V
1A	10V
1C	16V
1E	25V
1V	35V
1H	50V
1J	63V
1K	80V
2A	100V
2C	160V
2P	180V
2D	200V
2E	250V
2F	315V
2V	350V
2G	400V
2W	450V

CAPACITANCE

CODE	CAPACITANCE(μF)	CODE	CAPACITANCE(μF)
R10	0.1	151	150
R22	0.22	221	220
R33	0.33	331	330
R47	0.47	471	470
1R0	1.0	561	560
2R2	2.2	681	680
3R3	3.3	821	820
4R7	4.7	102	1000
6R8	6.8	222	2200
100	10	332	3300
220	22	472	4700
330	33	682	6800
470	47	822	8200
560	56	103	10000
680	68	223	22000
820	82	333	33000
101	100	473	47000
121	120	563	56000

TAPING

Lead Taping Capacitors for Automatic Insertion

DRAWING Ⅰ	DRAWING Ⅱ
	

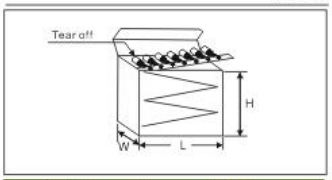
DIMENSIONS

Unit: mm

Applicable Drawing No			Ⅰ			Ⅱ	
Description	Symbol	Tolerance	Φ5	Φ8		Φ10	Φ16
Case Height	L	Max.	7–11	5.0		27.0	37.5
Lead Dia.	d	±0.05	0.5	0.6		0.8	0.8
Body Pitch	P	±1.0	12.7	15.0	25.4	30.0	30.0
Feeding Hole Pitch	P_0	±0.2	12.7	15.0	12.7	15.0	15.0
Feeding Hole Alignment	P_1	±0.7	5.1	5.0	3.85	3.75	3.75
Feeding Hole Alignment	P_2	±1.0	6.35	7.5	6.35	7.5	7.5
Lead Center Spacing	F	$^{+0.6}_{-0.2}$	5.0(2.5)	5.0		7.5	7.5
Body Inclination	Δh	±2.0	0	0		0	0
Tape Width	W	±0.5	18.0	18.0		18.0	18.0
Adhesive Tape Width	W_0	min.	9.5	12.5		12.5	12.5
Feading Hole Alignment	W_1	±0.5	9.0	9.0		9.0	9.0
Adhesive Tape Margin	W_2	max.	2.0	2.0.		2.0.	2.0.
Length from Seating Plane	H	±0.5	18.5	18.5		18.5	18.5
Lead Clinch Height	H_0	±0.5	16.5(17.0)	–		–	–
Feeding Hole Dia.	ΦD_0	±2.0	4.0	4.0		4.0	4.0
Total Tape Thickness	t	±2.0	0.7	0.7		0.7	0.7
Cut Lead Height	A	max.	11.0	11.0		11.0	11.0

PACKAGING Q'ty(pcs.)/Box

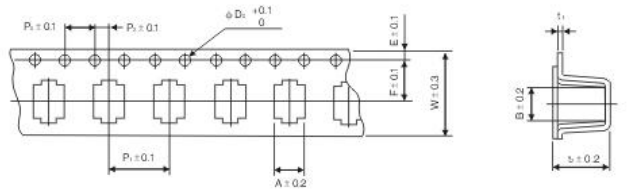
Unit: mm



	Size	Ammo			
Φ D	Case Height	L	H	W	Q'ty
3	5				3000
4	5,7	332	230	42	2500
5	5,7				2000
	9,11	332	230	49	
6.3	5,7	332	230	42	1500
	9,11	332	230	49	
8	5	332	230	42	1000
	9,11.5	332	230	49	
10	9,12.5,16	332	190	51	500
	20,25	332	190	59	
12.5	16,20,25	342	240	62	400
16	16,20,25	342	240	62	250
	31.5,35.5	342	240	74	
18	16,20,25	342	240	62	200
	35.5	342	240	74	

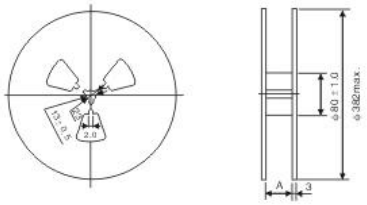
● Taping Specifications for Chip Type Capacitors

● Carrier Tape



φD×L	A	B	φD0	E	F	P0	P1	P2	t1	t2	W
4×5.3	4.7	4.7	1.5	1.75	5.5	4.0	8.0	2.0	0.4	5.7	12.0
5×5.3	5.7	5.7	1.5	1.75	5.5	4.0	12.0	2.0	0.4	5.7	12.0
6.3×5.3	7.0	7.0	1.5	1.75	7.5	4.0	12.0	2.0	0.4	5.7	16.0
6.3×5.8	7.0	7.0	1.5	1.75	7.5	4.0	12.0	2.0	0.4	6.3	16.0
8×6.2	8.7	8.7	1.5	1.75	7.5	4.0	12.0	2.0	0.4	6.8	16.0
8×10	8.7	8.7	1.5	1.75	11.5	4.0	16.0	2.0	0.4	11.0	24.0
10×10	10.7	10.7	1.5	1.75	11.5	4.0	16.0	2.0	0.4	11.0	24.0

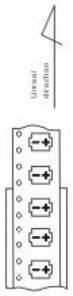
● Reel



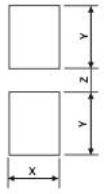
φD×L	
4×5.3	14
5×5.3	14
6.3×5.3	18
6.3×5.8	18
8×6.2	18
8×10	26
10×10	26

φD×L	Q'ty/Reel(pcs.)	Q'ty/Box(pcs.)
4×5.3	2000	20000
5×5.3	1000	10000
6.3×5.3	1000	10000
6.3×5.8	1000	10000
8×6.2	1000	10000
8×10	500	3000
10×10	500	3000

● Polarity



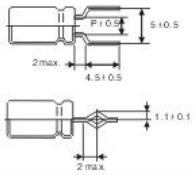
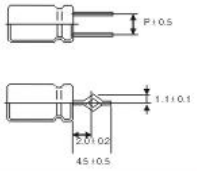
● Recommended Land Size



φD×L	X	Y	Z
4×5.3	1.6	2.6	1.0
5×5.3	1.6	3.0	1.4
6.3×5.3	1.6	3.5	2.0
6.3×5.8	1.6	3.5	2.0
8×6.2	2.5	4.0	2.0
8×10	2.5	3.5	3.0
10×10	2.5	4.0	4.0

● Lead Forming & Cutting

Unit: mm

Configurations	Cade	Case dia.	Shape	Configurations	Cade	Case dia.	Shape
Type	FC MC	φD≦8		Type	CC MC	φD≧10	

UUcap

CS Chip type, For Surface Mounting Series

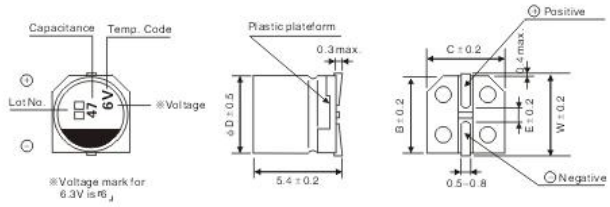


- Chip type with 5.5mm height
- Designed for surface mounting on high density PC board
- Applicable to automatic insertion machine using carrier tape

Item	Characteristics
Operating temperature range	−40 – +85℃
Leakage current max.	I=0.01CV or 3 μA whichever is gareater(after 2 minutes)
Capacitance tolerance	±20% at 120Hz, 20℃
Dissipation factor max. (At 120Hz,20℃)	WV: 4 | 6.3 | 10 | 16 | 25 | 35 | 50 tan δ: 0.35(0.40) | 0.24(0.30) | 0.20 | 0.16(0.19) | 0.13(0.16) | 0.12(0.14) | 0.19(0.14) Figures in( )are for φ3 products.
Low temperature characteristics Impedance ratio at 120Hz)	WV: 4 | 6.3 | 10 | 16 | 25 | 35 | 50 Z−25℃/Z+20℃: 6 | 4 | 3 | 2 | 2 | 2 | 2 Z−40℃/Z+20℃: 12 | 8 | 6 | 4 | 4 | 4 | 4
Load life (after application of the rated voltage for 2000 hours at 85℃	Leakage current: Less than specified value Capacitance change: Within ±20% of initial value tan δ: Less than 200% of specified value
Shelf life(at 85℃)	After 1000 hours no load test, leakage current, capacitance and tan δ are same as load life value.
Resistance to soldering heat	The following specifications shall be satisfied when the capacitors are restored to 20℃ after exposing them at 250℃ for 30 seconds. Leakage current: Less than specified value Capacitance change: Within ±10% of initial value tan δ: Less than specified value

● DRAWING

Unit: mm



φD	W	B	C	E
3	3.9	3.3	3.3	0.8
4	5.0	4.3	4.3	1.0
5	6.0	5.3	5.3	1.4
6.3	7.3	6.6	6.6	2.2

● DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

μF \ WV	4		6.3		10		16		25		35		50	
0.1													4(3)	3.2(2.4)
0.22													4(3)	4.7(3.5)
0.33													4(3)	5.7(4.3)
0.47													4(3)	6.8(5.2)
1.0													4(3)	10.0(7.5)
2.2											4(3)	11(10)	4	14.8
3.3									4(3)	15(12)	4	16	4	18.1
4.7							4(3)	16(13)	4	18	4	19	5	25.0
10	4(3)	16(13)	4(3)	19(16)	4	21	4	24	5	30	5	32	6.3	42.6
22	4(3)	24(19)	4	29	5	36	5	41	6.3	53	6.3	55		
33	4	29	5	41	5	44	6.3	58	6.3	64				
47	4	35	5	48	6.3	62	6.3	69						
100	6.3	68	6.3	82										
150	6.3	84												

▲ Ripple current(mA rms) at 85℃, 120Hz
▲ Case size φD(mm)

CM Chip type, Miniaturized Series

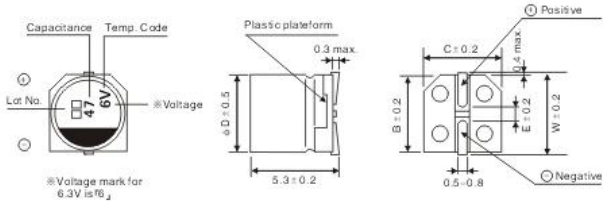
- Smaller case sizes than SC series
- Chip type with 5.5mm height
- Designed for surface mounting on high density PC board
- Applicable to automatic insertion machine using carrier tape



Item	Characteristics
Operating temperature range	–40 ~ +85℃
Leakage current max.	I=0.01CV or 3 μ A whichever is gareater(after 2 minutes)
Capacitance tolerance	±20% at 120Hz, 20℃
Dissipation factor max. (At 120Hz,20℃)	WV 4 6.3 10 16 25 35 50 tan δ 0.40 0.35 0.24 0.20 0.15 0.15 0.12
Low temperature characteristics Impedance ratio at 120Hz)	WV 4 6.3 10 16 25 35 50 Z–25℃/Z+20℃ 6 4 3 2 2 2 2 Z–40℃/Z+20℃ 12 8 6 4 4 3 3
Load life (after application of the rated voltage for 2000 hours at 85℃	Leakage current: Less than specified value Capacitance change: Within ±25% of initial value tan δ: Less than 200% of specified value
Shelf life(at 85℃)	After 1000 hours no load test, leakage current, capacitance and tan δ are same as load life value.
Resistance to soldering heat	The following specifications shall be satisfied when the capacitors are restored to 20℃ after exposing them at 250℃ for 30 seconds. Leakage current: Less than specified value Capacitance change: Within ±10% of initial value tan δ: Less than specified value

DRAWING

Unit: mm



φD	W	B	C	E
4	5.0	4.3	4.3	1.0
5	6.0	5.3	5.3	1.4
6.3	7.3	6.6	6.6	2.2

DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

μF \ WV	4		6.3		10		16		25		35		50	
0.1													4	4
0.22													4	5
0.33													4	6
0.47													4	8
1.0													4	11
2.2													4	17
3.3													4	20
4.7											4	18	4	24
10							4	21	4	24	4	27	5	41
22			4	24	4	28	4	30	4	41	6.3	53	6.3	71
33	4	27	4	30	4	34	5	43	5	50	6.3	65		
47	4	32	4	36	5	47	5	52	6.3	70				
68	4	44	5	50	6.3	66	6.3	78						
100	5	54	5	60	6.3	80	6.3	88	← Ripple current(mA rms) at 85℃, 120Hz					
220	6.3	93					▲		Case size φD(mm)					

CG Chip type, High CV Series

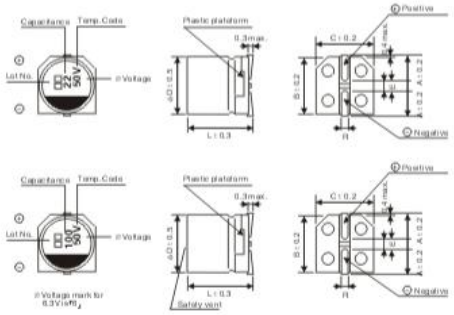


- Chip type higher capacitance in larger case sizes
- Designed for surface mounting on high density PC board
- Applicable to automatic mounting machine using carrier tape

Item	Characteristics
Operating temperature range	–40 ~ +85℃
Leakage current max.	I=0.03CV (after 1 minutes)
Capacitance tolerance	±20% at 120Hz, 20℃
Dissipation factor max. (At 120Hz,20℃)	WV: 6.3 / 10 / 16 / 25 / 35 / 50 tan δ: 0.28 / 0.24 / 0.20 / 0.16 / 0.14 / 0.12
Low temperature characteristics Impedance ratio at 120Hz)	WV: 6.3 / 10 / 16 / 25 / 35 / 50 Z–25℃/Z+20℃: 5 / 4 / 3 / 2 / 2 / 2 Z–40℃/Z+20℃: 10 / 8 / 6 / 4 / 3 / 3
Load life (after application of the rated voltage for 2000 hours at 85℃	Leakage current: Less than specified value Capacitance change: Within ±20% of initial value tan δ: Less than 200% of specified value
Shelf life(at 85℃)	After 1000 hours no load test, leakage current, capacitance and tan δ are same as load life value.
Resistance to soldering heat	The following specifications shall be satisfied when the capacitors are restored to 20℃ after exposing them at 250℃ for 30 seconds. Leakage current: Less than specified value Capacitance change: Within ±10% of initial value tan δ: Less than specified value

DRAWING

Unit: mm



ϕD × 5.8	A	B	C	E	R
6.3 × 5.8	2.4	6.6	6.6	2.2	0.5 ~ 0.8
8 × 6.2	3.3	8.3	8.3	2.3	0.5 ~ 0.8
8 × 10	2.9	8.3	8.3	3.1	0.8 ~ 1.1
10 × 10	3.2	10.3	10.3	4.5	0.8 ~ 1.1

DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

μF \ WV	6.3		10		16		25		35		50	
22											6.3 × 5.8	45
33									6.3 × 5.8	55	8 × 6.2	95
47							6.3 × 5.8	65	8 × 6.2	105	8 × 10	140
100			6.3 × 5.8	70	6.3 × 5.8	82	8 × 6.2	145	8 × 10	175	10 × 10	195
220	6.3 × 5.8	91	8 × 6.2	175	8 × 10	215	10 × 10	250	10 × 10	265		
330	8 × 6.2	190	8 × 10	240	8 × 10	270	10 × 10	305				
470	8 × 10	265	8 × 10	290	10 × 10	330						
1000	10 × 10	400										

CR Chip type, For Wide Temperature Range Series

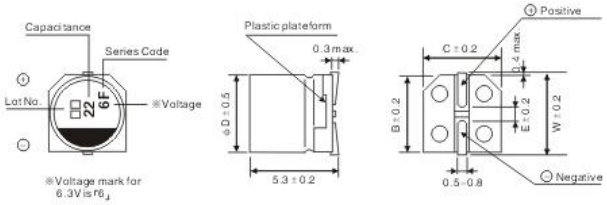


- Chip type with 5.5mm height
- WFide operating temperature range of –55 ~ +105℃
- Designed for surface mounting on high density PC board
- Applicable to automatic insertion machine suing carrier tape

Item	Characteristics
Operating temperature range	–55 ~ +105℃
Leakage current max.	I=0.01CV or 3 μA whichever is gareater(after 2 minutes)
Capacitance tolerance	±20% at 120Hz, 20℃
Dissipation factor max. (At 120Hz,20℃)	WV: 6.3 / 10 / 16 / 25 / 35 / 50 tanδ: 0.27 / 0.23 / 0.19 / 0.15 / 0.13 / 0.11
Low temperature characteristics Impedance ratio at 120Hz)	WV: 6.3 / 10 / 16 / 25 / 35 / 50 Z–25℃/Z+20℃: 3 / 3 / 2 / 2 / 2 / 2 Z–40℃/Z+20℃: 8 / 5 / 4 / 3 / 3 / 3
Load life (after application of the rated voltage for 1000 hours at 105℃	Leakage current: Less than specified value Capacitance change: Within ±25% of initial value tanδ: Less than 200% of specified value
Shelf life(at 105℃)	After 1000 hours no load test, leakage current, capacitance and tanδ are same as load life value.
Resistance to soldering heat	The following specifications shall be satisfied when the capacitors are restored to 20℃ after exposing them at 250℃ for 30 seconds. Leakage current: Less than specified value Capacitance change: Within ±15% of initial value tanδ: Less than specified value

DRAWING

Unit: mm



φD	W	B	C	E
4	5.0	4.3	4.3	1.0
5	6.0	5.3	5.3	1.4
6.3	7.3	6.6	6.6	2.2

DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

μF \ WV	6.3		10		16		25		35		50	
0.1											4	2.3
0.22											4	3.4
0.33											4	4.1
0.47											4	4.9
1.0											4	7.2
2.2											4	10.7
3.3											4	13.1
4.7							4	13	4	14	5	18.1
10					4	17	5	23	5	24	6.3	30.8
22	4	22	5	27	5	30	6.3	39	6.3	42		
33	4	31	5	33	6.3	43	6.3	48				
47	5	36	6.3	46	6.3	51						
100	6.3	50										
150												

Ripple current(mA rms) at 105℃, 120Hz
Case size φD(mm)

GS Standard, For General Purposes Series

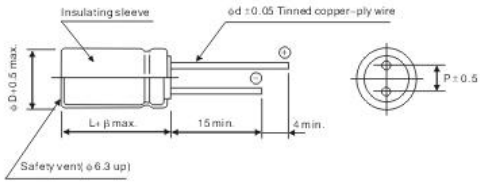


- Standard series for general purposes
- High performance and high reliability
- Load life of 2000 hours at 85℃

Item	Characteristics
Operating temperature range	−55 ~ +105℃
Leakage current max.	I=0.01CV or 3 μA whichever is gareater(after 2 minutes)
Capacitance tolerance	±20% at 120Hz, 20℃
Dissipation factor max. (At 120Hz,20℃)	WV: 6.3 / 10 / 16 / 25 / 35 / 50 tanδ: 0.27 / 0.23 / 0.19 / 0.15 / 0.13 / 0.11
Low temperature characteristics Impedance ratio at 120Hz)	WV: 6.3 / 10 / 16 / 25 / 35 / 50 Z−25℃/Z+20℃: 3 / 3 / 2 / 2 / 2 / 2 Z−40℃/Z+20℃: 8 / 5 / 4 / 3 / 3 / 3
Load life (after application of the rated voltage for 1000 hours at 105℃	Leakage current: Less than specified value Capacitance change: Within ±25% of initial value tanδ: Less than 200% of specified value
Shelf life(at 105℃)	After 1000 hours no load test, leakage current, capacitance and tanδ are same as load life value.
Resistance to soldering heat	The following specifications shall be satisfied when the capacitors are restored to 20℃ after exposing them at 250℃ for 30 seconds. Leakage current: Less than specified value Capacitance change: Within ±15% of initial value tanδ: Less than specified value

● DRAWING

Unit: mm



φD	5	6.3	8	10	12.5	16	18	22	25.4
P	2.0	0.5	3.5	5.0	5.0	7.5	7.5	10.0	12.5
φd	0.5	0.5	0.6	0.6	0.6	0.8	0.8	1.0	1.0
β	1.0			2.0					
α	0.5							1.0	

● PERMISSIBLE RIPPLE CURRENT MULTIPLIERS

μF \ Frequency	50Hz	120Hz	300Hz	1kHz	10kHz ~
~ 47	0.75	1	1.35	1.55	2.0
68 ~ 680	0.80	1	1.25	1.34	1.5
1000 ~	0.85	1	1.10	1.13	1.15

GS series

- DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

μF \ WV	6.3	10	16	25	35	40	50	63	80	100	160	200	250	350	400	450
0.1							5×11 7.2	5×11 7.8	5×11 7.8	5×11 7.8						
0.15							5×11 8.9	5×11 9.6	5×11 9.6	5×11 9.6						
0.22							5×11 11	5×11 12	5×11 12	5×11 12						
0.33							5×11 13	5×11 14	5×11 14	5×11 14						
0.47							5×11 16	5×11 17	5×11 17	5×11 17	6.3×11 17	6.3×11 17	6.3×11 17	8×11.5 20	8×11.5 20	
0.68							5×11 19	5×11 20	5×11 20	5×11 20	6.3×11 20	6.3×11 20	6.3×11 20	8×11.5 24	8×11.5 20	
1.0							5×11 23	5×11 25	5×11 25	5×11 25	6.3×11 25	6.3×11 25	6.3×11 25	8×11.5 29	8×11.5 29	8×11.5 26
1.5							5×11 28	5×11 30	5×11 30	5×11 30	6.3×11 30	6.3×11 30	8×11.5 36	8×11.5 36	10×12.5 41	10×12.5 37
2.2							5×11 34	5×11 37	5×11 37	5×11 37	6.3×11 37	6.3×11 37	8×11.5 43	10×12.5 50	10×12.5 50	10×12.5 45
3.3							5×11 42	5×11 45	5×11 45	5×11 45	8×11.5 53	8×11.5 53	10×12.5 61	10×12.5 61	10×12.5 61	10×16 60
4.7							5×11 50	5×11 54	5×11 54	5×11 54	8×11.5 63	10×12.5 73	10×12.5 73	10×12.5 73	10×16 80	10×20 78
6.8							5×11 60	5×11 65	5×11 65	5×11 65	10×12.5 88	10×12.5 88	10×12.5 88	10×16 96	10×20 105	10×20 96
10							5×11 72	5×11 78	5×11 78	6.3×11 90	10×12.5 107	10×16 117	10×16 117	10×20 128	12.5×20 150	12.5×20 134
15							5×11 89	5×11 96	6.3×11 110	6.3×11 110	10×16 143	10×20 156	10×20 156	12.5×20 183	12.5×20 183	12.5×25 179
22						5×11 101	5×11 108	6.3×11 133	6.3×11 133	8×11.5 157	10×20 189	10×20 189	12.5×20 222	12.5×25 242	12.5×25 242	16×25 240
33					5×11 123	6.3×11 142	6.3×11 151	6.3×11 163	8×11.5 193	10×12.5 224	12.5×20 272	12.5×20 272	12.5×25 297	12.5×25 297	16×25 329	16×31.5 322
47				5×11 131	6.3×11 169	6.3×11 169	6.3×11 181	8×11.5 230	10×12.5 267	10×16 293	12.5×20 325	12.5×25 354	16×25 393	16×25 393	16×35.5 451	16×35.5 403
68			5×11 141	6.3×11 182	6.3×11 203	8×11.5 240	8×11.5 256	10×12.5 321	10×12.5 321	10×16 352	12.5×25 426	16×25 472	16×25 472	16×35.5 542	18×35.5 582	18×40 546
100	5×11 143	5×11 157	6.3×11 201	6.3×11 220	8×11.5 291	8×11.5 291	8×11.5 311	10×12.5 390	10×16 427	10×20 466	16×25 573	16×25 573	16×31.5 627	18×40 741	22×40 815	22×40 729
150	6.3×11 201	6.3×11 220	6.3×11 246	8×11.5 318	10×12.5 414	10×12.5 414	10×16 484	10×16 523	10×20 571	12.5×20 670	16×31.5 768	16×35.5 806	18×35.5 864	22×40 998	25.4×40 1090	25.4×50 1064
220	6.3×11 244	6.3×11 267	8×11.5 352	8×11.5 386	10×12.5 501	10×16 549	10×16 586	10×20 691	12.5×20 811	12.5×25 885	18×35.5 1047	18×40 1098	22×40 1209	25.4×50 1440		
330	6.3×11 298	8×11.5 386	8×11.5 431	10×12.5 549	10×16 672	10×20 733	10×20 784	12.5×20 994	12.5×25 1083	16×25 1202	22×40 1481	22×40 1481	25.4×40 1617			
470	8×11.5 420	8×11.5 460	10×12.5 598	10×16 717	10×20 875	12.5×20 1027	12.5×20 1098	12.5×25 1293	16×25 1434	16×31.5 1569	25.4×40 1930	25.4×40 1930	25.4×50 2105			
680	10×12.5 587	10×12.5 643	10×20 859	10×20 941	12.5×20 1235	12.5×20 1235	12.5×25 1440	16×25 1725	16×31.5 1888	18×35.5 2125	25.4×50 2532					
1000	10×12.5 712	10×16 854	10×20 1042	12.5×20 1340	12.5×25 1633	16×25 1812	16×25 1937	16×31.5 2289	18×35.5 2577	22×40 2976						
1500	10×20 988	12.5×20 1259	12.5×20 1387	12.5×25 1633	16×25 1985	16×31.5 2172	16×35.5 2402	18×35.5 2733	22×40 3156	25.4×40 3448						
2200	12.5×20 1340	12.5×20 1442	12.5×25 1713	16×25 2032	16×31.5 2401	16×35.5 2519	18×35.5 2823	22×40 3420	25.4×40 3735							
3300	12.5×20 1571	12.5×25 1831	16×25 2194	16×31.5 2546	18×35.5 3065	18×35.5 3065	22×40 3673	25.4×40 4176								
4700	16×25 2179	16×25 2317	16×31.5 2718	16×35.5 3225	22×40 3951	22×40 3951	25.4×40 4458									
6800	16×25 2440	16×31.5 2814	18×35.5 3360	22×40 4053	25.4×40 4643	25.4×40 5065	← Case size φD×L(mm) ← Ripple current (mA rms) at 85℃									
10000	16×31.5 2955	18×35.5 3475	22×40 4209	25.4×40 4759												
15000	18×35.5 3605	22×40 4306	25.4×40 4877		It can produce the special sizes according to the client's specific requirements.											
22000	22×40 4415	25.4×40 4947														

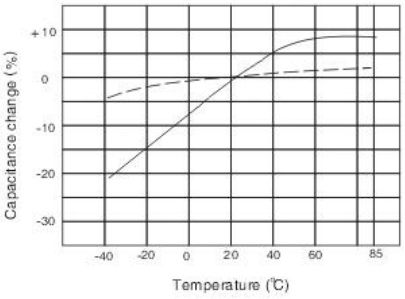
GS series

TYPICAL PERFORMANCE

— 10V 220μF
— 63V 1000μF

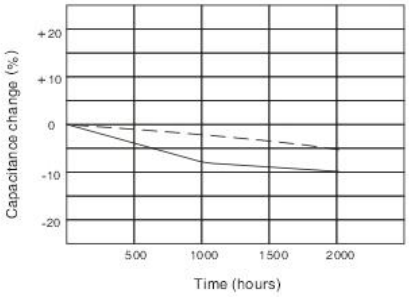
● TEMPERATURE CHARACTERISTICS

Capacitance change vs.temperature

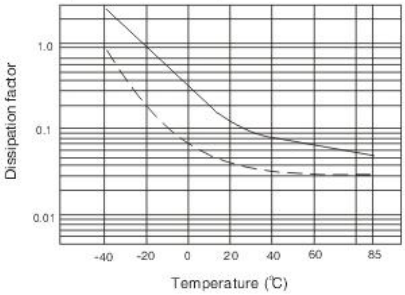


● LOAD LIFE (at+85℃)

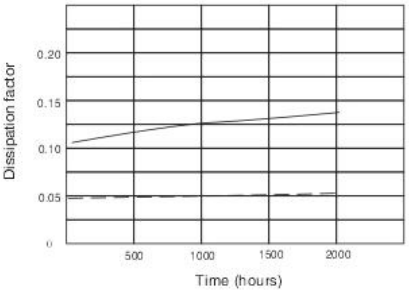
Capacitance change vs.time



Dissipation factor vs.temperature

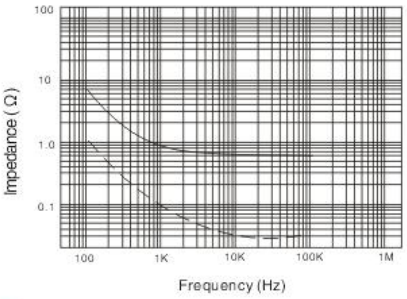


Dissipation factor vs.time

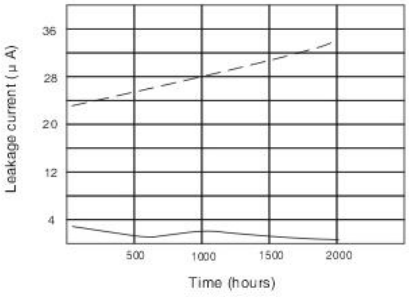


● FREQUENCY CHARACTERISTICS

Impedance vs.frepuency



Leakage current vs.time



GR Wide Temperature Range Series

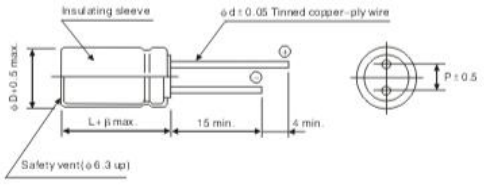


- Wide operating temperature range off-55~100℃
- Satandard series for general purposes
- Voltage range of 6.3~450V
- Load life of 2000 hours at 105℃

Item	Characteristics
Operating temperature range	WV: 6.3~100 / 160~350 / 400~450 Temperature range: -55~105℃ / -40~+105℃ / -25~105℃
Leakage current max.	WV≦100: I=0.01CV or 3μA whichever is gareater(after 2 min) I=0.03CV or 4μA whichever is gareater(after 1 min) WV>100: I=0.02CV+15μA (after 5 min)
Capacitance tolerance	±20% at 120Hz, 20℃
Dissipation factor max. (At 120Hz,20℃)	WV: 6.3 / 10 / 16 / 25 / 35 / 50 / 63 / 100 / 160~350 / 350~450 tan δ: 0.22 / 0.19 / 0.16 / 0.14 / 0.12 / 0.10 / 0.09 / 0.08 / 0.15 / 0.20
Low temperature characteristics Impedance ratio at 120Hz)	WV: 6.3 / 10 / 16 / 25~100 / 160~350 / 350~450 Z-25℃/Z+20℃: 4 / 3 / 2 / 2 / 2 / 2 Z-40℃/Z+20℃: 8 / 6 / 4 / 3 / 3 / 3
Load life (after application of the rated voltage for 1000 hours at 105℃	Leakage current: Less than specified value Capacitance change: Within ±20% of initial value tan δ: Less than 200 of specified value φ5, 6.3 and φ8 products are for 1000 hours
Shelf life(at 105℃)	After 1000 hours no load test, leakage current, capacitance and tan δ are same as load life value.

● DRAWING

Unit: mm



φD	5	6.3	8	10	12.5	16	18
P	2.0	0.5	3.5	5.0	5.0	7.5	7.5
φd	0.5	0.5	0.6	0.6	0.6	0.8	0.8
β	1.0			2.0			

● PERMISSIBLE RIPPLE CURRENT MULTIPLIERS

μF \ Frequency	50Hz	120Hz	300Hz	1kHz	10kHz~
~47	0.75	1	1.35	1.55	2.0
68~680	0.80	1	1.25	1.34	1.5
1000~	0.85	1	1.10	1.13	1.15

GR series

- DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

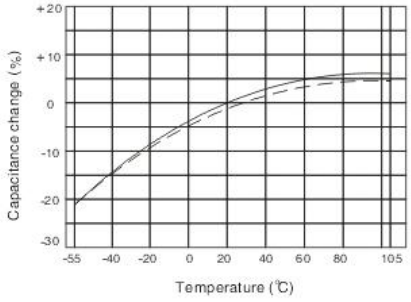
μF \ WV	6.3	10	16	25	35	50	63	100	160	200	250	350	400	450
0.47						5×11 11	5×11 12	5×11 12	6.3×11 11	6.3×11 11	6.3×11 11			
0.68						5×11 13	5×11 15	5×11 15	6.3×11 13	6.3×11 13	6.3×11 13			
1.0						5×11 16	5×11 18	5×11 18	6.3×11 16	6.3×11 16	6.3×11 16	8×11.5 19	8×11.5 19	8×11.5 16
1.5						5×11 20	5×11 22	5×11 22	6.3×11 19	6.3×11 19	8×11.5 23	10×12.5 27	10×12.5 27	10×12.5 20
2.2						5×11 24	5×11 26	5×11 26	6.3×11 23	6.3×11 23	8×11.5 28	10×12.5 32	10×12.5 32	10×12.5 27
3.3						5×11 29	5×11 32	5×11 32	8×11.5 34	8×11.5 34	10×12.5 39	10×16 43	10×16 43	10×16 36
4.7						5×11 35	5×11 38	5×11 38	8×11.5 40	10×12.5 47	10×12.5 47	10×16 51	10×16 51	10×20 47
6.8						5×11 42	5×11 46	6.3×11 53	10×12.5 56	10×16 62	10×16 62	10×20 67	10×20 67	12.5×20 66
10						5×11 51	5×11 56	6.3×11 64	10×16 75	10×16 75	10×16 75	10×20 82	12.5×20 96	12.5×20 80
15						5×11 62	6.3×11 78	8×11.5 93	10×16 92	10×20 100	10×20 100	12.5×20 118	12.5×25 128	12.5×25 107
22					5×11 65	5×11 75	6.3×11 95	8×11.5 112	10×20 121	10×20 121	12.5×20 143	12.5×25 155	12.5×25 155	16×25 144
33				5×11 75	5×11 80	6.3×11 106	6.3×11 116	10×12.5 159	12.5×20 175	12.5×20 175	12.5×20 175	16×25 211	16×25 211	16×31.5 193
47			5×11 81	5×11 90	6.3×11 110	6.3×11 127	8×11.5 164	10×16 208	12.5×20 208	12.5×25 227	12.5×25 227	16×31.5 276	16×35.5 289	18×40 272
68		5×11 90	5×11 98	6.3×11 125	6.3×11 132	8×11.5 180	10×12.5 229	10×20 274	12.5×25 273	16×25 303	16×25 303	16×35.5 348	18×40 392	
100	5×11 99	5×11 109	6.3×11 137	6.3×11 151	8×11.5 189	8×11.5 218	10×12.5 229	12.5×20 389	16×25 358	16×31.5 402	16×35.5 422	18×40 475		
150	6.3×11 139	6.3×11 154	6.3×11 167	8×11.5 218	10×12.5 269	10×16 340	10×20 406	12.5×25 520	16×31.5 492	16×40 543	16×40 582			
220	6.3×11 168	6.3×11 186	8×11.5 239	8×11.5 264	10×12.5 326	10×16 412	12.5×16 532	16×25 699	16×40 657	18×40 705				
330	6.3×11 206	8×11.5 269	8×11.5 293	10×12.5 376	10×16 437	12.5×16 595	12.5×20 708	16×25 856	18×40 863					
470	8×11.5 290	8×11.5 321	10×12.5 406	10×16 491	10×20 569	12.5×20 771	12.5×25 921	16×31.5 1117						
680	10×12.5 405	10×16 492	10×16 535	12.5×16 698	12.5×20 803	12.5×25 1011	16×25 1228	18×40 1588						
1000	10×12.5 491	10×16 596	10×20 707	12.5×20 918	12.5×25 1062	16×25 1360	16×31.5 1630							
1500	10×20 677	10×20 742	12.5×20 936	12.5×25 1109	16×25 1290	16×31.5 1578	18×40 1993							
2200	12.5×20 913	12.5×20 991	12.5×25 1150	16×25 1370	16×31.5 1560	18×35.5 1924								
3300	12.5×20 1067	12.5×25 1251	16×25 1468	16×31.5 1709	18×35.5 1992									
4700	16×25 1474	16×25 1576	16×31.5 1813	18×35.5 2157	← Case size φD × L(mm) ← Ripple current (mA rms) at 85℃									
6800	16×25 1642	16×31.5 1901	16×40 2184											
10000	16×31.5 1977	18×35.5 2330		It can produce the special sizes according to the client's specific requirements.										
15000	18×35.5 2396													

GR series

— 16V 1000μF
— 200V 10μF

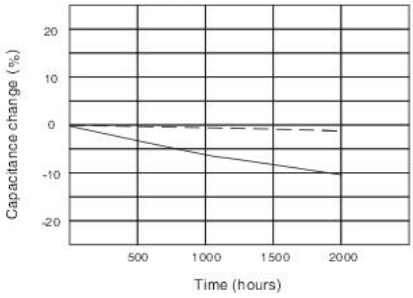
● TEMPERATURE CHARACTERISTICS

Capacitance change vs.temperature

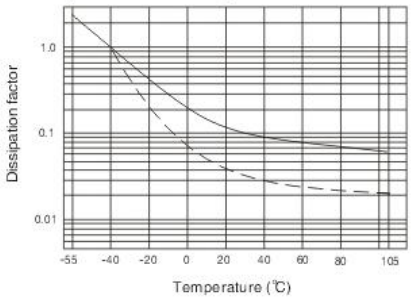


● LOAD LIFE (at+85℃)

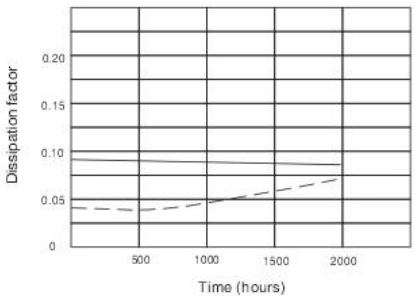
Capacitance change vs.time



Dissipation factor vs.temperature

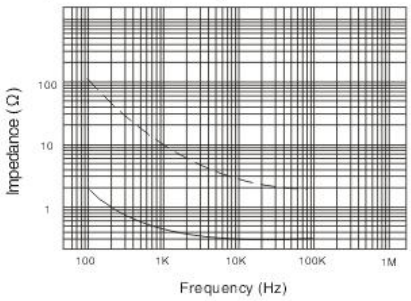


Dissipation factor vs.time

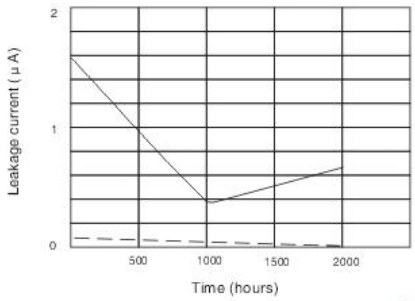


● FREQUENCY CHARACTERISTICS

Impedance vs.frepuency



Leakage current vs.time



NP Non-Polarized Serles



Standard non-polarized series
Designes for use in circuits with reversing polarity
Higher voltage ratings available up to 250V
Load life of 2000 hours st 85℃
Solvent proof

Item	Characteristics
Operating temperature range	-40~+85℃
Leakage current max.	I = 0.03CV or 3μA whichever is greater (after 5 minutes)
Capacitance tolerance	±20% at 120Hz,20℃
Dissipation factor max. (at 120Hz,20℃)	Capacitance > 1000μF : tan δ imcreases by 0.02 for each 1000μF from below value.

WV	6.3	10	16	25	35	50	63	80	100	160	200,250
tan δ	0.25	0.23	0.20	0.15	0.15	0.12	0.12	0.12	0.12	0.15	0.20

Low temperature characteristics (Impesance ratio at 120Hz)

WV	6.3	10	16	25~100	160~250
Z-25℃/Z+20℃	4	3	2	2	3
Z-40℃/Z+20℃	10	8	6	4	5

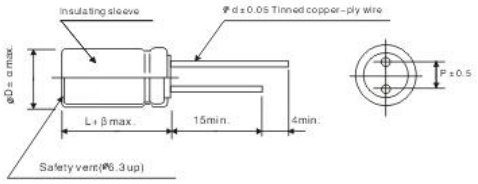
Load life (after application of the rated voltage for 2000 hours at 105℃)

Leakage current	Lass than specified value
Capacitance change	Within ±20% of initial value
tan δ	Less than 200% of specified value
Test method	Polarity reverse each 250 hours

Shelf life (at 85℃)	After 1000 hours no load test, leakage current,capacitance and tan δ are sameas load life value.

● DRAWING

Unit : mm



ΦD	5	6.3	8	10	12.5	16	18	22	25.4
P	2.0	2.5	3.5	5.0	5.0	7.5	7.5	10.0	12.5
Φd	0.5	0.5	0.6	0.6	0.6	0.8	0.8	1.0	1.0
β	1.0			2.0					
α	0.5								1.0

● PERMISSIBLE RIPPLE CURRENT MULTIPLIERS

μF \ Frequency	50Hz	120Hz	300Hz	1kHz	10kHz~
~47	0.75	1	1.35	1.55	2.0
68~680	0.80	1	1.25	1.34	1.5
1000~	0.85	1	1.10	1.13	1.15

NP series

● DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

WV / μF	6.3	10	16	25	35	50	63	80	100	160	200	250
0.47						5×11 12	5×11 12	5×11 12	5×11 12			
0.68						5×11 14	5×11 14	5×11 14	5×11 14			
1.0						5×11 18	5×11 18	5×11 18	5×11 18			
1.5						5×11 21	5×11 21	5×11 21	5×11 21			
2.2						5×11 26	5×11 26	5×11 26	5×11 26			
3.3							5×11 32	5×11 32	5×11 32	10×16 49	10×16 42	10×20 46
4.7						5×11 38	5×11 38	5×11 38	6.3×11 44	10×16 59	10×20 55	12.5×20 63
6.8						5×11 46	5×11 46	6.3×11 52	8×11.5 62	10×20 77	12.5×20 78	12.5×20 78
10						5×11 55	6.3×11 64	6.3×11 64	8×11.5 75		12.5×20 95	12.5×25 103
15					5×11 61	6.3×11 78	6.3×11 78	8×11.5 92	10×12.5 107	12.5×20 134	12.5×25 127	16×25 140
22				5×11 78	6.3×11 84	6.3×11 94	8×11.5 111	10×12.5 129	10×16 142		16×25 170	16×31.5 186
33			5×11 78	6.3×11 103	6.3×11 103	8×11.5 136	10×12.5 158	10×16 173	10×20 189	16×25 240	16×35.5 239	18×35.5 256
47		5×11 87	6.3×11 107	6.3×11 123	8×11.5 145	10×12.5 189	10×16 207	10×20 226	12.5×20 265	16×35.5 329	18×40 321	
68	5×11 100	6.3×11 120	6.3×11 129	8×11.5 175	10×12.5 203	10×16 249	10×20 272	12.5×20 319	12.5×25 348	18×35.5 425		
100	6.3×11 139	6.3×11 145	8×11.5 184	10×12.5 247	10×16 270	10×20 329	10×20 329	12.5×20 387	16×25 468			
150	6.3×11 171	8×11.5 210	10×12.5 262	10×16 331	10×20 361	10×20 404	12.5×20 474	12.5×25 516	16×25 573			
220	8×11.5 244	10×12.5 295	10×16 347	10×20 437	10×20 437	12.5×20 574	12.5×25 625		16×35.5 797			
330	10×12.5 347	10×16 396	10×20 464	10×20 535	12.5×20 628	16×25 850	16×25 850	16×35.5 976	18×40 1098			
470	10×16 454	10×20 516	10×20 553	12.5×20 750	12.5×25 818	16×31.5 1110	16×35.5 1164	18×40 1311	22×40 1443			
680	10×20 595	12.5×20 729	12.5×20 781	12.5×25 984	16×25 1091	18×35.5 1503	18×40 1577	22×40 1736	25.4×40 1896			
1000	12.5×20 847	12.5×20 883	12.5×25 1033	16×25 1323	16×35.5 1519	18×40 1912	22×40 2105	25.4×40 2299				
1500	12.5×20 999	12.5×25 1132	16×25 1338	16×35.5 1748	18×40 1968	22×40 2386	25.4×40 2607					
2200	12.5×25 1272	16×25 1463	16×35.5 1781	18×40 2254	22×40 2481	25.4×50 3221						
3300	16×25 1672	16×35.5 1985	18×40 2360	22×40 2890	25.4×40 3157							
4700	16×35.5 2221	18×40 2579	22×40 2987	25.4×50 3927	← Case size φD×L (mm) ← Ripple curent (mA rms)_at 85℃,120Hz							
6800	18×40 2840	22×40 3214	25.4×50 4004	It can produce the special sizes according to the client's specific requirements.								
10000	22×40 3516	25.4×50 4290										

WD Miniaturized,Extremely Low Impedance Series



- Smaller case sizes
- Extremely low impedance at high frequency
- High reliability withstanding 5000 hours load life at 105℃ (2000/3000 hours for smaller case sizes as specified below)

Item	Characteristics
Operating temperature range	−55 ~ +105℃
Leakage current max.	I = 0.01CV or 3㎂ whichever is greater (after 2 minutes) I = 0.03CV or 4㎂ whichever is greater (after 1 minute)
Capacitance tolerance	±20% at 120Hz,20℃
Dissipation factor max. (at 120Hz,20℃)	Capacitance > 1000㎌ : tan δ increases by 0.02 for each 1000 ㎌ from below value.

WV	6.3	10	16	25	35	50
tan δ	0.24	0.20	0.16	0.14	0.12	0.10

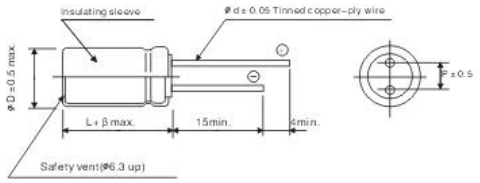
Low temperature characteristics (Impesance ratio at 120Hz)				
WV	6.3, 10		16~35	50
Z-55℃/Z+20℃	5		4	3

Load life (after application of the rated voltage for 5000 hours at 105℃)		
	Leakage current	Less than specified value
	Capacitance change	Within ±20% of imitial value
	tan δ	Less than 200% of specified value
Ø5,6.3, 8 products are for 2000 hours, Ø 10 products are for 3000 hours		

Shelf life (after leavign capacitors under no load at 105℃ for 1000 hours)		
	Leakage current	Less than specified value
	Capacitance change	Within ±20% of imitial value
	tan δ	Less than 150% of specified value

● DRAWING

Unit : mm



ØD	5	6.3	8	10	12.5	16	18
P	2.0	2.5	3.5	5.0	5.0	7.5	7.5
Ø d	0.5	0.5	0.6	0.6	0.6	0.8	0.8
β	1.0			2.0			

WD series

- DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

WV / Item / μF	6.3			10			16		
	φD×L (mm)	Impedance (Ω) max. 20℃ 100kHz	Ripple current (mA rms) 105℃ 100kHz	φD×L (mm)	Impedance (Ω) max. 20℃ 100kHz	Ripple current (mA rms) 105℃ 100kHz	φD×L (mm)	Impedance (Ω) max. 20℃ 100kHz	Ripple current (mA rms) 105℃ 100kHz
10							5×11	0.70	180
22	5×11	0.70	180	5×11	0.70	180	5×11	0.70	180
33	5×11	0.70	180	5×11	0.70	180	5×11	0.70	180
47	5×11	0.65	180	5×11	0.65	180	5×11	0.65	180
100	5×11	0.65	180	5×11	0.65	180	6.3×11	0.30	280
150	6.3×11	0.30	280	6.3×11	0.30	280	6.3×11	0.30	280
220	6.3×11	0.30	280	6.3×11	0.30	280	8×11.5	0.14	450
330	6.3×11	0.30	280	8×11.5	0.14	450	8×11.5	0.14	450
470	8×11.5	0.14	450	8×11.5	0.14	450	10×12.5	0.10	660
680	10×12.5	0.10	660	10×12.5	0.10	660	10×16	0.080	850
1000	10×12.5	0.10	660	10×16	0.080	850	10×20	0.054	1100
1500	10×20	0.054	1100	10×20	0.054	1100	12.5×20	0.050	1400
2200	12.5×20	0.050	1400	12.5×20	0.050	1400	12.5×25	0.038	1700
3300	12.5×20	0.050	1400	12.5×25	0.038	1700	16×25	0.030	2100
4700	16×25	0.030	2100	16×25	0.030	2100	16×31.5	0.025	2600
6800	16×25	0.030	2100	16×31.5	0.025	2600	18×35.5	0.022	3000
10000	16×31.5	0.025	2600	18×35.5	0.022	3000			
15000	18×35.5	0.022	3000						

WV / Item / μF	25			35			50		
	φD×L (mm)	Impedance (Ω) max. 20℃ 100kHz	Ripple current (mA rms) 105℃ 100kHz	φD×L (mm)	Impedance (Ω) max. 20℃ 100kHz	Ripple current (mA rms) 105℃ 100kHz	φD×L (mm)	Impedance (Ω) max. 20℃ 100kHz	Ripple current (mA rms) 105℃ 100kHz
0.47							5×11	5.0	25
1.0							5×11	3.5	40
2.2							5×11	3.0	55
3.3							5×11	2.6	65
4.7	5×11	0.70	180	5×11	0.70	180	5×11	2.3	90
10	5×11	0.70	180	5×11	0.70	180	5×11	1.4	120
22	5×11	0.70	180	5×11	0.70	180	5×11	1.2	150
33	5×11	0.70	180	5×11	0.65	180	6.3×11	0.60	200
47	5×11	0.65	180	6.3×11	0.30	280	6.3×11	0.43	250
100	6.3×11	0.30	280	8×11.5	0.14	450	8×11.5	0.24	340
150	8×11.5	0.14	450	8×11.5	0.14	450	10×12.5	0.17	490
220	8×11.5	0.14	450	10×12.5	0.10	660	10×16	0.12	650
330	10×12.5	0.10	660	10×16	0.080	850	10×20	0.10	810
470	10×16	0.080	850	10×20	0.054	1100	12.5×20	0.085	1100
680	10×20	0.054	1100	12.5×20	0.050	1400	12.5×25	0.065	1200
1000	12.5×20	0.050	1400	12.5×25	0.038	1700	16×25	0.043	1600
1500	16×20	0.030	2100	16×25	0.030	2100	16×31.5	0.038	2000
2200	16×25	0.030	2100	16×31.5	0.025	2600	18×35.5	0.034	2300
3300	16×31.5	0.025	2600	18×35.5	0.022	3000			
4700	18×35.5	0.022	3000						

WL Extremely Low Impedance Series



- Wide voltage compared with WD serids
- Operating temperature range of −40~+105℃
- Extremely low impedance at high frepuency
- High reliability withstanding 5000 hours load life at 105℃ (2000/3000 hours for as specified below)

Item	Characteristics
Operating temperature tange	WV: 6.3~100 / 160~350 / 400~450 Temperaturw range: −40~+105℃ / −40~+105℃ / −25~+105℃
Leakage current max.	WV≦100: I=0.01CV or 3 μA whichever is greate (after 2min.); I=0.03CV or 4 μA whichever is greate (after 1min.) WV>100: I=0.02CV+15 μA (after 5min.)
Capacitance tolerance	± 20% at 120Hz ,20℃
Dissipation factor max. (At 120Hz,20℃)	Capacitance > 1000 μF: tan δ increases by 0.02 for each 1000 μF form below value.

WV	6.3	10	16	25	35	35	63	100	160~315	350~450
tan δ	0.22	0.19	0.16	0.14	0.12	0.10	0.09	0.08	0.15	0.20

Low temperature characteristics (Impedance ratio at 120Hz)

WV	6.3	10	16	25~100	160~250	315~450
Z-25℃/Z+20℃	4	3	2	2	3	8
Z-40℃/Z+20℃	8	6	4	3	4	-

Loadlife (after application the rated voltage for 5000 hours at 105℃)

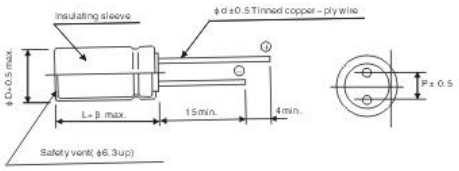
Capacitance change	Within ± 25% of initial value
Leakage current	less than specified value
tan δ	Less than ± 200% of specefied value

Life time	φD=5,6.3	φD=8	φD=10
WV≦100	2000hours	3000hours	5000hours
WV>100	2000hours		

Shelf life (at 105℃): After 1000 hours no load test,leakage current, capacitance and tan δ are same as load life value.

DRAWING

Unit : mm



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

WL series

- DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

WV / Item / μF	6.3			10			16			25		
	φD×L (mm)	Impedance (Ω)max. 20℃ 100kHz	Ripple current (mA rms) 105℃ 100kHz	φD×L (mm)	Impedance (Ω)max. 20℃ 100kHz	Ripple current (mA rms) 105℃ 100kHz	φD×L (mm)	Impedance (Ω)max. 20℃ 100kHz	Ripple current (mA rms) 105℃ 100kHz	φD×L (mm)	Impedance (Ω)max. 20℃ 100kHz	Ripple current (mA rms) 105℃ 100kHz
4.7										5×11	0.70	180
10							5×11	0.70	180	5×11	0.70	180
22	5×11	0.70	180	5×11	0.70	180	5×11	0.70	180	5×11	0.70	180
33	5×11	0.70	180	5×11	0.70	180	5×11	0.70	180	5×11	0.70	180
47	5×11	0.65	180	5×11	0.65	180	5×11	0.65	180	5×11	0.65	180
100	5×11	0.65	180	5×11	0.65	180	6.3×11	0.30	280	6.3×11	0.30	280
150	6.3×11	0.30	280	6.3×11	0.30	280	6.3×11	0.30	280	8×11.5	0.14	450
220	6.3×11	0.30	280	6.3×11	0.30	280	8×11.5	0.14	450	8×11.5	0.14	450
330	6.3×11	0.30	280	8×11.5	0.14	450	8×11.5	0.14	450	10×12.5	0.10	660
470	8×11.5	0.14	450	8×11.5	0.14	450	10×12.5	0.10	660	10×16	0.080	850
680	10×12.5	0.10	660	10×12.5	0.10	660	10×16	0.080	850	10×20	0.054	1100
1000	10×12.5	0.10	660	10×16	0.080	850	10×20	0.054	1100	12.5×20	0.050	1400
1500	10×20	0.054	1100	10×20	0.054	1100	12.5×20	0.050	1400	12.5×25	0.038	1700
2200	12.5×20	0.050	1400	12.5×20	0.050	1400	12.5×25	0.038	1700	16×25	0.030	2100
3300	12.5×20	0.050	1400	12.5×25	0.038	1700	16×25	0.030	2100	16×31.5	0.025	2600
4700	16×25	0.030	2100	16×25	0.030	2100	16×31.5	0.025	2600	18×35.5	0.022	3000
6800	16×25	0.030	2100	16×31.5	0.025	2600	18×35.5	0.022	3000			
10000	16×31.5	0.025	2600	18×35.5	0.022	3000						
15000	18×35.5	0.022	3000									

WV / Item / μF	35			50			63			100		
	φD×L (mm)	Impedance (Ω)max. 20℃ 100kHz	Ripple current (mA rms) 105℃ 100kHz	φD×L (mm)	Impedance (Ω)max. 20℃ 100kHz	Ripple current (mA rms) 105℃ 100kHz	φD×L (mm)	Impedance (Ω)max. 20℃ 100kHz	Ripple current (mA rms) 105℃ 100kHz	φD×L (mm)	Impedance (Ω)max. 20℃ 100kHz	Ripple current (mA rms) 105℃ 100kHz
0.22				5×11	8.0	18						
0.47				5×11	5.0	25						
1.0				5×11	3.5	40						
2.2				5×11	3.0	55				5×11	2.5	52
3.3				5×11	2.6	65	5×11	2.0	64	5×11	2.5	64
4.7	5×11	0.70	180	5×11	2.3	90	5×11	2.0	76	5×11	2.5	76
10	5×11	0.70	180	5×11	1.4	120	5×11	2.0	111	6.3×11	1.0	128
22	5×11	0.70	180	5×11	1.2	150	6.3×11	0.60	190	8×11.5	0.60	224
33	5×11	0.65	180	6.3×11	0.60	200	6.3×11	0.60	233	10×12.5	0.40	319
47	6.3×11	0.30	280	6.3×11	0.43	250	8×11.5	0.50	328	10×16	0.30	417
100	8×11.5	0.14	450	8×11.5	0.24	340	10×16	0.12	456	12.5×20	0.15	570
150	8×11.5	0.14	450	10×12.5	0.17	490	10×20	0.10	610	12.5×25	0.12	762
220	10×12.5	0.10	660	10×16	0.12	650	10×25	0.090	809	16×25	0.070	1048
330	10×16	0.080	850	10×20	0.10	810	12.5×20	0.085	1036	16×31.5	0.050	1404
470	10×20	0.054	1100	12.5×20	0.085	1100	16×20	0.050	1411	18×40	0.030	1980
680	12.5×20	0.050	1400	12.5×25	0.065	1200	16×25	0.043	1843			
1000	12.5×25	0.038	1700	16×25	0.043	1600	18×35.5	0.025	1967			
1500	16×25	0.030	2100	16×31.5	0.038	2000						
2200	16×31.5	0.025	2600	18×35.5	0.034	2300						
3300	18×35.5	0.022	3000									

HC

Snap-in Terminal Type ,Standard Series



- Standard snap-in terminal type
- Extended Voltage range of 6.3~500V
  (For 500WV prodrcts ,apply only FLserie,high ripple use)
- Including height 20mm products,low profile sized
  (Voltage range of 160~450V)

Item	Characteristics
Operating temperature range	WV≤350:-40~+85℃, WV>350:-25~85℃
Capacitance tolerance	±20%at 120Hz, 20℃
Leakage current max.	I=3√CV(μ A)(after 5 minutes)
Dissipation factor max. (at 120Hz, 20℃)	Capacitance>1000 μ F : tan δ increases by 0.01for each 1000 μ Florm belw value.

WV	6.3	10	16,25	35	50,63	80,100	160~400	450,500
tan δ	0.45	0.40	0.35	0.30	0.25	0.20	0.15	0.20

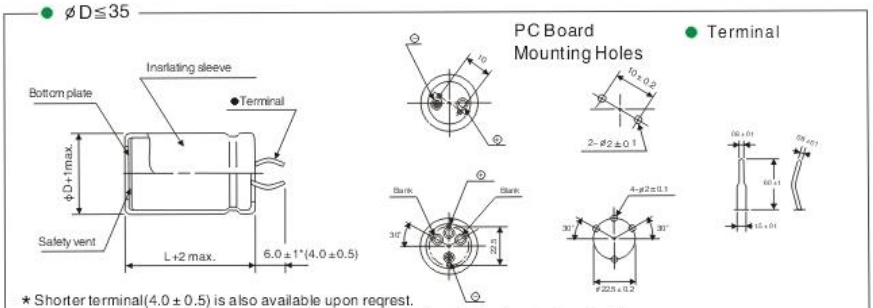
Load life (after application of the rated voltage for 2000 hours at 85℃)		
	Leakage current	Less than specified value
	Capacitance change	Within ±20%of initial value
	tan δ	Less than 200%of specified value

Shelf life (after leaving capacitors under noload at 85℃ for 1000hours)		
	Leakage current	Less than specified value
	Capacitance change	Within ±15%of initial value
	tan δ	Less than 150%of specified value

DRAWING

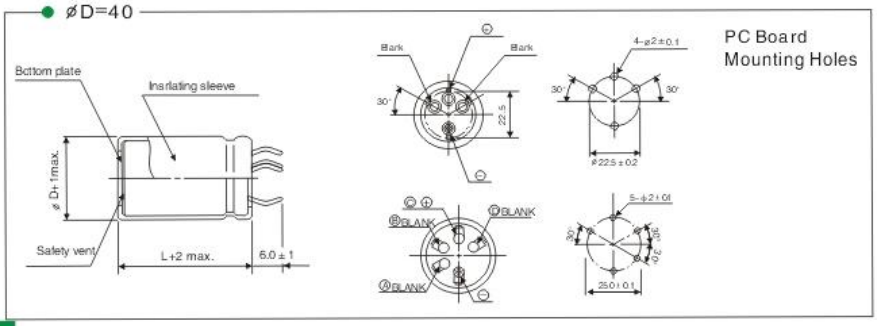
Unit : mm

øD≦35



★ Shorter terminal(4.0±0.5) is also available upon reqrest.
Terminal length of height 20mmproducts is applied shorter terminal to standard terminal type.

øD=40



HC series

● DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

WV / φD / μF	6.3					10					16				
	22	25.4	30	35	40	22	25.4	30	35	40	22	25.4	30	35	40
10000											22×25 3.32				
12000						22×25 3.31					22×30 3.55	25.4×25 3.89			
15000	22×25 3.39					22×30 3.82	25.4×25 3.39				22×35 4.29	25.4×30 4.45	30×25 4.56		
18000	22×30 3.85	25.4×25 3.96				22×35 4.28	25.4×25 4.17				22×40 4.77	25.4×35 4.96	30×30 5.10		
22000	22×35 4.34	25.4×25 4.22				22×40 4.79	25.4×30 4.17	30×25 4.83			22×50 5.51	25.4×40 5.51	30×30 5.39		
27000	22×40 4.85	25.4×30 4.77	30×25 4.89			22×45 5.30	25.4×35 5.26	30×30 5.41				25.4×45 6.06	30×35 5.98	35×25 5.80	
33000	22×45 5.36	25.4×35 5.32	30×30 5.47			22×50 5.82	25.4×40 5.81	30×30 5.69	35×25 5.81				30×40 6.56	35×30 6.41	
39000	22×50 5.83	25.4×40 5.82	30×30 5.70	35×25 5.82			25.4×45 6.31	30×35 6.22	35×30 6.38				30×45 7.08	30×35 6.96	
47000		25.4×45 6.35	30×35 6.26	35×30 6.41			25.4×50 6.83	30×40 6.78	35×30 6.52				30×50 7.62	35×40 7.54	
56000		25.4×50 6.85	30×40 6.80	35×30 6.64				30×45 7.31	35×35 7.18					35×45 8.08	40×40 8.23
68000			30×45 7.35	35×35 7.23					35×40 7.76					35×50 8.63	40×50 9.13
100000				35×45 8.34	40×40 8.49					40×50 9.35					40×60 10.2

WV / φD / μF	25					35					50				
	22	25.4	30	35	40	22	25.4	30	35	40		25.4	30	35	40
3300											22×30 2.97	25.4×25 3.06			
4700						22×30 3.06	25.4×25 2.98				22×40 3.83	25.4×35 3.98	30×25 3.86	35×25 4.19	
5600	22×25 2.65					22×35 3.28	25.4×30 3.39				22×45 4.26	25.4×40 4.44	30×30 4.35	35×25 4.44	
6800	22×30 3.06	25.4×25 3.15				22×40 3.73	25.4×30 3.67	30×25 3.76				25.4×40 4.76	30×35 4.92	35×30 5.04	
8200	22×35 3.45	25.4×30 3.57				22×45 4.13	25.4×35 4.10	30×30 4.22				25.4×50 5.43	30×40 5.38	35×30 5.26	
10000	22×40 3.95	25.4×30 3.89	30×25 3.99			22×50 4.68	25.4×40 4.68	30×30 4.58					30×45 6.07	35×35 5.97	
12000	22×45 4.41	25.4×35 4.37	30×30 4.50				25.4×45 5.18	30×35 5.11	35×30 5.24				30×50 6.62	35×40 6.55	
15000	22×50 4.94	25.4×40 4.94	30×35 5.10					30×40 5.72	35×35 5.88					35×45 7.20	
18000		25.4×45 5.45	30×35 5.38	30×30 5.51				30×45 6.28	35×40 6.46					35×50 7.74	40×40 7.62
22000			30×45 6.22	35×35 6.12					35×45 7.07	40×40 7.20					40×50 8.54
27000			30×50 6.82	35×40 6.74						40×50 8.14					40×60 9.45
33000				35×45 7.35	40×40 7.48					40×50 8.46					

WV / φD / μF	63					80					100				
	22	25.4	30	35	40	22	25.4	30	35	40	22	25.4	30	35	40
1200						22×25 2.24					22×30 2.39	25.4×25 2.46			
1500						22×30 2.67					22×35 2.83	25.4×30 2.93	30×25 3.00		
1800	22×25 2.20					22×30 2.92	25.4×25 3.01				22×40 3.26	25.4×35 2.39	30×25 3.49		
2200	22×30 2.50	25.4×25 2.58				22×35 3.25	25.4×30 3.36	30×25 3.45			22×45 3.58	25.4×40 3.74	30×30 3.66		
2700	22×35 2.94	25.4×30 3.04				22×40 3.79	25.4×35 3.94	30×30 4.05				25.4×45 4.33	30×35 4.27	35×30 4.37	
3300	22×35 3.14	25.4×30 3.26	30×25 3.34			22×45 4.18	25.4×40 4.36	30×30 4.27				25.4×50 4.76	30×40 4.72	35×35 4.85	
3900	22×40 3.60	25.4×35 3.74	30×25 3.85			22×50 4.75	25.4×45 4.96	30×35 4.89					30×45 5.36	35×35 5.27	
4700	22×50 4.19	25.4×40 4.19	30×35 4.10	30×30 4.19			25.4×50 5.44	30×40 5.39	35×30 5.27				30×50 5.86	35×40 5.80	
5600		25.4×45 4.65	30×35 4.58	35×30 4.70				30×45 5.91	35×35 5.81					35×45 6.34	40×40 6.45
6800		25.4×50 5.20	30×40 5.16	35×30 5.04					35×40 5.46						40×50 7.40
8200			30×45 5.62	35×35 5.53					35×35 6.91	40×40 7.04					40×50 7.60
10000			30×50 6.32	35×40 6.25						40×50 8.14	← Case size φD × L(mm) ← Ripple current(Arms) at85℃, 120Hz				
12000				35×45 6.83	40×40 6.95										

· Note: Case diameter(φ20) is available upon request.

HC series

● DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

μF \ WV / ⌀D	160					200					250				
	22	25.4	30	35	40	22	25.4	30	35	40	22	25.4	30	35	40
150											22×25 0.09	25.4×25 1.92			
180						22×20 0.19					22×25 0.90	25.4×25 1.01			
220	22×20 0.68					22×25 1.09	24×20 1.11				22×25 1.09	25.4×25 1.19	35×20 1.22		
270	22×25 1.20	25.4×20 1.32				22×25 1.20	25.4×25 1.32	30×20 1.35			22×30 1.28	25.4×25 1.32	35×20 1.35		
330	22×25 1.33	25.4×20 1.36				22×30 1.42	25.4×25 1.46	30×20 1.49			22×30 1.50	25.4×30 1.56	35×25 1.60	35×20 1.62	
390	22×25 1.43	25.4×25 1.59	30×20 1.62			22×30 1.54	25.4×25 1.59	30×25 1.72	35×20 1.77		22×30 1.72	25.4×30 1.69	30×25 1.74	35×20 1.77	
470	22×30 1.69	25.4×25 1.75	30×20 1.78			22×35 1.79	25.4×30 1.86	30×25 1.90	35×20 1.94		22×45 1.98	25.4×35 1.96	30×20 1.22	35×25 2.06	
560	22×30 1.96	25.4×20 2.03	30×25 2.08	35×20 2.12		22×25 1.20	25.4×25 1.32	30×20 1.35	35×25 2.25		22×30 1.28	25.4×25 1.32	30×20 1.35	35×25 2.25	
680	22×40 2.27	25.4×30 2.32	30×25 2.29	35×20 2.33		22×25 2.38	25.4×25 2.48	30×20 2.45	35×25 2.48		22×35 2.26	35.4×30 2.60	30×20 2.56	35×20 2.62	
820	22×45 2.61	25.4×35 2.59	30×30 2.67	35×25 2.73		22×50 2.73	25.4×45 2.85	30×35 2.81	35×30 2.89				30×40 2.95	35×35 3.03	
1000	22×50 3.01	25.4×40 3.01	30×30 2.95	35×25 3.01				30×40 2.26	35×30 3.18				30×45 3.40	35×40 3.50	
1200		25.4×45 3.23	30×35 3.18	35×30 3.26				30×45 3.49	35×35 3.43					35×45 3.76	40×40 3.18
1500			30×40 3.73	35×35 3.83				30×50 4.09	35×40 4.01					35×50 4.35	40×50 4.60
1800				35×40 4.39	40×40 4.66				35×45 4.58	40×45 4.66					40×60 5.39

μF \ WV / ⌀D	315					350					400				
	22	25.4	30	35	40	22	25.4	30	35	40	22	25.4	30	35	40
68											22×20 0.56				
82						22×20 0.62					22×25 0.66	25.4×20 0.68			
100	22×20 0.68					22×25 0.73	25.4×20 0.75				22×30 0.78	25.4×25 0.81	30×20 0.82		
120	22×25 0.80	25.4×20 0.80				22×30 0.86	25.4×25 0.88	30×20 0.90			22×30 0.80	25.4×25 0.88	30×20 0.90		
150	22×30 0.96	25.4×25 0.99	30×20 1.01			22×35 1.01	25.4×30 1.05	30×20 1.01			22×35 1.01	25.4×30 1.05	30×20 1.08	35×20 1.09	
180	22×35 1.011	25.4×30 1.15	30×25 1.18	35×20 1.20		22×40 1.17	25.4×35 1.21	30×25 1.18	35×20 1.20		22×40 1.17	25.4×35 1.21	30×25 1.18	35×25 1.28	
220	22×40 1.29	25.4×30 1.27	30×25 1.30	35×20 1.33		22×45 1.35	25.4×35 1.34	30×30 1.38	35×25 1.41		22×45 1.35	25.4×40 1.41	30×30 1.38	35×25 1.41	
270	22×45 1.50	25.4×35 1.49	30×30 1.53	35×25 1.56			25.4×45 1.64	30×35 1.61	35×25 1.68			25×45 1.64	30×35 1.61	35×30 1.66	
330	22×50 1.73	25.4×40 1.73	30×35 1.78	35×30 1.83			25.4×50 1.89	30×40 1.87	35×30 1.83			25.4×45 1.89	30×40 1.87	35×30 1.83	
390		25.4×45 1.97	30×35 1.94	35×30 1.99				30×45 2.12	35×35 2.09				30×45 2.12	35×35 2.09	
470			30×40 2023	35×35 2.29				30×50 2.43	35×40 2.40				30×50 2.43	35×40 2.40	
560				35×40 2.62					35×45 2.73					35×45 2.71	40×40 2.78
680				35×45 3.01					35×50 3.13	40×40 3.06				35×50 3.15	40×50 3.31
820				35×50 3.44	40×40 3.37					40×50 3.63					40×60 3.89

μF \ WV / ⌀D	450					500				
	22	25.4	30	35	40	22	25.4	30	35	40
56	22×20 0.39									
68	22×25 0.46	25.4×20 0.47				22×30 0.44				
82	22×30 0.54	25.4×25 0.56	30×20 0.57			22×35 0.51	25.4×30 0.53			
100	22×35 0.63	25.4×30 0.65	30×25 0.67	35×20 0.68		22×40 0.60	25.4×35 0.62			
120	22×40 0.73	25.4×35 0.76	30×25 0.73	35×20 0.75			25.4×40 0.71			
150	22×50 0.89	25.4×40 0.89	30×30 0.87	35×25 0.89				30×35 0.82		
180		25.4×45 1.02	30×35 1.01	35×25 0.98				30×45 0.94		
220		25.4×50 1.18	30×40 1.17	35×30 1.14				30×45 0.09		
270			30×45 1.35	35×35 1.33					35×45 1.30	
330			30×50 1.55	35×40 1.54					35×50 1.50	
390				35×45 1.74						
470				35×50 1.99	40×40 1.95					40×50 1.88
560					40×50 2.30					40×60 2.19
680					40×60 2.70					40×60 2.42

← Case size ⌀D x L(mm)
← Ripple current (Arms) at 85℃, 120Hz

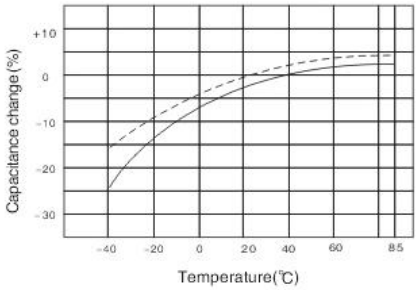
It can produce the special sizes according to the client's specific requirements.

HC series

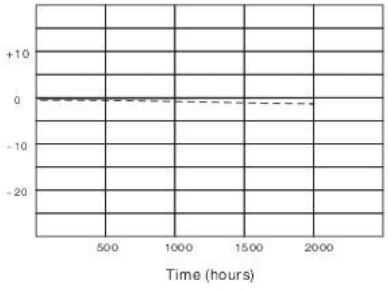
TYPICAL PERFORMANCE

—— 35V 2200μF
..... 63V 10000μF

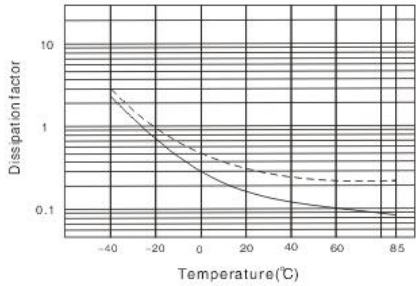
TEMPERATURE CHARACTERISTICS
Capacitance change vs.temperature



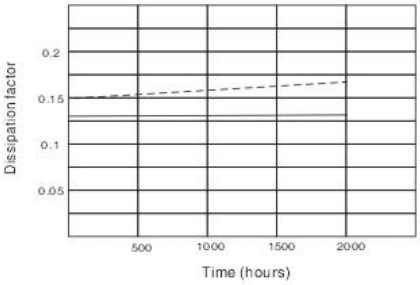
LOAD LIFE (at+85℃)
Capacitance change vs.time



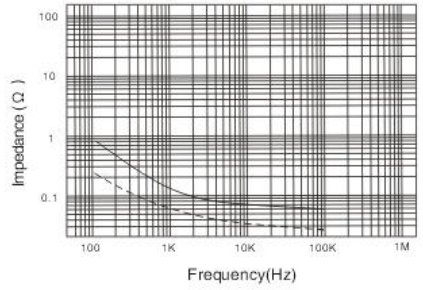
Dissipation factor vs.timperature



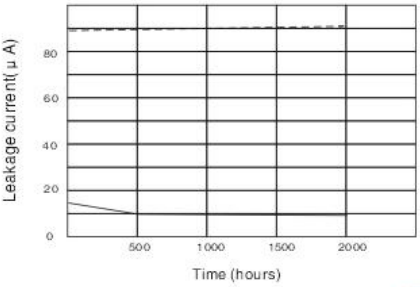
Dissipation factor vs.time



● FREQUENCY CHARACTERISTICS
Impedance vs.frequency



Leakage current vs.time



HE Wide Temperature Range ,stIndard Series

- Wide temperature range of –40(–25)~+105℃
- Standard snap–in teminal type
- Including height 20mm products,low profile sized
- (Voltage range of 160~450V)



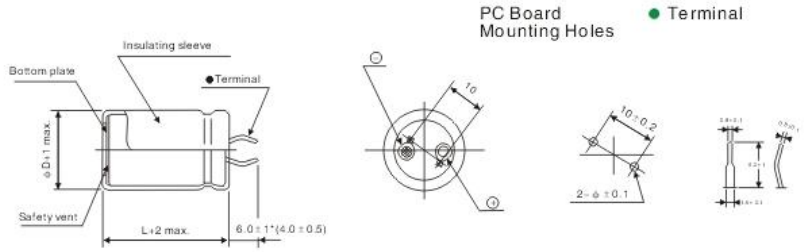
Item	Characteristics
Operating temperature range	WV≦400:–40~+105℃,WV=450:–25~+105℃
Capactance tolerance	±20% at 120 Hz,20℃
Leakage current max.	I=3√CV(μA)(after 5 minrtes)
Dissipation factor max. (at120Hz,20℃)	Capacitance>1000 μF : tan δ increases by 0.01for each 1000 μF form below value
Load life (after application of the rated voltage for 2000 hours at 105℃)	Leakage current: Less than specified value Capacitance change: Within ±20% of inital value tan δ: Less than 200%of specified value
Shelf life (at 105℃)	After 1000 hours no 'bad test, leakage current ,capacilance and tan δ are same as load life value.

WV	6.3,10	16	25,35	50,63	80,100	160~400	450
tan δ	0.50	0.40	0.35	0.25	0.20	0.15	0.20

● DRAWING

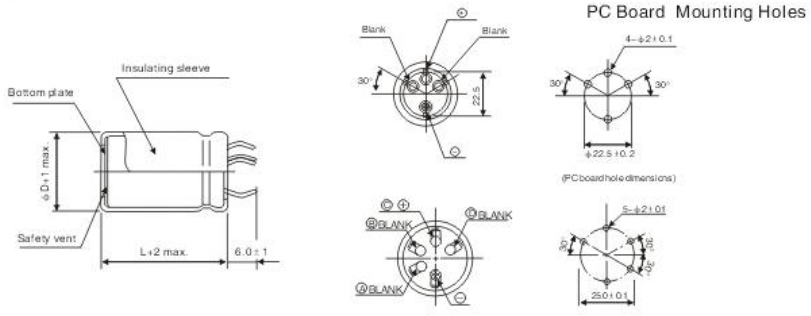
Unit: mm

● ø D≦35



★ Shorter teminal(4.0±0.5)is also available upon reqest.
Terminal length of height 20mm products is applied shorter terminal type

● ø D= 40



HE series

● DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

WV / ⌀D / μF	6.3					10					16				
	22	25.4	30	35	40	22	25.4	30	35	40	22	25.4	30	35	40
8200											22×25 2.14				
10000											22×30 2.48	25.4×25 2.56			
12000	22×25 2.19					22×30 2.48					22×35 2.80	25.4×30 2.90	30×25 2.97		
15000	22×30 2.53					22×35 2.83	25.4×25 2.75				22×40 3.17	25.4×35 3.29	30×30 3.38		
18000	22×35 2.85	25.4×25 2.77				22×35 3.00	25.4×30 3.11				22×45 3.50	25.4×40 3.65	30×30 3.57		
22000	22×35 3.04	25.4×30 3.15				22×40 3.35	25.4×35 3.48	30×25 3.38				25.4×45 4.03	30×35 3.98		
27000	22×40 3.40	25.4×35 3.53	30×25 3.42			22×50 3.88	25.4×40 3.87	30×30 3.79				25.4×50 4.42	30×40 4.39	35×30 4.29	
33000	22×50 3.92	25.4×40 3.91	30×30 3.83				25.4×45 4.26	30×35 4.20					30×45 4.79	35×35 4.71	
39000		25.4×45 4.26	30×35 4.20				25.4×50 4.60	30×40 4.57	35×30 4.46				30×50 5.16	35×40 5.10	
47000		25.4×50 4.63	30×40 4.60	35×30 4.50				30×45 4.95	35×35 4.87					35×45 5.50	40×40 5.60
56000			30×50 5.17	35×40 5.12					35×45 5.49	40×40 5.59					40×50 6.22
68000				35×45 5.52	40×40 5.62					40×50 6.22					40×60 6.83

WV / ⌀D / μF	25					35					50				
	22	25.4	30	35	40	22	25.4	30	35	40	22	25.4	30	35	40
2700											22×30 1.94				
3300						22×25 1.62					22×35 2.20				
3900						22×30 1.88					22×40 2.52	25.4×35 2.62	30×25 2.54		
4700	22×25 1.73					22×35 2.14	25.4×25 2.09				22×45 2.81	25.4×40 2.93	30×30 2.87		
5600	22×30 1.98					22×35 2.29	25.4×30 2.37	30×25 2.43			22×50 3.11	25.4×40 3.11	30×35 3.21		
6800	22×30 2.14	25.4×30 2.50				22×40 2.61	25.4×35 2.71	30×30 2.79				25.4×50 3.64	30×40 3.61	35×30 3.53	
8200	22×35 2.42	25.4×35 2.88				22×50 3.02	25.4×40 3.02	30×30 2.95					30×45 3.94	35×35 3.87	
10000	22×40 2.77	25.4×40 3.22					25.4×45 3.43	30×35 3.38					30×50 4.42	35×40 4.37	
12000	22×45 3.09	25.4×45 3.62	30×30 3.15				25.4×50 3.78	30×40 3.75	35×30 3.67					35×45 4.78	
15000		25.4×50 3.98	30×35 3.57	35×30 3.65				30×45 4.19	35×35 4.12					35×50 5.24	40×40 5.13
18000			30×40 3.95	35×35 4.05					35×40 4.52						40×50 5.76
22000			30×45 4.36	35×35 4.48					35×45 4.95	40×40 5.04					40×50 5.98
27000				35×45 4.92	40×40 5.01					40×50 5.92					40×60 6.61

WV / ⌀D / μF	63					80					100				
	22	25.4	30	35	40	22	25.4	30	35	40	22	25.4	30	35	40
820						22×25 1.37					22×30 1.46	25.4×25 1.51			
1000						22×30 1.62	25.4×25 1.67				22×35 1.71	25.4×30 1.77			
1200	22×25 1.37					22×30 1.67	25.4×25 1.72				22×40 1.86	25.4×35 1.94	30×25 1.88		
1500	22×30 1.50	25.4×25 1.54				22×35 1.98	25.4×30 2.05				22×45 2.18	25.4×40 2.28	30×30 2.23		
1800	22×30 1.64	25.4×25 1.69				22×40 2.28	25.4×35 2.37	30×25 2.30				25.4×45 2.61	30×35 2.57		
2200	22×35 1.86	25.4×30 1.92				22×45 2.51	25.4×35 2.49	30×30 2.55				25.4×50 2.85	30×40 2.83	35×30 2.76	
2700	22×40 2.17	25.4×30 2.13	30×25 2.18				25.4×45 3.03	30×35 2.99					30×45 3.27	35×35 3.22	
3300	22×50 2.53	25.4×40 2.53	30×30 2.48				25.4×50 3.33	30×40 3.30	35×30 3.23				30×50 3.59	35×40 3.55	
3900		25.4×45 2.88	30×35 2.84					30×45 3.75	35×35 3.69					35×45 4.03	
4700		25.4×40 3.20	30×40 3.17	35×30 3.10				30×50 4.10	35×40 4.05					35×50 4.40	40×40 4.31
5600			30×45 3.51	35×35 3.46					35×45 4.44						40×50 4.88
6800			30×50 3.92	35×40 3.88					35×50 4.90	40×40 4.80					40×50 5.18
8200				35×45 4.22						40×50 5.32	← Case size ϕD×L(mm) ← Ripple current (Arms)at℃,105,120Hz				
10000				35×50 4.74	40×40 4.64										

HE series

● DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

WV / μF \ ØD	160					200					250				
	22	25.4	30	35	40	22	25.4	30	35	40	22	25.4	30	35	40
150						22×20 0.63					22×25 0.68	25.4×20 0.59			
180	22×20 0.59					22×20 0.69					22×25 0.74	25.4×20 0.76	30×20 0.83		
220	22×20 0.76					22×25 0.82	25.4×20 0.84				22×30 0.88	25.4×25 0.90	30×20 0.92		
270	22×25 0.91	25.4×20 0.93				22×30 0.91	25.4×25 1.00	30×20 1.02			22×35 1.03	25.4×30 1.05	30×25 1.09	35×20 1.11	
330	22×25 1.01	25.4×25 1.10	30×20 1.13			22×30 1.07	25.4×25 1.11	30×20 1.13			22×40 1.20	25.4×30 1.18	30×25 1.21	35×20 1.23	
390	22×30 1.17	25.4×25 1.20	30×20 1.23			22×35 1.24	25.4×30 1.28	30×25 1.31	35×20 1.34		22×45 1.36	25.4×40 1.42	30×30 1.39	35×25 1.42	
470	22×35 1.36	25.4×25 1.32	30×25 1.44	35×20 1.47		22×40 1.43	25.4×35 1.40	30×25 1.44			22×50 1.56	25.4×40 1.56	30×30 1.53	35×25 1.56	
560	22×40 1.56	25.4×30 1.53	30×25 1.57	35×25 1.70		22×45 1.63	25.4×40 1.62	30×30 1.67	35×25 1.70			25.4×50 1.85	30×35 1.76	35×30 1.80	
680	22×45 1.80	25.4×35 1.79	30×25 1.73	35×25 1.88		22×50 1.88	25.4×45 1.95	30×30 1.84	35×25 1.88				30×45 2.12	35×35 2.09	
820	22×50 2.06	25.4×40 2.05	30×30 2.02	35×25 2.06			25.4×50 2.25	30×35 2.13	35×30 2.18					35×40 2.40	
1000		25.4×45 2.38	30×35 2.35	35×30 2.41				30×45 2.57	35×35 2.53					35×45 2.76	40×40 2.81
1200		25.4×50 2.52	30×40 2.50	35×30 2.44				30×50 2.72	35×35 2.57	40×40 2.85				35×50 2.91	40×50 3.08
1500				35×40 3.00	40×40 3.19				35×45 3.13	40×50 3.44					40×50 3.68

WV / μF \ ØD	315					350					400				
	22	25.4	30	35	40	22	25.4	30	35	40	22	25.4	30	35	40
56											22×20 0.37				
68						22×20 0.41					22×25 0.44	25.4×20 0.45			
82	22×20 0.45					22×25 0.48	25.4×20 0.49				22×30 0.51	25.4×25 0.53	30×20 0.54		
100	22×25 0.53	25.4×20 0.55				22×25 0.53	25.4×25 0.59	30×20 0.60			22×35 0.60	25.4×30 0.62	30×20 0.60		
120	22×30 0.62	25.4×25 0.64	30×20 0.65			22×30 0.62	25.4×25 0.64	30×20 0.65			22×40 0.69	25.4×30 0.68	30×25 0.70	35×20 0.71	
150	22×35 0.74	25.4×30 0.76	30×20 0.73			22×40 0.78	25.4×30 0.76	30×25 0.78	35×20 0.80		22×45 0.81	25.4×35 0.81	30×30 0.83	35×20 0.80	
180	22×40 0.85	25.4×35 0.88	30×25 0.85	35×20 0.87		22×45 0.89	25.4×35 0.88	30×30 0.91	35×20 0.87		22×50 0.93	25.4×40 0.93	30×30 0.91	35×25 0.93	
220	22×45 0.98	25.4×35 0.98	30×30 1.00	35×20 0.96		22×50 1.03	25.4×40 1.03	30×30 1.00	35×25 1.03			25.4×45 1.07	30×35 1.05	35×30 1.08	
270		25.4×45 1.19	30×35 1.17	35×25 1.14			25.4×45 1.19	30×35 1.17	35×30 1.20			25.4×50 1.24	30×40 1.23	35×30 1.20	
330		25.4×50 1.37	30×40 1.36	35×30 1.33				30×40 1.35	35×35 1.40				30×45 1.42	35×35 1.40	
390			30×45 1.54	35×35 1.52				30×45 1.54	35×40 1.59				30×50 1.61	35×40 1.59	
470			30×50 1.76	35×40 1.74					35×45 1.82					35×45 1.82	40×40 1.85
560				35×40 1.90					35×50 2.06	40×40 2.02				35×50 2.06	40×50 2.18
680				35×50 2.27	40×40 2.23					40×50 2.40					40×50 2.57

WV / μF \ ØD	450				
	22	25.4	30	35	40
47	22×20 0.25				
56	22×25 0.29	25.4×20 0.30			
68	22×30 0.34	25.4×25 0.35	30×20 0.36		
82	22×35 0.40	25.4×30 0.41	30×20 0.40		
100	22×40 0.47	25.4×30 0.46	30×25 0.47	35×20 0.48	
120	22×45 0.53	25.4×35 0.53	30×30 0.55	35×25 0.55	
150	22×50 0.62	25.4×40 0.62	30×30 0.61	35×25 0.62	
180		25.4×45 0.71	30×35 0.70	35×30 0.78	
220		25.4×50 0.82	30×40 0.82	35×30 0.80	
270			30×45 0.95	35×35 0.93	
330			30×50 1.09	35×40 1.08	
390				35×45 1.22	
470				35×50 1.39	40×40 1.36
560					40×50 1.61

← Case size ø D×L(mm)
← Ripple current (Arms)at 105℃,120Hz

It can produce the special sizes according to the client's specific requirements.

PERMISSIBLE RIPPLE CURRET MULTIERS

WV \ Friquency	50Hz	120Hz	300Hz	1kHz	10kHz~
~100	0.88	1	1.06	1.15	1.20
160~250	0.85	1	1.20	1.25	1.45
315~	0.88	1	1.15	1.20	1.40

LM Lug TerminalType Series

Lug terminal series
Suited for use inpower suppile and industrial controls



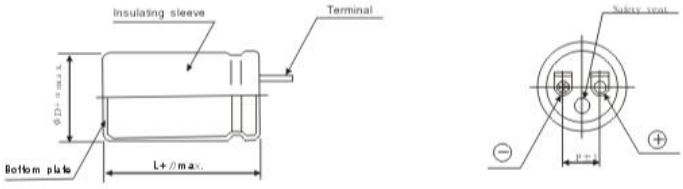
Item	Characteristcs
Operating temperature range	WV≦350:-40~+85℃,WV>350:-25~+85℃
Capacitance tolerance	±20% at 120Hz,20℃
Leakage current max.	I=3√CV(μA)(after 5minutes)
Dissipation factor max. (at 120Hz, 20℃)	Capacitance>1000μF:tanδ increases by 0.01for each 1000μF from below value

WV	16	25	35~63	80~350	400~450
tanδ	0.35	0.30	0.25	0.20	0.25

Load life (after application of the rated voltage for 2000 hours at 85℃)		
	Leakage current	Less han specified value
	Capacitance change	Within ±20% of initial value
	tan δ	Less than 200% of specified value
Shelf life (at 85℃)	After 1000 hours no load test, leakage current,capacitance and tan are same asload lifevalre.	

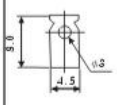
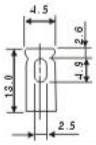
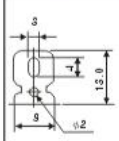
● DRAWING

Unit: mm



● TERMINAL

For solder tag

φD	≦35	40	51
Dimensions			
Code	LC	LA	LD

φD	25.4	30	35	40	51
P	10	10	14	18	18
α	1				2
β	2				3

LM series

- DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

μF \ WV	16		25		35		40		50	
3300							25.4×30	2.46	25.4×30	2.16
4700					25.4×30	2.89	25.4×40	3.21	25.4×40	3.21
6800			25.4×30	3.12	25.4×40	3.73	25.4×50	4.07	25.4×50	4.07
10000	25.4×30	3.42	25.4×40	4.03	25.4×50	4.71	25.4×60	5.07	30×50	5.08
15000	25.4×40	4.41	25.4×50	5.07	30×50	5.81	30×60	6.24	35×60	6.67
22000	25.4×50	5.44	30×50	6.15	35×60	7.44	35×60	7.44	35×80	8.34
33000	30×50	6.57	35×60	7.85	35×80	9.18	35×80	9.18	40×100	10.6
47000	35×60	8.19	35×80	9.49	40×100	11.3	51×105	12.5	51×105	12.5
68000	35×80	9.85	40×100	11.6	51×105	13.2				
100000	40×100	12.0	51×105	13.5						
150000	51×105	13.9								

μF \ WV	63		80		100		160		200	
330							25.4×30	0.92	25.4×30	0.92
470							25.4×40	1.22	25.4×40	1.22
680							25.4×50	1.60	25.4×50	1.60
1000					25.4×30	1.60	25.4×60	2.09	25.4×50	2.09
1500			25.4×30	1.92	25.4×40	2.13	30×60	2.69	30×50	2.87
2200	25.4×30	2.05	25.4×40	2.52	25.4×50	2.75	35×60	3.40	35×60	3.81
3300	25.4×40	2.73	25.4×50	3.29	30×50	3.55	35×100	5.02	35×80	5.27
4700	25.4×50	3.50	25.4×60	4.14	35×60	4.76	40×100	6.15	40×100	6.80
6800	25.4×60	4.38	30×60	5.15	35×80	6.17	51×105	7.86		
10000	30×60	5.46	35×80	7.08	40×100	8.16				
15000	35×80	7.48	40×80	8.43	51×105	10.2				
22000	35×100	9.16	51×105	11.3						
33000	51×105	11.7								

μF \ WV	250		315		350		400		450	
68									25.4×30	0.37
100					25.4×30	0.51	25.4×30	0.45	25.4×40	1.22
150			25.4×30	0.62	25.4×40	0.69	25.4×40	0.62	25.4×50	1.60
220	25.4×30	0.75	25.4×40	0.84	25.4×50	0.91	25.4×50	0.81	30×50	2.09
330	25.4×40	1.02	25.4×50	1.12	25.4×60	1.20	30×60	1.16	35×60	2.87
470	25.4×50	1.33	25.4×60	1.43	30×60	1.54	35×60	1.47	35×80	3.81
680	30×50	1.73	30×60	1.86	35×60	1.98	35×80	1.99	35×100	5.27
1000	30×60	2.25	35×70	2.56	35×100	2.96	40×100	2.78	51×80	6.80
1500	35×80	3.22	35×100	3.54	40×100	3.72	51×105	3.69		
2200	35×100	4.19	40×100	4.40	51×105	4.86	← Ripple current(Arms)at 85℃,120Hz			
3300	51×80	5.24	51×105	5.82			← Case size φD×L(mm)			

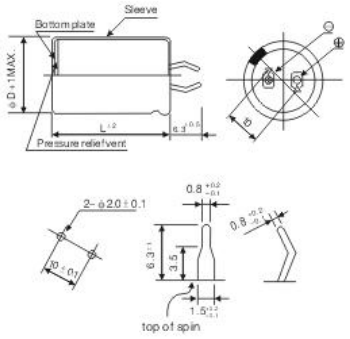
It can produce the special sizes according to the client's specific requirements.

Terminal-Shape

- There is a restriction for capacitors size.
- Please consults us the other terminal-shape.

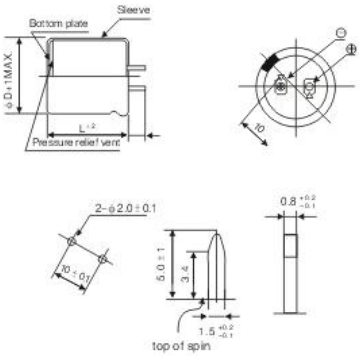
Standard type ① Applicable size: ϕ 20 - ϕ35, ~50mmL

(Terminal length4.0mm)



PC board hole dimensions terminal dimensions

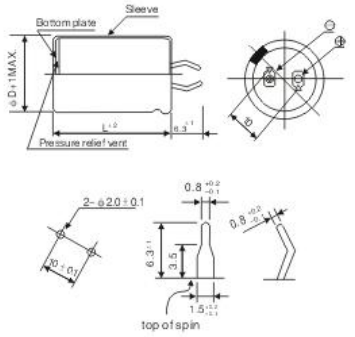
Staight type Applicable size: ϕ 20 - ϕ35, ~50mmL



PC board hole dimensions terminal dimensions

Long type ② Applicable size: ϕ 20 - ϕ35, ~50mmL

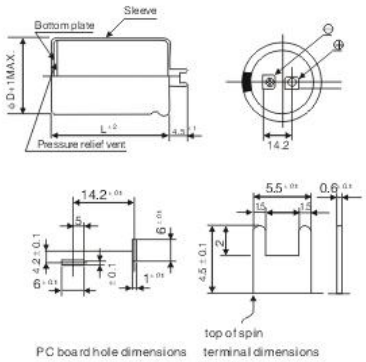
(Terminal length6.3mm)



PC board hole dimensions terminal dimensions

Vibration-resistant type

Applicable size: ϕ30 ~ ϕ40



PC board hole dimensions terminal dimensions

NM Series

High ripple current capability
Ideally suited for use as input and output fiter capacitors in power supplies



Item	Characteristics
Operating temperature range	WV ≤ 350:–40~+85℃,WV>350:–25~+85℃
Capacitance tolerance	± 20% at 120Hz,20℃
leakage current max.	$I=3\sqrt{CV}$(μA)(after 5minutes)

Dissipation factor max. (At120Hz,20℃)

φD \ WV	16	25	35	50	63	80	100	160~350	400,450
35	0.70	0.45	0.45	0.30	0.25	0.25	0.20	0.15	0.25
51	1.00	0.60	0.60	0.45	0.35	0.35	0.20	0.15	0.25
63.5	1.30	0.80	0.70	0.50	0.40	0.40	0.25	0.20	0.25
76.2	2.00	1.20	0.90	0.70	0.50	0.50	0.35	0.25	0.25

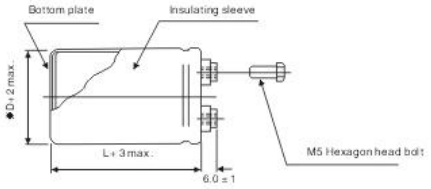
load life (after application of the rated voltage for 2000 hours at 85℃)

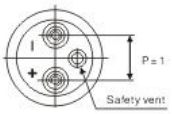
Leakage current	Less than specified value
Capacitance change	Within ±15% of initial value
tan δ	Less than 175% of specified value

Shelf life (at85℃): After1000hours no load test,leakage current,capccitance and tan δ are same as load life value.

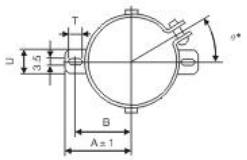
● DRAWING

Unit :mm

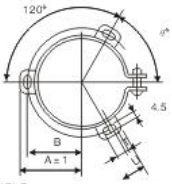




● TWO LEGS ANGLE



● THREE LEGS ANGLE



● TWO LEGS ANGLE SIZE TABLE

φD	B	A	T	U	θ°	P
35	24	29	7	10	31	12.7
51	33.6	39.9	6	14	31	22
63.5	40.8	46.8	6	14	30	28.6

● THREE LEGS ANGLE SIZE TABLE

φD	B	A	T	U	θ°	P
51	321.9	38.9	7	12	60	22
63.5	38.4	45.3	7	14	60	28.6
76.2	44.5	51.5	8	16	60	31.8

NM Series

● DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

WV / μF	16		25		35		50	
10000							35×60	6.2
15000					35×50	5.8	35×80	8.5
22000			35×60	7.5	35×68	7.9	35×100	11.3
33000	35×60	7.4	35×80	10.3	35×100	11.3	35×120	15.0
47000	35×80	9.9	35×100	13.5	35×120	14.6	51×100	15.2
68000	35×100	13.1	51×80	14.5	51×100	15.9	51×120	19.7
100000	51×80	13.7	51×100	19.2	51×120	20.7	63.5×120	24.2
150000	51×100	18.3	51×140	27.1	63.5×120	25.1	76.2×120	25.9
220000	51×140	25.4	63.5×120	28.4	76.2×120	27.7	76.2×160	35.1
330000	63.5×120	27.3	76.2×120	29.3	76.2×160	37.9		
470000	76.2×120	27.1	76.2×160	39.2				
680000	76.2×160	36.5						

WV / μF	63		80		100		160	
1500					35×50	5.8	35×60	3.4
2200					35×60	5.2	35×80	4.6
3300			35×60	5.6	35×80	7.0	35×100	6.2
4700			35×80	7.6	35×100	9.4	51×80	7.7
6800	35×50	5.2	35×120	11.1	51×80	11.8	51×100	10.0
10000	35×60	6.8	51×80	11.7	51×100	15.6	51×140	14.1
15000	35×80	9.3	51×120	16.8	51×140	22.0	63.5×140	16.5
22000	35×120	13.4	63.5×100	18.5	63.5×140	25.0	76.2×140	17.6
33000	51×100	14.5	63.5×140	25.4	76.2×140	26.2		
47000	51×120	18.6	76.2×140	29.7				
68000	63.5×100	20.8						
100000	76.2×120	25.0						
150000	76.2×140	32.5						

WV / μF	200		250		350		400	
330							35×60	1.2
470					35×60	1.9	35×80	1.7
680			35×50	2.1	35×80	2.6	35×100	2.2
1000	35×60	2.8	35×68	2.9	35×100	3.4	35×120	2.9
1500	35×68	3.6	35×80	3.8	51×80	4.3	51×100	3.7
2200	35×100	5.1	35×120	5.5	51×100	5.7	51×140	5.1
3300	35×120	6.7	51×100	7.0	51×140	8.0	63.5×120	6.2
4700	51×100	8.3	51×140	9.6	63.5×120	8.3	76.2×120	7.7
6800	51×140	11.5	63.5×120	10.0	76.2×120	9.2	76.2×160	10.3
10000	63.5×120	12.1	76.2×120	11.2	76.2×160	12.5		
15000	76.2×120	13.7	76.2×160	15.3	Ripple current(A rms)at85℃,120Hz			
22000	76.2×160	18.6			Case size φ D×L(mm)			

WV / μF	450	
220	35×50	0.9
330	35×60	1.2
470	35×80	1.7
680	35×120	2.4
1000	51×80	2.7
1500	51×120	3.9
2200	63.5×120	5.1
3300	76.2×120	6.4
4700	76.2×160	8.6

PERMISSIBLE RIPPLE CURRENT MULTILIERS

Frequency / WV	50Hz	120Hz	300Hz	1KHz	10KHz~
~100	0.8	1	1.1	1.15	1.2
160~250	0.8	1	1.1	1.15	1.3
315~	0.8	1	1.2	1.35	1.4

It can produce the special sizes according to the client's specific requirements.

NU Screw Terminal Type, Wide Temperature Range Series



- Screw terminal series for high temperature up to 105℃
- High ripple current capability
- Ideally suited use as input and output filter capacitors in power supplies

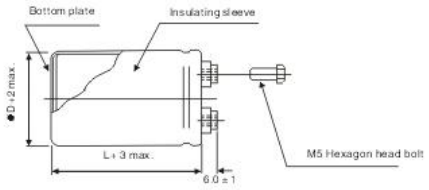
Item	Characteristics
Operating temperature range	-40~+105℃
Capacitance tolerance	±20%at120Hz，20℃
Leakage current max.	I=3√CV (μA)(after 5 minutes)
Dissipation factor max. (at 120Hz,20℃)	

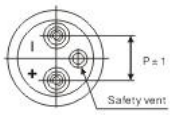
⌀D \ WV	16	25	35	50	63	80	100	160	200,250	350,400
35	0.45	0.45	0.40	0.30	0.25	0.25	0.20	0.15	0.15	0.25
51	0.60	0.60	0.45	0.45	0.35	0.30	0.20	0.15	0.15	0.25
63.5	0.80	0.70	0.50	0.50	0.40	0.35	0.25	0.20	0.20	0.25
76.2	1.20	0.90	0.70	0.70	0.70	0.50	0.40	0.35	0.25	0.25

Load life (after application of the rated voltage for 2000 hours at 105℃)		
	Leakage current	Less than specified value
	Capacitance change	Within ±20% of initial value
	tan δ	Less than 200% of specified value
Shelf life(at 105℃)	After 1000 hours no load test, leakage current, capacitance and tan δ are same as load life value.	

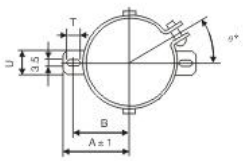
● DRAWING

Unit : mm

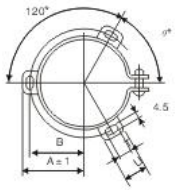




● TWO LEGS ANGLE



● THREE LEGS ANGLE



● TWO LEGS ANGLE SIZE TABLE

⌀D	B	A	T	U	⌀°	P
35	24	29	7	10	30	12.7
51	33.6	39.9	6	14	30	22
63.5	40.8	46.8	6	14	30	28.6

● THREE LEGS ANGLE SIZE TABLE

⌀D	B	A	T	U	⌀°	P
51	32.9	28.9	7	10	60	22
63.5	38.4	45.3	7	14	60	28.6
76.2	44.8	51.5	8	14	60	31.8

NU series

● DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

μF \ WV	16		25		35		50	
6800							35×50	3.1
10000					35×60	3.5	35×60	4.0
15000			35×60	3.8	35×80	4.8	35×80	5.5
22000	35×60	4.9	35×68	5.1	35×100	6.4	35×120	8.0
33000	35×80	6.7	35×100	7.4	35×120	8.5	51×100	8.3
47000	35×100	8.8	35×120	9.5	51×100	9.9	51×120	10.7
68000	51×80	9.5	51×100	10.3	51×120	12.8	63.5×100	12.6
100000	51×100	12.5	51×120	13.5	63.5×120	16.4	76.2×120	13.7
150000	51×140	17.5	63.5×120	16.9	76.2×120	16.8	76.2×140	17.9
220000	63.5×120	19.2	76.2×120	18.0	76.2×160	22.8		
330000	76.2×120	19.1	76.2×160	24.6				
470000	76.2×160	25.5						

μF \ WV	63		80		100		160	
1000							35×60	1.7
1500					35×60	1.9	35×80	2.1
2200					35×80	2.6	35×100	3.0
3300					35×100	3.5	35×120	4.0
4700			35×60	3.0	51×80	4.7	51×100	5.0
6800	35×60	3.7	35×80	4.1	51×100	5.7	51×140	7.0
10000	35×80	5.0	35×120	5.4	51×140	7.9	63.5×120	7.6
15000	35×120	7.2	51×80	6.3	63.5×140	9.5	76.2×120	7.0
22000	51×80	7.0	51×100	8.3	76.2×140	9.1	76.2×160	9.4
33000	51×120	10.1	51×140	11.7				
47000	63.5×100	11.7	63.5×140	14.3				
68000	63.5×140	16.0	76.2×140	14.2				
100000	76.2×140	4.6						

μF \ WV	200		250		350		400	
220							35×50	0.6
330					35×60	0.7	35×60	0.7
470			35×60	1.1	35×80	1.0	35×80	1.0
680	35×60	1.3	35×80	1.5	35×100	1.3	35×120	1.4
1000	35×68	1.8	35×100	2.1	35×120	1.7	51×80	1.6
1500	35×80	2.3	51×80	2.6	51×100	2.2	51×120	2.4
2200	35×120	3.3	51×100	3.4	51×140	3.1	63.5×120	3.2
3300	51×100	4.2	51×140	4.8	63.5×120	3.9	76.2×120	3.9
4700	51×140	5.8	63.5×120	5.2	76.2×120	4.6	76.2×160	5.2
6800	63.5×120	6.2	76.2×120	5.5	76.2×160	6.2		
10000	76.2×120	6.7	76.2×160	7.5	← Ripple current (A rms)at 105 ℃,120Hz			
15000	76.2×160	9.2	▲		← Case size ⌀ D×L (mm)			

It can produce the special sizes according to the client's specific requirements.

● PERMISSIBLE RIPPLE CURRENT MULTIPLIERS

WV \ Frequency	50Hz	120Hz	300Hz	1kHz	10kHz~
~100	0.8	1	1.1	1.15	1.2
160~250	0.8	1	1.1	1.15	1.3
315~	0.8	1	1.2	1.35	1.4

NT

For Inverter Circuets Series

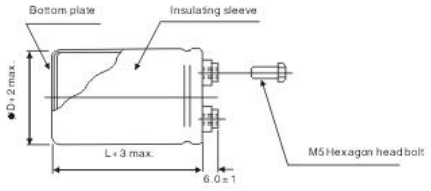


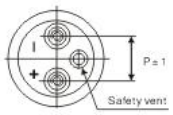
- High reliability
- High ripple current
- Suitrd for smoothing circuits for general purpose invertets and control citcuits for F.A.machines
- Designed for use as input filter capacitor for current U.P.S.

Item	Characteristics	
Operating temperature range	-25~+85℃	
Capacitance tolerance	±20% at 120Hz, 20℃	
Leakage current max.	I=3√CV(μA) (after 5 minutes)	
Dissipation factor	0.25 max. At 120Hz,20℃	
Load life (after application of the rated voltage for 2000hours at 85℃)	Leskage current	Less than specified value
	Capacitance change	Within ±20% of initial value
	Tan δ	Less than 300% of specified value
Shelf life (after leaving capacetors under no load for 1000hours at 85℃)	Leskage current	Less than specified value
	Capacitance change	Within ±20% of initial value
	Tan δ	Less than 300% of specified value

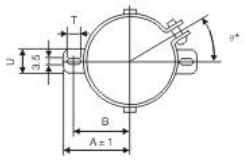
● DRAWING

Unit : mm

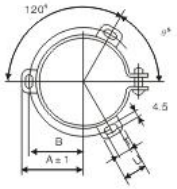




● TWO LEGS ANGLE



● THREE LEGS ANGLE



● TWO LEGS ANGLE SIZE TABLE

ΦD	B	A	T	U	θ°	P
35	24	29	7	10	30	12.7
51	33.6	39.9	6	14	30	22
63.5	40.8	46.8	6	14	30	28.6

● THREE LEGS ANGLE SIZE TABLE

ΦD	B	A	T	U	θ°	P
51	32.9	38.9	7	12	60	22
63.5	38.4	45.3	7	14	60	28.6
76.2	44.5	51.5	8	16	60	31.8
89	50.8	61	8	16	60	31.8

NT series

- DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

WV / Item / μF	350			400			450		
	φD×L (mm)	Ripple current (A rms)		φD×L (mm)	Ripple current (A rms)		φD×L (mm)	Ripple current (A rms)	
		40℃ 120Hz	85℃ 120Hz		40℃ 120Hz	85℃ 120Hz		40℃ 120Hz	85℃ 120Hz
180							35×60	2.9	1.0
220				35×50	3.0	1.1	35×60	3.2	1.1
270	35×50		1.2	35×50	3.3	1.2	35×60	3.6	1.2
330	35×50	3.7	1.3	35×60	3.9	1.4	35×80	4.4	1.5
390	35×60	4.3	1.5	35×60	4.3	1.5	35×80	4.8	1.7
470	35×60	4.7	1.6	35×80	5.3	1.8	35×100	5.8	2.0
560	35×80	5.8	2.0	35×100	6.3	2.2	35×100	6.3	2.2
680	35×80	6.4	2.2	35×100	7.0	2.4	35×120	7.5	2.6
820	35×100	7.7	2.7	35×120	8.3	2.9	51×80	8.0	2.8
1000	35×120	9.2	3.2	51×80	8.8	3.1	51×100	9.6	3.4
1200	51×80	9.7	3.4	51×80	9.7	3.4	51×100	10.6	3.7
1500	51×80	10.8	3.8	51×100	11.8	4.1	51×120	12.7	4.4
1800	51×100	12.9	4.5	51×120	13.9	4.9	63.5×140	13.8	4.8
2200	51×120	15.4	5.4	51×140	16.4	5.7	63.5×120	16.3	5.7
2700	51×140	18.2	6.4	63.5×120	18.1	6.3	63.5×140	19.2	6.7
3300	63.5×120	20.0	7.0	63.5×140	21.3	7.4	76.2×120	20.6	7.2
3900	63.5×140	23.1	8.1	63.5×160	24.4	8.6	76.2×140	23.7	8.3
4700	63.5×160	26.8	9.4	76.2×140	26.0	9.1	76.2×160	27.5	9.6
5600	76.2×140	28.4	10.0	76.2×160	30.0	10.5	89×140	31.3	10.9
6800	76.2×160	33.0	11.6	89×140	34.5	12.1	89×160	36.3	12.7
8200	89×140	37.8	13.2	89×160	39.8	13.9			
10000	89×160	44.0	15.4	89×160	44.0	15.4			

- PERMISSIBLE RIPLE CURRENT MULTIPLIERS

Frequency	50Hz	120Hz	300Hz	1KHz	3KHz
Coefficient	0.8	1.0	1.1	1.3	1.4

- WE CAN DESIGN SPECIAL CAPACITORS ACCORDING TO SPECIAL CAPACITANCE AND SIZE REQUIRED BY OUR CUSTOMERS.

NF Screw Terminal Type, Long Life Series

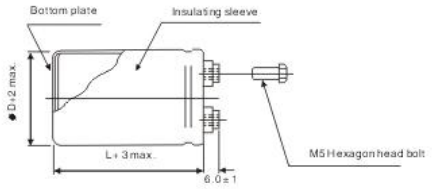


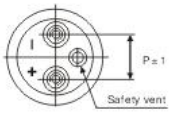
- Screw terminal series in more compact case sizes
- High reliability, long life guaranteed for 5000 hours load life at 85℃ (The only 500WV is assured 2000 hours at 85℃)
- Ideally suited for use in industrial robots, tooling machines, inverters, telecommunication equipment, measuring instruments and etc.

Item	Characteristics
Operating tenperature range	−25~+85℃
Capacitance tolerance	±20%at120Hz, 20℃
Leakage current max.	$I=3\sqrt{CV}$ (μA)(after 5 minutes)
Dissipation factor	0.20 max. At 120Hz,20℃
Low temperature characteristics (Impedance ratio at 120Hz)	Z−25℃/Z+20℃ ≦ 8
Load life (after application of the rated voltage for 2000 hours at 105℃)	Leakage current: Less than specified value Capacitance change: Within ± 20% of initial value tan δ: Less than 200% of specified value
Shelf life(at 105℃)	After 1000 hours no load test, leakage current, capacitance and tan δ are same as load life value.

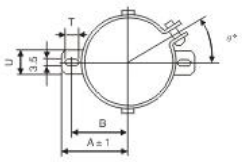
● DRAWING

Unit : mm

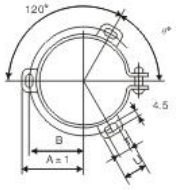




● TWO LEGS ANGLE



● THREE LEGS ANGLE



● TWO LEGS ANGLE SIZE TABLE

ØD	B	A	T	U	Ø°	P
51	33.6	39.9	6	14	30	22
63.5	40.8	46.8	6	14	30	28.6

● THREE LEGS ANGLE SIZE TABLE

ØD	B	A	T	U	Ø°	P
51	32.9	38.9	7	10	60	22
63.5	38.4	45.3	7	14	60	28.6
76.2	44.5	51.5	8	16	60	31.8
89	50.8	61	8	16	60	31.8

NF Series

● DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

WV / μF	350		400		450		500	
1000							51×120	4.2
1200							63.5×100	4.5
1500							63.5×100	5.1
1800							76.2×120	6.0
2200	51×110	6.0	51×130	6.4	76.2×110	16.4	76.2×140	7.0
2700	51×130	7.1	63.5×110	7.1	76.2×130	7.5	76.2×120	7.5
3300	63.5×100	7.5	63.5×130	8.3	76.2×110	8.0	76.2×140	8.8
3900	63.5×100	8.2	76.2×100	8.4	76.2×130	9.3		
4700	76.2×100	9.3	76.2×130	8.3	76.2×150	10.8		
5600	76.2×110	10.5	76.2×150	11.8	76.2×160	12.1		
6800	76.2×130	12.3	76.2×160	13.4	89×150	14.3		
8200	76.2×160	14.7	89×150	15.3	89×160	61.1		
10000	89×150	17.3	89×160	13.4	← Ripple current (A rms) at 85℃, 120Hz			
12000	89×160	19.5			Caae size ø D×L (mm)			

It can produce the special sizes according to the client's specific requirements.

● PERMISSIBLERIPPLE CURRENT MULTIPLIERS

Frepuency	50Hz	120Hz	300Hz	1kHz	3kHz
Coefficient	0.8	1.0	1.1	1.3	1.4

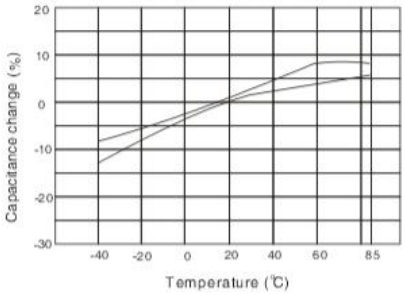
NF Series

TYPICAL PERFORMANCE

— 300V 4700uF
— 400V 6800uF

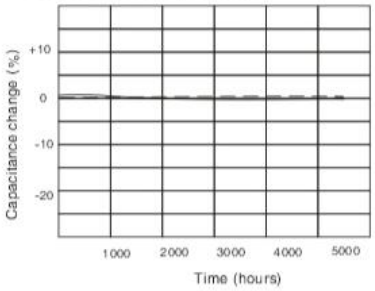
● TEMPERATURE CHARACTERISTICS

Capacitance change vs. temperature

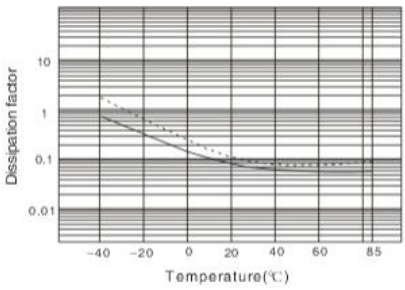


● LOAD LIFE (at+85℃)

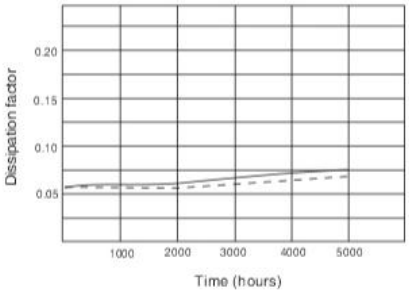
Capacitance change vs.time



Dissipation factor vs.temperature

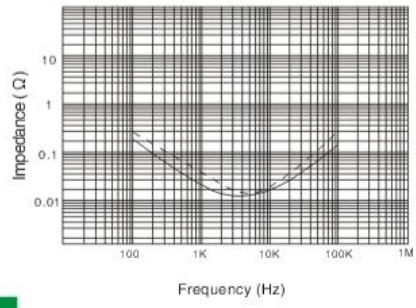


Dissipation factor vs.time

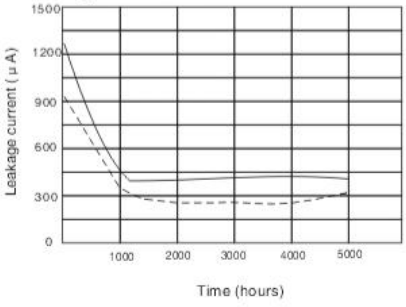


●FREQUENCY CHARACTERISTICS

Impedance vs.frepuency



Leakage current vs.time



T45 Series Sold Electrolyte Tantalum Chip Capacitor



● Brief Intoduction:

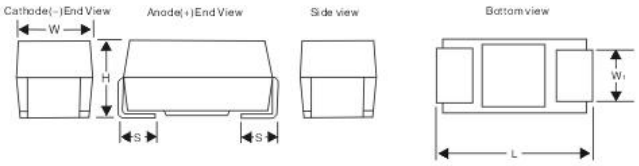
T45 Series sinter-anode, molded solid tantalum chip capacitor, featuring small size, high capacitance, high reliability and excellent operation performances,is used for telecommunications, computers, camcorder, SMT electric circuits and so on. T45 Series meets the requirements of ELA Standard 535BAAC.

● Features:

Item	Characteristics
Operating tenperature range	-55℃~+125℃; >85℃ with rated voltge derating
Capacitance tolerance	±20%; ±10%(for special order);
DC leakage at 20℃	Io≤0.01$C_R U_R$ or 0.5μA(Whichever is greater).
Dissipation factor at 20℃	Please See Table 3
Dimensions, rated voltage and nominal capacitance	Please see Table 1& 2 and Figure 1.
Temperature characteristics	See Table 3
ESR	See Table 4

Unit : mm

● OUTLNE DRAWINGS



● DIMENSIONS-Millimeters

Table 1

Case Size	L	W	H	S	W1
S	2.0±0.2	1.20±0.2	1.20±0.2	0.5±0.3	0.5±0.3
A	3.2±0.2	1.6±0.2	1.6±0.2	0.8±0.3	0.8±0.3
B	3.5±0.2	2.8±0.2	1.9±0.2	0.8±0.3	0.8±0.3
C	6.0±0.3	3.2±0.3	2.5±0.3	1.3±0.3	1.3±0.3
D	7.3±0.3	4.3±0.3	2.8±0.3	1.3±0.3	1.3±0.3
E	7.3±0.3	4.3±0.3	4.0±0.3	1.3±0.3	1.3±0.3

● TEMPERATURE CHARACTERISTICS

Table 3

Capacitance (uF)	Cap.Change			DF Max.				DCL Max.	
	-55℃	+85℃	+125℃	-55℃	+20℃	+85℃	+125℃	+85℃	+125℃
≤1.0	-10	+10	+12	6	4	6	6	10I_0	12I_0
1.5~68				10	6	10	10		
100~470				12	8	12	12		

T45 Series

ESR

Table 4

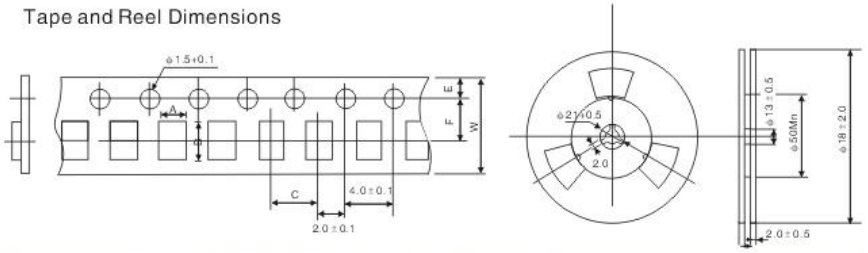
Rated Voltage	4	6.3	10	16	20	25	35	50
Capacitance(Sxtended)(μF)								
0.1					25.0		24.0	22.0
0.15					25.0		21.0	17.0/15.0
0.22					25.0		18.0	14.0
0.33					25.0		15.0	12.0
0.47				25.0	25.0	14.0	10/12	8.0
0.68			30.0	25.0	12/25	10.0	8.0	7.0
1.0		14/25	13/25	11/20	9.0	7/8	6.5	5.5
1.5	30.0	12/25	10.0/25	8.0/12.0	5/6.5	5.0	4.5/5.2	4.0/4.5
2.2	25.0	9/20	7.0/15	5.5/6.5	3.5/5.3	4.5	3.5	2.5
3.3	9/20	7.0/12	5.5/10	4.5/5.0	2.5/2.8	2.8	2.0/2.5	2.0
4.7	7.5/10	6.0/7.0	4/5	3.5/4	1.8/2.0	2.4	1.5/2.2	1.4
6.8	6.5/7.0	4/5	3/4	2.5/3.5	1.3	1.4/2.0	1.3	
10	4/6	3/4	2.5/3.0	2.0/2.8	1.1	1.2/1.8	1.0	
15	3.5/4	3.3/4.0	2.2/2.8	1.8	0.9	1.0	0.9	
22	3.2/3.5	2.5/3.5	1.8/2.4	1.1/1.6	0.9	0.9	0.9	
33	2.2/2.8	1.8/2.0	1.1/1.6	0.9/1.5	0.9/0.9	0.9		
47	1.8/2.2	1.6/2.0	0.9/1.2	0.9/1.4	0.9			
68	1.1/1.6	0.9/1.6	0.9	0.9				
100	0.9/1.3	0.9/1.4	0.9	0.9				
150	0.9	0.9	0.9	0.9				
220	0.9	0.9	0.9	0.9				
330	0.9	0.9	0.9					
470	0.9							

Rated Voltage, Voltage Derating, Surge Voltage and Nominal Capacitance

Table 2

Rated Voltage	4.0	6.3	10.0	16.0	20.0	25.0	35.0	50.0
Voltage Derating	2.5	4.0	6.3	10.0	13.0	16.0	23.0	33.0
Surge Voltage	5.0	8.0	13.0	20.0	26.0	32.0	46.0	65.0
Surge Voltage	3.4	5.0	9.0	12.0	16.0	20.0	26.0	38.0
Capacitance	Case size				(Standard/Extended)			
0.1					S		A	A
0.15					S		A	B/A
0.22					S		A	B
0.33					S		A	B
0.47				S	S	A	B/A	C
0.68			S	S	A/S	A	B	C
1.0		A/S	A/S	A/S	A	B/A	B	C
1.5	S	A/S	A/S	A/S	B/A	B	C/B	D/C
2.2	S	A/S	A/S	B/A	B/A	B	C	D
3.3	A/S	A/S	A/S	B/A	C/B	C	D/C	D
4.7	A/S	A/S	B/A	B/A	D/C	C	D/C	E
6.8	A/S	B/A	B/A	C/B	D/C	D/C	D	
10	B/A	B/A	B/A	C/B	D	D/C	D	
15	B/A	B/A	C/B	C	D	D	E	
22	B/A	B/A	C/B	D/C	D	D		
33	C/B	C/B	D/C	D/C	D	E		
47	C/B	C/B	D/C	D/C	E/D			
68	D/C	D/C	D	D	E			
100	D/C	D/C	D	D				
150	D/C	D	E	E				
220	D	E	E	E				
330	E	E	E					
470	E							

Tape and Reel Dimensions



Case size	A± 0.2	B± 0.2	C± 0.1	E± 0.1	F± 0.1	W± 0.3
S	1.6	2.4	4.0	1.75	3.5	8.0
A	1.9	3.5	4.0	1.75	3.5	8.0
B	3.1	3.8	4.0	1.75	3.5	8.0
C	3.6	6.4	8.0	1.75	5.5	12.0
D	4.7	7.7	8.0	1.75	5.5	12.0
E	4.6	7.6	8.0	1.75	5.5	12.0

Case size	W	Qty.per reel
A B	+1.50 8.4 −0.00	2000
C D	+2.00 12.4 −0.00	500
E	+2.00 12.4 −0.00	400
S	+2.00 12.4 −0.00	2500

T45 Series

Capacitor markings

Note: Direct designation is used for case sizes B,C,D,E while code designation is used for case size A and S.

Rated Voltage Code

Rated Voltage	4	6.3	10	16	20	25	35	50
Voltage Code	G	J	A	C	D	E	V	H

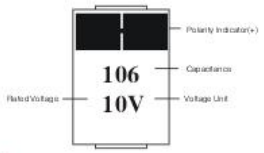
Capacitance Code

Capacitance	1	1.5	2.2	3.3	4.7	6.8
Capacitance Code	A	E	J	N	S	W

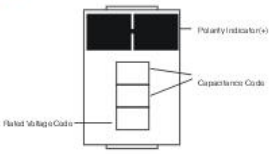
Multiplier	10^4	10^5	10^6	10^7
Second digit	4	5	6	7

Exp.A6C: A represents nominal capacitance code, the second digit represents multiplier and the third digit represents rated voltage, that is: voltage 16V;
Capacitance 1 × 106pF, 16V1 μ F.

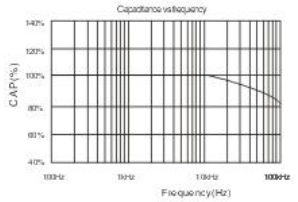
B、C、D、E Sizes

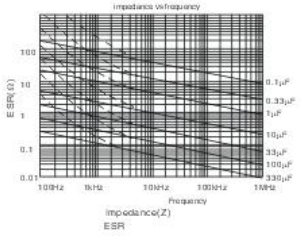


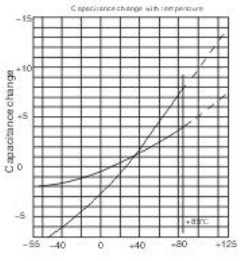
S、A Sizes



CHARACTERISTIC CURVE







T42 Series Epoxy-Coated Solid Electrolytic Tantalum Capacitor



Brief Introduction:

T42 Series sinter-anode, epoxy-coated solid electolyte tantalum capacitors are encapsulatedwith flame-retardantyellow epoxy powder, marked with laser. T42 Series meets and exceeds the requirementsof IEC Specification 384-15-3, IECQ Specification QC300201/UC0003 and Technical SpecificationSJ/T10856-96, used in military and civil applications such as TV sets, camcorders, computers, Program-controlledelectronic telephone switching systems, telehones, instruments and meters.

Features:

Item	Characteristics
Operating tenperature range	-55℃-+125℃; >85℃ with rated voltge derating
Rated Voltage	See Table 1
DC leakage at 20℃	Io≤0.01$C_r U_r$ or 0.5μA(Whichever is greater).
Dissipation factor at 20℃	Please See Table 3
Capacitance range	0.047μF - 680μF, see Table 1
Capacitance tolerance	±20%; ±10%; ±5%;(for special order);
Temperature characteristics	See Table 3

TEMPERATURE CHARACTERISTICS

Table 3

Capacitance (uF)	Cap.Change			DF Max.				DCL Max.	
	-55℃	+85℃	+125℃	-55℃	+20℃	+85℃	+125℃	+85℃	+125℃
≤1.0	±10	±15	+25	6	4	6	6	10Io	12.5Io
1.5~6.8				8	6	8	8		
10~68				10	8	10	10		
100~680				12	10	12	12		

DIMENSIONS-Millimeters

Table 2

Case Size	D(max)	H(max)	h(±0.5mm)	d(±0.5mm)
A	4.5	7.0	2.5	0.5
B	5.0	8.0	2.5	0.5
C	5.5	9.5	2.5	0.5
D	6.5	11.0	2.5	0.5
E	8.5	13.0	5.0	0.5
F	9.5	16.5	5.0	0.5

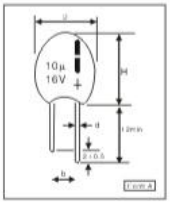
T42 Series

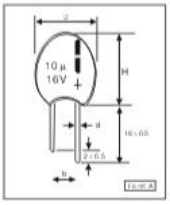
● Rated Voltage, Nominal Capacitance and Case Sizes

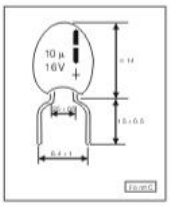
Table 1

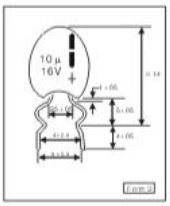
Rated Voltage	3	4	6.3	10	16	20	25	35	50
Voltage Derating	2	2.5	4	6.3	10	13	16	20	32
Surge Voltage	4	5.2	8	13	20	26	33	46	65
Capacitance	Case size								
0.047								A	A
0.068								A	A
0.1								A	A
0.15								A	A
0.22								A	A
0.33								A	A
0.47								A	A
0.68								A	A
1.0								A	A
1.5					A	A	A	A	B
2.2				A	A	A	A	A	C
3.3			A	A	A	A	A	B	C
4.7	A	A	A	A	A	B	B	B	D
6.8	A	A	A	B	B	B	B	C	D
10	A	A	B	B	B	C	C	D	E
15	A	A	B	C	B	C	C	D	E
22	B	B	C	C	C	D	D	E	F
33	B	B	C	D	C	D	D	E	F
47	C	C	D	D	D	E	E	F	
68	D	D	D	D	E	F	F		
100	D	D	E	E	E	F	F		
150	D	E	E	E	F				
220	E	E	E	F					
330	E	F	F						
470	F								
680	F								

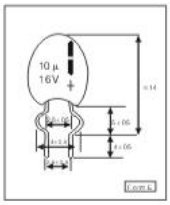
● Lead Styles (Other lead styles are available)

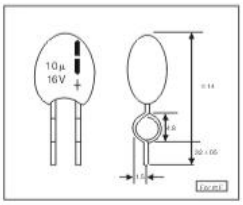








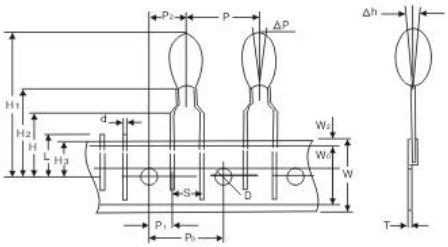




● Packaging information

B: Bulk pack
A: ammo pack(per Specification IEC286-2)

T42 Series



Designation	Symbol	Dimensions(mm)	
Pitch of component	P	12.7±1.0	
Feed hole pitch	Po	12.7±0.3	
Tape width	W	+1.18 −0.5	
Hold down tape width	Wo	12±0.5	
Hole position	H3	+0.75 9 −0.5	
Hold down tape position	W2	3.0max	
Overall component height	H1	32.5max	
Component alignment	△P	±1.3max	
Feed hole diameter	D	4.0±0.2	
Tape thickness	T	0.5±0.2	
Component alignment	△h	±0.2max	
Length of snipped leads	L	11max	
Lead clinch height	H	16±0.5	
Lead wire spacing	S	2.5±0.5	5.0±0.7
Feed hole center to wire center	P1	5.10±0.5	3.85±0.7
Hole center to component center	P2	6.35±0.4	
Compnent height	H2	+2.18 −0	
Lead diameter	d	0.5±0.05	

● Typical Characteristic Curve

