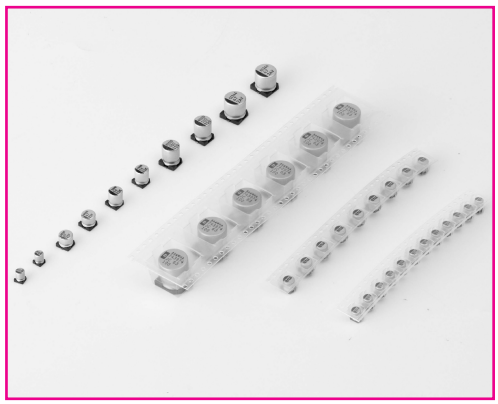
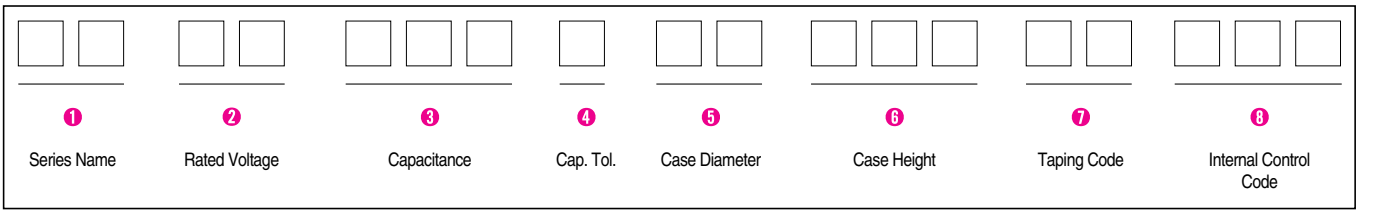
3 SURFACE MOUNT ALUMINUM ELECTROLYTIC CAPACITORS



PART NUMBER SYSTEM

● Part Number System



❶ Series Name

See page 4.

❷ Rated Working Voltage

WV	4	6.3	10	16	25	35	50
Code	0G	0J	1A	1C	1E	1V	1H

WV	63	100	160	200	250	400	450
Code	1J	2A	2C	2D	2E	2G	2W

❸ Capacitance

ex)	0.47μF	474
	4.7μF	475
	47μF	476
	470μF	477
	4700μF	478

❹ Capacitance Tolerance

Tolerance (%)	±20
Code	M

❺ Case Diameter

ex)	Ø4	04
	Ø5	05
	Ø6.3	6L
	Ø8	08
	Ø10	10
	Ø12.5	12

❻ Case Height

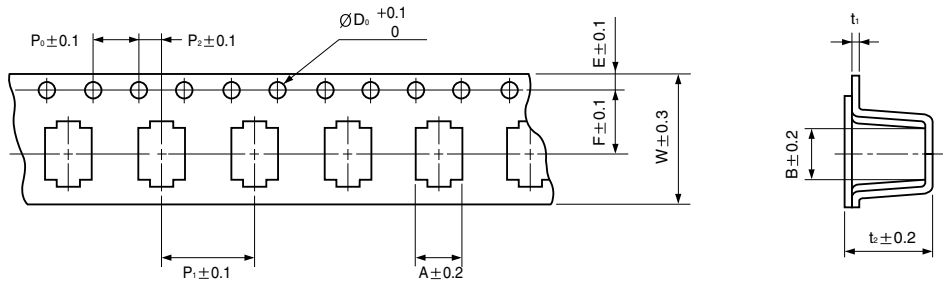
ex)	5.3mm	005
	5.8mm	006
	6.2mm	06B
	7.7mm	07K
	10mm	010
	13.5mm	13M

❼ VR (Reel Type)

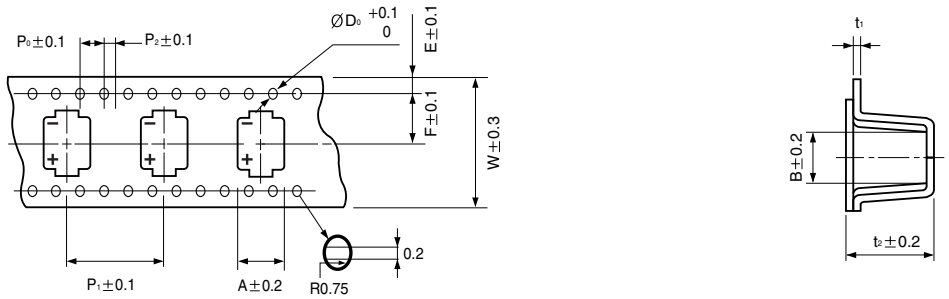
Taping Specifications for Chip Type Capacitors

Carrier Tape

· **Fig.1**

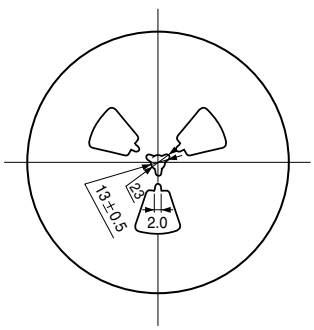


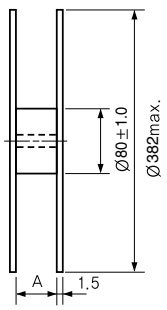
· **Fig.2**



ØD×L	A	B	ØD₀	E	F	P₀	P₁	P₂	t₁	t₂	W	Fig.
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	1
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	
6.3× 7.7	7.0	7.0	1.5	1.75	7.5	4.0	12.0	2.0	0.4	8.2	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	
12.5×13.5	14.0	14.0	1.5	1.75	14.2	4.0	24.0	2.0	0.5	14.0	32.0	2

Reel (Taping code : VR)

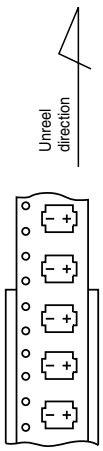




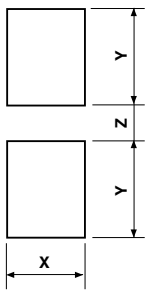
ØD×L	A
4 × 5.3	14
5 × 5.3	14
6.3 × 5.3	18
6.3 × 5.8	18
6.3 × 7.7	18
8 × 6.2	18
8 × 10	26
10 × 10	26
12.5×13.5	34

ØD×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
6.3 × 7.7	900	9000
8 × 6.2	1000	10000
8 × 10	500	3000
10 × 10	500	3000
12.5×13.5	200	1000

Polarity



Recommended Land Size



ØD×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
6.3 × 7.7	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
12.5×13.5	4.0	7.5	7.0

Reflow soldering method for the chip aluminum electrolytic capacitor

1. Recommended conditions for reflow soldering

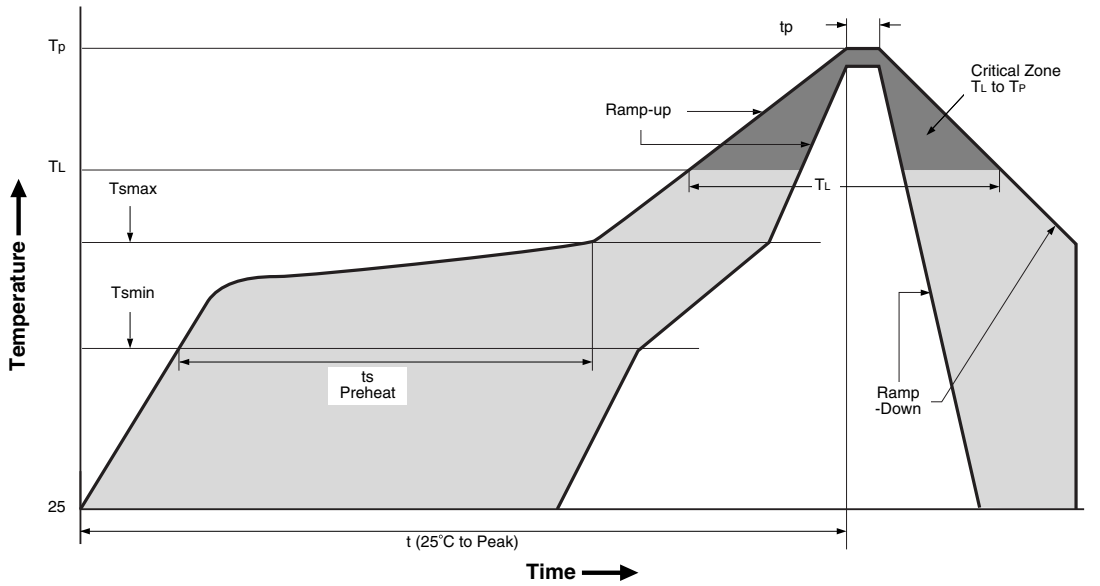
The chip aluminum electrolytic capacitor is subjected to soldering by reflow method.
Temperature and time conditions of reflow soldering shall be set as per each temperature profile shown below as a standard. The following are recommended conditions in the case of reflow soldering method for the chip aluminum electrolytic capacitor.

(1) The capacitor shall not be subjected to either flow or dip soldering method.

(2) Avoid soldering twice by reflow. The number of reflow time for chip aluminum electrolytic capacitor shall be once basically. If this type of capacitor has to be inevitably subjected to the reflow twice, enough cooling time between the first and the second reflow (at least more than 30 minutes) shall be taken to avoid the consecutive reflows by all means.

(3) The touch up work with a soldering iron is allowed after the reflow soldering (Temperature of soldering iron : MAX 400˚C, Time : 5 sec.), provided that carefully attention shall be paid lest a soldering iron should directly touch the capacitor body or its resin bottom base.

2. RECOMMENDED REFLOW SOLDERING CONDITIONS

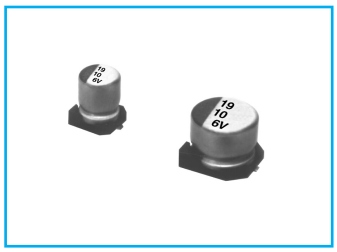


Profile Feature		Soldering condition	
		Ø4 ~ Ø10	Ø12.5
Average Ramp-up Rate (T_L to T_P)		3˚C / second max.	3˚C / second max.
Preheat	Temperature Min. (T_S min)	150˚C	150˚C
	Temperature Max. (T_S max)	200˚C	200˚C
	Time (T_S min to T_S max)	60 ~ 150 seconds	40~120 seconds
T_S max to T_L -Ramp-up Rate		3˚C / second max.	3˚C / second max.
Time maintained above	Time (T_L)	217˚C	217˚C
	Time (t_L)	60 ~ 90 seconds	40 ~ 60 seconds
Peak/classification Temperatrue (T_P)		250˚C	240˚C
Time within 5˚C of actual peak temperature(T_P)		10 seconds max.	10 seconds max.
Ramp-Down rate		3˚C / second max.	3˚C / second max.
Time 25˚C to peak temperature		8 minute max.	8 minute max.

SC Chip type, Standard Series

Solvent Proof
WV≦100V

NC ⇦ SC ⇨ RC
Non-polar / Wide temp



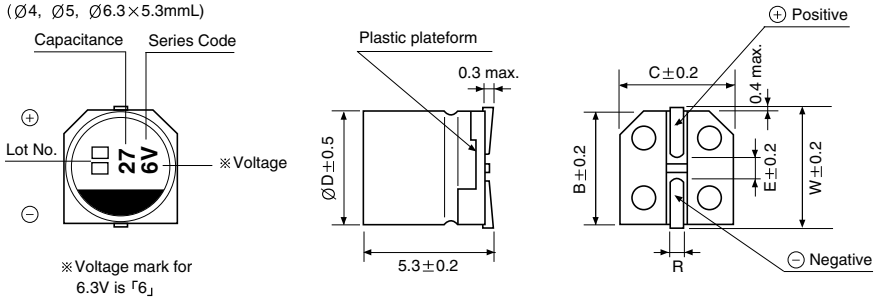
- Chip type higher capacitance in larger case size
- Designed for surface mounting on high density PC board
- Applicable to automatic insertion machine using carrier tape
- Complied to the RoHS directive

Item	Characteristics
Operating temperature range	-40 ~ +85℃
Leakage current max.	WV≦100 I = 0.01CV or 3μA whichever is greater (after 2 minutes) WV≧160 I = 0.04CV + 100μA(after 1 minutes)
Capacitance tolerance	±20% at 120Hz, 20℃
Dissipation factor max. (at 120Hz, 20℃)	WV: 4 / 6.3 / 10 / 16 / 25 / 35 / 50 / 63 / 100 / 160 / 200 / 250 / 400 / 450 tanδ: 0.40 / 0.35 / 0.24 / 0.20 / 0.16 / 0.15 / 0.12 / 0.12 / 0.12 / 0.20 / 0.20 / 0.20 / 0.25 / 0.25
Low temperature characteristics (Impedance ratio at 120Hz)	WV: 4 / 6.3 / 10 / 16 / 25 / 35 ~ 100 / 160 ~ 250 / 400 ~ 450 Z-25℃/Z+20℃: 6 / 5 / 4 / 3 / 2 / 2 / 3 / 6 Z-40℃/Z+20℃: 12 / 10 / 8 / 6 / 4 / 3 / 6 / 10
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 (Small size : ±25%) tanδ: Less than 200% of the specified value
Shelf life(at 85℃)	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 ±10% of initial value tanδ: Less than specified value

DRAWING

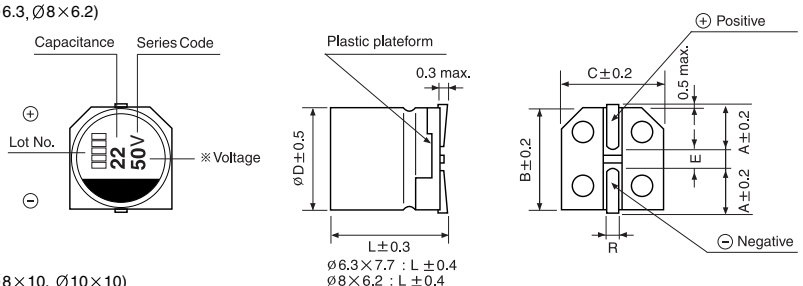
Unit : mm

(Ø4, Ø5, Ø6.3×5.3mmL)

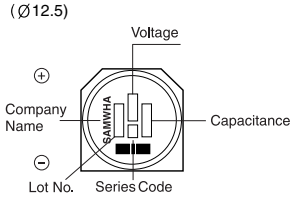


ØD×L	W	A	B	C	E	R
4×5.3	4.8		4.3	4.3	1.0	0.5~0.8
5×5.3	5.8		5.3	5.3	1.4	0.5~0.8
6.3×5.8	7.1		6.6	6.6	2.2	0.5~0.8
6.3×7.7		2.4	6.6	6.6	2.2	0.5~0.8
8×6.2		3.3	8.3	8.3	2.3	0.5~0.8
8×10		2.9	8.3	8.3	3.1	0.8~1.1
10×10		3.2	10.3	10.3	4.5	0.8~1.1
12.5×13.5		4.6	12.8	12.8	4.5	1.1~1.4

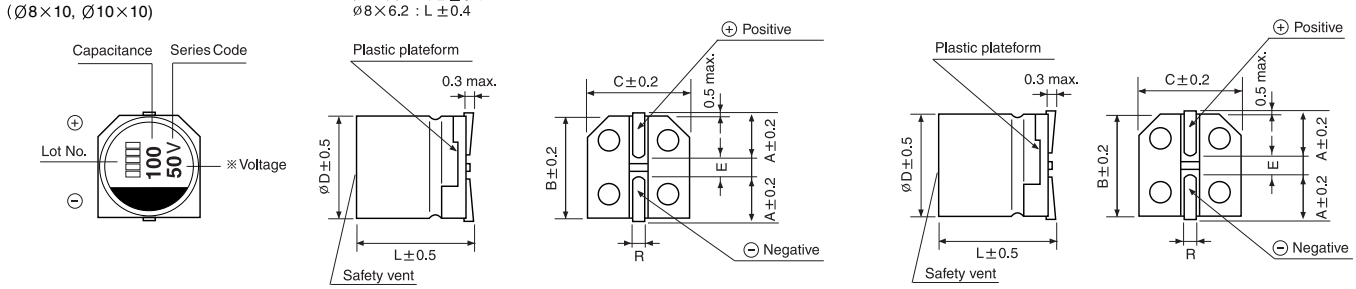
(Ø6.3, Ø8×6.2)



(Ø12.5)



(Ø8×10, Ø10×10)



SC series

● DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

WV / μF	4		6.3		10		16		25		35		50	
0.1													4×5.3	3.2
0.22													4×5.3	4.7
0.33													4×5.3	5.7
0.47													4×5.3	6.8
1.0													4×5.3	10
2.2											4×5.3	11	4×5.3	15
3.3									4×5.3	15	4×5.3	16	4×5.3	18
4.7							4×5.3	16	4×5.3	18	4×5.3	19	4×5.3	24
													5×5.3	25
10	4×5.3	16	4×5.3	19	4×5.3	21	4×5.3	21	4×5.3	24	4×5.3	27	5×5.3	41
									5×5.3	30	5×5.3	32	6.3×5.3	43
22	3×5.3	19	4×5.3	29	4×5.3	28	4×5.3	30	5×5.3	41	6.3×5.3	55	6.3×5.3	71
	4×5.3	24			5×5.3	36	5×5.3	41	6.3×5.3	53			6.3×5.8	73
33	4×5.3	29	4×5.3	30	4×5.3	34	5×5.3	43	5×5.3	50	6.3×5.3	65	6.3×7.7	94
			5×5.3	41	5×5.3	44	6.3×5.3	58	6.3×5.3	64	6.3×5.8	67	8×6.2	95
47	4×5.3	35	4×5.3	36	5×5.3	47	5×5.3	52	6.3×5.3	70	6.3×7.7	94	6.3×7.7	105
			5×5.3	48	6.3×5.3	62	6.3×5.3	69	6.3×5.8	72	8×6.2	105	8×10	140
100	5×5.3	54	5×5.3	60	6.3×5.3	80	6.3×5.3	88	8×6.2	145	6.3×7.7	132	8×10	181
	6.3×5.3	68	6.3×5.3	82	6.3×5.8	82	6.3×5.8	91			8×10	175	10×10	195
220	6.3×5.3	93	6.3×5.8	91	6.3×7.7	173	6.3×7.7	162	8×10	232	10×10	265	10×10	320
					8×6.2	175	8×10	215	10×10	250				
330			6.3×7.7	188	8×10	240	8×10	270	10×10	305	10×10	360	12.5×13.5	600
			8×6.2	190										
470			8×10	265	8×10	290	8×10	307	10×10	400	12.5×13.5	600		
							10×10	330						
1000			8×10	370	10×10	454	12.5×13.5	710	12.5×13.5	820				
			10×10	400										
1500			10×10	480	12.5×13.5	850	12.5×13.5	870						
2200			12.5×13.5	890	12.5×13.5	960								

SC series

● DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

μF \ WV	63		100		160		200		250		400		450	
2.2													10×10	85
3.3			6.5×5.8	29							10×10	90	10×10	100
4.7	6.3×5.8	31	6.3×5.8	35			10×10	100	10×10	100	12.5×13.5	115	12.5×13.5	115
			8×6.2	40										
10	6.3×5.8	46	8×10	77	10×10	100	12.5×13.5	150	12.5×13.5	150				
22	8×6.2	96	8×10	100	12.5×13.5	240	12.5×13.5	260						
33	8×10	117	10×10	130	12.5×13.5	260								
47	10×10	140	10×10	155										
68	10×10	160	12.5×13.5	350										
100	12.5×13.5	370	12.5×13.5	420										
220	12.5×13.5	550												

Ripple current (mA rms) at 85℃, 120Hz

Case size ØD x L (mm)

● FREQUENCY COEFFICIENT OF PERMISSIBLE RIPPLE CURRENT

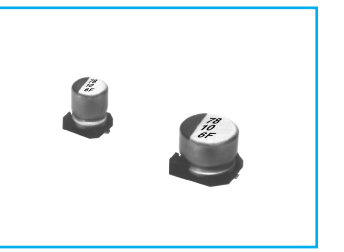
Frequency	50Hz	120Hz	300Hz	1kHz	10kHz≦
Coefficient	0.70	1.00	1.17	1.36	1.50

SURFACE MOUNT ALUMINUM ELECTROLYTIC CAPACITORS

RC Chip type, Wide Temperature Range Series

Solvent Proof

SC → RC (Wide temp.)



- Wide operating temperature range of -55 ~ +105˚C
- Designed for surface mounting on high density PC board
- Applicable to automatic insertion machine using carrier tape
- Complied to the RoHS directive

Item	Characteristics
Operating temperature range	-55 ~ +105˚C
Leakage current max.	I = 0.01CV or 3μA whichever is greater (after 2 minutes)
Capacitance tolerance	±20% at 120Hz, 20˚C
Dissipation factor max. (at 120Hz, 20˚C)	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˚C/Z+20˚C: 3 / 3 / 2 / 2 / 2 / 2 Z-40˚C/Z+20˚C: 8 / 5 / 4 / 3 / 3 / 3
Load life (after application of the rated voltage for 1000 hours at 105˚C)	Leakage current: Less than specified value Capacitance change: Within ±25% of initial value tanδ: Less than 200% of specified value
Shelf life (at 105˚C)	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˚C after exposing them at 250˚C for 30 seconds. Leakage current: Less than specified value Capacitance change: Within ±10% of initial value tanδ: Less than specified value

DRAWING (See page 49)

Unit : mm

-Series code of RC is F

DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

μF \ WV	6.3		10		16		25		35		50	
0.1											4×5.3	2.3
0.22											4×5.3	3.4
0.33											4×5.3	4.1
0.47											4×5.3	4.9
1.0											4×5.3	7.2
2.2											4×5.3	10.7
3.3											4×5.3	13.1
4.7							4×5.3	13	4×5.3	14	5×5.3	18.1
10					4×5.3	17	5×5.3	23	5×5.3	24	6.3×5.3	30.8
22	4×5.3	22	5×5.3	27	5×5.3	30	6.3×5.3	39	6.3×5.3	42	6.3×5.8	45
33	5×5.3	31	5×5.3	33	6.3×5.3	43	6.3×5.3	48	6.3×5.8	52	6.3×7.7	60
47	5×5.3	36	6.3×5.3	46	6.3×5.3	51	6.3×5.8	59	6.3×5.8	63	6.3×7.7	63
100	6.3×5.3	50	6.3×5.8	64	6.3×5.8	64	6.3×7.7	91	8×10	296	10×10	295
220	6.3×7.7	86	6.3×7.7	105	6.3×7.7	105	8×10	340	10×10	435		
330	6.3×7.7	105	8×10	305	8×10	340	10×10	360				
470	8×10	330	10×10	340	10×10	470						
1000	10×10	475										

Ripple current (mA rms) at 105˚C, 120Hz
Case size ØD×L (mm)

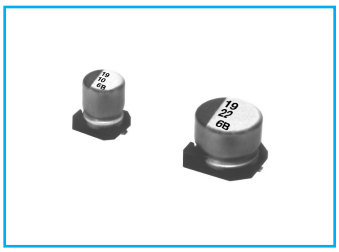
FREQUENCY COEFFICIENT OF PERMISSIBLE RIPPLE CURRENT

Frequency	50Hz	120Hz	300Hz	1kHz	10kHz≦
Coefficient	0.70	1.00	1.17	1.36	1.50

CB Chip type,Long Life Series

Long Life Solvent Proof

RC ⇨ CB
Long life



- Chip type with load life 5000 hours at 105°C
- Chip type with 5.5mmL Height
- Designed for surface mounting on high density PC board
- Applicable to automatic insertion machine using carrier tape
- Complied to the RoHS directive

Item	Characteristics
Operating temperature range	-55 ~ +105°C
Leakage current max.	I = 0.01CV or 3μA whichever is greater (after 2 minutes)
Capacitance tolerance	±20% at 120Hz, 20°C
Dissipation factor max. (at 120Hz, 20°C)	WV: 4 / 6.3 / 10 / 16 / 25 / 35 / 50 tanδ: 0.24 / 0.22 / 0.19 / 0.16 / 0.14 / 0.12 / 0.11
Low temperature characteristics (Impedance ratio at 120Hz)	WV: 4 / 6.3 / 10 / 16 / 25 ~ 50 Z-25°C/Z+20°C: 2 / 2 / 2 / 2 / 3 Z-55°C/Z+20°C: 4 / 4 / 4 / 3 / 3
Load life (after application of the rated voltage for 5000 hours at 105°C)	Capacitance change: Within ±30% of initial value tanδ: Less than 300% of the specified value Leakage current: Less than specified value
Shelf life(at 105°C)	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°C after exposing them at 250°C for 30 seconds. Leakage current: Less than specified value Capacitance change: Within ±10% of initial value tanδ: Less than specified value

DRAWING (See page 49)

Unit : mm

-Series code of CB is B

DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

μF \ WV	4		6.3		10		16		25		35		50	
0.1													4×5.3	2.4
0.22													4×5.3	3.5
0.33													4×5.3	4.3
0.47													4×5.3	5.1
1.0													4×5.3	7.4
2.2													4×5.3	11.0
3.3													4×5.3	13.5
4.7									4×5.3	14	4×5.3	15	5×5.3	18.6
6.8									4×5.3	17	5×5.3	21	6.3×5.3	26.1
10							4×5.3	19	5×5.3	24	5×5.3	26	6.3×5.3	32.6
15					4×5.3	22	5×5.3	28	5×5.3	31	6.3×5.3	37	6.3×5.3	40.0
22	4×5.3	24	4×5.3	25	5×5.3	30	5×5.3	33	6.3×5.3	42	6.3×5.3	45		
33	5×5.3	33	5×5.3	35	5×5.3	38	6.3×5.3	48						
47	5×5.3	40	5×5.3	42	6.3×5.3	52	6.3×5.3	57						
68	5×5.3	48	6.3×5.3	55	6.3×5.3	63								
100	5×5.3	55	6.3×5.3	67	6.3×5.3	72								

Ripple current (mA rms) at 105°C, 120Hz
Case size ØD×L(mm)

FREQUENCY COEFFICIENT OF PERMISSIBLE RIPPLE CURRENT

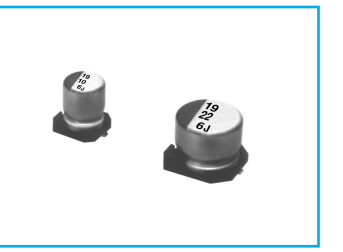
Frequency	50Hz	120Hz	300Hz	1kHz	10kHz≦
Coefficient	0.70	1.00	1.17	1.36	1.50

SURFACE MOUNT ALUMINUM ELECTROLYTIC CAPACITORS

JC Chip type, Higher Capacitance Range Series

Solvent Proof
WV≦100V

RC ⇨ JC
Long life



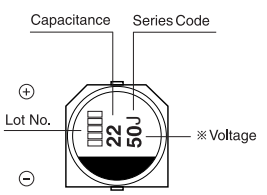
- Chip type higher capacitance in large case sizes
- Designed for surface mounting on high density PC board
- Applicable to automatic insertion machine using carrier tape
- Complied to the RoHS directive

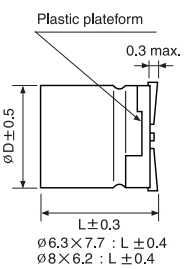
Item	Characteristics
Operating temperature range	WV≦100 : -55 ~ +105˚C WV≧160 : -40 ~ +105˚C
Leakage current max.	WV≦100 I = 0.01CV or 3μA whichever is greater (after 2 minutes) WV≧160 I = 0.04CV + 100μA(after 1 minutes)
Capacitance tolerance	±20% at 120Hz, 20˚C
Dissipation factor max. (at 120Hz, 20˚C)	WV: 4 / 6.3 / 10 / 16 / 25 / 35 / 50 / 63 / 100 / 160 / 200 / 250 / 400 / 450 tanδ: 0.37 / 0.28 / 0.24 / 0.20 / 0.16 / 0.13 / 0.12 / 0.10 / 0.10 / 0.15 / 0.15 / 0.15 / 0.20 / 0.20
Low temperature characteristics (Impedance ratio at 120Hz)	WV: 4 / 6.3 / 10 / 16 / 25 ~ 50 / 63 ~ 100 / 160 ~ 250 / 400 ~ 450 Z-25˚C/Z+20˚C: 6 / 3 / 3 / 2 / 2 / 3 / 3 / 6 Z-40˚C/Z+20˚C: 12 / 8 / 5 / 4 / 3 / 4 / 6 / 10
Load life (after application of the rated voltage for 2000 hours at 105˚C)	Leakage current: Less than specified value Capacitance change: Within ±20% of initial value (Small size : ±25%) tanδ: Less than 200% of specified value
Shelf life (at 105˚C)	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˚C after exposing them at 250˚C for 30 seconds. Leakage current: Less than specified value Capacitance change: Within ±10% of initial value tanδ: Less than specified value

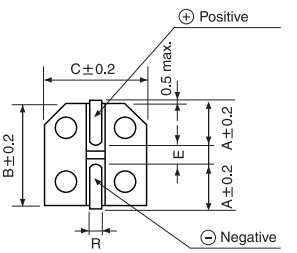
DRAWING

Unit : mm

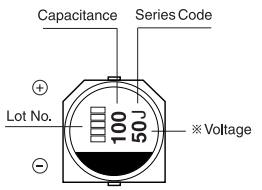
(Ø6.3, Ø8×6.2)

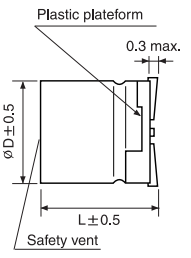


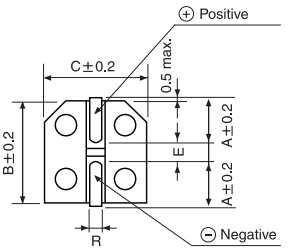




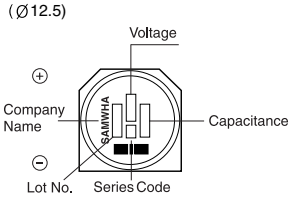
(Ø8×10, Ø10×10)

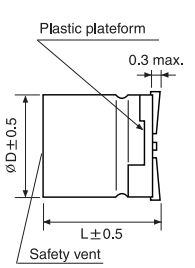


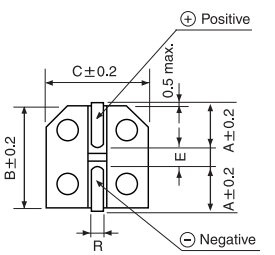




(Ø12.5)







ØD×L	A	B	C	E	R
6.3×5.8	2.4	6.6	6.6	2.2	0.5~0.8
6.3×7.7	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
12.5×13.5	4.6	12.8	12.8	4.5	1.1~1.4

JC series

● DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

μF \ WV	4		6.3		10		16		25		35		50	
10													6.3×5.8	30
22									6.3×5.8	38	6.3×5.8	42	8×6.2	67
33							6.3×5.8	40	6.3×5.8	48	8×6.2	76	8×10	133
47					6.3×5.8	46	6.3×5.8	50	8×6.2	79	8×10	124	10×10	180
100	6.3×5.8	60	6.3×5.8	60	6.3×5.8	60	8×10	148	8×10	181	10×10	304	10×10	310
220			8×10	161	8×10	173	10×10	330	10×10	351	10×10	450	12.5×13.5	480
330			8×10	288	10×10	318	10×10	441	10×10	372	12.5×13.5	500		
470			10×10	340	10×10	351	10×10	489	10×10	450	12.5×13.5	600		
680			10×10	408	10×10	392	12.5×13.5	500	12.5×13.5	500				
1000			10×10	495	10×10	550	12.5×13.5	600						
1500			10×10	560	12.5×13.5	650								
2200			12.5×13.5	730										

μF \ WV	63		100		160		200		250		400		450	
3.3									10×10	30	12.5×13.5	30	12.5×13.5	40
4.7							10×10	45	12.5×13.5	65				
10	8×6.2	32			10×10	45	12.5×13.5	75						
22	8×10	60	8×10	90	12.5×13.5	85	12.5×13.5	85						
33	8×10	110	10×10	120	12.5×13.5	95	← Ripple current (mA rms) at 105°C, 120Hz							
47	10×10	130	12.5×13.5	250	↑ Case size ØD x L (mm)									
68	10×10	160	12.5×13.5	300										
100	12.5×13.5	270												

● FREQUENCY COEFFICIENT OF PERMISSIBLE RIPPLE CURRENT

Frequency	50Hz	120Hz	300Hz	1kHz	10kHz≦
Coefficient	0.70	1.00	1.17	1.36	1.50

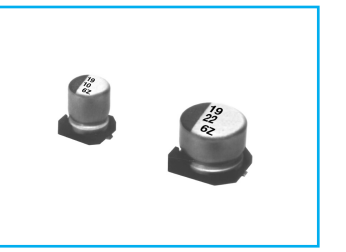
ZC

Height 5.5mmL, Low Impedance Series

Low Impedance　Solvent Proof

- Chip type, low impedance temperature range up to 105˚C
- Designed for surface mounting on high density PC board
- Applicable to automatic insertion machine using carrier tape
- Complied to the RoHS directive

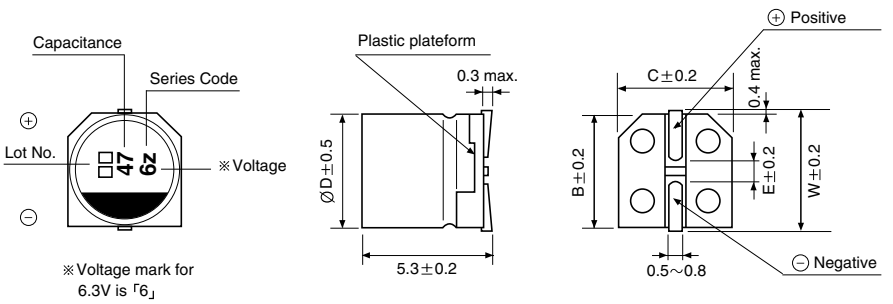
RC ⇒ ZC
Low Imp.



Item	Characteristics
Operating temperature range	-55 ~ +105˚C
Leakage current max.	I = 0.01CV or 3μA whichever is greater (after 2 minutes)
Capacitance tolerance	±20% at 120Hz, 20˚C
Dissipation factor max. (at 120Hz, 20˚C)	WV: 6.3 / 10 / 16 / 25 / 35 tanδ: 0.22 / 0.19 / 0.16 / 0.14 / 0.12
Low temperature characteristics (Impedance ratio at 120Hz)	WV: 6.3 / 10 / 16 / 25 / 35 Z-25˚C/Z+20˚C: 2 / 2 / 2 / 2 / 3 Z-55˚C/Z+20˚C: 4 / 4 / 3 / 3 / 3
Load life (after application of the rated voltage for 1000 hours at 105˚C)	Leakage current: Less than specified value Capacitance change: Within ±20% of initial value tanδ: Less than 200% of specified value
Shelf life (at 105˚C)	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˚C after exposing them at 250˚C for 30 seconds. Leakage current: Less than specified value Capacitance change: Within ±10% of initial value tanδ: Less than specified value

DRAWING

Unit : mm



ØD	W	B	C	E
4	4.8	4.3	4.3	1.0
5	5.8	5.3	5.3	1.4
6.3	7.1	6.6	6.6	2.2

DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

μF \ WV	6.3			10			16			25			35		
1.0													4×5.3	5.0	50
1.5													4×5.3	5.0	50
2.2													4×5.3	5.0	50
3.3													4×5.3	5.0	50
4.7										4×5.3	5.0	50	4×5.3	5.0	50
6.8										4×5.3	5.0	50	5×5.3	2.6	80
10							4×5.3	5.0	50	5×5.3	2.6	80	5×5.3	2.6	80
15							5×5.3	2.6	80	6.3×5.3	1.3	75	6.3×5.3	1.3	115
22	4×5.3	5.0	50	5×5.3	2.6	80	5×5.3	2.6	80	6.3×5.3	1.3	115	6.3×5.3	1.3	115
33	5×5.3	2.6	80	5×5.3	2.6	80	6.3×5.3	1.3	115	6.3×5.3	1.3	115			
47	5×5.3	2.6	80	6.3×5.3	1.3	115	6.3×5.3	1.3	115						
68	6.3×5.3	1.3	115	6.3×5.3	1.3	115									
100	6.3×5.3	1.3	115												

Ripple current (mA rms) at 105˚C, 100kHz
Impedance (Ω) at 20˚C, 100kHz
Case size ØD×L(mm)

FREQUENCY COEFFICIENT OF PERMISSIBLE RIPPLE CURRENT

Frequency	50Hz	120Hz	300Hz	1kHz	10kHz≦
Coefficient	0.35	0.5	0.64	0.83	1.00

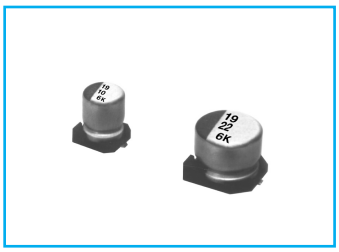
CK

Chip type, Low Impedance, High CV Series

Low Impedance Solvent Proof

- Chip type, low impedance temperature range up to 105˚C
- Designed for surface mounting on high density PC board
- Applicable to automatic insertion machine using carrier tape
- Complied to the RoHS directive

ZC ⇨ CK
Low Imp.

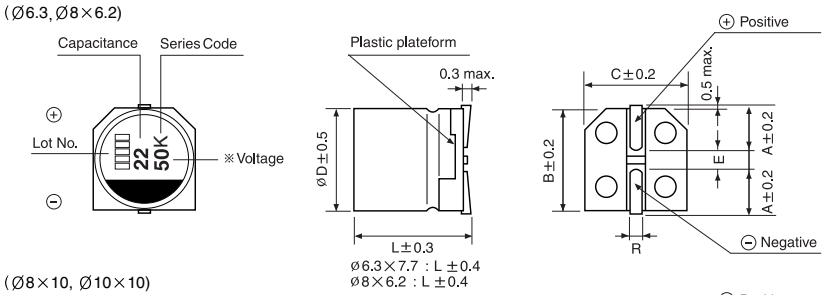


Item	Characteristics
Operating temperature range	-55 ~ +105˚C
Leakage current max.	I = 0.01CV or 3μA whichever is greater (after 2 minutes)
Capacitance tolerance	±20% at 120Hz, 20˚C
Dissipation factor max. (at 120Hz, 20˚C)	WV: 6.3 / 10 / 16 / 25 / 35 / 50 / 63 / 80 / 100 tanδ: 0.24 / 0.19 / 0.16 / 0.14 / 0.12 / 0.12 / 0.10 / 0.10 / 0.10
Low temperature characteristics (Impedance ratio at 120Hz)	WV: 6.3 / 10 / 16 / 25 / 35 / 50 / 63~100 Z-25˚C/Z+20˚C: 2 / 2 / 2 / 2 / 2 / 2 / 3 Z-55˚C/Z+20˚C: 3 / 3 / 3 / 3 / 3 / 3 / 4
Load life (after application of the rated voltage for 2000 hours at 105˚C)	Leakage current: Less than specified value Capacitance change: Within ±25% of initial value tanδ: Less than 200% of specified value
Shelf life (at 105˚C)	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˚C after exposing them at 250˚C for 30 seconds. Leakage current: Less than specified value Capacitance change: Within ±10% of initial value tanδ: Less than specified value

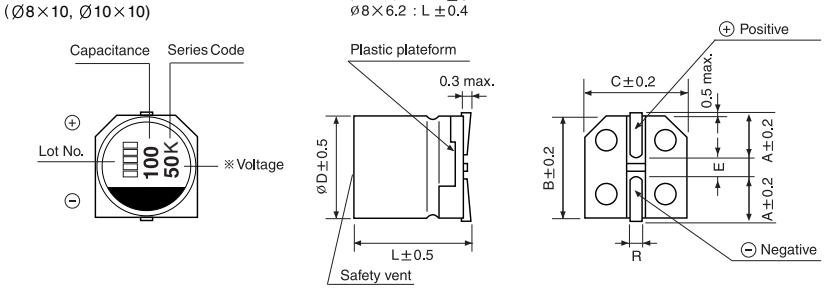
DRAWING

Unit : mm

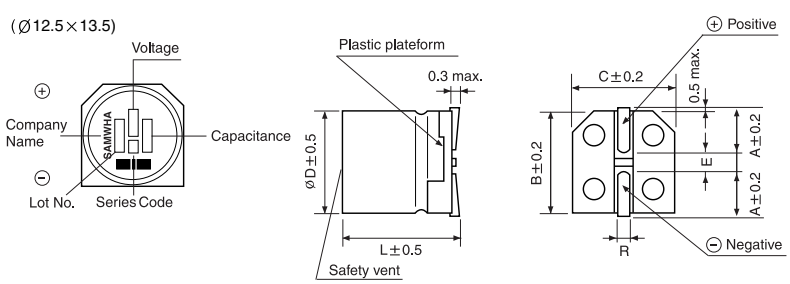
(Ø6.3, Ø8×6.2)



(Ø8×10, Ø10×10)



(Ø12.5×13.5)



ØD×L	A	B	C	E	R
6.3×5.8	2.4	6.6	6.6	2.2	0.5~0.8
6.3×7.7	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
12.5×13.5	4.6	12.8	12.8	4.5	1.1~1.4

CK series

● DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

μF \ WV	6.3			10			16			25			35			50		
10																6.3×5.8	0.88	165
15																6.3×5.8	0.88	165
22																6.3×5.8	0.88	165
33							6.3×5.8	0.44	230	6.3×5.8	0.44	230	6.3×5.8	0.44	230	6.3×7.7	0.68	280
																8×6.2	0.63	300
47				6.3×5.8	0.44	230	6.3×5.8	0.44	230	6.3×5.8	0.44	230	6.3×5.8	0.44	230	6.3×7.7	0.68	280
																8×6.2	0.63	300
68	6.3×5.8	0.44	230	6.3×5.8	0.44	230	6.3×5.8	0.44	230	6.3×5.8	0.44	230	6.3×7.7	0.34	280	8×10	0.34	450
													8×6.2	0.26	300			
100	6.3×5.8	0.44	230	6.3×5.8	0.44	230	6.3×5.8	0.44	230	6.3×7.7	0.34	280	8×10	0.17	450	10×10	0.18	670
										8×6.2	0.26	300					
150	6.3×5.8	0.44	230	6.3×5.8	0.44	230	6.3×7.7	0.34	280	8×10	0.17	450	8×10	0.17	450			
							8×6.2	0.26	300									
220	6.3×5.8	0.44	230	6.3×7.7	0.34	280	6.3×7.7	0.34	280	8×10	0.17	450	10×10	0.09	670			
				8×6.2	0.26	300	8×6.2	0.26	300									
330	6.3×7.7	0.34	280	8×10	0.17	450	8×10	0.17	450	10×10	0.09	670						
	8×6.2	0.26	300															
470	8×10	0.17	450	8×10	0.17	450	10×10	0.09	670									
680	8×10	0.17	450	10×10	0.09	670												
1000	10×10	0.09	670															
1500	10×10	0.09	670															

Ripple current (mA rms) at 105°C, 100kHz

Impedance (Ω) at 20°C, 100kHz

Case size ØD x L (mm)

μF \ WV	63			80			100		
10	6.3×5.8	2.3	80	6.3×7.7	2.4	60			
22	6.3×7.7	2.1	120	8×10	1.3	130	8×10	1.3	130
33	8×10	0.9	250	8×10	1.3	130	10×10	0.7	200
47	8×10	0.9	250	10×10	0.7	200	12.5×13.5	0.45	500
68	10×10	0.45	400	12.5×13.5	0.35	500	12.5×13.5	0.45	500
100	10×10	0.45	400	12.5×13.5	0.35	500			
150	12.5×13.5	0.32	800	12.5×13.5	0.35	500			
220	12.5×13.5	0.32	800						

● FREQUENCY COEFFICIENT OF PERMISSIBLE RIPPLE CURRENT

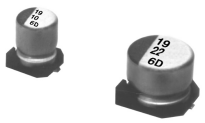
Frequency	50Hz	120Hz	300Hz	1kHz	10kHz≦
Coefficient	0.35	0.5	0.64	0.83	1.00

CD Chip type, Extremely Low Impedance Series

Low Impedance Solvent Proof

- Chip type, low impedance temperature range up to 105˚C
- Designed for surface mounting on high density PC board
- Applicable to automatic insertion machine using carrier tape
- Complied to the RoHS directive

CK ⇨ CD
Low Imp.

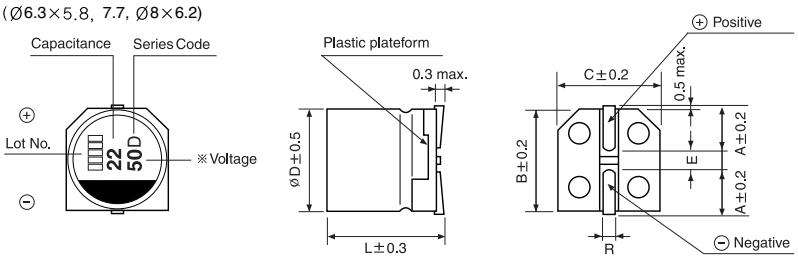


Item	Characteristics
Operating temperature range	-55 ~ +105˚C
Leakage current max.	I = 0.01CV or 3μA whichever is greater (after 2 minutes)
Capacitance tolerance	±20% at 120Hz, 20˚C
Dissipation factor max. (at 120Hz, 20˚C)	WV: 6.3 / 10 / 16 / 25 / 35 / 50 tanδ: 0.24 / 0.19 / 0.16 / 0.14 / 0.12 / 0.12
Low temperature characteristics (Impedance ratio at 120Hz)	WV: 6.3 / 10 / 16 / 25 / 35 / 50 Z-25˚C/Z+20˚C: 2 / 2 / 2 / 2 / 2 / 2 Z-55˚C/Z+20˚C: 3 / 3 / 3 / 3 / 3 / 3
Load life (after application of the rated voltage for 2000 hours at 105˚C)	Leakage current: Less than specified value Capacitance change: Within ±25% of initial value tanδ: Less than 200% of specified value
Shelf life (at 105˚C)	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˚C after exposing them at 250˚C for 30 seconds. Leakage current: Less than specified value Capacitance change: Within ±10% of initial value tanδ: Less than specified value

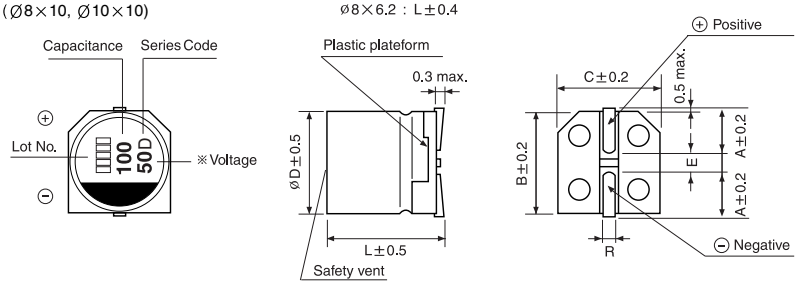
DRAWING

Unit : mm

(Ø6.3×5.8, 7.7, Ø8×6.2)



(Ø8×10, Ø10×10)



ØD	A	B	C	E	R
6.3×5.8	2.4	6.6	6.6	2.2	0.5~0.8
6.3×7.7	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

CD series

● DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

μF \ WV	6.3			10			16			25			35			50		
10																6.3×5.8	0.86	170
15																6.3×5.8	0.86	170
22																6.3×5.8	0.86	170
33							6.3×5.8	0.39	240	6.3×5.8	0.39	240	6.3×5.8	0.39	240	6.3×7.7	0.66	280
																8×6.2	0.63	300
47				6.3×5.8	0.39	240	6.3×5.8	0.39	240	6.3×5.8	0.39	240	6.3×5.8	0.39	240	6.3×7.7	0.66	280
																8×6.2	0.63	300
68	6.3×5.8	0.36	240	6.3×5.8	0.36	240	6.3×5.8	0.36	240	6.3×5.8	0.36	240	6.3×7.7	0.32	290	8×10	0.32	350
100	6.3×5.8	0.36	240	6.3×5.8	0.36	240	6.3×5.8	0.36	240	6.3×7.7	0.32	290	8×10	0.16	600	10×10	0.16	700
										8×6.2	0.26	300						
150	6.3×5.8	0.36	240	6.3×5.8	0.36	240	6.3×7.7	0.32	290	8×10	0.16	600	8×10	0.16	600			
220	6.3×5.8	0.36	240	6.3×7.7	0.32	290	6.3×7.7	0.32	290	8×10	0.16	600	10×10	0.08	850			
				8×6.2	0.26	300	8×6.2	0.26	300									
330	6.3×7.7	0.32	290	8×10	0.16	600	8×10	0.16	600	10×10	0.10	850						
	8×6.2	0.26	300															
470	8×10	0.16	600	8×10	0.16	600	10×10	0.08	850									
680	8×10	0.16	600	10×10	0.08	850												
1000	10×10	0.08	850															
1500	10×10	0.08	850															

← Ripple current (mA rms) at 105°C, 100kHz

Impedance (Ω) at 20°C, 100kHz

Case size ØD x L (mm)

● FREQUENCY COEFFICIENT OF PERMISSIBLE RIPPLE CURRENT

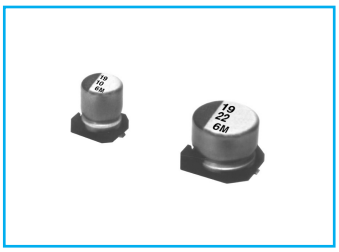
Frequency	50Hz	120Hz	300Hz	1kHz	10kHz≦
Coefficient	0.35	0.5	0.64	0.83	1.00

CM

Chip type, Extremely Low Impedance Long Life Series

Low Impedance　Solvent Proof

CD ⇨ CM
Long life



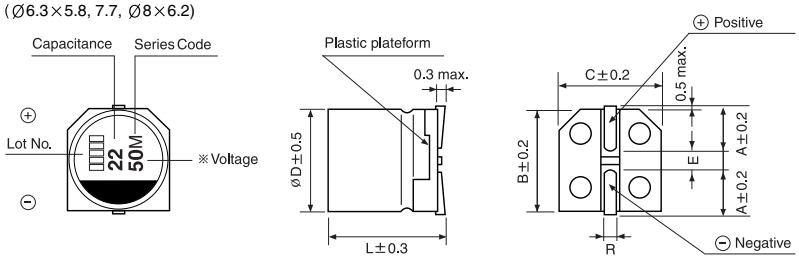
- Chip type, low impedance temperature range up to 105˚C
- Designed for surface mounting on high density PC board
- Applicable to automatic insertion machine using carrier tape
- Complied to the RoHS directive

Item	Characteristics
Operating temperature range	-55 ~ +105˚C
Leakage current max.	I = 0.01CV or 3μA whichever is greater (after 2 minutes)
Capacitance tolerance	±20% at 120Hz, 20˚C
Dissipation factor max. (at 120Hz, 20˚C)	WV: 6.3 / 10 / 16 / 25 / 35 / 50 tanδ: 0.26 / 0.19 / 0.16 / 0.14 / 0.13 / 0.12
Low temperature characteristics (Impedance ratio at 120Hz)	WV: 6.3 / 10 / 16 / 25 / 35 / 50 Z-25˚C/Z+20˚C: 2 / 2 / 2 / 2 / 2 / 2 Z-55˚C/Z+20˚C: 4 / 4 / 4 / 3 / 3 / 3
Load life (after application of the rated voltage for 5000 hours at 105˚C)	Leakage current: Less than specified value Capacitance change: Within ±30% of initial value tanδ: Less than 250% of specified value Ø6.3 and 8×6.2 product are for 3000 hours
Shelf life (at 105˚C)	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˚C after exposing them at 250˚C for 30 seconds. Leakage current: Less than specified value Capacitance change: Within ±10% of initial value tanδ: Less than specified value

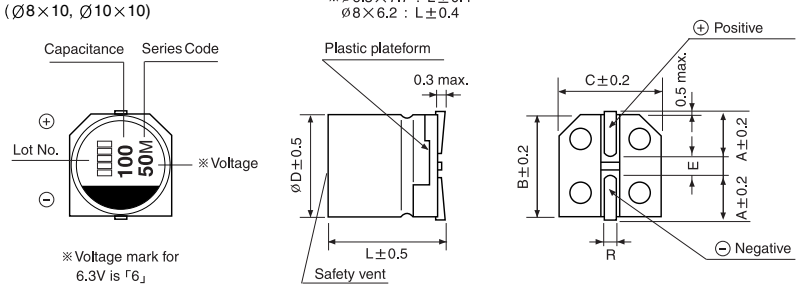
DRAWING

Unit : mm

(Ø6.3×5.8, 7.7, Ø8×6.2)



(Ø8×10, Ø10×10)



ØD	A	B	C	E	R
6.3×5.8	2.4	6.6	6.6	2.2	0.5~0.8
6.3×7.7	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

CM series

● DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

μF \ WV	6.3			10			16			25			35			50		
10																6.3×5.8	0.86	170
15																6.3×5.8	0.86	170
22																6.3×5.8	0.86	170
33							6.3×5.8	0.39	240	6.3×5.8	0.39	240	6.3×5.8	0.39	240	6.3×7.7	0.66	280
																8×6.2	0.63	300
47				6.3×5.8	0.39	240	6.3×5.8	0.39	240	6.3×5.8	0.39	240	6.3×5.8	0.39	240	6.3×7.7	0.66	280
																8×6.2	0.63	300
68	6.3×5.8	0.36	240	6.3×5.8	0.36	240	6.3×5.8	0.36	240	6.3×5.8	0.36	240	6.3×7.7	0.32	290	8×10	0.32	350
100	6.3×5.8	0.36	240	6.3×5.8	0.36	240	6.3×5.8	0.36	240	6.3×7.7	0.32	290	8×10	0.16	600	10×10	0.16	700
										8×6.2	0.26	300						
150	6.3×5.8	0.36	240	6.3×5.8	0.36	240	6.3×7.7	0.32	290	8×10	0.16	600	8×10	0.16	600			
220	6.3×5.8	0.36	240	6.3×7.7	0.36	290	6.3×7.7	0.32	290	8×10	0.16	600	10×10	0.08	850			
				8×6.2	0.26	300	8×6.2	0.26	300									
330	6.3×7.7	0.32	290	8×10	0.16	600	8×10	0.16	600	10×10	0.08	850						
	8×6.2	0.26	300															
470	8×10	0.16	600	8×10	0.16	600	10×10	0.08	850									
680	8×10	0.16	600	10×10	0.08	850												
1000	10×10	0.08	850															

Ripple current (mA rms) at 105°C, 100kHz

Impedance (Ω) at 20°C, 100kHz

Case size ØD x L (mm)

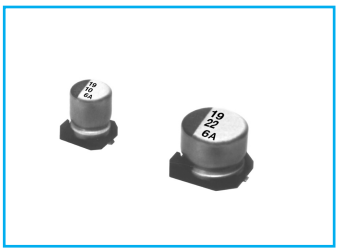
● FREQUENCY COEFFICIENT OF PERMISSIBLE RIPPLE CURRENT

Frequency	50Hz	120Hz	300Hz	1kHz	10kHz≦
Coefficient	0.35	0.5	0.64	0.83	1.00

CA Chip type, Long Life, High CV Series

Long Life Solvent Proof

JC ⇨ CA (Long life)

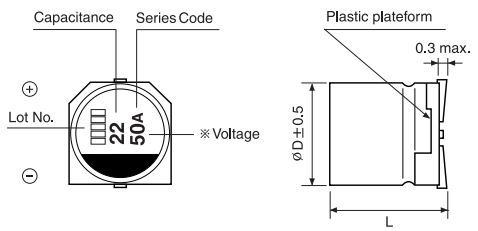


- Chip type, long life capacitance in large case sizes
- Chip type with load life of 5000 hours at +105˚C
- Designed for surface mounting on high density PC board
- Applicable to automatic insertion machine using carrier tape
- Complied to the RoHS directive

Item	Characteristics
Operating temperature range	-55 ~ +105˚C
Leakage current max.	I = 0.01CV or 3μA whichever is greater (after 2 minutes)
Capacitance tolerance	±20% at 120Hz, 20˚C
Dissipation factor max. (at 120Hz, 20˚C)	WV: 6.3 / 10 / 16 / 25 / 35 / 50 tanδ: 0.28 / 0.24 / 0.2 / 0.16 / 0.13 / 0.12
Low temperature characteristics (Impedance ratio at 120Hz)	WV: 6.3 / 10 / 16 / 25 / 35 / 50 Z-25˚C/Z+20˚C: 4 / 3 / 2 / 2 / 2 / 2 Z-40˚C/Z+20˚C: 10 / 7 / 5 / 3 / 3 / 3
Load life (after application of the rated voltage for 5000 hours at 105˚C)	Leakage current: Less than specified value Capacitance change: Within ±30% of initial value tanδ: Less than 300% of specified value
Shelf life (at 105˚C)	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˚C after exposing them at 250˚C for 30 seconds. Leakage current: Less than specified value Capacitance change: Within ±10% of initial value tanδ: Less than specified value

DRAWING

Unit : mm



* Please refer to drawing for CK Series in page 57 for detail drawing.

DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

μF \ WV	6.3		10		16		25		35		50	
10											6.3×5.8	30
22							6.3×5.8	38	6.3×5.8	42	6.3×7.7	120
33					6.3×5.8	40	6.3×5.8	48	6.3×7.7	57	8×10	140
47			6.3×5.8	46	6.3×5.8	50	6.3×7.7	63	8×10	92	8×10	170
100	6.3×5.8	60	6.3×7.7	81	6.3×7.7	81	8×10	116	10×10	151	10×10	310
220	6.3×7.7	101	8×10	141	10×10	216	10×10	216	10×10	216		
330	8×10	160	10×10	238	10×10	238	10×10	238				
470	10×10	254	10×10	254	10×10	254						
1000	10×10	313										

← Ripple current (mA rms) at 105˚C, 120Hz
↑ Case size ØD×L (mm)

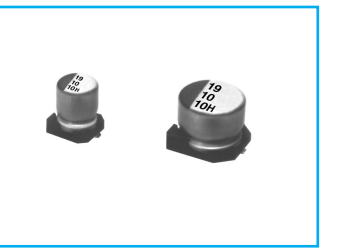
FREQUENCY COEFFICIENT OF PERMISSIBLE RIPPLE CURRENT

Frequency	50Hz	120Hz	300Hz	1kHz	10kHz≦
Coefficient	0.70	1.00	1.17	1.36	1.50

CF Chip type, High Temperature, Long Life, Series

Long Life Solvent Proof

JC ⇨ CF
Wide temp
Long life



- Chip type, high temperature range, for + 130˚C use
- For ECU
- Application to automatic insertion machine using carrier
- Complied to the RoHS directive

Item	Characteristics
Operating temperature range	-40 ~ +130˚C
Leakage current	I = 0.03CV or 4μA whichever is greater (after 2 minutes)
Capacitance tolerance	±20% (20˚C,120Hz)
Dissipation factor max. (at 120Hz, 20˚C)	Rated Voltage(V): 10 / 16 / 25 / 35 / 50 tanδ: 0.32 / 0.24 / 0.21 / 0.18 / 0.18
Low temperature characteristics (Impedance ratio at 120Hz)	WV: 10 / 16 / 25 / 35 / 50 Z-40˚C/Z+20˚C: 12 / 11 / 8 / 6 / 6
Load life (after application of the rated voltage for 5000 hours at 130˚C)	Leakage current: Less than specified value Capacitance change: Within ±30% of initial value tanδ: Less than 300% of the specified value Ø8×6.2 : 2000 hours, Ø8×10 : 3000 hours, Ø10~: 5000 hours
Shelf life (at 130˚C)	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˚C after exposing them at 250˚C for 30 seconds. Leakage current: Less than specified value Capacitance change: Within ±10% of initial value tanδ: Less than specified value

DRAWING (See page 49)

Unit : mm

-Series code of CF is H

DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

μF \ WV	10		16		25		35		50	
22									8×6.2	28
33							8×6.2	41	8×10	75
47							10×10	90	10×10	90
68			8×6.2	50	8×6.2	45	10×10	105	12.5×13.5	132
100	8×6.2	48	8×10	66	10×10	163	10×10	132	12.5×13.5	167
220	8×10	90	10×10	163	10×10	200	12.5×13.5	249		
330	10×10	125	10×10	200	12.5×13.5	304				
470	10×10	150	12.5×13.5	304						
1000	12.5×13.5	405								

Ripple current (mA rms) at 130˚C, 120Hz
Case size ØD×L(mm)

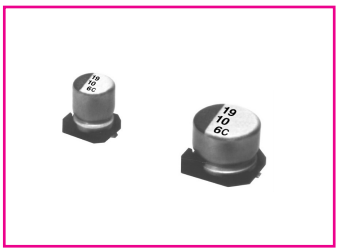
FREQUENCY COEFFICIENT OF PERMISSIBLE RIPPLE CURRENT

Frequency	50Hz	120Hz	300Hz	1kHz	10kHz≦
Coefficient	0.70	1.00	1.17	1.36	1.50

CT Chip type, High Temperature, Low Imp., Series

Solvent Proof

CF ⇒ CT
Low Imp.



- Chip type, Low Impedance temperature range up to 130˚C use
- For ECU
- Application to automatic insertion machine using carrier tape
- Complied to the RoHS directive

Item	Characteristics
Operating temperature range	-40 ~ +130˚C
Leakage current max.	I = 0.03CV or 4μA whichever is greater (after 2 minutes)
Capacitance tolerance	±20% (20˚C, 120Hz)
Dissipation factor max. (at 120Hz, 20˚C)	Rated Voltage(V): 10 / 16 / 25 / 35 / 50 tanδ: 0.32 / 0.24 / 0.21 / 0.18 / 0.18
Low temperature characteristics (Impedance ratio at 120Hz)	WV: 10 / 16 / 25 / 35 / 50 Z-40˚C/Z+20˚C: 12 / 10 / 8 / 6 / 6
Load life (after application of the rated voltage for 2000 hours at 130˚C)	Leakage Current: Less than specified value Capacitance Change: Within ±30% of initial value tanδ: Less than 300% of specified value
Shelf life (at 130˚C)	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˚C after exposing them at 250˚C for 30 seconds. Leakage Current: Less than specified value Capacitance Change: Within ±10% of initial value tanδ: Less than specified value

● DRAWING (See page 49)

Unit : mm

-Series code of CT is C

● DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

μF \ WV	10			16			25			35			50		
33													8×10	0.6	270
47										8×10	0.6	270	10×10	0.5	315
68				8×10	0.6	270	8×10	0.6	270	10×10	0.5	270	10×10	0.5	315
100	8×10	0.6	270	8×10	0.6	270	8×10	0.6	270	10×10	0.5	315	12.5×13.5	0.4	345
220	8×10	0.6	270	8×10	0.6	270	10×10	0.5	315	12.5×13.5	0.4	345			
330	10×10	0.5	315	10×10	0.5	315	12.5×13.5	0.4	345						
470	10×10	0.5	315	12.5×13.5	0.4	345									

← Ripple current (mA rms) at 130˚C, 100kHz
← Impedance (Ω) at 20˚C, 100kHz
← Case size ØD×L(mm)

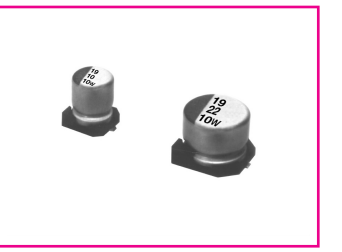
● FREQUENCY COEFFICIENT OF PERMISSIBLE RIPPLE CURRENT

Frequency	50Hz	120Hz	300Hz	1kHz	10kHz≦
Coefficient	0.35	0.5	0.64	0.83	1.00

CW Chip type, High Reliability Series

Solvent Proof

CF ⇨ CW
High Temp



· Chip type, high temperature range, for + 150˚C use
· Applicable to automatic insertion machine using carrier tape
· Complied to the RoHS directive

Item	Characteristics
Operating temperature range	-40 ~ +150˚C
Leakage current	I = 0.03CV or 4μA whichever is greater (after 2 minutes)
Capacitance tolerance	±20% at 120Hz, 20˚C
Dissipation factor max. (at 120Hz, 20˚C)	WV: 10 / 16 / 25 / 35 / 50 tanδ: 0.30 / 0.20 / 0.16 / 0.14 / 0.14
Low temperature characteristics (Impedance ratio at 120Hz)	WV: 10 / 16 / 25 / 35 / 50 Z-40˚C/Z+20˚C: 12 / 10 / 8 / 6 / 6
Load life (after application of the rated voltage for 1000 hours at 150˚C)	Leakage current: Less than specified value Capacitance change: Within ±30% of initial value tanδ: Less than 300% of the specified value
Shelf life (at 150˚C)	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˚C after exposing them at 250˚C for 30 seconds. Leakage current: Less than specified value Capacitance change: Within ±10% of initial value tanδ: Less than specified value

● DRAWING (See page 49)

Unit : mm

-Series code of CW is W

● DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

WV / μF	10		16		25		35		50	
33									10×10	75
47							10×10	90	10×10	90
68							10×10	105	12.5×13.5	132
100					10×10	160	10×10	132	12.5×13.5	167
220			10×10	163	10×10	200	12.5×13.5	249		
330	10×10	183	10×10	200	12.5×13.5	304				
470	10×10	218	12.5×13.5	304						
1000	12.5×13.5	405								

Ripple current (mA rms) at 150˚C, 120Hz
Case size ØD×L(mm)

● FREQUENCY COEFFICIENT OF PERMISSIBLE RIPPLE CURRENT

Frequency	50Hz	120Hz	300Hz	1kHz	10kHz≦
Coefficient	0.70	1.00	1.17	1.36	1.50

NC Chip type, Non-polarized Series

Non-polarized

Solvent Proof

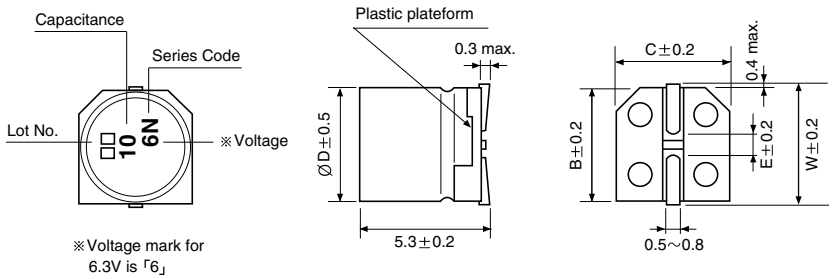
- Chip type with 5.5mmL height
- Designed for surface mounting on high density PC board
- Applicable to automatic mounting machine using carrier tape
- Complied to the RoHS directive

SC (Non-polar) ⇨ NC ⇨ CN (Wide temp.)

Item	Characteristics
Operating temperature range	-40 ~ +85℃
Leakage current max.	I = 0.05CV or 10μA whichever is greater (after 2 minutes)
Capacitance tolerance	±20% at 120Hz, 20℃
Dissipation factor max. (at 120Hz, 20℃)	WV: 6.3 / 10 / 16 / 25 / 35 / 50 tanδ: 0.24 / 0.20 / 0.17 / 0.17 / 0.15 / 0.15
Low temperature characteristics (Impedance ratio at 120Hz)	WV: 6.3 / 10 / 16 / 25 / 35 / 50 Z-25℃/Z+20℃: 4 / 3 / 2 / 2 / 2 / 2 Z-40℃/Z+20℃: 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 ±20% of initial value tanδ: 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 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 ±10% of initial value tanδ: Less than specified value

● DRAWING

Unit : mm



ØD	W	B	C	E
4	4.8	4.3	4.3	1.0
5	5.8	5.3	5.3	1.4
6.3	7.1	6.6	6.6	2.2

● DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

μF \ WV	6.3		10		16		25		35		50	
0.1											4×5.3	1.0
0.22											4×5.3	2.0
0.33											4×5.3	2.8
0.47											4×5.3	4.0
1.0											4×5.3	8.4
2.2									4×5.3	8.4	5×5.3	13
3.3							5×5.3	12	5×5.3	16	5×5.3	17
4.7					4×5.3	12	5×5.3	16	5×5.3	18	6.3×5.3	20
10			4×5.3	17	5×5.3	23	6.3×5.3	27	6.3×5.3	29		
22	5×5.3	28	6.3×5.3	33	6.3×5.3	37						
33	6.3×5.3	37	6.3×5.3	41	6.3×5.3	49						
47	6.3×5.3	45										

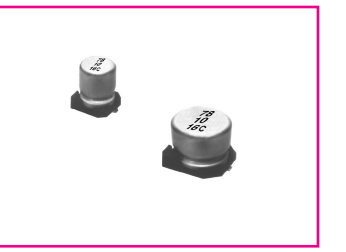
Ripple current (mA rms) at 85℃, 120Hz
Case size ØD x L (mm)

SURFACE MOUNT ALUMINUM ELECTROLYTIC CAPACITORS

CN Height 5.5mmL, 105˚C Non-polarized Series

Non-polarized Solvent Proof

NC ⇨ CN
Wide temp.

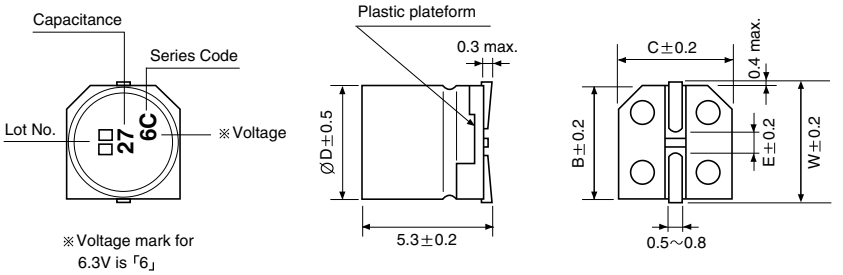


- Chip type, Non-polarized, Wide temperature 105˚C
- Chip type with 5.5mmL height
- Designed for surface mounting on high density PC board
- Applicable to automatic insertion machine using carrier tape
- Complied to the RoHS directive

Item	Characteristics
Operating temperature range	-55 ~ +105˚C
Leakage current max.	I = 0.05CV or 10μA whichever is greater (after 2 minutes)
Capacitance tolerance	±20% at 120Hz, 20˚C
Dissipation factor max. (at 120Hz, 20˚C)	WV: 6.3 / 10 / 16 / 25 / 35 / 50 tanδ: 0.32 / 0.26 / 0.24 / 0.20 / 0.18 / 0.18
Low temperature characteristics (Impedance ratio at 120Hz)	WV: 6.3 / 10 / 16 / 25 / 35 / 50 Z-25˚C/Z+20˚C: 4 / 3 / 2 / 2 / 2 / 2 Z-40˚C/Z+20˚C: 8 / 6 / 4 / 4 / 3 / 3
Load life (after application of the rated voltage for 1000 hours at 105˚C)	Leakage current: Less than specified value Capacitance change: Within ±20% of initial value tanδ: Less than 200% of specified value Test method: Polarity reverse each 250 hours
Shelf life (at 105˚C)	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˚C after exposing them at 250˚C for 30 seconds. Leakage current: Less than specified value Capacitance change: Within ±10% of initial value tanδ: Less than specified value

● DRAWING

Unit : mm



ØD	W	B	C	E
4	4.8	4.3	4.3	1.0
5	5.8	5.3	5.3	1.4
6.3	7.1	6.6	6.6	2.2

● DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

μF \ WV	6.3		10		16		25		35		50	
0.1											4×5.3	1.3
0.22											4×5.3	2.3
0.33											4×5.3	2.8
0.47											4×5.3	4.0
1.0											4×5.3	8.4
2.2									4×5.3	8.4	5×5.3	13
3.3							5×5.3	12	5×5.3	16	5×5.3	17
4.7					4×5.3	12	5×5.3	16	5×5.3	18	6.3×5.3	20
10			4×5.3	17	5×5.3	23	6.3×5.3	27	6.3×5.3	29		
22	5×5.3	28	6.3×5.3	33	6.3×5.3	37						
33	6.3×5.3	37	6.3×5.3	41	6.3×5.3	49						
47	6.3×5.3	45										

Ripple current (mA rms) at 105˚C, 120Hz
Case size ØD×L (mm)