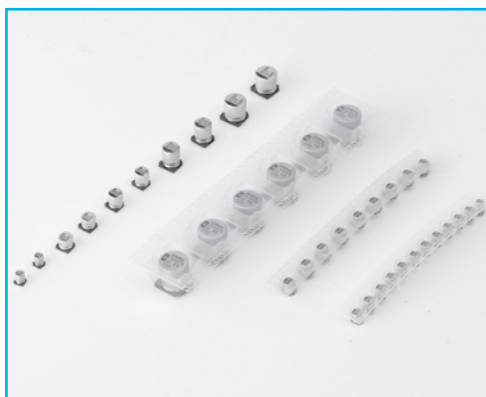


3 SURFACE MOUNT ALUMINUM ELECTROLYTIC CAPACITORS



SURFACE MOUNT ALUMINUM ELECTROLYTIC CAPACITORS

PART NUMBER SYSTEM

● Part Number System

1	2	3	4	5	6	7	8
Series Name	Rated Voltage	Capacitance	Cap. Tol.	Case Diameter	Case Height	Taping Code	Internal Control Code

1 Series Name
See page 4.

2 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

6 Case Height

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

7 VR (Reel Type)

3 Capacitance

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

4 Capacitance Tolerance

Tolerance (%)	± 20
Code	M

5 Case Diameter

ex) $\varnothing 4$ 04
 $\varnothing 5$ 05
 $\varnothing 6.3$ 6L
 $\varnothing 8$ 08
 $\varnothing 10$ 10
 $\varnothing 12.5$ 12

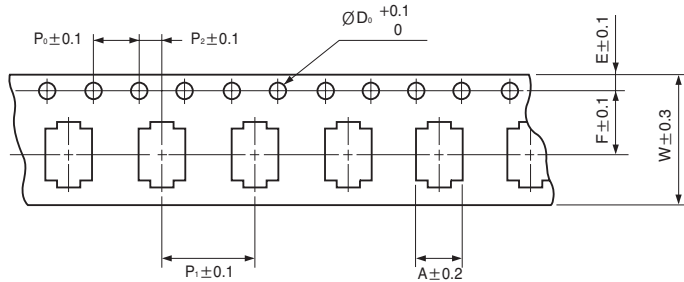
SURFACE MOUNT ALUMINUM ELECTROLYTIC CAPACITORS



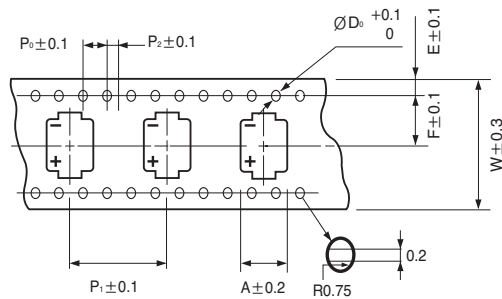
● Taping Specifications for Chip Type Capacitors

● Carrier Tape

• Fig.1

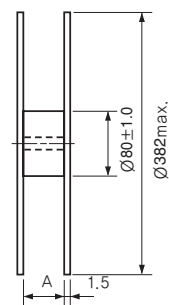
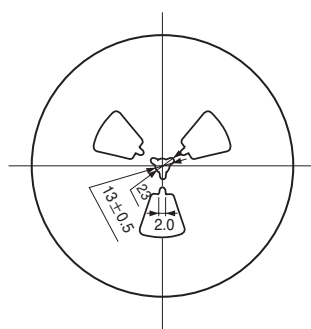


• Fig.2

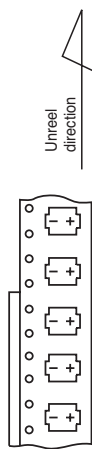


ØD×L	A	B	ØD ₀	E	F	P ₀	P ₁	P ₂	t ₁	t ₂	W	Fig.
4 × 5.3	4.7	4.7	1.5	1.75	5.5	4.0	8.0	2.0	0.4	5.7	12.0	1
5 × 5.3	5.7	5.7	1.5	1.75	5.5	4.0	12.0	2.0	0.4	5.7	12.0	
6.3 × 5.3	7.0	7.0	1.5	1.75	7.5	4.0	12.0	2.0	0.4	5.7	16.0	
6.3 × 5.8	7.0	7.0	1.5	1.75	7.5	4.0	12.0	2.0	0.4	6.3	16.0	
6.3 × 7.7	7.0	7.0	1.5	1.75	7.5	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)

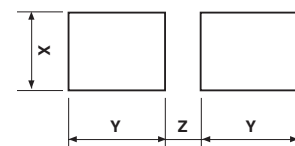


● Polarity



ØD×L	A	Q'ty/Reel(pcs.)	Q'ty/Box(pcs.)
4 × 5.3	14	2000	20000
5 × 5.3	14	1000	10000
6.3 × 5.3	18	1000	10000
6.3 × 5.8	18	1000	10000
6.3 × 7.7	18	900	9000
8 × 6.2	18	1000	10000
8 × 10	26	500	3000
10 × 10	26	500	3000
12.5 × 13.5	34	200	1000

● 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

SURFACE MOUNT ALUMINUM ELECTROLYTIC CAPACITORS

Reflow soldering method for the chip aluminum electrolytic capacitor

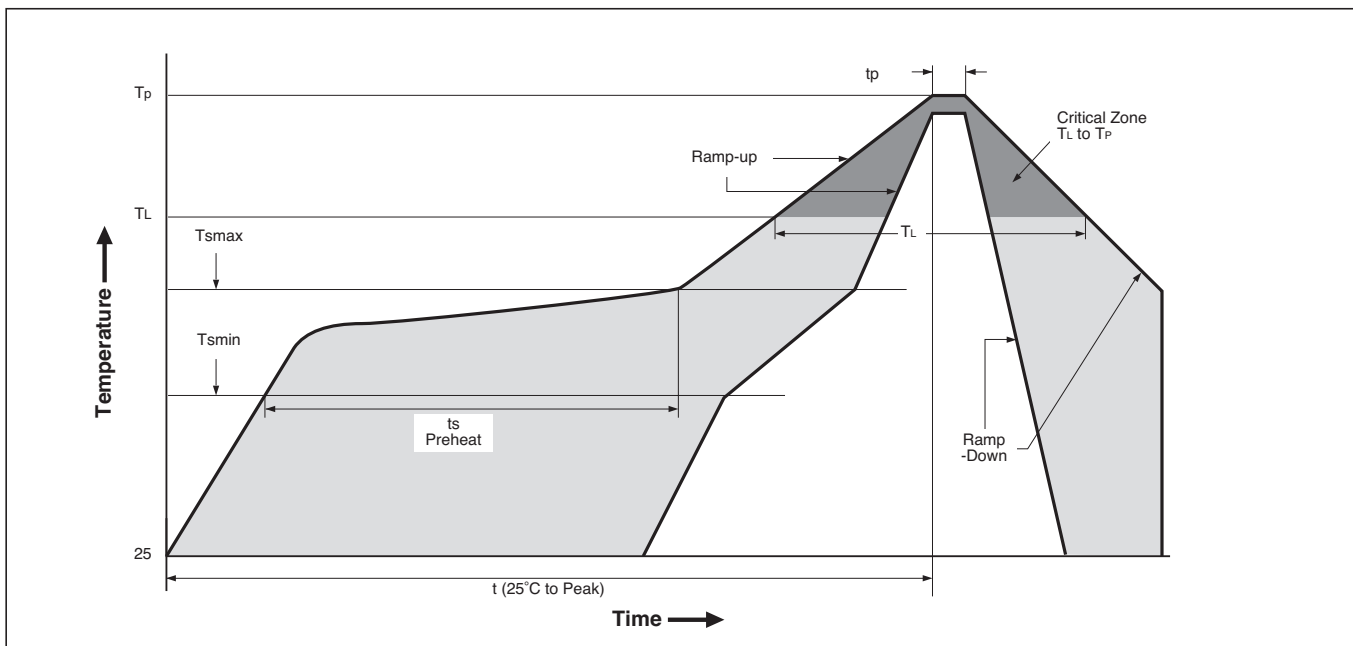
1. Recommended conditions for reflow soldering

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.

SURFACE MOUNT ALUMINUM ELECTROLYTIC CAPACITORS



SC Chip type, Standard Series

S
Solvent Proof
WV ≤ 100V

- 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

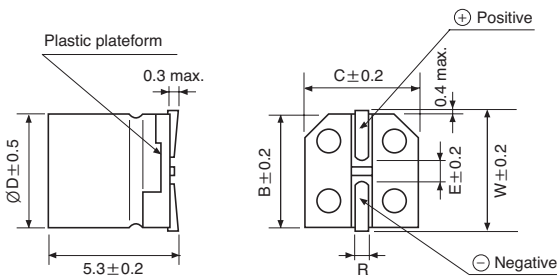
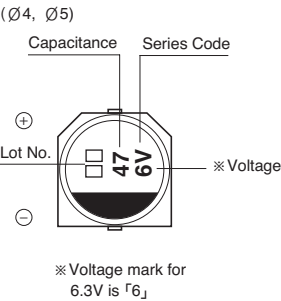
NC ← **SC** → RC
Non-polar Wide temp



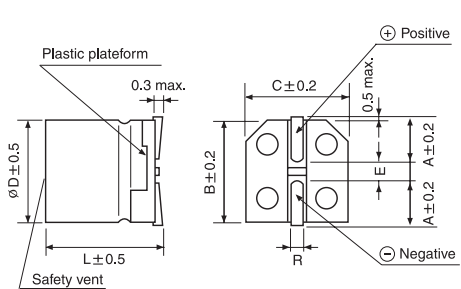
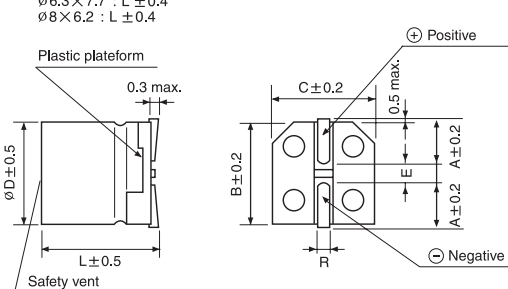
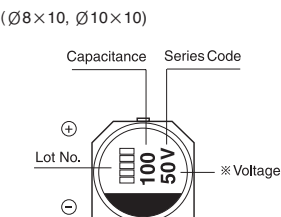
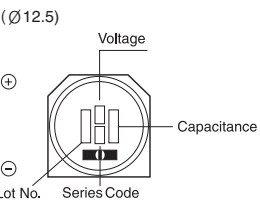
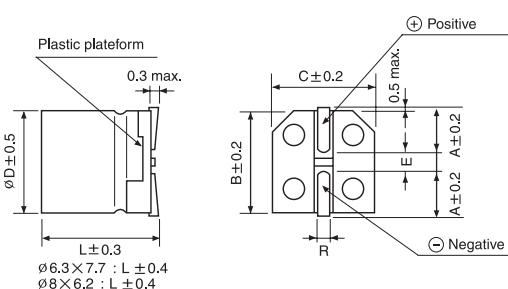
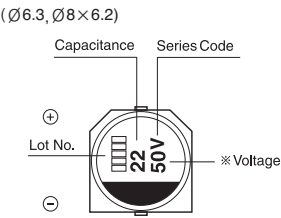
Item	Characteristics														
Operating temperature range	-40 ~ +85°C														
Leakage current max.	WV ≤ 100 I = 0.01CV or 3μA whichever is greater (after 2 minutes) WV ≥ 160 I = 0.04CV + 100μA(after 1 minutes)														
Capacitance tolerance	± 20% at 120Hz, 20°C														
Dissipation factor max. (at 120Hz, 20°C)	WV	4	6.3	10	16	25	35	50	63	100	160	200	250	400	450
	tanδ	0.40	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°C/Z+20°C			6	5	4	3	2	2		3	6			
	Z-40°C/Z+20°C			12	10	8	6	4	3		6	10			
Load life (after application of the rated voltage for 2000 hours at 85°C)	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°C)	After 1000 hours no load test, leakage current, capacitance and tanδ are same as load life value. The measurement shall be performed at 20°C by the KS C 6035 clause 5.4.														
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 10 seconds.														
	Leakage current						Less than specified value								
	Capacitance change						Within ±10% of initial value								
	tanδ						Less than specified value								

● DRAWING -Series code of SC is "V"

Unit : mm



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
6.3×5.3		2.4	6.6	6.6	2.2	0.5~0.8
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	0.8~1.4



CHIP TYPES

SURFACE MOUNT ALUMINUM ELECTROLYTIC CAPACITORS

SC series

● DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

μF \ WV	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 5×5.3	24 25
10	4×5.3	16	4×5.3	19	4×5.3	21	4×5.3	21	4×5.3 5×5.3	24 30	4×5.3 5×5.3	27 32	5×5.3 6.3×5.3	41 43
22	4×5.3	24	4×5.3	29	4×5.3 5×5.3	28 36	4×5.3 5×5.3	30 41	5×5.3 6.3×5.3	41 53	6.3×5.3	55	6.3×5.3 6.3×5.8	71 73
33	4×5.3	29	4×5.3 5×5.3	30 41	4×5.3 5×5.3	34 44	5×5.3 6.3×5.3	43 58	5×5.3 6.3×5.3	50 64			6.3×5.3 6.3×5.8	65 67
47	4×5.3	35	4×5.3 5×5.3	36 48	5×5.3 6.3×5.3	47 62	5×5.3 6.3×5.3	52 69	6.3×5.3 6.3×5.8	70 72	6.3×7.7 8×6.2	94 105	6.3×7.7 8×10	105 140
100	5×5.3 6.3×5.3	54 68	5×5.3 6.3×5.3	60 82	6.3×5.3 6.3×5.8	80 82	6.3×5.3 6.3×5.8	88 91	8×6.2	145	6.3×7.7 8×10	132 175	8×10 10×10	181 195
220	6.3×5.3	93	6.3×5.8	91	6.3×7.7 8×6.2	173 175	6.3×7.7 8×10	162 215	8×10 10×10	232 250	10×10	265	10×10	320
330			6.3×7.7 8×6.2	188 190	8×10	240	8×10	270	10×10	305				
470			8×10	265	8×10	290	8×10 10×10	307 330	10×10	400	12.5×13.5	600		
1000			8×10 10×10	370 400	10×10	454	12.5×13.5	710	12.5×13.5	820				
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								

Ripple current (mA rms) at 85°C, 120Hz
 Case size ØD × L (mm)

SURFACE MOUNT ALUMINUM ELECTROLYTIC CAPACITORS



SC series

● DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

μF \ WV	63		100		160		200		250		400		450	
2.2													10×10	85
3.3			6.3×5.8	29							10×10	90	10×10	100
4.7	6.3×5.8	31	6.3×5.8 8×6.2	35 40			10×10	100	10×10	100	12.5×13.5	115	12.5×13.5	115
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	Ripple current (mA rms) at 85°C, 120Hz Case size ØD × L (mm)									
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												

● FREQUENCY COEFFICIENT OF PERMISSIBLE RIPPLE CURRENT

Frequency	50Hz	120Hz	300Hz	1kHz	10kHz $\leq$
Coefficient	0.70	1.00	1.17	1.36	1.50

SURFACE MOUNT ALUMINUM ELECTROLYTIC CAPACITORS

RC Chip type, Wide Temperature Range Series

- 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. The measurement shall be performed at 20°C by the KS C 6035 clause 5.4.						
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 10 seconds.						
	Leakage current			Less than specified value			
	Capacitance change			Within ±10% of initial value			
	tanδ			Less than specified value			

DRAWING (See page 55)

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
0.22											4×5.3	3
0.33											4×5.3	4
0.47											4×5.3	5
1.0											4×5.3	7
2.2											4×5.3	11
3.3											4×5.3	13
4.7							4×5.3	13	4×5.3	14	5×5.3	18
10					4×5.3	17	5×5.3	23	5×5.3	24	6.3×5.3	31
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

SURFACE MOUNT ALUMINUM ELECTROLYTIC CAPACITORS



JC Chip type, Higher Capacitance Range Series

- 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

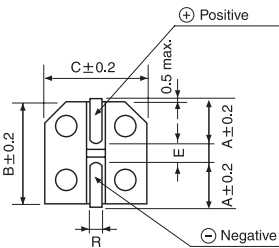
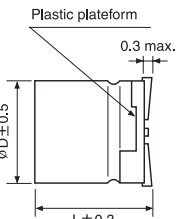
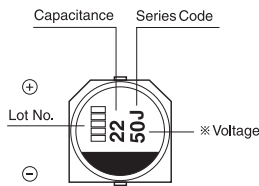


Item	Characteristics														
Operating temperature range	WV ≤ 100 : -55 ~ +105℃ WV ≥ 160 : -40 ~ +105℃														
Leakage current max.	WV ≤ 100 I = 0.01CV or 3μA whichever is greater (after 2 minutes) WV ≥ 160 I = 0.04CV + 100μA(after 1 minutes)														
Capacitance tolerance	± 20% at 120Hz, 20℃														
Dissipation factor max. (at 120Hz, 20℃)	WV	4	6.3	10	16	25	35	50	63	100	160	200	250	400	450
	tanδ	0.37	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℃/Z+20℃			6	3	3	2	2		3		3		6	
	Z-40℃/Z+20℃			12	8	5	4	3		4		6		10	
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								
	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. The measurement shall be performed at 20℃ by the KS C 6035 clause 5.4.														
Resistance to soldering heat	The following specifications shall be satisfied when the capacitors are restored to 20℃ after exposing them at 250℃ for 10 seconds.														
	Leakage current						Less than specified value								
	Capacitance change						Within ± 10% of initial value								
	tanδ						Less than specified value								

● DRAWING -Series code of JC is "J"

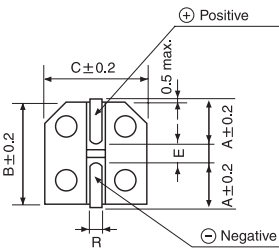
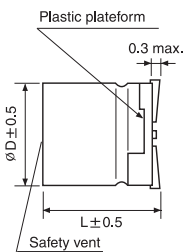
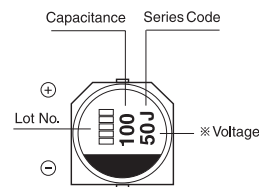
Unit : mm

(Ø6.3, Ø8×6.2)

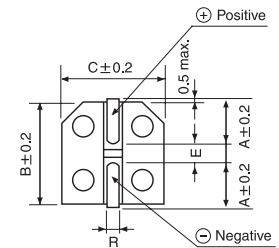
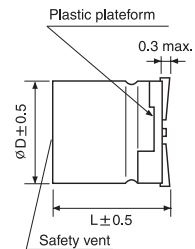
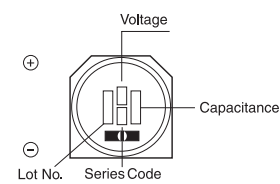


ØD×L	A	B	C	E	R
6.3×5.8	2.4	6.6	6.6	2.2	0.5~0.8
6.3×7.7	2.4	6.6	6.6	2.2	0.5~0.8
8×6.2	3.3	8.3	8.3	2.3	0.5~0.8
8×10	2.9	8.3	8.3	3.1	0.8~1.1
10×10	3.2	10.3	10.3	4.5	0.8~1.1
12.5×13.5	4.6	12.8	12.8	4.5	0.8~1.4

(Ø8×10, Ø10×10)



(Ø12.5)



CHIP TYPES

SURFACE MOUNT ALUMINUM ELECTROLYTIC CAPACITORS

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										

μ F \ 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 $\leq$
Coefficient	0.70	1.00	1.17	1.36	1.50

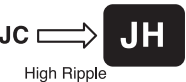
SURFACE MOUNT ALUMINUM ELECTROLYTIC CAPACITORS



JH Chip type, High Ripple Current Series



- High Ripple current Compared with JC series
- Designed for surface mounting on high density PC board
- Applicable to automatic insertion machine using carrier tape
- Complied to the RoHS directive

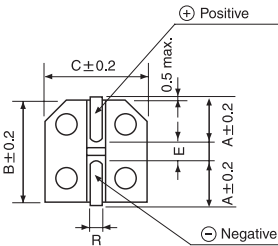
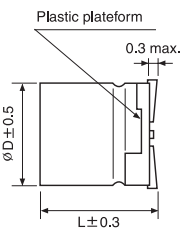
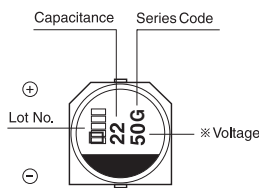


Item	Characteristics								
Operating temperature range	-55 ~ +105°C								
Leakage current max.	I = 0.01CV or 3μA whichever is greater (after 2 minutes)								
Capacitance tolerance	± 20% at 120Hz, 20°C								
Dissipation factor max. (at 120Hz, 20°C)	WV	6.3	10	16	25	35	50	63	100
	tanδ	0.28	0.24	0.20	0.16	0.13	0.12	0.10	0.10
Low temperature characteristics (Impedance ratio at 120Hz)	WV		6.3	10	16	25 ~ 50		63 ~ 100	
	Z-25°C/Z+20°C		3	3	2	2		3	
	Z-55°C/Z+20°C		8	5	4	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 ±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. The measurement shall be performed at 20°C by the KS C 6035 clause 5.4.								
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 10 seconds.								
	Leakage current			Less than specified value					
	Capacitance change			Within ±10% of initial value					
	tanδ			Less than specified value					

● DRAWING -Series code of JH is "G"

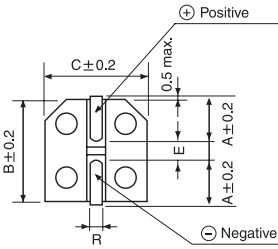
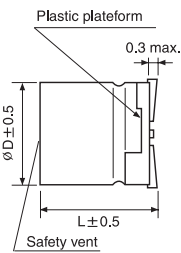
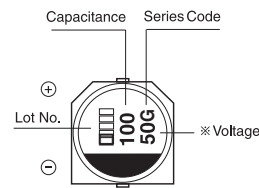
Unit : mm

(Ø6.3, Ø8×6.2)

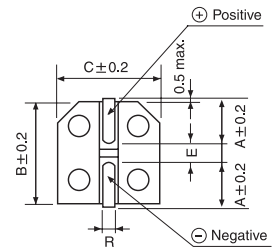
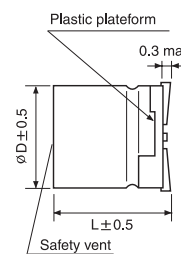
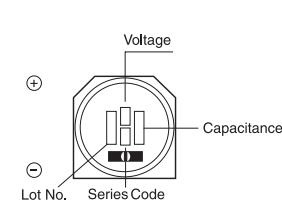


ØD×L	A	B	C	E	R
6.3×5.8	2.4	6.6	6.6	2.2	0.5~0.8
6.3×7.7	2.4	6.6	6.6	2.2	0.5~0.8
8×6.2	3.3	8.3	8.3	2.3	0.5~0.8
8×10	2.9	8.3	8.3	3.1	0.8~1.1
10×10	3.2	10.3	10.3	4.5	0.8~1.1
12.5×13.5	4.6	12.8	12.8	4.5	0.8~1.4

(Ø8×10, Ø10×10)



(Ø12.5)



SURFACE MOUNT ALUMINUM ELECTROLYTIC CAPACITORS

JH series

● DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

μF \ WV	6.3		10		16		25		35	
10										
22							6.3×5.8	57	6.3×5.8	63
33					6.3×5.8	60	6.3×5.8	72	8×6.2	114
47			6.3×5.8	69	6.3×5.8	75	8×6.2	120	8×10	186
100	6.3×5.8	90	6.3×5.8	90	8×10	222	8×10	270	10×10	456
220	8×10	242	8×10	260	10×10	495	10×10	525	10×10	675
330	8×10	432	10×10	477	10×10	660	10×10	558	12.5×13.5	750
470	10×10	510	10×10	527	10×10	735	10×10	675	12.5×13.5	900
680	10×10	612	10×10	588	12.5×13.5	750	12.5×13.5	750		
1000	10×10	743	10×10	825	12.5×13.5	900				
1500	10×10	840	12.5×13.5	975	↑ ↑ Ripple current (mA rms) at 105°C, 120Hz Case size $\varnothing D \times L$ (mm)					
2200	12.5×13.5	1095								

μF \ WV	50		63		100	
10	6.3×5.8	45	8×6.2	48		
22	8×6.2	100	8×10	90	8×10	135
33	8×10	200	8×10	165	10×10	180
47	10×10	270	10×10	195	12.5×13.5	375
68	10×10	315	10×10	240	12.5×13.5	450
100	10×10	465	12.5×13.5	405		
220	12.5×13.5	720				

● FREQUENCY COEFFICIENT OF PERMISSIBLE RIPPLE CURRENT

Frequency	50Hz	120Hz	300Hz	1kHz	10kHz $\leq$
Coefficient	0.70	1.00	1.17	1.36	1.50

SURFACE MOUNT ALUMINUM ELECTROLYTIC CAPACITORS



NEW
JM Chip type, Long Life Series



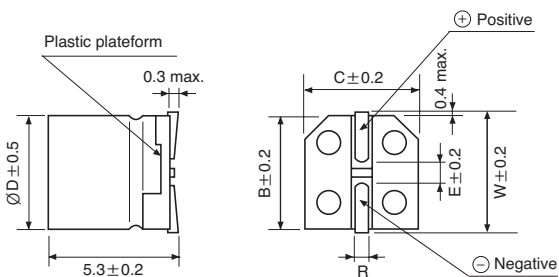
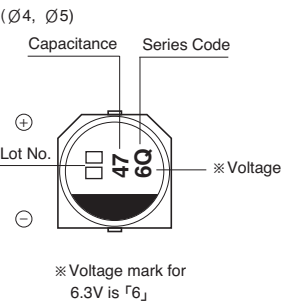
- Long Life Compared with JC series
- Designed for surface mounting on high density PC board
- Applicable to automatic insertion machine using carrier tape
- Complied to the RoHS directive

JC → JM
Long life

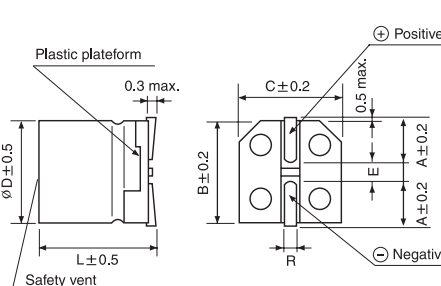
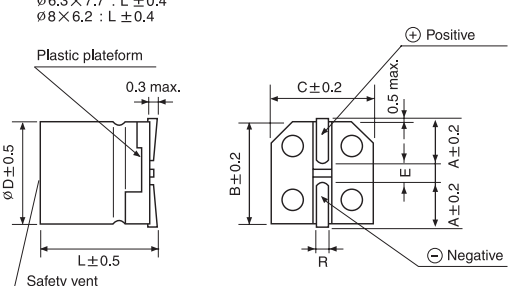
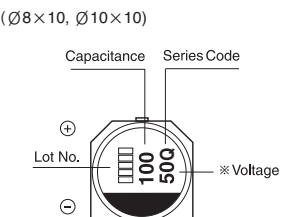
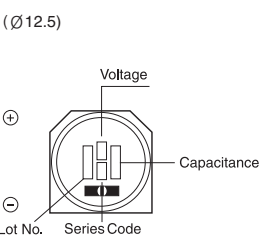
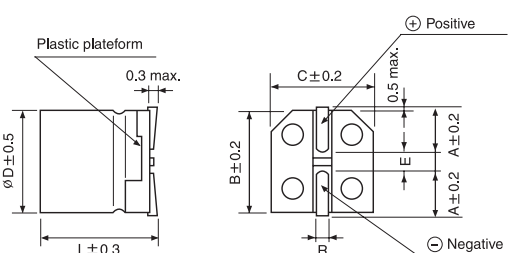
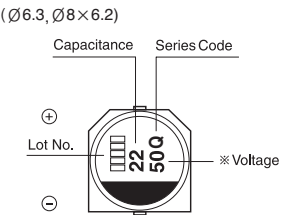
Item	Characteristics								
Operating temperature range	-25 ~ +105°C								
Leakage current max.	I = 0.01CV or 3μA whichever is greater (after 2 minutes)								
Capacitance tolerance	± 20% at 120Hz, 20°C								
Dissipation factor max. (at 120Hz, 20°C)	WV	6.3	10	16	25	35	50	63	100
	tanδ	0.32	0.28	0.21	0.21	0.18	0.18	0.12	0.12
Low temperature characteristics (Impedance ratio at 120Hz)	WV	6.3	10	16	25 ~ 50		63 ~ 100		
	Z-25°C/Z+20°C	8	8	6	4		3		
Load life (after application of the rated voltage for 3000 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. The measurement shall be performed at 20°C by the KS C 6035 clause 5.4.								
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 10 seconds.								
	Leakage current			Less than specified value					
	Capacitance change			Within ±10% of initial value					
	tanδ			Less than specified value					

● DRAWING -Series code of JM is "Q"

Unit : mm



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
6.3×5.3		2.4	6.6	6.6	2.2	0.5~0.8
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	0.8~1.4



SURFACE MOUNT ALUMINUM ELECTROLYTIC CAPACITORS

JM series

● DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

μF \ WV	6.3		10		16		25		35	
10	4×5.3	10	4×5.3	15	4×5.3	19	5×5.3	24	6.3×5.3	26
22	4×5.3	25	5×5.3	30	5×5.3	33	6.3×5.3	38	6.3×5.8	42
33	5×5.3	35	5×5.3	38	6.3×5.3	42	6.3×5.8	48	8×6.2	76
47	5×5.3	42	6.3×5.3	52	6.3×5.8	60	8×6.2	79	8×10	124
100	6.3×5.8	60	6.3×5.8	60	8×10	148	8×10	181	10×10	310
220	8×10	161	8×10	173	10×10	330	10×10	351	10×10	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	Ripple current (mA rms) at 105°C, 120Hz Case size $\varnothing D \times L$ (mm)					
2200	12.5×13.5	730								

μF \ WV	50		63		100	
10	6.3×5.8	30	8×6.2	32		
22	8×6.2	67	8×10	60	8×10	90
33	8×10	133	8×10	110	10×10	120
47	10×10	180	10×10	130	12.5×13.5	250
68	10×10	200	10×10	160	12.5×13.5	300
100	10×10	310	12.5×13.5	270		
220	12.5×13.5	480				

● FREQUENCY COEFFICIENT OF PERMISSIBLE RIPPLE CURRENT

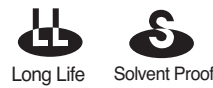
Frequency	50Hz	120Hz	300Hz	1kHz	10kHz $\leq$
Coefficient	0.70	1.00	1.17	1.36	1.50

SURFACE MOUNT ALUMINUM ELECTROLYTIC CAPACITORS



CA Chip type, Long Life Series

- 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

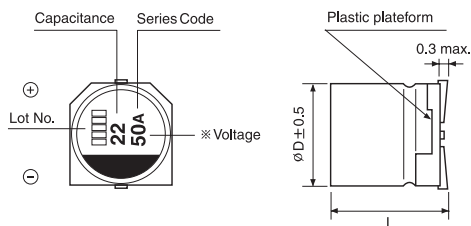


Item	Characteristics							
Operating temperature range	-55 ~ +105°C							
Leakage current max.	I = 0.01CV or 3μA whichever is greater (after 2 minutes)							
Capacitance tolerance	± 20% at 120Hz, 20°C							
Dissipation factor max. (at 120Hz, 20°C)	WV	6.3	10	16	25	35	50	
	tanδ	0.28	0.24	0.2	0.16	0.13	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. The measurement shall be performed at 20°C by the KS C 6035 clause 5.4.							
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 10 seconds.							
	Leakage current			Less than specified value				
	Capacitance change			Within ±10% of initial value				
	tanδ			Less than specified value				

DRAWING

Unit : mm

-Series code of CA is "A"



* Please refer to drawing for CK Series in page 69 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

SURFACE MOUNT ALUMINUM ELECTROLYTIC CAPACITORS

CB Chip type, Long Life Series

LL Long Life
S Solvent Proof



- 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

RC Long life **CB**

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. The measurement shall be performed at 20°C by the KS C 6035 clause 5.4.							
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 10 seconds.							
	Leakage current			Less than specified value				
	Capacitance change			Within ±10% of initial value				
	tanδ			Less than specified value				

DRAWING (See page 55)

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
0.22													4×5.3	3
0.33													4×5.3	4
0.47													4×5.3	5
1.0													4×5.3	7
2.2													4×5.3	11
3.3													4×5.3	14
4.7									4×5.3	14	4×5.3	15	5×5.3	19
6.8									4×5.3	17	5×5.3	21	6.3×5.3	26
10							4×5.3	19	5×5.3	24	5×5.3	26	6.3×5.3	33
15					4×5.3	22	5×5.3	28	5×5.3	31	6.3×5.3	37	6.3×5.3	40
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


JL

 Chip type, Long Life
Series

LL
Long Life

S
Solvent Proof

- Chip type, long life capacitance in large case size
- For ECU
- Application to automatic insertion machine using carrier tape
- Complied to the RoHS directive

CA → **JL**
Long Life


Item		Characteristics				
Operating temperature range	-40 ~ +105°C					
Leakage current	I = 0.03CV or 4 μ A whichever is greater (after 2 minutes)					
Capacitance tolerance	$\pm$ 20% (20°C, 120Hz)					
Dissipation factor max. (at 120Hz, 20°C)	Rated Voltage(V)	10	16	25	35	50
	tan δ	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 10000 hours at 105°C)	Leakage current		Less than specified value			
	Capacitance change		Within $\pm$ 30% of the initial value			
	tan δ		Less than 300% of the specified value			
Shelf life (at 105°C)	After 1000 hours no load test, leakage current, capacitance and tan δ are same as load life value. The measurement shall be performed at 20°C by the KS C 6035 clause 5.4.					
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 10 seconds.					
	Leakage current		Less than specified value			
	Capacitance change		Within $\pm$ 30% of the initial value			
	tan δ		Less than 300% of the specified value			

● DRAWING (See page 55)

Unit : mm

-Series code of JL is "P"

CHIP TYPES

● DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

μF	WV	10		16		25		35		50	
33										8×10	75
47								8×10	90	8×10	90
100				8×10	270	8×10	163	10×10	132	10×10	167
220		8×10	270	8×10	270	10×10	200	10×10	249		
330		8×10	270	10×10	315	10×10	304				
470		10×10	315	10×10	315						

 ↑
 ↑
 Ripple current (mA rms) at 105°C, 120Hz
 Case size $\varnothing D \times L$ (mm)

● FREQUENCY COEFFICIENT OF PERMISSIBLE RIPPLE CURRENT

Frequency	50Hz	120Hz	300Hz	1kHz	10kHz $\leq$
Coefficient	0.70	1.00	1.17	1.36	1.50

SURFACE MOUNT ALUMINUM ELECTROLYTIC CAPACITORS

ZC Height 5.5mmL, Low Impedance Series



- 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
	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. The measurement shall be performed at 20°C by the KS C 6035 clause 5.4.					
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 10 seconds.					
	Leakage current		Less than specified value			
	Capacitance change		Within ±10% of initial value			
	tanδ		Less than specified value			

● DRAWING (See page 55)

Unit : mm

-Series code of ZC is "Z"

● 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	Ripple current (mA rms) at 105°C, 100kHz Impedance (Ω) at 20°C, 100kHz Case size ØD×L(mm)					
68	6.3×5.3	1.3	115	6.3×5.3	1.3	115									
100	6.3×5.3	1.3	115												

● FREQUENCY COEFFICIENT OF PERMISSIBLE RIPPLE CURRENT

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

SURFACE MOUNT ALUMINUM ELECTROLYTIC CAPACITORS



CK Chip type, Low Impedance, High CV Series



- 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

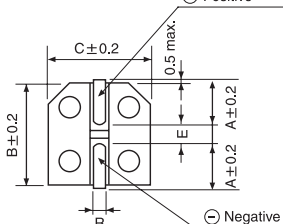
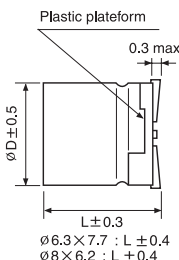
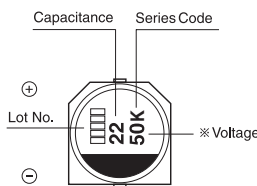


Item	Characteristics									
Operating temperature range	-55 ~ +105°C									
Leakage current max.	I = 0.01CV or 3μA whichever is greater (after 2 minutes)									
Capacitance tolerance	± 20% at 120Hz, 20°C									
Dissipation factor max. (at 120Hz, 20°C)	WV	6.3	10	16	25	35	50	63	80	100
	tanδ	0.24	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. The measurement shall be performed at 20°C by the KS C 6035 clause 5.4.									
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 10 seconds.									
	Leakage current				Less than specified value					
	Capacitance change				Within ±10% of initial value					
	tanδ				Less than specified value					

● DRAWING -Series code of CK is "K"

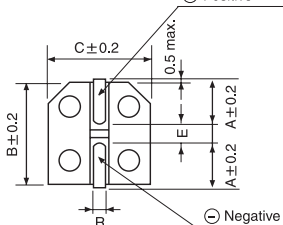
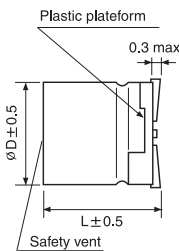
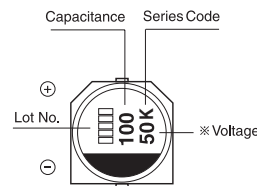
Unit : mm

(Ø6.3, Ø8×6.2)

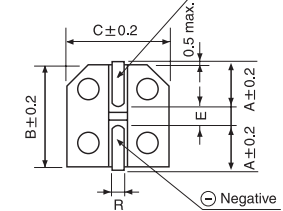
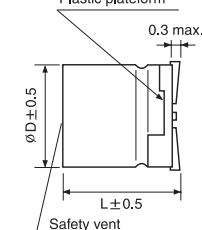
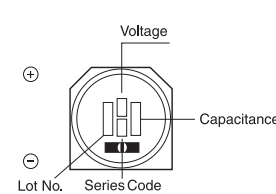


ØD×L	A	B	C	E	R
6.3×5.8	2.4	6.6	6.6	2.2	0.5~0.8
6.3×7.7	2.4	6.6	6.6	2.2	0.5~0.8
8×6.2	3.3	8.3	8.3	2.3	0.5~0.8
8×10	2.9	8.3	8.3	3.1	0.8~1.1
10×10	3.2	10.3	10.3	4.5	0.8~1.1
12.5×13.5	4.6	12.8	12.8	4.5	0.8~1.4

(Ø8×10, Ø10×10)



(Ø12.5×13.5)



SURFACE MOUNT ALUMINUM ELECTROLYTIC CAPACITORS

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															

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	0.45	500	12.5×13.5	0.45	500
100	10×10	0.45	400	12.5×13.5	0.45	500			
150	12.5×13.5	0.32	800	12.5×13.5	0.45	500			
220	12.5×13.5	0.32	800						

↑ Ripple current (mA rms) at 105°C, 100kHz
 ↑ Impedance (Ω) at 20°C, 100kHz
 ↑ Case size $\varnothing D \times L$ (mm)

● FREQUENCY COEFFICIENT OF PERMISSIBLE RIPPLE CURRENT

Frequency	50Hz	120Hz	300Hz	1kHz	10kHz $\leq$
Coefficient	0.35	0.5	0.64	0.83	1.00

SURFACE MOUNT ALUMINUM ELECTROLYTIC CAPACITORS



CD Chip type, Extremely Low Impedance Series



- 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



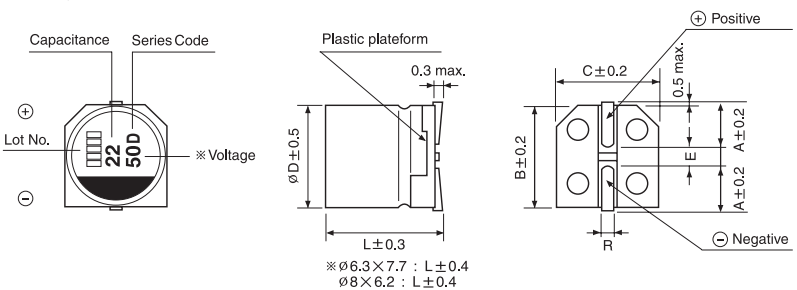
Item	Characteristics						
Operating temperature range	-55 ~ +105°C						
Leakage current max.	I = 0.01CV or 3μA whichever is greater (after 2 minutes)						
Capacitance tolerance	± 20% at 120Hz, 20°C						
Dissipation factor max. (at 120Hz, 20°C)	WV	6.3	10	16	25	35	50
	tanδ	0.24	0.19	0.16	0.14	0.12	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. The measurement shall be performed at 20°C by the KS C 6035 clause 5.4.						
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 10 seconds.						
	Leakage current			Less than specified value			
	Capacitance change			Within ±10% of initial value			
	tanδ			Less than specified value			

DRAWING

Unit : mm

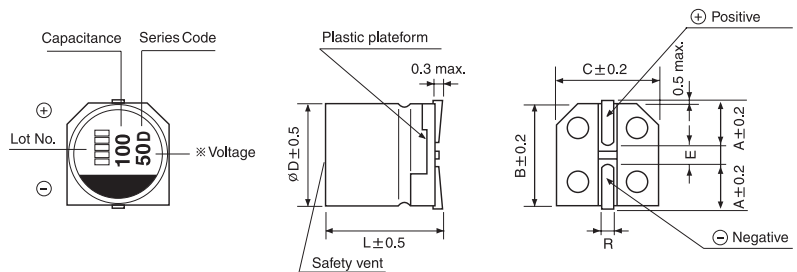
-Series code of CD is "D"

(Ø6.3×5.8, 7.7, Ø8×6.2)



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

(Ø8×10, Ø10×10)



SURFACE MOUNT ALUMINUM ELECTROLYTIC CAPACITORS

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	← Ripple current (mA rms) at 105°C, 100kHz								
680	8×10	0.16	600	10×10	0.08	850	↑ Impedance (Ω) at 20°C, 100kHz											
1000	10×10	0.08	850	↑ Case size ØD x L (mm)														
1500	10×10	0.08	850															

● FREQUENCY COEFFICIENT OF PERMISSIBLE RIPPLE CURRENT

Frequency	50Hz	120Hz	300Hz	1kHz	10kHz $\leq$
Coefficient	0.35	0.5	0.64	0.83	1.00

SURFACE MOUNT ALUMINUM ELECTROLYTIC CAPACITORS



CM Chip type, Extremely Low Impedance Long Life Series



- 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



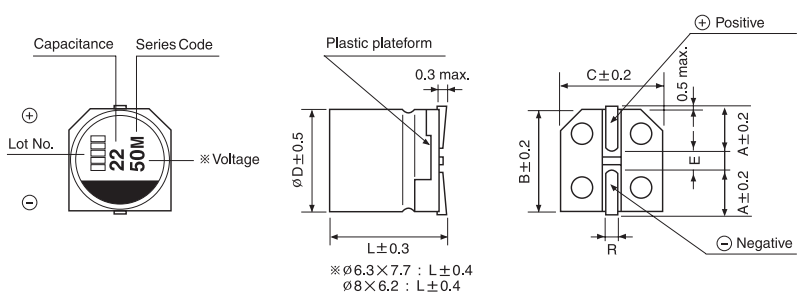
Item	Characteristics						
Operating temperature range	-55 ~ +105°C						
Leakage current max.	I = 0.01CV or 3μA whichever is greater (after 2 minutes)						
Capacitance tolerance	± 20% at 120Hz, 20°C						
Dissipation factor max. (at 120Hz, 20°C)	WV	6.3	10	16	25	35	50
	tanδ	0.26	0.19	0.16	0.14	0.13	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				
	ØD		ØD ≤ 6.3, Ø8×6.2mmL			ØD ≥ 8	
	Life time		3000 hours			5000 hours	
Shelf life (at 105°C)	After 1000 hours no load test, leakage current, capacitance and tanδ are same as load life value. The measurement shall be performed at 20°C by the KS C 6035 clause 5.4.						
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 10 seconds.						
	Leakage current		Less than specified value				
	Capacitance change		Within ±10% of initial value				
	tanδ		Less than specified value				

DRAWING

Unit : mm

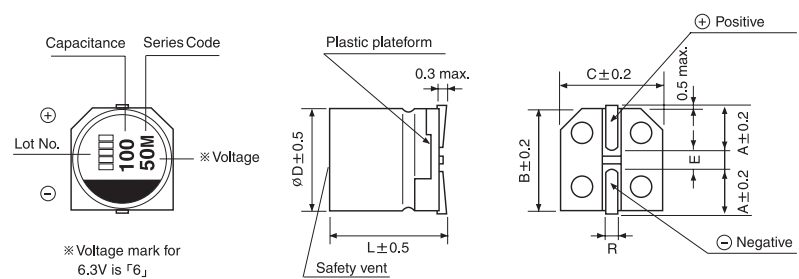
-Series code of CM is "M"

(Ø6.3×5.8, 7.7, Ø8×6.2)



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

(Ø8×10, Ø10×10)



SURFACE MOUNT ALUMINUM ELECTROLYTIC CAPACITORS

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	Ripple current (mA rms) at 105°C, 100kHz Impedance (Ω) at 20°C, 100kHz Case size $\varnothing D \times L$ (mm)								
680	8×10	0.16	600	10×10	0.08	850												
1000	10×10	0.08	850															

● FREQUENCY COEFFICIENT OF PERMISSIBLE RIPPLE CURRENT

Frequency	50Hz	120Hz	300Hz	1kHz	10kHz $\leq$
Coefficient	0.35	0.5	0.64	0.83	1.00

SURFACE MOUNT ALUMINUM ELECTROLYTIC CAPACITORS



Upgrade

UC

Chip type, High Reliability
Series

- Chip type, high temperature range, for +125°C use
- Designed for surface mounting on high density PC board
- Applicable to automatic insertion machine using carrier tape
- Complied to the RoHS directive

Solvent Proof
WV ≤ 100V

High Temp.


Item	Characteristics							
Operating temperature range	-40 ~ 125°C							
Leakage current max.	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	63~100	160~200	250~400
	tanδ	0.32	0.24	0.21	0.18	0.12	0.2	0.24
Low temperature characteristics (Impedance ratio at 120Hz)	WV	10	16	25	35~50	63~100	160~200	250~400
	Z-25°C/Z+20°C	8	6	4	4	3	3	6
	Z-40°C/Z+20°C	12	8	6	4	4	6	10
Load life (after application of the rated voltage for 2000 hours at 125°C)	Leakage current			Less than specified value				
	Capacitance change			Within ±30% of initial value				
	tanδ			Less than 300% of specified value				
Shelf life (at 125°C)	After 1000 hours no load test, leakage current, capacitance and tanδ are same as load life value. The measurement shall be performed at 20°C by the KS C 6035 clause 5.4.							
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 10 seconds.							
	Leakage current			Less than specified value				
	Capacitance change			Within ±10% of initial value				
	tanδ			Less than specified value				

● DRAWING (See page 59)

Unit : mm

-Series code of UC is "U"

● DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

μF \ WV	10		16		25		35		50		63	
10									8×6.2	65	8×6.2	40
22									8×6.2	65	8×10	67
33							8×6.2	65	8×10	125	8×10	67
47					8×6.2	65	8×10	125	10×10	200	10×10	115
68			8×6.2	65	8×6.2	65	10×10	200	12.5×13.5	525	12.5×13.5	335
100	8×6.2	65	8×10	125	8×10	125	10×10	200	12.5×13.5	525	12.5×13.5	335
220	8×10	125	10×10	200	10×10	200	12.5×13.5	525				
330	10×10	200	10×10	200	12.5×13.5	525						
470	10×10	200	12.5×13.5	525								
1000	12.5×13.5	525										

Ripple current (mA rms) at 125°C, 120Hz
Case size ØD×L(mm)

μF \ WV	80		100		160		200		250		400	
3.3											12.5×13.5	30
4.7									12.5×13.5	45	12.5×13.5	30
10	8×10	45	8×10	45	10×10	45	10×10	45	12.5×13.5	85		
22	8×10	45	10×10	80	12.5×13.5	85	12.5×13.5	85				
33	10×10	80	10×10	80								
47	10×10	80	12.5×13.5	300								
68	12.5×13.5	300	12.5×13.5	300								

Ripple current (mA rms) at 125°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

CF Chip type, High Temperature, Long Life, Series

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

LL Long Life
S Solvent Proof

UC  **CF**
Wide temp
Long life



Item	Characteristics					
Operating temperature range	-40 ~ +130°C					
Leakage current	I = 0.03CV or 4 μ A whichever is greater (after 2 minutes)					
Capacitance tolerance	$\pm$ 20% (20°C, 120Hz)					
Dissipation factor max. (at 120Hz, 20°C)	Rated Voltage(V)	10	16	25	35	50
	tan δ	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 $\pm$ 30% of initial value			
	tan δ		Less than 300% of the specified value			
	$\varnothing$ D	$\varnothing$ 8 $\times$ 6.2mmL	$\varnothing$ 8 $\times$ 10mmL		$\varnothing$ D $\geq$ 10	
	Life time	2000 hours	3000 hours		5000 hours	
Shelf life (at 130°C)	After 1000 hours no load test, leakage current, capacitance and tan δ are same as load life value. The measurement shall be performed at 20°C by the KS C 6035 clause 5.4.					
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 10 seconds.					
	Leakage current		Less than specified value			
	Capacitance change		Within $\pm$ 10% of initial value			
	tan δ		Less than specified value			

DRAWING (See page 59)

Unit : mm

-Series code of CF is “H”

DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

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

Ripple current (mA rms) at 130°C, 120Hz
Case size $\varnothing$ D $\times$ L(mm)

FREQUENCY COEFFICIENT OF PERMISSIBLE RIPPLE CURRENT

Frequency	50Hz	120Hz	300Hz	1kHz	10kHz $\leq$
Coefficient	0.70	1.00	1.17	1.36	1.50

SURFACE MOUNT ALUMINUM ELECTROLYTIC CAPACITORS



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



- 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. The measurement shall be performed at 20°C by the KS C 6035 clause 5.4.					
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 10 seconds.					
	Leakage Current	Less than specified value				
	Capacitance Change	Within ±10% of initial value				
	tanδ	Less than specified value				

- DRAWING (See page 59)
- Series code of CT is “C”

Unit : mm

CHIP TYPES

● 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)

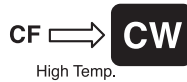
● FREQUENCY COEFFICIENT OF PERMISSIBLE RIPPLE CURRENT

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

SURFACE MOUNT ALUMINUM ELECTROLYTIC CAPACITORS

CW Chip type, High Reliability Series

- 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. The measurement shall be performed at 20°C by the KS C 6035 clause 5.4.					
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 10 seconds.					
	Leakage current		Less than specified value			
	Capacitance change		Within ±10% of initial value			
	tanδ		Less than specified value			

DRAWING (See page 59)

Unit : mm

-Series code of CW is “W”

DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

μF \ WV	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

SURFACE MOUNT ALUMINUM ELECTROLYTIC CAPACITORS



NC

 Chip type, Non-polarized Series


- 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

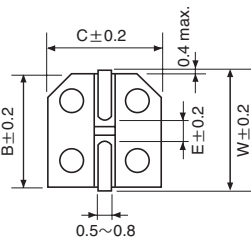
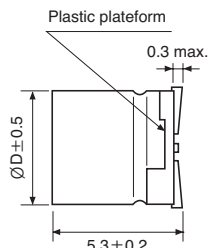
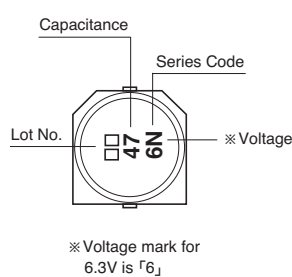


Item	Characteristics							
Operating temperature range	-40 ~ +85°C							
Leakage current max.	I = 0.05CV or 10μA whichever is greater (after 2 minutes)							
Capacitance tolerance	±20% at 120Hz, 20°C							
Dissipation factor max. (at 120Hz, 20°C)	WV	6.3	10	16	25	35	50	
	tanδ	0.24	0.20	0.17	0.17	0.15	0.15	
Low temperature characteristics (Impedance ratio at 120Hz)	WV		6.3	10	16	25	35	50
	Z-25°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 2000 hours at 85°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 85°C)	After 1000 hours no load test, leakage current, capacitance and tanδ are same as load life value. The measurement shall be performed at 20°C by the KS C 6035 clause 5.4.							
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 10 seconds.							
	Leakage current			Less than specified value				
	Capacitance change			Within ±10% of initial value				
	tanδ			Less than specified value				

DRAWING

Unit : mm

-Series code of NC is "N"



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

μ F	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°C, 120Hz
Case size ØD x L (mm)

SURFACE MOUNT ALUMINUM ELECTROLYTIC CAPACITORS

CN

Height 5.5mmL, 105°C Non-polarized Series

NP
Non-polarized

S
Solvent Proof



- 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

NC → **CN**
Wide temp.

Item	Characteristics							
Operating temperature range	-55 ~ +105°C							
Leakage current max.	I = 0.05CV or 10 μ A whichever is greater (after 2 minutes)							
Capacitance tolerance	$\pm$ 20% at 120Hz, 20°C							
Dissipation factor max. (at 120Hz, 20°C)	WV	6.3	10	16	25	35	50	
	tan δ	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 $\pm$ 20% of initial value				
	tan δ			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 tan δ are same as load life value. The measurement shall be performed at 20°C by the KS C 6035 clause 5.4.							
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 10 seconds.							
	Leakage current			Less than specified value				
	Capacitance change			Within $\pm$ 10% of initial value				
	tan δ			Less than specified value				

DRAWING (See page 79)

Unit : mm

-Series code of CN is "C"

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 $\varnothing D \times L$ (mm)