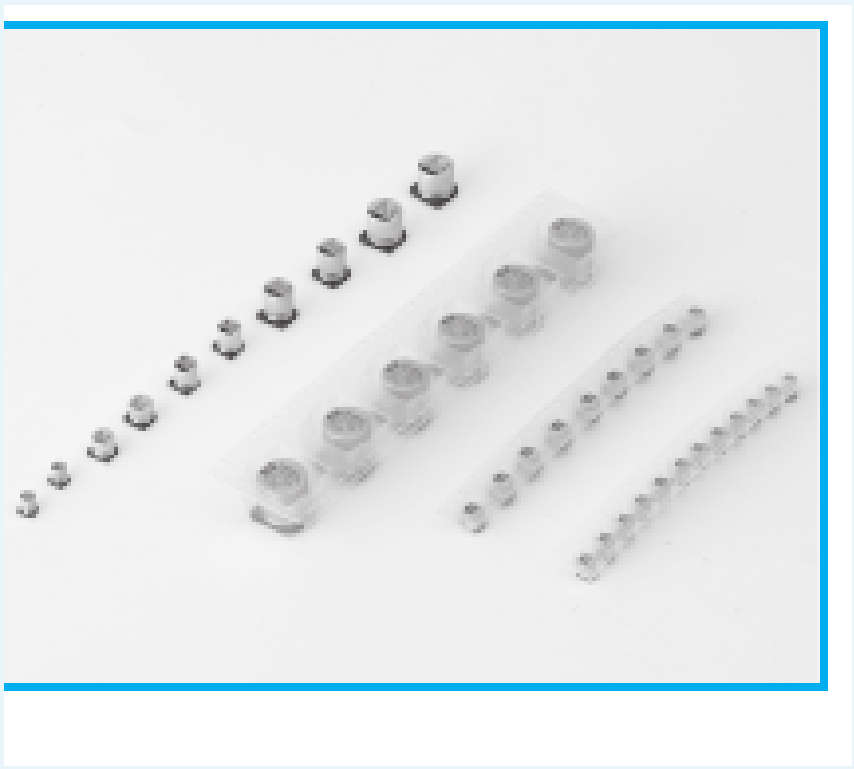
CATEGORY 3

SURFACE MOUNT

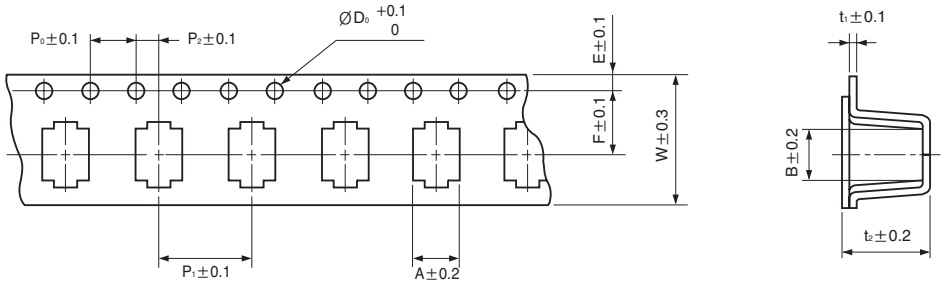
ALUMINUM ELECTROLYTIC CAPACITORS



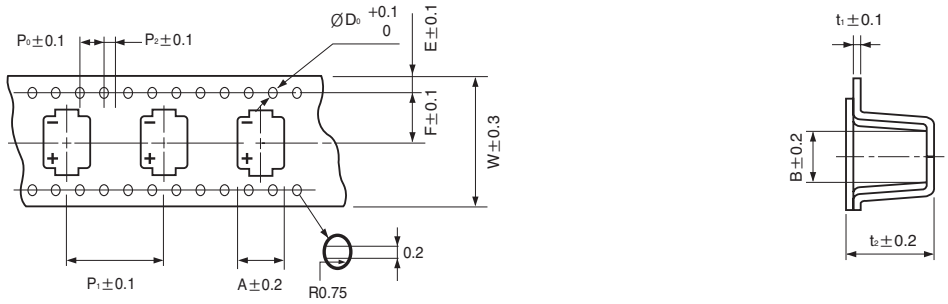
Taping Specifications for Chip Type Capacitors

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	0.5	8.3	16.0	
8 × 6.2	8.7	8.7	1.5	1.75	7.5	4.0	12.0	2.0	0.5	6.9	16.0	
8 × 10	8.7	8.7	1.5	1.75	11.5	4.0	16.0	2.0	0.5	11.1	24.0	
10 × 10	10.7	10.7	1.5	1.75	11.5	4.0	16.0	2.0	0.5	11.1	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

Fig.1(PAPER)

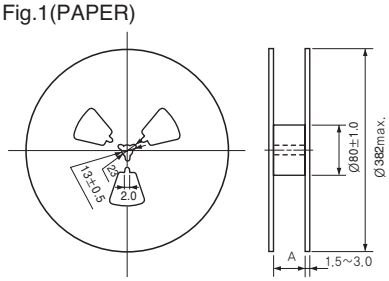
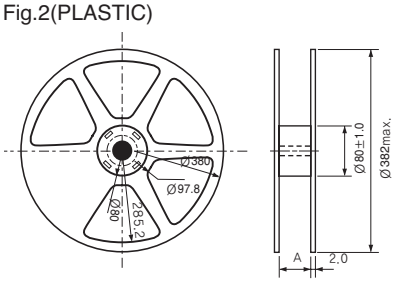
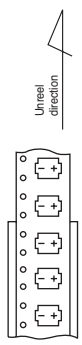


Fig.2(PLASTIC)



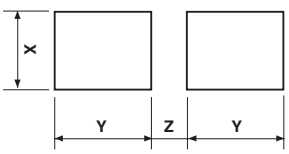
Polarity



ØD×L	A	
	Fig.1	Fig.2
4 × 5.3	14	12
5 × 5.3	14	12
6.3 × 5.3	18	16
6.3 × 5.8	18	16
6.3 × 7.7	18	16
8 × 6.2	18	16
8 × 10	26	24
10 × 10	26	24
12.5×13.5	34	32

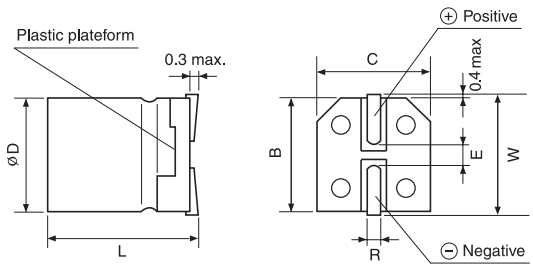
ØD×L	Q'ty/Reel(pcs.)	Q'ty/Box(pcs.)
4 × 5.3	2000	20000
5 × 5.3	1000	10000
6.3 × 5.3	1000	10000
6.3 × 5.8	1000	10000
6.3 × 7.7	900	9000
8 × 6.2	1000	10000
8 × 10	500	3000
10 × 10	500	3000
12.5×13.5	200	1000

Recommended Land Size

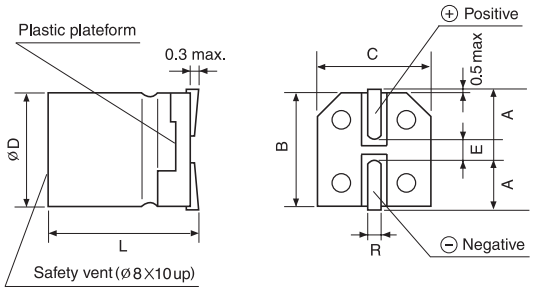


Type	ØD×L	X	Y	Z
VR	4×5.3	1.6	2.6	1.0
	5×5.3	1.6	3.0	1.4
	6.3×5.3	1.6	3.5	2.0
	6.3×5.8	1.6	3.5	2.0
	6.3×7.7	1.6	3.5	2.0
	8×6.2	2.5	4.0	2.0
	8×10	2.5	3.5	3.0
	10×10	2.5	4.0	4.0
	12.5×13.5	2.5	5.7	4.0
VG	6.3×7.7	3.0	4.0	1.6
	8×10	4.3	5.3	2.0
	10×10	4.3	5.6	3.3
	12.5×13.5	7.0	7.3	3.0

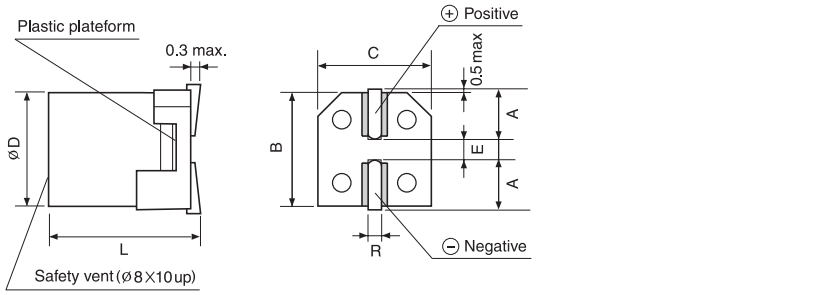
DRAWING I



DRAWING II



DRAWING III



● DIMENSION OF STANDARD TYPE

APPLICABLE DRAWING NO.	Ø×D	B±0.2	C±0.2	E±0.2	A±0.2	R
DRAWING I	4×5.3	4.3	4.3	1.0	4.8	0.5 ~ 0.8
	5×5.3	5.3	5.3	1.4	5.8	0.5 ~ 0.8

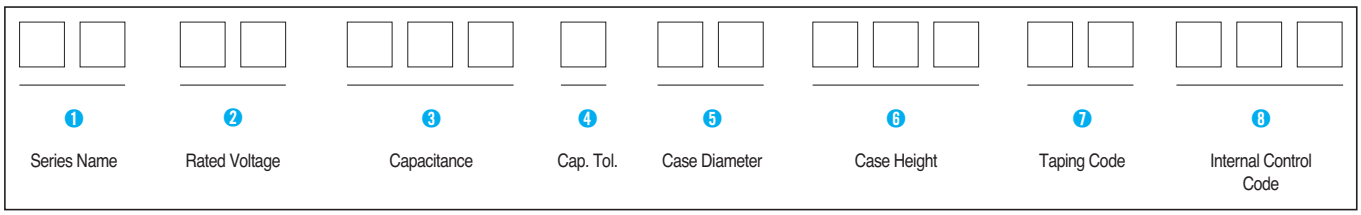
APPLICABLE DRAWING NO.	Ø×D	B±0.2	C±0.2	E±0.2	A±0.2	R
DRAWING II	6.3×5.3	6.6	6.6	2.2	2.4	0.5 ~ 0.8
	6.3×5.8	6.6	6.6	2.2	2.4	0.5 ~ 0.8
	6.3×7.7	6.6	6.6	2.2	2.4	0.5 ~ 0.8
	8×6.2	8.3	8.3	2.3	3.3	0.5 ~ 0.8
	8×10	8.3	8.3	3.1	2.9	0.8 ~ 1.1
	10×10	10.3	10.3	4.5	3.2	0.8 ~ 1.1
	10×12.5	10.3	10.3	4.5	3.2	0.8 ~ 1.1
	12.5×13.5	12.8	12.8	4.5	4.6	1.3 ~ 1.6

● DIMENSION OF VIBRATION RESISTANT TYPE(FOR 30G)

APPLICABLE DRAWING NO.	Ø×D	B±0.2	C±0.2	E±0.2	A±0.2	R
DRAWING III	6.3×7.7	6.6	6.6	2.2	2.4	0.5 ~ 0.8
	8×10	8.3	8.3	3.1	2.9	0.8 ~ 1.1
	10×10	10.3	10.3	4.5	3.2	0.8 ~ 1.1
	12.5×13.5	12.8	12.8	4.5	4.6	1.3 ~ 1.6

PART NUMBER SYSTEM

Part Number System



1 Series Name

See page 6.

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

3 Capacitance

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

4 Capacitance Tolerance

Tolerance (%)	±20	±10
Code	M	K

5 Case Diameter

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

6 Case Height

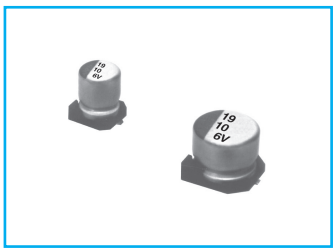
ex) 5.3mm 005
5.8mm 006
6.2mm 06B
7.7mm 07K
10mm 010
13.5mm 13M

7 Taping Code

VR (Reel Type)
VG (Vibration Resistance Reel Type)

SC Chip type, Standard Series

Solvent Proof
WV≦100V



- Chip type higher capacitance in larger case sizes
- Designed for surface mounting on high density PC board
- Applicable to automatic insertion machine using carrier tape
- Complied to the RoHS directive
- AEC-Q200 compliant : Please contact us for more details.

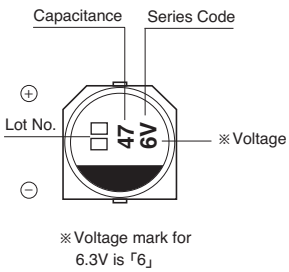
NC ⇦ SC ⇨ RC
Non-polar / Wide temp

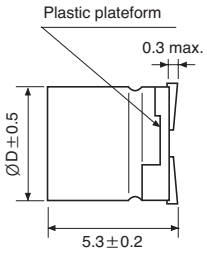
Item	Characteristics
Operating temperature range	-40 ~ +85˚C
Leakage current max.	WV≦100 I = 0.01CV or 3μA whichever is greater (after 2 minutes) WV≧160 I = 0.04CV + 100μA(after 1 minutes)
Capacitance tolerance	±20% at 120Hz, 20˚C
Dissipation factor max. (at 120Hz, 20˚C)	WV: 4 / 6.3 / 10 / 16 / 25 / 35 / 50 / 63 / 100 / 160 / 200 / 250 / 400 / 450 tanδ: 0.40 / 0.35 / 0.24 / 0.20 / 0.16 / 0.13 / 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 IEC 60384 - 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

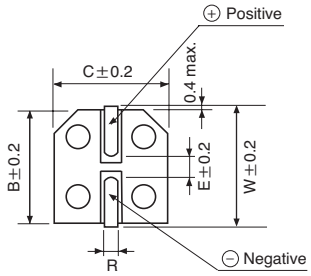
● DRAWING -Series code of SC is "V"

Unit : mm

(Ø4, Ø5)

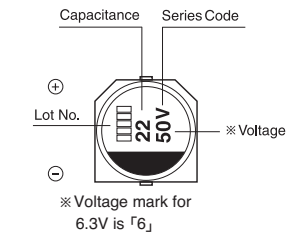


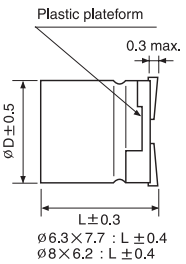


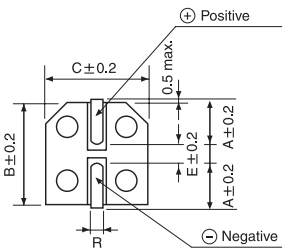


ØD×L	W	A	B	C	E	R
4×5.3	4.8		4.3	4.3	1.0	0.5~0.8
5×5.3	5.8		5.3	5.3	1.4	0.5~0.8
6.3×5.3		2.4	6.6	6.6	2.2	0.5~0.8
6.3×5.8		2.4	6.6	6.6	2.2	0.5~0.8
6.3×7.7		2.4	6.6	6.6	2.2	0.5~0.8
8×6.2		3.3	8.3	8.3	2.3	0.5~0.8
8×10		2.9	8.3	8.3	3.1	0.8~1.1
10×10		3.2	10.3	10.3	4.5	0.8~1.1
12.5×13.5		4.6	12.8	12.8	4.5	1.3~1.6

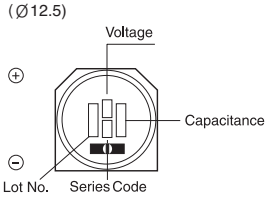
(Ø6.3, Ø8×6.2)



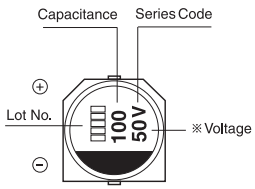


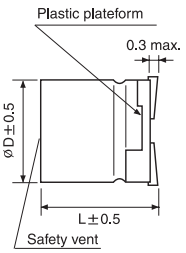


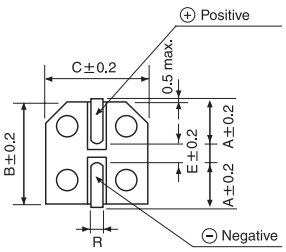
(Ø12.5)

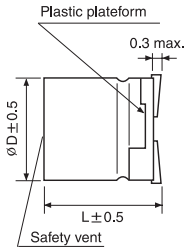


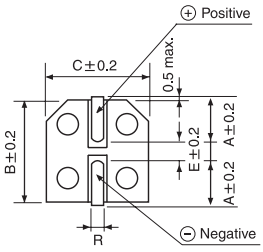
(Ø8×10, Ø10×10)











CHIP TYPES

SC series

● DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

WV / μF	4		6.3		10		16		25		35		50	
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	4×5.3	24	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
					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								

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

WV / μF	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	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°C, 120Hz
Case size ØD x L (mm)

● FREQUENCY COEFFICIENT OF PERMISSIBLE RIPPLE CURRENT

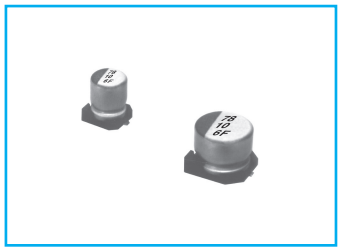
Frequency	50Hz	120Hz	300Hz	1kHz	10kHz≦
Coefficient	0.70	1.00	1.17	1.36	1.50

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
- AEC-Q200 compliant : Please contact us for more details.

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-55˚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 IEC 60384 - 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 63)

-Series code of RC is “F”

● DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

μF \ WV	6.3		10		16		25		35		50	
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

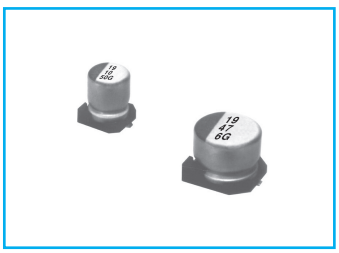
Frequency	50Hz	120Hz	300Hz	1kHz	10kHz≦
Coefficient	0.70	1.00	1.17	1.36	1.50

SURFACE MOUNT ALUMINUM ELECTROLYTIC CAPACITORS

JH Chip type, High Ripple Current Series

Solvent Proof
WV≦100V

RC ⇨ JH
Long life



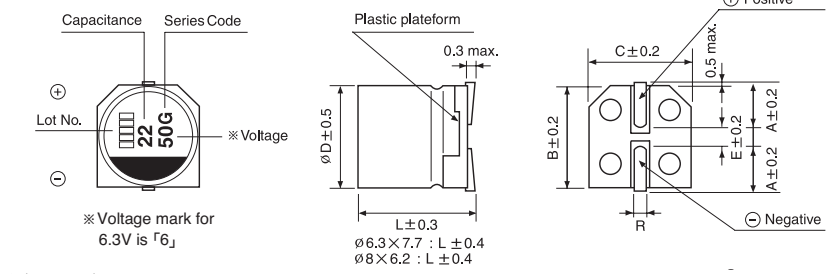
- High Ripple current Compared with JC series
- Designed for surface mounting on high density PC board
- Applicable to automatic insertion machine using carrier tape
- Complied to the RoHS directive
- AEC-Q200 compliant : Please contact us for more details.

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: 6.3 / 10 / 16 / 25 / 35 / 50 / 63 / 100 / 160 / 200 / 250 / 400 tanδ: 0.28 / 0.24 / 0.20 / 0.16 / 0.13 / 0.12 / 0.10 / 0.10 / 0.15 / 0.15 / 0.15 / 0.20
Low temperature characteristics (Impedance ratio at 120Hz)	WV: 6.3 / 10 / 16 / 25 ~ 50 / 63 ~ 100 / 160 ~ 250 / 400 Z-25˚C/Z+20˚C: 3 / 3 / 2 / 2 / 3 / 3 / 6 Z-40˚C/Z+20˚C: - / - / - / - / - / 6 / 10 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 IEC 60384 - 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

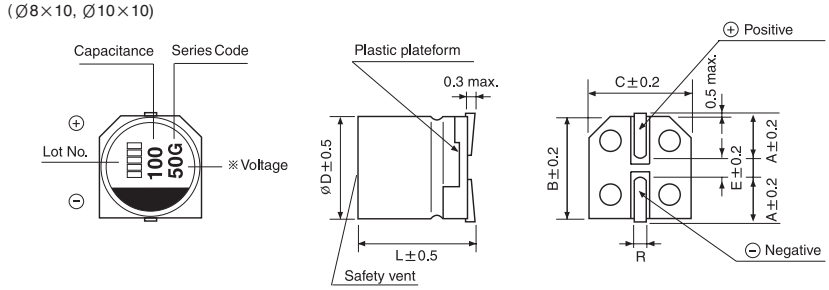
● DRAWING -Series code of JH is "G"

Unit : mm

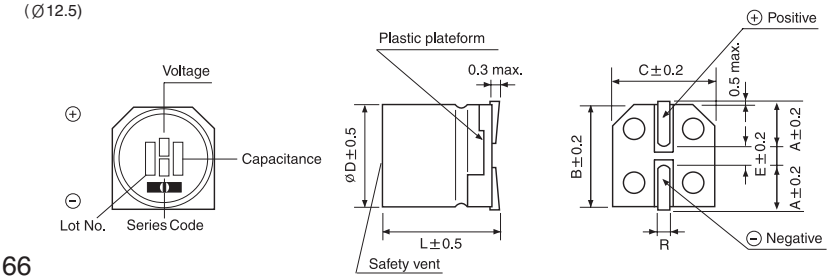
(ØD6.3, Ø8×6.2)



(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	1.3~1.6

JH series

● DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

μF \ WV	6.3		10		16		25		35	
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	6.3×5.8	110	8×10	270	10×10	456
					8×10	222				
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						
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
			10×10	175		
47	10×10	270	10×10	195	10×10	285
					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				

μF \ WV	160		200		250		400	
3.3					10×10	45	10×10	45
4.7			10×10	65	12.5×13.5	95		
10	10×10	65	12.5×13.5	110				
22	12.5×13.5	125	12.5×13.5	125				
33	12.5×13.5	140						

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

● FREQUENCY COEFFICIENT OF PERMISSIBLE RIPPLE CURRENT

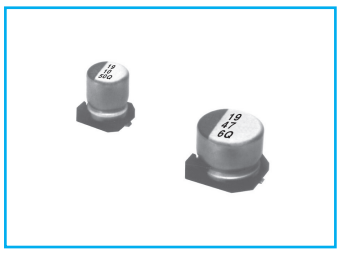
Frequency	50Hz	120Hz	300Hz	1kHz	10kHz≦
Coefficient	0.70	1.00	1.17	1.36	1.50

SURFACE MOUNT ALUMINUM ELECTROLYTIC CAPACITORS

JM Chip type, Long Life Series

Solvent Proof
WV≦100V

JH ⇒ JM
Long life



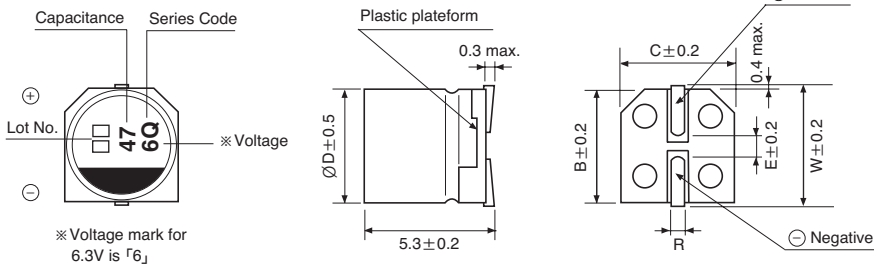
- Long Life Compared with JC series
- Designed for surface mounting on high density PC board
- Applicable to automatic insertion machine using carrier tape
- Complied to the RoHS directive
- AEC-Q200 compliant : Please contact us for more details.

Item	Characteristics
Operating temperature range	-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: 6.3 / 10 / 16 / 25 / 35 / 50 / 63 / 100 / 160 / 200 / 250 / 400 tanδ: 0.32 / 0.28 / 0.21 / 0.21 / 0.18 / 0.18 / 0.12 / 0.12 / 0.15 / 0.15 / 0.15 / 0.20
Low temperature characteristics (Impedance ratio at 120Hz)	WV: 6.3 / 10 / 16 / 25 ~ 50 / 63 ~ 100 / 160 ~ 250 / 400 Z-25˚C/Z+20˚C: 3 / 3 / 3 / 3 / 3 / 3 / 6 Z-40˚C/Z+20˚C: 8 / 5 / 4 / 3 / 4 / 6 / 10
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 IEC 60384 - 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

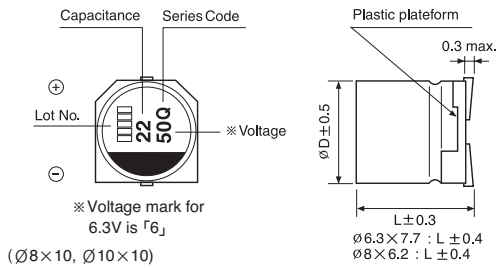
● DRAWING -Series code of JM is "Q"

Unit : mm

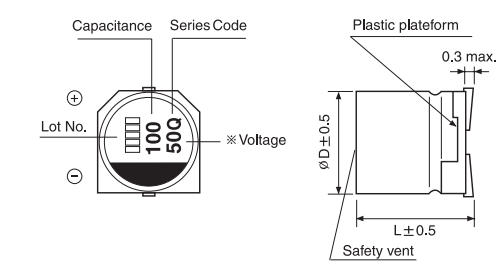
(Ø4, Ø5)



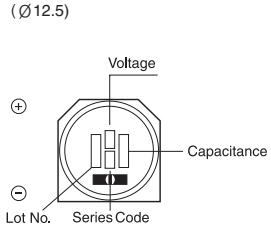
(Ø6.3, Ø8×6.2)

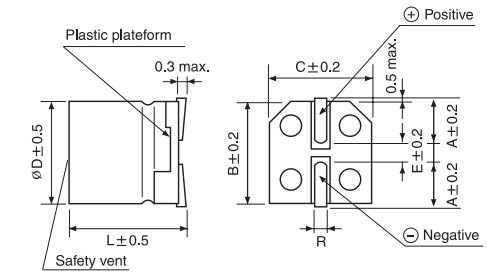


(Ø8×10, Ø10×10)



(Ø12.5)





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	1.3~1.6

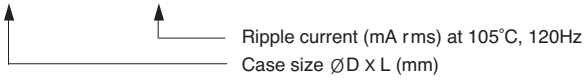
JM series

● 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						
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				

μF \ WV	160		200		250		400	
2.2							8×10	27
3.3					10×10	30	10×10	30
4.7			10×10	45	12.5×13.5	65	12.5×13.5	40
6.8								
10	10×10	45	12.5×13.5	75				
22	12.5×13.5	85	12.5×13.5	85				
33	12.5×13.5	95						



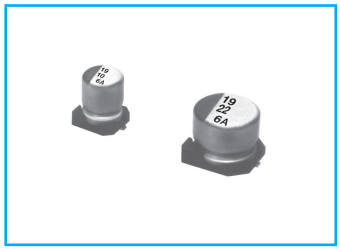
● FREQUENCY COEFFICIENT OF PERMISSIBLE RIPPLE CURRENT

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

CA Chip type, Long Life Series

Long Life Solvent Proof

JM ⇨ 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
- AEC-Q200 compliant : Please contact us for more details.

Item	Characteristics
Operating temperature range	ØD ≦ 6.3: -40 ~ +105˚C; ØD ≧ 8: -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: 2 / 2 / 2 / 3 / 3 / 3; Z-55˚C/Z+20˚C: 14 / 12 / 8 / 6 / 4 / 4; Z-40˚C/Z+20˚C: 14 / 12 / 8 / 6 / 4 / 4
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 IEC 60384 - 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 63)

-Series code of CA is “A”

● 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)

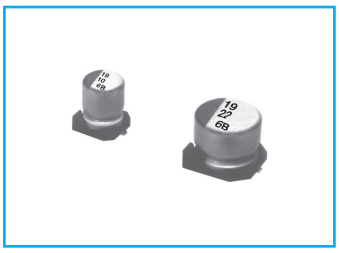
● FREQUENCY COEFFICIENT OF PERMISSIBLE RIPPLE CURRENT

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

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
- AEC-Q200 compliant : Please contact us for more details.

Item	Characteristics
Operating temperature range	-40 ~ +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: 0.32 / 0.28 / 0.24 / 0.2 / 0.16 / 0.13 / 0.12
Low temperature characteristics (Impedance ratio at 120Hz)	WV: 4 / 6.3 / 10 / 16 / 25 / 35~50 Z-25°C/Z+20°C: 12 / 10 / 8 / 6 / 4 / 4 Z-40°C/Z+20°C: 16 / 14 / 12 / 8 / 6 / 4
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 IEC 60384 - 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 63)

-Series code of CB is “B”

● DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

μF \ WV	4		6.3		10		16		25		35		50	
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

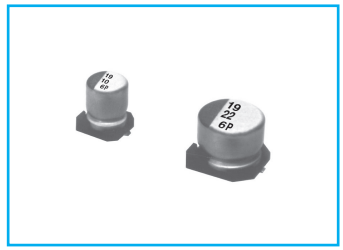
Frequency	50Hz	120Hz	300Hz	1kHz	10kHz≦
Coefficient	0.70	1.00	1.17	1.36	1.50

SURFACE MOUNT ALUMINUM ELECTROLYTIC CAPACITORS

JL Chip type, Long Life Series

Long Life Solvent Proof

CA ⇒ JL
Long life



- Chip type, long life capacitance in large case sizes
- For ECU
- Application to automatic insertion machine using carrier tape
- Complied to the RoHS directive
- AEC-Q200 compliant : Please contact us for more details.

Item	Characteristics
Operating temperature range	-40 ~ +105˚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)	WV: 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-25˚C/Z+20˚C: 6 / 4 / 3 / 2 / 2 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 ±30% of the initial value tanδ: Less than 300% of the 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 IEC 60384 - 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 the initial value tanδ: Less than specified value

DRAWING (See page 63)

-Series code of JL is “P”

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 ØD×L(mm)

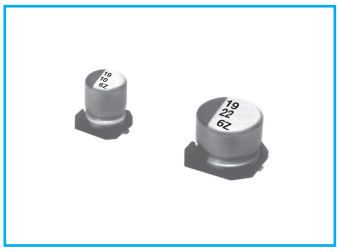
FREQUENCY COEFFICIENT OF PERMISSIBLE RIPPLE CURRENT

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

ZC Height 5.5mmL, Low Impedance Series

Low Impedance Solvent Proof

RC ⇨ ZC (Low Imp.)



- 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
- AEC-Q200 compliant : Please contact us for more details.

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 IEC 60384 - 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 63)

-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						
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

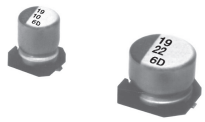
Frequency	50Hz	120Hz	300Hz	1kHz	10kHz≦
Coefficient	0.35	0.5	0.64	0.83	1.00

CD

Chip type, Extremely Low Impedance Series

Low Impedance　Solvent Proof

ZC ⇨ CD
Low Imp.



- 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
- AEC-Q200 compliant : Please contact us for more details.

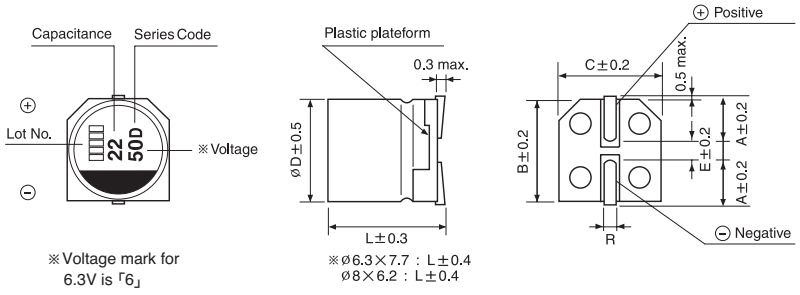
Item	Characteristics
Operating temperature range	-55 ~ +105˚C
Leakage current max.	I = 0.01CV or 3μA whichever is greater (after 2 minutes)
Capacitance tolerance	±20% at 120Hz, 20˚C
Dissipation factor max. (at 120Hz, 20˚C)	WV: 6.3 / 10 / 16 / 25 / 35 / 50 / 63 / 80 / 100 tanδ: 0.24 / 0.19 / 0.16 / 0.14 / 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 IEC 60384 - 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

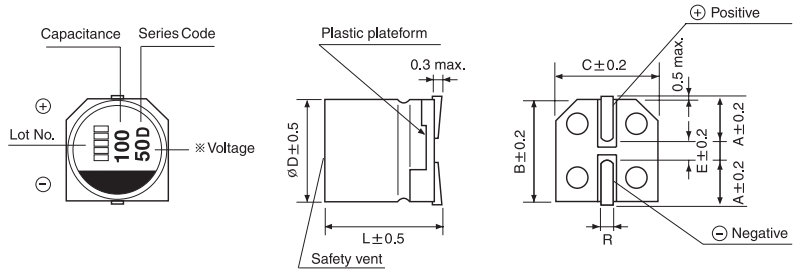
-Series code of CD is “D”

(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
12.5×13.5	4.6	12.8	12.8	4.5	1.3~1.6

(Ø8×10, Ø10×10)



CD series

● DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

μF \ WV	6.3			10			16			25			35			50		
10																6.3×5.8	0.92	170
15																6.3×5.8	0.79	170
22																6.3×5.8	0.79	170
33							6.3×5.8	0.39	384	6.3×5.8	0.39	384	6.3×5.8	0.43	384	6.3×7.7	0.61	280
																8×6.2	0.58	300
47				6.3×5.8	0.36	384	5×5.3	1.00	210	6.3×5.8	0.39	384	6.3×5.3	0.70	240	6.3×7.7	0.61	280
							6.3×5.8	0.39	384				6.3×5.8	0.43	384	8×6.2	0.58	300
68	6.3×5.8	0.40	384	6.3×5.8	0.36	384	6.3×5.8	0.36	384	6.3×5.8	0.36	384	6.3×7.7	0.29	600	8×10	0.29	450
100	6.3×5.3	0.53	250	6.3×5.8	0.36	384	6.3×5.3	0.70	250	6.3×7.7	0.29	600	6.3×7.7	0.29	600	8×10	0.29	450
	6.3×5.8	0.40	384				6.3×5.8	0.36	384	8×6.2	0.24	500	8×10	0.15	960	10×10	0.18	700
150	6.3×5.8	0.40	384	6.3×5.8	0.36	384	6.3×5.8	0.36	384	8×10	0.15	960	8×10	0.15	960	10×10	0.18	700
							6.3×7.7	0.29	600									
220	6.3×5.8	0.40	384	6.3×7.7	0.32	600	6.3×7.7	0.29	600	6.3×7.7	0.29	600	8×10	0.15	960	10×10	0.18	700
				8×6.2	0.24	500	8×6.2	0.24	500	8×10	0.15	960	10×10	0.09	1360			
330	6.3×7.7	0.29	600	8×10	0.15	960	8×10	0.15	960	8×10	0.15	960	8×10	0.10	960			
	8×6.2	0.24	500				10×10	0.10	960	10×10	0.09	1360	10×10	0.09	1360			
470	8×10	0.15	960	6.3×7.7	0.16	600	8×10	0.16	960	8×10	0.15	960	10×10	0.09	1360			
				8×10	0.15	960	10×10	0.07	1360	10×10	0.09	1360						
560	8×10	0.15	960	8×10	0.15	960	10×10	0.07	1360	10×10	0.09	1360						
680	8×10	0.15	960	8×10	0.15	960	10×10	0.08	1360									
				10×10	0.07	1360												
820	8×10	0.15	960	10×10	0.08	1360												
1000	8×10	0.15	960	10×10	0.08	1360												
	10×10	0.07	1360															
1500	10×10	0.07	1360															

μF \ WV	63			80			100		
10	6.3×5.8	2.30	80	6.3×7.7	2.16	60			
22	6.3×7.7	1.90	120	8×10	1.17	130	8×10	1.80	130
33	8×10	0.80	250	8×10	1.17	130	10×10	1.35	200
47	8×10	0.80	250	10×10	1.08	200	12.5×13.5	0.90	500
68	10×10	0.70	400	12.5×13.5	0.70	500	12.5×13.5	0.90	500
100	10×10	0.70	400	12.5×13.5	0.70	500			
150	12.5×13.5	0.54	800	12.5×13.5	0.70	500			
220	12.5×13.5	0.54	800						

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	0.50	0.64	0.83	1.00

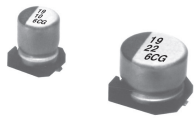
CG

Chip type, Miniaturization Series

Solvent Proof

- Chip type, miniaturized temperature range up to 105˚C
- Applicable to automatic insertion machine using carrier tape
- Complied to the RoHS directive
- AEC-Q200 compliant : Please contact us for more details.

CD ⇨ CG
miniaturized



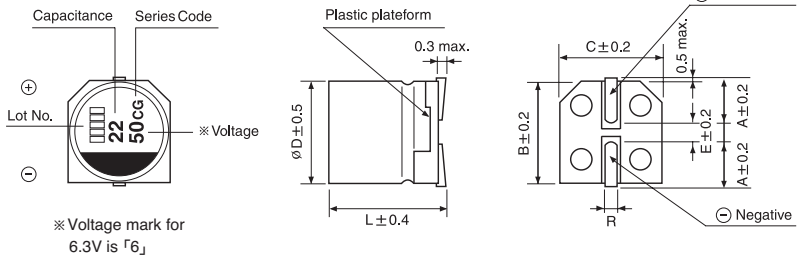
Item	Characteristics
Operating temperature range	-55 ~ +105˚C
Leakage current max.	I = 0.01CV or 3μA whichever is greater (after 2 minutes)
Capacitance tolerance	±20% at 120Hz, 20˚C
Dissipation factor max. (at 120Hz, 20˚C)	WV: 6.3 / 10 / 16 / 25 / 35 ~ 50 / 63 ~ 80 tanδ: 0.24 / 0.19 / 0.16 / 0.14 / 0.12 / 0.08
Low temperature characteristics (Impedance ratio at 120Hz)	WV: 6.3 / 10 / 16 / 25 / 35 ~ 50 / 63 ~ 80 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 (63~80V : 300%)
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 IEC 60384 - 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

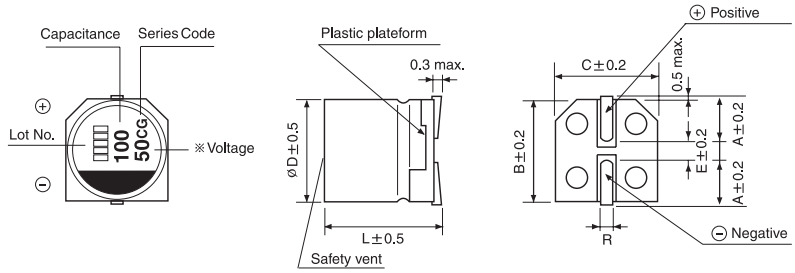
Unit : mm

-Series code of CG is “CG”

(Ø6.3, Ø8×6.2)



(Ø8×10, Ø10×10)



ØD	A	B	C	E	R
6.3×7.7	2.4	6.6	6.6	2.2	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

CG series

● DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

μF \ WV	6.3			10			16			25			35			50		
100																6.3×7.7	0.34	350
150										6.3×7.7	0.16	600	6.3×7.7	0.16	600			
220										6.3×7.7	0.16	600				8×10	0.18	670
330				6.3×7.7	0.16	600	6.3×7.7	0.16	600				8×10	0.08	850	10×10	0.12	900
470	6.3×7.7	0.16	600	6.3×7.7	0.16	600				8×10	0.08	850						
560													10×10	0.06	1190			
680	6.3×7.7	0.16	600				8×10	0.08	850				10×10	0.06	1190			
820										10×10	0.06	1190						
1000				8×10	0.08	850	10×10	0.06	1190									
1500	8×10	0.08	850	10×10	0.06	1190												
2200	10×10	0.06	1190															

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

μF \ WV	63			80		
33				6.3×7.7	0.80	190
47	6.3×7.7	0.80	190			
68				8×10	0.40	300
100	8×10	0.40	300	10×10	0.25	500
220	10×10	0.25	500			

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

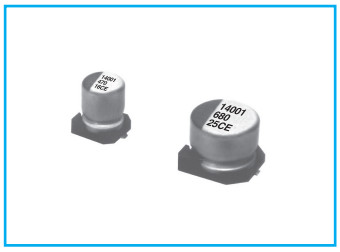
Frequency	50Hz	120Hz	300Hz	1kHz	10kHz≦
Coefficient	0.35	0.5	0.64	0.83	1.00

SURFACE MOUNT ALUMINUM ELECTROLYTIC CAPACITORS

Upgrade

CE

Chip type Low ESR



· Downsizing and Lower ESR, 2000 hours at 105˚C
· Complied to the RoHS directive
· AEC-Q200 compliant : Please contact us for more details.

CG ⟹ CE

High Capacitance

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: 16 / 25 / 35 tanδ: 0.16 / 0.14 / 0.12
Low temperature characteristics (Impedance ratio at 120Hz)	WV: 16 / 25 / 35 Z-25˚C/Z+20˚C: 2 / 2 / 2 Z-40˚C/Z+20˚C: 3 / 3 / 3 Z-55˚C/Z+20˚C: 4 / 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 ±30% of the 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 IEC 60384 - 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 76)

Unit : mm

-Series code of CE is “CE”

ØD	A	B	C	E	R
6.3×7.7	2.4	6.6	6.6	2.2	0.5~0.8
8×10	2.9	8.3	8.3	3.1	0.8~1.1
10×10	3.2	10.3	10.3	4.5	0.8~1.1

● DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

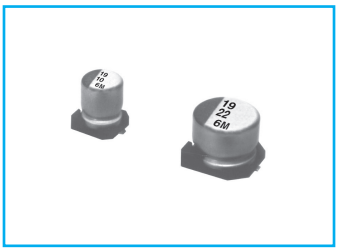
WV	μF	ØD×L(mm)	tan δ	ESR (Ω)max. 20˚C 100kHz	Ripple current (mA rms)
16	**470**	6.3 × 7.7	0.16	0.16	600
	820	8 × 10	0.16	0.08	850
	1500	10 × 10	0.16	0.06	1190
25	**330**	6.3 × 7.7	0.14	0.16	600
	680	8 × 10	0.14	0.08	850
	1200	10 × 10	0.14	0.06	1190
35	**220**	6.3 × 7.7	0.12	0.16	600
	510	8 × 10	0.12	0.08	850
	820	10 × 10	0.12	0.06	1190

● FREQUENCY COEFFICIENT OF PERMISSIBLE RIPPLE CURRENT

Frequency	120Hz	1kHz	10kHz	100kHz
Coefficient	0.50	0.85	0.94	1.00

CM Chip type, Low Impedance Long Life 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
- AEC-Q200 compliant : Please contact us for more details.

CD ⇨ CM
Long life

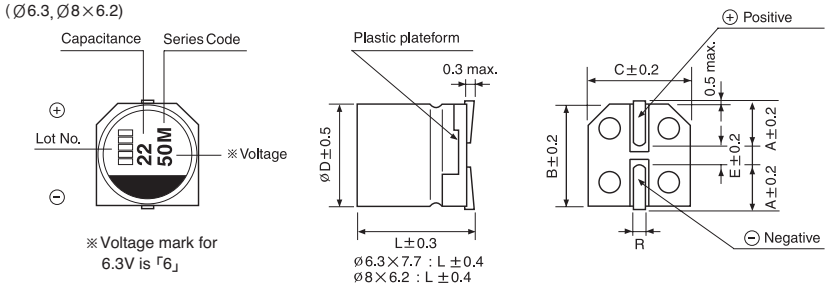
Item	Characteristics
Operating temperature range	-55 ~ +105˚C
Leakage current max.	I = 0.01CV or 3μA whichever is greater (after 2 minutes)
Capacitance tolerance	±20% at 120Hz, 20˚C
Dissipation factor max. (at 120Hz, 20˚C)	WV: 6.3 / 10 / 16 / 25 / 35 / 50 / 63 ~ 100 tanδ: 0.26 / 0.19 / 0.16 / 0.14 / 0.13 / 0.12 / 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 / 2 Z-55˚C/Z+20˚C: 4 / 4 / 4 / 3 / 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 the initial value tanδ: Less than 250% of the specified value Ø6.3 and 8×6.2 products 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 10 seconds. Leakage current: Less than specified value Capacitance change: Within ±10% of initial value tanδ: Less than specified value

DRAWING

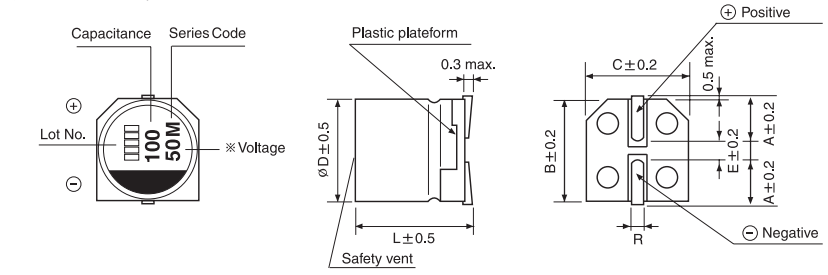
Unit : mm

-Series code of CM is “M”

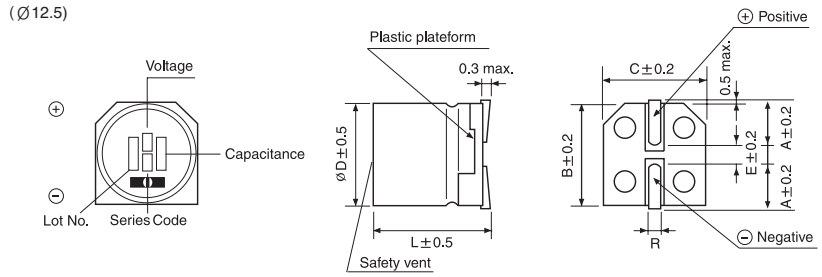
(Ø6.3, Ø8×6.2)



(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	1.3~1.6

CM series

● DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

μF \ WV	6.3			10			16			25			35			50		
2.2																4×5.3	6.00	30
10													5×5.3	2.00	160	6.3×5.8	1.00	170
15																6.3×5.8	0.86	170
22													6.3×5.3	1.00	160	6.3×5.8	0.86	170
33							5×5.3	1.50	150	5×5.3	1.05	160	6.3×5.3	0.85	220	6.3×7.7	0.66	280
							6.3×5.8	0.43	240				6.3×5.8	0.44	240	8×6.2	0.63	300
47				6.3×5.8	0.43	240	6.3×5.8	0.43	240	6.3×5.3	0.60	220	6.3×5.8	0.44	240	6.3×7.7	0.66	280
										6.3×5.8	0.43	240				8×6.2	0.63	300
68	6.3×5.8	0.43	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	0.32	290	6.3×7.7	0.30	420
													8×6.2	0.38	300			
100	6.3×5.8	0.43	240	6.3×5.8	0.39	240	6.3×5.8	0.39	240	6.3×7.7	0.32	290	6.3×7.7	0.32	290	8×10	0.32	450
										8×6.2	0.26	300	8×10	0.16	600	10×10	0.20	700
120													6.3×7.7	0.30	420			
150	6.3×5.8	0.43	240	6.3×5.8	0.39	240	6.3×7.7	0.32	290	8×10	0.16	600	8×10	0.16	600	10×10	0.20	700
180										6.3×7.7	0.30	420				8×10	0.18	670
220	6.3×5.8	0.43	240	6.3×7.7	0.36	290	6.3×7.7	0.32	290	8×10	0.16	600	8×10	0.16	600	10×10	0.20	700
				8×6.2	0.26	300	8×6.2	0.26	300	10×10	0.15	700	10×10	0.08	850			
270							6.3×7.7	0.30	420							10×10	0.14	750
330	6.3×7.7	0.32	290	6.3×7.7	0.30	420	8×10	0.16	600	8×10	0.16	600	8×10	0.08	850	12.5×13.5	0.16	800
	8×6.2	0.26	300	8×10	0.16	600				10×10	0.08	850						
470	8×10	0.16	600	8×10	0.16	600	8×10	0.16	600	8×10	0.08	850	10×10	0.10	850			
							10×10	0.08	850				12.5×13.5	0.08	900			
560													10×10	0.06	850			
680	8×10	0.16	600	8×10	0.16	600	8×10	0.08	850	10×10	0.10	850	12.5×13.5	0.08	900			
				10×10	0.08	850												
820				8×10	0.16	600				10×10	0.06	850						
1000	8×10	0.17	450	10×10	0.08	850	10×10	0.08	850	12.5×13.5	0.10	900	12.5×13.5	0.08	900			
	10×10	0.08	850				12.5×13.5	0.08	900									
1200				10×10	0.08	850												
1500							12.5×13.5	0.08	900									
2200				12.5×13.5	0.08	1000												
3300	12.5×13.5	0.06	1100															

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	6.3×7.7	2.1	80	8×10	1.3	130	8×10	2.0	140
22	6.3×7.7	2.1	120	8×10	1.3	130	10×10	1.5	330
33	8×10	1.0	250	10×10	1.0	200	12.5×13.5	1.0	500
47	8×10	1.0	250	12.5×13.5	0.8	500	12.5×13.5	1.0	500
68	10×10	0.8	400	12.5×13.5	0.8	500	12.5×13.5	1.0	500
100	10×10	0.8	400	12.5×13.5	0.8	500	12.5×13.5	1.0	500
150	12.5×13.5	0.6	800	12.5×13.5	0.8	500			
220	12.5×13.5	0.6	800						

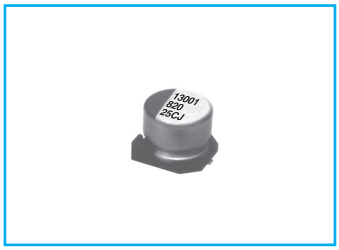
● FREQUENCY COEFFICIENT OF PERMISSIBLE RIPPLE CURRENT

Frequency	50Hz	120Hz	300Hz	1kHz	10kHz≦
Coefficient	0.35	0.50	0.64	0.83	1.00

New

CJ

Chip type, Long Life



- Long Life, High capacitance
- Endurance : 105˚C 8000 hours, Low ESR
- Application to automotive system
- Complied to the RoHS directive
- AEC-Q200 compliant : Please contact us for more details.

CM ⇨ **CJ**
Long life

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	25	35
	tanδ	0.14	0.12
Low temperature characteristics (Impedance ratio at 120Hz)	WV	25	35
	Z-25˚C/Z+20˚C	2	2
	Z-40˚C/Z+20˚C	3	3
	Z-55˚C/Z+20˚C	3	3
Load life (after application of the rated voltage for 8000 hours at 105˚C)	Leakage current	Less than specified value	
	Capacitance change	Within ±35% 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 IEC 60384 - 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 76)

Unit : mm

-Series code of CJ is “CJ”

ØD×L	A	B	C	E	R
8×10	2.9	8.3	8.3	3.1	0.8~1.1
10×10	3.2	10.3	10.3	4.5	0.8~1.1

● DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

WV	μF	ØD×L(mm)	ESR (Ω)max. at 100kHz 20˚C	Ripple current (mA rms)
25	**470**	8 × 10	0.10	850
	820	10 × 10	0.07	1190
35	**330**	8 × 10	0.10	850
	560	10 × 10	0.07	1190

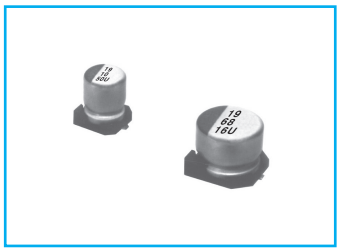
● FREQUENCY COEFFICIENT OF PERMISSIBLE RIPPLE CURRENT

Frequency	120Hz	1kHz	10kHz	100kHz
Coefficient	0.6	0.85	0.95	1.00

UC Chip type, High Reliability Series

Solvent Proof
WV≦100V

RC ⇨ UC
High Temp.



- 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
- AEC-Q200 compliant : Please contact us for more details.

Item	Characteristics
Operating temperature range	-40 ~ +125˚C
Leakage current max.	WV≦100 I = 0.03CV or 4μA 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: 10 / 16 / 25 / 35~63 / 80~100 / 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 IEC 60384 - 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 30 seconds. Leakage current: Less than specified value Capacitance change: Within ±10% of initial value tanδ: Less than specified value

● DRAWING (See page 63) -Series code of UC is "U"

● DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

μF \ WV	10		16		25		35		50		63	
4.7							4×5.3	18				
10					4×5.3	25	4×5.3	23	8×6.2	65	8×6.2	40
15							5×5.3	23				
22									8×6.2	65	8×10	67
33							8×6.2	65	8×6.2	65	8×10	67
									8×10	125		
47					8×6.2	65	8×6.2	100	10×10	200	10×10	115
							8×10	125				
68			8×6.2	65	8×6.2	65	8×10	170	12.5×13.5	525	12.5×13.5	335
							10×10	200				
100	8×6.2	65	8×10	125	8×10	125	8×10	170	12.5×13.5	525	12.5×13.5	335
							10×10	200				
220	8×10	125	10×10	200	8×10	150	12.5×13.5	525				
					10×10	200						
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											10×10	70
4.7									12.5×13.5	85	12.5×13.5	70
10	8×10	45	8×10	45	10×10	65	10×10	65	12.5×13.5	85		
22	8×10	45	8×10	45	12.5×13.5	85	12.5×13.5	85				
			10×10	80								
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								

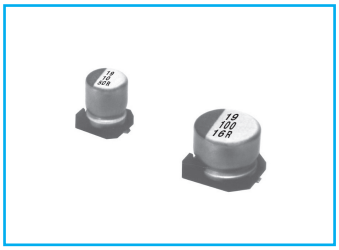
Ripple current (mA rms) at 125˚C, 120Hz
Case size ØD×L(mm)

● FREQUENCY COEFFICIENT OF PERMISSIBLE RIPPLE CURRENT

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

UR Chip type, High Reliability Series

Low ESR | Long Life | Solvent Proof WV≦100V



- Chip type, high temperature range, for 125˚C use
- Lower ESR than UC series
- Designed for surface mounting on high density PC board
- Applicable to automatic insertion machine using carrier tape
- AEC-Q200 compliant : Please contact us for more details.
- Complied to the RoHS directive

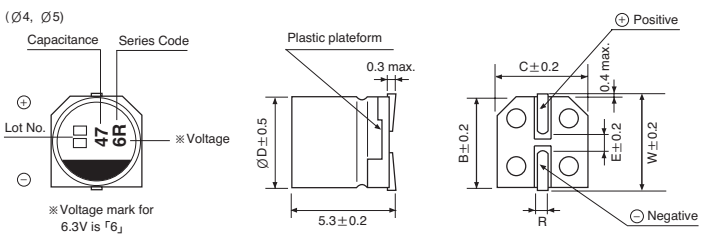
UC ⇨ UR
Low ESR.

Item	Characteristics
Operating temperature range	-40 ~ +125˚C
Leakage current max.	WV ≤ 100: I = 0.01CV or 3μA whichever is greater (after 2 minutes) WV ≥ 160: I = 0.04CV + 100μA (after 2 minutes)
Capacitance tolerance	±20% at 120Hz, 20˚C
Dissipation factor max. (at 120Hz, 20˚C)	WV: 10 / 16 / 25 / 35 / 50~80 / 100 / 160~250 / 400 tanδ: 0.22 / 0.19 / 0.16 / 0.14 / 0.12 / 0.10 / 0.20 / 0.24
Temperature characteristics (Impedance ratio at 120Hz)	WV: 10 / 16 / 25 / 35~100 / 160~250 / 400 Z-25˚C/Z+20˚C: 3 / 2 / 2 / 2 / 3 / 6 Z-40˚C/Z+20˚C: 4 / 3 / 3 / 3 / 6 / 10
Load life (after application of the rated voltage for 5000 hours at 125˚C)	Leakage current: Less than specified value Capacitance change: Within ±30% of initial value tanδ: Less than 300% of specified value ØD = 4, 5, 6.3(L≤5.8): ~80V 1000 hours; 100V -; 160V~ - 6.3×7.7: 2000 hours; - ; - 8×6.2: 3000 hours; - ; - ØD = 8, 10: 5000 hours; 2000 hours; 2000 hours ØD = 12.5: 5000 hours; 5000 hours; 2000 hours
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 IEC 60384-4
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

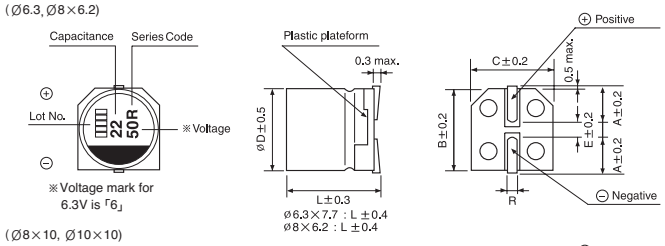
DRAWING - Series code of UR is "R"

Unit : mm

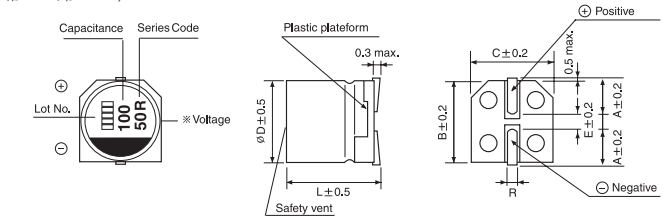
(Ø4, Ø5)



(Ø6.3, Ø8×6.2)

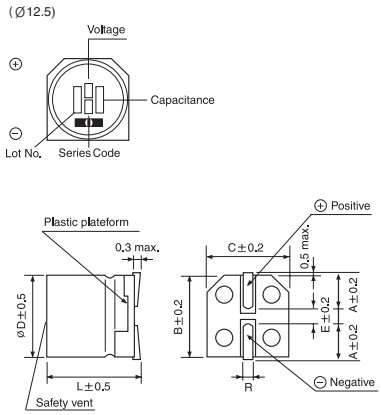


(Ø8×10, Ø10×10)



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	1.3~1.6

(Ø12.5)



UR series

● DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

μF \ WV	10			16			25			35		
4.7										4×5.3	7.00	12
10				4×5.3	7.00	12	5×5.3	3.30	23	6.3×5.8	1.60	69
22	5×5.3	3.30	23	5×5.3	3.30	23	6.3×5.3	2.00	40	6.3×5.8	1.60	69
										6.3×7.7	1.60	75
33	5×5.3	3.30	23	6.3×5.3	2.00	40	6.3×5.8	1.60	69	6.3×7.7	0.90	110
47	6.3×5.3	2.00	40	6.3×5.8	1.60	69	6.3×7.7	0.90	110	6.3×7.7	0.90	190
							8×6.2	0.90	110	8×10	0.30	264
100	8×6.2	0.90	110	8×6.2	0.90	110	6.3×7.7	0.90	150	8×10	0.30	264
							8×10	0.30	264			
220	8×10	0.30	264	8×10	0.30	355	8×10	0.30	355	8×10	0.30	350
										10×10	0.20	400
330	8×10	0.30	355	10×10	0.20	400	10×10	0.20	400	12.5×13.5	0.14	750
							12.5×13.5	0.14	750			
470	10×10	0.20	400	12.5×13.5	0.14	750	12.5×13.5	0.14	750			
680										12.5×13.5	0.10	1000
820							12.5×13.5	0.10	800			
1000							12.5×13.5	0.06	1700			

μF \ WV	50			63			80			100		
10	6.3×5.8	2.80	51	6.3×5.8	2.50	55	8×10	1.20	70	8×10	1.60	70
				8×6.2	2.00	60						
22	6.3×7.7	2.20	70	8×10	1.00	70	10×10	0.55	115	10×10	1.60	95
	8×6.2	1.60	83									
33	8×10	0.70	192	10×10	0.55	115	10×10	0.55	115	10×10	0.80	115
47	10×10	0.50	330	10×10	0.55	115	10×10	0.55	115	12.5×13.5	0.33	450
							12.5×13.5	0.33	450			
100	10×10	0.50	330	10×10	0.55	115	12.5×13.5	0.33	450	12.5×13.5	0.33	450
				12.5×13.5	0.33	450						
220	12.5×13.5	0.23	550	12.5×13.5	0.33	450						
330	12.5×13.5	0.23	550									
470	12.5×13.5	0.23	550									

Ripple current (mA rms) at 125°C, 100kHz
ESR (Ω) at 20°C, 100kHz
Case size ØD×L (mm)

μF \ WV	160		200		250		400	
1							8×10	18
2.2							10×10	26
3.3							10×10	37
4.7					12.5×13.5	70	12.5×13.5	70
10	12.5×13.5	100	12.5×13.5	100	12.5×13.5	100		
22	12.5×13.5	120	12.5×13.5	120				

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

● FREQUENCY COEFFICIENT OF PERMISSIBLE RIPPLE CURRENT

Frequency		120Hz	1kHz	10kHz	100kHz
wv	cap.				
≤ 100	~ 10	0.66	0.86	0.93	1.00
	22 ~	0.93	0.97	1.00	1.00
160 ≤	-	1.00	1.50	1.75	1.80

UN Chip type, High Reliability Series

Low ESR Solvent Proof

- Chip type, high temperature range, for +125˚C use
- Lower ESR than UR series
- Application to automotive system
- Complied to the RoHS directive

UR ⇒ UN
Low ESR.



Item	Characteristics
Operating temperature range	-40 ~ +125˚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: 10 / 16 / 25 / 35 / 50 / 63 tanδ: 0.30 / 0.23 / 0.18 / 0.16 / 0.16 / 0.14
Low temperature characteristics (Impedance ratio at 120Hz)	WV: 10 / 16 / 25 / 35 / 50 / 63 Z-40˚C/Z+20˚C: 4 / 3 / 3 / 3 / 3 / 3
Load life (after application of the rated voltage for 3000 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 IEC 60384 - 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 76)

-Series code of UN is “UN”

Unit : mm

ØD×L	A	B	C	E	R
6.3×7.7	2.4	6.6	6.6	2.2	0.5~0.8
8×10	2.9	8.3	8.3	3.1	0.8~1.1
10×10	3.2	10.3	10.3	4.5	0.8~1.1

● DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

WV	μF	ØD×L(mm)	ESR (Ω)max.		Ripple current (mA rms)
			20˚C 100kHz	-40˚C 100kHz	
10	220	6.3 × 7.7	0.30	3.0	240
	470	8 × 10	0.20	2.0	350
	680	10 × 10	0.15	1.5	550
16	220	6.3 × 7.7	0.30	3.0	240
	330	8 × 10	0.20	2.0	350
	680	10 × 10	0.15	1.5	550
25	100	6.3 × 7.7	0.30	3.0	240
	220	8 × 10	0.20	2.0	350
	330	10 × 10	0.15	1.5	550
35	47	6.3 × 7.7	0.30	3.0	240
	100	6.3 × 7.7	0.30	3.0	240
	220	8 × 10	0.20	2.0	350
	330	10 × 10	0.15	1.5	550
50	47	6.3 × 7.7	0.50	5.0	190
	150	8 × 10	0.30	4.0	320
	220	10 × 10	0.20	3.0	500
63	33	6.3 × 7.7	0.80	8.0	150
	68	8 × 10	0.40	6.0	250
	100	10 × 10	0.25	3.0	400

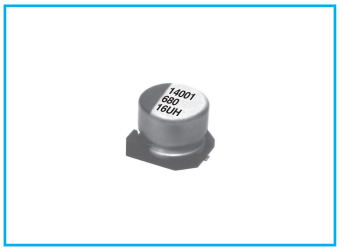
● FREQUENCY COEFFICIENT OF PERMISSIBLE RIPPLE CURRENT

Frequency	50Hz	120Hz	300Hz	1kHz	10kHz≦
Coefficient	0.35	0.50	0.64	0.83	1.00

UH Chip type High Capacitance

- Downsizing, High capacitance
- Endurance : 2000 to 5000 hours at 125˚C
- Application to automotive system
- Complied to the RoHS directive
- AEC-Q200 compliant : Please contact us for more details

UR ⟹ UH
High Capacitance



Item	Characteristics
Operating temperature range	-40 ~ +125˚C
Leakage current max.	I = 0.01CV or 3μA whichever is greater (after 2 minutes) I = 0.03CV (Size 12.5×13.5)
Capacitance tolerance	±20% at 120Hz, 20˚C
Dissipation factor max. (at 120Hz, 20˚C)	WV: 16 / 25 / 35 tanδ: 0.20 / 0.16 / 0.14
Low temperature characteristics (Impedance ratio at 120Hz)	WV: 16 / 25 / 25 Z-25˚C/Z+20˚C: 2 / 2 / 2 Z-40˚C/Z+20˚C: 4 / 4 / 3
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 the initial value tanδ: Less than 300% of specified value 12.5×13.5 products are for 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 IEC 60384 - 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 83)

Unit : mm

-Series code of UH is “UH”

ØD×L	A	B	C	E	R
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	1.3~1.6

● DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

WV	μF	ØD×L(mm)	ESR (Ω)max.		Ripple current (mA rms)
			20˚C 100kHz	-40˚C 100kHz	
16	**680**	8 × 10	0.19	2.60	620
	1000	10 × 10	0.13	1.70	780
	1500	12.5 × 13.5	0.087	1.10	1060
25	**470**	8 × 10	0.19	2.60	620
	680	10 × 10	0.13	1.70	780
	1000	12.5 × 13.5	0.087	1.10	1060
35	**220**	8 × 10	0.19	2.60	620
	270	8 × 10	0.19	2.60	620
	470	10 × 10	0.13	1.70	780
	680	12.5 × 13.5	0.087	1.10	1060

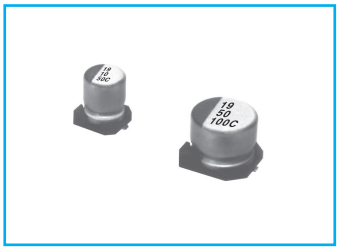
● FREQUENCY COEFFICIENT OF PERMISSIBLE RIPPLE CURRENT

Frequency	120Hz	1kHz	10kHz	100kHz
Coefficient	0.50	0.85	0.94	1.00

KC Chip type, High Reliability Series

Solvent Proof

UC ⟹ KC
High temp.



- Chip type, high temperature range, for 135˚C use
- Designed for surface mounting on high density PC board
- Applicable to automatic insertion machine using carrier tape
- Complied to the RoHS directive
- AEC-Q200 compliant : Please contact us for more details.

Item	Characteristics
Operating temperature range	-40 ~ +135˚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: 10 / 16 / 25 / 35 tanδ: 0.30 / 0.23 / 0.18 / 0.16
Low temperature characteristics (Impedance ratio at 120Hz)	WV: 10 / 16 / 25 / 35 Z-25˚C/Z+20˚C: 8 / 6 / 4 / 4 Z-40˚C/Z+20˚C: 12 / 8 / 6 / 4
Load life (after application of the rated voltage for 2000 hours at 135˚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 135˚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 IEC 60384 - 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 63)

-Series code of KC is “C”

● DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

μF \ WV	10			16			25			35		
47										8×10	0.20	270
68										8×10	0.20	270
100				8×10	0.20	270	8×10	0.20	270	8×10	0.20	270
220	8×10	0.20	270	8×10	0.20	270	10×10	0.15	500	10×10	0.15	500
330	10×10	0.20	270	10×10	0.15	500	10×10	0.15	500			
470	10×10	0.15	500	10×10	0.15	500						

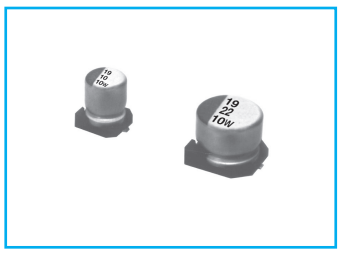
Ripple current (mA rms) at 135˚C, 100kHz
ESR (Ω) at 20˚C, 100kHz
Case size ØD x L (mm)

● FREQUENCY COEFFICIENT OF PERMISSIBLE RIPPLE CURRENT

Frequency	50Hz	120Hz	300Hz	1kHz	10kHz≦
Coefficient	0.35	0.50	0.64	0.83	1.00

CW Chip type, High Reliability Series

Solvent Proof



- Chip type, high temperature range, for 150˚C use
- Applicable to automatic insertion machine using carrier tape
- Complied to the RoHS directive
- AEC-Q200 compliant : Please contact us for more details.

KC ⇨ CW
High Temp.

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-25˚C/Z+20˚C: 8 / 6 / 4 / 4 / 4 Z-40˚C/Z+20˚C: 12 / 10 / 8 / 6 / 6
Load life (after application of the rated voltage for 2000 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 IEC 60384 - 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 63)

-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

CQ

Chip type, High Temperature Low ESR Series

- Chip type, high temperature range, for +150˚C use
- Lower ESR
- Application to automotive system
- Complied to the RoHS directive

CW ⇨ CQ
Low ESR



Item	Characteristics
Operating temperature range	-40 ~ +150˚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: 25 / 35 tanδ: 0.16 / 0.14
Low temperature characteristics (Impedance ratio at 120Hz)	WV: 25 / 35 Z-40˚C/Z+20˚C: 6 / 4
Load life (after application of the rated voltage for 2000 hours at 150˚C)	Leakage current: Less than specified value Capacitance change: Within ±40% of initial value tanδ: Less than 400% of specified value Ø8 products are for 1500 hours
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 IEC 60384 - 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 76)

-Series code of CQ is “CQ”

Unit : mm

ØD×L	A	B	C	E	R
8×10	2.9	8.3	8.3	3.1	0.8~1.1
10×10	3.2	10.3	10.3	4.5	0.8~1.1

DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

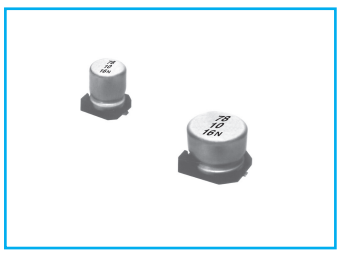
WV	μF	ØD×L(mm)	tan δ	ESR (Ω)max. 20˚C 100kHz	Ripple current (mA rms) 150˚C 100kHz
25	150	8 × 10	0.16	0.26	80
	270	10 × 10	0.16	0.15	120
35	100	8 × 10	0.14	0.26	80
	180	10 × 10	0.14	0.15	120

FREQUENCY COEFFICIENT OF PERMISSIBLE RIPPLE CURRENT

Frequency	120Hz	300Hz	1kHz	10kHz≦
Coefficient	0.67	0.79	0.91	1.00

NC Chip type, Non-polarized Series

Non-polarized Solvent Proof



- Designed for surface mounting on high density PC board
- Applicable to automatic insertion machine using carrier tape
- Complied to the RoHS directive
- AEC-Q200 compliant : Please contact us for more details.

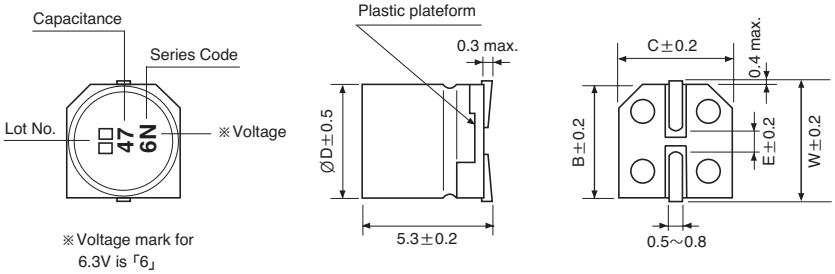
SC (Non-polar) ⇒ NC ⇒ CN (Wide temp.)

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 IEC 60384 - 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

μF \ WV	6.3		10		16		25		35		50	
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)

CN 105°C Non-polarized Series

Non-polarized Solvent Proof

- Designed for surface mounting on high density PC board
- Applicable to automatic insertion machine using carrier tape
- Complied to the RoHS directive
- AEC-Q200 compliant : Please contact us for more details.

NC ⇨ CN
Wide temp.



Item	Characteristics
Operating temperature range	WV≦25 : -55 ~ +105°C WV≧35 : -40 ~ +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: - / - / - / - / 4 / 4 Z-55°C/Z+20°C: 8 / 5 / 4 / 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. The measurement shall be performed at 20°C by the KS C IEC 60384 - 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 90)

-Series code of CN is “C”

● DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

μF \ WV	6.3		10		16		25		35		50	
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)

4 MINIATURE ALUMINUM ELECTROLYTIC CAPACITORS

