SAMSUNG ELECTRO-MECHANICS

The 1nside Edge that shapes the Future

www.sem.samsung.com

July 2006

RoHS compliant ecoparts

MUTLAYER CERAMIC CAPACITORS

SAMSUNG ELECTRO-MECHANICS

QS 9000 / ISO 9001

Registered by BSI to QS 9000 or ISO 9001 under BSI's accreditation by UKAS for Certification.

Registration NO : FM25309(2002. 2. 28)

WE WILL PROVIDE A CUSTOMER WITH HIGH RELIABLE PRODUCTS AND SERVICES

003

We, Samsung, declare that our component MLCC is produced in accordance with EU RoHS directive.

1. RoHS Compliance and restriction of Br

The following restricted materials are not used in packaging materials as well as products in compliance with the law and restriction.

- Cd, Pb, Hg, Cr+6, As, Br and the compounds, PCB, asbestos
- Bromic materials : PBBs, PBBOs, PBDO, PBDE, PBB

2. No use of materials breaking Ozone layer

The following ODS materials are not used in our fabrication process.

- ODS material : Freon, Haron, 1-1-1 TCE, CCl4, HCFC

If you want more detailed Information,Please Visit Samsung Electro-mechanics Website [http://www.sem.samsung.com]

Quality System Certification List

Table 1:Certification list of Samsung Factory

	SUWON(KOREA)	BUSAN(KOREA)	PHILIPPINES	TIANJIN(CHINA)	THAILAND
ISO / TS 16949	BSI TS 91430-001	BSI TS 91430-001			
QS 9000(Product)			BSI FM 62262		
ISO 9001 (Product)				UL A14163	
TL 9000 (Product)		BSI FM 90588			
ISO 14001	BSI EMS 66454	BSI EMS 66454	BSI EMS 77354	CNAB 02103SI0055ROL	BSI EMS69298
OSHAS 18001	BSI OHS 54734	BSI OHS 54734		CCEMS 012RO	

CONTENTS

Part Numbering System

CL	10	A	105	K	Q	8	N	N	N	C
1	2	3	4	5	6	7	8	9	10	11

1. SERIES CODE
CL=Multi layer Ceramic Capacitors

2. SIZE CODE — inch(㎜)
03=0201(0603) 21=0805(2012) 42=1808(4520)
05=0402(1005) 31=1206(3216) 43=1812(4532)
10=0603(1608) 32=1210(3225) 55=2220(5750)
14=0504(1410) 01=0306(0816) 12=0508(1220)

★ 3. DIELECTRIC CODE

Class Ⅰ	Class Ⅱ
C=C0G S=S2H L=S2L P=P2H T=T2H R=R2H U=U2J	A=X5R F=Y5V B=X7R X=X6S

★★ 4. CAPACITANCE CODE
Capacitance expressed in pF. 2 significant digits plus number of zeros.
example) 106=10×10⁶=10000000pF
For Values < 10pF, Letter R denotes decimal point
example) 1R5=1.5pF

5. TOLERANCE CODE
B=±0.1pF F=±1pF, ±1%* K=±10%
C=±0.25pF G=±2% M=±20%
D=±0.5pF J=±5% Z=+80/-20%

*For Values ≤ 10pF, F=±1pF
Values > 10pF, F=±1%

6. RATED VOLTAGE CODE
R=4V O=16V B=50V E=250V I=1000V
Q=6.3V A=25V C=100V G=500V J=2000V
P=10V L=35V D=200V H=630V K=3000V

★★★ 7. THICKNESS CODE
3=0.30㎜ A=0.65㎜ M=1.15㎜ I=2.00㎜ Q=1.25㎜*
5=0.50㎜ C=0.85㎜ F=1.25㎜ J=2.50㎜ V=2.50㎜*
8=0.80㎜ D=1.00㎜ H=1.60㎜ L=3.20㎜

8. INNER ELECTRODE / TERMINATION / PLATING CODE
A=Normal Product Pd / Ag / Ni barrier / Sn 100%
N=Normal Product Ni / Cu / Ni barrier / Sn 100%
G=Normal Product Cu / Cu / Ni barrier / Sn 100%
L=Low profile Ni / Cu / Ni barrier / Sn 100%

9. PRODUCT CODE
A=Array(2-element) L=LICC
B=Array(4-element) N=Normal
P=Automotive

10. SPECIAL CODE
N=Reserved for future use

11. PACKAGING CODE
B=Bulk O=Cardboard Tape, 10"Reel E=Embossed Type, 7"Reel
P=Bulk Case D=Cardboard Tape, 13"Reel(10,000ea) F=Embossed Type, 13"Reel
C=Cardboard Tape, 7"Reel L=Cardboard Tape, 13"Reel(15,000ea) S=Embossed Type, 10"Reel

Class Ⅰ

Symbol	EIA Code	Operation Temperature Range(℃)	Temperature Coefficient Range(ppm/℃)
C	C0G	-55~+125	0±30
P	P2H	-55~+125	-150±60
R	R2H	-55~+125	-220±60
S	S2H	-55~+125	-330±60
T	T2H	-55~+125	-470±60
U	U2J	-55~+125	-750±120
L	S2L	-55~+125	-1000~+350

★ Class Ⅱ

Symbol	EIA Code	Operation Temperature Range(℃)	Capacitance Change(△C %)
A	X5R	-55~+85	±15
B	X7R	-55~+125	±15
X	X6S	-55~+105	±22
F	Y5V	-30~+85	-82~+22

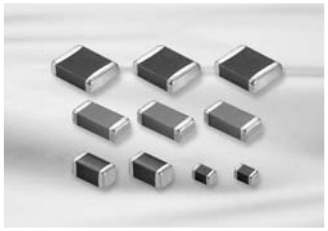
★★

Series	TC	Capacitance Step											
E-3	Y5V	1.0				2.2				4.7			
E-6	X5R X7R X6S	1.0		1.5		2.2		3.3		4.7		6.8	
E-12	C0G TC series	1.0	1.2	1.5	1.8	2.2	2.7	3.3	3.9	4.7	5.6	6.8	8.2

★★★

Size	Code	Thickness(mm)	Spec(mm)	Size	Code	Thickness(mm)	Spec(mm)
0201(0603)	3	0.30	±0.03	1210(3225)	H	1.60	±0.20
0402(1005)	5	0.50	±0.05		U	1.80	±0.20
0603(1608)	8	0.80	±0.10		I	2.00	±0.20
0805(2012)	A	0.65	±0.10		J	2.50	±0.20
	C	0.85	±0.10		*V	2.50	±0.30
	D	1.00	±0.15	1808(4520)	F	1.25	±0.20
	F	1.25	±0.10		H	1.60	±0.20
	*Q	1.25	±0.15		I	2.00	±0.20
1206(3216)	C	0.85	±0.15	1812(4532)	F	1.25	±0.20
	D	1.00	±0.15		H	1.60	±0.20
	E	1.10	±0.10		I	2.00	±0.20
	P	1.15	±0.10		J	2.50	±0.20
	F	1.25	±0.15		L	3.20	±0.30
	H	1.60	±0.20	2220(5750)	F	1.25	±0.20
1210(3225)	C	0.85	±0.10		H	1.60	±0.20
	9	0.90	±0.10		I	2.00	±0.20
	E	1.10	±0.10		J	2.50	±0.20
	M	1.15	±0.10		L	3.20	±0.30
	F	1.25	±0.20				
	S	1.35	±0.15				

General Capacitors



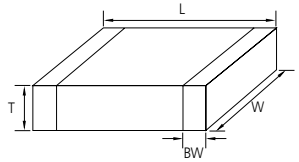
Feature

- Wide selection of size : from 0402 to 2220
- Highly reliable tolerance and high speed automatic chip placement on PCBs
- Wide capacitance range
- Wide temperature compensation and voltage range
  : from C0G to Y5V and from 6.3V to 50V
- Highly reliable performance
- Highly resistant termination metal
- Tape & reel for surface mount assembly

Application

- HHP, DSC, DVC, LCD, TV, Car Navigation, Memory Module, PDA, Game Machine

Structure and Dimensions



Code	EIA Code	Dimension(mm)			
		L	W	T	BW
05	0402	1.0±0.05	0.5±0.05	0.5±0.05	0.2+0.15/-0.1
10	0603	1.6±0.1	0.8±0.1	0.8±0.1	0.3±0.2
21	0805	2.0±0.1	1.25±0.1	1.25±0.1	0.5+0.2/-0.3
		2.0±0.15	1.25±0.15	1.25±0.15	0.5+0.2/-0.3
31	1206	3.2±0.2	1.6±0.2	1.6±0.2	0.5±0.3
		3.2±0.15	1.6±0.15	1.25±0.15	
				0.85±0.15	
32	1210	3.2±0.3	2.5±0.2	2.5±0.2	0.6±0.3
		3.2±0.4	2.5±0.3	2.5±0.3	0.6±0.3
42	1808	4.5±0.4	2.0±0.2	2.0±0.2	0.8±0.3
43	1812	4.5±0.4	3.2±0.3	3.2±0.3	0.8±0.3
55	2220	5.7±0.4	5.0±0.4	3.2±0.3	1.0±0.3

■ Pd MLCC (12th code in part number of pd MLCC = A)
- Class Ⅰ type
  Capacitance ＜10pF (Class Ⅰ. 0402, 0603, 0805 case size)
  Capacitance ＜18pF (Class Ⅰ. 1206 case size)

＊ Except the capacitance range mentioned as above, All other the capacitance range is using Ni inner electrode for Class Ⅰ, Class Ⅱ type(12th code in part number of Ni MLCC = N)

Capacitance Table (General Capacitors)

Size	0402(05)	0603(10)	0805(21)	1206(31)		1210(32)	1812(43)		2220(55)
TC	C0G(C)								
Rated V	50(B)	50(B)	50(B)	25(A)	50(B)	50(B)	25(A)	50(B)	50(B)
	Capacitance -pF- (part numbering code) and thickness -mm-								
0.2(0R2)	0.5 (5)								
0.5(0R5)									
1(010)									
10(100)									
12(120)									
18(180)									
22(220)									
33(330)									
39(390)									
47(470)									
56(560)									
100(101)									
150(151)									
180(181)									
220(221)									
270(271)									
330(331)									
390(391)									
470(471)									
560(561)		0.8 (8)	0.85 (A)						
680(681)									
820(821)									
1000(102)									
1200(122)									
1500(152)									
1800(182)									
2200(222)									
2700(272)			1.25 (F)	0.85 (C)					
3300(332)									
3900(392)									
4700(472)									
5600(562)				1.25 (F)					
6800(682)									
8200(822)									
10000(103)					1.6 (H)				
12000(123)									
15000(153)									
18000(183)									
22000(223)									
27000(273)									
33000(333)									
39000(393)				1.6 (H)		2.0 (T)			
43000(433)									
47000(473)									
56000(563)								2.5 (J)	
68000(683)									
100000(104)							1.6 (H)		2.5 (J)
120000(124)									

:X7R(B) :X5R(A) :Y5V(F) :C0G(C) :X6S(X)

Capacitance Table (General Capacitors)

Size	0402(05)			0603(10)					0805(21)				
TC	U2J(U)/ S2L(L)	T2H(T)	R2H(R)	U2J(U)/ S2L(L)	T2H(T)	R2H(R)	S2H(S)	P2H(P)	U2J(U)/ S2L(L)	T2H(T)	R2H(R)	S2H(S)	P2H(P)
Rated V	50(B)												

Capacitance -pF- (part numbering code) and thickness -mm-

0.5(0R5)	0.5 (5)	0.5 (5)	0.5 (5)				0.8 (8)	0.8 (8)					0.65 (A)
1(010)													
10(100)													
12(120)													
15(150)													
18(180)													
22(220)													
27(270)													
33(330)													
39(390)													
47(470)													
56(560)													
68(680)													
82(820)													
100(101)													
120(121)													
150(151)				0.8 (8)	0.8 (8)	0.8 (8)			0.65 (A)	0.65 (A)	0.65 (A)	0.65 (A)	
180(181)													
220(221)													
270(271)													
330(331)													
390(391)													
470(471)													
560(561)													
680(681)													
820(821)											0.85 (C)	0.85 (C)	0.85 (C)
1000(102)										0.85 (C)			
1200(122)									0.85 (C)				
1500(152)													

:X7R(B) :X5R(A) :Y5V(F) :C0G(C) :X6S(X)

Capacitance Table (General Capacitors)

Size	0402(05)					0603(10)				
TC	X7R(B) / X5R(A)									
Rated V	6.3(Q)	10(P)	16(O)	25(A)	50(B)	6.3(Q)	10(P)	16(O)	25(A)	50(B)

Capacitance -nF- (part numbering code) and thickness -mm-

0.10(101)					0.5 (5)					0.8 (8)
0.15(151)										
0.22(221)										
0.33(331)										
0.47(471)										
0.68(681)										
1.0(102)										
1.5(152)										
2.2(222)										
3.3(332)										
4.7(472)										
6.8(682)										
10(103)										
15(153)				0.5 (5)						
22(223)										
33(333)		0.5 (5)	0.5 (5)							
47(473)			0.5 (5)							
68(683)										
100(104)										
150(154)								0.8 (8)	0.8 (8)	
220(224)										
330(334)	0.5 (5)									
470(474)							0.8 (8)			
680(684)						0.8 (8)				
1000(105)										
1500(155)								0.8 (8)		
2200(225)										
3300(335)						0.8 (8)				
4700(475)										
10000(106)										

:X7R(B) :X5R(A) :Y5V(F) :C0G(C) :X6S(X)

Capacitance Table (General Capacitors)

Size	0805(21)					
TC	X7R(B)/ X5R(A)					
Rated V	4(R)	6.3(Q)	10(P)	16(O)	25(A)	50(B)
	Capacitance -nF- (part numbering code) and thickness -mm-					
0.15(151)						0.65 (A)
0.22(221)						
0.33(331)						
0.47(471)						
0.68(681)						
1.0(102)						
1.5(152)						
2.2(222)						
3.3(332)						
4.7(472)						
6.8(682)						
10(103)						
15(153)						
22(223)						
33(333)						
47(473)					0.65 (A)	0.85 (C)
68(683)				0.65 (A)	0.85 (C)	
100(104)			0.65 (A)	0.85 (C)	1.25 (F)	1.25 (F)
150(154)			0.85 (C)			
220(224)			1.25 (F)	1.25 (F)	0.85 (C)	
330(334)				0.85 (C)	1.25 (F)	
470(474)			0.85 (C)	1.25 (F)		
680(684)			1.25 (F)			
1000(105)						
1500(155)						
2200(225)						
3300(335)						
4700(475)						
6800(685)						
10000(106)						
15000(156)		1.25 (Q)				
22000(226)						
47000(476)	1.25 (Q)					

:X7R(B) :X5R(A) :Y5V(F) :C0G(C) :X6S(X)

Capacitance Table (General Capacitors)

Size	1206(31)					1210(32)				
TC	X7R(B) / X5R(A)									
Rated V	6.3(Q)	10(P)	16(O)	25(A)	50(B)	6.3(Q)	10(P)	16(O)	25(A)	50(B)
	Capacitance -nF- (part numbering code) and thickness -mm-									
1.0(102)										
1.5(152)										
2.2(222)										
3.3(332)										
4.7(472)										
6.8(682)										
10(103)										
15(153)										
22(222)										
33(333)										
47(473)										
68(683)										
100(104)										
150(154)					0.85 (C)					
220(224)				0.85 (C)	1.25 (F)					
330(334)				1.25 (F)	1.6 (H)					1.25 (F)
470(474)			0.85 (C)	1.6 (H)	1.6 (H)				1.25 (F)	1.6 (H)
680(684)		0.85 (C)	1.25 (F)						2.0 (I)	2.0 (I)
1000(105)		1.25 (F)	1.6 (H)	0.85 (C)				1.25 (F)	2.5 (J)	2.5 (J)
1500(155)		1.6 (H)						1.6 (H)	1.6 (T)	
2200(225)			0.85 (C)					2.0 (I)		
3300(335)								2.5 (J)	1.6 (T)	
4700(475)		1.6 (H)					2.0 (I)			
6800(685)	1.6 (H)							2.5 (J)		
10000(106)		1.6 (H)				0.85 (C)				
22000(226)	1.6 (H)					2.5 (J)				
33000(336)						2.5 (V)				
47000(476)										
68000(686)										
100000(107)										

:X7R(B) :X5R(A) :Y5V(F) :C0G(C) :X6S(X)

Capacitance Table (General Capacitors)

Size	1812(43)					2220(55)		
TC	X7R(B) / X5R(A)							
Rated V	6.3(Q)	10(P)	16(O)	25(A)	50(B)	6.3(Q)	10(P)	25(A)
Capacitance -nF- (part numbering code) and thickness -mm-								
10(103)					1.25 (F)			
1000(105)								
1500(155)								
2200(225)								
3300(335)								
4700(475)				2.5 (J)				
6800(685)								2.5 (J)
10000(106)				3.2 (L)				
15000(156)								
22000(226)		2.5 (J)						
33000(336)							2.5 (J)	
47000(476)	2.5 (J)							
100000(107)	3.2 (L)					2.5 (J)		

Capacitance Table (General Capacitors)

Size	0805(21)				1206(31)			
TC	Y5V(F)							
Rated V	10(P)	16(O)	25(A)	50(B)	10(P)	16(O)	25(A)	50(B)
Capacitance -nF- (part numbering code) and thickness -mm-								
2.2(222)				0.65 (A)				
4.7(472)								
10(103)								
22(223)								
47(473)								
100(104)								
220(224)			0.65 (A)					0.85 (C)
470(474)		0.65 (A)	0.85 (C)	1.25 (F)				
1000(105)		0.85 (C)					0.85 (C)	1.25 (F)
2200(225)		1.25 (F)	1.25 (F)			0.85 (C)	1.25 (F)	
4700(475)						1.25 (F)		
10000(106)	1.25 (F)					1.6 (H)		
22000(226)					1.6 (H)			

Size	0402(05)					0603(10)			
TC	Y5V(F)								
Rated V	6.3(Q)	10(P)	16(O)	25(A)	50(B)	6.3(Q)	10(P)	16(O)	50(B)
Capacitance -nF- (part numbering code) and thickness -mm-									
2.2(222)					0.50 (5)				
4.7(472)									
10(103)									
22(223)				0.50 (5)					
47(473)									0.80 (8)
100(104)			0.50 (5)						
220(224)									
470(474)		0.50 (5)							
1000(105)	0.50 (5)							0.80 (8)	
2200(225)							0.80 (8)		
4700(475)						0.80 (8)			

:X7R(B) :X5R(A) :Y5V(F) :C0G(C) :X6S(X)

Size	1210(32)				1812(43)		2220(55)
TC	Y5V(F)						
Rated V	6.3(Q)	10(P)	25(A)	35(L)	16(O)	50(B)	10(P)
Capacitance -nF- (part numbering code) and thickness -mm-							
10(103)							
22(223)							
47(473)							
100(104)							
220(224)							
470(474)							
1000(105)							
2200(225)				1.6 (H)			
4700(475)			1.6 (H)				
10000(106)						2.5 (J)	
22000(226)		2.0 (I)			2.0 (I)		
47000(476)	2.5 (J)						2.5 (J)
100000(107)							

:X7R(B) :X5R(A) :Y5V(F) :C0G(C) :X6S(X)

Product Line UP (General Capacitors)

Part Number	Size L×W (1.0×0.5mm)							Capacitance (pF)	Capacitance Tolerance	Rated Voltage (Vdc)	Thickness Max. (mm)
	C	P	R	S	T	U	L				
	C0G	P2H	R2H	S2H	T2H	U2J	S2L				
CL05○0R2CB5ANN□	●				●	●		0.20	±0.25pF	50	0.55
CL05○0R5CB5ANN□	●				●	●		0.50	±0.25pF	50	0.55
CL05○0R8CB5ANN□	●				●	●		0.80	±0.25pF	50	0.55
CL05○R82CB5ANN□	●				●	●		0.82	±0.25pF	50	0.55
CL05○0R9CB5ANN□	●				●	●		0.90	±0.25pF	50	0.55
CL05○010CB5ANN□	●				●	●		1.00	±0.25pF	50	0.55
CL05○1R2CB5ANN□	●				●	●		1.20	±0.25pF	50	0.55
CL05○1R5CB5ANN□	●				●	●		1.50	±0.25pF	50	0.55
CL05○1R8CB5ANN□	●				●	●		1.80	±0.25pF	50	0.55
CL05○020CB5ANN□	●				●	●		2.00	±0.25pF	50	0.55
CL05○2R2CB5ANN□	●				●	●		2.20	±0.25pF	50	0.55
CL05○2R7CB5ANN□	●				●	●		2.70	±0.25pF	50	0.55
CL05○030CB5ANN□	●				●	●		3.00	±0.25pF	50	0.55
CL05○3R3CB5ANN□	●				●	●		3.30	±0.25pF	50	0.55
CL05○3R9CB5ANN□	●				●	●		3.90	±0.25pF	50	0.55
CL05○040CB5ANN□	●				●	●		4.00	±0.25pF	50	0.55
CL05○4R7CB5ANN□	●				●	●		4.70	±0.25pF	50	0.55
CL05○050DB5ANN□	●				●	●		5.00	±0.5pF	50	0.55
CL05○5R6DB5ANN□	●				●	●		5.60	±0.5pF	50	0.55
CL05○060DB5ANN□	●				●	●		6.00	±0.5pF	50	0.55
CL05○6R8DB5ANN□	●				●	●		6.80	±0.5pF	50	0.55
CL05○070DB5ANN□	●				●	●		7.00	±0.5pF	50	0.55
CL05○080DB5ANN□	●				●	●		8.00	±0.5pF	50	0.55
CL05○8R2DB5ANN□	●				●	●		8.20	±0.5pF	50	0.55
CL05○090DB5ANN□	●				●	●		9.00	±0.5pF	50	0.55
CL05○100JB5NNN□	●							10	±5%	50	0.55
CL05○120JB5NNN□	●							12	±5%	50	0.55
CL05○120JB5ANN□					●	●		12	±5%	50	0.55
CL05○150JB5NNN□	●							15	±5%	50	0.55
CL05○180JB5NNN□	●							18	±5%	50	0.55
CL05○220JB5NNN□	●							22	±5%	50	0.55
CL05○270JB5NNN□	●							27	±5%	50	0.55
CL05○270JB5ANN□					●	●		27	±5%	50	0.55
CL05○330JB5NNN□	●							33	±5%	50	0.55
CL05○330JB5ANN□					●	●		33	±5%	50	0.55

※○mark means temperature characteristic code. The parts with mark ●are available to produce.
※□mark means packaging code. If you want to learn the code or quantity in detail, please see p 58.

Product Line UP (General Capacitors)

Part Number	Size L×W (1.0×0.5mm)							Capacitance (pF)	Capacitance Tolerance	Rated Voltage (Vdc)	Thickness Max. (mm)
	C	P	R	S	T	U	L				
	C0G	P2H	R2H	S2H	T2H	U2J	S2L				
CL05○390JB5NNN□	●							39	±5%	50	0.55
CL05○390JB5ANN□					●	●		39	±5%	50	0.55
CL05○470JB5NNN□	●							47	±5%	50	0.55
CL05○470JB5ANN□					●	●		47	±5%	50	0.55
CL05○560JB5NNN□	●							56	±5%	50	0.55
CL05○560JB5ANN□					●	●		56	±5%	50	0.55
CL05○680JB5NNN□	●							68	±5%	50	0.55
CL05○680JB5ANN□					●	●		68	±5%	50	0.55
CL05○820JB5NNN□	●							82	±5%	50	0.55
CL05○820JB5ANN□						●		82	±5%	50	0.55
CL05○101JB5NNN□	●							100	±5%	50	0.55
CL05○101JB5ANN□						●		100	±5%	50	0.55
CL05○121JB5NNN□	●							120	±5%	50	0.55
CL05○151JB5NNN□	●							150	±5%	50	0.55
CL05○151JB5ANN□						●		150	±5%	50	0.55
CL05○181JB5NNN□	●							180	±5%	50	0.55
CL05○221JB5NNN□	●							220	±5%	50	0.55
CL05○271JB5NNN□	●							270	±5%	50	0.55
CL05○331JB5NNN□	●							330	±5%	50	0.55
CL05○471JB5NNN□	●							470	±5%	50	0.55

Part Number	Size L×W (1.6×0.8mm)							Capacitance (pF)	Capacitance Tolerance	Rated Voltage (Vdc)	Thickness Max. (mm)
	C	P	R	S	T	U	L				
	C0G	P2H	R2H	S2H	T2H	U2J	S2L				
CL10○0R2CB8ANN□	●		●	●	●	●	●	0.20	±0.25pF	50	0.90
CL10○0R3CB8ANN□	●		●	●	●	●	●	0.30	±0.25pF	50	0.90
CL10○0R4CB8ANN□	●		●	●	●	●	●	0.40	±0.25pF	50	0.90
CL10○R47CB8ANN□	●		●	●	●	●	●	0.47	±0.25pF	50	0.90
CL10○0R5CB8ANN□	●		●	●	●	●	●	0.50	±0.25pF	50	0.90
CL10○R56CB8ANN□	●		●	●	●	●	●	0.56	±0.25pF	50	0.90
CL10○R68CB8ANN□	●		●	●	●	●	●	0.68	±0.25pF	50	0.90
CL10○0R7CB8ANN□	●		●	●	●	●	●	0.70	±0.25pF	50	0.90
CL10○0R8CB8ANN□	●		●	●	●	●	●	0.80	±0.25pF	50	0.90

※○mark means temperature characteristic code. The parts with mark ●are available to produce.
※□mark means packaging code. If you want to learn the code or quantity in detail, please see p 58.

Product Line UP (General Capacitors)

Part Number	Size L×W (1.6×0.8mm)							Capacitance (pF)	Capacitance Tolerance	Rated Voltage (Vdc)	Thickness Max. (mm)
	C	P	R	S	T	U	L				
	C0G	P2H	R2H	S2H	T2H	U2J	S2L				
CL10○R82CB8ANN□	●		●	●	●	●	●	0.82	±0.25pF	50	0.90
CL10○010CB8ANN□	●		●	●	●	●	●	1.00	±0.25pF	50	0.90
CL10○1R2CB8ANN□	●		●	●	●	●	●	1.20	±0.25pF	50	0.90
CL10○1R5CB8ANN□	●		●	●	●	●	●	1.50	±0.25pF	50	0.90
CL10○1R8CB8ANN□	●		●	●	●	●	●	1.80	±0.25pF	50	0.90
CL10○020CB8ANN□	●		●	●	●	●	●	2.00	±0.25pF	50	0.90
CL10○2R2CB8ANN□	●		●	●	●	●	●	2.20	±0.25pF	50	0.90
CL10○2R7CB8ANN□	●		●	●	●	●	●	2.70	±0.25pF	50	0.90
CL10○030CB8ANN□	●		●	●	●	●	●	3.00	±0.25pF	50	0.90
CL10○3R3CB8ANN□	●		●	●	●	●	●	3.30	±0.25pF	50	0.90
CL10○3R9CB8ANN□	●		●	●	●	●	●	3.90	±0.25pF	50	0.90
CL10○040CB8ANN□	●		●	●	●	●	●	4.00	±0.25pF	50	0.90
CL10○4R7CB8ANN□	●		●	●	●	●	●	4.70	±0.25pF	50	0.90
CL10○050DB8ANN□	●		●	●	●	●	●	5.00	±0.5pF	50	0.90
CL10○5R6DB8ANN□	●		●	●	●	●	●	5.60	±0.5pF	50	0.90
CL10○060DB8ANN□	●		●	●	●	●	●	6.00	±0.5pF	50	0.90
CL10○6R8DB8ANN□	●		●	●	●	●	●	6.80	±0.5pF	50	0.90
CL10○070DB8ANN□	●		●	●	●	●	●	7.00	±0.5pF	50	0.90
CL10○080DB8ANN□	●		●	●	●	●	●	8.00	±0.5pF	50	0.90
CL10○8R2DB8ANN□	●		●	●	●	●	●	8.20	±0.5pF	50	0.90
CL10○090DB8ANN□	●		●	●	●	●	●	9.00	±0.5pF	50	0.90
CL10○100JB8NNN□	●							10	±5%	50	0.90
CL10○100JB8ANN□			●	●	●	●	●	10	±5%	50	0.90
CL10○120JB8NNN□	●							12	±5%	50	0.90
CL10○120JB8ANN□			●	●	●	●	●	12	±5%	50	0.90
CL10○150JB8NNN□	●							15	±5%	50	0.90
CL10○150JB8ANN□			●	●	●	●	●	15	±5%	50	0.90
CL10○180JB8NNN□	●							18	±5%	50	0.90
CL10○180JB8ANN□			●	●	●	●	●	18	±5%	50	0.90
CL10○220JB8NNN□	●							22	±5%	50	0.90
CL10○220JB8ANN□			●	●	●	●	●	22	±5%	50	0.90
CL10○270JB8NNN□	●							27	±5%	50	0.90
CL10○270JB8ANN□			●		●	●	●	27	±5%	50	0.90
CL10○330JB8NNN□	●							33	±5%	50	0.90
CL10○330JB8ANN□			●		●	●	●	33	±5%	50	0.90

※○mark means temperature characteristic code. The parts with mark ●are available to produce.
※□mark means packaging code. If you want to learn the code or quantity in detail, please see p 58.

SAMSUNG ELECTRO-MECHANICS

Product Line UP (General Capacitors)

Part Number	Size L×W (1.6×0.8mm)							Capacitance (pF)	Capacitance Tolerance	Rated Voltage (Vdc)	Thickness Max. (mm)
	C	P	R	S	T	U	L				
	C0G	P2H	R2H	S2H	T2H	U2J	S2L				
CL10○390JB8NNN□	●							39	±5%	50	0.90
CL10○390JB8ANN□			●		●	●	●	39	±5%	50	0.90
CL10○470JB8NNN□	●							47	±5%	50	0.90
CL10○470JB8ANN□			●		●	●	●	47	±5%	50	0.90
CL10○560JB8NNN□	●							56	±5%	50	0.90
CL10○560JB8ANN□			●		●	●		56	±5%	50	0.90
CL10○680JB8NNN□	●							68	±5%	50	0.90
CL10○680JB8ANN□			●		●	●		68	±5%	50	0.90
CL10○820JB8NNN□	●							82	±5%	50	0.90
CL10○820JB8ANN□			●		●	●		82	±5%	50	0.90
CL10○101JB8NNN□	●							100	±5%	50	0.90
CL10○101JB8ANN□			●		●	●		100	±5%	50	0.90
CL10○121JB8NNN□	●							120	±5%	50	0.90
CL10○121JB8ANN□			●		●	●		120	±5%	50	0.90
CL10○151JB8NNN□	●							150	±5%	50	0.90
CL10○151JB8ANN□			●		●	●		150	±5%	50	0.90
CL10○181JB8NNN□	●							180	±5%	50	0.90
CL10○181JB8ANN□			●		●	●		180	±5%	50	0.90
CL10○221JB8NNN□	●							220	±5%	50	0.90
CL10○221JB8ANN□					●	●		220	±5%	50	0.90
CL10○271JB8NNN□	●							270	±5%	50	0.90
CL10○271JB8ANN□					●	●		270	±5%	50	0.90
CL10○331JB8NNN□	●							330	±5%	50	0.90
CL10○331JB8ANN□					●	●		330	±5%	50	0.90
CL10○391JB8NNN□	●							390	±5%	50	0.90
CL10○471JB8NNN□	●							470	±5%	50	0.90
CL10○471JB8ANN□						●		470	±5%	50	0.90
CL10○561JB8NNN□	●							560	±5%	50	0.90
CL10○681JB8NNN□	●							680	±5%	50	0.90
CL10○681JB8ANN□						●		680	±5%	50	0.90
CL10○821JB8NNN□	●							820	±5%	50	0.90
CL10○102JB8NNN□	●							1000	±5%	50	0.90
CL10○122JB8NNN□	●							1200	±5%	50	0.90
CL10○222JB8NNN□	●							2200	±5%	50	0.90
CL10○332JA8NNN□	●							3300	±5%	25	0.90

※○mark means temperature characteristic code. The parts with mark ●are available to produce.
※□mark means packaging code. If you want to learn the code or quantity in detail, please see p 58.

Product Line UP (General Capacitors)

Part Number	Size L×W (2.0×1.25mm)							Capacitance (pF)	Capacitance Tolerance	Rated Voltage (Vdc)	Thickness Max. (mm)
	C	P	R	S	T	U	L				
	C0G	P2H	R2H	S2H	T2H	U2J	S2L				
CL21○R47CBAANN□	●	●	●	●	●	●	●	0.47	±0.25pF	50	0.75
CL21○0R5CBAANN□	●	●	●	●	●	●	●	0.50	±0.25pF	50	0.75
CL21○R68CBAANN□	●	●	●	●	●	●	●	0.68	±0.25pF	50	0.75
CL21○R82CBAANN□	●	●	●	●	●	●	●	0.82	±0.25pF	50	0.75
CL21○010CBAANN□	●	●	●	●	●	●	●	1.00	±0.25pF	50	0.75
CL21○1R2CBAANN□	●	●	●	●	●	●	●	1.20	±0.25pF	50	0.75
CL21○1R5CBAANN□	●	●	●	●	●	●	●	1.50	±0.25pF	50	0.75
CL21○1R8CBAANN□	●	●	●	●	●	●	●	1.80	±0.25pF	50	0.75
CL21○020CBAANN□	●	●	●	●	●	●	●	2.00	±0.25pF	50	0.75
CL21○2R2CBAANN□	●	●	●	●	●	●	●	2.20	±0.25pF	50	0.75
CL21○2R7CBAANN□	●	●	●	●	●	●	●	2.70	±0.25pF	50	0.75
CL21○030CBAANN□	●	●	●	●	●	●	●	3.00	±0.25pF	50	0.75
CL21○3R3CBAANN□	●	●	●	●	●	●	●	3.30	±0.25pF	50	0.75
CL21○3R9CBAANN□	●	●	●	●	●	●	●	3.90	±0.25pF	50	0.75
CL21○040CBAANN□	●	●	●	●	●	●	●	4.00	±0.25pF	50	0.75
CL21○4R7CBAANN□	●	●	●	●	●	●	●	4.70	±0.25pF	50	0.75
CL21○050DBAANN□	●	●	●	●	●	●	●	5.00	±0.5pF	50	0.75
CL21○5R6DBAANN□	●	●	●	●	●	●	●	5.60	±0.5pF	50	0.75
CL21○060DBAANN□	●	●	●	●	●	●	●	6.00	±0.5pF	50	0.75
CL21○6R8DBAANN□	●	●	●	●	●	●	●	6.80	±0.5pF	50	0.75
CL21○070DBAANN□	●	●	●	●	●	●	●	7.00	±0.5pF	50	0.75
CL21○080DBAANN□	●	●	●	●	●	●	●	8.00	±0.5pF	50	0.75
CL21○8R2DBAANN□	●	●	●	●	●	●	●	8.20	±0.5pF	50	0.75
CL21○090DBAANN□	●	●	●	●	●	●	●	9.00	±0.5pF	50	0.75
CL21○100JBANNN□	●							10	±5%	50	0.75
CL21○100JBAANN□			●	●	●	●	●	10	±5%	50	0.75
CL21○120JBANNN□	●							12	±5%	50	0.75
CL21○120JBAANN□			●	●	●	●	●	12	±5%	50	0.75
CL21○150JBANNN□	●							15	±5%	50	0.75
CL21○180JBANNN□	●							18	±5%	50	0.75
CL21○220JBANNN□	●							22	±5%	50	0.75
CL21○270JBANNN□	●							27	±5%	50	0.75
CL21○330JBANNN□	●							33	±5%	50	0.75
CL21○390JBANNN□	●							39	±5%	50	0.75
CL21○470JBANNN□	●							47	±5%	50	0.75

※○mark means temperature characteristic code. The parts with mark ●are available to produce.
※□mark means packaging code. If you want to learn the code or quantity in detail, please see p 58.

Product Line UP (General Capacitors)

Part Number	Size L×W (2.0×1.25mm)							Capacitance (pF)	Capacitance Tolerance	Rated Voltage (Vdc)	Thickness Max. (mm)
	C	P	R	S	T	U	L				
	C0G	P2H	R2H	S2H	T2H	U2J	S2L				
CL21○560JBANNN□	●							56	±5%	50	0.75
CL21○680JBANNN□	●							68	±5%	50	0.75
CL21○820JBANNN□	●							82	±5%	50	0.75
CL21○101JBANNN□	●							100	±5%	50	0.75
CL21○101JBAANN□			●	●	●	●	●	100	±5%	50	0.75
CL21○121JBANNN□	●							120	±5%	50	0.75
CL21○151JBANNN□	●							150	±5%	50	0.75
CL21○181JBANNN□	●							180	±5%	50	0.75
CL21○221JBANNN□	●							220	±5%	50	0.75
CL21○271JBANNN□	●							270	±5%	50	0.75
CL21○331JBANNN□	●							330	±5%	50	0.75
CL21○331JBAANN□			●	●	●	●	●	330	±5%	50	0.75
CL21○391JBANNN□	●							390	±5%	50	0.75
CL21○471JBANNN□	●							470	±5%	50	0.75
CL21○471JBAANN□			●	●	●	●	●	470	±5%	50	0.75
CL21○561JBANNN□	●							560	±5%	50	0.75
CL21○821JBCNNN□	●							820	±5%	50	0.95
CL21○821JBAANN□			●	●	●	●	●	820	±5%	50	0.75
CL21○102JBCNNN□	●							1000	±5%	50	0.95
CL21○122JBFNNN□	●							1200	±5%	50	1.35
CL21○152JBFNNN□	●							1500	±5%	50	1.35
CL21○182JBFNNN□	●							1800	±5%	50	1.35
CL21○222JBFNNN□	●							2200	±5%	50	1.35
CL21○332JAFNNN□	●							3300	±5%	25	1.35
CL21○332JBFNNN□	●							3300	±5%	50	1.35
CL21○392JBFNNN□	●							3900	±5%	50	1.35
CL21○472JAFNNN□	●							4700	±5%	25	1.35
CL21○472JBFNNN□	●							4700	±5%	50	1.35
CL21○562JBFNNN□	●							5600	±5%	50	1.35
CL21○103JBFNNN□	●							10000	±5%	50	1.35

※○mark means temperature characteristic code. The parts with mark ●are available to produce.
※□mark means packaging code. If you want to learn the code or quantity in detail, please see p 58.

Product Line UP (General Capacitors)

Part Number	Size L×W (3.2×1.6(2.5)mm)							Capacitance (pF)	Capacitance Tolerance	Rated Voltage (Vdc)	Thickness Max. (mm)
	C	P	R	S	T	U	L				
	C0G	P2H	R2H	S2H	T2H	U2J	S2L				
CL31○122JBCNNN□	●							1200	±5%	50	0.75
CL31○152JBCNNN□	●							1500	±5%	50	0.75
CL31○182JBCNNN□	●							1800	±5%	50	0.75
CL31○222JBCNNN□	●							2200	±5%	50	0.75
CL31○472JBFNNN□	●							4700	±5%	50	1.35
CL31○562JBHNNN□	●							5600	±5%	50	1.80
CL31○682JBHNNN□	●							6800	±5%	50	1.80
CL31○103JAFNNN□	●							10000	±5%	25	1.35
CL32○103JBFNNN□	●							10000	±5%	50	1.35

Part Number	Size L×W (1.0×0.5mm)			Capacitance	Capacitance Tolerance	Rated Voltage (Vdc)	Thickness Max. (mm)
	A	B	F				
	X5R(EIA)	X7R(EIA)	Y5V(EIA)				
CL05○221KB5NNN□		●		0.22㎋	±10%	50	0.55
CL05○331KB5NNN□		●		0.33㎋	±10%	50	0.55
CL05○471KB5NNN□		●		0.47㎋	±10%	50	0.55
CL05○681KB5NNN□		●		0.68㎋	±10%	50	0.55
CL05○102KB5NNN□		●		1.0㎋	±10%	50	0.55
CL05○152KB5NNN□		●		1.5㎋	±10%	50	0.55
CL05○222KB5NNN□		●		2.2㎋	±10%	50	0.55
CL05○332KB5NNN□		●		3.3㎋	±10%	50	0.55
CL05○472KB5NNN□		●		4.7㎋	±10%	50	0.55
CL05○682KB5NNN□		●		6.8㎋	±10%	50	0.55
CL05○103KB5NNN□		●		10㎋	±10%	50	0.55
CL05○103ZB5NNN□			●	10㎋	+80%~-20%	50	0.55
CL05○102KA5NNN□		●		1㎋	±10%	25	0.55
CL05○222KA5NNN□		●		2.2㎋	±10%	25	0.55
CL05○332KA5NNN□		●		3.3㎋	±10%	25	0.55
CL05○472KA5NNN□		●		4.7㎋	±10%	25	0.55
CL05○682KA5NNN□		●		6.8㎋	±10%	25	0.55
CL05○103KA5NNN□		●		10㎋	±10%	25	0.55

※○mark means temperature characteristic code. The parts with mark ●are available to produce.
※□mark means packaging code. If you want to learn the code or quantity in detail, please see p 58.

Product Line UP (General Capacitors)

Part Number	Size L×W (1.0×0.5mm)			Capacitance	Capacitance Tolerance	Rated Voltage (Vdc)	Thickness Max. (mm)
	A	B	F				
	X5R(EIA)	X7R(EIA)	Y5V(EIA)				
CL05○153KA5NNN□		●		15㎋	±10%	25	0.55
CL05○223KA5NNN□		●		22㎋	±10%	25	0.55
CL05○223ZA5NNN□			●	22㎋	+80%~-20%	25	0.55
CL05○102KO5NNN□		●		1.0㎋	±10%	16	0.55
CL05○472KO5NNN□		●		4.7㎋	±10%	16	0.55
CL05○682KO5NNN□		●		6.8㎋	±10%	16	0.55
CL05○103KO5NNN□		●		10㎋	±10%	16	0.55
CL05○103ZO5NNN□			●	10㎋	+80%~-20%	16	0.55
CL05○153KO5NNN□		●		15㎋	±10%	16	0.55
CL05○223KO5NNN□		●		22㎋	±10%	16	0.55
CL05○223ZO5NNN□			●	22㎋	+80%~-20%	16	0.55
CL05○333KO5NNN□		●		33㎋	±10%	16	0.55
CL05○473KO5NNN□		●		47㎋	±10%	16	0.55
CL05○473ZO5NNN□			●	47㎋	+80%~-20%	16	0.55
CL05○683KO5NNN□		●		68㎋	±10%	16	0.55
CL05○104KO5NNN□	●	●		100㎋	±10%	16	0.55
CL05○104ZO5NNN□			●	100㎋	+80%~-20%	16	0.55
CL05○224ZO5NNN□			●	220㎋	+80%~-20%	16	0.55
CL05○103KP5NNN□		●		10㎋	±10%	10	0.55
CL05○333KP5NNN□		●		33㎋	±10%	10	0.55
CL05○473KP5NNN□		●		47㎋	±10%	10	0.55
CL05○683KP5NNN□		●		68㎋	±10%	10	0.55
CL05○104KP5NNN□	●	●		100㎋	±10%	10	0.55
CL05○224ZP5NNN□			●	220㎋	+80%~-20%	10	0.55
CL05○474ZP5NNN□			●	470㎋	+80%~-20%	10	0.55
CL05○104KQ5NNN□	●	●		100㎋	±10%	6.3	0.55
CL05○474KQ5NNN□			●	470㎋	+80%~-20%	6.3	0.55

※○mark means temperature characteristic code. The parts with mark ●are available to produce.
※□mark means packaging code. If you want to learn the code or quantity in detail, please see p 58.

Product Line UP (General Capacitors)

Part Number	Size L×W (1.6×0.8mm) A X5R(EIA)	B X7R(EIA)	F Y5V(EIA)	Capacitance	Capacitance Tolerance	Rated Voltage (Vdc)	Thickness Max. (mm)
CL10○101KB8NNN□		●		0.10㎋	±10%	50	0.90
CL10○151KB8NNN□		●		0.15㎋	±10%	50	0.90
CL10○221KB8NNN□		●		0.22㎋	±10%	50	0.90
CL10○331KB8NNN□		●		0.33㎋	±10%	50	0.90
CL10○471KB8NNN□		●		0.47㎋	±10%	50	0.90
CL10○681KB8NNN□		●		0.68㎋	±10%	50	0.90
CL10○102KB8NNN□		●		1.0㎋	±10%	50	0.90
CL10○152KB8NNN□		●		1.5㎋	±10%	50	0.90
CL10○222KB8NNN□		●		2.2㎋	±10%	50	0.90
CL10○332KB8NNN□		●		3.3㎋	±10%	50	0.90
CL10○472KB8NNN□		●		4.7㎋	±10%	50	0.90
CL10○682KB8NNN□		●		6.8㎋	±10%	50	0.90
CL10○103KB8NNN□		●		10㎋	±10%	50	0.90
CL10○103ZB8NNN□			●	10㎋	+80%~-20%	50	0.90
CL10○153KB8NNN□		●		15㎋	±10%	50	0.90
CL10○223KB8NNN□		●		22㎋	±10%	50	0.90
CL10○223ZB8NNN□			●	22㎋	+80%~-20%	50	0.90
CL10○333KB8NNN□		●		33㎋	±10%	50	0.90
CL10○473KB8NNN□		●		47㎋	±10%	50	0.90
CL10○473ZB8NNN□			●	47㎋	+80%~-20%	50	0.90
CL10○683KB8NNN□		●		68㎋	±10%	50	0.90
CL10○104KB8NNN□		●		100㎋	±10%	50	0.90
CL10○104ZB8NNN□			●	100㎋	+80%~-20%	50	0.90
CL10○224ZB8NNN□			●	220㎋	+80%~-20%	50	0.90
CL10○474ZB8NNN□			●	470㎋	+80%~-20%	50	0.90
CL10○102KA8NNN□		●		1.0㎋	±10%	25	0.90
CL10○472KA8NNN□		●		4.7㎋	±10%	25	0.90
CL10○682KA8NNN□		●		6.8㎋	±10%	25	0.90
CL10○103KA8NNN□		●		10㎋	±10%	25	0.90
CL10○153KA8NNN□		●		15㎋	±10%	25	0.90
CL10○223KA8NNN□		●		22㎋	±10%	25	0.90
CL10○223ZA8NNN□			●	22㎋	+80%~-20%	25	0.90
CL10○333KA8NNN□		●		33㎋	±10%	25	0.90
CL10○473KA8NNN□		●		47㎋	±10%	25	0.90
CL10○473ZA8NNN□			●	47㎋	+80%~-20%	25	0.90

※○mark means temperature characteristic code. The parts with mark ●are available to produce.
※□mark means packaging code. If you want to learn the code or quantity in detail, please see p 58.

Product Line UP (General Capacitors)

Part Number	Size L×W (1.6×0.8mm) A X5R(EIA)	B X7R(EIA)	F Y5V(EIA)	Capacitance	Capacitance Tolerance	Rated Voltage (Vdc)	Thickness Max. (mm)
CL10○683KA8NNN□		●		68㎋	±10%	25	0.90
CL10○104KA8NNN□		●		100㎋	±10%	25	0.90
CL10○104ZA8NNN□			●	100㎋	+80%~-20%	25	0.90
CL10○224KA8NNN□	●			220㎋	±10%	25	0.90
CL10○224ZA8NNN□			●	220㎋	+80%~-20%	25	0.90
CL10○334KA8NNN□	●			330㎋	±10%	25	0.90
CL10○474ZA8NNN□			●	470㎋	+80%~-20%	25	0.90
CL10○102KO8NNN□		●		1.0㎋	±10%	16	0.90
CL10○103KO8NNN□		●		10㎋	±10%	16	0.90
CL10○153KO8NNN□		●		15㎋	±10%	16	0.90
CL10○223KO8NNN□		●		22㎋	±10%	16	0.90
CL10○333KO8NNN□		●		33㎋	±10%	16	0.90
CL10○473KO8NNN□		●		47㎋	±10%	16	0.90
CL10○473ZO8NNN□			●	47㎋	+80%~-20%	16	0.90
CL10○683KO8NNN□		●		68㎋	±10%	16	0.90
CL10○104KO8NNN□		●		100㎋	±10%	16	0.90
CL10○104ZO8NNN□			●	100㎋	+80%~-20%	16	0.90
CL10○154KO8NNN□		●		150㎋	±10%	16	0.90
CL10○224KO8NNN□		●		220㎋	±10%	16	0.90
CL10○224ZO8NNN□			●	220㎋	+80%~-20%	16	0.90
CL10○334KO8NNN□		●		330㎋	±10%	16	0.90
CL10○474KO8NNN□		●		470㎋	±10%	16	0.90
CL10○474ZO8NNN□			●	470㎋	+80%~-20%	16	0.90
CL10○105ZO8NNN□			●	1.0㎌	+80%~-20%	16	0.90
CL10○154KP8NNN□		●		150㎋	±10%	10	0.90
CL10○224KP8NNN□	●	●		220㎋	±10%	10	0.90
CL10○334KP8NNN□		●		330㎋	±10%	10	0.90
CL10○474KP8NNN□		●		470㎋	±10%	10	0.90
CL10○474ZP8NNN□			●	470㎋	+80%~-20%	10	0.90
CL10○105ZP8NNN□			●	1.0㎌	+80%~-20%	10	0.90
CL10○474KQ8NNN□		●		470㎋	±10%	6.3	0.90
CL10○684KQ8NNN□		●		680㎋	±10%	6.3	0.90
CL10○105KQ8NNN□		●		1.0㎌	±10%	6.3	0.90

※○mark means temperature characteristic code. The parts with mark ●are available to produce.
※□mark means packaging code. If you want to learn the code or quantity in detail, please see p 58.

Product Line UP (General Capacitors)

Part Number	Size L×W (2.0×1.25mm) A X5R(EIA)	B X7R(EIA)	F Y5V(EIA)	Capacitance	Capacitance Tolerance	Rated Voltage (Vdc)	Thickness Max. (mm)
CL21○151KBANNN□		●		0.15㎋	±10%	50	0.75
CL21○221KBANNN□		●		0.22㎋	±10%	50	0.75
CL21○331KBANNN□		●		0.33㎋	±10%	50	0.75
CL21○471KBANNN□		●		0.47㎋	±10%	50	0.75
CL21○681KBANNN□		●		0.68㎋	±10%	50	0.75
CL21○102KBANNN□		●		1.0㎋	±10%	50	0.75
CL21○152KBANNN□		●		1.5㎋	±10%	50	0.75
CL21○222KBANNN□		●		2.2㎋	±10%	50	0.75
CL21○332KBANNN□		●		3.3㎋	±10%	50	0.75
CL21○332KBCNNN□		●		3.3㎋	±10%	50	0.95
CL21○472KBANNN□		●		4.7㎋	±10%	50	0.75
CL21○682KBANNN□		●		6.8㎋	±10%	50	0.75
CL21○103KBANNN□		●		10㎋	±10%	50	0.75
CL21○103KBCNNN□		●		10㎋	±10%	50	0.95
CL21○103ZBANNN□			●	10㎋	+80%~-20%	50	0.75
CL21○153KBANNN□		●		15㎋	±10%	50	0.75
CL21○223KBANNN□		●		22㎋	±10%	50	0.75
CL21○223ZBANNN□			●	22㎋	+80%~-20%	50	0.75
CL21○333KBANNN□		●		33㎋	±10%	50	0.75
CL21○473ZBANNN□			●	47㎋	+80%~-20%	50	0.75
CL21○683KBCNNN□		●		68㎋	±10%	50	0.95
CL21○104KBCNNN□		●		100㎋	±10%	50	0.95
CL21○104ZBANNN□			●	100㎋	+80%~-20%	50	0.75
CL21○104ZBCNNN□			●	100㎋	+80%~-20%	50	0.95
CL21○154KBFNNN□		●		150㎋	±10%	50	1.35
CL21○224KBFNNN□		●		220㎋	±10%	50	1.35
CL21○224ZBCNNN□			●	220㎋	+80%~-20%	50	0.95
CL21○474ZBFNNN□			●	470㎋	+80%~-20%	50	1.35
CL21○105ZBFNNN□			●	1.0㎌	+80%~-20%	50	1.35
CL21○102KAANNN□		●		1.0㎋	±10%	25	0.75
CL21○103KAANNN□		●		10㎋	±10%	25	0.75
CL21○473KAANNN□		●		47㎋	±10%	25	0.75
CL21○683KAANNN□		●		68㎋	±10%	25	0.75
CL21○104KACNNN□		●		100㎋	±10%	25	0.95
CL21○104ZAANNN□			●	100㎋	+80%~-20%	25	0.75

※○mark means temperature characteristic code. The parts with mark ●are available to produce.
※□mark means packaging code. If you want to learn the code or quantity in detail, please see p 58.

Product Line UP (General Capacitors)

Part Number	Size L×W (2.0×1.25mm) A X5R(EIA)	B X7R(EIA)	F Y5V(EIA)	Capacitance	Capacitance Tolerance	Rated Voltage (Vdc)	Thickness Max. (mm)
CL21○154KAFNNN□		●		150㎋	±10%	25	1.35
CL21○224KAFNNN□		●		220㎋	±10%	25	1.35
CL21○224ZAANNN□			●	220㎋	+80%~-20%	25	0.75
CL21○334KAFNNN□		●		330㎋	±10%	25	1.35
CL21○474KAFNNN□		●		470㎋	±10%	25	1.35
CL21○474ZACNNN□			●	470㎋	+80%~-20%	25	0.95
CL21○105ZAFNNN□			●	1.0㎌	+80%~-20%	25	1.35
CL21○225ZAFNNN□			●	2.2㎌	+80%~-20%	25	1.35
CL21○153KOANNN□		●		15㎋	±10%	16	0.75
CL21○333KOANNN□		●		33㎋	±10%	16	0.75
CL21○104KOANNN□		●		100㎋	±10%	16	0.75
CL21○104ZOANNN□			●	100㎋	+80%~-20%	16	0.75
CL21○154KOANNN□		●		150㎋	±10%	16	0.75
CL21○224KOCNNN□		●		220㎋	±10%	16	0.95
CL21○224ZOANNN□			●	220㎋	+80%~-20%	16	0.75
CL21○334KOCNNN□		●		330㎋	±10%	16	0.95
CL21○474KOFNNN□		●		470㎋	±10%	16	1.35
CL21○474ZOANNN□			●	470㎋	+80%~-20%	16	0.75
CL21○474ZOCNNN□			●	470㎋	+80%~-20%	16	0.95
CL21○684KOFNNN□		●		680㎋	±10%	16	1.35
CL21○105KOFNNN□		●		1.0㎌	±10%	16	1.35
CL21○105ZOCNNN□			●	1.0㎌	+80%~-20%	16	0.95
CL21○105ZOFNNN□			●	1.0㎌	+80%~-20%	16	1.35
CL21○225ZOFNNN□			●	2.2㎌	+80%~-20%	16	1.35
CL21○475ZOFNNN□			●	4.7㎌	+80%~-20%	16	1.35
CL21○474KPCNNN□		●		470㎋	±10%	10	0.95
CL21○684KPFNNN□		●		680㎋	±10%	10	1.35
CL21○105KPFNNN□		●		1.0㎌	±10%	10	1.35
CL21○225ZPFNNN□			●	2.2㎌	+80%~-20%	10	1.35
CL21○475ZPFNNN□			●	4.7㎌	+80%~-20%	10	1.35

※○mark means temperature characteristic code. The parts with mark ●are available to produce.
※□mark means packaging code. If you want to learn the code or quantity in detail, please see p 58.

Product Line UP (General Capacitors)

Part Number	Size L×W (3.2×1.6mm) A X5R(EIA)	B X7R(EIA)	F Y5V(EIA)	Capacitance	Capacitance Tolerance	Rated Voltage (Vdc)	Thickness Max. (mm)
CL31○154KBCNNN□		●		150㎋	±10%	50	1.00
CL31○334KBFNNN□		●		330㎋	±10%	50	1.40
CL31○474KBHNNN□		●		470㎋	±10%	50	1.8
CL31○474ZBCNNN□			●	470㎋	+80%~-20%	50	1.00
CL31○684KBHNNN□		●		680㎋	±10%	50	1.8
CL31○105KBHNNN□		●		1.0㎌	±10%	50	1.8
CL31○105ZBFNNN□			●	1.0㎌	+80%~-20%	50	1.40
CL31○225KBHNNN□	●			2.2㎌	±10%	50	1.8
CL31○104KACNNN□		●		100㎋	±10%	25	1.00
CL31○154KACNNN□		●		150㎋	±10%	25	1.00
CL31○224KACNNN□		●		220㎋	±10%	25	1.00
CL31○334KACNNN□		●		330㎋	±10%	25	1.00
CL31○684KAHNNN□		●		680㎋	±10%	25	1.8
CL31○105KAHNNN□		●		1.0㎌	±10%	25	1.8
CL31○105ZACNNN□			●	1.0㎌	+80%~-20%	25	1.00
CL31○225KAHNNN□	●			2.2㎌	±10%	25	1.8
CL31○225ZAFNNN□			●	2.2㎌	+80%~-20%	25	1.40
CL31○334KOCNNN□		●		330㎋	±10%	16	1.00
CL31○474KOCNNN□		●		470㎋	±10%	16	1.00
CL31○684KOCNNN□		●		680㎋	±10%	16	1.00
CL31○105ZOCNNN□			●	1.0㎌	+80%~-20%	16	1.00
CL31○155KOFNNN□		●		1.5㎌	±10%	16	1.40
CL31○225KOHNNN□		●		2.2㎌	±10%	16	1.8
CL31○225ZOCNNN□			●	2.2㎌	+80%~-20%	16	1.00
CL31○335KOCLNN□	●			3.3㎌	±10%	16	1.00
CL31○335KOHNNN□	●	●		3.3㎌	±10%	16	1.8
CL31○475ZOENNN□			●	4.7㎌	+80%~-20%	16	1.25
CL31○475ZOFNNN□			●	4.7㎌	+80%~-20%	16	1.40
CL31○106ZOHNNN□			●	10㎌	+80%~-20%	16	1.8
CL31○105KPCNNN□		●		1.0㎌	±10%	10	1.00
CL31○225KPENNN□		●		2.2㎌	±10%	10	1.25
CL31○475KPHNNN□		●		4.7㎌	±10%	10	1.8
CL31○106ZPENNN□			●	10㎌	+80%~-20%	10	1.25
CL31○106ZPFNNN□			●	10㎌	+80%~-20%	10	1.40
CL31○685KQHNNN□		●		6.8㎌	±10%	6.3	1.8
CL31○106KQHNNN□		●		10㎌	±10%	6.3	1.8

※○mark means temperature characteristic code. The parts with mark ●are available to produce.
※□mark means packaging code. If you want to learn the code or quantity in detail, please see p 58.

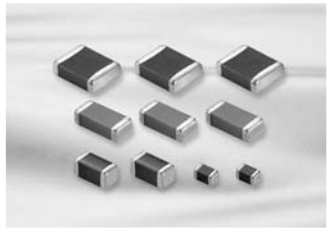
Product Line UP (General Capacitors)

Part Number	Size L×W (3.2×2.5mm) A X5R(EIA)	B X7R(EIA)	F Y5V(EIA)	Capacitance	Capacitance Tolerance	Rated Voltage (Vdc)	Thickness Max. (mm)
CL32○474KBFNNN□		●		470㎋	±10%	50	1.45
CL32○225KBJNNN□		●		2.2㎌	±10%	50	2.70
CL32○475KLULNN□	●			4.7㎌	±10%	35	2.00
CL32○106KLULNN□	●			10㎌	±10%	35	2.00
CL32○106ZLHNNN□			●	10㎌	+80%~-20%	35	1.80
CL32○105KAFNNN□		●		1.0㎌	±10%	25	1.45
CL32○475KAULNN□	●			4.7㎌	±10%	25	2.00
CL32○475KAINNN□	●			4.7㎌	±10%	25	2.20
CL32○475ZAHNNN□			●	4.7㎌	+80%~-20%	25	1.80
CL32○106KA9LNN□	●			10㎌	±10%	25	1.00
CL32○106KATLNN□	●			10㎌	±10%	25	1.70
CL32○106KAULNN□	●			10㎌	±10%	25	2.00
CL32○106KAJNNN□		●		10㎌	±10%	25	2.70
CL32○106KAJSNN□		●		10㎌	±10%	25	2.70
CL32○106ZAHNNN□			●	10㎌	+80%~-20%	25	1.80
CL32○106ZASLNN□			●	10㎌	+80%~-20%	25	1.50
CL32○475KOINNN□		●		4.7㎌	±10%	16	2.20
CL32○475ZO9LNN□			●	4.7㎌	+80%~-20%	16	1.00
CL32○475ZOFNNN□			●	4.7㎌	+80%~-20%	16	1.45
CL32○106KOCLNN□	●			10㎌	±10%	16	0.95
CL32○106KO9LNN□	●			10㎌	±10%	16	1.00
CL32○106KOMLNN□	●			10㎌	±10%	16	1.25
CL32○106KOTLNN□	●			10㎌	±10%	16	1.70
CL32○106KOJNNN□	●	●		10㎌	±10%	16	2.70
CL32○106ZOELNN□			●	10㎌	+80%~-20%	16	1.20
CL32○106ZOHNNN□			●	10㎌	+80%~-20%	16	1.80
CL32○106ZOMLNN□			●	10㎌	+80%~-20%	16	1.25
CL32○106KPINNN□	●	●		10㎌	±10%	10	2.20

Part Number	Size L×W (4.5×3.2mm) A X5R(EIA)	B X7R(EIA)	F Y5V(EIA)	Capacitance	Capacitance Tolerance	Rated Voltage (Vdc)	Thickness Max. (mm)
CL43○684KBFNNN□		●		680㎋	±10%	50	1.45
CL43○105KBFNNN□		●		1㎌	±10%	50	1.45
CL43○106KALNNN□		●		10㎌	±10%	25	3.40

Part Number	Size L×W (5.7×5.0mm) A X5R(EIA)	B X7R(EIA)	F Y5V(EIA)	Capacitance	Capacitance Tolerance	Rated Voltage (Vdc)	Thickness Max. (mm)
CL55○105KBINNN□		●		1㎌	±10%	50	2.20
CL55○476KPJNNN□	●			47㎌	±10%	10	2.70
CL55○107KQJNNN□	●			100㎌	±10%	6.3	2.70
CL55○107ZPJNNN□			●	100㎌	+80%~-20%	10	2.70

※○mark means temperature characteristic code. The parts with mark ●are available to produce.
※□mark means packaging code. If you want to learn the code or quantity in detail, please see p 58.



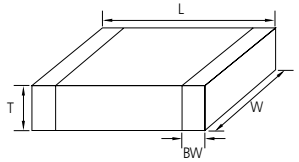
Feature

- Wide selection of size : from 0402 to 1812
- Highly reliable tolerance and high speed automatic chip placement on PCBs
- Wide capacitance range
- Highly reliable performance
- Highly resistant termination metal
- Tape & reel for surface mount assembly

Application

- Desktop PC, Note PC, HHP, DC-DC Converter, DSC
- LCD TV, LCD Monitor

Structure and Dimensions



Code	EIA Code	Dimension(mm)			
		L	W	T	BW
05	0402	1.0±0.05	0.5±0.05	0.5±0.05	0.2+0.15/-0.1
10	0603	1.6±0.1	0.8±0.1	0.8±0.1	0.3±0.2
21	0805	2.0±0.1	1.25±0.1	1.25±0.1	0.5+0.2/-0.3
		2.0±0.15	1.25±0.15	1.25±0.15	0.5+0.2/-0.3
31	1206	3.2±0.2	1.6±0.2	1.6±0.2	0.5±0.3
		3.2±0.15	1.6±0.15	1.25±0.15	
				0.85±0.15	
32	1210	3.2±0.3	2.5±0.2	2.5±0.2	0.6±0.3
		3.2±0.4	2.5±0.3	2.5±0.3	0.6±0.3
42	1808	4.5±0.4	2.0±0.2	2.0±0.2	0.8±0.3
43	1812	4.5±0.4	3.2±0.3	3.2±0.3	0.8±0.3

Capacitance Table (Ultra High Capacitors)

Size	0402(05)			0603(10)				
TC	X5R(A)							
Rated V	4(R)	6.3(Q)	10(P)	4(R)	6.3(Q)	10(P)	16(O)	25(A)
	Capacitance -nF- (part numbering code) and thickness -mm-							
0.10(101)								
0.15(151)								
0.22(221)								
0.33(331)								
0.47(471)								
0.68(681)								
1.0(102)								
1.5(152)								
2.2(222)								
3.3(332)								
4.7(472)								
6.8(682)								
10(103)								
15(153)								
22(223)								
33(333)								
47(473)								
68(683)								
100(104)								
150(154)								
220(224)		0.5 (5)	0.5 (5)					
330(334)								
470(474)						0.8 (8)		0.8 (8)
680(684)								
1000(105)							0.5 (5)	
1500(155)							0.8 (8)	
2200(225)	0.5 (5)				0.8 (8)			
3300(335)								
4700(475)								
10000(106)				0.8 (8)				

:X7R(B) :X5R(A) :Y5V(F) :C0G(C) :X6S(X)

Capacitance Table (Ultra High Capacitors)

Size	0805(21)					1206(31)				1210(32)			1812(43)
TC	X5R(A)												
Rated V	4(R)	6.3(Q)	10(P)	16(O)	25(A)	6.3(Q)	10(P)	16(O)	25(A)	6.3(Q)	10(P)	16(O)	6.3(Q)
Capacitance -nF- (part numbering code) and thickness -mm-													
0.15(151)													
0.22(221)													
0.33(331)													
0.47(471)													
0.68(681)													
1.0(102)													
1.5(152)													
2.2(222)													
3.3(332)													
4.7(472)													
6.8(682)													
10(103)													
15(153)													
22(223)													
33(333)													
47(473)													
68(683)													
100(104)													
150(154)													
220(224)													
330(334)													
390(394)													
470(474)													
680(684)													
1000(105)				1.25 (Q)	1.25 (Q)								
1500(155)													
2200(225)		1.25 (Q)	1.25 (Q)	1.25 (Q)			0.85 (C)	0.85 (C)	0.85 (C)				
3300(335)													
4700(475)		0.85 (C)				1.6 (H)	1.25 (F)		1.6 (H)				
6800(685)													
10000(106)		1.25 (Q)				1.6 (H)				2.5 (V)	2.5 (V)	0.85 (C)	
15000(156)													
22000(226)												2.5 (V)	2.5 (J)
47000(476)	1.25 (Q)												
68000(686)													
100000(107)													3.2 (L)

:X7R(B) :X5R(A) :Y5V(F) :C0G(C) :X6S(X)

Capacitance Table (Ultra High Capacitors)

Size	0402(05)	0603(10)	0805(21)			1206(31)	1210(32)	1812(43)
TC	X7R(B) / X6S(X)							
Rated V	6.3(Q)	6.3(Q)	4(R)	6.3(Q)	10(P)	6.3(Q)	6.3(Q)	10(P)
Capacitance -nF- (part numbering code) and thickness -mm-								
2.2(222)								
4.7(472)								
10(103)								
22(223)								
47(473)								
100(104)								
220(224)								
470(474)								
1000(105)	0.5 (S)	0.8 (8)						
2200(225)				1.25 (F)	1.25 (F)			
4700(475)					1.25 (F)			
10000(106)			1.25 (F)			1.6 (H)		
22000(226)						1.6 (H)	2.5 (J)	2.5 (J)
47000(476)								
100000(107)								

Size	0402(05)	0603(10)		0805(21)	1206(31)	1210(32)	
TC	Y5V(F)						
Rated V	6.3(Q)	6.3(Q)	10(P)	10(P)	10(P)	6.3(Q)	10(P)
Capacitance -nF- (part numbering code) and thickness -mm-							
2.2(222)							
4.7(472)							
10(103)							
22(223)							
47(473)							
100(104)							
220(224)							
470(474)							
1000(105)	0.50 (5)						
2200(225)			0.80 (8)				
4700(475)		0.80 (8)					
10000(106)				1.25 (F)			
22000(226)					1.6 (H)		1.6 (H)
47000(476)							
100000(107)						2.5 (V)	

:X7R(B) :X5R(A) :Y5V(F) :C0G(C) :X6S(X)

Product Line UP (Ultra High Capacitors)

Part Number	TC Code	Temperature Characteristics	Size L×W (mm)	Capacitance	Capacitance Tolerance	Rated Voltage (Vdc)	Thickness Max. (mm)
CL10A474KA8NNN □	X5R(EIA)	±15%(-55~+85℃)	1.60×0.80	0.47㎌	±10%	25	0.90
CL10A105KA8NNN □	X5R(EIA)	±15%(-55~+85℃)	1.60×0.80	1.0㎌	±10%	25	0.90
CL21A105KACLNN □	X5R(EIA)	±15%(-55~+85℃)	2.00×1.25	1.0㎌	±10%	25	1.00
CL21A105KAFNNN □	X5R(EIA)	±15%(-55~+85℃)	2.00×1.25	1.0㎌	±10%	25	1.35
CL21A225KAFNNN □	X5R(EIA)	±15%(-55~+85℃)	2.00×1.25	2.2㎌	±10%	25	1.35
CL31A475KACLNN □	X5R(EIA)	±15%(-55~+85℃)	3.20×1.60	4.7㎌	±10%	25	1.00
CL31A475KAPLNN □	X5R(EIA)	±15%(-55~+85℃)	3.20×1.60	4.7㎌	±10%	25	1.25
CL31A475KAHNNN □	X5R(EIA)	±15%(-55~+85℃)	3.20×1.60	4.7㎌	±10%	25	1.80
CL31A106KAHNNN □	X5R(EIA)	±15%(-55~+85℃)	3.20×1.60	10㎌	±10%	25	1.80
CL10A105KO5LNN □	X5R(EIA)	±15%(-55~+85℃)	1.60×0.80	1.0㎌	±10%	16	0.55
CL10A105KO8NNN □	X5R(EIA)	±15%(-55~+85℃)	1.60×0.80	1.0㎌	±10%	16	0.90
CL21A105KO6LNN □	X5R(EIA)	±15%(-55~+85℃)	2.00×1.25	1.0㎌	±10%	16	0.70
CL21A105KOFNNN □	X5R(EIA)	±15%(-55~+85℃)	2.00×1.25	1.0㎌	±10%	16	1.35
CL10A225KO8NNN □	X5R(EIA)	±15%(-55~+85℃)	1.60×0.80	2.2㎌	±10%	16	0.90
CL21A225KOFNNN □	X5R(EIA)	±15%(-55~+85℃)	2.00×1.25	2.2㎌	±10%	16	1.35
CL21A475KOFNNN □	X5R(EIA)	±15%(-55~+85℃)	2.00×1.25	4.7㎌	±10%	16	1.35
CL31A475KOCLNN □	X5R(EIA)	±15%(-55~+85℃)	3.20×1.60	4.7㎌	±10%	16	1.00
CL31A475KOHNNN □	X5R(EIA)	±15%(-55~+85℃)	3.20×1.60	4.7㎌	±10%	16	1.80
CL31A106KOCLNN □	X5R(EIA)	±15%(-55~+85℃)	3.20×1.60	10㎌	±10%	16	1.00
CL31A106KOHNNN □	X5R(EIA)	±15%(-55~+85℃)	3.20×1.60	10㎌	±10%	16	1.80
CL32A226KOJNNN □	X5R(EIA)	±15%(-55~+85℃)	3.20×2.50	22㎌	±10%	16	2.70
CL10A474KO8NNN □	X5R(EIA)	±15%(-55~+85℃)	1.60×0.80	0.47㎌	±10%	16	0.90
CL05A224KP5NNN □	X5R(EIA)	±15%(-55~+85℃)	1.00×0.50	0.22㎌	±10%	10	0.55
CL10A684KP8NNN □	X5R(EIA)	±15%(-55~+85℃)	1.60×0.80	0.68㎌	±10%	10	0.90
CL05A105KP5NNN □	X5R(EIA)	±15%(-55~+85℃)	1.00×0.50	1.0㎌	±10%	10	0.55
CL21A105KPFNNN □	X5R(EIA)	±15%(-55~+85℃)	2.00×1.25	1.0㎌	±10%	10	1.35
CL10A225KP8NNN □	X5R(EIA)	±15%(-55~+85℃)	1.60×0.80	2.2㎌	±10%	10	0.90
CL21A225KPENNN □	X5R(EIA)	±15%(-55~+85℃)	2.00×1.25	2.2㎌	±10%	10	1.20
CL21A225KPFNNN □	X5R(EIA)	±15%(-55~+85℃)	2.00×1.25	2.2㎌	±10%	10	1.35
CL10A475KP8NNN □	X5R(EIA)	±15%(-55~+85℃)	1.60×0.80	4.7㎌	±10%	10	0.90
CL21A475KPCLNN □	X5R(EIA)	±15%(-55~+85℃)	2.00×1.25	4.7㎌	±10%	10	1.00
CL21A475KPFNNN □	X5R(EIA)	±15%(-55~+85℃)	2.00×1.25	4.7㎌	±10%	10	1.35
CL31A475KP6LNN □	X5R(EIA)	±15%(-55~+85℃)	3.20×1.60	4.7㎌	±10%	10	0.70
CL21A106KPFNNN □	X5R(EIA)	±15%(-55~+85℃)	2.00×1.25	10㎌	±10%	10	1.35
CL31A106KPPLNN □	X5R(EIA)	±15%(-55~+85℃)	3.20×1.60	10㎌	±10%	10	1.25
CL31A106KPHNNN □	X5R(EIA)	±15%(-55~+85℃)	3.20×1.60	10㎌	±10%	10	1.80
CL31A226KPHNNN □	X5R(EIA)	±15%(-55~+85℃)	3.20×1.60	22㎌	±10%	10	1.80

※ □mark means packaging code. If you want to learn the code or quantity in detail, please see p 58.

SAMSUNG ELECTRO-MECHANICS

Product Line UP (Ultra High Capacitors)

Part Number	TC Code	Temperature Characteristics	Size L×W (mm)	Capacitance	Capacitance Tolerance	Rated Voltage (Vdc)	Thickness Max. (mm)
CL32A226KPJNNN □	X5R(EIA)	±15%(-55~+85℃)	3.20×2.50	22㎌	±10%	10	2.70
CL05A224KQ5NNN □	X5R(EIA)	±15%(-55~+85℃)	1.00×0.50	0.22㎌	±10%	6.3	0.55
CL05A334KQ5NNN □	X5R(EIA)	±15%(-55~+85℃)	1.00×0.50	0.33㎌	±10%	6.3	0.55
CL05A474KQ5NNN □	X5R(EIA)	±15%(-55~+85℃)	1.00×0.50	0.47㎌	±10%	6.3	0.55
CL05A105KQ5NNN □	X5R(EIA)	±15%(-55~+85℃)	1.00×0.50	1.0㎌	±10%	6.3	0.55
CL05A225KQ5NSN □	X5R(EIA)	±15%(-55~+85℃)	1.00×0.50	2.2㎌	±10%	6.3	0.57
CL10A225KQ5LNN □	X5R(EIA)	±15%(-55~+85℃)	1.60×0.80	2.2㎌	±10%	6.3	0.55
CL10A225KQ8NNN □	X5R(EIA)	±15%(-55~+85℃)	1.60×0.80	2.2㎌	±10%	6.3	0.90
CL10A335KQ8NNN □	X5R(EIA)	±15%(-55~+85℃)	1.60×0.80	3.3㎌	±10%	6.3	0.90
CL21A335KQFNNN □	X5R(EIA)	±15%(-55~+85℃)	2.00×1.25	3.3㎌	±10%	6.3	1.35
CL10A475KQ8NNN □	X5R(EIA)	±15%(-55~+85℃)	1.60×0.80	4.7㎌	±10%	6.3	0.90
CL21A475KQCLNN □	X5R(EIA)	±15%(-55~+85℃)	2.00×1.25	4.7㎌	±10%	6.3	1.00
CL21A475KQFNNN □	X5R(EIA)	±15%(-55~+85℃)	2.00×1.25	4.7㎌	±10%	6.3	1.35
CL10A106KQ8NNN □	X5R(EIA)	±15%(-55~+85℃)	1.60×0.80	10㎌	±10%	6.3	0.90
CL21A106KQCLNN □	X5R(EIA)	±15%(-55~+85℃)	2.00×1.25	10㎌	±10%	6.3	1.00
CL21A106KQFNNN □	X5R(EIA)	±15%(-55~+85℃)	2.00×1.25	10㎌	±10%	6.3	1.35
CL31A106KQHNNN □	X5R(EIA)	±15%(-55~+85℃)	3.20×1.60	10㎌	±10%	6.3	1.80
CL31A156KQHNNN □	X5R(EIA)	±15%(-55~+85℃)	3.20×1.60	15㎌	±10%	6.3	1.80
CL21A226MQQNNN □	X5R(EIA)	±15%(-55~+85℃)	2.00×1.25	22㎌	±20%	6.3	1.40
CL31A226KQHNNN □	X5R(EIA)	±15%(-55~+85℃)	3.20×1.60	22㎌	±10%	6.3	1.80
CL32A226MQCLNN □	X5R(EIA)	±15%(-55~+85℃)	3.20×2.50	22㎌	±20%	6.3	1.00
CL32A226KQJNNN □	X5R(EIA)	±15%(-55~+85℃)	3.20×2.50	22㎌	±10%	6.3	2.70
CL31A476MQHNNN □	X5R(EIA)	±15%(-55~+85℃)	3.20×1.60	47㎌	±20%	6.3	1.80
CL32A476MQJNNN □	X5R(EIA)	±15%(-55~+85℃)	3.20×2.50	47㎌	±20%	6.3	2.70
CL43A476MQJNNN □	X5R(EIA)	±15%(-55~+85℃)	4.50×3.20	47㎌	±20%	6.3	2.70
CL32A107MQVNNN □	X5R(EIA)	±15%(-55~+85℃)	3.20×2.50	100㎌	±20%	6.3	2.80
CL43A107MQLNNN □	X5R(EIA)	±15%(-55~+85℃)	4.50×3.20	100㎌	±20%	6.3	3.50
CL05A225KR5NNN □	X5R(EIA)	±15%(-55~+85℃)	1.00×0.50	2.2㎌	±10%	4	0.55
CL10A106KR8NNN □	X5R(EIA)	±15%(-55~+85℃)	1.60×0.80	10㎌	±10%	4	0.90
CL21A476MRQNHN □	X5R(EIA)	±15%(-55~+85℃)	2.00×1.25	47㎌	±20%	4	1.40

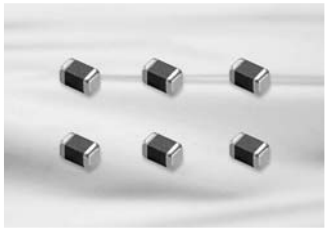
※ □mark means packaging code. If you want to learn the code or quantity in detail, please see p 58.

Product Line UP (Ultra High Capacitors)

Part Number	TC Code	Temperature Characteristics	Size L×W (mm)	Capacitance	Capacitance Tolerance	Rated Voltage (Vdc)	Thickness Max. (mm)
CL05X105KQ5NNN □	X6S(EIA)	±22%(-55~+105℃)	1.00×0.50	1.0㎌	±10%	6.3	0.55
CL10X105KQ8NNN □	X6S(EIA)	±22%(-55~+105℃)	1.60×0.80	1.0㎌	±10%	6.3	0.90
CL21X225KQFNNN □	X6S(EIA)	±22%(-55~+105℃)	2.00×1.25	2.2㎌	±10%	6.3	1.35
CL21X475KQFNNN □	X6S(EIA)	±22%(-55~+105℃)	2.00×1.25	4.7㎌	±10%	6.3	1.35
CL31X106KQHNNN □	X6S(EIA)	±22%(-55~+105℃)	3.20×1.60	10㎌	±10%	6.3	1.80
CL21X106KRFNNN □	X6S(EIA)	±22%(-55~+105℃)	2.00×1.25	10㎌	±10%	4	1.35
CL21B225KPFNNN □	X7R(EIA)	±15%(-55~+125℃)	2.00×1.25	2.2㎌	±10%	10	1.35
CL43B226KOJNNN □	X7R(EIA)	±15%(-55~+125℃)	4.50×3.20	22㎌	±10%	10	2.80
CL21B225KPFNNN □	X7R(EIA)	±15%(-55~+125℃)	2.00×1.25	2.2㎌	±10%	6.3	1.35
CL31B106KQHNNN □	X7R(EIA)	±15%(-55~+125℃)	3.20×1.60	10㎌	±10%	6.3	1.80
CL32B226KQJNNN □	X7R(EIA)	±15%(-55~+125℃)	3.20×2.50	22㎌	±10%	6.3	2.80

Part Number	TC Code	Temperature Characteristics	Size L×W (mm)	Capacitance	Capacitance Tolerance	Rated Voltage (Vdc)	Thickness Max. (mm)
CL10F225ZP8NNN □	Y5V(EIA)	-82~+22%(-30~+85℃)	1.60×0.80	2.2㎌	80%/-20%	10	0.90
CL21F106ZPFNNN □	Y5V(EIA)	-82~+22%(-30~+85℃)	2.00×1.25	10㎌	80%/-20%	10	1.35
CL31F226ZPHNNN □	Y5V(EIA)	-82~+22%(-30~+85℃)	3.20×1.60	22㎌	80%/-20%	10	1.80
CL32F226ZPINNN □	Y5V(EIA)	-82~+22%(-30~+85℃)	3.20×2.50	22㎌	80%/-20%	10	2.20
CL32F226ZPJNNN □	Y5V(EIA)	-82~+22%(-30~+85℃)	3.20×2.50	22㎌	80%/-20%	10	2.80
CL05F105ZQ5NNN □	Y5V(EIA)	-82~+22%(-30~+85℃)	1.00×0.50	1.0㎌	80%/-20%	6.3	0.55
CL10F475ZQ8NNN □	Y5V(EIA)	-82~+22%(-30~+85℃)	1.60×0.80	4.7㎌	80%/-20%	6.3	0.90
CL32F107ZQJNNN □	Y5V(EIA)	-82~+22%(-30~+85℃)	3.20×2.50	100㎌	80%/-20%	6.3	2.80

※□mark means packaging code. If you want to learn the code or quantity in detail, please see p 58.



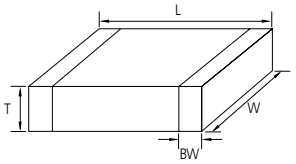
Feature

- Small chip size(0.6×0.3×0.3 mm)
- 03 Series(C0G) MLCC shows very low ESR valae.
- 03 Series are suited to only reflow soldering
- 03 Series are suited to miniature RF module, portable equipment and high frequency circuit

Application

- VCO, Tuner, RF Module
- MCM Module
- Mobile phone, Wireless LAN, Note PC

Structure and Dimensions



Code	EIA Code	Dimension(mm)			
		L	W	T	BW
03	0201	0.6±0.03	0.3±0.03	0.3±0.03	0.15±0.05

Capacitance Table (Super Small Size Capacitors)

Size	0201(03)					
TC	C0G(C)		X7R(B) / X5R(A)			Y5V(F)
Rated V	25(A)	50(B)	6.3(Q)	10(P)	16(O)	6.3(Q)
	Capacitance -pF- (part numbering code) and thickness -mm- (part numbering code)					
0.5(0R5)		0.3 (3)				
0.75(R75)		0.3 (3)				
1.0(010)		0.3 (3)				
2.0(020)		0.3 (3)				
3.0(030)		0.3 (3)				
4.0(040)		0.3 (3)				
5.0(050)		0.3 (3)				
6.0(060)		0.3 (3)				
7.0(070)		0.3 (3)				
8.0(080)		0.3 (3)				
9.0(090)		0.3 (3)				
10(100)		0.3 (3)				
12(120)		0.3 (3)				
15(150)		0.3 (3)				
18(180)		0.3 (3)				
20(200)		0.3 (3)				
22(220)	0.3 (3)					
27(270)	0.3 (3)					
33(330)	0.3 (3)					
39(390)	0.3 (3)					
47(470)	0.3 (3)					
56(560)	0.3 (3)					
68(680)	0.3 (3)					
82(820)	0.3 (3)					
100(101)	0.3 (3)				0.3 (3)	
150(151)					0.3 (3)	
220(221)					0.3 (3)	
330(331)					0.3 (3)	
470(471)					0.3 (3)	
680(681)					0.3 (3)	
1000(102)					0.3 (3)	
1500(152)				0.3 (3)		
2200(222)				0.3 (3)		
3300(332)				0.3 (3)		
4700(472)				0.3 (3)		
6800(682)				0.3 (3)		
10000(103)				0.3 (3)		
15000(153)			0.3 (3)			
22000(223)			0.3 (3)			
33000(333)			0.3 (3)			
47000(473)			0.3 (3)			
68000(683)			0.3 (3)			
100000(104)			0.3 (3)			0.3 (3)

:X7R(B) :X5R(A) :Y5V(F) :C0G(C) :X6S(X)

Product Line UP (Super Small Size Capacitors)

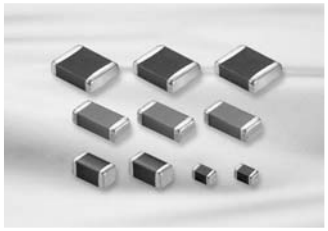
Part Number	TC Code	Temperature Characteristics	Size L×W (mm)	Capacitance	Capacitance Tolerance	Rated Voltage (Vdc)	Thickness Max. (mm)	Remark
CL03C0R5CA3GNN □	C0G(EIA)	±30ppm/℃ (-55~+125℃)	0.60×0.30	0.5pF	±0.25pF	25	0.33	High-Q
CL03C010CA3GNN □	C0G(EIA)	±30ppm/℃ (-55~+125℃)	0.60×0.30	1.0pF	±0.25pF	25	0.33	High-Q
CL03C1R2CA3GNN □	C0G(EIA)	±30ppm/℃ (-55~+125℃)	0.60×0.30	1.2pF	±0.25pF	25	0.33	High-Q
CL03C1R5CA3GNN □	C0G(EIA)	±30ppm/℃ (-55~+125℃)	0.60×0.30	1.5pF	±0.25pF	25	0.33	High-Q
CL03C1R8CA3GNN □	C0G(EIA)	±30ppm/℃ (-55~+125℃)	0.60×0.30	1.8pF	±0.25pF	25	0.33	High-Q
CL03C020CA3GNN □	C0G(EIA)	±30ppm/℃ (-55~+125℃)	0.60×0.30	2.0pF	±0.25pF	25	0.33	High-Q
CL03C2R2CA3GNN □	C0G(EIA)	±30ppm/℃ (-55~+125℃)	0.60×0.30	2.2pF	±0.25pF	25	0.33	High-Q
CL03C2R7CA3GNN □	C0G(EIA)	±30ppm/℃ (-55~+125℃)	0.60×0.30	2.7pF	±0.25pF	25	0.33	High-Q
CL03C030CA3GNN □	C0G(EIA)	±30ppm/℃ (-55~+125℃)	0.60×0.30	3.0pF	±0.25pF	25	0.33	High-Q
CL03C3R3CA3GNN □	C0G(EIA)	±30ppm/℃ (-55~+125℃)	0.60×0.30	3.3pF	±0.25pF	25	0.33	High-Q
CL03C3R9CA3GNN □	C0G(EIA)	±30ppm/℃ (-55~+125℃)	0.60×0.30	3.9pF	±0.25pF	25	0.33	High-Q
CL03C4R7CA3GNN □	C0G(EIA)	±30ppm/℃ (-55~+125℃)	0.60×0.30	4.7pF	±0.25pF	25	0.33	High-Q
CL03C5R6DA3GNN □	C0G(EIA)	±30ppm/℃ (-55~+125℃)	0.60×0.30	5.6pF	±0.5pF	25	0.33	High-Q
CL03C6R8DA3GNN □	C0G(EIA)	±30ppm/℃ (-55~+125℃)	0.60×0.30	6.8pF	±0.5pF	25	0.33	High-Q
CL03C8R2DA3GNN □	C0G(EIA)	±30ppm/℃ (-55~+125℃)	0.60×0.30	8.2pF	±0.5pF	25	0.33	High-Q
CL03C090DA3GNN □	C0G(EIA)	±30ppm/℃ (-55~+125℃)	0.60×0.30	9.0pF	±0.5pF	25	0.33	High-Q
CL03C100JA3GNN □	C0G(EIA)	±30ppm/℃ (-55~+125℃)	0.60×0.30	10pF	±5%	25	0.33	High-Q
CL03C150JA3GNN □	C0G(EIA)	±30ppm/℃ (-55~+125℃)	0.60×0.30	15pF	±5%	25	0.33	High-Q
CL03C180JA3GNN □	C0G(EIA)	±30ppm/℃ (-55~+125℃)	0.60×0.30	18pF	±5%	25	0.33	High-Q
CL03C220JA3GNN □	C0G(EIA)	±30ppm/℃ (-55~+125℃)	0.60×0.30	22pF	±5%	25	0.33	High-Q
CL03C270JA3GNN □	C0G(EIA)	±30ppm/℃ (-55~+125℃)	0.60×0.30	27pF	±5%	25	0.33	High-Q
CL03C330JA3GNN □	C0G(EIA)	±30ppm/℃ (-55~+125℃)	0.60×0.30	33pF	±5%	25	0.33	High-Q
CL03C390JA3ANN □	C0G(EIA)	±30ppm/℃ (-55~+125℃)	0.60×0.30	39pF	±5%	25	0.33	
CL03C470JA3ANN □	C0G(EIA)	±30ppm/℃ (-55~+125℃)	0.60×0.30	47pF	±5%	25	0.33	
CL03C101JA3ANN □	C0G(EIA)	±30ppm/℃ (-55~+125℃)	0.60×0.30	100pF	±5%	25	0.33	

※ □mark means packaging code. If you want to learn the code or quantity in detail, please see p 58.

Product Line UP (Super Small Size Capacitors)

Part Number	TC Code	Temperature Characteristics	Size L×W (mm)	Capacitance	Capacitance Tolerance	Rated Voltage (Vdc)	Thickness Max. (mm)
CL03B331KO3NNN □	X7R(EIA)	±15%(-55~+125℃)	0.60×0.30	0.33㎋	±10%	16	0.33
CL03B102KO3NNN □	X7R(EIA)	±15%(-55~+125℃)	0.60×0.30	1.0㎋	±10%	16	0.33
CL03B472KP3NNN □	X7R(EIA)	±15%(-55~+125℃)	0.60×0.30	4.7㎋	±10%	10	0.33
CL03A103KP3NNN □	X5R(EIA)	±15%(-55~+85℃)	0.60×0.30	10㎋	±10%	10	0.33
CL03B103KP3NNN □	X7R(EIA)	±15%(-55~+125℃)	0.60×0.30	10㎋	±10%	10	0.33
CL03B472KQ3NNN □	X7R(EIA)	±15%(-55~+125℃)	0.60×0.30	4.7㎋	±10%	6.3	0.33
CL03A223KQ3NNN □	X5R(EIA)	±15%(-55~+85℃)	0.60×0.30	22㎋	±10%	6.3	0.33
CL03A473KQ3NNN □	X5R(EIA)	±15%(-55~+85℃)	0.60×0.30	47㎋	±10%	6.3	0.33
CL03A104KQ3NNN □	X5R(EIA)	±15%(-55~+85℃)	0.60×0.30	100㎋	±10%	6.3	0.33

※□mark means packaging code. If you want to learn the code or quantity in detail, please see p 58.



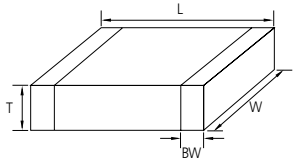
Feature

- Highly reliable performance
- Operating at high voltage level
- Wide voltage level: from 100V to 3000V
- High withstanding voltage
- Tape & reel surface mount assembly

Application

- Switching Power Circuit(SMPS)
- Lighting Ballast, LCD back lighting inverter
- DC-DC converter input filter, snubber circuit
- Tip & Ring(Phone, Fax, Modem)
- Network(IEEE802.3)

Structure and Dimensions



Code	EIA Code	Dimension(mm)			
		L	W	T	BW
10	0603	1.6±0.1	0.8±0.1	0.8±0.1	0.3±0.2
21	0805	2.0±0.1	1.25±0.1	1.25±0.1	0.5+0.2/-0.3
31	1206	3.2±0.2	1.6±0.2	1.6±0.2	0.5±0.3
		3.2±0.15	1.6±0.15	1.25±0.15	
				0.85±0.15	
32	1210	3.2±0.3	2.5±0.2	2.5±0.2	0.6±0.3
42	1808	4.5±0.4	2.0±0.2	2.0±0.2	0.8±0.3
43	1812	4.5±0.4	3.2±0.3	2.5±0.2	0.8±0.3
55	2220	5.7±0.4	5.0±0.4	2.5±0.2	1.0±0.3

Capacitance Table (High Voltage Capacitors)

Size	0603(10)	0805(21)			1206(31)						
TC	C0G(C)										
Rated V	100(C)	100(C)	200(D)	250(E)	100(C)	200(D)	250(E)	500(G)	630(H)	1000(I)	2000(J)
Capacitance -pF- (part numbering code) and thickness -mm-											
0.5(0R5) ~9.1(9R1)	0.80 (8)										
10(100) ~27(270)		0.65 (A)									
33(330)			0.85 (C)	0.85 (C)							1.6 (H)
39(390)											
47(470)										1.25 (F)	
56(560)								1.25 (F)	1.25 (F)		
68(680)											
82(820) ~180(181)											
220(221) ~390(391)					0.85 (C)	0.85 (C)	0.85 (C)			1.6 (H)	150 | 270
470(471)		0.85 (C)	1.25 (F)	1.25 (F)							
560(561)						1.25 (F)	1.25 (F)	1.6 (H)	1.6 (H)		
680(681)					1.25 (F)						
820(821)											
1000(102)											
1200(122)											
1500(152)											
1800(182)											
2200(222)											
2700(272)											
3300(332)											
3900(392)											
4700(472)											
5600(562)											
6800(682)											

:X7R(B) :X5R(A) :Y5V(F) :C0G(C) :X6S(X)

Capacitance Table (High Voltage Capacitors)

Size	1210(32)							1808(42)	
TC	C0G(C)								
Rated V	100(C)	200(D)	250(E)	500(G)	630(H)	1000(I)	2000(J)	2000(J)	3000(K)
Capacitance -pF- (part numbering code) and thickness -mm-									
10(100)									
12(120)									
15(150)									
18(180)									
22(220)									
27(270)									
33(330)									
39(390)									
47(470)									
56(560)									
68(680)									
82(820)									
100(101)									
120(121)									
150(151)									
180(181)									
220(221)									
270(271)									
330(331)									
390(391)									
470(471)									
560(561)									
680(681)									
820(821)									
1000(102)									
1200(122)									
1500(152)									
1800(182)									
2200(222)									
2700(272)									
3300(332)									
3900(392)									
4700(472)									
5600(562)									
6800(682)									
8200(822)									
10000(103)									
12000(123)									
15000(153)									
18000(183)									

:X7R(B) :X5R(A) :Y5V(F) :C0G(C) :X6S(X)

Capacitance Table (High Voltage Capacitors)

Size	1812(43)								2220(55)				
TC	C0G(C)												
Rated V	100(C)	200(D)	250(E)	500(G)	630(H)	1000(I)	2000(J)	3000(K)	250(E)	500(G)	630(H)	1000(I)	3000(K)
Capacitance -pF- (part numbering code) and thickness -mm-													
47(470)							1.25 (F)						
82(820)													
100(101)							1.6 (H)	1.6 (H)					
120(121)													
150(151)													
180(181)													
220(221)							2.0 (I)	2.0 (I)					
270(271)							2.5 (J)	2.5 (J)					
390(391)													
470(471)				1.25 (F)	1.25 (F)	1.25 (F)							
680(681)													2.5 (J)
820(821)				1.25 (F)	1.25 (F)	1.6 (H)							
1000(102)						2.0 (I)							
1200(122)													
1500(152)						2.5 (J)							
1800(182)				1.6 (H)	1.6 (H)								
2200(222)												2.5 (J)	
2700(272)				2.0 (I)	2.0 (I)								
3300(332)													
3600(362)				2.5 (J)	2.5 (J)								
4700(472)													
5600(562)													
6800(682)										2.5 (J)	2.5 (J)		
8200(822)													
10000(103)	1.25 (F)	2.5 (J)	2.5 (J)										
12000(123)													
15000(153)													
18000(183)	1.6 (H)								2.5 (J)				
22000(223)	2.0 (I)												
27000(273)	2.5 (J)												
33000(333)													
39000(393)													
47000(473)													
68000(683)													

:X7R(B) :X5R(A) :Y5V(F) :C0G(C) :X6S(X)

Capacitance Table (High Voltage Capacitors)

Size	0603(10)	0805(21)			1206(31)						
TC	X7R(B)										
Rated V	100(C)	100(C)	200(D)	250(E)	100(C)	200(D)	250(E)	500(G)	630(H)	1000(I)	2000(J)
Capacitance -pF- (part numbering code) and thickness -mm-											
220(221)											
330(331)											
470(471)	0.80 (8)	0.65 (A)	0.85 (C)	0.85 (C)							
680(681)											
1000(102)											
1500(152)											
2200(222)											
3300(332)											
4700(472)											
6800(682)				1.25 (F)							
10000(103)					0.85 (C)						
15000(153)		0.85 (C)									
22000(223)						0.85 (C)					
33000(333)		1.25 (F)									
47000(473)						1.25 (F)	1.25 (F)	1.25 (F)	1.25 (F)	1.25 (F)	1.6 (H)
68000(683)					1.25 (F)	1.6 (H)	1.6 (H)				
100000(104)							★(2.5)				
150000(154)					1.6 (H)						
1000000(105)											

Size	1210(32)						1808(42)
TC	X7R(B)						
Rated V	100(C)	250(E)	500(G)	630(H)	1000(I)	2000(J)	2000(J)
Capacitance -pF- (part numbering code) and thickness -mm-							
470(471)						1.25 (F)	
1000(102)							1.25 (F)
2200(222)							
3300(332)				1.25 (F)			
4700(472)					1.25 (F)		
6800(682)							
10000(103)			1.25 (F)				
15000(153)							
22000(223)							
33000(333)							
47000(473)			1.6 (H)				
68000(683)		2.0 (I)					
100000(104)		2.5 (J)					
150000(154)							
220000(224)	1.6 (H)	★(2.5)					
330000(334)							
470000(474)	2.0 (I)						
680000(684)							
1000000(105)	2.5 (J)						

:X7R(B) :X5R(A) :Y5V(F) :C0G(C) :X6S(X)

★( ) Tip & Ring: A special CODE will be applicable.

Capacitance Table (High Voltage Capacitors)

Size	1812(43)						2220(55)					
TC	X7R(B)											
Rated V	100(C)	200(D)	250(E)	500(G)	1000(I)	2000(J)	100(C)	250(E)	500(G)	630(H)	1000(I)	2000(J)
Capacitance -pF- (part numbering code) and thickness -mm-												
1000(102)						1.25 (F)						
1500(152)					1.25 (F)							
1800(182)												
2700(272)												
3300(332)												1.6 (H)
3900(392)												
4700(472)												
5600(562)												
6800(682)												
8200(822)												
10000(103)				1.25 (F)								
12000(123)					1.6 (H)							
15000(153)												
18000(183)					2.5 (J)							
22000(223)												
27000(273)												
33000(333)												
39000(393)												
47000(473)		1.25 (F)									2.0 (I)	
56000(563)				1.6 (H)								
68000(683)												
82000(823)				2.0 (I)								
100000(104)	1.25 (F)											
120000(124)									1.6 (H)			
150000(154)			2.5 (J)									
180000(184)									2.0 (I)	2.5 (J)		
220000(224)												
270000(274)									2.5 (J)			
330000(334)								2.5 (J)				
470000(474)	1.6 (H)		★(2.5)									
560000(564)	2.0 (I)											
680000(684)							1.6 (H)					
820000(824)	2.5 (J)							★(2.5)				
1000000(105)							2.0 (I)					
1500000(155)												
2200000(225)							2.5 (J)					
3300000(335)												
4700000(475)												

:X7R(B) :X5R(A) :Y5V(F) :C0G(C) :X6S(X)

★( ) Tip & Ring: A special CODE will be applicable.

Product Line UP (High Voltage Capacitors)

Part Number	TC Code	Temperature Characteristics	Rated Voltage (Vdc)	Size L × W (mm)	Capacitance	Capacitance Tolerance	Thickness Max. (mm)
CL42C100JKFNNN □	C0G(EIA)	±30ppm/℃(-55~+125℃)	3000	4.50X2.00	10pF	±5%	1.35
CL31C220JJHNNN □	C0G(EIA)	±30ppm/℃(-55~+125℃)	2000	3.20X1.60	22pF	±5%	1.80
CL31C470JJHNNN □	C0G(EIA)	±30ppm/℃(-55~+125℃)	2000	3.20X1.60	47pF	±5%	1.80
CL32C101JJFNNN □	C0G(EIA)	±30ppm/℃(-55~+125℃)	2000	3.20X2.50	100pF	±5%	1.35
CL31C680JIFNNN □	C0G(EIA)	±30ppm/℃(-55~+125℃)	1000	3.20X1.60	68pF	±5%	1.35
CL31C101JIFNNN □	C0G(EIA)	±30ppm/℃(-55~+125℃)	1000	3.20X1.60	100pF	±5%	1.35
CL43C102JIHNNN □	C0G(EIA)	±30ppm/℃(-55~+125℃)	1000	4.50X3.20	1.0nF	±5%	1.80
CL43C122JIINNN □	C0G(EIA)	±30ppm/℃(-55~+125℃)	1000	4.50X3.20	1.2nF	±5%	2.20
CL43C182JIJNNN □	C0G(EIA)	±30ppm/℃(-55~+125℃)	1000	4.50X3.20	1.8nF	±5%	2.80
CL31C470JHFNNN □	C0G(EIA)	±30ppm/℃(-55~+125℃)	630	3.20X1.60	47pF	±5%	1.35
CL31C680JHFNNN □	C0G(EIA)	±30ppm/℃(-55~+125℃)	630	3.20X1.60	68pF	±5%	1.35
CL31C101JHFNNN □	C0G(EIA)	±30ppm/℃(-55~+125℃)	630	3.20X1.60	100pF	±5%	1.35
CL31C150JGFNNN □	C0G(EIA)	±30ppm/℃(-55~+125℃)	500	3.20X1.60	15pF	±5%	1.35
CL31C180JGFNNN □	C0G(EIA)	±30ppm/℃(-55~+125℃)	500	3.20X1.60	18pF	±5%	1.35
CL31C220JGFNNN □	C0G(EIA)	±30ppm/℃(-55~+125℃)	500	3.20X1.60	22pF	±5%	1.35
CL31C270JGFNNN □	C0G(EIA)	±30ppm/℃(-55~+125℃)	500	3.20X1.60	27pF	±5%	1.35
CL31C330JGFNNN □	C0G(EIA)	±30ppm/℃(-55~+125℃)	500	3.20X1.60	33pF	±5%	1.35
CL31C390JGFNNN □	C0G(EIA)	±30ppm/℃(-55~+125℃)	500	3.20X1.60	39pF	±5%	1.35
CL31C470JGFNNN □	C0G(EIA)	±30ppm/℃(-55~+125℃)	500	3.20X1.60	47pF	±5%	1.35
CL31C560JGFNNN □	C0G(EIA)	±30ppm/℃(-55~+125℃)	500	3.20X1.60	56pF	±5%	1.35
CL31C680JGFNNN □	C0G(EIA)	±30ppm/℃(-55~+125℃)	500	3.20X1.60	68pF	±5%	1.35
CL31C820JGFNCN □	C0G(EIA)	±30ppm/℃(-55~+125℃)	500	3.20X1.60	82pF	±5%	1.35
CL31C101JGFNNN □	C0G(EIA)	±30ppm/℃(-55~+125℃)	500	3.20X1.60	100pF	±5%	1.35
CL31C121JGFNNN □	C0G(EIA)	±30ppm/℃(-55~+125℃)	500	3.20X1.60	120pF	±5%	1.35
CL31C151JGFNNN □	C0G(EIA)	±30ppm/℃(-55~+125℃)	500	3.20X1.60	150pF	±5%	1.35
CL31C181JGFNNN □	C0G(EIA)	±30ppm/℃(-55~+125℃)	500	3.20X1.60	180pF	±5%	1.35
CL31C221JGFNNN □	C0G(EIA)	±30ppm/℃(-55~+125℃)	500	3.20X1.60	220pF	±5%	1.35
CL31C271JGFNNN □	C0G(EIA)	±30ppm/℃(-55~+125℃)	500	3.20X1.60	270pF	±5%	1.35
CL31C331JGFNNN □	C0G(EIA)	±30ppm/℃(-55~+125℃)	500	3.20X1.60	330pF	±5%	1.35
CL31C471JGFNNN □	C0G(EIA)	±30ppm/℃(-55~+125℃)	500	3.20X1.60	470pF	±5%	1.35
CL31C561JGFNNN □	C0G(EIA)	±30ppm/℃(-55~+125℃)	500	3.20X1.60	560pF	±5%	1.35
CL31C681JGFNNN □	C0G(EIA)	±30ppm/℃(-55~+125℃)	500	3.20X1.60	680pF	±5%	1.80
CL31C102JGHNNN □	C0G(EIA)	±30ppm/℃(-55~+125℃)	500	3.20X1.60	1.0nF	±5%	1.80
CL21C101JECNNN □	C0G(EIA)	±30ppm/℃(-55~+125℃)	250	2.00X1.25	100pF	±5%	1.00
CL21C150JDCNNN □	C0G(EIA)	±30ppm/℃(-55~+125℃)	200	2.00X1.25	15pF	±5%	1.00

※ □mark means packaging code. If you want to learn the code or quantity in detail, please see p 58.

Product Line UP (High Voltage Capacitors)

Part Number	TC Code	Temperature Characteristics	Rated Voltage (Vdc)	Size L×W (mm)	Capacitance	Capacitance Tolerance	Thickness Max. (mm)
CL21C180JDCNNN □	C0G(EIA)	±30ppm/℃(-55~+125℃)	200	2.00X1.25	18㎊	±5%	1.00
CL21C330JDCNNN □	C0G(EIA)	±30ppm/℃(-55~+125℃)	200	2.00X1.25	33㎊	±5%	1.00
CL21C390JDCNNN □	C0G(EIA)	±30ppm/℃(-55~+125℃)	200	2.00X1.25	39㎊	±5%	1.00
CL21C470JDCNNN □	C0G(EIA)	±30ppm/℃(-55~+125℃)	200	2.00X1.25	47㎊	±5%	1.00
CL21C560JDCNNN □	C0G(EIA)	±30ppm/℃(-55~+125℃)	200	2.00X1.25	56㎊	±5%	1.00
CL21C680JDCNNN □	C0G(EIA)	±30ppm/℃(-55~+125℃)	200	2.00X1.25	68㎊	±5%	1.00
CL21C101JDCNNN □	C0G(EIA)	±30ppm/℃(-55~+125℃)	200	2.00X1.25	100㎊	±5%	1.00
CL21C121JDCNNN □	C0G(EIA)	±30ppm/℃(-55~+125℃)	200	2.00X1.25	120㎊	±5%	1.00
CL21C221JDCNNN □	C0G(EIA)	±30ppm/℃(-55~+125℃)	200	2.00X1.25	220㎊	±5%	1.00
CL21C102JDFNNN □	C0G(EIA)	±30ppm/℃(-55~+125℃)	200	2.00X1.25	1.0㎋	±5%	1.35
CL10C100JC8NNN □	C0G(EIA)	±30ppm/℃(-55~+125℃)	100	1.60X0.80	10㎊	±5%	0.90
CL21C100JCANNN □	C0G(EIA)	±30ppm/℃(-55~+125℃)	100	2.00X1.25	10㎊	±5%	0.75
CL21C120JCANNN □	C0G(EIA)	±30ppm/℃(-55~+125℃)	100	2.00X1.25	12㎊	±5%	0.75
CL10C150JC8NNN □	C0G(EIA)	±30ppm/℃(-55~+125℃)	100	1.60X0.80	15㎊	±5%	0.90
CL21C150JCANNN □	C0G(EIA)	±30ppm/℃(-55~+125℃)	100	2.00X1.25	15㎊	±5%	0.75
CL21C180JCANNN □	C0G(EIA)	±30ppm/℃(-55~+125℃)	100	2.00X1.25	18㎊	±5%	0.75
CL21C220JCANNN □	C0G(EIA)	±30ppm/℃(-55~+125℃)	100	2.00X1.25	22㎊	±5%	0.75
CL21C270JCANNN □	C0G(EIA)	±30ppm/℃(-55~+125℃)	100	2.00X1.25	27㎊	±5%	0.75
CL21C330JCANNN □	C0G(EIA)	±30ppm/℃(-55~+125℃)	100	2.00X1.25	33㎊	±5%	0.75
CL10C330JC8NNN □	C0G(EIA)	±30ppm/℃(-55~+125℃)	100	1.60X0.80	33㎊	±5%	0.90
CL10C390JC8NNN □	C0G(EIA)	±30ppm/℃(-55~+125℃)	100	1.60X0.80	39㎊	±5%	0.90
CL10C470JC8NNN □	C0G(EIA)	±30ppm/℃(-55~+125℃)	100	1.60X0.80	47㎊	±5%	0.90
CL21C470JCANNN □	C0G(EIA)	±30ppm/℃(-55~+125℃)	100	2.00X1.25	47㎊	±5%	0.75
CL21C560JCCNNN □	C0G(EIA)	±30ppm/℃(-55~+125℃)	100	2.00X1.25	47㎊	±5%	0.75
CL21C680JCANNN □	C0G(EIA)	±30ppm/℃(-55~+125℃)	100	2.00X1.25	68㎊	±5%	0.75
CL31C680JCCNNN □	C0G(EIA)	±30ppm/℃(-55~+125℃)	100	3.20X1.60	68㎊	±5%	1.00
CL21C820JCCNNN □	C0G(EIA)	±30ppm/℃(-55~+125℃)	100	3.20X1.60	82㎊	±5%	1.00
CL10C101JC8NNN □	C0G(EIA)	±30ppm/℃(-55~+125℃)	100	1.60X0.80	100㎊	±5%	0.90
CL21C101JCANNN □	C0G(EIA)	±30ppm/℃(-55~+125℃)	100	2.00X1.25	100㎊	±5%	0.75
CL10C121JC8NNN □	C0G(EIA)	±30ppm/℃(-55~+125℃)	100	1.60X0.80	120㎊	±5%	0.90
CL10C151JC8NNN □	C0G(EIA)	±30ppm/℃(-55~+125℃)	100	1.60X0.80	150㎊	±5%	0.90
CL21C151JCANNN □	C0G(EIA)	±30ppm/℃(-55~+125℃)	100	2.00X1.25	150㎊	±5%	0.75
CL21C221JCANNN □	C0G(EIA)	±30ppm/℃(-55~+125℃)	100	2.00X1.25	220㎊	±5%	0.75
CL31C271JCCNNN □	C0G(EIA)	±30ppm/℃(-55~+125℃)	100	3.20X1.60	270㎊	±5%	1.00
CL21C331JCANNN □	C0G(EIA)	±30ppm/℃(-55~+125℃)	100	2.00X1.25	330㎊	±5%	0.75

※ □mark means packaging code. If you want to learn the code or quantity in detail, please see p 58.

SAMSUNG ELECTRO-MECHANICS

Product Line UP (High Voltage Capacitors)

Part Number	TC Code	Temperature Characteristics	Rated Voltage (Vdc)	Size L×W (mm)	Capacitance	Capacitance Tolerance	Thickness Max. (mm)
CL10C331JC8NNN □	C0G(EIA)	±30ppm/℃(-55~+125℃)	100	1.60X0.80	330㎊	±5%	0.90
CL31C391JCCNNN □	C0G(EIA)	±30ppm/℃(-55~+125℃)	100	3.20X1.60	390㎊	±5%	1.00
CL10C471JC8NNN □	C0G(EIA)	±30ppm/℃(-55~+125℃)	100	1.60X0.80	470㎊	±5%	0.90
CL21C471JCCNNN □	C0G(EIA)	±30ppm/℃(-55~+125℃)	100	2.00X1.25	470㎊	±5%	1.00
CL21C561JCCNNN □	C0G(EIA)	±30ppm/℃(-55~+125℃)	100	2.00X1.25	560㎊	±5%	1.00
CL31C561JCCNNN □	C0G(EIA)	±30ppm/℃(-55~+125℃)	100	3.20X1.60	560㎊	±5%	1.00
CL21C681JCCNNN □	C0G(EIA)	±30ppm/℃(-55~+125℃)	100	2.00X1.25	680㎊	±5%	1.00
CL21C102JCFNNN □	C0G(EIA)	±30ppm/℃(-55~+125℃)	100	2.00X1.25	1.0㎋	±5%	1.35
CL31C102JCCNNN □	C0G(EIA)	±30ppm/℃(-55~+125℃)	100	3.20X1.60	1.0㎋	±5%	1.00
CL31C152JCCNNN □	C0G(EIA)	±30ppm/℃(-55~+125℃)	100	3.20X1.60	1.5㎋	±5%	1.00
CL31C222JCCNNN □	C0G(EIA)	±30ppm/℃(-55~+125℃)	100	3.20X1.60	2.2㎋	±5%	1.00
CL31C392JCHNNN □	C0G(EIA)	±30ppm/℃(-55~+125℃)	100	3.20X1.60	3.9㎋	±5%	1.80

Part Number	TC Code	Temperature Characteristics	Rated Voltage (Vdc)	Size L×W (mm)	Capacitance	Capacitance Tolerance	Thickness Max. (mm)
CL31B102KJHNNN □	X7R(EIA)	±15%(-55~+125℃)	2000	3.20×1.60	1.0㎋	±10%	1.80
CL32B102KJFNNN □	X7R(EIA)	±15%(-55~+125℃)	2000	3.20×2.50	1.0㎋	±10%	1.35
CL43B102KJFNNN □	X7R(EIA)	±15%(-55~+125℃)	2000	4.50×3.20	1.0㎋	±10%	1.35
CL43B152KJFNNN □	X7R(EIA)	±15%(-55~+125℃)	2000	4.50×3.20	1.5㎋	±10%	1.35
CL31B102KIFNNN □	X7R(EIA)	±15%(-55~+125℃)	1000	3.20×1.60	1.0㎋	±10%	1.35
CL31B222KIFNNN □	X7R(EIA)	±15%(-55~+125℃)	1000	3.20×1.60	2.2㎋	±10%	1.35
CL43B222KIFNNN □	X7R(EIA)	±15%(-55~+125℃)	1000	4.50×3.20	2.2㎋	±10%	1.35
CL43B103KIFNNN □	X7R(EIA)	±15%(-55~+125℃)	1000	4.50×3.20	10㎋	±10%	1.35
CL31B102KHFNNN □	X7R(EIA)	±15%(-55~+125℃)	630	3.20×1.60	1.0㎋	±10%	1.35
CL32B472KHFNNN □	X7R(EIA)	±15%(-55~+125℃)	630	3.20×2.50	4.7㎋	±10%	1.35
CL31B103KHFNNN □	X7R(EIA)	±15%(-55~+125℃)	630	3.20×1.60	10㎋	±10%	1.35
CL31B221KGFNNN □	X7R(EIA)	±15%(-55~+125℃)	500	3.20×1.60	0.22㎋	±10%	1.35
CL31B471KGFNNN □	X7R(EIA)	±15%(-55~+125℃)	500	3.20×1.60	0.47㎋	±10%	1.35
CL31B102KGFNNN □	X7R(EIA)	±15%(-55~+125℃)	500	3.20×1.60	1.0㎋	±10%	1.35
CL31B152KGFNNN □	X7R(EIA)	±15%(-55~+125℃)	500	3.20×1.60	1.5㎋	±10%	1.35

※ □mark means packaging code. If you want to learn the code or quantity in detail, please see p 58.

Product Line UP (High Voltage Capacitors)

Part Number	TC Code	Temperature Characteristics	Rated Voltage (Vdc)	Size L×W (mm)	Capacitance	Capacitance Tolerance	Thickness Max. (mm)
CL31B222KGFNNN □	X7R(EIA)	±15%(-55~+125℃)	500	3.20×1.60	2.2㎋	±10%	1.35
CL31B332KGFNNN □	X7R(EIA)	±15%(-55~+125℃)	500	3.20×1.60	3.3㎋	±10%	1.35
CL31B472KGFNNN □	X7R(EIA)	±15%(-55~+125℃)	500	3.20×1.60	4.7㎋	±10%	1.35
CL31B682KGFNNN □	X7R(EIA)	±15%(-55~+125℃)	500	3.20×1.60	6.8㎋	±10%	1.35
CL31B103KGFNNN □	X7R(EIA)	±15%(-55~+125℃)	500	3.20×1.60	10㎋	±10%	1.35
CL32B153KGFNNN □	X7R(EIA)	±15%(-55~+125℃)	500	3.20×2.50	15㎋	±10%	1.35
CL32B223KGFNNN □	X7R(EIA)	±15%(-55~+125℃)	500	3.20×2.50	22㎋	±10%	1.35
CL43B473KGFNNN □	X7R(EIA)	±15%(-55~+125℃)	500	4.50×3.20	47㎋	±10%	1.35
CL43B104KGINNN □	X7R(EIA)	±15%(-55~+125℃)	500	4.50×3.20	100㎋	±10%	2.20
CL21B153KEFNNN □	X7R(EIA)	±15%(-55~+125℃)	250	2.00×1.25	15㎋	±10%	1.35
CL31B473KEHNNN □	X7R(EIA)	±15%(-55~+125℃)	250	3.20×1.60	47㎋	±10%	1.80
CL32B104KEJNNN □	X7R(EIA)	±15%(-55~+125℃)	250	3.20×2.50	100㎋	±10%	2.80
CL43B474KEJNNN □	X7R(EIA)	±15%(-55~+125℃)	250	4.50×3.20	470㎋	±10%	2.80
CL21B221KDCNNN □	X7R(EIA)	±15%(-55~+125℃)	200	2.00×1.25	0.22㎌	±10%	1.00
CL21B331KDCNNN □	X7R(EIA)	±15%(-55~+125℃)	200	2.00×1.25	0.33㎌	±10%	1.00
CL31B471KDCNNN □	X7R(EIA)	±15%(-55~+125℃)	200	3.20×1.60	0.47㎌	±10%	1.00
CL21B102KDCNNN □	X7R(EIA)	±15%(-55~+125℃)	200	2.00×1.25	1.0㎌	±10%	1.00
CL21B222KDCNNN □	X7R(EIA)	±15%(-55~+125℃)	200	2.00×1.25	2.2㎌	±10%	1.00
CL31B222KDCNNN □	X7R(EIA)	±15%(-55~+125℃)	200	3.20×1.60	2.2㎌	±10%	1.00
CL21B472KDCNNN □	X7R(EIA)	±15%(-55~+125℃)	200	2.00×1.25	4.7㎌	±10%	1.00
CL31B472KDCNNN □	X7R(EIA)	±15%(-55~+125℃)	200	3.20×1.60	4.7㎌	±10%	1.00
CL21B103KDCNNN □	X7R(EIA)	±15%(-55~+125℃)	200	2.00×1.25	10㎌	±10%	1.00
CL31B153KDCNNN □	X7R(EIA)	±15%(-55~+125℃)	200	3.20×1.60	15㎌	±10%	1.00
CL31B223KDCNNN □	X7R(EIA)	±15%(-55~+125℃)	200	3.20×1.60	22㎌	±10%	1.00
CL31B333KDFNNN □	X7R(EIA)	±15%(-55~+125℃)	200	3.20×1.60	33㎌	±10%	1.35
CL31B473KDFNNN □	X7R(EIA)	±15%(-55~+125℃)	200	3.20×1.60	47㎌	±10%	1.35
CL32B473KDHNNN □	X7R(EIA)	±15%(-55~+125℃)	200	3.20×2.50	47㎌	±10%	1.80
CL31B104KDHNNN □	X7R(EIA)	±15%(-55~+125℃)	200	3.20×1.60	100㎌	±10%	1.80
CL43B104KDFNNN □	X7R(EIA)	±15%(-55~+125℃)	200	4.50×3.20	100㎌	±10%	1.35
CL21B221KCANNN □	X7R(EIA)	±15%(-55~+125℃)	100	2.00×1.25	0.22㎌	±10%	0.75
CL21B471KCANNN □	X7R(EIA)	±15%(-55~+125℃)	100	2.00×1.25	0.47㎌	±10%	0.75
CL10B102KC8NNN □	X7R(EIA)	±15%(-55~+125℃)	100	1.60×0.80	1.0㎋	±10%	0.90
CL21B102KCANNN □	X7R(EIA)	±15%(-55~+125℃)	100	2.00×1.25	1.0㎋	±10%	0.75
CL21B222KCANNN □	X7R(EIA)	±15%(-55~+125℃)	100	2.00×1.25	2.2㎋	±10%	0.75
CL21B332KCANNN □	X7R(EIA)	±15%(-55~+125℃)	100	2.00×1.25	3.3㎋	±10%	0.75

※ □mark means packaging code. If you want to learn the code or quantity in detail, please see p 58.

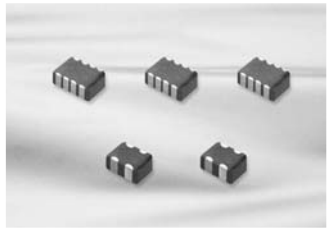
SAMSUNG ELECTRO-MECHANICS

Product Line UP (High Voltage Capacitors)

Part Number	TC Code	Temperature Characteristics	Rated Voltage (Vdc)	Size L×W (mm)	Capacitance	Capacitance Tolerance	Thickness Max. (mm)
CL10B472KC8NNN □	X7R(EIA)	±15%(-55~+125℃)	100	1.60×0.80	4.7㎋	±10%	0.90
CL21B472KCANNN □	X7R(EIA)	±15%(-55~+125℃)	100	2.00×1.25	4.7㎋	±10%	0.75
CL21B682KCANNN □	X7R(EIA)	±15%(-55~+125℃)	100	2.00×1.25	6.8㎋	±10%	0.75
CL10B103KC8NNN □	X7R(EIA)	±15%(-55~+125℃)	100	1.60×0.80	10㎋	±10%	0.90
CL21B103KCANNN □	X7R(EIA)	±15%(-55~+125℃)	100	2.00×1.25	10㎋	±10%	0.75
CL32B103KCFNNN □	X7R(EIA)	±15%(-55~+125℃)	100	3.20×2.50	10㎋	±10%	1.35
CL21B153KCCNNN □	X7R(EIA)	±15%(-55~+125℃)	100	2.00×1.25	15㎋	±10%	1.00
CL31B153KCCNNN □	X7R(EIA)	±15%(-55~+125℃)	100	3.20×1.60	15㎋	±10%	1.00
CL21B223KCFNNN □	X7R(EIA)	±15%(-55~+125℃)	100	2.00×1.50	22㎋	±10%	1.35
CL31B223KCCNNN □	X7R(EIA)	±15%(-55~+125℃)	100	3.20×1.60	22㎋	±10%	1.00
CL31B333KCCNNN □	X7R(EIA)	±15%(-55~+125℃)	100	3.20×1.60	33㎋	±10%	1.00
CL21B473KCFNNN □	X7R(EIA)	±15%(-55~+125℃)	100	2.00×1.25	47㎋	±10%	1.35
CL31B473KCCNNN □	X7R(EIA)	±15%(-55~+125℃)	100	3.20×1.60	47㎋	±10%	1.00
CL31B104KCFNNN □	X7R(EIA)	±15%(-55~+125℃)	100	3.20×1.60	100㎋	±10%	1.35
CL31B154KCHNNN □	X7R(EIA)	±15%(-55~+125℃)	100	3.20×1.60	150㎋	±10%	1.80
CL32B154KCFNNN □	X7R(EIA)	±15%(-55~+125℃)	100	3.20×2.50	150㎋	±10%	1.35
CL32B224KCHNNN □	X7R(EIA)	±15%(-55~+125℃)	100	3.20×2.50	220㎋	±10%	1.80
CL43B224KCFNNN □	X7R(EIA)	±15%(-55~+125℃)	100	4.50×3.20	220㎋	±10%	1.35
CL32B334KCHNNN □	X7R(EIA)	±15%(-55~+125℃)	100	3.20×2.50	330㎋	±10%	1.80
CL43B334KCFNNN □	X7R(EIA)	±15%(-55~+125℃)	100	4.50×3.20	330㎋	±10%	1.35
CL32B474KCINNN □	X7R(EIA)	±15%(-55~+125℃)	100	3.20×2.50	470㎋	±10%	2.20
CL43B474KCHNNN □	X7R(EIA)	±15%(-55~+125℃)	100	4.50×3.20	470㎋	±10%	1.80
CL31B105KCHNNN □	X7R(EIA)	±15%(-55~+125℃)	100	3.20×1.60	1.0㎌	±10%	1.80
CL32B105KCJNNN □	X7R(EIA)	±15%(-55~+125℃)	100	3.20×2.50	1.0㎌	±10%	2.80
CL43B105KCJNNN □	X7R(EIA)	±15%(-55~+125℃)	100	4.50×3.20	1.0㎌	±10%	2.80
CL55B105KCHNNN □	X7R(EIA)	±15%(-55~+125℃)	100	5.70×5.00	1.0㎌	±10%	1.80

※ □mark means packaging code. If you want to learn the code or quantity in detail, please see p 58.

Array Type Capacitors



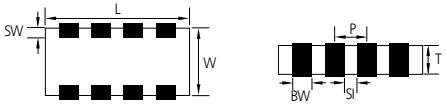
Feature

- Reduction in required space(more than 50%)
- Reduction in cost and time for replacement of PCB
- Reduction in amount of solder joints
- Easier PCB design
- Reduced waste from tape and reel packaging process

Application

- A bypass for digital and analog signal line noise generated by telecommunication equipment and other common electronic circuits

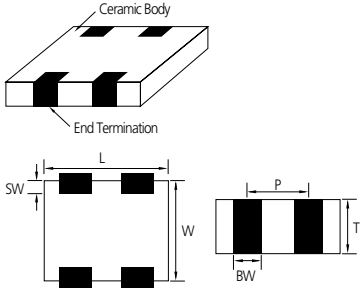
Structure and Dimensions



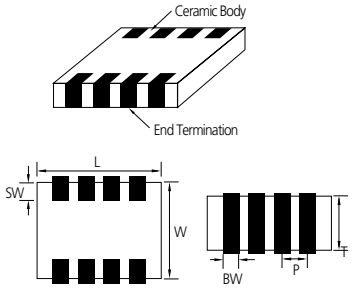
Code	EIA Code	Dimension(mm)					
		L	W	T	BW	SW	P
A	0504	1.37±0.15	1.0±0.15	0.60±0.06 0.80±0.08	0.36±0.1	0.2±0.1	0.64±0.1
A	0805	2.0±0.15	1.25±0.15	0.85±0.1	0.5±0.2	0.25±0.15	1.0±0.1
B	0805	2.0±0.15	1.25±0.15	0.85±0.1	0.25±0.1	0.25±0.15	0.5±0.1
B	1206	3.2±0.15	1.6±0.15	0.85±0.15	0.4±0.2	0.3±0.15	0.8±0.2

Structure and Control Code

▪ A : ARRAY(2-element)



▪ B : ARRAY(4-element)



Capacitance Table (Array Type Capacitors)

Size	0504(14)				0805(21)					1206(31)					
TC	X7R(B) / X5R(A)				X5R(A)			X7R(B)		C0G(C)	X7R(B)			Y5V(F)	
Element	2				2			4		4	4			4	
Rated V	6.3(Q)	10(P)	16(O)	25(A)	6.3(Q)	10(P)	16(O)	10(P)	16(O)	50(B)	16(O)	25(A)	50(B)	25(A)	50(B)
Capacitance -pF- (part numbering code) and thickness -mm- (part numbering code)															
100(101)										0.85 (C)					
120(121)															
150(151)															
180(181)															
220(221)															
270(271)															
330(331)															
390(391)															
470(471)															
560(561)															
680(681)															
820(821)															
1000(102)															
1500(152)															
2200(222)				0.60 (6)											
3300(332)															
4700(472)													0.85 (C)		
6800(682)															
10000(103)															
15000(153)															
22000(223)			0.60 (6)												
33000(333)															
47000(473)		0.60 (6)						0.85 (C)	0.85 (C)					0.85 (C)	0.85 (C)
68000(683)	0.60 (6)										0.85 (C)	0.85 (C)			
100000(104)															
150000(154)			0.80 (8)												
220000(224)	0.80 (8)	0.80 (8)			0.85 (8)	0.85 (8)	0.85 (8)								
680000(684)															
470000(474)															
1000000(105)															

:X7R(B) :X5R(A) :Y5V(F) :C0G(C) :X6S(X)

※ Please consult us for special capacitance and high voltage(100V)

Product Line UP (Array Type Capacitors)

Part Number	TC Code	Temperature Characteristics	Element Type	Size L×W (mm)	Capacitance	Capacitance Tolerance	Rated Voltage (Vdc)	Thickness Max. (mm)
CL31C100JBCNBN □	C0G(EIA)	±30ppm/℃(-55~+125℃)	4-Array	3.20×1.60	10pF	±5%	50	1.0
CL31C150JBCNBN □	C0G(EIA)	±30ppm/℃(-55~+125℃)	4-Array	3.20×1.60	15pF	±5%	50	1.0
CL31C220JBCNBN □	C0G(EIA)	±30ppm/℃(-55~+125℃)	4-Array	3.20×1.60	22pF	±5%	50	1.0
CL31C270JBCNBN □	C0G(EIA)	±30ppm/℃(-55~+125℃)	4-Array	3.20×1.60	27pF	±10%	50	1.0
CL31C330KBCNBN □	C0G(EIA)	±30ppm/℃(-55~+125℃)	4-Array	3.20×1.60	33pF	±10%	50	1.0
CL31C390KBCNBN □	C0G(EIA)	±30ppm/℃(-55~+125℃)	4-Array	3.20×1.60	39pF	±10%	50	1.0
CL31C470JBCNBN □	C0G(EIA)	±30ppm/℃(-55~+125℃)	4-Array	3.20×1.60	47pF	±5%	50	1.0
CL31C680JBCNBN □	C0G(EIA)	±30ppm/℃(-55~+125℃)	4-Array	3.20×1.60	68pF	±5%	50	1.0
CL31C820JBCNBN □	C0G(EIA)	±30ppm/℃(-55~+125℃)	4-Array	3.20×1.60	82pF	±5%	50	1.0
CL31C101JBCNBN □	C0G(EIA)	±30ppm/℃(-55~+125℃)	4-Array	3.20×1.60	100pF	±5%	50	1.0
CL31C151KBCNBN □	C0G(EIA)	±30ppm/℃(-55~+125℃)	4-Array	3.20×1.60	150pF	±10%	50	1.0
CL31C181JBCNBN □	C0G(EIA)	±30ppm/℃(-55~+125℃)	4-Array	3.20×1.60	180pF	±5%	50	1.0
CL31C331JBCNBN □	C0G(EIA)	±30ppm/℃(-55~+125℃)	4-Array	3.20×1.60	330pF	±5%	50	1.0
CL31C471JBCNBN □	C0G(EIA)	±30ppm/℃(-55~+125℃)	4-Array	3.20×1.60	470pF	±5%	50	1.0

Part Number	TC Code	Temperature Characteristics	Element Type	Size L×W (mm)	Capacitance	Capacitance Tolerance	Rated Voltage (Vdc)	Thickness Max. (mm)
CL21B471KBCNBN □	X7R(EIA)	±15%(-55~+125℃)	4-Array	2.00×1.25	470pF	±5%	50	0.95
CL31B102MBCNBN □	X7R(EIA)	±15%(-55~+125℃)	4-Array	3.20×1.60	1.0nF	±20%	50	1.0
CL31B103MBCNBN □	X7R(EIA)	±15%(-55~+125℃)	4-Array	3.20×1.60	10nF	±20%	50	1.0
CL31B153KBCNBN □	X7R(EIA)	±15%(-55~+125℃)	4-Array	3.20×1.60	15nF	±10%	50	1.0
CL31B473KACNBN □	X7R(EIA)	±15%(-55~+125℃)	4-Array	3.20×1.60	47nF	±10%	25	1.0
CL31F473ZBCNBN □	Y5V(EIA)	-82~+22%(-30~+85℃)	4-Array	3.20×1.60	47nF	80%/-20%	50	1.0
CL31B104KACNBN □	X7R(EIA)	±15%(-55~+125℃)	4-Array	3.20×1.60	100nF	±10%	25	1.0
CL31F104ZACNBN □	Y5V(EIA)	-82~+22%(-30~+85℃)	4-Array	3.20×1.60	100nF	80%/-20%	25	1.0
CL21B104KOCNBN □	X7R(EIA)	±15%(-55~+125℃)	4-Array	2.00×1.25	100nF	±10%	16	0.95
CL31B104KOCNBN □	X7R(EIA)	±15%(-55~+125℃)	4-Array	3.20×1.60	100nF	±10%	16	1.0
CL21B104MPCNBN □	X7R(EIA)	±15%(-55~+125℃)	4-Array	2.00×1.25	100nF	±20%	10	0.95
CL21A105KOCNAN □	X5R(EIA)	±15%(-55~+85℃)	2-Array	2.00×1.25	1.0μF	±10%	16	0.95
CL14A105MO8NAN□	X5R(EIA)	±15%(-55~+85℃)	2-Array	1.40×1.00	1.0μF	±20%	16	0.88
CL14A105KP8NAN □	X5R(EIA)	±15%(-55~+85℃)	2-Array	1.40×1.00	1.0μF	±10%	10	0.88
CL21A105MPCNAN □	X5R(EIA)	±15%(-55~+85℃)	2-Array	2.00×1.25	1.0μF	±20%	10	0.95

※□mark means packaging code. If you want to learn the code or quantity in detail, please see p 58.

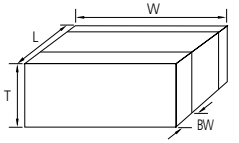
Feature

- Low ESL, good for noise reduction for high frequency
- Highly reliable tolerance and high speed automatic chip placement on PCBs
- Highly reliable performance
- Highly resistant termination metal
- Tape & reel for surface mount assembly

Application

- High Speed Microprocessor
- High Frequency Digital Equipment

Structure and Dimensions



Code	EIA Code	Dimension(mm)			
		L	W	T	BW
01	0306	0.8±0.1	1.6±0.1	0.5±0.1	0.15 min.
12	0508	1.25±0.1	2.0±0.1	0.5±0.1 0.85±0.1	0.2 min.
13	0612	1.6±0.2	3.2±0.2	0.85±0.1 1.25±0.15	0.2 min.

Capacitance Table (Low ESL Capacitors)

Size	0306(01)					0508(12)					0612(13)	
TC	X5R(A) / X7R(B)											
Rated V	6.3(Q)	10(P)	16(O)	25(A)	50(B)	6.3(Q)	10(P)	16(O)	25(A)	50(B)	6.3(Q)	50(B)
Capacitance -uF- (part numbering code)												
0.01(103)					0.5 (5)				0.5 (5)	0.85 (C)		0.5 (5)
0.015(153)												
0.022(223)												
0.033(333)				0.5 (5)								
0.047(473)												
0.068(683)			0.5 (5)									
0.1(104)												
0.15(154)	0.5 (5)	0.5 (5)							0.85 (C)			
0.22(224)												
0.33(334)	0.5 (5)							0.85 (C)				
0.47(474)							0.85 (C)					
0.68(684)						0.5 (5)						
1.0(105)						0.85 (C)						
1.5(155)												
2.2(225)												
3.3(335)												
4.7(475)											1.25 (F)	
10(106)												

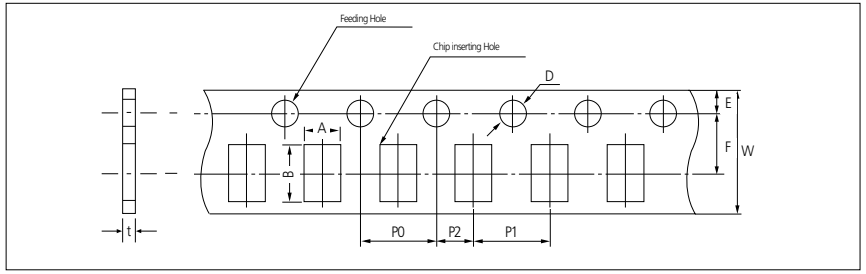
:X7R(B) :X5R(A) :Y5V(F) :C0G(C) :X6S(X)

Product Line UP (Low ESL Capacitors)

Part Number	TC Code	Temperature Characteristics	Size L×W (mm)	Capacitance	Capacitance Tolerance	Rated Voltage (Vdc)	Thickness Max. (mm)
CL01B103KB5NLN □	X7R(EIA)	±15%(-55~+125℃)	0.80×1.60	10㎋	±10%	50	0.55
CL12B103KB5NLN □	X7R(EIA)	±15%(-55~+125℃)	1.25×2.00	10㎋	±10%	50	0.55
CL12B103KBCNLN □	X7R(EIA)	±15%(-55~+125℃)	1.25×2.00	10㎋	±10%	50	1.00
CL01B153KB5NLN □	X7R(EIA)	±15%(-55~+125℃)	0.80×1.60	15㎋	±10%	50	0.55
CL12B153KB5NLN □	X7R(EIA)	±15%(-55~+125℃)	1.25×2.00	15㎋	±10%	50	0.55
CL12B153KBCNLN □	X7R(EIA)	±15%(-55~+125℃)	1.25×2.00	15㎋	±10%	50	1.00
CL01B223KB5NLN □	X7R(EIA)	±15%(-55~+125℃)	0.80×1.60	22㎋	±10%	50	0.55
CL12B223KB5NLN □	X7R(EIA)	±15%(-55~+125℃)	1.25×2.00	22㎋	±10%	50	0.55
CL12B223KBCNLN □	X7R(EIA)	±15%(-55~+125℃)	1.25×2.00	22㎋	±10%	50	1.00
CL12B333KB5NLN □	X7R(EIA)	±15%(-55~+125℃)	1.25×2.00	33㎋	±10%	50	0.55
CL12B333KBCNLN □	X7R(EIA)	±15%(-55~+125℃)	1.25×2.00	33㎋	±10%	50	1.00
CL12B473KBCNLN □	X7R(EIA)	±15%(-55~+125℃)	1.25×2.00	47㎋	±10%	50	1.00
CL12B683KBCNLN □	X7R(EIA)	±15%(-55~+125℃)	1.25×2.00	68㎋	±10%	50	1.00
CL12B104KBCNLN □	X7R(EIA)	±15%(-55~+125℃)	1.25×2.00	100㎋	±10%	50	1.00
CL13B104KB5NLN □	X7R(EIA)	±15%(-55~+125℃)	1.60×3.20	100㎋	±10%	50	0.55
CL01B333KA5NLN □	X7R(EIA)	±15%(-55~+125℃)	0.80×1.60	33㎋	±10%	25	0.55
CL01B473KA5NLN □	X7R(EIA)	±15%(-55~+125℃)	0.80×1.60	47㎋	±10%	25	0.55
CL12B473KA5NLN □	X7R(EIA)	±15%(-55~+125℃)	1.25×2.00	47㎋	±10%	25	0.55
CL12B154KACNLN □	X7R(EIA)	±15%(-55~+125℃)	1.25×2.00	150㎋	±10%	25	1.00
CL12B224KA5NLN □	X7R(EIA)	±15%(-55~+125℃)	1.25×2.00	220㎋	±10%	25	0.55
CL12B224KACNLN □	X7R(EIA)	±15%(-55~+125℃)	1.25×2.00	220㎋	±10%	25	1.00
CL01B683KO5NLN □	X7R(EIA)	±15%(-55~+125℃)	0.80×1.60	68㎋	±10%	16	0.55
CL12B683KO5NLN □	X7R(EIA)	±15%(-55~+125℃)	1.25×2.00	68㎋	±10%	16	0.55
CL01B104KO5NLN □	X7R(EIA)	±15%(-55~+125℃)	0.80×1.60	100㎋	±10%	16	0.55
CL12B104KO5NLN □	X7R(EIA)	±15%(-55~+125℃)	1.25×2.00	100㎋	±10%	16	0.55
CL12B154KO5NLN □	X7R(EIA)	±15%(-55~+125℃)	1.25×2.00	150㎋	±10%	16	0.55
CL12B334KOCNLN □	X7R(EIA)	±15%(-55~+125℃)	1.25×2.00	330㎋	±10%	16	1.00
CL01B154KP5NLN □	X7R(EIA)	±15%(-55~+125℃)	0.80×1.60	150㎋	±10%	10	0.55
CL01B224KP5NLN □	X7R(EIA)	±15%(-55~+125℃)	0.80×1.60	220㎋	±10%	10	0.55
CL12B334KP5NLN □	X7R(EIA)	±15%(-55~+125℃)	1.25×2.00	330㎋	±10%	10	0.55
CL12B474KP5NLN □	X7R(EIA)	±15%(-55~+125℃)	1.25×2.00	470㎋	±10%	10	0.55
CL12B474KPCNLN □	X7R(EIA)	±15%(-55~+125℃)	1.25×2.00	470㎋	±10%	10	1.00
CL12B684KPCNLN □	X7R(EIA)	±15%(-55~+125℃)	1.25×2.00	680㎋	±10%	10	1.00
CL12B105KPCNLN □	X7R(EIA)	±15%(-55~+125℃)	1.25×2.00	1.0㎌	±10%	10	1.00
CL01A334KQ5NLN □	X5R(EIA)	±15%(-55~+85℃)	0.80×1.60	330㎋	±10%	6.3	0.55
CL01A474KQ5NLN □	X5R(EIA)	±15%(-55~+85℃)	0.80×1.60	470㎋	±10%	6.3	0.55
CL01A684KQ5NLN □	X5R(EIA)	±15%(-55~+85℃)	0.80×1.60	680㎋	±10%	6.3	0.55
CL01A105KQ5NLN □	X5R(EIA)	±15%(-55~+85℃)	0.80×1.60	1.0㎌	±10%	6.3	0.55
CL12A155KQCNLN □	X5R(EIA)	±15%(-55~+85℃)	1.25×2.00	1.5㎌	±10%	6.3	1.00
CL12A225KQCNLN □	X5R(EIA)	±15%(-55~+85℃)	1.25×2.00	2.2㎌	±10%	6.3	1.00
CL12A335KQCNLN □	X5R(EIA)	±15%(-55~+85℃)	1.25×2.00	3.3㎌	±10%	6.3	1.00
CL12A475KQCNLN □	X5R(EIA)	±15%(-55~+85℃)	1.25×2.00	4.7㎌	±10%	6.3	1.00
CL13A106KQFNLN □	X5R(EIA)	±15%(-55~+85℃)	1.60×3.20	10㎌	±10%	6.3	1.4

※ □mark means packaging code. If you want to learn the code or quantity in detail, please see p 58.

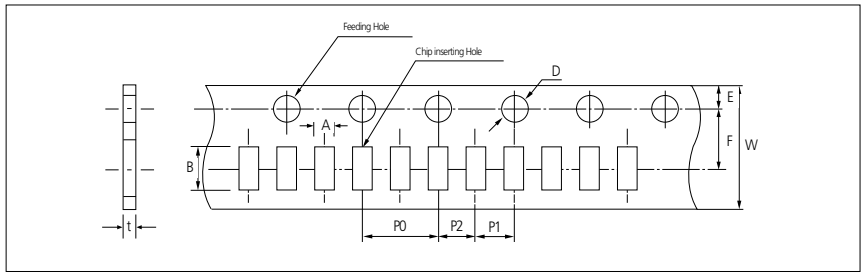
Cardboard Paper Tape(4mm)



Unit: inch(mm)

Symbol / Type		A	B	W	F	E	P1	P2	P0	D	t
Dimension	0504 (1410)	1.3 ±0.2	1.7 ±0.2	8.0 ±0.3	3.5 ±0.05	1.75 ±0.1	4.0 ±0.1	2.0 ±0.05	4.0 ±0.1	Ø1.5 +0.1/-0	1.1 Below
	0603 0306 (1608) (0816)	1.1 ±0.2	1.9 ±0.2								
	0805 0508 (2012) (1220)	1.6 ±0.2	2.4 ±0.2								
	1206 0612 (3216) (1632)	2.0 ±0.2	3.6 ±0.2								

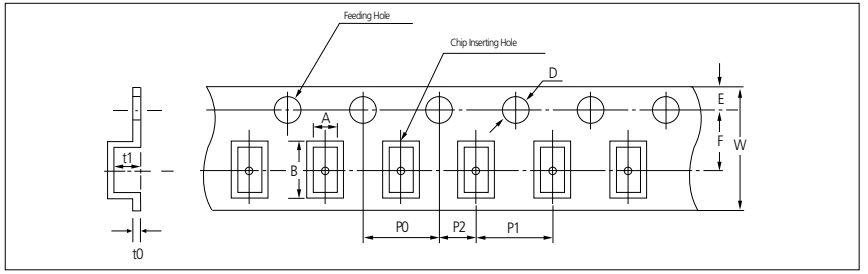
Cardboard Paper Tape(2mm)



Unit: inch(mm)

Symbol / Type		A	B	W	F	E	P1	P2	P0	D	t
Dimension	0201 (0603)	0.38 ±0.03	0.68 ±0.03	8.0 ±0.3	3.5 ±0.05	1.75 ±0.1	2.0 ±0.05	2.0 ±0.05	4.0 ±0.1	Ø1.5 +0.1/ -0.03	0.37 ±0.03
	0402 (1005)	0.62 ±0.04	1.12 ±0.04								0.6 ±0.05

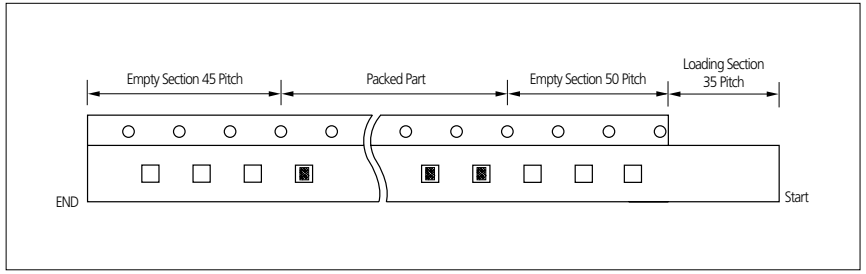
Embossed Plastic Tape



Unit: inch(mm)

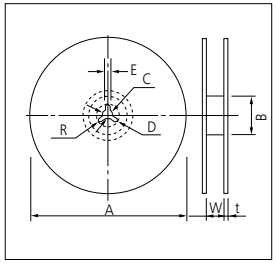
Symbol / Type		A	B	W	F	E	P1	P2	P0	D	t1	t0
Dimension	0805 (2012)	1.45 ±0.2	2.3 ±0.2	8.0 ±0.3	3.5 ±0.05	1.75 ±0.1	4.0 ±0.1	2.0 ±0.05	4.0 ±0.1	Ø1.5 +0.1/ -0	2.5 max	0.6 BELOW
	1206 0612 (3216) (1632)	1.9 ±0.2	3.5 ±0.2									
	1210 (3225)	2.9 ±0.2	3.7 ±0.2									
	1808 (4520)	2.3 ±0.2	4.9 ±0.2	12.0 ±0.3	5.60 ±0.05		8.0 ±0.1				3.8 max	
	1812 (4532)	3.6 ±0.2	4.9 ±0.2									
	2220 (5750)	5.5 ±0.2	6.2 ±0.2									

Taping Size



	Dimension(mm)			Quantity & Packing Code				
				Paper Type			Plastic Type	
	Length	Width	Thickness Max. (mm)	7"reel	10"reel	13"reel	7"reel	13"reel
General Product	0.6	0.3	t ≤0.33	10,000(C)		50,000(D)		
	1.0	0.5	t ≤0.57	10,000(C)	30,000(O)	50,000(D)		
	1.6	0.8	t ≤0.9	4,000(C)	10,000(O)	10,000(D) 15,000(L)	2,000(E)	10,000(F)
	2.0	1.2	t ≤1.40	4,000(C)	10,000(O)	10,000(D)		
			t ≤1.00			15,000(L)		
			1.00<t ≤1.40				2,000(E)	10,000(F)
	3.2	1.6	t ≤1.80	4,000(C)	10,000(O)	10,000(D)		10,000(F)
			t ≤1.00			10,000(L)		
			1.00<t ≤1.80				2,000(E)	
			t <1.80					10,000(F)
			t =1.80					8,000(F)
	3.2	2.5	t ≤1.80				2,000(E)	10,000(F)
			1.80<t ≤2.20				1,000(E)	8,000(F)
			2.20<t ≤2.70				1,000(E)	4,000(F)
	4.5	2.0	t ≤1.80				2,000(E)	
			t ≤2.2				1,000(E)	
			t <1.80					10,000(F)
			1.80≤t <2.20					4,000(F)
	4.5	3.2	t <2.20					4,000(F)
			2.20≤t					2,000(F)
	5.7	5.0	t ≤2.8					2,000(F)
Array	1.4	1.0	t ≤0.9	4,000(C)	10,000(O)	10,000(D) 15,000(L)	2,000(E)	10,000(F)
	2.0	1.2	t ≤1.00			15,000(L)		
	3.2	1.6	t ≤1.00			10,000(L)		
Low ESL (LICC)	0.8	1.6	t ≤0.57	10,000(C)	30,000(O)	50,000(D)		
	1.2	2.0	t ≤0.57	10,000(C)	30,000(O)	50,000(D)		
			t ≤1.00			15,000(L)		
	1.6	3.2	t ≤1.00			10,000(L)		
			1.00<t ≤1.80				2,000(E)	

Reel Dimensions



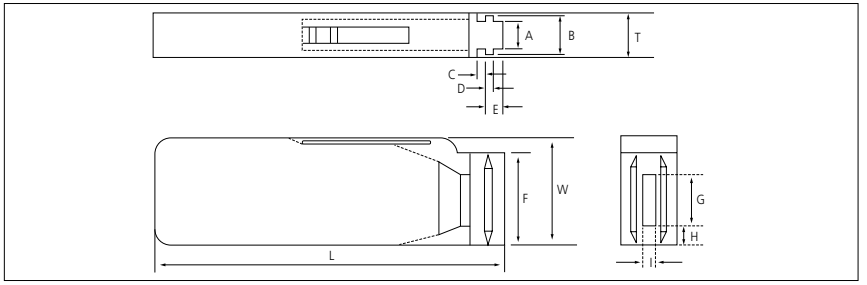
Unit: mm

Symbol	Tape Width	A	B	C	D
7" Reel	8mm	Ø180+0/-3	Ø60+1/-0	Ø13±0.3	25±0.5
	12mm	Ø180+0/-3	Ø60+1/-0	Ø13±0.3	25±0.5
13" Reel	8mm	Ø330±2.0	Ø80±1.0	Ø13±0.3	25±0.5
	12mm	Ø330±2.0	Ø80±1.0	Ø13±0.3	25±0.5

Symbol	Tape Width	E	W	t	R
7" Reel	8mm	2.0±0.5	9±0.5	1.2±0.2	1.0
	12mm	2.0±0.5	13±0.5	1.2±0.2	1.0
13" Reel	8mm	2.0±0.5	9±0.5	2.2±0.2	1.0
	12mm	2.0±0.5	13±0.5	2.2±0.2	1.0

Bulk Case Packaging

- Bulk case packaging can reduce the stock space and transportation costs.
- The bulk feeding system can increase the productivity.
- It can eliminate the components loss.



Unit: mm

Symbol	A	B	T	C	D	E
Dimension	6.8±0.1	8.8±0.1	12±0.1	1.5+0.1/-0	2+0/-0.1	3.0+0.2/-0

Symbol	F	W	G	H	L	I
Dimension	31.5+0.2/-0	36+0/-0.2	19±0.35	7±0.35	110±0.7	5±0.35

• **QUANTITY**

Unit: inch(mm) and pcs

Size	0402(1005)	0603(1608)	0805(2012)	
			T=0.65mm	T=0.85mm
Quantity	50,000	10,000 or 15,000	10,000	5,000 or 10,000

Reliability Test Condition

No	Item		Performance	Test Condition
1	Appearance		No abnormal exterior appearance	Visual Inspection through Microscope(×10)
2	Insulation Resistance		10,000MΩ min. or 500MΩ · μF min. product whichever is smaller (Rated voltage ≤ 16V:10,000MΩ min. or 100MΩ · μF min. product whichever is smaller)	Apply the rated voltage for 60~120 sec. *Rated voltage > 500V: Insulation Resistance shall be measured with 500±50Vdc
3	Withstanding Voltage		No dielectric breakdown or mechanical breakdown	Apply the specified voltage* for 1~5 sec. Charge/Discharge current limit: 50mA max. *CLASS Ⅰ (Rated Voltage < 100V): 300% of the rated Voltage CLASS Ⅱ (Rated Voltage < 100V): 250% of the rated Voltage In the case of Vr ≥ 100V products, following condition should be applied. 100V ≤ Rated Voltage < 500V: 200% of the rated Voltage 500V ≤ Rated Voltage < 1000V: 150% of the rated Voltage Rated Voltage ≥ 1000V: 120% of the rated Voltage
4	Capacitance	CLASS Ⅰ	Within the specified tolerance	Capacitance / Frequency / Voltage: ≤1,000pF — 1MHz±10% — 0.5 ~ 5 Vrms; >1,000pF — 1KHz±10% — 0.5 ~ 5 Vrms
		CLASS Ⅱ	Within the specified tolerance	Capacitance / Frequency / Voltage: ≤10μF — 1KHz±10% — 1.0±0.2 Vrms; >10μF — 120Hz±20% — 0.5±0.1Vrms; * — 1KHz±10% — 0.5±0.1Vrms
5	Q	CLASS Ⅰ	Capacitance ≥ 30pF : Q ≥ 1,000 <30pF : Q ≥ 400 +20×C (C : Capacitance)	Capacitance / Frequency / Voltage: ≤1,000pF — 1MHz±10% — 0.5 ~ 5 Vrms; >1,000pF — 1KHz±10% — 0.5 ~ 5 Vrms
	Tanδ	CLASS Ⅱ	1. Characteristic: A(X5R)	Capacitance / Frequency / Voltage: ≤10μF — 1KHz±10% — 1.0±0.2 Vrms; >10μF — 120Hz±20% — 0.5±0.1Vrms; * — 1KHz±10% — 0.5±0.1Vrms

1. Characteristic: A(X5R)

Rated Voltage	Spec
50V /35V	0.025 max / 0.05 max*
25V	0.025 max / 0.05 max* / 0.10 max*
16V	0.035 max / 0.05 max* / 0.10 max*
≤10V	0.05 max /0.10 max*

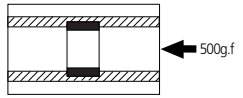
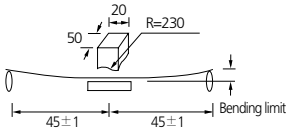
2. Characteristic: B(X7R), X(X6S)

Rated Voltage	Spec
50V / 35V / 25V	0.025 max / 0.05 max* / 0.10 max*
16V	0.035 max / 0.10 max*
≤10V	0.05 max /0.10 max*

3. Characteristic: F(Y5V)

Rated Voltage	Spec
50V / 35V / 25V	0.05 max / 0.07 max* / 0.09 max*
16V	0.07 max / 0.09 max* / 0.125 max*
10V	0.125 max /0.16 max*
≤6.3V	0.16 max

You can check the specification at the web site or contact sales people for each product with mark*

No	Item		Performance	Test Condition
6	Temperature Characteristics of Capacitance	CLASS Ⅰ	Characteristic / Temp. Coefficient(PPM/℃): C — 0±30; P — -150±60; R — -220±60; S — -330±60; T — -470±60; U — -750±120; S — +350~-1000	Capacitance shall be measured by the steps shown in the following table. Step / Temperature(℃): 1 — 25±2; 2 — Min. Operating Temp. ±2; 3 — 25±2; 4 — Max. Operating Temp. ±2; 5 — 25±2 (1) CLASS Ⅰ Temperature Coefficient shall be calculated from the formula as below Temp. Coefficient= $\frac{C2-C1}{C1\times\triangle T}\times10^6$[ppm/℃] C1: Capacitance at step 3 C2: Capacitance at 85℃ △T:60℃(=85℃-25℃) (2) CLASS Ⅱ Capacitance Change shall be calculated from the formula as below $\triangle C=\frac{C2-C1}{C1}\times100(\%)$ C1: Capacitance at step 3 C2: Capacitance at step 2 or 4
		CLASS Ⅱ	Characteristic / Capacitance Change (with No bias): A(X5R) / B(X7R) — ±15%; X(X6S) — ±22%; F(Y5V) — +22%~-82%	
7	Adhesive Strength of Termination		No indication of peeling shall occur on the terminal electrode	Apply 500g.f* pressure for 10±1 sec. *200g.f for 0201 
8	Bending Strength	Appearance	No indication of peeling shall occur	• Bending Limit: 1mm • Test Speed: 1.0mm/sec. • Keep the test board at the limit point in 5 sec. • Then Measure Capacitance 
		Capacitance	Characteristic / Capacitance Change: CLASS Ⅰ — ±5% or ± 0.5 pF whichever is larger; CLASS Ⅱ A(X5R), B(X7R), X(X6S) — ±12.5%; CLASS Ⅱ F(Y5V) — ±30%	
9	Solderability		More than 95% of the terminal surface is to be soldered newly, so metal part does not come out or dissolve 	Solder / Sn-3Ag-0.5Cu / 63Sn-37Pb: Solder Temp. — 245±5℃ / 235±5℃; Flux — RMA Type; Dip time — 3±0.3 sec. / 5±0.5 sec.; Pre-heating — at 80~120℃ for 10~30 sec.
10	Resistance to Soldering Heat	Appearance	No mechanical damage shall occur	Solder temperature: 270±5℃ DIP TIME:10±1 sec. Each termination shall be fully immersed and preheated as below: Step / Temperature(℃) / Time (sec.): 1 — 80~100 — 60; 2 — 150~180 — 60
		Capacitance	Characteristic / Capacitance Change: CLASS Ⅰ — ±2.5% or ± 0.25 pF whichever is larger; CLASS Ⅱ A(X5R), B(X7R) — ±7.5%; CLASS Ⅱ X(X6S) — ±15%; CLASS Ⅱ F(Y5V) — ±20%	
		Q (CLASS Ⅰ)	Within the specified initial value	Leave the capacitor in ambient condition for specified time* before measurement *24 ± 2 hours(CLASS Ⅰ) 48 ± 4 hours(CLASS Ⅱ)
		Tanδ (CLASS Ⅱ)	Within the specified initial value	
		Insulation resistance	Within the specified initial value	
		Withstanding voltage	Within the specified initial value	

No	Item		Performance			Test Condition
11	Vibration Test	Appearance	No mechanical damage shall occur			The capacitor shall be subjected to a harmonic motion having a total amplitude of 1.5mm changing frequency from 10Hz to 55Hz and back to 10Hz in about 1 min. Repeat this for 2hours each in 3 mutually perpendicular directions.
		Capacitance	Characteristic		Capacitance Change	
			CLASS Ⅰ		±2.5% or ± 0.25 pF whichever is larger	
			CLASS Ⅱ	A(X5R), B(X7R)	±5%	
				X(X6S)	±10%	
				F(Y5V)	±20%	
		Q (CLASS Ⅰ)	Within the specified initial value			
		Tanδ (CLASS Ⅱ)	Within the specified initial value			
		Insulation resistance	Within the specified initial value			
12	Humidity (Steady state)	Appearance	No mechanical damage shall occur			Temperature: 40±2℃ Humidity: 90~95% RH Duration Time: 500+12/-0 Hr. Leave the capacitor in ambient condition for specified time* before measurement *24 ± 2 hours(CLASS Ⅰ) 48 ± 4 hours(CLASS Ⅱ) You can check the specification at the web site or contact sales people for each product with mark*
		Capacitance	Characteristic		Capacitance Change	
			CLASS Ⅰ		±5% or ± 0.5 pF whichever is larger	
			CLASS Ⅱ	A(X5R), B(X7R), X(X6S)	±12.5%	
				F(Y5V)	±30% / +30~-40%*	
		Q (CLASS Ⅰ)	Capacitance≥30pF : Q≥350 10≤Capacitance<30pF : Q≥275+2.5×C Capacitance<10pF : Q≥200+10×C (C: Capacitance)			
		Tanδ (CLASS Ⅱ)	1.Characteristic: A(X5R) 0.05 max / 0.075 max* (35V / 50V) 0.05 max / 0.075 max* / 0.125 max*(16V / 25V) 0.075 max / 0.125 max* (≤10V) 2.Characteristic: B(X7R), X(X6S) 0.05 max / 0.125 max* (16V / 25V / 35V / 50V) 0.075 max / 0.125 max* (≤10V) 3.Characteristic: F(Y5V) 0.09 max (50V) 0.09 max / 0.125 max* (25V / 35V) 0.09 max / 0.125 max* / 0.16 max* (16V) 0.16 max / 0.195 max* (10V) 0.195 max (4V / 6.3V)			
		Insulation resistance	1,000MΩ min. or 50MΩ·μF min. product whichever is smaller / 25MΩ·μF or over*			
13	Moisture Resistance	Appearance	No mechanical damage shall occur			Applied Voltage: rated voltage Temperature: 40±2℃ Humidity: 90~95% RH Duration Time: 500+12/-0 Hr. Charge/Discharge Current: 50mA max. Perform the initial measurement according to Note1. Perform the final measurement according to Note2. This test is only applied to Vr≤500V products. You can check the specification at the web site or contact sales people for each product with mark*
		Capacitance	Characteristic		Capacitance Change	
			CLASS Ⅰ		±7.5% or ± 0.75pF whichever is larger	
			CLASS Ⅱ	A(X5R), B(X7R), X(X6S)	±12.5%	
				F(Y5V)	±30% / +30~ -40%*	
		Q (CLASS Ⅰ)	Capacitance≥30pF : Q≥200 <30pF : Q≥100+10/3×C(C: Capacitance)			
		Tanδ (CLASS Ⅱ)	1.Capacitance: A(X5R) 0.05 max / 0.075 max* (35V / 50V) 0.05 max / 0.075 max* / 0.125 max*(16V / 25V) 0.075 max / 0.125 max* (≤10V) 2.Capacitance: B(X7R), X(X6S) 0.05 max / 0.125 max* (16V / 25V / 35V / 50V) 0.075 max / 0.125 max* (≤10V) 3.Capacitance: F(Y5V) 0.09 max (50V) 0.09 max / 0.125 max* (25V / 35V) 0.09 max / 0.125 max* / 0.16 max* (16V) 0.16 max / 0.195 max* (10V) 0.195 max (4V / 6.3V)			
		Insulation resistance	500MΩ min. or 25MΩ·μF min. product whichever is smaller / 12.5MΩ·μF or over*			

No	Item		Performance			Test Condition
14	High Temperature Resistance	Appearance	No mechanical damage shall occur			Applied Voltage: 200%* of the rated voltage Temperature: max. operating temperature Duration Time: 1000+48/-0 Hr. Charge/Discharge Current: 50mA max. Rated Voltage<250V: 200% of the rated Voltage 250V≤Vr<500V: 150% of the rated Voltage Tip & Ring(250V): 110% of the rated Voltage 500V≤rated voltage<1000V: 120% of the rated Voltage 1000V≤rated voltage≤3000V: 100% of the rated Voltage * : 150% / 100% of the rated Voltage Perform the initial measurement according to Note1 for class Ⅱ Perform the final measurement according to Note2. You can check the specification at the web site or contact sales people for each product with mark*
		Capacitance	Characteristic		Capacitance Change	
			CLASS Ⅰ		±3% or ± 0.3 pF whichever is larger	
			CLASS Ⅱ	A(X5R), B(X7R)	±12.5%	
				X(X6S)	±25%	
				F(Y5V)	±30%	
					±30% / +30~ -40%*	
		Q (CLASS Ⅰ)	Capacitance≥30pF : Q≥350 10≤Capacitance<30pF : Q≥275+2.5×C Capacitance<10pF : Q≥200+10×C (C: Capacitance)			
		Tanδ (CLASS Ⅱ)	1.Capacitance: A(X5R) 0.05 max / 0.075 max* (35V / 50V) 0.05 max / 0.075 max* / 0.125 max*(16V / 25V) 0.075 max / 0.125 max* (≤10V) 2.Capacitance: B(X7R), X(X6S) 0.05 max / 0.125 max* (16V / 25V / 35V / 50V) 0.075 max / 0.125 max* (≤10V) 3.Capacitance: F(Y5V) 0.09 max (50V) 0.09 max / 0.125 max* (25V / 35V) 0.09 max / 0.125 max* / 0.16 max* (16V) 0.16 max / 0.195 max* (10V) 0.195 max (4V / 6.3V)			
		Insulation resistance	1,000MΩ min. or 50MΩ·μF min. product whichever is smaller / 25MΩ·μF or over*			
15	Temperature Cycle	Appearance	No mechanical damage shall occur			Capacitor shall be subjected to 5 cycles. Condition for 1 cycle: Leave the capacitor in ambient condition for specified time* before measurenment *24 ± 2 hours(CLASS Ⅰ) 48 ± 4 hours(CLASS Ⅱ)
		Capacitance	Characteristic		Capacitance Change	
			CLASS Ⅰ		±2.5% or ± 0.25pF whichever is larger	
			CLASS Ⅱ	A(X5R), B(X7R)	±7.5%	
				X(X6S)	±15%	
				F(Y5V)	±20%	
		Q (CLASS Ⅰ)	Within the specified initial value			
		Tanδ (CLASS Ⅱ)	Within the specified initial value			
		Insulation resistance	Within the specified initial value			

Step	Temperature(℃)	Time(min.)
1	min. operating temperature +0/-3	30
2	25	2~3
3	max. operating temperature +0/-3	30
4	25	2~3

No	Recommended Soldering Method					
		Size inch(mm)	Temperature Characteristic	Capacitance	Condition	
					Flow	Reflow
16	Recommended Soldering Method By Size & Capacitance	0201 (0603)	-	-	-	○
		0402 (1005)				
		0603(1608)	Class Ⅰ	-	○	○
			Class Ⅱ	C < 1㎌	○	○
				C ≥ 1㎌	-	○
		0805 (2012)	Class Ⅰ	-	○	○
			Class Ⅱ	C < 4.7㎌	○	○
				C ≥ 4.7㎌	-	○
			Array	-	-	○
		1206 (3216)	Class Ⅰ	-	○	○
			Class Ⅱ	C < 10㎌	○	○
				C ≥ 10㎌	-	○
			Array	-	-	○
		1210 (3225)	-	-	-	○
		1808 (4520)				○
		1812 (4532)				○
		2220 (5750)				○

Note1. Initial Measurement For Class Ⅱ

Perform the heat treatment at 150℃+0/-10℃ for 1 hour. Then Leave the capacitor in ambient condition for 48±4 hours before measurement. Then perform the measurement.

Note2. Latter Measurement

1. CLASS Ⅰ
   Leave the capacitor in ambient condition for 24±2 hours before measurement. Then perform the measurement.
2. CLASSⅡ
   Perform the heat treatment at 150℃+0/-10℃for 1 hour. Then Leave the capacitor in ambient condition for 48±4 hours before measurement. Then perform the measurement.

Note3. All Size in Reliability Test Condition Section is "inch"

1.Storage of products

1-1. Storage Environment

Tape packing materials are designed to withstand long-term storage, but they will degrade more rapidly in the presence of high temperature or high humidity, Therefore, the products must be stored in an ambient 5~40℃ with a relative humidity of 20~70%. Allowable storage period is within 6 months from the outgoing date of delivery.

1-2. Corrosive Gases

Since sulfur and chlorine may degrade the solderability of the end termination, it is important to store the capacitors in an environment free of these gases

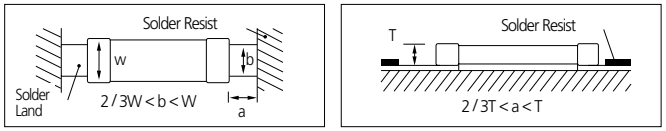
1-3. Temperature Fluctuations

Since dew condensation may occur by the differences in temperature when the products are taken out of storage, it is important to maintain a temperature-controlled environment.

2.Design of Solder Land Pattern

When designing printed circuit boards, the shape and size of the solder lands must allow for the proper amount of solder on the capacitor. The amount of solder at the end terminations has a direct effect on the probability that the chip will crack. The greater amount of solder, the larger amount of stress on the chip, and the more likely that it will break. Use the following illustrations as guidelines for proper Solder land design.

Recommendation of solder Land Shape and Size



3.Adhesives

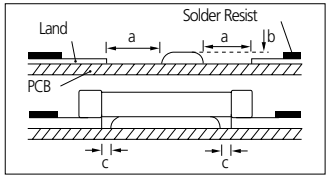
MLCCs generally require the use of an adhesive to position the chips to the circuit board prior to soldering.

3-1. Requirements for Adhesives

They must have enough adhesion so that the chips will not fall off or move during the handling of the circuit board.
They must maintain their adhesive strength when exposed to soldering temperatures.
They should not spread or run when applied to the circuit board.
They should have a long pot life.
They should harden quickly.
They should not corrode the circuit board or chip material.
They should be a good insulator.
They should be non-toxic, and not produce harmful gases, nor be harmful when touched.

3-2. Application Method

It is important to use the proper amount of adhesive. Too little will cause poor adhesion to the circuit board, and too much may strain the conductor pattern, thereby causing defective soldering. The following illustrations show the proper quantity of adhesive.



Unit: mm

Type	21	31
a	0.2min	0.2min
b	70~100㎛	70~100㎛
c	>0	>0

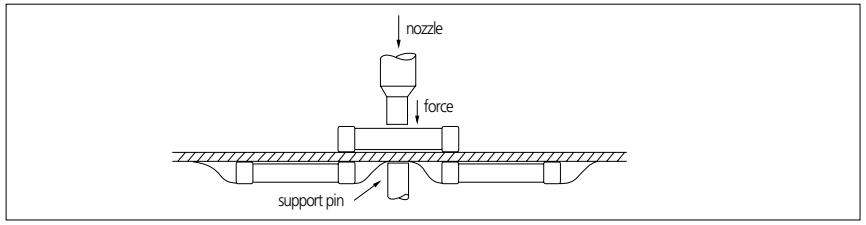
3-3. Adhesive hardening Characteristics

To prevent oxidation of the terminations, the adhesive must harden at 160℃ or less, within 2 minutes or less.

4. Mounting

4-1. Mounting Head Pressure
Excessive pressure will cause chip capacitors to crack. The pressure between nozzle and chip capacitor will be 300g maximum during mounting.

4-2. Bending Stress
Bending of printed circuit board by mounting head when double-sided circuit boards are used, chip capacitors first are mounted and soldered onto one side of the board. When the capacitors are mounted onto the other side, it is important to support the board as shown in the illustration.
If the circuit board is not supported, it may bend, causing the already-installed capacitors to crack.



5. Flux

Although highly-activated flux gives better solderability, substances which increase activity may also degrade the insulation of the chip capactiors, To avoid such degradation, it is recommended that a mildly activated rosin flux (less than 0.2% chlorine) be used.

6. Soldering

Since a multilayer ceramic chip capacitor comes into direct contact with melted solder during soldering, it is exposed to potentially mechanical stress caused by the sudden temperature change. The capacitor may also be subject to silver migration, and to contamination by the flux.
Because of these factors, soldering technique is critical.

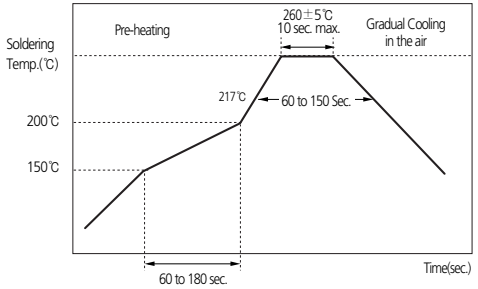
6-1. Soldering Methods

Method	Classification	
Reflow slodering	· Overall heating	· Infrared rays · Hot plate · VPS (Vapor phase)
	· Local heating	· Air heater · Laser · Light beam
Flow Soldering	· Single wave · Double wave	

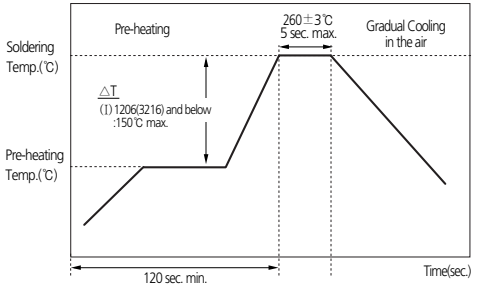
6-2. Soldering Profile
To avoid the crack problem by sudden temperature change, follow the temperature profile in the adjacent graph.

6-2-1 Pb-Free (Sn 100%) Plating

▪ REFLOW SOLDERING



▪ FLOW SOLDERING

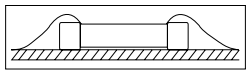
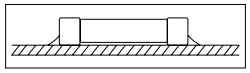


▪ SOLDER IRON(Hand Soldering)

Variation of Temp.(℃)	Soldering Temp(℃)	Pre-heating Time(sec.)	Soldering Time(sec.)	Cooling Time(sec.)	Condition of Iron Facilities		
					Wattage	Tip Diameter	Soldering Time
△T≤130	300±10℃max.	≥ 60 sec.	≤ 4 sec.	-	20W max.	3mm max.	4 sec max.

6-3. Manual Soldering
Manual soldering can pose a great risk of creating thermal cracks in chip capacitors. The hot soldering iron tip comes into direct contact with the end terminations, and operator's carelessness may cause the tip of the soldering iron to come into direct contact with the ceramic body of the capacitor. Therefore the soldering iron must be handled carefully, and close attention must be paid to the selection of the soldering iron tip and to temperature control of the tip.

6-4. Amount of Solder

Too much Solder		Cracks tend to occur due to large stress.
Not enough solder		Weak holding force may cause bad connections or detaching of the capacitor

6-5. Cooling
Natural cooling using air is recommended. If the chips are dipped into solvent for cleaning, the temperature difference (ΔT) must be less than 100℃

6-6. Cleaning
If rosin flux is used, cleaning usually is unnecessary. When strongly activated flux is used, chlorine in the flux may dissolve into some types of cleaning fluids, thereby affecting the chip capacitors. This means that the cleaning fluid must be carefully selected, and should always be new.

7. Notes for Separating Multiple, Shared PC Boards

A multi-PC board is separated into many individual circuit boards after soldering has been completed. If the board is bent or distorted at the time of separation, cracks may occur in the chip capacitors. Carefully choose a separation method that minimizes the bending of the circuit board.