

Data Sheet

Customer : _____

Product : Multilayer Ceramic Chip Capacitors - C Series _____

Size : 01005/0201/0402/0603/0805/1206/1210/1808/1812/1825/2211/2220/2225 _____

Issued Date : 16.Sep.-2026 _____

Edition : Ver.17 _____

Record of change

Date	Ver.	Description	Page
30-Oct.-2014	1		
05-Oct.-2015	2	Revised storage condition	21
20-Feb.-2016	3	Revised capacitance range and thickness Delete size 2211	4 ~ 13
23-Apr.-2016	4	Add PCB land pattern recommendation	27
16-Sep.-2020	5	0805N103J500 T : 0.85mm / 1.25mm	5
16-Jul.-2021	6	1210B105K500 T : 1.65mm / 1.25mm	9
27-Oct.-2021	7	Add 1206 154/224 200/250V	10
10-Dec.-2021	8	Add 1210 106K 100V X7R, Y5V EOL	10,13
10-May.-2022	9	Revised C >10UF Freq.	15
08-Nov.-2022	10	EOL 1825 1.8NF ±5% 3000V NPO	8
20-Sep.-2023	11	Revise capacitance range & thickness code & add 0201 & specification	2~37
04-Jan.-2024	12	Add External Dimensions	1
12-Jan.-2024	13	Add COG(NPO) Q value	26
21-Jun.-2024	14	Add NPO 1210 123/153 1000V & NPO 1808 272/332 1000V & NPO1808 222 1500V/2000V	8,9
		Add NPO 1812 122 3000V & NPO 2225 121~102 4000V	9,10
		Delete X7R 1206 123~223 1500V & Revised X7R 1206 472 2000V & Add X7R 1812 123~556 2000V	16,17
		Add X7R 1812 151~103 3500V & Add X7R 2225 223 3000V	17,18
28-Jun.-2024	15	Add All X7T Series	1,2,25,26~31,34,35
01-Jul.-2025	16	Revise Part Numbering DIELECTRIC S=X6S , A=X7S	2
16-Sep.-2026	17	Add All 01005 Series & Revise All Size and Capacitance Range	1~33,36

HITANO ENTERPRISE CORP.

7F-7, No. 3, Wu Chuan 1st Road, New Taipei
Industrial Park, New Taipei City, TAIWAN, R.O.C.
Tel: +886 2 2299 1331 (Rep.)
Fax: +886 2 2298 2466, 2298 2969

Prepared by	Checked by	Approved by	Accepted by (customer)
16-Sep.-2026	16-Sep.-2026	16-Sep.-2026	
Randy Yu	Michelle Lin	Arthur Su	

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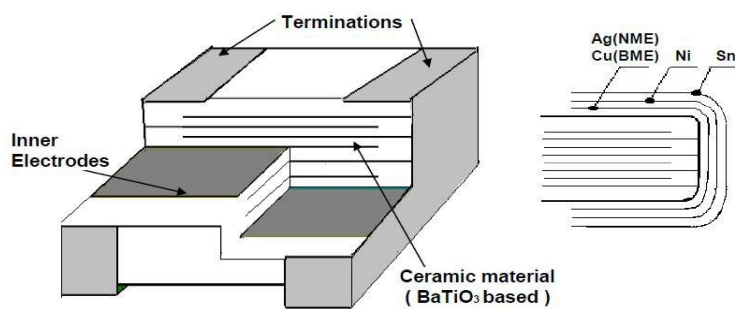
Features

- a. A wide selection of sizes is available (01005 to 2225).
- b. High capacitance in given case size.
- c. Capacitor with lead-free termination (pure Tin).
- d. RoHS & HALOGEN compliant.

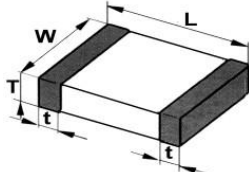
Applications

- a. For general digital circuit.
- b. For power supply bypass capacitors.
- c. For consumer electronics.
- d. For telecommunication.
- e. DC to DC converter.

Construction of MLCC



EXTERNAL DIMENSIONS

Size Inch (mm)	L (mm)	W (mm)	Code / T (mm)	t (mm)		
01005(0402)	0.40±0.02	0.20±0.02	See Thickness Code (Page 25)	0.10±0.03		
0201(0603)	0.60±0.03	0.30±0.03		0.15±0.05		
	0.60±0.05 (Cap.≥0.68μF) 0.60±0.09 (Cap.≥1.0μF)	0.30±0.05 (Cap.≥0.68μF) 0.30±0.09 (Cap.≥1.0μF)				
0402(1005)	1.00±0.10	0.50±0.10		0.25 +0.05/-0.10		
	1.00±0.20 ^{#1}	0.50±0.20 ^{#1}				
0603(1608)	1.60±0.15	0.80±0.15		0.40±0.15		
	1.60±0.20 ^{#2}	0.80±0.20 ^{#2}				
0805(2012)	2.00±0.20	1.25±0.20		0.50±0.20		
1206(3216)	3.20±0.20	1.60±0.20		0.60±0.20		
	3.30±0.30 (X7T)					
	3.30±0.30 (≥1KVdc)					
	3.30±0.30 (X7T) 3.20 +0.30/-0.10 ^{#3} 3.30±0.30 ^{#4} 3.30±0.30 (≥1KVdc)					1.60 +0.30/-0.10 ^{#3} (X7T) 1.60 +0.30/-0.10 ^{#3} 1.60 +0.30/-0.10 ^{#4} 1.60 +0.30/-0.10 ^{#3}
1210(3225)	3.20±0.30 3.30±0.40 (≥1KVdc)	2.50±0.30		0.75±0.35		
1808(4520)	4.50±0.40 4.50 +0.5/-0.3 (≥1KVdc)	2.00±0.25		0.75±0.35		
1812(4532)	4.50±0.40	3.20±0.30		0.75±0.35		
	4.50 +0.5/-0.3 (≥1KVdc)	3.20±0.40				
1825(4563)	4.50±0.40	6.30±0.40		0.75±0.35		
	4.50 +0.5/-0.3 (≥1KVdc)					
2211(5728)	5.70±0.40	2.80±0.30	0.85±0.35			
2220(5750)	5.70±0.40	5.00±0.40	0.85±0.35			
2225(5763)	5.70±0.40	6.30±0.40	0.85±0.35			

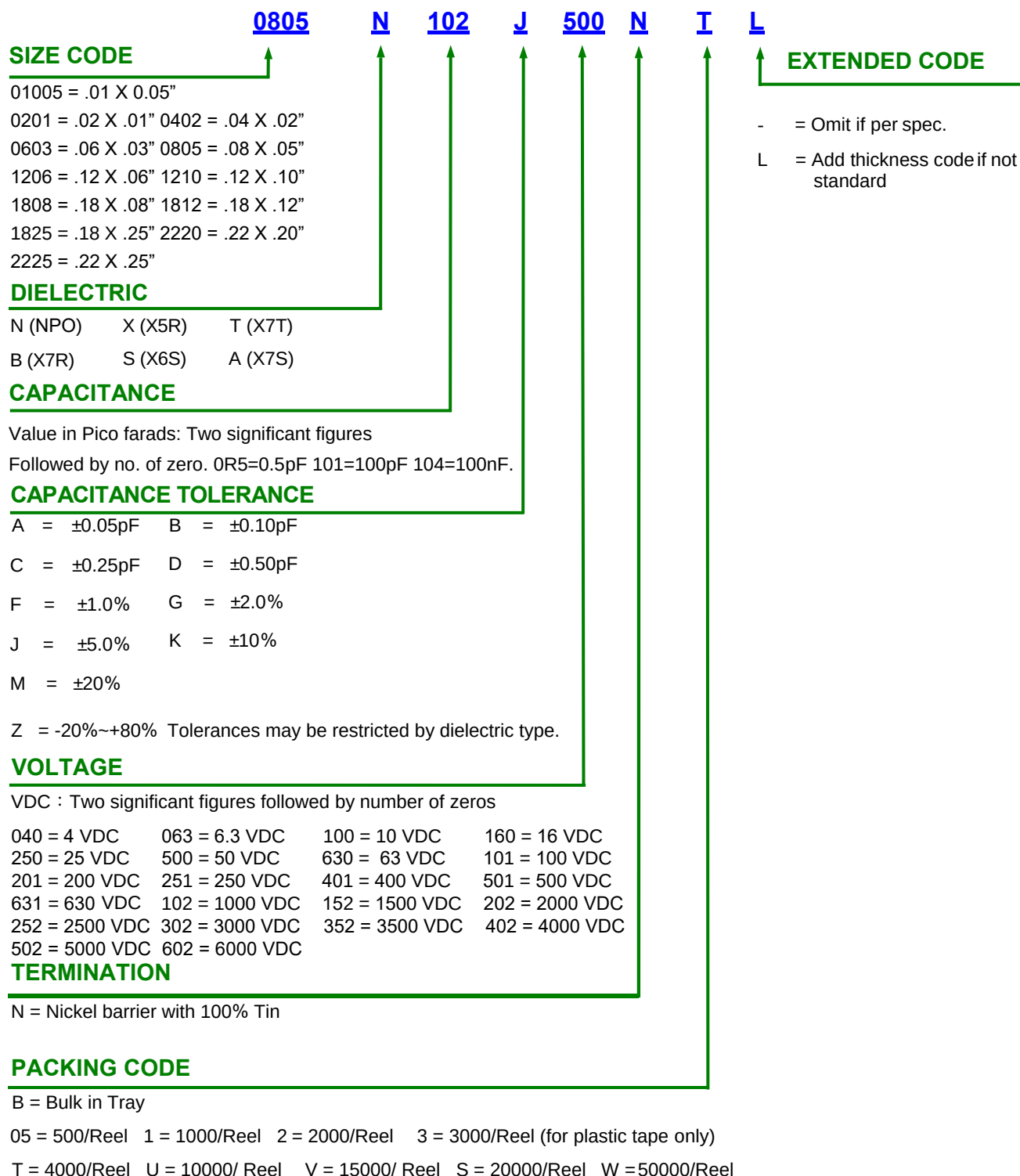
#1 For 0402 size K thickness products.

#2 For 0603/Cap.≥10μF or 0603(≤6.3V)/Cap.≥4.7μF or 0603(>10V)/Cap.>1μF products or 0603/Cap.≥10μF SIZE S/B thickness ± 0.2mm products.

#3 For 1206 size P thickness products.

#4 For 1206/100V/Cap.≥1.2μF products.

Part Numbering



Size and Capacitance Range NPO 16V ~ 50V (Low Voltage)

SIZE		01005		
DIELECTRIC		NP0		
RATED VOLTAGE (VDC)		16V	25V	50V
Capacitance	0.2pF (0R2)			
	0.3pF (0R3)			
	0.4pF (0R4)			
	0.5pF (0R5)	✓	✓	✓
	1.0pF (1R0)	✓	✓	✓
	1.5pF (1R5)	✓	✓	✓
	2.0pF (2R0)	✓	✓	✓
	3.0pF (3R0)	✓	✓	✓
	4.0pF (4R0)	✓	✓	✓
	5.0pF (5R0)	✓	✓	✓
	6.0pF (6R0)	✓	✓	✓
	7.0pF (7R0)	✓	✓	✓
	8.0pF (8R0)	✓	✓	✓
	9.0pF (9R0)	✓	✓	✓
	10pF (100)	✓	✓	✓
	12pF (120)	✓	✓	✓
	15pF (150)	✓	✓	✓
	18pF (180)	✓	✓	✓
	22pF (220)	✓	✓	✓
	27pF (270)	✓	✓	✓
	33pF (330)	✓	✓	✓
	39pF (390)	✓	✓	✓
	47pF (470)	✓	✓	✓
	56pF (560)	✓	✓	✓
	68pF (680)	✓	✓	✓
	82pF (820)	✓	✓	✓
	100pF (101)	✓	✓	✓
	120pF (121)	✓	✓	
	150pF (151)	✓	✓	
	180pF (181)	✓	✓	
	220pF (221)	✓	✓	

Size and Capacitance Range NPO 10V ~ 50V (Low Voltage)

Cap(pF)	EIA Size	0201				0402				0603				0805				1206			
	Code	10V	16V	25V	50V	10V	16V	25V	50V	10V	16V	25V	50V	10V	16V	25V	50V	10V	16V	25V	50V
0.1	0R1	L	L	L	L	N	N	N	N												
0.2	0R2	L	L	L	L	N	N	N	N												
0.3	0R3	L	L	L	L	N	N	N	N	S	S	S	S								
0.4	0R4	L	L	L	L	N	N	N	N	S	S	S	S								
0.5	0R5	L	L	L	L	N	N	N	N	S	S	S	S	A	A	A	A				
0.6	0R6	L	L	L	L	N	N	N	N	S	S	S	S	A	A	A	A				
0.7	0R7	L	L	L	L	N	N	N	N	S	S	S	S	A	A	A	A				
0.8	0R8	L	L	L	L	N	N	N	N	S	S	S	S	A	A	A	A				
0.9	0R9	L	L	L	L	N	N	N	N	S	S	S	S	A	A	A	A				
1.0	1R0	L	L	L	L	N	N	N	N	S	S	S	S	A	A	A	A				X
1.2	1R2	L	L	L	L	N	N	N	N	S	S	S	S	A	A	A	A	X	X	X	X
1.5	1R5	L	L	L	L	N	N	N	N	S	S	S	S	A	A	A	A	X	X	X	X
1.8	1R8	L	L	L	L	N	N	N	N	S	S	S	S	A	A	A	A	X	X	X	X
2.2	2R2	L	L	L	L	N	N	N	N	S	S	S	S	A	A	A	A	X	X	X	X
2.7	2R7	L	L	L	L	N	N	N	N	S	S	S	S	A	A	A	A	X	X	X	X
3.3	3R3	L	L	L	L	N	N	N	N	S	S	S	S	A	A	A	A	X	X	X	X
3.9	3R9	L	L	L	L	N	N	N	N	S	S	S	S	A	A	A	A	X	X	X	X
4.7	4R7	L	L	L	L	N	N	N	N	S	S	S	S	A	A	A	A	X	X	X	X
5.6	5R6	L	L	L	L	N	N	N	N	S	S	S	S	A	A	A	A	X	X	X	X
6.8	6R8	L	L	L	L	N	N	N	N	S	S	S	S	A	A	A	A	X	X	X	X
8.2	8R2	L	L	L	L	N	N	N	N	S	S	S	S	A	A	A	A	X	X	X	X
10	100	L	L	L	L	N	N	N	N	S	S	S	S	A	A	A	A	X	X	X	X
12	120	L	L	L	L	N	N	N	N	S	S	S	S	A	A	A	A	X	X	X	X
15	150	L	L	L	L	N	N	N	N	S	S	S	S	A	A	A	A	X	X	X	X
18	180	L	L	L	L	N	N	N	N	S	S	S	S	A	A	A	A	X	X	X	X
22	220	L	L	L	L	N	N	N	N	S	S	S	S	A	A	A	A	X	X	X	X
27	270	L	L	L	L	N	N	N	N	S	S	S	S	A	A	A	A	X	X	X	X
33	330	L	L	L	L	N	N	N	N	S	S	S	S	A	A	A	A	X	X	X	X
39	390	L	L	L	L	N	N	N	N	S	S	S	S	A	A	A	A/X	X	X	X	X
47	470	L	L	L	L	N	N	N	N	S	S	S	S	A	A	A	A/X	X	X	X	X
56	560	L	L	L	L	N	N	N	N	S	S	S	S	A	A	A	A	X	X	X	X
68	680	L	L	L	L	N	N	N	N	S	S	S	S	A	A	A	A	X	X	X	X
82	820	L	L	L	L	N	N	N	N	S	S	S	S	A	A	A	A	X	X	X	X
100	101	L	L	L	L	N	N	N	N	S	S	S	S	A	A	A	A/X	X	X	X	X
120	121	L	L	L	L	N	N	N	N	S	S	S	S	A	A	A	A	X	X	X	X
150	151	L	L	L	L	N	N	N	N	S	S	S	S	A	A	A	A	X	X	X	X
180	181	L	L	L	L	N	N	N	N	S	S	S	S	A	A	A	A	X	X	X	X
220	221	L	L	L	L	N	N	N	N	S	S	S	S	A	A	A	A	X	X	X	X
270	271	L	L	L		N	N	N	N	S	S	S	S	A	A	A	A	X	X	X	X
330	331	L	L	L		N	N	N	N	S	S	S	S	A	A	A	A	X	X	X	X
390	391	L	L	L		N	N	N	N	S	S	S	S	X	X	X	X	X	X	X	X
470	471	L	L	L		N	N	N	N	S	S	S	S	X	X	X	X	X	X	X	X
560	561	L	L	L		N	N	N	N	S	S	S	S	X	X	X	X	X	X	X	X
680	681	L	L	L		N	N	N	N	S	S	S	S	X	X	X	X	X	X	X	X
820	821			L		N	N	N	N	S	S	S	S	X	X	X	X	X	X	X	X
1000	102			L		N	N	N	N	S	S	S	S	X	X	X	X	X	X	X	X
1200	122									B	B	B	B	X	X	X	X	X	X	X	X
1500	152									B	B	B	B	X	X	X	X	X	X	X	X
1800	182									B	B	B	B	X	X	X	X	X	X	X	X
2200	222									B	B	B	B	X	X	X	C/X	X	X	X	X
2700	272									B	B	B	B	C	C	C	C	X	X	X	X
3300	332									B	B	B	B	C	C	C	C	X	X	X	X
3900	392									B	B	B	B	C	C	C	C	X	X	X	X
4700	472									B	B	B	B	C	C	C	C	X	X	X	X
5600	562									B	B	B	B	C	C	C	C	X	X	X	X
6800	682									B	B	B	B	C	C	C	C	C	C	C	C
8200	822									B	B	B	B	C	C	C	C	C	C	C	C
10000	103									B	B	B	B	C	C	C	C	C	C	C	C
12000	123													C	C	C	C	P	P	P	P
15000	153													C	C	C	C	P	P	P	P
18000	183													C	C	C	C	P	P	P	P
22000	223													C	C	C	C	P	P	P	P
27000	273																	P	P	P	P
33000	333																	P	P	P	P
39000	393																	P	P	P	P
47000	473																	P	P	P	P
56000	563																	P	P	P	P
68000	683																	P	P	P	P
82000	823																	P	P	P	P
100000	104																	E/P	E/P	E/P	E/P

Size and Capacitance Range NPO 10V ~ 50V (Low Voltage)

Cap(pF)	EIA Size	1210				1808		1812				1825		2220		2225	
	Code	10V	16V	25V	50V	25V	50V	10V	16V	25V	50V	25V	50V	25V	50V	25V	50V
2.2	2R2					C	C										
2.7	2R7					C	C										
3.3	3R3					C	C										
3.9	3R9					C	C										
4.7	4R7					C	C										
5.6	5R6					C	C										
6.8	6R8					C	C										
8.2	8R2					C	C										
10	100	M	M	M	M	C	C	C	C	C	C	F	F	F	F	F	F
12	120	M	M	M	M	C	C	C	C	C	C	F	F	F	F	F	F
15	150	M	M	M	M	C	C	C	C	C	C	F	F	F	F	F	F
18	180	M	M	M	M	C	C	C	C	C	C	F	F	F	F	F	F
22	220	M	M	M	M	C	C	C	C	C	C	F	F	F	F	F	F
27	270	M	M	M	M	C	C	C	C	C	C	F	F	F	F	F	F
33	330	M	M	M	M	C	C	C	C	C	C	F	F	F	F	F	F
39	390	M	M	M	M	C	C	C	C	C	C	F	F	F	F	F	F
47	470	M	M	M	M	C	C	C	C	C	C	F	F	F	F	F	F
56	560	M	M	M	M	C	C	C	C	C	C	F	F	F	F	F	F
68	680	M	M	M	M	C	C	C	C	C	C	F	F	F	F	F	F
82	820	M	M	M	M	C	C	C	C	C	C	F	F	F	F	F	F
100	101	M	M	M	M	C	C	C	C	C	C	F	F	F	F	F	F
120	121	M	M	M	M	C	C	C	C	C	C	F	F	F	F	F	F
150	151	M	M	M	M	C	C	C	C	C	C	F	F	F	F	F	F
180	181	M	M	M	M	C	C	C	C	C	C	F	F	F	F	F	F
220	221	M	M	M	M	C	C	C	C	C	C	F	F	F	F	F	F
270	271	M	M	M	M	C	C	C	C	C	C	F	F	F	F	F	F
330	331	M	M	M	M	C	C	C	C	C	C	F	F	F	F	F	F
390	391	M	M	M	M	C	C	C	C	C	C	F	F	F	F	F	F
470	471	M	M	M	M	C	C	C	C	C	C	F	F	F	F	F	F
560	561	M	M	M	M	C	C	C	C	C	C	F	F	F	F	F	F
680	681	M	M	M	M	C	C	C	C	C	C	F	F	F	F	F	F
820	821	M	M	M	M	C	C	C	C	C	C	F	F	F	F	F	F
1000	102	M	M	M	M	C	C	C	C	C	C	F	F	F	F	F	F
1200	122	M	M	M	M	C	C	C	C	C	C	F	F	F	F	F	F
1500	152	M	M	M	M	C	C	C	C	C	C	F	F	F	F	F	F
1800	182	M	M	M	M	C	C	C	C	C	C	F	F	F	F	F	F
2200	222	M	M	M	M	C	C	C	C	C	C	F	F	F	F	F	F
2700	272	M	M	M	M	C	C	C	C	C	C	F	F	F	F	F	F
3300	332	M	M	M	M	C	C	C	C	C	C	F	F	F	F	F	F
3900	392	M	M	M	M	C	C	C	C	C	C	F	F	F	F	F	F
4700	472	M	M	M	M	C	C	C	C	C	C	F	F	F	F	F	F
5600	562	M	M	M	M	C	C	C	C	C	C	F	F	F	F	F	F
6800	682	M	M	M/C	M/C	C	C	C	C	C	C	F	F	F	F	F	F
8200	822	M	M	M/C	M/C	C	C	C	C	C	C	F	F	F	F	F	F
10000	103	M	M	M/C	M/C	C	C	C	C	C	C	F	F	F	F	F	F
12000	123	C	C	C/E	C/E	E	E	C	C	C	C	F	F	F	F	F	F
15000	153	C	C	C/E	C/E	E	E	C	C	C	C	F	F	F	F	F	F
18000	183	F	F	F	F	F	F	C	C	C	C	F	F	F	F	F	F
22000	223	F	F	F	F	F	F	C	C	C	C	F	F	F	F	F	F
27000	273	F	F	F/G	F/G			C/E	C/E	C/E	C/E	F	F	F	F	F	F
33000	333	F	F	F/G	F/G			C/E	C/E	C/E	C/E	F	F	F	F	F	F
39000	393	F	F	F/G	F/G			F/G	F/G	F/G	F/G	F	F	F	F	F	F
47000	473	F	F	F	F			F/G	F/G	F/G	F/G	F	F	F	F	F	F
56000	563							G	G	G	G	F	F	F	F	F	F
68000	683							G	G	G	G	F	F	F	F	F	F
82000	823							G	G	G	G	F	F	F	F	F	F
100000	104							G	G	G	G	G	G	G	G	F	F

Size and Capacitance Range NPO 100V ~ 630V (Medium Voltage)

Dimension		0402			0603			0805					1206				
Cap(pF)	Code	100V	200V	250V	100V	200V	250V	100V	200V	250V	500V	630V	100V	200V	250V	500V	630V
0.5	0R5	N	N	N	S	S	S	A	A	A	A	A					
1.0	1R0	N	N	N	S	S	S	A	A	A	A	A					
1.2	1R2	N	N	N	S	S	S	A	A	A	A	A	X			X	
1.5	1R5	N	N	N	S	S	S	A	A	A	A	A	X	X	X	X	X
1.8	1R8	N	N	N	S	S	S	A	A	A	A	A	X	X	X	X	X
2.2	2R2	N	N	N	S	S	S	A	A	A	A	A	X	X	X	X	X
2.7	2R7	N	N	N	S	S	S	A	A	A	A	A	X	X	X	X	X
3.3	3R3	N	N	N	S	S	S	A	A	A	A	A	X	X	X	X	X
3.9	3R9	N	N	N	S	S	S	A	A	A	A	A	X	X	X	X	X
4.7	4R7	N	N	N	S	S	S	A	A	A	A	A	X	X	X	X	X
5.6	5R6	N	N	N	S	S	S	A	A	A	A	A	X	X	X	X	X
6.8	6R8	N	N	N	S	S	S	A	A	A	A	A	X	X	X	X	X
8.2	8R2	N	N	N	S	S	S	A	A	A	A	A	X	X	X	X	X
10	100	N	N	N	S	S	S	A	A	A	A	A	X	X	X	X	X
12	120	N	N	N	S	S	S	A	A	A	A	A	X	X	X	X	X
15	150	N	N	N	S	S	S	A	A	A	A	A	X	X	X	X	X
18	180	N	N	N	S	S	S	A	A	A	A	A	X	X	X	X	X
22	220	N	N	N	S	S	S	A	A	A	A	A	X	X	X	X	X
27	270	N	N	N	S	S	S	A	A	A	A	A	X	X	X	X	X
33	330	N	N	N	S	S	S	A	A	A	A	A	X	X	X	X	X
39	390	N	N	N	S	S	S	A	A	A	A	A	X	X	X	X	X
47	470	N	N	N	S	S	S	A	A	A	A	A	X	X	X	X	X
56	560	N	N	N	S	S	S	A	A	A	A	A	X	X	X	X	X
68	680	N	N		S	S	S	A	A	A	A	A	X	X	X	X	X
82	820	N	N		S	S	S	A	A	A	X	X	X	X	X	X	X
100	101	N	N		S	S	S	A	A	X	X	X	X	X	X	X	X
120	121	N			S	S	S	A	A	X	C	C	X	X	X	X	X
150	151	N			S	S	S	A	X	X	C	C	X	X	X	X	X
180	181	N			S	S	S	A	X	C	C	C	X	X	X	X	X
220	221	N			S	S	S	A	X/C	C	C	C	X	X	X	X	X
270	271				S	B	B	A	C	C	C	C	X	X	M	M	M
330	331				S	B	B	A	C	C	C	C	X	X	M	M	M
390	391				S	B	B	X	C	C	C	C	X	X	M	M	M
470	471				S	B	B	X	C	C	I	I	X	M	M	M	M
560	561				S	B	B	X	C	C	I	I	X	M	C	C	C
680	681				S	B	B	X	C	C	I	I	X	M	C	C	C
820	821				S	B	B	X	C	C	I	I	X	M	E	E	E
1000	102				S	B	B	X	X/C	C	I	I	X	M	E	E	E
1200	122				B	B	B	X	C	C	I	I	X	M	E	E	E
1500	152				B	B	B	X	C	C	I	I	X	C	E	E	E
1800	182				B	B	B	X	C	C	I	I	X	C	E	E	E
2200	222				B	B	B	X	C	C	I	I	M	C	E	E	E
2700	272				B			C	C/I	C/I			M	C	E	E	E
3300	332				B			C	I	I			C	C	E	E	E
3900	392				B			C	I	I			C	E	E	E	E
4700	472				B			C	I	I			C	E	E	E	E
5600	562				B			C					E	E	E	E	E
6800	682				B			C					E	E	E	E	C/E
8200	822				B			C					E	E	E	E	E
10000	103				B			C					E	E	E	E	E
12000	123							C					P	E	E		
15000	153							C					P	P	P		
18000	183							C					P				
22000	223							C					P				
27000	273												P				
33000	333												P				

Size and Capacitance Range NPO 100V ~ 630V (Medium Voltage)

Dimension		1210					1808					1812				
Cap(pF)	Code	100V	200V	250V	500V	630V	100V	200V	250V	500V	630V	100V	200V	250V	500V	630V
2.2	2R2						C	C	C	C	C					
2.7	2R7						C	C	C	C	C					
3.3	3R3						C	C	C	C	C					
3.9	3R9						C	C	C	C	C					
4.7	4R7						C	C	C	C	C					
5.6	5R6						C	C	C	C	C					
6.8	6R8						C	C	C	C	C					
8.2	8R2						C	C	C	C	C					
10	100	M	M	M	M	M	C	C	C	C	C	C	C	C	C	C
12	120	M	M	M	M	M	C	C	C	C	C	C	C	C	C	C
15	150	M	M	M	M	M	C	C	C	C	C	C	C	C	C	C
18	180	M	M	M	M	M	C	C	C	C	C	C	C	C	C	C
22	220	M	M	M	M	M	C	C	C	C	C	C	C	C	C	C
27	270	M	M	M	M	M	C	C	C	C	C	C	C	C	C	C
33	330	M	M	M	M	M	C	C	C	C	C	C	C	C	C	C
39	390	M	M	M	M	M	C	C	C	C	C	C	C	C	C	C
47	470	M	M	M	M	M	C	C	C	C	C	C	C	C	C	C
56	560	M	M	M	M	M	C	C	C	C	C	C	C	C	C	C
68	680	M	M	M	M	M	C	C	C	C	C	C	C	C	C	C
82	820	M	M	M	M	M	C	C	C	C	C	C	C	C	C	C
100	101	M	M	M	M	M	C	C	C	C	C	C	C	C	C	C
120	121	M	M	M	M	M	C	C	C	C	C	C	C	C	C	C
150	151	M	M	M	M	M	C	C	C	C	C	C	C	C	C	C
180	181	M	M	M	M	M	C	C	C	C	C	C	C	C	C	C
220	221	M	M	M	M	M	C	C	C	C	C	C	C	C	C	C
270	271	M	M	M	M	M	C	C	C	F	F	C	C	C	C	C
330	331	M	M	M	M	M	C	C	C	F	F	C	C	C	C	C
390	391	M	M	M	M	M	C	C	C	F	F	C	C	C	C	C
470	471	M	M	M	M	M	C	C	C	F	F	C	C	C	C	C
560	561	M	M	M	M	M	C	C	C	F	F	C	C	C	C	C
680	681	M	M	M	M	M	C	C	C	F	F	C	C	C	C	C
820	821	M	M	M	M	M	C	C	C	F	F	C	C	C	C	C
1000	102	M	C	C	C	C	C	C	C	F	F	C	C	C	C	C
1200	122	M	C	C	C	C	C	C	C	F	F	C	C	C	C	C
1500	152	M	C	C	C	C	C	C	C	F	F	C	C	C	C	C
1800	182	M	C	C	C	C	C	C	C	F	F	C	C	C	C	C
2200	222	M	C	C	C	C	C	C	C	F	F	C	C	C	C	C
2700	272	M	C	C	C	C	C	C	C	F	F	C	C	C	C	C
3300	332	M	C	C	C	C	C	C	C	F	F	C	C	C	C	C
3900	392	M	C	C	C	C	C	C	C			C	C	C	C	C
4700	472	M	E/C	E/C	C	C	C	C	C			C	C	C	C	C
5600	562	C	E/C	E/C	C	C	C	E	E			C	C	C	C	C
6800	682	C	E	E	E/C	E/C	C	E	E			C	C	C	C	C
8200	822	C	E	E	E	E	E	F	F			C	C	C	C	C
10000	103	E	E/F	E/F	F	F	E	F	F			C	C	C	C	C
12000	123	E	C/E/F	C/E/F	F	F						C	E	E	E	E
15000	153	F	C/E/F	C/E/F	G	G						C	E	E	E	E
18000	183	F/G	E/F/G	E/F	G	G						E	F	F	F	F
22000	223	F/G	E/F/G	E/F	G	G						E	F	F	F	F
27000	273	F	F	F	G	G						F	G	G	F	F
33000	333	F	F/G	F/G	G	G						F			G	G
39000	393	F	F/G	F/G								G			G	G
47000	473	F	F/G	F/G								G			H	H
56000	563		G	G								G				
68000	683		G	G								G				
82000	823		G	G								G				
100000	104		G	G								G				

Size and Capacitance Range NPO 100V ~ 630V (Medium Voltage)

Dimension		1825					2220					2225				
Cap(pF)	Code	100V	200V	250V	500V	630V	100V	200V	250V	500V	630V	100V	200V	250V	500V	630V
10	100	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
12	120	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
15	150	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
18	180	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
22	220	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
27	270	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
33	330	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
39	390	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
47	470	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
56	560	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
68	680	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
82	820	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
100	101	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
120	121	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
150	151	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
180	181	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
220	221	F	F	F	F	F	F	F	E/F	F	F	F	F	F	F	F
270	271	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
330	331	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
390	391	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
470	471	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
560	561	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
680	681	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
820	821	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
1000	102	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
1200	122	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
1500	152	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
1800	182	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
2200	222	F	F	F	F	F	F	F	E/F	F	F	F	F	F	F	F
2700	272	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
3300	332	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
3900	392	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
4700	472	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
5600	562	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
6800	682	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
8200	822	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
10000	103	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
12000	123	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
15000	153	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
18000	183	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
22000	223	F	F	F	F	F	F	F	F	F	F	F	F	F	F	E/F
27000	273	F	F	F	F	F	F	F	F	F	E/F	F	F	F	F	F
33000	333	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
39000	393	F	F	F	G	G	F	F	F	F	F	F	F	F	F	F
47000	473	F	F	F	F/G	F/G	F	G	G	G	F	F	F	F	F	F
56000	563	F	G	G	F/G	F/G	F	G	G	G	G	F	G	G	G	G
68000	683	F	G	G	F/G	F/G	F	G	G	H	H	F	G	G	G	G
82000	823	G					G			H	H	F	G	G	G	
100000	104	G					G			H	H	G	G	G		
120000	124															
150000	154															
180000	184															
220000	224															

Size and Capacitance Range NPO 1000V ~ 3000V (High Voltage)

Dimension		0805	1206				1210			
Cap.(pF)	Code	1000V	1000V	1500V	2000V	3000V	1000V	1500V	2000V	3000V
1.5	1R5	C	X	X	X					
1.8	1R8	C	X	X	X					
2.2	2R2	C	X	X	X					
2.7	2R7	C	X	X	X					
3.3	3R3	C	X	X	X					
3.9	3R9	C	X	X	X					
4.7	4R7	C	X	X	X					
5.0	5R0	C	X	X	X					
5.6	5R6	C	X	X	X					
6.8	6R8	C	X	X	X					
8.2	8R2	C	X	X	X					
10	100	C/X	X	X	X	E	M	M	M	F
12	120	C	X	X	X	E	M	M	M	F
15	150	C	X	X	X	E	M	M	M	F
18	180	C	X	X	X	E	M	M	M	F
22	220	C	X	X	X	E	M	M	M	F
27	270	C	X	X	X	E	M	M	M	F
33	330	C	X	M/X	M/X	E	M	M	M	F
39	390	C	X	M/X	M/X	E	M	M	M	F
47	470	C	X	M/X	M/X	E	M	M	M	F
56	560	C	X	C/X	C/X	E	M	C/M	C/M	F
68	680	C	X	C/X	C/X	E	M	C/M	C/M	F
82	820	C	X	C/X	C/X	E	M	C/M	C/M	F
100	101	C	X	C/X	C/X	E	C	C/M	C/M	F
120	121	C	X/C	E/X	E/X	E	C	C/M	C/M	F
150	151	C	C	E/M	E/M		C	E/C/M	E	F
180	181	C	E/C	E/M	E/M		C	E	E	F
220	221	C	E/C	E/C	E/C		E	E	E	F
270	271	C	E/C	P/C	P/C		E	F	F	G
330	331	C	E/C	P/E	P/E		E	F	F	
390	391	C	E/C	P/E	P/E		E	G/M	G/M	
470	471		E/C	E	E		E	C	C	
560	561		E				E	G/C	G/C	
680	681		E				E	G/E	G/E	
820	821		E				E	G/E	G/E	
1000	102		E				E	G/F	G/F	
1200	122		E				E	F	F	
1500	152		E				F	G	G	
1800	182		E				F/G	G	G	
2200	222		E				G			
2700	272		E				G			
3300	332		E				F/G			
3900	392		E				G			
4700	472		E				G			
5600	562						F/G			
6800	682						F/G			
8200	822						G			
10000	103						G			
12000	123						G			
15000	153						G			
18000	183									
23000	223									

Size and Capacitance Range NPO 1000V ~ 6000V (High Voltage)

Dimension		1808						1812					1825			
Cap.(pF)	Code	1000V	1500V	2000V	3000V	4000V	6000V	1000V	1500V	2000V	3000V	4000V	1000V	1500V	2000V	3000V
1.5	1R5															
1.8	1R8															
2.2	2R2	C	C	C	C	C										
2.7	2R7	C	C	C	C	C										
3.3	3R3	C	C	C	C	C	C*									
3.9	3R9	C	C	C	C	C	C*									
4.7	4R7	C	C	C	C	C	C*									
5.0	5R0	C	C	C	C	C	C*									
5.6	5R6	C	C	C	C	C	C*									
6.8	6R8	C	C	C	C	C	C*									
8.2	8R2	C	C	C	C	C	C*									
10	100	C	C	C	C	C	C*	C	C	C	C	C	F	F	F	F
12	120	C	C	C	C	C	C*	C	C	C	C	C	F	F	F	F
15	150	C	C	C	C	C	C*	C	C	C	C	C	F	F	F	F
18	180	C	C	C	C	C	C*	C	C	C	C	C	F	F	F	F
22	220	C	C	C	C	E	C*	C	C	C	C	C	F	F	F	F
27	270	C	C	C	C	E	C*	C	C	C	C	C	F	F	F	F
33	330	C	C	C	C	E*	C*	C	C	C	C	C*	F	F	F	F
39	390	C	C	C	C	F*	E*	C	C	C	C	C*	F	F	F	F
47	470	C	C	C	C		E*	C	C	C	C	E*	F	F	F	F
56	560	C	C	C	C		E*	C	C	C	C	E*	F	F	F	F
68	680	C	C	C	C		F*	C	C	C	C	F*	F	F	F	F
82	820	C	C	C	C		F*	C	C	C	C	F*	F	F	F	F
100	101	C	C	C	C		F*	C	C	C	C	F*	F	F	F	F
120	121	C	C	C	C			C	C	C	C	G*	F	F	F	F
150	151	C	C	C	C			C	C	C	C		F	F	F	F
180	181	C	C	C	C			C	C	C	C		F	F	F	F
220	221	C	C	C	E			C	C	C	C		F	F	F	F
270	271	C	C	C	E			C	C	C	C		F	F	F	F
330	331	C	C	C	F			C	C	C	C		F	F	F	F
390	391	C	C	C	F			C	C	C	C		F	F	F	F
470	471	C	C	C	F			C	C	C	E		F	F	F	F
560	561	C	C	C				C	C	C	E		F	F	F	F
680	681	C	C	C				C	C	C	F		F	F	F	F
820	821	C	C	C				C	C	C	G		F	F	F	F
1000	102	C	E	E				C	C	C	G		F	F	F	F
1200	122	E	E	E				C	E	E	H/R		F	F	F	
1500	152	E	F	F				C	E	E	R		F	F	F	
1800	182	F	F	F				E	F	F			F	F	F	
2200	222	F	F	F				F	F	F			F	F	F	
2700	272	F						F	G	G			F	F	F	
3300	332	F						F	G	G			F	F	F	
3900	392							G					F	F	F	
4700	472							F/G					F	F	F	
5600	562							G					F			
6800	682							G					F			
8200	822							G					G			
10000	103							G					G			
12000	123							G								

Size and Capacitance Range NPO 1000V ~ 4000V (High Voltage)

Dimension		2220					2225				
Cap.(pF)	Code	1000V	1500V	2000V	3000V	4000V	1000V	1500V	2000V	3000V	4000V
10	100	F	F	F	F	F	F	F	F	F	F
12	120	F	F	F	F	F	F	F	F	F	F
15	150	F	F	F	F	F	F	F	F	F	F
18	180	F	F	F	F	F	F	F	F	F	F
22	220	F	F	F	F	F	F	F	F	F	F
27	270	F	F	F	F	F	F	F	F	F	F
33	330	F	F	F	F	F	F	F	F	F	F
39	390	F	F	F	F	F	F	F	F	F	F
47	470	F	F	F	F	F	F	F	F	F	F
56	560	F	F	F	F	F	F	F	F	F	F
68	680	F	F	F	F	F	F	F	F	F	F
82	820	F	F	F	F	F	F	F	F	F	F
100	101	F	F	F	F	F	F	F	F	F	F
120	121	F	F	F	F	F	F	F	F	F	F*
150	151	F	F	F	F	F	F	F	F	F	F*
180	181	F	F	F	F	F	F	F	F	F	F*
220	221	F	F	F	F	F	F	F	F	F	F*
270	271	F	F	F	F	G	F	F	F	F	F*
330	331	F	F	F	F	G	F	F	F	F	F*
390	391	F	F	F	F		F	F	F	F	F*
470	471	F	F	F	F		F	F	F	F	F*
560	561	F	F	F	F		F	F	F	F	F*
680	681	F	F	F	F		F	F	F	F	F*
820	821	F	F	F	F		F	F	F	F	F*
1000	102	F	F	F	F		F	F	F	F	G*
1200	122	F	F	F	F		F	F	F	F	
1500	152	F	F	F	F		F	F	F	F	
1800	182	F	F	F			F	F	F	F	
2200	222	F	F	F			F	F	F	F	
2700	272	F	F	F			F	F	F	G	
3300	332	F	F	F			F	F	F	G	
3900	392	F	F	F			F	F	F		
4700	472	F	F	F			F	F	F		
5600	562	F					F	F	F		
6800	682	F					F	F	F		
8200	822	G					F	G	G		
10000	103	F/G					G	G	G		
12000	123	G									
15000	153	G									
18000	183	G									
22000	223	G									
27000	273	G									
33000	333	G									

Size and Capacitance Range X7R 6.3V ~ 50V (Low Voltage)

Cap(pF)	EIA Size	01005		0201					0402					0603					0805				
	Code	6.3V	10V	6.3V	10V	16V	25V	50V	6.3V	10V	16V	25V	50V	6.3V	10V	16V	25V	50V	6.3V	10V	16V	25V	50V
100	101		V		L	L	L	L		N	N	N	N		S	S	S	S		X	X	X	X
120	121					L	L	L		N	N	N	N		S	S	S	S		X	X	X	X
150	151		V			L	L	L		N	N	N	N		S	S	S	S		X	X	X	X
180	181					L	L	L		N	N	N	N		S	S	S	S		X	X	X	X
220	221		V		L	L	L	L		N	N	N	N		S	S	S	S		X	X	X	X
270	271					L	L	L		N	N	N	N		S	S	S	S		X	X	X	X
330	331		V			L	L	L		N	N	N	N		S	S	S	S		X	X	X	X
390	391					L	L	L		N	N	N	N		S	S	S	S		X	X	X	X
470	471		V			L	L	L		N	N	N	N		S	S	S	S		X	X	X	X
560	561					L	L	L		N	N	N	N		S	S	S	S		X	X	X	X
680	681					L	L	L		N	N	N	N		S	S	S	S		X	X	X	X
820	821					L	L	L		N	N	N	N		S	S	S	S		X	X	X	X
1000	102	V	V	L	L	L	L	L	N	N	N	N	N		S	S	S	S/B		X	X	X	X
1200	122			L	L	L	L			N	N	N	N		S	S	S	S		X	X	X	X
1500	152			L	L	L	L			N	N	N	N		S	S	S	S		X	X	X	X
1800	182			L	L	L	L			N	N	N	N		S	S	S	S		X	X	X	X
2200	222			L	L	L	L			N	N	N	N		S	S	S	S		X	X	X	X
2700	272			L	L	L	L			N	N	N	N		S	S	S	S		X	X	X	X
3300	332			L	L	L	L			N	N	N	N		S	S	S	S		X	X	X	X
3900	392			L	L	L	L			N	N	N	N		S	S	S	S		X	X	X	X
4700	472			L	L	L	L		N	N	N	N	N		S	S	S	S		X	X	X	X
5600	562			L	L	L	L			N	N	N	N		S	S	S	S		X	X	X	X
6800	682			L	L	L				N	N	N	N		S	S	S	S		X	X	X	X
8200	822			L	L	L				N	N	N	N		S	S	S	S		X	X	X	X
10000	103			L	L	L	L		N	N	N	N	N		S	S	S	S/B		X	X	X	X
12000	123									N	N	N	N		S	S	S	S		X	X	X	X
15000	153									N	N	N	N		S	S	S	S		X	X	X	X
18000	183									N	N	N	N		S	S	S	S		X	X	X	X
22000	223				L	L			N	N	N	N	N		S	S	S	S		X	X	X	X
27000	273									N	N	N	N		S	S	S	S		X	X	X	X
33000	333									N	N	N	N		S	S	S	B		X	X	X	X
39000	393									N	N	N	N		S	S	S	B		X	X	X	X
47000	473									N	N	N	N		S	S	S	B		X	X	X	X
56000	563									N	N	N	K		S	S	S	B		X	X	X	X
68000	683									N	N	N	K		S	S	S	B		X	X	X	X
82000	823									N	N	N	K		S	S	S	B		X	X	X	X/C
100000	104								N	N	N	N	N/K		S	S	S	S/B		X	X	X	X/C
120000	124														S	S	B			X	X	X	X/C
150000	154										N				S	S	B	B		C	C	C	C
180000	184														S	S	B			C	C	C	C
220000	224								N	N	N	N			S	S	B	B		C	C	C	C/I
270000	274													B	B	B	B		C	C	C	C	I
330000	334								N	N					B	B	B	B		C	C	C	I
390000	394														B	B	B			C	C	C	I
470000	474								N	N				B	B	B	B	B		C	C	C	I
560000	564														B	B				C	C	C	
680000	684													B	B	B				C	C	C	I
820000	824														B	B				C	C	C	

Size and Capacitance Range X7R 6.3V ~ 50V (Low Voltage)

Cap(pF)	EIA Size	1206					1210					1812				1825		2220		2225	
	Code	6.3V	10V	16V	25V	50V	6.3V	10V	16V	25V	50V	10V	16V	25V	50V	25V	50V	25V	50V	25V	50V
100	101		X	X	X	X															
120	121		X	X	X	X															
150	151		X	X	X	X															
180	181		X	X	X	X															
220	221		X	X	X	X		M	M	M	M										
270	271		X	X	X	X		M	M	M	M	C	C	C	C						
330	331		X	X	X	X		M	M	M	M	C	C	C	C						
390	391		X	X	X	X		M	M	M	M	C	C	C	C						
470	471		X	X	X	X		M	M	M	M	C	C	C	C						
560	561		X	X	X	X		M	M	M	M	C	C	C	C						
680	681		X	X	X	X		M	M	M	M	C	C	C	C						
820	821		X	X	X	X		M	M	M	M	C	C	C	C						
1000	102		X	X	X	X		M	M	M	M	C	C	C	C	F	F	F	F	F	F
1200	122		X	X	X	X		M	M	M	M	C	C	C	C	F	F	F	F	F	F
1500	152		X	X	X	X		M	M	M	M	C	C	C	C	F	F	F	F	F	F
1800	182		X	X	X	X		M	M	M	M	C	C	C	C	F	F	F	F	F	F
2200	222		X	X	X	X		M	M	M	M	C	C	C	C	F	F	F	F	F	F
2700	272		X	X	X	X		M	M	M	M	C	C	C	C	F	F	F	F	F	F
3300	332		X	X	X	X		M	M	M	M	C	C	C	C	F	F	F	F	F	F
3900	392		X	X	X	X		M	M	M	M	C	C	C	C	F	F	F	F	F	F
4700	472		X	X	X	X		M	M	M	M	C	C	C	C	F	F	F	F	F	F
5600	562		X	X	X	X		M	M	M	M	C	C	C	C	F	F	F	F	F	F
6800	682		X	X	X	X		M	M	M	M	C	C	C	C	F	F	F	F	F	F
8200	822		X	X	X	X		M	M	M	M	C	C	C	C	F	F	F	F	F	F
10000	103		X	X	X	X		M	M	M	M	C	C	C	C	F	F	F	F	F	F
12000	123		X	X	X	X		M	M	M	M	C	C	C	C	F	F	F	F	F	F
15000	153		X	X	X	X		M	M	M	M	C	C	C	C	F	F	F	F	F	F
18000	183		X	X	X	X		M	M	M	M	C	C	C	C	F	F	F	F	F	F
22000	223		X	X	X	X		M	M	M	M	C	C	C	C	F	F	F	F	F	F
27000	273		X	X	X	X		M	M	M	M	C	C	C	C	F	F	F	F	F	F
33000	333		X	X	X	X		M	M	M	M	C	C	C	C	F	F	F	F	F	F
39000	393		X	X	X	X		M	M	M	M	C	C	C	C	F	F	F	F	F	F
47000	473		X	X	X	X		M	M	M	M	C	C	C	C	F	F	F	F	F	F
56000	563		X	X	X	X		M	M	M	M	C	C	C	C	F	F	F	F	F	F
68000	683		X	X	X	X		M	M	M	M	C	C	C	C	F	F	F	F	F	F
82000	823		X	X	X	X		M	M	M	M	C	C	C	C	F	F	F	F	F	F
100000	104		X	X	X	X		M	M	M	M	C	C	C	C	F	F	F	F	F	F
120000	124		X	X	X	X		M	M	M	M	C	C	C	C	F	F	F	F	F	F
150000	154		X/M	X/M	X/M	X/M		M	M	M	M	C	C	C	C	F	F	F	F	F	F
180000	184		X/M	X/M	X/M	X/M		M	M	M	M	C	C	C	C	F	F	F	F	F	F
220000	224		X/M	X/M	X/M	X/M		M	M	M	M	C	C	C	C	F	F	F	F	F	F
270000	274		X/M	X/M	X/M	C/X		M	M	M	M	C	C	C	C	F	F	F	F	F	F
330000	334		X/M	X/M	X/M	C/X		M	M	M	C/M	C	C	C	C	F	F	F	F	F	F
390000	394		C/M	C/M	C/J	C/P		M	M	M	C/M	C	C	C	C	F	F	F	F	F	F
470000	474		C/J	C/J	C/J	C/P		M	M	M	C/M	C	C	C	C	F	F	F	F	F	F
560000	564		C/J	C/J	C/J	C/P		C/M	C/M	C/M	C/M	C	C	C	C	F	F	F	F	F	F
680000	684		C/J	C/J	C/J	C/P		C/M	C/M	C/M	C/M	C	C	C	C	F	F	F	F	F	F
820000	824		E/J	E/J	E/J	E/P		C	C	C	C	C	C	C	C	F	F	F	F	F	F

Size and Capacitance Range X7R 100V ~ 630V (Medium Voltage)

Dimension		0402	0603			0805					1206					
Cap(pF)	Code	100V	100V	200V	250V	100V	200V	250V	500V	630V	100V	200V	250V	400V 450V	500V	630V
100	101	N	S	B	B	X	X	X	X	X		C	C		C	C
120	121	N	S	B	B	X	X	X	X	X		C	C		C	C
150	151	N	S	B	B	X	X	X	X	X	X	C	C		C	C
180	181	N	S	B	B	X	X	X	X	X	X	C	C		C	C
220	221	N	S	B	B	X	X	X	X	X	X	C	C		C	C
270	271	N	S	B	B	X	X	X	X	X	X	C	C		C	C
330	331	N	S	B	B	X	X	X	X	X	X	C	C		C	C
390	391	N	S	B	B	X	X	X	X	X	X	C	C		C	C
470	471	N	S	B	B	X	X	X	X	X	X	C	C		C	C
560	561	N	S	B	B	X	X	X	X	X	X	C	C		C	C
680	681	N	S	B	B	X	X	X	X	X	X	C	C		C	C
820	821	N	S	B	B	X	X	X	X	X	X	C	C		C	C
1000	102	N	S	B	B	X	X	X	X	X	X	C	C		C	C
1200	122	N	S	B	B	X	X	X	X	X	X	C	C		C	C
1500	152	N	S	B	B	X	X	X	X	X	X	C	C		C	C
1800	182	N	S	B	B	X	X	X	X	X	X	C	C		C	C
2200	222	N	S	B	B	X	X	X	X	X	X	C	C		C	C
2700	272	N	S	B	B	X	X	X	X	X	X	C	C		C	C
3300	332	N	S	B	B	X	X	X	X	X	X	C	C		C	C
3900	392	N	S	B	B	X	X	X	X	X	X	C	C		C	C
4700	472	N	S	B	B	X	X	X	C	C	X	C	C		C	C
5600	562		S	B	B	X	X	X	C	C	X	C	C		C	C
6800	682		S	B	B	X	X	X	C	C	X	C	C		C	C
8200	822		S	B	B	X	X	X	C	C	X	C	C		C	C
10000	103		S	B	B	X	C	C	C	C	X	C	C		C	C
12000	123		B			X	C	C	C	C	X	C	C		C	C
15000	153		B			X	C	C	C	C	X	C	C		C	C
18000	183		B			X	C	C	C	C	X	C	C		C	C
22000	223		B			X	C	C	C	C	X	C	C		C/E	C/E
27000	273		B			C	C	C	C	C	X	C	C		E	E
33000	333		B			C	C	C	C		X	E	E		E	E
39000	393		B			C	C	C			X	E	E		E	E
47000	473		B			C	C	C			X	E	E		E	E
56000	563		B			C	C	C			X	E	E		E	E
68000	683		B			C	C	C			X	E	E	E		
82000	823		B			C	C				C	E	E	E		
100000	104		B			C	C				C	E	E	E		
120000	124					I					C	E	E			
150000	154					I					E	E	E			
180000	184					I					E	E	E			
220000	224					I					E	E	E			
270000	274					I					E					
330000	334					I					E					
390000	394					I					E					
470000	474					I					E					
560000	564										P					
680000	684										P					
820000	824										P					

Size and Capacitance Range X7R 100V ~ 630V (Medium Voltage)

Dimension		1825					2220					2225				
Cap(pF)	Code	100V	200V	250V	500V	630V	100V	200V	250V	500V	630V	100V	200V	250V	500V	630V
1000	102	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
1200	122	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
1500	152	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
1800	182	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
2200	222	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
2700	272	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
3300	332	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
3900	392	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
4700	472	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
5600	562	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
6800	682	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
8200	822	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
10000	103	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
12000	123	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
15000	153	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
18000	183	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
22000	223	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
27000	273	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
33000	333	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
39000	393	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
47000	473	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
56000	563	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
68000	683	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
82000	823	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
100000	104	F	F	F	F	C/F	F	F	F	F	F	F	F	F	F	F
120000	124	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
150000	154	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
180000	184	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
220000	224	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
270000	274	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
330000	334	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
390000	394	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
470000	474	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
560000	564	F	F	F	G	G	F	F	F	G	F/G	F	F	F	F	F
680000	684	F	F	F			F	F	F	G	G	F	F	F	F	F
820000	824	F	F	F			F	F	F	H	H	F	F	F	F	F

Size and Capacitance Range X7R 100V ~ 630V (Medium Voltage)

Dimension		1210						1808		1812					
Cap(pF)	Code	100V	200V	250V	400V 450V	500V	630V	500V	630V	100V	200V	250V	450V	500V	630V
100	101			C/E		C	C								
120	121			C/E		C	C								
150	151			C/E		C	C	C	C						
180	181			C/E		C	C	C	C						
220	221	M	M	M		M	M	C	C						
270	271	M	M	M		M	M	C	C	C	C	C	C	C	C
330	331	M	M	M		M	M	C	C	C	C	C	C	C	C
390	391	M	M	M		M	M	C	C	C	C	C	C	C	C
470	471	M	M	M		M	M	C	C	C	C	C	C	C	C
560	561	M	M	M		M	M	C	C	C	C	C	C	C	C
680	681	M	M	M		M	M	C	C	C	C	C	C	C	C
820	821	M	M	M		M	M	C	C	C	C	C	C	C	C
1000	102	M	M	M		M	M	C	C	C	C	C	C	C	C
1200	122	M	M	M		M	M	C	C	C	C	C	C	C	C
1500	152	M	M	M		M	M	C	C	C	C	C	C	C	C
1800	182	M	M	M		M	M	C	C	C	C	C	C	C	C
2200	222	M	M	M		M	M	C	C	C	C	C	C	C	C
2700	272	M	M	M		M	M	C	C	C	C	C	C	C	C
3300	332	M	M	M		M	M	C	C	C	C	C	C	C	C
3900	392	M	M	M		M	M	C	C	C	C	C	C	C	C
4700	472	M	M	M		M	M	C	C	C	C	C	C	C	C
5600	562	M	M	M		M	M	C	C	C	C	C	C	C	C
6800	682	M	M	M		M	M	C	C	C	C	C	C	C	C
8200	822	M	M	M		M	M	C	C	C	C	C	C	C	C
10000	103	M	M	M		M	M	C	C	C	C	C	C	C	C
12000	123	M	M	M		M	M	E	E	C	C	C	C	C	C
15000	153	M	M	M		M	M	E	E	C	C	C	C	C	C
18000	183	M	M	M		C	C	F	F	C	C	C	C	C	C
22000	223	M	M	M		C	C	F	F	C	C	C	C	C	C
27000	273	M	M	M		C	C	F	F	C	C	C	C	C	C
33000	333	M	M	M		E	E	F	F	C	C	C	C	C	C
39000	393	M	M	M		E	E	F	F	C	C	C	C	C	C
47000	473	M	M	M		E	E	F	F	C	C	C	C	C	C
56000	563	M	M	M		E	E	F	F	C	C	C	F	E	E
68000	683	M	M	M		F/E	F/E	F	F	C	C	C	F	E	E
82000	823	M	M	M		F	F	F	F	C	C	C	F	E	E
100000	104	M	M	M		F	F			C	C	C	F	E	E
120000	124	M	E	E	G	G	G			C	C	C	G	G	F
150000	154	M	E	E	G	G	G			C	C	C	G	G	F
180000	184	M	E	E	G					C	C	C	G	G	G
220000	224	M	C/E	C/E	G					C	C	C	G	G	G/W
270000	274	M	F	F	G					C	E	E	G	G	
330000	334	M	F	F	G					C	E	E	G	G	
390000	394	C	G	G						C	F	F	G	G	
470000	474	C/G	G	G						C	F	F	G	G	
560000	564	G	G	G						C	G	G	G		
680000	684	G	G	G						C	G	G	G		
820000	824	P								C	G	G	H		

Size and Capacitance Range X7R 1000V ~ 4000V (High Voltage)

Dimension		0805	1206					1210			1808				
Cap.(pF)	Code	1000V	1000V	1500V	2000V	2500V	2800V	1000V	1500V	2000V	1000V	1500V	2000V	3000V	4000V
100	101	X	C/X	C/X	C/X	C/X		C	C/E	C/E					
120	121	X	C/X	C/X	C/X	C/X		C	C/E	C/E					
150	151	X	C/X	C/X	C/X	C/X		C	C/E	C/E	C	C	C	C	F*
180	181	X	C/X	C/X	C/X	C/X		C	C/E	C/E	C	C	C	C	F*
220	221	X	C/X	C/X	C/X	C/X		M/C	M/C	M/C/E	C	C	C	C	F*
270	271	X	C/X	C/X	C/X	C/X		M/C	M/C	M/C/E	C	C	C	C	F*
330	331	X	C/X	C/X	C/X	C/X		M/C	M/C	M/C/E	C	C	C	F	F*
390	391	X	C/X	C/X	C/X	C/X		M/C	M/C	M/C/E	C	C	C	F	F*
470	471	X	C/X	C/X	C/X	C/X		M/C	M/C	M/C/E	C	C	C	F	F*
560	561	X	C/X	C/X	C/X	C/X		M/C	M/C	M/C/E	C	C	C	F	F*
680	681	X	C/X	M/C	M/C	C*	C*	M/C	M/C	M/C/E	C	C	C	F	F*
820	821	X	C/X	M/C	M/C	C*	C*	M/C	M/C	M/C/E	C	C	C	F	F*
1000	102	X	C/X	C	X/C	C*	C*	M/C	C	M/C/E	C	C	C/E	C/D/E	F*
1200	122	X	C/X	E	E	E*		M/C	G	M/C/E	C	C/F	C/F	F	
1500	152	C	C/X	E	E	E*		M/C	G	F	C	C/F	C/F	F	
1800	182	C	C/X	E	E	E*		M/C	G	F	C	C/F	C/F	F	
2200	222	C	C/X	E	E	E*		M/C	G	F	C	E/F	E/F	F	
2700	272	C	C/X	E	E	E*		M/C	G	G	C	F	F	F	
3300	332	C	C/X	E	E	E*		M/C	G	G	C	F	F	F	
3900	392	C	C/X	E		E*		M/E	G	G	C	F	F	F*	
4700	472	C	C/X	E		E*		M/E	G/F	E/F/G	C	F	F	F*	
5600	562	C	C/X	E*				M/E	G	G*	C/F	F	F	F*	
6800	682	C	M/C	E*				M/E	G	G*	C/F	F	F	F*	
8200	822	C	M/C	E*				M/E	G	G*	C/F	F*	F*	F*	
10000	103	C	M/C	E*				C/E	G	G*	C/F	F*	F*	F*	
12000	123		C/E					C/E	G		E/F				
15000	153		E					E	G		E/F				
18000	183		E					E	G		F				
22000	223		E					E	G		F				
27000	273							E	G		F				
33000	333							E	G		F				
39000	393							F			F				
47000	473							G			F				
56000	563										F				
68000	683														

* Surface coating only.

Size and Capacitance Range X7R 1000V ~ 4000V (High Voltage)

Dimension		1812						1825				
Cap.(pF)	Code	1000V	1500V	2000V	3000V	3500V	4000V	1000V	1500V	2000V	3000V	4000V
150	151					C*						
180	181					C*						
220	221					C*						
270	271	C	C	C	F	C*	F*					F*
330	331	C	C	C	F	C*	F*					F*
390	391	C	C	C	F	C*	F*					F*
470	471	C	C	C	F	C*	F*					F*
560	561	C	C	C	F	C*	F*					F*
680	681	C	C	C	F	C*	F*					F*
820	821	C	C	C	F	C*	F*					F*
1000	102	C	C	C	F	C*	F*	F	F	F	F	F*
1200	122	C	C	C	F	C*	G*	F	F	F	F	G*
1500	152	C	C	C	F	C*	G*	F	F	F	F	G*
1800	182	C	C	C	G	C*	G*	F	F	F	F	G*
2200	222	C	C	C	G*	E*		F	F	F	F*	
2700	272	C	C	C	G*	E*		F	F	F	F*	
3300	332	C	F	F	G*	E*		F	F	F	F*	
3900	392	C	F	F	G*	G*		F	F	F	F*	
4700	472	C	F	F	G*	G*		F	F	F	F*	
5600	562	C	G	G		G*		F	F	F	G*	
6800	682	C	G	G		G*		F	F	F	G*	
8200	822	C	G	G		G*		F	F	F	G*	
10000	103	C	E/G/F	E/G/F		G*		F	F	F	G*	
12000	123	F	E/G/F	G				F	G	G	H*	
15000	153	F	E/G/F	G				F	G	G	H*	
18000	183	G	E/G/F	G				F	G	G	H*	
22000	223	G	F/G	G				F	G	G		
27000	273	G						F	H	H		
33000	333	G						F	H	H		
39000	393	G						F	H	H		
47000	473	G/F						F	H	H		
56000	563	G						F	H			
68000	683	G						F				
82000	823	G						F				
100000	104	G						G				
120000	124											
150000	154											
180000	184											
220000	224											
270000	274											
330000	334											

* Surface coating only.

Size and Capacitance Range X7R 1000V ~ 5000V (High Voltage)

Dimension		2211		2220						2225					
Cap.(pF)	Code	3000V	4000V	1000V	1500V	2000V	3000V	4000V	5000V	1000V	1500V	2000V	3000V	4000V	5000V
270	271	F	F*					F*	F*					F*	F*
330	331	F	F*					F*	F*					F*	F*
390	391	F	F*					F*	F*					F*	F*
470	471	F	F*					F*	F*				E	F*	F*
560	561	F	F*					F*	F*					F*	F*
680	681	F	F*					F*	F*					F*	F*
820	821	F	F*					F*	F*					F*	F*
1000	102	F	F*	F	F	F	F	F*	F*	F	F	F	F	F*	F*
1200	122	G	G*	F	F	F	F	G*	F*	F	F	F	F	G*	F*
1500	152	G	G*	F	F	F	F	G*	F*	F	F	F	F	G*	F*
1800	182	G	G*	F	F	F	F	G*	F*	F	F	F	F	G*	F*
2200	222	G		F	F	F	F*		F*	F	F	F	F*		F*
2700	272	G		F	F	F	F*		F*	F	F	F	F*		F*
3300	332	G		F	F	F	F*		F*	F	F	F	F*		F*
3900	392			F	F	F	F*		F*	F	F	F	F*		F*
4700	472			F	F	F	F*		F/G*	F	F	F	F*		F/G*
5600	562			F	F	F	F*			F	F	F	G*		
6800	682			F	F	F	G*			F	F	F	G*		
8200	822			F	G	G	G*			F	F	F	G*		
10000	103			F	G/F	E/G/F	G*			F	F	F	G*		
12000	123			F	G	G	H*			F	G	G	G*		
15000	153			F	G	G	H*			F	G	G	G*		
18000	183			F	H	H	H*			F	G	G	G/H*		
22000	223			F	H	H/G				F	G/F	G/F	F*		
27000	273			F	H	H/G				F	G	G			
33000	333			F	H	H/F				F	G	G			
39000	393			F	H	H				F	G	H			
47000	473			F	H	H				F	G	H			
56000	563			F	H	H				F	G	H			
68000	683			F						F	G				
82000	823			F						F	G				
100000	104			G/F						G	G				
120000	124			G/F						H					
150000	154			H						G/H					
180000	184			H						H					
220000	224			H/F						H					
270000	274			H						F/G/H					
330000	334			H						G/H					
390000	394														

* Surface coating only.

Size and Capacitance Range X5R 6.3V ~ 50V (Low Voltage)

Cap(pF)	EIA Size	01005		0201					0402					0603				
	Code	6.3V	10V	6.3V	10V	16V	25V	50V	6.3V	10V	16V	25V	50V	6.3V	10V	16V	25V	50V
100	101		V			L	L	L										
120	121																	
150	151		V			L	L	L										
180	181																	
220	221		V			L	L	L										
270	271																	
330	331		V			L	L	L										
390	391																	
470	471		V			L	L	L										
560	561																	
680	681		V			L	L	L										
820	821																	
1000	102	V	V		L	L	L	L										
1500	152		V		L	L	L											
2200	222		V		L	L	L											
2700	272																	
3300	332		V		L	L	L											
4700	472		V		L	L	L											
6800	682		V		L	L	L											
10000	103	V	V	L	L	L	L	L										
15000	153			L	L	L							N					
22000	223	V		L	L	L	L					N	N					
27000	273																	
33000	333	V		L	L	L				N			N					
39000	393																	
47000	473	V		L	L	L	L		N	N	N		N					
56000	563																	
68000	683			L	L	L			N	N	N		K					
82000	823																	
100000	104	V	V	L	L	L	L		N	N	N	N	K				S	
150000	154								N	N	N	N						
220000	224			L	L	L	L		N	N	N	N	N	B	B	B	B	B
270000	274																	
330000	334			L	L	L	L		N	N	N			B	B	B	B	
390000	394																	
470000	474			L	L				N	N	N/K	K	K	B	B	B	B	B
680000	684								N	N				B	B	B	B	
820000	824																	

Size and Capacitance Range X7R 6.3V~ 630V (Low Voltage & High Capacitance)

Dimension		0402	0603					0805					1206						
Cap(pF)	Code	6.3V	6.3V	10V	16V	25V	50V	6.3V	10V	16V	25V	50V	6.3V	10V	16V	25V	35V	50V	100V
1000000	105	N	B	B	B	B	B		C	C	C	I		J/P	J/P	J/P		P	P
1200000	125													P	P	P		P	E/P
1500000	155								I	I	I		J	J/P	J/P	P		P	E/P
1800000	185													P	P	P		P	P
2200000	225		B	B	B			I	I	I	I	I	J	J/P	J/P	P		P	P
2700000	275													P	P	P		P	
3300000	335													P	P	P		P	
3900000	395													P	P	P		P	
4700000	475		B	B				I	I	I	I		P	P	P	P		P	
5600000	565													P	P	P			
6800000	685													P	P	P			
8200000	825													P	P	P			
10000000	106							I	I	I*			P	P	P	P	P		
12000000	126																		
15000000	156																		
18000000	186																		
22000000	226												P	P	P*				
47000000	476																		

Dimension		1210						1812								1825				
Cap(pF)	Code	6.3V	10V	16V	25V	50V	100V	10V	16V	25V	50V	100V	200V	250V	450	25V	50V	100V	200V	250V
1000000	105		C	C	C	C	P	C	C	C	F	F	G/W	G/W	H	F	F	F	F	F
1200000	125		P	P	P	P	F	C	C	C	C	C				F	F	F	G	
1500000	155		F	F	F	C/E/F	F	C	C	C	C	C				F	F	F	G	
1800000	185		G	G	G	G	G	E	E	E	E	E				F	F	F	G	
2200000	225		E/G	E/G	E/G	G	F/G	E	E	E	E	E				F	F	F	G	
2700000	275		G	G	G	G	G	F	F	F	F	F				F	F	F		
3300000	335		G	G	G	G	G	F	F	F	F	F				F	F	F		
3900000	395		G	G	G	G	G	F	F	F	F	F				F	F	F		
4700000	475		F/G	F/G	F/G	F/G	G/W	G	G	G	G	G				F	F	F		
5600000	565		G	G	G	G	G	G	G	G	G					F	F	F		
6800000	685		G	G	G	G	G	G	G	G	G					F	F	F		
8200000	825		G	G	G	G	G	G	G	G	G					G	G	G		
10000000	106	F	G	G	G	G	G	G	G	G	F/G					G	G	F/G		
12000000	126		G	G	G			G	G	G										
15000000	156		G	G	G			G	G	G										
18000000	186		G	G	G			G	G	G										
22000000	226		G	G	G			G	G	G										
47000000	476	G	G																	

Dimension		2220							2225						
Cap(pF)	Code	25V	50V	100V	200V	250V	500V	630V	25V	50V	100V	200V	250V	500V	630V
1000000	105	F	E/F	E/F	F	F	H	H	F	F	F	F	F	G	G
1200000	125	F	F	F	G	G			F	F	F	G	G		
1500000	155	F	E/F	E/F	G	G			F	F	F	G	G		
1800000	185	F	F	F	G	G			F	F	F	G	G		
2200000	225	F	F	F	G	G			F	F	F	G	G		
2700000	275	F	F	F					F	F	F	G	G		
3300000	335	F	F	F					F	F	F				
3900000	395	F	F	F					F	F	F				
4700000	475	F	F	F					F	F	F				
5600000	565	F	F	F					F	F	F				
6800000	685	F	F	F					F	F	F				
8200000	825	G	G	G					G	G	G				
10000000	106	G	G	G					G	G	G				
12000000	126	H	H	F/G					F/G						
15000000	156	H	H	G					F/G						
18000000	186	H	H	H											
22000000	226	H	H	R											
27000000	276	H													
33000000	336	H													
39000000	396	H													
47000000	476	R													

Size and Capacitance Range X5R 4V ~ 50V (Low Voltage & High Capacitance)

Dimension		0201			0402						0603					
Cap(pF)	Code	6.3V	10V	16V	4V	6.3V	10V	16V	25V	50	4V	6.3V	10V	16V	25V	50V
1000000	105	L	L	L*		N	N	N	N			B	B	B	B	B
1500000	155											B	B			
2200000	225	L*	L*			N	N	K	K			B	B	B	B	B
3300000	335											B	B			
4700000	475					K*	K*					B	B	B	B	
6800000	685															
10000000	106				K*	K*	K*				B	B	B*	B	B*	
22000000	226				K*	K*					B*	B*	B*			
47000000	476										B*	B*				
100000000	107															
220000000	227															

Dimension		0805						1206					
Cap(pF)	Code	4V	6.3V	10V	16V	25V	50V	4V	6.3V	10V	16V	25V	50V
1000000	105			C	C	C	I						P/M
1500000	155		I	I	I	I				J	J	P	P
2200000	225		I	I	I	I				J	J	P	P
3300000	335		I	I	I	I				P	P	P	P
4700000	475		I	I	I	I			P	P	P	P	P
6800000	685								P	P			
10000000	106		I	I	I	I			P	P	P	P	P
22000000	226		I	I*	I*	I*			P	P	P	P	
47000000	476	I*	I*	I*					P*	P*	P*		
100000000	107	I*	I*						P				
220000000	227							P*	P*				

Dimension		1210						
Cap(pF)	Code	4V	6.3V	10V	16V	25V	35V	50V
1000000	105							
1500000	155			F	F			
2200000	225			F	F			
3300000	335							
4700000	475			F	F	F		
6800000	685							
10000000	106		F	F	F	F	G	G
22000000	226		G	G	G	G	G	
47000000	476		G	G	G	G*		
100000000	107		G*	G*	G*			
220000000	227	G*	G*					

"*" Means M tolerance only.

Size and Capacitance Range X6S 4V ~ 100V (Low Voltage & High Capacitance)

Cap(pF)	EIA Size	0201					0402			
	Code	4V	6.3V	10V	16V	25V	6.3V	10V	16V	25V
2200	222			L				N		
4700	472			L						
15000	153	L	L	L				N		
22000	223	L	L	L						
27000	273	L	L	L						
33000	333	L	L	L						
39000	393	L	L	L						
47000	473	L	L	L						
56000	563	L	L	L						
68000	683	L	L	L						
82000	823	L	L	L						
100000	104	L	L	L	L	L	N			
150000	154									
220000	224		L	L*			N			
330000	334									
470000	474	L					K/N			
680000	684									

Dimension		0201		0402				0603					0805					
Cap(pF)	Code	4V	6.3V	6.3V	10V	16V	25V	4V	6.3V	10V	16V	25V	4V	6.3V	10V	16V	25V	50V
1000000	105	L	L	N	N	N	K											
1500000	155																	
2200000	225			K	K				B	B	B					I		
3300000	335																	
4700000	475			K*	K*			B	B	B	B	B					I	
6800000	685																	
10000000	106			K*				B*	B*	B*	B*		I	I	I	I	I	
22000000	226							B*	B*				I	I*	I*	I		
47000000	476												I*	I*				
100000000	107																	
220000000	227																	

Dimension		1206				1210				
Cap(pF)	code	6.3V	10V	16V	25V	6.3V	10V	16V	25V	100V
1000000	105									
1500000	155									
2200000	225									
3300000	335									
4700000	475									
6800000	685									
10000000	106				P					
22000000	226		P	P*	P				G	
47000000	476	P				G	G	G		
100000000	107					G*	G*			
220000000	227									

“*” Means M tolerance only.

Size and Capacitance Range X7S 4V ~ 100V (Low Voltage & High Capacitance)

Cap(pF)	EIA Size	0201	0402	0603		0805		1206
	Code	10V	6.3V	10V	16V	16V	25V	6.3V
100000	104	L						
150000	154							
220000	224							
330000	334							
470000	474							
680000	684							

Dimension		0402				0603					0805							
Cap(pF)	Code	6.3V	10V	16V	25V	4V	6.3V	10V	16V	25V	4V	6.3V	10V	16V	25V	50V	100V	
1000000	105								B									
1500000	155																	
2200000	225	K																
3300000	335																	
4700000	475							B	B									
6800000	685																	
10000000	106													I	I			
22000000	226																	
47000000	476																	
100000000	107																	
220000000	227																	

Dimension		1206			
Cap(pF)	Code	6.3V	10V	16V	25V
1000000	105				
1500000	155				
2200000	225				
3300000	335				
4700000	475				
6800000	685				
10000000	106				
22000000	226			P*	
47000000	476	P*			
100000000	107				
220000000	227				

“*” Means M tolerance only.

Size and Capacitance Range X7T 250V ~ 630V (Medium Voltage)

Dimension		1206			1210			1812			2220		
Cap(pF)	Code	250V	450V	630V	250V	450V	630V	250V	450V	630V	250V	450V	630V
10000	103		M	M									
12000	123		M	C									
15000	153		M	C									
18000	183		M	C									
22000	223		M	C			M						
27000	273		C	E			C						
33000	333		C	E			C						
39000	393		C	E			C						
47000	473	M	E	P			C						
56000	563	M	E	P			E						
68000	683	M	E			C	E			C			
82000	823	C	P			C	E			C			
100000	104	C	P		M	E	E			E			F
120000	124	E			M	E	F			E			F
150000	154	E			C	F	F		E	E			F
180000	184	E			C	F			E	F			F
220000	224	P			E	F		C	E	F		F	F
270000	274				E			C	F	G		F	F
330000	334				F			C	F			F	F
390000	394							E	G			F	G
470000	474							E	G		F	F	G
560000	564							E			F	F	G
680000	684							E			F	F	
820000	824							F			F	G	
1000000	105							G			F	G	
1500000	155										F		
2200000	225										G		

Thickness Code & Standard Packing Q'ty per reel

Chip Size	Thickness Code	Chip Thickness	Q'ty of carboard tape in		Q'ty of Embosses tape in	
			7" reel	13" reel	7" reel	13" reel
01005	V	0.20±0.02	20k	-	-	-
0201	L	0.30±0.03	15k	70k	-	-
0402	N	0.50±0.05	10k	50k	-	-
	Q	0.50 +0.02/-0.05	10k	50k	-	-
	K	0.50±0.20	10k	-	-	-
0603	U	0.50±0.10	4k	-	-	-
	S	0.80±0.07	4k	15k	-	-
	B	0.80 +0.15/-0.10	4k	15k	-	-
0805	U	0.50±0.10	4k	15k	-	-
	A	0.60±0.10	4k	15k	-	-
	X	0.80±0.10	4k	15k	-	-
	T	0.85±0.10	4k	15k	-	-
	C	1.25±0.10	-	-	3k	10k
	I	1.25±0.20	-	-	3k	10k
1206	X	0.80±0.10	4k	15k	-	-
	T	0.85±0.10	4k	15k	-	-
	M	0.95±0.10	-	-	3k	10k
	J	1.15±0.15	-	-	3k	10k
	C	1.25±0.10	-	-	3k	10k
	E	1.60±0.20	-	-	2k	10k
	P	1.60 +0.30/-0.10	-	-	2k	9k
1210	T	0.85±0.10	-	-	3k	10k
	M	0.95±0.10	-	-	3k	10k
	C	1.25±0.10	-	-	3k	10k
	E	1.60±0.20	-	-	2k	-
	F	2.00±0.20	-	-	1k	6k
	G	2.50±0.30	-	-	1k	6k
1808	C	1.25±0.10	-	-	2k	10k
	E	1.60±0.20	-	-	2k	8k
	F	2.00±0.20	-	-	1k	6k
1812	C	1.25±0.10	-	-	1k	5k
	E	1.60±0.20	-	-	1k	-
	F	2.00±0.20	-	-	1k	-
	G	2.50±0.30	-	-	0.5k	3k
	H	2.80±0.30	-	-	0.5k	-
1825	E	1.60±0.20	-	-	1k	-
	F	2.00±0.20	-	-	1k	-
	G	2.50±0.30	-	-	0.5k	-
	H	2.80±0.30	-	-	0.5k	-
2220	E	1.60±0.20	-	-	1k	-
	F	2.00±0.20	-	-	1k	-
	G	2.50±0.30	-	-	0.5k	-
	H	2.80±0.30	-	-	0.5k	-
2225	E	1.60±0.20	-	-	1k	-
	F	2.00±0.20	-	-	1k	-
	G	2.50±0.30	-	-	0.5k	-
	H	2.80±0.30	-	-	0.5k	-

RELIABILITY TEST CONDITIONS AND REQUIREMENTS

No.	Item	Test Condition	Requirements																																																																																	
1.	Visual and Dimensions	---	* No remarkable defect. * Dimensions to confirm to individual specification sheet.																																																																																	
2.	Capacitance	* Class I : (NPO) Cap.≤1000pF, 1.0±0.2Vrms, 1MHz±10%. Cap.>1000pF, 1.0±0.2Vrms, 1KHz±10%. * Class II : (X7R, X5R, X7S, X6S) Cap.≤10μF, 1.0±0.2Vrms, 1KHz±10%**. Cap.>10μF, 0.5±0.2Vrms, 120Hz±20%. * Class II : (X7T) 1.0±0.2Vrms, 1KHz±10%. ** Test condition : 0.5±0.2Vrms, 1KHz±10%. X7R : 0805=106(6.3V), 0603/475(6.3V) X5R : 0201≥224 (6.3V,10V,16V)#1, 0402≥475 (6.3V,16V), 0402≥225(10V), 0603=106 (6.3V) X7R & X5R(≥10V) & 01005X103≤6.3V & 01005X104≤10V * 0.5±0.2Vrms, 1kHz±10% : X5R(≤6.3V); Excluding 01005X103≤6.3V & 01005X104≤10V TT18X≥475(10V) , TT15X series X6S : 0201/474(4V),0201≥104 (6.3V,10V#1), 0402≥225 (6.3V), 0402/475 (10V), 0603/106 (6.3V), X7S : 0402/225(6.3V) #1 Excluding X5R/0201/105(6.3V);225(10V), X6S/0201/104(10V) (1.0±0.2Vrms · 1KHz±10%) *Before initial measurement (Class II only) : To apply de-aging at 150°C for 1hr then set for 24±2 hrs at room temp.	* Shall not exceed the limits given in the detailed spec. * NPO : Cap.<30pF, Q≥400+20C Cap.≥30pF, Q≥1000 *01005 : X7R: ≤5.0% X5R: ≤10% * X7T: <table><tr><td>Rated Vol.(V)</td><td>Q/D.F.</td></tr><tr><td>≥50</td><td>D.F.≤2.5%</td></tr></table> * X7R: <table><tr><td>Rated</td><td>D.F.≤</td><td>Exception of D.F.≤</td></tr><tr><td rowspan="3">≥100V</td><td rowspan="3">≤2.5%</td><td>≤3.5% 1206≥0.47μF, 1812≥4.7μF, 1825≥4.7μF, 2220≥4.7μF, 2225≥4.7μF</td></tr><tr><td>≤5% 0603≥0.068μF, 0805>0.1μF, 1206>1μF, 1210≥2.2μF</td></tr><tr><td>≤10% 0805>0.22μF, 1210≥3.3μF</td></tr><tr><td rowspan="3">50V</td><td rowspan="3">≤2.5%</td><td>≤3.5% 0201(50V), 0603≥0.047μF, 0805≥0.1μF, 1206≥0.47μF, 1210≥2.2μF, 1812≥4.7μF, 1825≥4.7μF, 2220≥4.7μF, 2225≥4.7μF</td></tr><tr><td>≤5% 0201≥0.01uF, 1210≥4.7μF</td></tr><tr><td>≤10% 0402≥0.012μF, 0603>0.1μF, 0805≥1μF, 1206≥2.2μF, 1210≥10μF</td></tr><tr><td>35V</td><td>≤3.5%</td><td>≤10% 0603≥1μF, 0805≥2.2μF, 1206≥2.2μF, 1210≥10μF</td></tr><tr><td rowspan="4">25V</td><td rowspan="4">≤3.5%</td><td>≤5% 0201≥0.01μF, 0805≥1μF, 1210≥10μF</td></tr><tr><td>≤7% 0603≥0.33μF</td></tr><tr><td>≤10% 0201≥0.1μF, 0402≥0.056μF, 0603≥0.47μF, 0805≥2.2μF, 1206≥2.2μF, 1210≥22μF</td></tr><tr><td>≤12.5% 0402≥0.47μF, 0805=10μF</td></tr><tr><td rowspan="3">16V</td><td rowspan="3">≤3.5%</td><td>≤5% 0201≥0.01μF, 0402≥0.033μF, 0603≥0.15μF, 0805≥0.68μF, 1206≥2.2μF, 1210≥4.7μF</td></tr><tr><td>≤10% 0201≥0.1uF(0201/X7R≥0.022μF), 0402≥0.22uF, 0603≥0.15μF, 0805≥2.2μF, 1206≥4.7μF, 1210≥22μF</td></tr><tr><td>≤12.5% 0402=1μF; 0805=10μF</td></tr><tr><td rowspan="3">10V</td><td rowspan="3">≤5%</td><td>≤10% 0201≥0.012μF, 0402≥0.33μF(0402/X7R≥0.22μF), 0603≥0.33μF, 0805≥2.2μF, 1206≥2.2μF, 1210≥22μF</td></tr><tr><td>≤12.5% 0805=10μF</td></tr><tr><td>≤15% 0201≥0.1μF, 0402≥1μF, 0603≥10μF</td></tr><tr><td>6.3V</td><td>≤10%</td><td>≤15% 0201≥0.1μF, 0402≥1μF, 0603≥10μF, 0805≥4.7μF, 1206≥47μF, 1210≥100μF</td></tr><tr><td>4V</td><td>≤15%</td><td>--- ---</td></tr></table> * X5R: <table><tr><td>Rated</td><td>D.F.≤</td><td>Exception of D.F. ≤</td></tr><tr><td rowspan="3">≥100V</td><td rowspan="3">≤2.5%</td><td>≤3.5% 1206≥0.47μF</td></tr><tr><td>≤5% 0603≥0.068μF; 0805>0.1μF; 1206≥1μF; 1210≥2.2μF</td></tr><tr><td>≤10% 0805>0.22μF; 1210≥3.3μF</td></tr><tr><td rowspan="4">50V</td><td rowspan="4">≤2.5%</td><td>≤3.5% 0201(50V); 0603≥0.047μF; 0805≥0.18μF; 1206≥0.47μF</td></tr><tr><td>≤5% 0201≥0.01uF; 1210≥3.3μF</td></tr><tr><td>≤10% 0402≥0.012μF; 0603>0.1μF; 0805≥1μF; 1206≥2.2μF; 1210≥10μF</td></tr><tr><td>≤12.5% 1206=10μF</td></tr><tr><td>35V</td><td>≤3.5%</td><td>≤10% 0603≥1μF; 0805≥2.2μF; 1206≥2.2μF; 1210≥10μF</td></tr><tr><td rowspan="4">25V</td><td rowspan="4">≤3.5%</td><td>≤5% 0201≥0.01μF; 0805≥1μF</td></tr><tr><td>≤7% 0603≥0.33μF</td></tr><tr><td>≤10% 0201≥0.1μF; 0402≥0.10μF; 0603≥0.47μF; 0805≥2.2μF; 1206≥4.7μF; 1210≥10μF</td></tr><tr><td>≤12.5% 0402≥0.47μF; 0805=10μF</td></tr><tr><td rowspan="3">16V</td><td rowspan="3">≤3.5%</td><td>≤5% 0201≥0.01μF; 0402≥0.033μF; 0603≥0.15μF; 0805≥0.68μF; 1206≥2.2μF; 1210≥4.7μF</td></tr><tr><td>≤10% 0201>0.01uF; 0402≥0.22uF; 0603>0.47μF; 0805≥2.2μF; 1206≥4.7μF; 1210≥22μF</td></tr><tr><td>≤12.5% 0402≥1μF; 0805=10μF</td></tr><tr><td rowspan="3">10V</td><td rowspan="3">≤5%</td><td>≤10% 0201≥0.012μF; 0402≥0.22μF; 0603≥0.33μF; 0805≥2.2μF; 1206≥2.2μF; 1210≥22μF</td></tr><tr><td>≤12.5% 0805=10μF</td></tr><tr><td>≤15% 0201≥0.1μF; 0402≥1μF; 0603≥10μF</td></tr><tr><td>6.3V</td><td>≤10%</td><td>≤15% 0201≥0.1μF; 0402≥1μF; 0603≥10μF; 0805≥4.7μF; 1206≥47μF; 1210≥100μF</td></tr><tr><td>4V</td><td>≤15%</td><td>--- ---</td></tr></table>	Rated Vol.(V)	Q/D.F.	≥50	D.F.≤2.5%	Rated	D.F.≤	Exception of D.F.≤	≥100V	≤2.5%	≤3.5% 1206≥0.47μF, 1812≥4.7μF, 1825≥4.7μF, 2220≥4.7μF, 2225≥4.7μF	≤5% 0603≥0.068μF, 0805>0.1μF, 1206>1μF, 1210≥2.2μF	≤10% 0805>0.22μF, 1210≥3.3μF	50V	≤2.5%	≤3.5% 0201(50V), 0603≥0.047μF, 0805≥0.1μF, 1206≥0.47μF, 1210≥2.2μF, 1812≥4.7μF, 1825≥4.7μF, 2220≥4.7μF, 2225≥4.7μF	≤5% 0201≥0.01uF, 1210≥4.7μF	≤10% 0402≥0.012μF, 0603>0.1μF, 0805≥1μF, 1206≥2.2μF, 1210≥10μF	35V	≤3.5%	≤10% 0603≥1μF, 0805≥2.2μF, 1206≥2.2μF, 1210≥10μF	25V	≤3.5%	≤5% 0201≥0.01μF, 0805≥1μF, 1210≥10μF	≤7% 0603≥0.33μF	≤10% 0201≥0.1μF, 0402≥0.056μF, 0603≥0.47μF, 0805≥2.2μF, 1206≥2.2μF, 1210≥22μF	≤12.5% 0402≥0.47μF, 0805=10μF	16V	≤3.5%	≤5% 0201≥0.01μF, 0402≥0.033μF, 0603≥0.15μF, 0805≥0.68μF, 1206≥2.2μF, 1210≥4.7μF	≤10% 0201≥0.1uF(0201/X7R≥0.022μF), 0402≥0.22uF, 0603≥0.15μF, 0805≥2.2μF, 1206≥4.7μF, 1210≥22μF	≤12.5% 0402=1μF; 0805=10μF	10V	≤5%	≤10% 0201≥0.012μF, 0402≥0.33μF(0402/X7R≥0.22μF), 0603≥0.33μF, 0805≥2.2μF, 1206≥2.2μF, 1210≥22μF	≤12.5% 0805=10μF	≤15% 0201≥0.1μF, 0402≥1μF, 0603≥10μF	6.3V	≤10%	≤15% 0201≥0.1μF, 0402≥1μF, 0603≥10μF, 0805≥4.7μF, 1206≥47μF, 1210≥100μF	4V	≤15%	--- ---	Rated	D.F.≤	Exception of D.F. ≤	≥100V	≤2.5%	≤3.5% 1206≥0.47μF	≤5% 0603≥0.068μF; 0805>0.1μF; 1206≥1μF; 1210≥2.2μF	≤10% 0805>0.22μF; 1210≥3.3μF	50V	≤2.5%	≤3.5% 0201(50V); 0603≥0.047μF; 0805≥0.18μF; 1206≥0.47μF	≤5% 0201≥0.01uF; 1210≥3.3μF	≤10% 0402≥0.012μF; 0603>0.1μF; 0805≥1μF; 1206≥2.2μF; 1210≥10μF	≤12.5% 1206=10μF	35V	≤3.5%	≤10% 0603≥1μF; 0805≥2.2μF; 1206≥2.2μF; 1210≥10μF	25V	≤3.5%	≤5% 0201≥0.01μF; 0805≥1μF	≤7% 0603≥0.33μF	≤10% 0201≥0.1μF; 0402≥0.10μF; 0603≥0.47μF; 0805≥2.2μF; 1206≥4.7μF; 1210≥10μF	≤12.5% 0402≥0.47μF; 0805=10μF	16V	≤3.5%	≤5% 0201≥0.01μF; 0402≥0.033μF; 0603≥0.15μF; 0805≥0.68μF; 1206≥2.2μF; 1210≥4.7μF	≤10% 0201>0.01uF; 0402≥0.22uF; 0603>0.47μF; 0805≥2.2μF; 1206≥4.7μF; 1210≥22μF	≤12.5% 0402≥1μF; 0805=10μF	10V	≤5%	≤10% 0201≥0.012μF; 0402≥0.22μF; 0603≥0.33μF; 0805≥2.2μF; 1206≥2.2μF; 1210≥22μF	≤12.5% 0805=10μF	≤15% 0201≥0.1μF; 0402≥1μF; 0603≥10μF	6.3V	≤10%	≤15% 0201≥0.1μF; 0402≥1μF; 0603≥10μF; 0805≥4.7μF; 1206≥47μF; 1210≥100μF	4V	≤15%	--- ---
Rated Vol.(V)	Q/D.F.																																																																																			
≥50	D.F.≤2.5%																																																																																			
Rated	D.F.≤		Exception of D.F.≤																																																																																	
≥100V	≤2.5%		≤3.5% 1206≥0.47μF, 1812≥4.7μF, 1825≥4.7μF, 2220≥4.7μF, 2225≥4.7μF																																																																																	
			≤5% 0603≥0.068μF, 0805>0.1μF, 1206>1μF, 1210≥2.2μF																																																																																	
			≤10% 0805>0.22μF, 1210≥3.3μF																																																																																	
50V	≤2.5%		≤3.5% 0201(50V), 0603≥0.047μF, 0805≥0.1μF, 1206≥0.47μF, 1210≥2.2μF, 1812≥4.7μF, 1825≥4.7μF, 2220≥4.7μF, 2225≥4.7μF																																																																																	
			≤5% 0201≥0.01uF, 1210≥4.7μF																																																																																	
			≤10% 0402≥0.012μF, 0603>0.1μF, 0805≥1μF, 1206≥2.2μF, 1210≥10μF																																																																																	
35V	≤3.5%	≤10% 0603≥1μF, 0805≥2.2μF, 1206≥2.2μF, 1210≥10μF																																																																																		
25V	≤3.5%	≤5% 0201≥0.01μF, 0805≥1μF, 1210≥10μF																																																																																		
		≤7% 0603≥0.33μF																																																																																		
		≤10% 0201≥0.1μF, 0402≥0.056μF, 0603≥0.47μF, 0805≥2.2μF, 1206≥2.2μF, 1210≥22μF																																																																																		
		≤12.5% 0402≥0.47μF, 0805=10μF																																																																																		
16V	≤3.5%	≤5% 0201≥0.01μF, 0402≥0.033μF, 0603≥0.15μF, 0805≥0.68μF, 1206≥2.2μF, 1210≥4.7μF																																																																																		
		≤10% 0201≥0.1uF(0201/X7R≥0.022μF), 0402≥0.22uF, 0603≥0.15μF, 0805≥2.2μF, 1206≥4.7μF, 1210≥22μF																																																																																		
		≤12.5% 0402=1μF; 0805=10μF																																																																																		
10V	≤5%	≤10% 0201≥0.012μF, 0402≥0.33μF(0402/X7R≥0.22μF), 0603≥0.33μF, 0805≥2.2μF, 1206≥2.2μF, 1210≥22μF																																																																																		
		≤12.5% 0805=10μF																																																																																		
		≤15% 0201≥0.1μF, 0402≥1μF, 0603≥10μF																																																																																		
6.3V	≤10%	≤15% 0201≥0.1μF, 0402≥1μF, 0603≥10μF, 0805≥4.7μF, 1206≥47μF, 1210≥100μF																																																																																		
4V	≤15%	--- ---																																																																																		
Rated	D.F.≤	Exception of D.F. ≤																																																																																		
≥100V	≤2.5%	≤3.5% 1206≥0.47μF																																																																																		
		≤5% 0603≥0.068μF; 0805>0.1μF; 1206≥1μF; 1210≥2.2μF																																																																																		
		≤10% 0805>0.22μF; 1210≥3.3μF																																																																																		
50V	≤2.5%	≤3.5% 0201(50V); 0603≥0.047μF; 0805≥0.18μF; 1206≥0.47μF																																																																																		
		≤5% 0201≥0.01uF; 1210≥3.3μF																																																																																		
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RELIABILITY TEST CONDITIONS AND REQUIREMENTS

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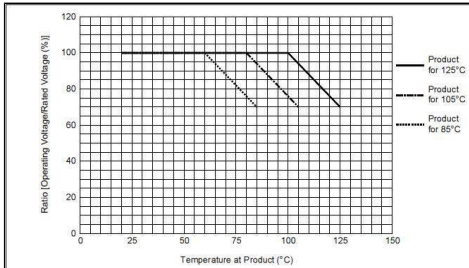
RELIABILITY TEST CONDITIONS AND REQUIREMENTS

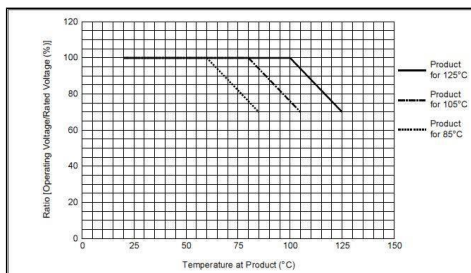
No.	Item	Test Condition	Requirements																																			
5.	Insulation Resistance	<table><tr><th>Rated Vol.(V)</th><th>Apply Voltage</th><th>Charge Time</th></tr><tr><td>≤100</td><td>1 times of U_R</td><td>Max. 120 sec.</td></tr><tr><td>200≤V≤500</td><td>1 times of U_R</td><td>60 sec.</td></tr><tr><td>>500</td><td>500Vdc</td><td>60 sec.</td></tr></table>	Rated Vol.(V)	Apply Voltage	Charge Time	≤100	1 times of U _R	Max. 120 sec.	200≤V≤500	1 times of U _R	60 sec.	>500	500Vdc	60 sec.	* ≥10GΩ or RxC≥500Ω-F, whichever is smaller. 01005 : NP0, X7R : ≥10GΩ or RxC≥500Ω-F whichever is smaller. X5R : RxC≥50Ω-F * Except : <table><tr><th>Rated voltage (X7R/X5R/X7S/X6S/X7T)</th><th>I.R.</th></tr><tr><td>≥100V : All X7R & X7T</td><td rowspan="7">≥10GΩ or RxC≥100Ω-F, whichever is smaller</td></tr><tr><td>50V : 0402>0.01μF, 0603≥1μF, 0805≥1μF, 1206≥4.7μF, 1210≥4.7μF, 1812≥10μF, 2220≥22μF</td></tr><tr><td>35V : 0805≥2.2μF, 1206≥2.2μF, 1210≥10μF</td></tr><tr><td>25V : 0402≥1μF, 0603≥2.2μF, 0805≥2.2μF, 1206≥10μF, 1210≥10μF</td></tr><tr><td>16V : 0201≥0.1μF, 0402≥0.22μF, 0603≥1μF, 0805≥2.2μF, 1206≥10μF, 1210≥47μF</td></tr><tr><td>10V : 0201≥47nF, 0402≥0.47μF, 0603≥0.47μF, 0805≥2.2μF, 1206≥4.7μF, 1210≥47μF</td></tr><tr><td>6.3V; 4V</td></tr><tr><th>Rated voltage (X7R/X7S/X6S/X5R)</th><th>I.R.</th></tr><tr><td>100V : 1210≥3.3μF</td><td rowspan="8">RxC≥50Ω-F</td></tr><tr><td>50V : 0402≥0.1μF, 0603≥2.2μF, 0805≥10μF, 1206≥10μF</td></tr><tr><td>35V : 0603≥1μF</td></tr><tr><td>25V : 0201≥0.1μF, 0402≥2.2μF, 0603≥10μF, 0805≥10μF, 1206≥22μF</td></tr><tr><td>16V : 0603≥10μF, 0402≥1μF, 0201≥0.22μF</td></tr><tr><td>10V : 0201>0.1μF, 0402≥1μF, 0603≥10μF, 0805≥47μF</td></tr><tr><td>6.3V : 0201≥0.1μF, 0603>4.7μF, 0805≥47μF, 1206≥10μF</td></tr><tr><td>4V : 0603≥22μF, 0805≥47μF, 1206≥100μF</td></tr><tr><td>All X7S items; All X6S items</td><td></td></tr></table>	Rated voltage (X7R/X5R/X7S/X6S/X7T)	I.R.	≥100V : All X7R & X7T	≥10GΩ or RxC≥100Ω-F, whichever is smaller	50V : 0402>0.01μF, 0603≥1μF, 0805≥1μF, 1206≥4.7μF, 1210≥4.7μF, 1812≥10μF, 2220≥22μF	35V : 0805≥2.2μF, 1206≥2.2μF, 1210≥10μF	25V : 0402≥1μF, 0603≥2.2μF, 0805≥2.2μF, 1206≥10μF, 1210≥10μF	16V : 0201≥0.1μF, 0402≥0.22μF, 0603≥1μF, 0805≥2.2μF, 1206≥10μF, 1210≥47μF	10V : 0201≥47nF, 0402≥0.47μF, 0603≥0.47μF, 0805≥2.2μF, 1206≥4.7μF, 1210≥47μF	6.3V; 4V	Rated voltage (X7R/X7S/X6S/X5R)	I.R.	100V : 1210≥3.3μF	RxC≥50Ω-F	50V : 0402≥0.1μF, 0603≥2.2μF, 0805≥10μF, 1206≥10μF	35V : 0603≥1μF	25V : 0201≥0.1μF, 0402≥2.2μF, 0603≥10μF, 0805≥10μF, 1206≥22μF	16V : 0603≥10μF, 0402≥1μF, 0201≥0.22μF	10V : 0201>0.1μF, 0402≥1μF, 0603≥10μF, 0805≥47μF	6.3V : 0201≥0.1μF, 0603>4.7μF, 0805≥47μF, 1206≥10μF	4V : 0603≥22μF, 0805≥47μF, 1206≥100μF	All X7S items; All X6S items	
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6.	Dielectric Strength (Voltage proof)	<table><tr><th>Rated Voltage</th><th>Condition</th></tr><tr><td>≤100</td><td>2.5 times of U_R</td></tr><tr><td>100<V≤250</td><td>2.0 times of U_R</td></tr><tr><td>250<V≤500</td><td>1.5 times of U_R</td></tr><tr><td>630≤V≤3000V</td><td>1.2 times of U_R</td></tr><tr><td>3000<V<5000V</td><td>1.1 times of U_R</td></tr><tr><td>≥5000V</td><td>1.0 times of U_R</td></tr></table> * Duration : 1 to 5 sec. * Charge and discharge current less than 50mA.	Rated Voltage	Condition	≤100	2.5 times of U _R	100<V≤250	2.0 times of U _R	250<V≤500	1.5 times of U _R	630≤V≤3000V	1.2 times of U _R	3000<V<5000V	1.1 times of U _R	≥5000V	1.0 times of U _R	* No evidence of damage or flash over during test.																					
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7.	Solderability	* Solder temperature : 235±5°C for (01005,0201~1210). * Solder temperature : 245±5°C for (1808~2225). * Dipping time : 2±0.5 sec.	* 75% min. coverage of all metalized area. * 95% min. coverage of all metalized area.(for 01005)																																			
8.	Resistance to Soldering Heat	* Solder temperature : 260±5°C. * Dipping time : 10±1 sec. * Preheating : 120 to 150°C for 1 minute before immerse the capacitor in a eutectic solder. * Before initial measurement (Class II only) : To apply de-aging at 150°C for 1hr then set for 24±2 hrs at room temp. ≥1KVdc for 48±4hrs * Measurement to be made after keeping at room temp.for 24±2 hrs (Class I) or 48±4 hrs (Class II).	* No remarkable damage. * Cap. change : NPO : Within ±2.5% or ±0.25pF, whichever is larger. X7R, X5R, X6S, X7S : Within ±7.5%. X7T : Within ±7.5%. * Q/D.F. & I.R. : To meet initial requirements. * 25% max. leaching on each edge.																																			
9.	Temperature Cycle (Rapid change of temperature)	* Conduct the five cycles according to the temperatures and time. <table><tr><th>Step</th><th>Temp.(°C)</th><th>Time(min.)</th></tr><tr><td>1</td><td>Min. operating temp. +0/-3</td><td>30±3</td></tr><tr><td>2</td><td>Room temp.</td><td>2~3</td></tr><tr><td>3</td><td>Max. operating temp. +3/-0</td><td>30±3</td></tr><tr><td>4</td><td>Room temp.</td><td>2~3</td></tr></table> * Before initial measurement (Class II only) : To apply de-aging at 150°C for 1hr then set for 24±2 hrs at room temp. * Measurement to be made after keeping at room temp. for 24±2 hrs (Class I) or 48±4 hrs (Class II).	Step	Temp.(°C)	Time(min.)	1	Min. operating temp. +0/-3	30±3	2	Room temp.	2~3	3	Max. operating temp. +3/-0	30±3	4	Room temp.	2~3	* No remarkable damage. * Cap. change : NPO : Within ±2.5% or ±0.25pF, whichever is larger. X7R, X5R , X7S, X6S : Within ±7.5% 01005 X5R : Within ±15.0% X7T : Within ±7.5%. * Q for NPO : To meet initial requirements. * D.F.(Class II) : ≤150% of initial requirement. Q/D.F. : X7T : D.F.≤150% of initial requirement. * I.R. : To meet initial requirements. * 01005 Q/D.F., I.R. and dielectric strength : To meet initial requirements.																				
Step	Temp.(°C)	Time(min.)																																				
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RELIABILITY TEST CONDITIONS AND REQUIREMENTS

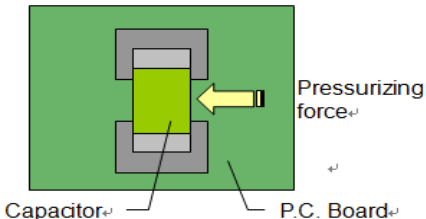
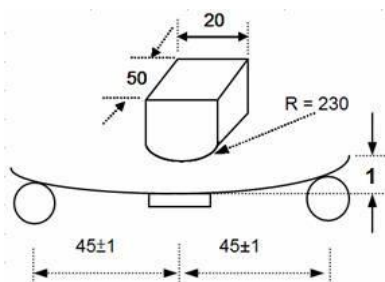
No.	Item	Test Condition	Requirements										
10.	Humidity (Damp Heat) Steady State	* Test temp. : 40±2°C. * Humidity : 90~95%RH. * Test time : 500 +24/-0hrs. * Before initial measurement (Class II only) : To apply de-aging at 150°C for 1hr then set for 24±2 hrs at room temp. * Measurement to be made after keeping at room temp. for 24±2 hrs (Class I) or 48±4 hrs (Class II).	* No remarkable damage. * Cap. change : NPO : Within ±5.0% or ±0.5pF, whichever is larger. X7R, X5R, X6S, X7S : Within ±12.5% for ≥10V**, within ±25% for 6.3V. 01005 X5R : within ±25.0% **10V : Within ±25% for 0603≥4.7μF, 0402≥1μF, 0201≥0.1μF. X7T : Within ±12.5%. * Q/D.F. : NPO : Cap.>30pF, Q≥350; 10pF≤Cap.≤30pF, Q≥275+2.5C; Cap.<10pF, Q≥200+10C. 01005 X7R : ≤7.5% 01005 X5R : ≤20% * I.R 01005. : NP0, X7R : ≥1GΩ or RxC≥50Ω-F whichever is smaller. X5R : RxC≥10Ω-F. * D.F.(Class II) : ≤200% of initial requirement. * I.R. : ≥10V, ≥1GΩ or R×C≥50Ω-F, whichever is smaller. * Q/D.F. : X7T : D.F.≤200% of initial requirement. * I.R. (Class II) : ≥1GΩ or RxC≥10Ω-F, whichever is smaller. Class II (X7R, X5R, X7S, X6S) * Except : <table><tr><th>Rated voltage</th><th>I.R.</th></tr><tr><td>100V : All X7R; 1210≥3.3μF</td><td rowspan="7">≥1GΩ or RxC≥10Ω-F, whichever is smaller</td></tr><tr><td>50V : 0402>0.01μF, 0603≥1μF, 0805≥1μF, 1206≥4.7μF, 1210≥4.7μF</td></tr><tr><td>35V : 0603≥1μF, 0805≥2.2μF, 1206≥2.2μF, 1210≥10μF</td></tr><tr><td>25V : 0201≥0.1uF, 0402≥0.22μF, 0603≥2.2μF, 0805≥2.2μF, 1206≥10μF, 1210≥10μF</td></tr><tr><td>16V : 0201≥0.1uF, 0402≥0.22μF, 0603≥1μF, 0805≥2.2μF, 1206≥10μF, 1210≥47μF</td></tr><tr><td>10V : 0201≥47nF, 0402≥0.47μF, 0603≥0.47μF, 0805≥2.2μF, 1206≥4.7μF, 1210≥47μF</td></tr><tr><td>6.3V; 4V; All X6S/X7S items; Size≥1812</td></tr></table>	Rated voltage	I.R.	100V : All X7R; 1210≥3.3μF	≥1GΩ or RxC≥10Ω-F, whichever is smaller	50V : 0402>0.01μF, 0603≥1μF, 0805≥1μF, 1206≥4.7μF, 1210≥4.7μF	35V : 0603≥1μF, 0805≥2.2μF, 1206≥2.2μF, 1210≥10μF	25V : 0201≥0.1uF, 0402≥0.22μF, 0603≥2.2μF, 0805≥2.2μF, 1206≥10μF, 1210≥10μF	16V : 0201≥0.1uF, 0402≥0.22μF, 0603≥1μF, 0805≥2.2μF, 1206≥10μF, 1210≥47μF	10V : 0201≥47nF, 0402≥0.47μF, 0603≥0.47μF, 0805≥2.2μF, 1206≥4.7μF, 1210≥47μF	6.3V; 4V; All X6S/X7S items; Size≥1812
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6.3V; 4V; All X6S/X7S items; Size≥1812													
11.	Humidity (Damp Heat) Load	* Test temp. : 40±2°C. * Humidity : 90~95%RH. * Test time : 500 +24/-0hrs. * To apply voltage : Rated voltage. * Before initial measurement (Class II only) : To apply de-aging at 150°C for 1hr then set for 24±2 hrs at room temp. * Measurement to be made after keeping at room temp. for 24±2 hrs (Class I) or 48±4 hrs (Class II).	* No remarkable damage. * Cap. change : NPO : Within ±7.5% or ±0.75pF, whichever is larger. X7R, X5R, X7S, X6S : Within ±12.5% for ≥10V**, within ±25% for 6.3V. **10V : Within ±25% for 0603≥4.7μF, 0402≥1μF, 0201≥0.1μF. X7T : Within ±12.5%. * Q/D.F. : NPO : Cap.≥30pF, Q≥200; Cap.<30pF, Q≥100+10/3C. * 01005 Q/D.F. value : NP0 : Cap≥30pF, Q≥200; Cap<30pF; Q≥100+10/3C X7R : ≤7.5% X5R : ≤20% * I.R. : NP0, X7R : ≥500MΩ or RxC≥25Ω-F whichever is smaller. X5R : RxC≥5Ω-F. * D.F.(Class II) : ≤200% of initial requirement. * I.R. : ≥10V, ≥500MΩ or RxC≥25Ω-F, whichever is smaller. * Q/D.F. : X7T : D.F.≤200% of initial requirement. * I.R. : ≥500MΩ or RxC≥25Ω-F, whichever is smaller. Class II (X7R, X5R, X7S, X6S) * Except : <table><tr><th>Rated voltage</th><th>I.R.</th></tr><tr><td>100V : All X7R; 1210≥3.3μF</td><td rowspan="7">≥500MΩ or RxC≥5Ω-F, whichever is smaller</td></tr><tr><td>50V : 0402>0.01μF, 0603≥1μF, 0805≥1μF, 1206≥4.7μF, 1210≥4.7μF</td></tr><tr><td>35V : 0603≥1μF, 0805≥2.2μF, 1206≥2.2μF, 1210≥10μF</td></tr><tr><td>25V : 0201≥0.1uF, 0402≥0.22μF, 0603≥2.2μF, 0805≥2.2μF, 1206≥10μF, 1210≥10μF</td></tr><tr><td>16V : 0201≥0.1uF, 0402≥0.22μF, 0603≥1μF, 0805≥2.2μF, 1206≥10μF, 1210≥47μF</td></tr><tr><td>10V : 0201≥47nF, 0402≥0.47μF, 0603≥0.47μF, 0805≥2.2μF, 1206≥4.7μF, 1210≥47μF</td></tr><tr><td>6.3V; 4V; All X6S/X7S items; Size≥1812</td></tr></table>	Rated voltage	I.R.	100V : All X7R; 1210≥3.3μF	≥500MΩ or RxC≥5Ω-F, whichever is smaller	50V : 0402>0.01μF, 0603≥1μF, 0805≥1μF, 1206≥4.7μF, 1210≥4.7μF	35V : 0603≥1μF, 0805≥2.2μF, 1206≥2.2μF, 1210≥10μF	25V : 0201≥0.1uF, 0402≥0.22μF, 0603≥2.2μF, 0805≥2.2μF, 1206≥10μF, 1210≥10μF	16V : 0201≥0.1uF, 0402≥0.22μF, 0603≥1μF, 0805≥2.2μF, 1206≥10μF, 1210≥47μF	10V : 0201≥47nF, 0402≥0.47μF, 0603≥0.47μF, 0805≥2.2μF, 1206≥4.7μF, 1210≥47μF	6.3V; 4V; All X6S/X7S items; Size≥1812
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RELIABILITY TEST CONDITIONS AND REQUIREMENTS

No.	Item	Test Condition	Requirements																																																																																																																														
12.	High Temperature Load (Endurance)	* Test temp. : NPO, X7R, X7S, X7T : 125±3°C. * X5R : 85±3°C. X6S : 105±3°C. * To apply voltage : (1) 10V≤Ur≤100V : 200% of rated voltage. or ≤6.3V or Cap.≥10μF : 150% of rated voltage. (2) 200V≤Ur≤500V : 150% of rated voltage. (3) 400V~450V : 120% of rated voltage (4) =630V : 120% of rated voltage. (5) 100% of rated voltage for below range : <table><tr><th>Size</th><th>Dielectric</th><th>Rated</th><th>Capacitance</th></tr><tr><td>01005</td><td>X5R</td><td>6.3V</td><td>-</td></tr><tr><td>0201</td><td>X5R/X7R/X7S/X6S</td><td>≤10V ≥16V</td><td>C≥0.1μF C>0.1μF</td></tr><tr><td>0402</td><td>X5R/X7R/X7S/X6S</td><td>6.3V, 10V, 16V, 25V</td><td>C≥1.0μF</td></tr><tr><td>0603</td><td>X5R/X7R/X7S/X6S</td><td>4V 6.3V,10V 25V, 35V</td><td>C≥22μF C≥4.7μF C≥1.0μF</td></tr><tr><td>0805</td><td>X5R/X7R/X7S/X6S</td><td>4V 6.3V 10V~50V</td><td>C≥22μF C≥4.7μF C≥10μF</td></tr><tr><td>1206</td><td>X5R/X7R/X7S/X6S</td><td>≤6.3V</td><td>C≥47μF</td></tr><tr><td>1210</td><td>X5R/X7R/X7S/X6S</td><td>16V</td><td>C≥47μF</td></tr><tr><td></td><td>X7R</td><td>≥100V</td><td>C≥3.3μF</td></tr></table> (6) 150% of rated voltage for below range : <table><tr><th>Size</th><th>Dielectric</th><th>Rated Voltage</th><th>Capacitance</th></tr><tr><td>01005</td><td>X5R</td><td>10V</td><td>-</td></tr><tr><td>0201</td><td>X5R/X7R/X7S/X6S</td><td>16V/25V</td><td>C≥0.1μF</td></tr><tr><td></td><td>X7R</td><td>16V</td><td>C≥0.022μF</td></tr><tr><td></td><td></td><td>50V</td><td>C≥0.1μF</td></tr><tr><td>0402</td><td>X5R/X7R/X7S/X6S</td><td>10~25V</td><td>C≥0.22μF</td></tr><tr><td>0603</td><td>X7R</td><td>≥50V</td><td>C≥0.082μF</td></tr><tr><td></td><td>X5R/X7R/X7S/X6S</td><td>10V,16V, 50V</td><td>C≥1.0μF</td></tr><tr><td>0805</td><td>X5R/X7R/X7S/X6S</td><td>10~50V</td><td>C≥4.7μF</td></tr><tr><td></td><td>X5R/X7R/X7S</td><td>50V ≥100V</td><td>C≥0.47μF C≥0.12μF</td></tr><tr><td>1206</td><td>X5R/X7R/X7S/X6S</td><td>≥50V</td><td>C≥1.0μF</td></tr><tr><td>1210</td><td>X5R/X7R/X7S/X6S</td><td>≤100V</td><td>C≥1.0μF</td></tr><tr><td></td><td>X7R</td><td>>100V</td><td>C≥0.22μF</td></tr><tr><td>1812</td><td>X7R</td><td>≤50V</td><td>C≥4.7μF</td></tr><tr><td></td><td></td><td>100V</td><td>C≥1.0μF</td></tr><tr><td>1825</td><td></td><td></td><td></td></tr><tr><td>2220</td><td>X7R</td><td>≥100V</td><td>C≥1.0μF</td></tr><tr><td>2225</td><td></td><td></td><td></td></tr></table> (7) 120% of rated voltage for below range : <table><tr><th>Size</th><th>Dielectric</th><th>Rated Voltage</th><th>Capacitance</th></tr><tr><td>2220</td><td>X7R</td><td>≥100V</td><td>C≥15μF</td></tr></table> * Test time : 1000 +24/-0 hrs. * Before initial measurement (Class II only) : To apply de-aging at 150°C for 1hr then set for 24±2 hrs at room temp. * Measurement to be made after keeping at room temp. for 424±2 hrs (Class I) or 48±4 hrs (Class II). ** De-rating conditions : (For 100% of rated voltage items) 	Size	Dielectric	Rated	Capacitance	01005	X5R	6.3V	-	0201	X5R/X7R/X7S/X6S	≤10V ≥16V	C≥0.1μF C>0.1μF	0402	X5R/X7R/X7S/X6S	6.3V, 10V, 16V, 25V	C≥1.0μF	0603	X5R/X7R/X7S/X6S	4V 6.3V,10V 25V, 35V	C≥22μF C≥4.7μF C≥1.0μF	0805	X5R/X7R/X7S/X6S	4V 6.3V 10V~50V	C≥22μF C≥4.7μF C≥10μF	1206	X5R/X7R/X7S/X6S	≤6.3V	C≥47μF	1210	X5R/X7R/X7S/X6S	16V	C≥47μF		X7R	≥100V	C≥3.3μF	Size	Dielectric	Rated Voltage	Capacitance	01005	X5R	10V	-	0201	X5R/X7R/X7S/X6S	16V/25V	C≥0.1μF		X7R	16V	C≥0.022μF			50V	C≥0.1μF	0402	X5R/X7R/X7S/X6S	10~25V	C≥0.22μF	0603	X7R	≥50V	C≥0.082μF		X5R/X7R/X7S/X6S	10V,16V, 50V	C≥1.0μF	0805	X5R/X7R/X7S/X6S	10~50V	C≥4.7μF		X5R/X7R/X7S	50V ≥100V	C≥0.47μF C≥0.12μF	1206	X5R/X7R/X7S/X6S	≥50V	C≥1.0μF	1210	X5R/X7R/X7S/X6S	≤100V	C≥1.0μF		X7R	>100V	C≥0.22μF	1812	X7R	≤50V	C≥4.7μF			100V	C≥1.0μF	1825				2220	X7R	≥100V	C≥1.0μF	2225				Size	Dielectric	Rated Voltage	Capacitance	2220	X7R	≥100V	C≥15μF	* No remarkable damage. * Cap. change : NPO : Within ±3.0% or ±0.3pF, whichever is larger. X7R, X5R, X7S, X6S : Within ±12.5% for ≥10V**, within ±25% for ≤6.3V. **10V : Within ±25% for 0603≥4.7μF, 0402≥1μF, 0201≥0.1μF. X7T : Within ±12.5%. * Q for NPO : Cap.>30pF, Q≥350. 10pF≤Cap.≤30pF, Q≥275+2.5C. D.F.(Class II) : ≤200% of initial requirement. * I.R. : ≥10V, ≥1GΩ or RxC≥50Ω-F, whichever is smaller. * Q/D.F. : X7T : D.F.≤200% of initial requirement. * I.R. : ≥1GΩ or RxC≥10Ω-F, whichever is smaller. * Except : <table><tr><th>Rated voltage</th><th>I.R.</th></tr><tr><td>100V : All X7R; 1210≥3.3μF</td><td rowspan="7">≥1GΩ or RxC≥10Ω-F, whichever is smaller</td></tr><tr><td>50V : 0402>0.01μF, 0603≥1μF, 0805≥1μF, 1206≥4.7μF, 1210≥4.7μF</td></tr><tr><td>35V : 0603≥1μF, 0805≥2.2μF, 1206≥2.2μF, 1210≥10μF</td></tr><tr><td>25V : 0201≥0.1uF, 0402≥0.22μF, 0603≥2.2μF, 0805≥2.2μF, 1206≥10μF, 1210≥10μF</td></tr><tr><td>16V : 0201≥0.1uF, 0402≥0.22μF, 0603≥1μF, 0805≥2.2μF, 1206≥10μF, 1210≥47μF</td></tr><tr><td>10V : 0201≥47nF, 0402≥0.47μF, 0603≥0.47μF, 0805≥2.2μF, 1206≥4.7μF, 1210≥47μF</td></tr><tr><td>6.3V; 4V; All X6S/X7S items; Size≥1812</td></tr></table>	Rated voltage	I.R.	100V : All X7R; 1210≥3.3μF	≥1GΩ or RxC≥10Ω-F, whichever is smaller	50V : 0402>0.01μF, 0603≥1μF, 0805≥1μF, 1206≥4.7μF, 1210≥4.7μF	35V : 0603≥1μF, 0805≥2.2μF, 1206≥2.2μF, 1210≥10μF	25V : 0201≥0.1uF, 0402≥0.22μF, 0603≥2.2μF, 0805≥2.2μF, 1206≥10μF, 1210≥10μF	16V : 0201≥0.1uF, 0402≥0.22μF, 0603≥1μF, 0805≥2.2μF, 1206≥10μF, 1210≥47μF	10V : 0201≥47nF, 0402≥0.47μF, 0603≥0.47μF, 0805≥2.2μF, 1206≥4.7μF, 1210≥47μF	6.3V; 4V; All X6S/X7S items; Size≥1812
		Size	Dielectric	Rated	Capacitance																																																																																																																												
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RELIABILITY TEST CONDITIONS AND REQUIREMENTS

No.	Item	Test Condition	Requirements										
13.	Adhesive Strength of Termination (Robustness of termination)	* Capacitors mounted on a substrate. A force of 1N(01005) or 2N(0201) or 5N(0402~0603) or 10N(>0603) applied perpendicular to the place of substrate and parallel the line joining the center of terminations for 10±1 second.  Capacitor P.C. Board Pressurizing force	* No remarkable damage or removal of the terminations.										
14.	Resistance to Flexure of Substrate (Substrate bending test)	* The middle part of substrate shall be pressurized by means of the pressurizing rod at a rate of about 1mm per second until the deflection becomes 1mm.  Unit : mm	* No remarkable damage. <table><tr><th>Dielectric</th><th>Cap. Change</th></tr><tr><td>NPO ≤50V</td><td>Within ±5.0% or ±0.5pF, whichever is larger</td></tr><tr><td>NPO ≥100V</td><td>Within ±3.0% or ±2.0pF, whichever is larger</td></tr><tr><td>X7R,X5R,X7S,X6S,X7T</td><td>Within ±12.5%</td></tr><tr><td>01005 X5R</td><td>Within ±25.0%</td></tr></table> (This capacitance change means the change of capacitance under specified flexure of substrate from the capacitance measured before the test)	Dielectric	Cap. Change	NPO ≤50V	Within ±5.0% or ±0.5pF, whichever is larger	NPO ≥100V	Within ±3.0% or ±2.0pF, whichever is larger	X7R,X5R,X7S,X6S,X7T	Within ±12.5%	01005 X5R	Within ±25.0%
Dielectric	Cap. Change												
NPO ≤50V	Within ±5.0% or ±0.5pF, whichever is larger												
NPO ≥100V	Within ±3.0% or ±2.0pF, whichever is larger												
X7R,X5R,X7S,X6S,X7T	Within ±12.5%												
01005 X5R	Within ±25.0%												
15.	Vibration Resistance	* Vibration frequency : 10~55Hz/min. * Total amplitude : 1.5mm. * Test time : 6 hrs. (Two hrs each in three mutually perpendicular directions) * Before initial measurement (Class II only) : To apply de-aging at 150°C for 1hr then set for 24±2 hrs at room temp. * Measurement to be made after keeping at room temp. for 24±2 hrs (Class I) or 48±4 hrs (Class II).	* No remarkable damage. * Cap. change and D.F. : To meet initial spec.										

PACKAGE DIMENSION AND QUANTITY

1. EMBOSSED TAPE DIMENSIONS

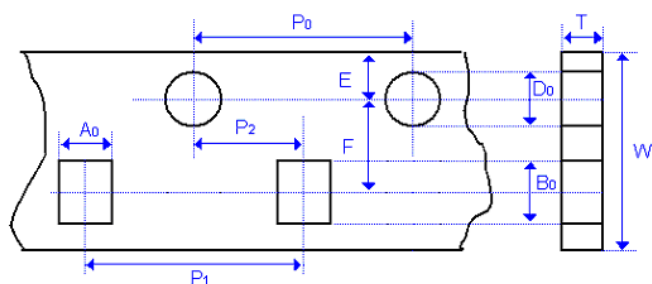


Fig. 1 The dimension of paper tape

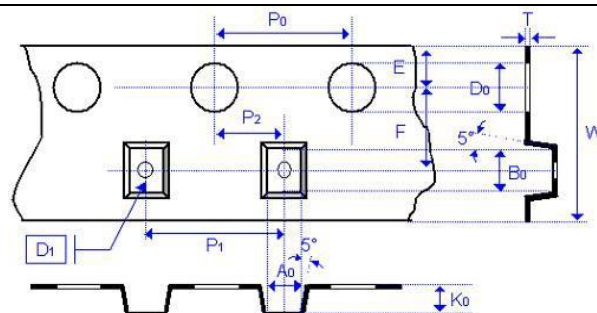


Fig. 2 The dimension of plastic tape

Size	01005	0201	0402	0603
Chip Thickness	0.20±0.02	0.50±0.05 0.50±0.10	0.50±0.05 0.50±0.10	0.80±0.07 0.80 +0.15/-0.1
A ₀	0.25±0.05	0.40±0.10	0.70±0.20	1.05 ±0.30
B ₀	0.45±0.07	0.70±0.10	1.20±0.20	1.80±0.30
T	≤0.50	≤0.55	≤0.80	≤1.20
K ₀	-	-	-	-
W	8.00±0.30	8.00±0.30	8.00±0.30	8.00±0.30
P ₀	4.00±0.10	4.00±0.10	4.00±0.10	4.00±0.10
10xP ₀	40.00±0.10	40.00±0.10	40.00±0.10	40.00±0.20
P ₁	2.00±0.05	2.00±0.05	2.00±0.05	4.00±0.10
P ₂	2.00±0.05	2.00±0.05	2.00±0.05	2.00±0.05
D ₀	1.50+0.1/-0	1.50+0.1/-0	1.50+0.1/-0	1.50+0.1/-0
D ₁	-	-	-	-
E	1.75±0.10	1.75±0.10	1.75±0.10	1.75±0.10
F	3.50±0.05	3.50±0.05	3.50±0.05	3.50±0.05
Unit :	mm	mm	mm	mm

Size	0805		1206			1210	
Chip Thickness	0.80±0.10	1.25±0.10 1.25±0.20	0.80±0.10	0.95±0.10 1.25±0.10	1.60±0.20 1.60+0.30/-0.10	1.25±0.10 1.60±0.20	2.50±0.30
A ₀	1.50±0.20	<1.80	2.00±0.10	<2.00	<2.50	<3.05	<3.20
B ₀	2.30±0.20	<2.70	3.50±0.50	<3.70	<4.00	<3.80	<4.00
T	0.95±0.05	0.23±0.05	0.95±0.05	0.23±0.05	0.23±0.05	0.23±0.05	0.23±0.05
K ₀	-	<2.50	-	<2.50	<2.50	<2.50	<3.50
W	8.00±0.10	8.00±0.10	8.00±0.10	8.00±0.10	8.00±0.10	8.00±0.10	8.00±0.10
P ₀	4.00±0.10	4.00±0.10	4.00±0.10	4.00±0.10	4.00±0.10	4.00±0.10	4.00±0.10
10xP ₀	40.00±0.20	40.00±0.20	40.00±0.20	40.00±0.20	40.00±0.20	40.00±0.20	40.00±0.20
P ₁	4.00±0.10	4.00±0.10	4.00±0.10	4.00±0.10	4.00±0.10	4.00±0.10	4.00±0.10
P ₂	2.00±0.05	2.00±0.05	2.00±0.05	2.00±0.05	2.00±0.05	2.00±0.05	2.00±0.05
D ₀	1.50 +0.10/-0	1.50 +0.10/-0	1.50 +0.10/-0	1.50 +0.10/-0	1.50 +0.10/-0	1.50 +0.10/-0	1.50 +0.10/-0
D ₁	-	1.00±0.10	-	1.00±0.10	1.00±0.10	1.00±0.10	1.00±0.10
E	1.75±0.05	1.75±0.10	1.75±0.10	1.75±0.10	1.75±0.10	1.75±0.10	1.75±0.10
F	3.50±0.05	3.50±0.05	3.50±0.05	3.50±0.05	3.50±0.05	3.50±0.05	3.50±0.05
Unit :	mm	mm	mm	mm	mm	mm	mm

PACKAGE DIMENSION AND QUANTITY

Size	1808		1812		1825	
Chip Thickness	1.25±0.10 1.60±0.20	2.00±0.20	1.25±0.10 1.60±0.20 2.00±0.20	2.50±0.30 2.80±0.30	1.60±0.20 2.00±0.20	2.50±0.30 2.80±0.30
A₀	<2.50	<2.50	<3.90	<3.90	<6.80	<6.80
B₀	<5.30	<5.30	<5.30	<5.30	<5.30	<5.30
T	0.25±0.05	0.25±0.05	0.25±0.05	0.25±0.05	0.30±0.10	0.30±0.10
K₀	<2.50	<2.50	<2.50	<3.00	<2.50	<3.10
W	12.00±0.20	12.00±0.20	12.00±0.20	12.00±0.20	12.00±0.20	12.00±0.20
P₀	4.00±0.10	4.00±0.10	4.00±0.10	4.00±0.10	4.00±0.10	4.00±0.10
10xP₀	40.00±0.20	40.00±0.20	40.00±0.20	40.00±0.20	40.00±0.20	40.00±0.20
P₁	4.00±0.10	4.00±0.10	8.00±0.10	8.00±0.10	8.00±0.10	8.00±0.10
P₂	2.00±0.05	2.00±0.05	2.00±0.05	2.00±0.05	2.00±0.05	2.00±0.05
D₀	1.50 +0.10/-0	1.50 +0.10/-0	1.50 +0.10/-0	1.50 +0.10/-0	1.50 +0.10/-0	1.50 +0.10/-0
D₁	1.50±0.10	1.50±0.10	1.50±0.10	1.50±0.10	1.50±0.10	1.50±0.10
E	1.75±0.10	1.75±0.10	1.75±0.10	1.75±0.10	1.75±0.10	1.75±0.10
F	5.50±0.05	5.50±0.05	5.50±0.05	5.50±0.05	5.50±0.05	5.50±0.05
Unit :	mm	mm	mm	mm	mm	mm

Size	2220		2225	
Chip Thickness	1.40±0.15 1.60±0.20 2.00±0.20	2.50±0.30 2.80±0.30	1.60±0.20 2.00±0.20	2.50±0.30 2.80±0.30
A₀	<5.80	<6.80	<6.80	<6.80
B₀	<6.50	<6.50	<6.50	<6.50
T	0.30±0.10	0.30±0.10	0.30±0.10	0.30±0.10
K₀	<2.50	<3.10	<2.50	<3.10
W	12.00±0.20	12.00±0.20	12.00±0.20	12.00±0.20
P₀	4.00±0.10	4.00±0.10	4.00±0.10	4.00±0.10
10xP₀	40.00±0.20	40.00±0.20	40.00±0.20	40.00±0.20
P₁	8.00±0.10	8.00±0.10	8.00±0.10	8.00±0.10
P₂	2.00±0.05	2.00±0.05	2.00±0.05	2.00±0.05
D₀	1.50 +0.10/-0	1.50 +0.10/-0	1.50 +0.10/-0	1.50 +0.10/-0
D₁	1.50±0.10	1.50±0.10	1.50±0.10	1.50±0.10
E	1.75±0.10	1.75±0.10	1.75±0.10	1.75±0.10
F	5.50±0.05	5.50±0.05	5.50±0.05	5.50±0.05
Unit :	mm	mm	mm	mm

PACKAGE DIMENSION AND QUANTITY (X7T)

Size	1206			1210		1812	
Chip Thickness	0.80±0.10	0.95±0.10 1.25±0.10	1.60±0.20 1.60±0.3/-0.1	0.95±0.10 1.25±0.10 1.60±0.20	2.50±0.30 2.80±0.30	1.25±0.10 1.60±0.20 2.00±0.20	2.50±0.30 2.80±0.30
A ₀	2.00±0.10	<2.00	<2.00	<3.05	<3.10	<3.90	<3.90
B ₀	3.50±0.10	<3.60	<3.70	<3.80	<4.00	<5.30	<5.30
T	0.95±0.05	0.23±0.05	0.23±0.05	0.23±0.05	0.23±0.05	0.25±0.05	0.25±0.05
K ₀	-	<2.50	<2.50	<2.50	<3.50	<2.50	<3.00
W	8.00±0.10	8.00±0.10	8.00±0.10	8.00±0.10	12.00±0.20	12.00±0.20	12.00±0.20
P ₀	4.00±0.10	4.00±0.10	4.00±0.10	4.00±0.10	4.00±0.10	4.00±0.10	4.00±0.10
10xP ₀	40.00±0.20	40.00±0.20	40.00±0.20	40.00±0.20	40.00±0.20	40.00±0.20	40.00±0.20
P ₁	4.00±0.10	4.00±0.10	4.00±0.10	4.00±0.10	4.00±0.10	8.00±0.10	8.00±0.10
P ₂	2.00±0.05	2.00±0.05	2.00±0.05	2.00±0.05	2.00±0.05	2.00±0.05	2.00±0.05
D ₀	1.55±0.05	1.50 +0.10/-0	1.50 +0.10/-0	1.50 +0.10/-0	1.50 +0.10/-0	1.50 +0.10/-0	1.50 +0.10/-0
D ₁	-	1.00±0.10	1.00±0.10	1.00±0.10	1.00±0.10	1.50±0.10	1.50±0.10
E	1.75±0.10	1.75±0.10	1.75±0.10	1.75±0.10	1.75±0.10	1.75±0.10	1.75±0.10
F	3.50±0.05	3.50±0.05	3.50±0.05	3.50±0.05	3.50±0.05	5.50±0.05	5.50±0.05
Unit :	mm	mm	mm	mm	mm	mm	mm

Size	2220	
Chip Thickness	1.40±0.15 1.60±0.20 2.00±0.20	2.50±0.30 2.80±0.30
A ₀	<5.80	<6.80
B ₀	<6.50	<6.50
T	0.30±0.10	0.30±0.10
K ₀	<2.50	<3.10
W	12.00±0.20	12.00±0.20
P ₀	4.00±0.10	4.00±0.10
10xP ₀	40.00±0.20	40.00±0.20
P ₁	8.00±0.10	8.00±0.10
P ₂	2.00±0.05	2.00±0.05
D ₀	1.50 +0.10/-0	1.50 +0.10/-0
D ₁	1.50±0.10	1.50±0.10
E	1.75±0.10	1.75±0.10
F	5.50±0.05	5.50±0.05
Unit :	mm	mm

PACKAGE DIMENSION AND QUANTITY

2. REEL DIMENSIONS

Size	01005	0201, 0402, 0603, 0805, 1206, 1210		1808, 1812, 1825, 2220, 2225
Reel size	7"	7"	13"	7"
C	13.0 ±0.05	13.0 +0.5/-0.2	13.0 +0.5/-0.2	13.0 +0.7/-0.3
W ₁	8.4 +1.5	8.4 +1.5	8.4 +1.5	12.4 +2.0/-0
W	14.4max	14.4max	14.4max	shall accommodate tape width without interference
A	178.0 ±0.20	178.0 ±0.20	330.0 ±1.0	178.0 ±0.20
N	60.0 +1.0/-0	60.0 +1.0/-0	100 ±1.0	60.0 +1.0/-0

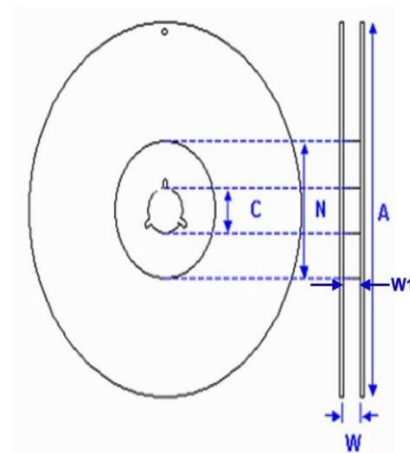


Fig. 3 The dimension of reel

REEL DIMENSIONS (X7T)

Size	1210		1812, 2220
Reel size	7"	13"	7"
C	13.0 +0.5/-0.2	13.0 +0.7/-0.3	13.0 +0.5/-0.2
W ₁	8.4 +1.5/-0	8.4 +2.0/-0	12.4 +2.0/-0
W	14.4max	14.4max	shall accommodate tape width without interference
A	178.0 ±0.10	330.0 ±1.0	178.0 ±0.10
N	60.0 +1.0/-0	100 ±1.0	60.0 +1.0/-0

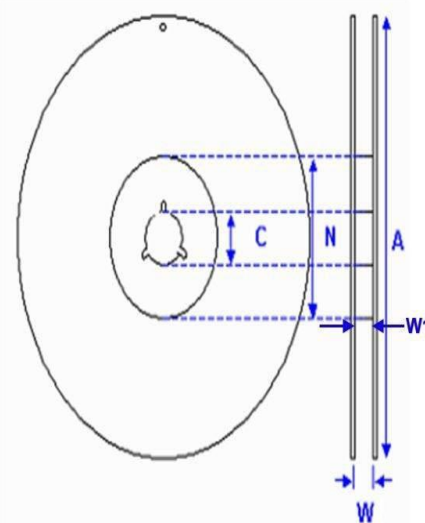


Fig. 3 The dimension of reel

APPLICATION NOTES

STORAGE

To prevent the damage of solderability of terminations, the following storage conditions are recommended :

Indoors under 5 ~ 40°C and 20% ~ 70% RH.

No harmful gases containing sulfuric acid, ammonia, hydrogen sulfide or chlorine.

Packaging should not be opened until the capacitors are required for use. If opened, the pack should be re-sealed as soon as is practicable. Taped product should be stored out of direct sunlight, which might promote deterioration in tape or adhesion performance. The product is recommended to be used within 12 months after shipment and checked the solderability before use.

HANDLING

Chip capacitors are dense, hard, brittle, and abrasive materials. They are liable to suffer mechanical damage, in the form of cracks or chips. Chip Capacitors should be handled with care to avoid contamination or damage. To use vacuum or plastic tweezers to pick up or plastic tweezers is recommended for manual placement. Tape and reeled packages are suitable for automatic pick and placement machine.

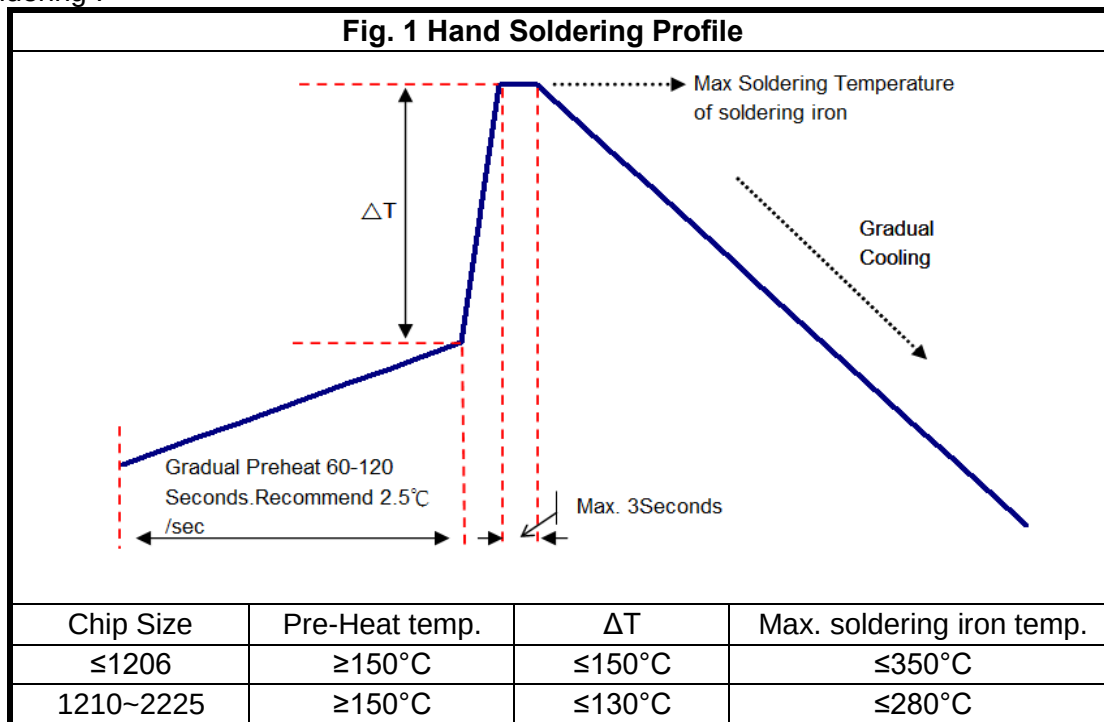
PREHEAT

In order to minimize the risk of thermal shock during soldering, a carefully controlled preheat is required. The rate of preheat should not exceed 3°C per second.

SOLDERING

Use mildly activated rosin fluxes do not use activated flux. The amount of solder in each solder joint should be controlled to prevent the damage of chip capacitors caused by the stress between solder, chips, and substrate.

a.) Hand soldering :



* Soldering iron tip diameter ≤ 1.0 mm and wattage max. 20W.

* The Capacitors shall be pre-heated and that the temperature gradient between the devices and the tip of the soldering iron.

* The required amount of solder shall be melted on the soldering tip.

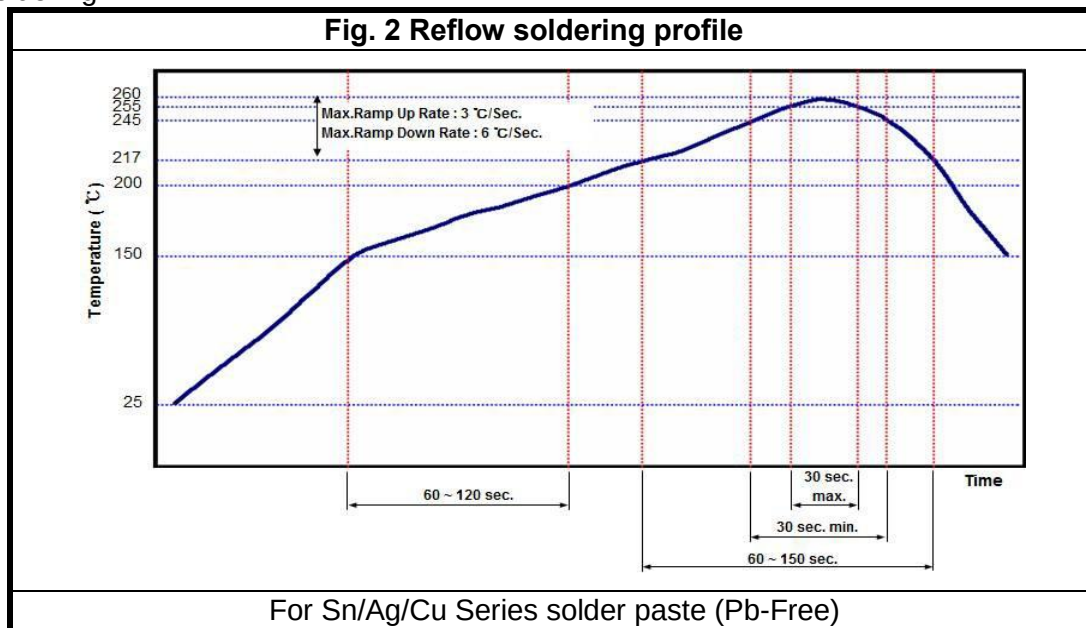
* The tip of iron should not contact the ceramic body directly.

* The Capacitors shall be cooled gradually at room temperature after soldering.

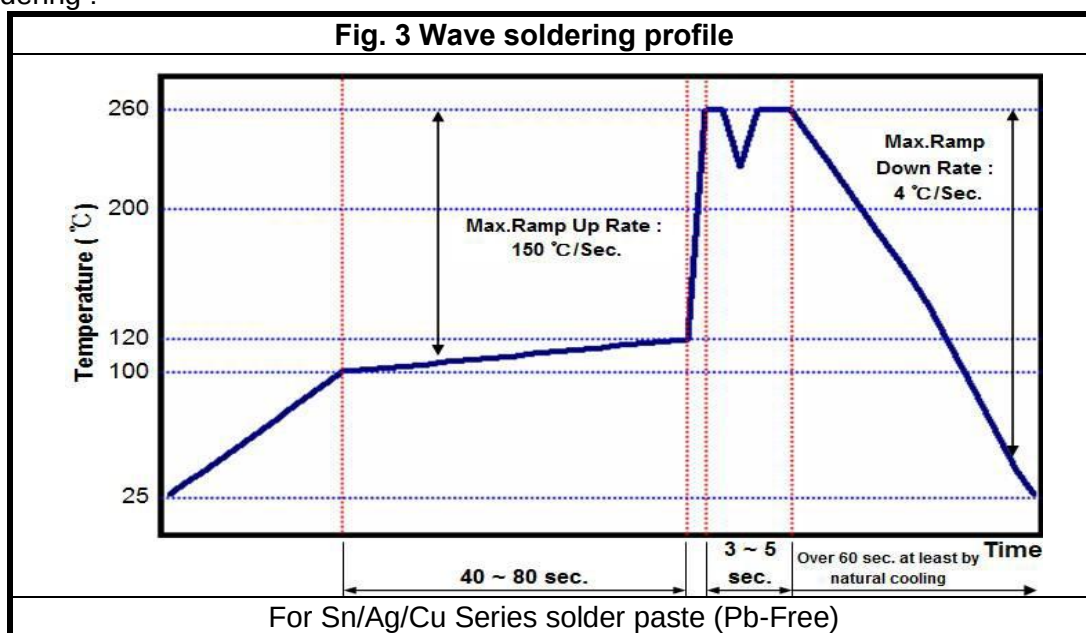
* Forced air cooling is not allowed.

APPLICATION NOTES

b.) Reflow soldering :



c.) Wave soldering :



Soldering conditions :

Class I :

Size Inch (mm)	Temper. Char.	Capacitance	Condition	
			Wave	Reflow
≤0402 (1005)	Class I	All	X	O
0603 (1608)	Class I	All	O	O
0805 (2012)	Class I	All	O	O
1206 (3216)	Class I	All	O	O
		Thickness >0.95mm	X	O
≥1210 (3225)	Class I	All	X	O
Coating Products	All	All	X	O

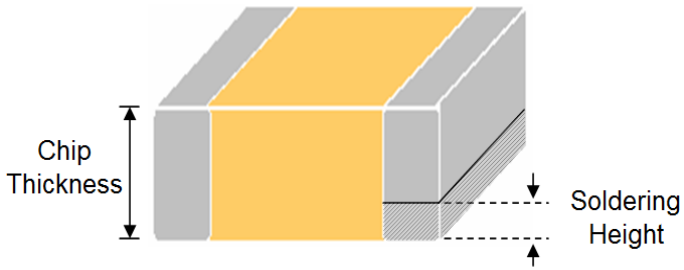
APPLICATION NOTES

Soldering conditions :

Class II :

Size Inch (mm)	Temper. Char.	Capacitance	Condition	
			Wave	Reflow
≤0402 (1005)	Class II	All	X	O
0603 (1608)	Class II	Cap. <2.2μF	O	O
		Cap. ≥2.2μF	X	O
0805 (2012)	Class II	Thickness ≤ 0.95mm	O	O
		Thickness > 0.95mm	X	O
1206 (3216)	Class II	Thickness ≤ 0.95mm	O	O
		Thickness > 0.95mm	X	O
≥1210 (3225)	Class II	All	X	O
Coating Products	All	All	X	O

Soldering height :

The solder climbing minimum height is suggesting to 25% of chip thickness or 500um whichever is less. (Reference from IPC-610E)	
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COOLING

After soldering, cool the chips and the substrate gradually to room temperature. Natural cooling in air is recommended to minimize stress in the solder joint.

CLEANING

All flux residues must be removed by using suitable electronic-grade vapor-cleaning solvents to eliminate contamination that could cause electrolytic surface corrosion. Good results can be obtained by using ultrasonic cleaning of the solvent. The choice of the proper system is depends upon many factors such as component mix, flux, and solder paste and assembly method. The ability of the cleaning system to remove flux residues and contamination from under the chips is very important.