Multilayer Ceramic Chip Capacitors
Anti-bend General Purpose

ST Series

MERITEK

FEATURE

- A wide selection of sized is available (0603 to 2225)
- High capacitance in given case size
- Capacitor with lead-free termination (pure Tin)
- High reliability and stability
- Reduction in PCB bend failure
- Application: DC to DC converter. General digital circuit. Power supply bypass capacitors. Consumer electronics. Telecommunication

PART NUMBERING SYSTEM

RoHS

ST	0805	XR	104	K	101
(1)	(2)	(3)	(4)	(5)	(6)

No	Item	Code	Description	Series Reference
(1)	**Meritek Series**	ST	Multilayer Ceramic Chip Capacitor	Anti-bend Series
(2)	**Size**	0805	0805: 2.0x1.25mm	See dimension table for available size below
(3)	**Dielectric**	XR	X7R	CG: C0G(NP0)
(4)	**Capacitance**	104	104: $10x10^4$pF = 100000pF	See capacitor range table below
(5)	**Tolerance**	K	K: ±10%	See capacitor tolerance ref. table below
(6)	**Rated Voltage**	101	101: 100VDC	First 2 digits: significant; Third: multiplier

ELECTRICAL CHARACTERISTICS

Properties	Characteristics	
Dielectric	C0G(NP0)	X7R
Chip Size	0402, 0603, 0805, 1206, 1210, 1808, 1812, 1825, 2220, 2225	0402, 0603, 0805, 1206, 1210, 1808, 1812, 1825, 2220, 2225
Rated Voltage	10V,16V, 25V, 50V, 100V, 200V, 250V, 500V, 630V, 1KV, 1.5KV, 2KV, 3KV, 4KV	6.3V, 10V, 16V, 25V, 50V, 100V, 200V, 250V, 500V, 630V, 1KV, 1.5KV, 2KV, 3KV, 4KV
Capacitance Range	0.1pF ~ 330nF	100pF ~ 22nF
Capacitance Tolerance	See Capacitance Tolerance Reference Table Below	
Dissipation Factor	Cap<30pF: Q≥400+20C Cap≥30pF: Q≥1000	See Dissipation Factor (Reliability)
Test Condition for Dissipation Factor and Capacitance	Cap. Range / Test Condition: Cap≤1000pF: 1.0±0.2Vrms, 1.0MHz±10% Cap>1000pF: 1.0±0.2Vrms, 1.0KHz±10% For 25°C at ambient temperature	Cap. Range / Test Condition: Cap≤10uF: 1.0±0.2Vrms, 1.0KHz±10% Cap>10uF: 0.5±0.2Vrms, 120Hz±20% Preconditioning for Class II MLCC: Perform a heat treatment at 150±10°C for 1 hour, then leave in ambient condition for 24±2 hours before measurement
Insulation Resistance	≥100GΩ or R•C≥500Ω-F Whichever is smaller	≥10GΩ or R•C≥100Ω-F Whichever is smaller
Operation Temperature	-55 ~ +125°C	-55 ~ +125°C
Temperature Coefficient	±30ppm/^{0}C	±15%
Termination	Cu (or Ag)/Ni/Sn (lead-free termination)	Cu (or Ag)/Ni/Sn (lead-free termination)

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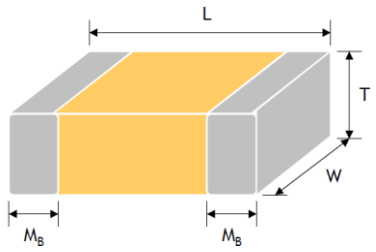
DIMENSIONS

Size Inch (mm)	L (mm)	W (mm)	Thickness T (mm) code	$M_{B\ min}$ (mm)
0402 (1005)	1.00+0.15/-1.0	0.50+0.15/-1.0	See Thickness Specification Reference Table below	0.25+0.05/-0.10
0603 (1608)	1.60±0.20	0.80±0.15		0.40±0.15
0805 (2012)	2.10±0.20	1.25±0.20		0.50±0.20
1206 (3216)	3.30±0.30	1.60+0.30/-0.10		0.60±0.20
1210 (3225)	3.30±0.40	2.50±0.30		0.75±0.35
1808 (4520)	4.60±0.50	2.00±0.20		0.75±0.35
1812 (4532)	4.60±0.50	3.20±0.30		0.75±0.35
1825 (4563)	4.60±0.50	6.30±0.40		0.75±0.35
2220 (5750)	5.70±0.50	5.00±0.40		0.85±0.35
2225 (5763)	5.70±0.50	6.30±0.40		0.85±0.35



CAPACITANCE TOLERANCE REFERENCE

Code	Description	Code	Description	Code	Description	Code	Description
A	±0.05 pF	G	±2 %	L	0%~10%	Z	-20%~80%
B	±0.10 pF	H	±3 %	M	±20 %	X	+10% ~ +20%
C	±0.25 pF	I	-10%~0%	N	-5%~10%		
D	±0.50 pF	J	±5 %	P	±0.02 pF		
F	±1 %	K	±10 %	Q	±0.03 pF		

THICKNESS SPECIFICATION REFERENCE

Code	Thickness (mm)	Code	Thickness (mm)	Code	Thickness (mm)
A	0.60 ± 0.10	I	1.25 ± 0.20	Q	0.50 + 0.02/-0.05
B	0.8 + 0.15/-0.10	J	1.15 ± 0.15	R	3.10 ± 0.30
C	1.25 ± 0.10	K	0.50 ± 0.20	S	0.80 ± 0.07
D	1.40 ± 0.15	L	0.30 ± 0.03	T	0.85 ± 0.10
E	1.60 ± 0.20	M	0.95 ± 0.10	U	0.50 ± 0.10
F	2.00 ± 0.20	N	0.50 ± 0.05	V	0.20 ± 0.02
G	2.50 ± 0.30	O	3.50 ± 0.20	X	0.80 ± 0.10
H	2.80 ± 0.30	P	1.60 +0.3/-0.10	Z	0.25 ± 0.03

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CAPACITANCE RANGE - C0G (NP0) Dielectric (0402~ 0805)

Dimension		Size 0402 (V)					Size 0603 (V)							Size 0805 (V)									
Cap.(pF)	Code	10	16	25	50	100	10	16	25	50	100	200	250	10	16	25	50	100	200	250	500	630	1K
0.1	0R1	K	K	K	K																		
0.2	0R2	K	K	K	K																		
0.3	0R3	K	K	K	K		S	S	S	S													
0.4	0R4	K	K	K	K		S	S	S	S													
0.5	0R5	K	K	K	K	K	S	S	S	S	S	S	S	A	A	A	A	A	A	A	A	A	C
0.6	0R6	K	K	K	K	K	S	S	S	S	S	S	S	A	A	A	A	A	A	A	A	A	C
0.7	0R7	K	K	K	K	K	S	S	S	S	S	S	S	A	A	A	A	A	A	A	A	A	C
0.8	0R8	K	K	K	K	K	S	S	S	S	S	S	S	A	A	A	A	A	A	A	A	A	C
0.9	0R9	K	K	K	K	K	S	S	S	S	S	S	S	A	A	A	A	A	A	A	A	A	C
1.0	1R0	K	K	K	K	K	S	S	S	S	S	S	S	A	A	A	A	A	A	A	A	A	C
1.2	1R2	K	K	K	K	K	S	S	S	S	S	S	S	A	A	A	A	A	A	A	A	A	C
1.5	1R5	K	K	K	K	K	S	S	S	S	S	S	S	A	A	A	A	A	A	A	A	A	C
1.8	1R8	K	K	K	K	K	S	S	S	S	S	S	S	A	A	A	A	A	A	A	A	A	C
2.2	2R2	K	K	K	K	K	S	S	S	S	S	S	S	A	A	A	A	A	A	A	A	A	C
2.7	2R7	K	K	K	K	K	S	S	S	S	S	S	S	A	A	A	A	A	A	A	A	A	C
3.3	3R3	K	K	K	K	K	S	S	S	S	S	S	S	A	A	A	A	A	A	A	A	A	C
3.9	3R9	K	K	K	K	K	S	S	S	S	S	S	S	A	A	A	A	A	A	A	A	A	C
4.7	4R7	K	K	K	K	K	S	S	S	S	S	S	S	A	A	A	A	A	A	A	A	A	C
5.0	5R0	K	K	K	K	K	S	S	S	S	S	S	S	A	A	A	A	A	A	A	A	A	C
5.6	5R6	K	K	K	K	K	S	S	S	S	S	S	S	A	A	A	A	A	A	A	A	A	C
6.8	6R8	K	K	K	K	K	S	S	S	S	S	S	S	A	A	A	A	A	A	A	A	A	C
8.2	8R2	K	K	K	K	K	S	S	S	S	S	S	S	A	A	A	A	A	A	A	A	A	C
10	100	K	K	K	K	K	S	S	S	S	S	S	S	A	A	A	A	A	A	A	A	A	C
12	120	K	K	K	K	K	S	S	S	S	S	S	S	A	A	A	A	A	A	A	A	A	C
15	150	K	K	K	K	K	S	S	S	S	S	S	S	A	A	A	A	A	A	A	A	A	C
18	180	K	K	K	K	K	S	S	S	S	S	S	S	A	A	A	A	A	A	A	A	A	C
22	220	K	K	K	K	K	S	S	S	S	S	S	S	A	A	A	A	A	A	A	A	A	C
27	270	K	K	K	K	K	S	S	S	S	S	S	S	A	A	A	A	A	A	A	A	A	C
33	330	K	K	K	K	K	S	S	S	S	S	S	S	A	A	A	A	A	A	A	A	A	C
39	390	K	K	K	K	K	S	S	S	S	S	S	S	A	A	A	A	A	A	A	A	A	C
47	470	K	K	K	K	K	S	S	S	S	S	S	S	A	A	A	A	A	A	A	A	A	C
56	560	K	K	K	K	K	S	S	S	S	S	S	S	A	A	A	A	A	A	A	A	A	C
68	680	K	K	K	K	K	S	S	S	S	S	S	S	A	A	A	A	A	A	A	A	A	C
82	820	K	K	K	K	K	S	S	S	S	S	S	S	A	A	A	A	A	A	A	X	X	C
100	101	K	K	K	K	K	S	S	S	S	S	S	S	A	A	A	A	A	A	X	X	X	C
120	121	K	K	K	K	K	S	S	S	S	S	S	S	A	A	A	A	A	A	X	C	C	C
150	151	K	K	K	K	K	S	S	S	S	S	S	S	A	A	A	A	A	X	X	C	C	C
180	181	K	K	K	K	K	S	S	S	S	S	S	S	A	A	A	A	A	X	C	C	C	C
220	221	K	K	K	K	K	S	S	S	S	S	S	S	A	A	A	A	A	C	C	C	C	C
270	271	K	K	K	K		S	S	S	S	S	B	B	A	A	A	A	A	C	C	C	C	C
330	331	K	K	K	K		S	S	S	S	S	B	B	A	A	A	A	A	C	C	C	C	C
390	391	K	K	K	K		S	S	S	S	S	B	B	X	X	X	X	X	C	C	C	C	C
470	471	K	K	K	K		S	S	S	S	S	B	B	X	X	X	X	X	C	C	I	I	
560	561	K	K	K	K		S	S	S	S	S			X	X	X	X	X	C	C	I	I	
680	681	K	K	K	K		S	S	S	S	S			X	X	X	X	X	C	C	I	I	
820	821	K	K	K	K		S	S	S	S	S			X	X	X	X	X	C	C	I	I	
1000	102	K	K	K	K		S	S	S	S	S			X	X	X	X	X	C	C	I	I	
1200	122						B	B	B	B				X	X	X	X	X	C	C			
1500	152						B	B	B	B				X	X	X	X	X	C	C			
1800	182						B	B	B	B				X	X	X	X	X	C	C			
2200	222						B	B	B	B				X	X	X	X	X	C	C			
2700	272						B	B	B	B				C	C	C	C	C	C	C			
3300	332						B	B	B	B				C	C	C	C	C					
3900	392													C	C	C	C	C					
4700	472													C	C	C	C	C					
5600	562													C	C	C	C	C					
6800	682													C	C	C	C	C					
8200	822													C	C	C	C						
10000	103													C	C	C	C						

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CAPACITANCE RANGE - C0G (NP0) Dielectric (1206~1210)

Dimension		Size 1206 (V)										Size 1210 (V)									
Cap.(pF)	Code	10 16 25	50	100	200	250	500	630	1K	1.5K	2K	10 16 25	50	100	200	250	500	630	1K	1.5K	2K
1.0	1R0		X																		
1.2	1R2	X	X	X			X														
1.5	1R5	X	X	X	X	X	X	X	X	X	X										
1.8	1R8	X	X	X	X	X	X	X	X	X	X										
2.2	2R2	X	X	X	X	X	X	X	X	X	X										
2.7	2R7	X	X	X	X	X	X	X	X	X	X										
3.3	3R3	X	X	X	X	X	X	X	X	X	X										
3.9	3R9	X	X	X	X	X	X	X	X	X	X										
4.7	4R7	X	X	X	X	X	X	X	X	X	X										
5.0	5R0	X	X	X	X	X	X	X	X	X	X										
5.6	5R6	X	X	X	X	X	X	X	X	X	X										
6.8	6R8	X	X	X	X	X	X	X	X	X	X										
8.2	8R2	X	X	X	X	X	X	X	X	X	X										
10	100	X	X	X	X	X	X	X	X	X	X	M	M	M	M	M	M	M	M	M	M
12	120	X	X	X	X	X	X	X	X	X	X	M	M	M	M	M	M	M	M	M	M
15	150	X	X	X	X	X	X	X	X	X	X	M	M	M	M	M	M	M	M	M	M
18	180	X	X	X	X	X	X	X	X	X	X	M	M	M	M	M	M	M	M	M	M
22	220	X	X	X	X	X	X	X	X	X	X	M	M	M	M	M	M	M	M	M	M
27	270	X	X	X	X	X	X	X	X	X	X	M	M	M	M	M	M	M	M	M	M
33	330	X	X	X	X	X	X	X	X	M	M	M	M	M	M	M	M	M	M	M	M
39	390	X	X	X	X	X	X	X	X	M	M	M	M	M	M	M	M	M	M	M	M
47	470	X	X	X	X	X	X	X	M	M	M	M	M	M	M	M	M	M	M	M	M
56	560	X	X	X	X	X	X	X	M	C	C	M	M	M	M	M	M	M	M	C	C
68	680	X	X	X	X	X	X	X	M	C	C	M	M	M	M	M	M	M	M	C	C
82	820	X	X	X	X	X	X	X	C	C	C	M	M	M	M	M	M	M	M	C	C
100	101	X	X	X	X	X	X	X	C	C	C	M	M	M	M	M	M	M	C	C	C
120	121	X	X	X	X	X	X	X	C	E	E	M	M	M	M	M	M	M	C	C	C
150	151	X	X	X	X	X	X	X	C	E	E	M	M	M	M	M	M	M	C	E	E
180	181	X	X	X	X	X	X	X	E	E	E	M	M	M	M	M	M	M	C	E	E
220	221	X	X	X	X	X	X	X	E	E	E	M	M	M	M	M	M	M	E	E	E
270	271	X	X	X	X	M	M	M	E	P	P	M	M	M	M	M	M	M	E	F	F
330	331	X	X	X	X	M	M	M	E	P	P	M	M	M	M	M	M	M	E	F	F
390	391	X	X	X	X	M	M	M	E	P	P	M	M	M	M	M	M	M	E	G	G
470	471	X	X	X	M	M	M	M	E			M	M	M	M	M	M	M	E	G	G
560	561	X	X	X	M	C	C	C	E			M	M	M	M	M	M	M	E	G	G
680	681	X	X	X	M	C	C	C	E			M	M	M	M	M	M	M	E	G	G
820	821	X	X	X	M	E	E	E	E			M	M	M	M	M	M	M	E	G	G
1000	102	X	X	X	M	E	E	E	E			M	M	M	C	C	C	C	E	G	G
1200	122	X	X	X	M	E	E	E				M	M	M	C	C	C	C	E	F	F
1500	152	X	X	X	C	E	E	E				M	M	M	C	C	C	C	F	G	G
1800	182	X	X	X	C	E	E	E				M	M	M	C	C	C	C	G	G	G
2200	222	X	X	X	C	E	E	E				M	M	M	C	C	C	C	G		
2700	272	X	X	X	C	E	E	E				M	M	M	C	C	C	C	G		
3300	332	X	X	X	C	E	E	E				M	M	M	C	C	C	C	G		
3900	392	X	X	X	E	E	E	E				M	M	M	C	C	C	C	G		
4700	472	X	X	X	E	E	E	E				M	M	M	E	E	E	E			
5600	562	X	X	X	E	E	E					M	M	C	E	E	E	E			
6800	682	M	M	M	E	E	E					M	M	C	E	E	E	E			
8200	822	C	C	C	E	E						M	M	C	E	E	E	E			
10000	103	C	C	C	E	E						M	M	E	F	F	F	F			
12000	123	P	P	P								C	C	E							
15000	153	P	P	P								C	C	F							
18000	183	P	P	P								F	F	G							
22000	223	P	P	P								F	F	G							
27000	273	P	P									G	G								
33000	333	P	P									G	G								
39000	393	P	P									G	G								
47000	473																				
56000	563																				
68000	683																				

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CAPACITANCE RANGE - C0G (NP0) Dielectric (1808~1812)

Dimension		Size 1808 (V)											Size 1812 (V)											
Cap.(pF)	Code	25 50	100	200	250	500	630	1K	1.5K	2K	3K	4K	10 16	25	50	100	200	250	500	630	1K	1.5K	2K	3K
1.0	1R0																							
1.2	1R2																							
1.5	1R5																							
1.8	1R8																							
2.2	2R2	C	C	C	C	C	C	C	C	C	C	C												
2.7	2R7	C	C	C	C	C	C	C	C	C	C	C												
3.3	3R3	C	C	C	C	C	C	C	C	C	C	C												
3.9	3R9	C	C	C	C	C	C	C	C	C	C	C												
4.7	4R7	C	C	C	C	C	C	C	C	C	C	C												
5.0	5R0	C	C	C	C	C	C	C	C	C	C	C												
5.6	5R6	C	C	C	C	C	C	C	C	C	C	C												
6.8	6R8	C	C	C	C	C	C	C	C	C	C	C												
8.2	8R2	C	C	C	C	C	C	C	C	C	C	C												
10	100	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
12	120	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
15	150	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
18	180	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
22	220	C	C	C	C	C	C	C	C	C	C	E	C	C	C	C	C	C	C	C	C	C	C	C
27	270	C	C	C	C	C	C	C	C	C	C	E	C	C	C	C	C	C	C	C	C	C	C	C
33	330	C	C	C	C	C	C	C	C	C	C	F	C	C	C	C	C	C	C	C	C	C	C	C
39	390	C	C	C	C	C	C	C	C	C	C	F	C	C	C	C	C	C	C	C	C	C	C	C
47	470	C	C	C	C	C	C	C	C	C	C		C	C	C	C	C	C	C	C	C	C	C	C
56	560	C	C	C	C	C	C	C	C	C	C		C	C	C	C	C	C	C	C	C	C	C	C
68	680	C	C	C	C	C	C	C	C	C	C		C	C	C	C	C	C	C	C	C	C	C	C
82	820	C	C	C	C	C	C	C	C	C	C		C	C	C	C	C	C	C	C	C	C	C	C
100	101	C	C	C	C	C	C	C	C	C	F		C	C	C	C	C	C	C	C	C	C	C	C
120	121	C	C	C	C	C	C	C	C	C	F		C	C	C	C	C	C	C	C	C	C	C	C
150	151	C	C	C	C	C	C	C	F	F	F		C	C	C	C	C	C	C	C	C	C	C	C
180	181	C	C	C	C	C	C	C	F	F	F		C	C	C	C	C	C	C	C	C	C	C	F
220	221	C	C	C	C	C	C	C	F	F	F		C	C	C	C	C	C	C	C	C	C	C	F
270	271	C	C	C	C	C	C	F	F	F	F		C	C	C	C	C	C	C	C	C	F	F	F
330	331	C	C	C	C	C	C	F	F	F	F		C	C	C	C	C	C	C	C	C	F	F	F
390	391	C	C	C	C	C	C	F	F	F	F		C	C	C	C	C	C	C	C	C	F	F	F
470	471	C	C	C	C	C	C	F	F	F			C	C	C	C	C	C	C	C	C	F	F	F
560	561	C	C	C	C	C	C	F	F	F			C	C	C	C	C	C	C	C	C	F	F	F
680	681	C	C	C	C	C	C	F	F	F			C	C	C	C	C	C	C	C	C	F	F	F
820	821	C	C	C	C	C	C	F	F	F			C	C	C	C	C	C	C	C	C	F	F	G
1000	102	C	C	C	C	C	C	F	F	F			C	C	C	C	C	C	C	C	C	F	F	G
1200	122	C	C	C	C	C	C	F	F	F			C	C	C	C	C	C	C	C	C	F	F	
1500	152	C	C	C	C	C	C	F	F	F			C	C	C	C	C	C	C	C	C	F	F	
1800	182	C	C	C	C	C	C	F	F	F			C	C	C	C	C	C	C	C	E	F	F	
2200	222	C	C	C	C	C	C	F					C	C	C	C	C	C	C	C	E	F	F	
2700	272	C	C	C	C	C	C						C	C	C	C	C	C	C	C	F	G	G	
3300	332	C	C	C	C	C	C						C	C	C	C	C	C	C	C	F	G	G	
3900	392	C	C	C	C								C	C	C	C	C	C	C	C	G			
4700	472	C	C	C	C								C	C	C	C	C	C	C	C	G			
5600	562	C	C	E	E								C	C	C	C	C	C	C	C				
6800	682	C	C	E	E								C	C	C	C	C	C	C	C				
8200	822	C	E	F	F								C	C	C	C	C	C	C	C				
10000	103	C	E	F	F								C	C	C	C	C	C	C	C				
12000	123	E											C	C	C	C	E	E	E	E				
15000	153	E											C	C	C	C	E	E	E	E				
18000	183	F											C	C	C	E	F	F	F	F				
22000	223	F											C	C	C	E	F	F	F	F				
27000	273												C	E	E	F	G	G						
33000	333												C	E	E	F								
39000	393													F	F	G								
47000	473													F	F	G								
56000	563													G	G									
68000	683													G	G									
82000	823													G	G									
100000	104													G	G									
120000	124																							
150000	154																							

CAPACITANCE RANGE - C0G (NP0) Dielectric (1825~2220)

Dimension		Size 1825 (V)										Size 2220 (V)										
Cap.(pF)	Code	25 50	100	200	250	500	630	1K	1.5K	2K	3K	25 50	100	200	250	500	630	1K	1.5K	2K	3K	4K
10	100	F	F	F	F	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	F	F		F	F	
15	150	F	F	F	F	F	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	F	F	F	F	F	
22	220	F	F	F	F	F	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	F	F	F	F	F	F
33	330	F	F	F	F	F	F	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	F	F	F	F	F	F
47	470	F	F	F	F	F	F	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	F	F	F	F	F	F
68	680	F	F	F	F	F	F	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	F	F	F	F	F	F
100	101	F	F	F	F	F	F	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	F	F	F	F	F	F
150	151	F	F	F	F	F	F	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	F	F	F	F	F	F
220	221	F	F	F	F	F	F	F	F	F	F	F	F	F	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	F	F	F	F	F	G
330	331	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	G
390	391	F	F	F	F	F	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	F	F	F	F	F	
560	561	F	F	F	F	F	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	F	F	F	F	F	
820	821	F	F	F	F	F	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	F	F	F	F	F	
1200	122	F	F	F	F	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	F	F	F	F	
1800	182	F	F	F	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	F	F	F		
2700	272	F	F	F	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	F	F	F		
3900	392	F	F	F	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	F	F	F		
5600	562	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				
8200	822	F	F	F	F	F	F	G				F	F	F	F	F	F	G				
10000	103	F	F	F	F	F	F	G				F	F	F	F	F	F	G				
12000	123	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					
18000	183	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					
27000	273	F	F	F	F	F						F	F	F	F	F						
33000	333	F	F	F	F	F						F	F	F	F	F						
39000	393	F	E	F	F	G						F	F	F	F	F						
47000	473	F	E	F	F	G						F	F	G	G	G						
56000	563	F	F	G	G							F	F	G	G							
68000	683	F	F	G	G							F	F	G	G							
82000	823	F	G									F	G									
100000	104	G	G									G	G									
120000	124																					
150000	154																					
180000	184																					
220000	224																					
270000	274																					
330000	334																					

Multilayer Ceramic Chip Capacitors
Anti-bend General Purpose

ST Series

MERITEK

CAPACITANCE RANGE - C0G (NP0) Dielectric (2225)

Dimension		Size 2225 (V)											
Cap.(pF)	Code	25	50	100	200	250	500	630	1K	1.5K	2K	3K	4K
10	100	F	F	F	F	F	F	F	F	F	F	F	
12	120	F	F	F	F	F	F	F	F	F	F	F	
15	150	F	F	F	F	F	F	F	F	F	F	F	
18	180	F	F	F	F	F	F	F	F	F	F	F	
22	220	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
33	330	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
47	470	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
68	680	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
100	101	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	
150	151	F	F	F	F	F	F	F	F	F	F	F	
180	181	F	F	F	F	F	F	F	F	F	F	F	
220	221	F	F	F	F	F	F	F	F	F	F	F	
270	271	F	F	F	F	F	F	F	F	F	F	F	
330	331	F	F	F	F	F	F	F	F	F	F	F	
390	391	F	F	F	F	F	F	F	F	F	F	F	
470	471	F	F	F	F	F	F	F	F	F	F	F	
560	561	F	F	F	F	F	F	F	F	F	F	F	
680	681	F	F	F	F	F	F	F	F	F	F	F	
820	821	F	F	F	F	F	F	F	F	F	F	F	
1000	102	F	F	F	F	F	F	F	F	F	F	F	
1200	122	F	F	F	F	F	F	F	F	F	F	F	
1500	152	F	F	F	F	F	F	F	F	F	F	F	
1800	182	F	F	F	F	F	F	F	F	F	F	F	
2200	222	F	F	F	F	F	F	F	F	F	F	F	
2700	272	F	F	F	F	F	F	F	F	F	F	G	
3300	332	F	F	F	F	F	F	F	F	F	F	G	
3900	392	F	F	F	F	F	F	F	F	F	F		
4700	472	F	F	F	F	F	F	F	F	F	F		
5600	562	F	F	F	F	F	F	F	F	F	F		
6800	682	F	F	F	F	F	F	F	F	F	F		
8200	822	F	F	F	F	F	F	F	F	G	G		
10000	103	F	F	F	F	F	F	F	G	G	G		
12000	123	F	F	F	F	F	F	F					
15000	153	F	F	F	F	F	F	F					
18000	183	F	F	F	F	F	F	F					
22000	223	F	F	F	F	F	F	F					
27000	273	F	F	F	F	F	F	F					
33000	333	F	F	F	F	F	F	F					
39000	393	F	F	F	F	F	F	F					
47000	473	F	F	F	F	F	F	F					
56000	563	F	F	F	G	G	G	G					
68000	683	F	F	F	G	G	G	G					
82000	823	F	F	F	G	G	G						
100000	104	F	F	G	G	G							
120000	124												
150000	154												
180000	184												
220000	224												
270000	274												
330000	334												

Multilayer Ceramic Chip Capacitors
Anti-bend General Purpose

ST Series

MERITEK

CAPACITANCE RANGE – X7R Dielectric (0402~0805)

Dimension		Size 0402 (V)						Size 0603 (V)								Size 0805 (V)										
Cap.(pF)	Code	6.3	10	16	25	50	100	6.3	10	16	25	50	100	200	250	6.3	10	16	25	50	100	200	250	500	630	1K
100	101		K	K	K	K	K		S	S	S	S	S	B	B		C	C	C	C	C	C	C	X	X	X
120	121		K	K	K	K	K		S	S	S	S	S	B	B		C	C	C	C	C	C	C	X	X	X
150	151		K	K	K	K	K		S	S	S	S	S	B	B		C	C	C	C	C	C	C	X	X	X
180	181		K	K	K	K	K		S	S	S	S	S	B	B		C	C	C	C	C	C	C	X	X	X
220	221		K	K	K	K	K		S	S	S	S	S	B	B		C	C	C	C	C	C	C	X	X	X
270	271		K	K	K	K	K		S	S	S	S	S	B	B		C	C	C	C	C	C	C	X	X	X
330	331		K	K	K	K	K		S	S	S	S	S	B	B		C	C	C	C	C	C	C	X	X	X
390	391		K	K	K	K	K		S	S	S	S	S	B	B		C	C	C	C	C	C	C	X	X	X
470	471		K	K	K	K	K		S	S	S	S	S	B	B		C	C	C	C	C	C	C	X	X	X
560	561		K	K	K	K	K		S	S	S	S	S	B	B		C	C	C	C	C	C	C	X	X	X
680	681		K	K	K	K	K		S	S	S	S	S	B	B		C	C	C	C	C	C	C	X	X	X
820	821		K	K	K	K	K		S	S	S	S	S	B	B		C	C	C	C	C	C	C	X	X	X
1000	102		K	K	K	K	K		S	S	S	S	S	B	B		C	C	C	C	C	C	C	X	X	X
1200	122		K	K	K	K	K		S	S	S	S	S	B	B		C	C	C	C	C	C	C	X	X	X
1500	152		K	K	K	K	K		S	S	S	S	S	B	B		C	C	C	C	C	C	C	X	X	C
1800	182		K	K	K	K	K		S	S	S	S	S	B	B		C	C	C	C	C	C	C	X	X	C
2200	222		K	K	K	K	K		S	S	S	S	S	B	B		C	C	C	C	C	C	C	X	X	C
2700	272		K	K	K	K	K		S	S	S	S	S	B	B		C	C	C	C	C	C	C	X	X	
3300	332		K	K	K	K	K		S	S	S	S	S	B	B		C	C	C	C	C	C	C	X	X	
3900	392		K	K	K	K	K		S	S	S	S	S	B	B		C	C	C	C	C	C	C	X	X	
4700	472		K	K	K	K	K		S	S	S	S	S	B	B		C	C	C	C	C	C	C	C	C	
5600	562		K	K	K	K			S	S	S	S	S	B	B		C	C	C	C	C	C	C	C	C	
6800	682		K	K	K	K			S	S	S	S	S	B	B		C	C	C	C	C	C	C	C	C	
8200	822		K	K	K	K			S	S	S	S	S	B	B		C	C	C	C	C	C	C	C	C	
10000	103		K	K	K	K			S	S	S	S	S	B	B		C	C	C	C	C	C	C	C	C	
12000	123		K	K	K				S	S	S	S	B				C	C	C	C	C	C	C	C	C	
15000	153		K	K	K				S	S	S	S	B				C	C	C	C	C	C	C	C	C	
18000	183		K	K	K				S	S	S	S	B				C	C	C	C	C	C	C	C	C	
22000	223		K	K	K				S	S	S	S	B				C	C	C	C	C	C	C	C	C	
27000	273		K	K	K				S	S	S	S	B				C	C	C	C	C	C	C	C	C	
33000	333		K	K	K				S	S	S	B	B				C	C	C	C	C	C	C	C	C	
39000	393		K	K	K				S	S	S	B	B				C	C	C	C	C	C	C			
47000	473		K	K	K				S	S	S	B	B				C	C	C	C	C	C	C			
56000	563		K	K					S	S	S	B	B				C	C	C	C	C	C	C			
68000	683		K	K					S	S	S	B	B				C	C	C	C	C	C	C			
82000	823		K	K					S	S	S	B	B				C	C	C	C	C	C				
100000	104	K	K	K					S	S	S	B	B				C	C	C	C	C	C				
120000	124								S	S	B						C	C	C	C	I					
150000	154								S	S	B						C	C	C	C	I					
180000	184								S	S	B						C	C	C	C	I					
220000	224								S	S	B	B					C	C	C	C	I					
270000	274							B	B	B	B						I	I	I	I						
330000	334								B	B	B						I	I	I	I						
390000	394								B	B	B						I	I	I	I						
470000	474							B	B	B	B						I	I	I	I	I					
560000	564								B	B							I	I	I							
680000	684							B	B	B							I	I	I							
820000	824								B	B							I	I	I							
1000000	105							B	B	B							I	I	I	I						
1200000	125																									
1500000	155																I	I	I							
2200000	225															I	I	I	I							
4700000	475																	I								

Multilayer Ceramic Chip Capacitors
Anti-bend General Purpose

ST Series

MERITEK

CAPACITANCE RANGE – X7R Dielectric (1206~1210)

Dimension		Size 1206 (V)													Size 1210 (V)											
Cap.(pF)	Code	6.3	10	16	25	50	100	200	250	500	630	1K	1.5K	2K	10	16	25	50	100	200	250	500	630	1K	1.5K	2K
100	101							C	C	C	C	C	C	C												
120	121							C	C	C	C	C	C	C												
150	151		C	C	C	C	C	C	C	C	C	C	C	C												
180	181		C	C	C	C	C	C	C	C	C	C	C	C												
220	221		C	C	C	C	C	C	C	C	C	C	C	C			M	M	M	M	M	M	M	M	M	M
270	271		C	C	C	C	C	C	C	C	C	C	C	C			M	M	M	M	M	M	M	M	M	M
330	331		C	C	C	C	C	C	C	C	C	C	C	C			M	M	M	M	M	M	M	M	M	M
390	391		C	C	C	C	C	C	C	C	C	C	C	C			M	M	M	M	M	M	M	M	M	M
470	471		C	C	C	C	C	C	C	C	C	C	C	C			M	M	M	M	M	M	M	M	M	M
560	561		C	C	C	C	C	C	C	C	C	C	C	C			M	M	M	M	M	M	M	M	M	M
680	681		C	C	C	C	C	C	C	C	C	C	C	C			M	M	M	M	M	M	M	M	M	M
820	821		C	C	C	C	C	C	C	C	C	C	C	C			M	M	M	M	M	M	M	M	M	M
1000	102		C	C	C	C	C	C	C	C	C	C	C	C	M	M	M	M	M	M	M	M	M	M	C	C
1200	122		C	C	C	C	C	C	C	C	C	C	E	E	M	M	M	M	M	M	M	M	M	M	E	E
1500	152		C	C	C	C	C	C	C	C	C	C	E	E	M	M	M	M	M	M	M	M	M	M	E	E
1800	182		C	C	C	C	C	C	C	C	C	C	E	E	M	M	M	M	M	M	M	M	M	M	E	E
2200	222		C	C	C	C	C	C	C	C	C	C	E	E	M	M	M	M	M	M	M	M	M	M	F	F
2700	272		C	C	C	C	C	C	C	C	C	C	E	E	M	M	M	M	M	M	M	M	M	M	F	G
3300	332		C	C	C	C	C	C	C	C	C	C	E	E	M	M	M	M	M	M	M	M	M	M	F	G
3900	392		C	C	C	C	C	C	C	C	C	C	E		M	M	M	M	M	M	M	M	M	M	G	G
4700	472		C	C	C	C	C	C	C	C	C	C	E		M	M	M	M	M	M	M	M	M	M	G	G
5600	562		C	C	C	C	C	C	C	C	C	C	E		M	M	M	M	M	M	M	M	M	M	G	G*
6800	682		C	C	C	C	C	C	C	C	C	C	E		M	M	M	M	M	M	M	M	M	M	G	G*
8200	822		C	C	C	C	C	C	C	C	C	C	E		M	M	M	M	M	M	M	M	M	M	G	G*
10000	103		C	C	C	C	C	C	C	C	C	C	E		M	M	M	M	M	M	M	M	M	C		
12000	123		C	C	C	C	C	C	C	C	C	E			M	M	M	M	M	M	M	M	M	C		
15000	153		C	C	C	C	C	C	C	C	C	E			M	M	M	M	M	M	M	M	M	E		
18000	183		C	C	C	C	C	C	C	C	C				M	M	M	M	M	M	M	C	C	E		
22000	223		C	C	C	C	C	C	C	E	E				M	M	M	M	M	M	M	C	C	E		
27000	273		C	C	C	C	C	C	C	E	E				M	M	M	M	M	M	M	C	C	E		
33000	333		C	C	C	C	C	E	E	E	E				M	M	M	M	M	M	M	E	E	E		
39000	393		C	C	C	C	C	E	E	E	E				M	M	M	M	M	M	M	E	E	F		
47000	473		C	C	C	C	C	E	E	E	E				M	M	M	M	M	C	C	E	E	G		
56000	563		C	C	C	C	C	E	E	E	E				M	M	M	M	M	C	C	E	E			
68000	683		C	C	C	C	C	E	E						M	M	M	M	M	E	E	F	F			
82000	823		C	C	C	C	C	E	E						M	M	M	M	M	E	E	F	F			
100000	104		C	C	C	C	C	E	E						M	M	M	M	M	E	E	F	F			
120000	124		C	C	C	C	C								M	M	M	M	M	E	E					
150000	154		M	M	M	M	E								M	M	M	M	C	E	E					
180000	184		M	M	M	M	E								M	M	M	M	C	E	E					
220000	224		M	M	M	M	E								M	M	M	M	C	E	E					
270000	274		M	M	M	C	E								M	M	M	M	E	F	F					
330000	334		M	M	M	C	E								M	M	M	C	E	F	F					
390000	394		M	M	J	P	E								M	M	M	C	G	G	G					
470000	474		J	J	J	P	E								M	M	M	C	G	G	G					
560000	564		J	J	J	P	P								C	C	C	C	G	G	G					
680000	684		J	J	J	P	P								C	C	C	C	F	G	G					
820000	824		J	J	J	P	P								C	C	C	C	F							
1000000	105		J	J	J	P	P								C	C	C	C	F							
1200000	125																									
1500000	155	J	J	J	P	P										F	E	G	G							
1800000	185																									
2200000	225	J	J	J	P	P										F	E	G	G							
2700000	275																									
3300000	335		P	P	P											F	E	G	G							
3900000	395																									
4700000	475	P	P	P	P										F	F	F	G								
10000000	106	P	P	P	P										F	F	G	G								
22000000	226		P													G										

Multilayer Ceramic Chip Capacitors
Anti-bend General Purpose

ST Series

MERITEK

CAPACITANCE RANGE – X7R Dielectric (1808~1812)

Dimension		Size 1808 (V)							Size 1812 (V)												
Cap.(pF)	Code	500	630	1K	1.5K	2K	3K	4K	10 16	25 50	100	200	250	400	500	630	1K	1.5K	2K	3K	4K
100	101																				
120	121																				
150	151	C	C	C	C	C	C	F*													
180	181	C	C	C	C	C	C	F*													
220	221	C	C	C	C	C	C	F*													
270	271	C	C	C	C	C	C	F*		C	C	C	C	C	C	C	C	C	C	C	F*
330	331	C	C	C	C	C	C	F*		C	C	C	C	C	C	C	C	C	C	C	F*
390	391	C	C	C	C	C	C	F*		C	C	C	C	C	C	C	C	C	C	C	F*
470	471	C	C	C	C	C	C	F*		C	C	C	C	C	C	C	C	C	C	C	F*
560	561	C	C	C	C	C	E	F*		C	C	C	C	C	C	C	C	C	C	C	F*
680	681	C	C	C	C	C	E	F*		C	C	C	C	C	C	C	C	C	C	C	F*
820	821	C	C	C	C	C	E	F*		C	C	C	C	C	C	C	C	C	C	C	F*
1000	102	C	C	C	C	C	F	F*	C	C	C	C	C	C	C	C	C	C	C	E	F*
1200	122	C	C	C	C	C	F		C	C	C	C	C	C	C	C	C	C	C	F	G*
1500	152	C	C	C	C	C	F		C	C	C	C	C	C	C	C	C	C	C	F	G*
1800	182	C	C	C	C	C	F		C	C	C	C	C	C	C	C	C	C	C	G	G*
2200	222	C	C	C	E	E	F		C	C	C	C	C	C	C	C	C	C	C	G*	
2700	272	C	C	C	F	F	F		C	C	C	C	C	C	C	C	C	C	C	G*	
3300	332	C	C	C	F	F	F		C	C	C	C	C	C	C	C	C	E	E	G*	
3900	392	C	C	C	F	F			C	C	C	C	C	C	C	C	C	F	F		
4700	472	C	C	C	F	F			C	C	C	C	C	C	C	C	C	F	F		
5600	562	C	C	C	F	F			C	C	C	C	C	C	C	C	C	G	G		
6800	682	C	C	C	F	F			C	C	C	C	C	C	C	C	C	G	G		
8200	822	C	C	C					C	C	C	C	C	C	C	C	C	G	G		
10000	103	C	C	C					C	C	C	C	C	C	C	C	C	G	G		
12000	123	E	E	E					C	C	C	C	C	C	C	C	C				
15000	153	E	E	E					C	C	C	C	C	C	C	C	C				
18000	183	F	F	F					C	C	C	C	C	C	C	C	E				
22000	223	F	F	F					C	C	C	C	C	C	C	C	E				
27000	273	F	F	F					C	C	C	C	C	C	C	C	F				
33000	333	F	F	F					C	C	C	C	C	C	C	C	F				
39000	393	F	F	F					C	C	C	C	C	C	C	C	G				
47000	473	F	F	F					C	C	C	C	C	C	C	C	G				
56000	563	F	F	F					C	C	C	C	C	C	E	E	G				
68000	683	F	F						C	C	C	C	C	C	E	E	G				
82000	823	F	F						C	C	C	C	C	C	E	E	G				
100000	104								C	C	C	C	C	C	E	E	G				
120000	124								C	C	C	C	C	C	F	F					
150000	154								C	C	C	C	C	C	F	F					
180000	184								C	C	C	C	C	C	G	G					
220000	224								C	C	C	C	C	C	G	G					
270000	274								C	C	C	E	E	E	G						
330000	334								C	C	C	E	E	E	G						
390000	394								C	C	C	F	F	F	G						
470000	474								C	C	C	F	F	F	G						
560000	564								C	C	C	G	G								
680000	684								C	C	C	G	G								
820000	824								C	C	C	G	G								
1000000	105								C	C	C	G	G								
1200000	125									C	C										
1500000	155									C	C										
1800000	185									E	E										
2200000	225									E	E										
2700000	275									F	F										
3300000	335									F	F										
3900000	395									F	F										
4700000	475									G	G										
5600000	565									G											
6800000	685									G											
8200000	825									G											
10000000	106									G											

Multilayer Ceramic Chip Capacitors
Anti-bend General Purpose

ST Series

MERITEK

CAPACITANCE RANGE – X7R Dielectric (1825~2220)

Dimension		Size 1825 (V)											Size 2220 (V)											
Cap.(pF)	Code	25 50	100	200	250	500	630	1K	1.5K	2K	3K	4K	25 50	100	200	250	400	500	630	1K	1.5K	2K	3K	4K
100	101																							
120	121																							
150	151																							
180	181																							
220	221																							
270	271											F*												F*
330	331											F*												F*
390	391											F*												F*
470	471											F*												F*
560	561											F*												F*
680	681											F*												F*
820	821											F*												F*
1000	102	F	F	F	F	F	F	F	F	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	G*	F	F	F	F	F	F	F	F	F	F	F	G*
1500	152	F	F	F	F	F	F	F	F	F	F	G*	F	F	F	F	F	F	F	F	F	F	F	G*
1800	182	F	F	F	F	F	F	F	F	F	F	G*	F	F	F	F	F	F	F	F	F	F	F	G*
2200	222	F	F	F	F	F	F	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	F	F	F	F	F	F*	
3300	332	F	F	F	F	F	F	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	F	F	F	F	F	F*	
4700	472	F	F	F	F	F	F	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	G*		F	F	F	F	F	F	F	F	F	F	F*	
6800	682	F	F	F	F	F	F	F	F	F	G*		F	F	F	F	F	F	F	F	F	F	G*	
8200	822	F	F	F	F	F	F	F	F	F	G*		F	F	F	F	F	F	F	F	G	G	G*	
10000	103	F	F	F	F	F	F	F	F	F	G*		F	F	F	F	F	F	F	F	G	G	G*	
12000	123	F	F	F	F	F	F	F	G	G	H*		F	F	F	F	F	F	F	F	G	G	H*	
15000	153	F	F	F	F	F	F	F	G	G	H*		F	F	F	F	F	F	F	F	G	G	H*	
18000	183	F	F	F	F	F	F	F	G	G	H*		F	F	F	F	F	F	F	F	H	H	H*	
22000	223	F	F	F	F	F	F	F	G	G			F	F	F	F	F	F	F	F	H	H		
27000	273	F	F	F	F	F	F	F	H	H			F	F	F	F	F	F	F	F	H	H		
33000	333	F	F	F	F	F	F	F	H	H			F	F	F	F	F	F	F	F	H	H		
39000	393	F	F	F	F	F	F	F	H	H			F	F	F	F	F	F	F	F	H	H		
47000	473	F	F	F	F	F	F	F	H	H			F	F	F	F	F	F	F	F	H	H		
56000	563	F	F	F	F	F	F	F	H				F	F	F	F	F	F	F	F	H	H		
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	F	F	G					F	F	F	F	F	F	F	G				
120000	124	F	F	F	F	F	F						F	F	F	F	F	F	F	G				
150000	154	F	F	F	F	F	F						F	F	F	F	F	F	F	H				
180000	184	F	F	F	F	F	F						F	F	F	F	F	F	F	H				
220000	224	F	F	F	F	F	F						F	F	F	F	F	F	F	H				
270000	274	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					
390000	394	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					
560000	564	F	F	F	F	G	G						F	F	F	F								
680000	684	F	F	F	F								F	F	F	F								
820000	824	F	F	F	F								F	F	F	F								
1000000	105	F	F	F	F								F	F	F	F								
1200000	125	F	F	G									F	F	G	G								
1500000	155	F	F	G									F	F	G	G								
1800000	185	F	F	G									F	F	G	G								
2200000	225	F	F	G									F	F	G	G								
2700000	275	F	F										F	F										
3300000	335	F	F										F	F										
3900000	395	F	F										F	F										
4700000	475	F	F										F	F										
5600000	565	F	F										F	F										
6800000	685	F	F										F	F										
8200000	825	G	G										G	G										
10000000	106	G	G										G	G										
12000000	126												H											
15000000	156												H											
18000000	186												H											
22000000	226												H											

Multilayer Ceramic Chip Capacitors
Anti-bend General Purpose

ST Series

MERITEK

CAPACITANCE RANGE – X7R Dielectric (2225)

Dimension		Size 2225 (V)											
Cap.(pF)	Code	25	50	100	200	250	500	630	1K	1.5K	2K	3K	4K
100	101												
120	121												
150	151												
180	181												
220	221												
270	271												F*
330	331												F*
390	391												F*
470	471												F*
560	561												F*
680	681												F*
820	821												F*
1000	102	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*	G*
1500	152	F	F	F	F	F	F	F	F	F	F	F*	G*
1800	182	F	F	F	F	F	F	F	F	F	F	F*	G*
2200	222	F	F	F	F	F	F	F	F	F	F	F*	
2700	272	F	F	F	F	F	F	F	F	F	F	F*	
3300	332	F	F	F	F	F	F	F	F	F	F	F*	
3900	392	F	F	F	F	F	F	F	F	F	F	F*	
4700	472	F	F	F	F	F	F	F	F	F	F	F*	
5600	562	F	F	F	F	F	F	F	F	F	F	G*	
6800	682	F	F	F	F	F	F	F	F	F	F	G*	
8200	822	F	F	F	F	F	F	F	F	F	F	G*	
10000	103	F	F	F	F	F	F	F	F	F	F	G*	
12000	123	F	F	F	F	F	F	F	F	G	G	G*	
15000	153	F	F	F	F	F	F	F	F	G	G	G*	
18000	183	F	F	F	F	F	F	F	F	G	G	H*	
22000	223	F	F	F	F	F	F	F	F	G	G		
27000	273	F	F	F	F	F	F	F	F	G	G		
33000	333	F	F	F	F	F	F	F	F	G	G		
39000	393	F	F	F	F	F	F	F	F	G	H		
47000	473	F	F	F	F	F	F	F	F	G	H		
56000	563	F	F	F	F	F	F	F	F	G	H		
68000	683	F	F	F	F	F	F	F	F	G			
82000	823	F	F	F	F	F	F	F	F	G			
100000	104	F	F	F	F	F	F	F	G	G			
120000	124	F	F	F	F	F	F	F	H				
150000	154	F	F	F	F	F	F	F	H				
180000	184	F	F	F	F	F	F	F	H				
220000	224	F	F	F	F	F	F	F	H				
270000	274	F	F	F	F	F	F	F					
330000	334	F	F	F	F	F	F	F					
390000	394	F	F	F	F	F	F	F					
470000	474	F	F	F	F	F	F	F					
560000	564	F	F	F	F	F	F	F					
680000	684	F	F	F	F	F							
820000	824	F	F	F	F	F							
1000000	105	F	F	F	F	F							
1200000	125	F	F	F	G	G							
1500000	155	F	F	F	G	G							
1800000	185	F	F	F	G	G							
2200000	225	F	F	F	G	G							
2700000	275	F	F	F	G	G							
3300000	335	F	F	F									
3900000	395	F	F	F									
4700000	475	F	F	F									
5600000	565	F	F	F									
6800000	685	F	F	F									
8200000	825	G	G	G									
10000000	106	G	G	G									
12000000	126												
15000000	156												
18000000	186												
22000000	226												

RELIABILITY TEST CONDITIONS AND REQUIREMENTS

<table>
<tr><th>Item</th><th>Test Condition</th><th>Requirements</th></tr>
<tr><td>Visual and Dimensions</td><td>- - -</td><td>No remarkable defect.
Dimensions to confirm to individual specification sheet.</td></tr>
<tr><td>Capacitance</td><td rowspan="2">Class I (NP0) :
Cap≤1000pF, 1.0±0.2Vrms, 1MHz±10%
Cap>1000pF, 1.0±0.2Vrms, 1MHz±10%
Class II (X7R) :
Cap≤10uF, 1.0±0.2Vrms, 1KHz±10%**
Cap>10uF, 0.5±0.2Vrms, 120Hz±20%

**Test condition: 0.5±0.2Vrms, 1KHz±10%
X7R: 0805=106(6.3V&10V), 0603=475(6.3V)</td><td>Shall not exceed the limits given in the detailed spec.</td></tr>
<tr><td>Q/D.F. (Dissipation Factor)</td><td>Class I (NP0)
<table>
<tr><th>Rated Vol.(V)</th><th>Q/D.F.</th><th>Remark</th></tr>
<tr><td rowspan="2">All</td><td>Q≥1000</td><td>Cap≥30pF</td></tr>
<tr><td>Q≥400+20C</td><td>Cap<30pF</td></tr>
</table>
Class II (X7R)
<table>
<tr><th>Rated</th><th>D.F.≤</th><th colspan="2">Exception of D.F.≤</th></tr>
<tr><td rowspan="3">≥100V</td><td rowspan="3">≤2.5%</td><td>≤3%</td><td>1206≥0.47uF</td></tr>
<tr><td>≤5%</td><td>0805>0.1uF, 0603≥0.068uF, 1206>1uF, 1210≥2.2uF</td></tr>
<tr><td>≤10%</td><td>0805>0.22uF, 1210≥3.3uF</td></tr>
<tr><td rowspan="3">50V</td><td rowspan="3">≤2.5%</td><td>≤3%</td><td>0201(50v), 0603≥0.047uF, 0805≥0.18uF, 1206≥0.47uF, 1210≥3.3uF, 1812≥10uF, 2220≥22uF</td></tr>
<tr><td>≤5%</td><td>0201≥0.01uF, 1210≥4.7uF</td></tr>
<tr><td>≤10%</td><td>0402≥0.1uF, 0603>0.1uF, 0805≥1uF, 1206≥2.2uF, 1210≥10uF</td></tr>
<tr><td>35V</td><td>≤3.5%</td><td>≤10%</td><td>0603>1uF, 0805≥2.2uF, 1206≥2.2uF, 1210≥10uF</td></tr>
<tr><td rowspan="4">25V</td><td rowspan="4">≤3.5%</td><td>≤5%</td><td>0201≥0.01uF, 0805≥1uF,1210≥10uF</td></tr>
<tr><td>≤7%</td><td>0603≥0.33uF, 1206≥4.7uF</td></tr>
<tr><td>≤10%</td><td>0201≥0.1uF, 0402≥0.10uF, 0603≥0.47uF, 0805≥2.2uF, 1206≥6.8uF, 1210≥22uF</td></tr>
<tr><td>≤12.5%</td><td>0402≥0.47uF</td></tr>
<tr><td rowspan="2">16V</td><td rowspan="2">≤3.5%</td><td>≤5%</td><td>0201≥0.01μF, 0402≥0.033μF, 0603≥0.15μF, 0805≥0.68μF, 1206≥2.2μF, 1210≥4.7μF</td></tr>
<tr><td>≤10%</td><td>0201≥0.1uF(0201/X7R≥0.022μF), 0402≥0.22uF, 0603≥0.68μF, 0805≥2.2μF, 1206≥4.7μF, 1210≥22μF</td></tr>
<tr><td rowspan="2">10V</td><td rowspan="2">≤5%</td><td>≤10%</td><td>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>≤15%</td><td>0201≥0.1μF, 0402≥1μF</td></tr>
<tr><td rowspan="2">6.3V</td><td rowspan="2">≤10%</td><td>≤15%</td><td>0201≥0.1μF, 0402≥1μF, 0603≥10μF, 0805≥4.7μF, 1206≥47μF, 1210≥100μF</td></tr>
<tr><td>≤20%</td><td>0402≥2.2μF</td></tr>
<tr><td>4V</td><td>≤15%</td><td>---</td><td>---</td></tr>
</table></td></tr>
</table>

RELIABILITY TEST CONDITIONS AND REQUIREMENTS

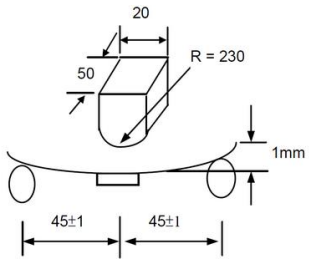
<table>
<tr><th>Item</th><th>Test Condition</th><th>Requirements</th></tr>
<tr><td>Temperature Coefficient</td><td>
With no electrical load.
<table>
<tr><th>T.C.</th><th>Operating Temp.</th></tr>
<tr><td>C0G (NP0)</td><td>-55~125°C at 25°C</td></tr>
<tr><td>X7R</td><td>-55~125°C at 25°C</td></tr>
</table>
Measurement voltage for Class II:
<table>
<tr><th>Size</th><th>Cap. Range</th><th>Condition</th></tr>
<tr><td rowspan="3">0201</td><td>Cap.<0.1μF</td><td>1V</td></tr>
<tr><td>0.1μF≤Cap.<1μF</td><td>0.2V</td></tr>
<tr><td>Cap.≥1μF</td><td>0.1V</td></tr>
<tr><td rowspan="4">0402</td><td>Cap.<0.1μF</td><td>1V</td></tr>
<tr><td>Cap.=1μF</td><td>0.5V</td></tr>
<tr><td>1μF<Cap.<10μF</td><td>0.2V</td></tr>
<tr><td>Cap.≥10μF</td><td>0.1V</td></tr>
<tr><td rowspan="3">0603</td><td>Cap.≤1μF</td><td>1V</td></tr>
<tr><td>1μF<Cap.≤4.7μF</td><td>0.5V</td></tr>
<tr><td>Cap.>4.7μF</td><td>0.2V</td></tr>
<tr><td rowspan="3">0805</td><td>Cap.<10μF</td><td>1V</td></tr>
<tr><td>Cap.=10μF</td><td>0.5V</td></tr>
<tr><td>Cap.>10μF</td><td>0.2V</td></tr>
<tr><td rowspan="3">1206/1210</td><td>Cap.≤10μF</td><td>1V</td></tr>
<tr><td>10μF<Cap.≤100μF</td><td>0.5V</td></tr>
<tr><td>Cap.>100μF</td><td>0.2V</td></tr>
</table>
</td><td>
<table>
<tr><th>T.C.</th><th>Capacitance Change</th></tr>
<tr><td>C0G (NP0)</td><td>Within ±30ppm/°C</td></tr>
<tr><td>X7R</td><td>Within ±15%</td></tr>
</table>
</td></tr>
<tr><td>Insulation Resistance</td><td>
<table>
<tr><th>Rated Vol.(V)</th><th>Apply Voltage</th><th>Test Condition</th></tr>
<tr><td>≤100</td><td>1 times of U_R</td><td>Max. 120 sec.</td></tr>
<tr><td>100<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>
</td><td>
<table>
<tr><th>Dielectric</th><th>Requirements</th></tr>
<tr><td>Class I (NP0)</td><td>≥10GΩ or RxC≥500Ω-F, whichever is smaller</td></tr>
<tr><td>Class II (X7R)</td><td>≥10GΩ or RxC≥100Ω-F, whichever is smaller</td></tr>
</table>
Except (Class II):
<table>
<tr><th>Rated voltage</th><th>I.R.</th></tr>
<tr><td>100V : 1210≥3.3uF</td><td rowspan="8">RxC≥50Ω-F</td></tr>
<tr><td>50V: 0402≥0.1uF, 0603≥2.2uF, 0805≥10uF, 1206≥10uF</td></tr>
<tr><td>35V:0603≥1uF</td></tr>
<tr><td>25V: 0201≥0.1uF, 0402≥2.2uF, 0603≥10uF, 0805≥10uF, 1206≥22uF</td></tr>
<tr><td>16V: 0603≥10uF, 0402≥1uf, 0201≥2.2uF,</td></tr>
<tr><td>10V: 0201>0.1uF, 0402≥1uF, 0603≥10uF, 0805≥47uF</td></tr>
<tr><td>6.3V : 0201≥0.1uF, 0603>4.7uF, 0805≥47uF, 1206≥10uF</td></tr>
<tr><td>4V: 0603≥22uF, 0805≥47uF, 1206≥100uF</td></tr>
</table>
</td></tr>
<tr><td>Dielectric Strength</td><td>
<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 second
Charge and discharge current less than 50mA
Test in insulating fluid for rated voltage ≥1KV
</td><td>No evidence of damage or flash over during test.</td></tr>
</table>

RELIABILITY TEST CONDITIONS AND REQUIREMENTS

<table>
<tr><th>Item</th><th>Test Condition</th><th>Requirements</th></tr>
<tr><td>Solderability</td><td>Solder temperature: 235±5°C for (0402~1210)
Solder temperature: 245±5°C for (1808~2225)
Dipping time: 2±0.5 sec.</td><td>75% min. coverage of all metalized area.</td></tr>
<tr><td>Resistance to Soldering Heat</td><td>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 1 hr. and 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).</td><td>No remarkable damage.
Cap change:
C0G(NP0): within ±2.5% or ±0.25pF whichever is larger.
X7R: within ±7.5%
D.F./Q, I.R. and dielectric strength: To meet initial requirements.
25% max. leaching on each edge.</td></tr>
<tr><td>Temperature Cycle</td><td>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 1 hr. and 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).</td><td>No remarkable damage.
Cap change:
C0G(NP0): within ±2.5% or ±0.25pF whichever is larger.
X7R: within ±7.5%
D.F./Q:
C0G(NP0): Q≥100% of initial requirements
X7R: D.F.≤150% of initial requirement
I.R.: ≥ 100% of initial requirement.</td></tr>
<tr><td>Humidity (Damp Heat) Steady State</td><td>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 1 hr. and 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).</td><td>No remarkable damage.
Cap change:
C0G(NP0):within ±5% or 0.5pF whichever is larger
X7R: within ±12.5% for ≥10V**, within ±25% for 6.3V;
**10V: within ±25% for 0603≧4.7μF;0402≧1μF;
D.F./Q:
C0G(NP0): Q≥350 for Cap>30pF, Q≥275+2.5C for 10pF≤Cap≤30pF, Q≥200+10C for Cap<10pF
X7R: D.F.≤200% of initial requirement
I.R.: ≥10V, ≥1GΩ or RxC≥50Ω-F, whichever is smaller

Except (Class II):
<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; Size≥1812</td></tr>
</table></td></tr>
</table>

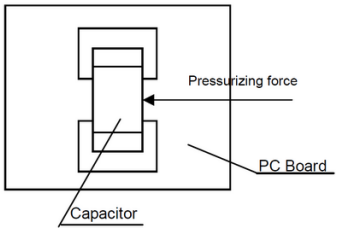
RELIABILITY TEST CONDITIONS AND REQUIREMENTS

<table>
<tr><th>Item</th><th>Test Condition</th><th>Requirements</th></tr>
<tr><td>Resistance to Flexure of Substrate</td><td>The middle part of substrate shall be pressurized by means of the pressurizing rod at a rate of about 1 mm per second until the deflection becomes 5mm for product size < 1808, 3mm for product size ≥ 1808.
 
</td><td>No remarkable damage.
<table><tr><td>Dielectric</td><td>Cap Change</td></tr><tr><td>Class I (NP0)</td><td>within ±5.0% or ±0.5pF whichever is larger</td></tr><tr><td>Class II (X7R)</td><td>within ±12.5%</td></tr></table>(This capacitance change means the change of capacitance under specified flexure of substrate from the capacitance measured before the test.)</td></tr>
<tr><td>Vibration Resistance</td><td>Vibration frequency: 10~55 Hz/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).</td><td>No remarkable damage.
Cap change and Q/D.F.: To meet initial spec.</td></tr>
<tr><td>Humidity (Damp Heat) Load</td><td>Reflow solder the capacitors on a P.C. Board before test.
Test temp. : 40±2°C
Humidity : 90~95% RH
Test time : 500 +24/-0hrs.
To apply voltage : Rated voltage (500Vdc max. for general purpose)
Measurement to be made after keeping at room temp. for 24±2 hrs (Class I) or 48±4 hrs (Class II).</td><td>No remarkable damage.
Cap change:
C0G(NP0):within ±7.5% or 0.75pF whichever is larger
X7R: ≥10V*,within ±12.5%; 6.3V within ±25%;
*10V:0603≥4.7μF; 0402≥1μF; within ±25%;
Q/D.F.: C0G(NP0): Q≥350 for Cap>30pF, Q≥275+2.5C for 10pF≤Cap≤30pF, Q≥200+10C for Cap<10pF
X7R: ≤200% of initial requirement
I.R.: ≥10V, ≥500MΩ or RxC≥25Ω-F, whichever is smaller
Except:
<table><tr><td>Rated Voltage</td><td>I.R.</td></tr><tr><td>≥100V: All X7R; 1210≥3.3uF</td><td rowspan="7">≥500MΩ or RxC≥5Ω-F, whichever is smaller</td></tr><tr><td>50V:0402>0.01uF, 0805≥1uF, 1206≥4.7uF, 1210≥4.7uF</td></tr><tr><td>35V:0603≥1uF, 0805≥2.2uF, 1206≥2.2uF, 1210≥10uF</td></tr><tr><td>25V: 0201≥0.1uF, 0402≥0.22uF, 0603≥2.2uF, 0805≥2.2uF, 1206≥10uF, 1210≥10uF</td></tr><tr><td>16V: 0210≥0.1uF, 0402≥0.22uF, 0603≥1uF, 0805≥2.2uF, 1206≥10uF, 1210≥47uF</td></tr><tr><td>10V: 0210≥47nF, 0402≥0.47uF, 0603≥0.47uF, 0805≥2.2uF, 1206≥4.7uF, 1210≥47uF</td></tr><tr><td>6.3V: 4V; Size≥1812</td></tr></table></td></tr>
</table>

RELIABILITY TEST CONDITIONS AND REQUIREMENTS

<table>
<tr><th>Item</th><th>Test Condition</th><th>Requirements</th></tr>
<tr><td>High Temperature Load (Endurance)</td><td>
Test temp. : 125±3°C.
To apply voltage :
≤6.3V or Cap.≥10μF : 150% of rated voltage.
10V≤Ur≤100V : 200% of rated voltage.
200V≤Ur≤500V : 150% of rated voltage.
630V : 120% of rated voltage.
Ur≥1000V : 100% of rated voltage.
100% of rated voltage for below range :
<table>
<tr><th>Size</th><th>Dielectric</th><th>Rated Vol. (V)</th><th>Capacitance Range</th></tr>
<tr><td rowspan="2">0201</td><td rowspan="2">X7R</td><td>≤10V</td><td>C≥0.1μF</td></tr>
<tr><td>≥16V</td><td>C>0.1μF</td></tr>
<tr><td>0402</td><td>X7R</td><td>6.3V, 10V, 16V, 25V</td><td>C≥1.0μF</td></tr>
<tr><td rowspan="3">0603</td><td rowspan="3">X7R</td><td>4V</td><td>C≥22μF</td></tr>
<tr><td>6.3V,10V</td><td>C≥4.7μF</td></tr>
<tr><td>25V, 35V</td><td>C≥1.0μF</td></tr>
<tr><td rowspan="3">0805</td><td rowspan="3">X7R</td><td>4V</td><td>C≥47μF</td></tr>
<tr><td>6.3V</td><td>C≥22μF</td></tr>
<tr><td>10V~50V</td><td>C≥10μF</td></tr>
<tr><td>1206</td><td>X7R</td><td>≤6.3V</td><td>C≥47μF</td></tr>
<tr><td rowspan="2">1210</td><td>X7R</td><td>16V</td><td>C≥47μF</td></tr>
<tr><td>X7R</td><td>≥100V</td><td>C≥3.3μF</td></tr>
</table>
150% of rated voltage for below range:
<table>
<tr><th>Size</th><th>Dielectric</th><th>Rated Vol. (V)</th><th>Capacitance Range</th></tr>
<tr><td>0201</td><td>X7R</td><td>16V</td><td>C≥0.022μF</td></tr>
<tr><td rowspan="2">0402</td><td rowspan="2">X7R</td><td>50V</td><td>C≥0.1μF</td></tr>
<tr><td>10~25V</td><td>C≥0.22μF</td></tr>
<tr><td rowspan="2">0603</td><td rowspan="2">X7R</td><td>≥50V</td><td>C≥0.082μF</td></tr>
<tr><td>10V,16V,50V</td><td>C≥1.0μF</td></tr>
<tr><td rowspan="3">0805</td><td rowspan="3">X7R</td><td>10~50V</td><td>C≥4.7μF</td></tr>
<tr><td>50V</td><td>C≥0.47μF</td></tr>
<tr><td>≥100V</td><td>C≥0.12μF</td></tr>
<tr><td>1206</td><td>X7R</td><td>≥50V</td><td>C≥1.0μF</td></tr>
<tr><td rowspan="2">1210</td><td>X7R</td><td>≤100V</td><td>C≥1.0μF</td></tr>
<tr><td>X7R</td><td>>100V</td><td>C≥0.22μF</td></tr>
<tr><td rowspan="2">1812</td><td rowspan="2">X7R</td><td>≤50V</td><td>C≥4.7μF</td></tr>
<tr><td>100V</td><td>C≥1.0μF</td></tr>
<tr><td>1825
2220
2225</td><td>X7R</td><td>≥100V</td><td>C≥1.0μF</td></tr>
</table>
120% of rated voltage for below range:
<table>
<tr><th>Size</th><th>Dielectric</th><th>Rated Vol. (V)</th><th>Capacitance Range</th></tr>
<tr><td>2220</td><td>X7R</td><td>≥100</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 24±2 hrs. (Class I) or 48±4 hrs. (Class II).
</td><td>
No remarkable damage.
Cap. change :
C0G : Within ±5.0% or ±0.5pF, whichever is larger.
X7R : Within ±12.5% for ≥10V, within ±25% for 6.3V.
10V : Within ±25% for 0603≥4.7μF, 0402≥1μF.
D.F./Q :
C0G : Q≥350 for Cap.>30pF, Q≥275+2.5C for 10pF≤Cap.≤30pF, Q≥200+10C for Cap.<10pF.
X7R : D.F.≤200% of initial requirement.
I.R. : ≥10V, ≥1GΩ or R×C≥50Ω-F, whichever is smaller.

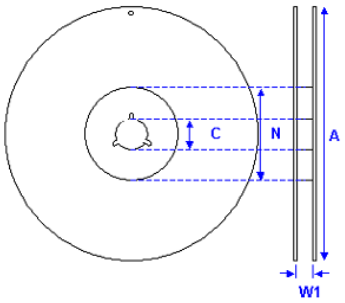
Except :
<table>
<tr><th>Rated Voltage</th><th>Insulation Resistance</th></tr>
<tr><td>100V : All X7R; 1210≥3.3μF</td><td rowspan="6">1GΩ or RxC≧ 10 Ω-F whichever is smaller.</td></tr>
<tr><td>50V : 0402>0.01μF, 0603≥1μF, 0805≥1μF, 1206≥4.7μF, 1210≥4.7μF</td></tr>
<tr><td>35V : 0603≥1μF, 0805≥2.2μF, 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; Size≥1812</td></tr>
</table>
</td></tr>
<tr><td>Adhesive Strength of Termination</td><td>
Capacitors mounted on a substrate. A force of 5N(≤0603) or 10N(> 0603) applied perpendicular to the place of substrate and parallel the line joining the center of terminations for 10±1 second.



</td><td>No remarkable damage or removal of the terminations.</td></tr>
</table>

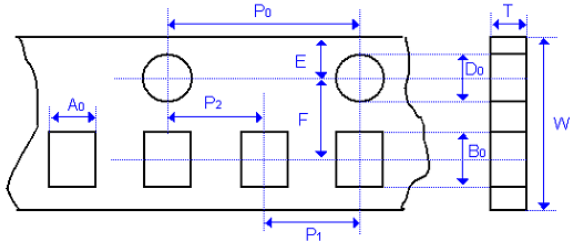
PACKAGE DIMENSION

Size	0402, 0603, 0805, 1206, 1210			1812, 1825, 2220, 2225
Reel Size	7"	10"	13"	7"
C	13.0+0.5/-0.2	13.0+0.5/-0.2	13.0+0.5/-0.2	13.0+0.5/-0.2
W1	8.4+1.5/-0	8.4+1.5/-0	8.4+1.5/-0	12.4+2.0/-0
A	178.0±0.10	250.0±1.0	330.0±0.10	178.0±0.10
N	65.0±1.0	100.0±1.0	100.0±1.0	60.5±1.0

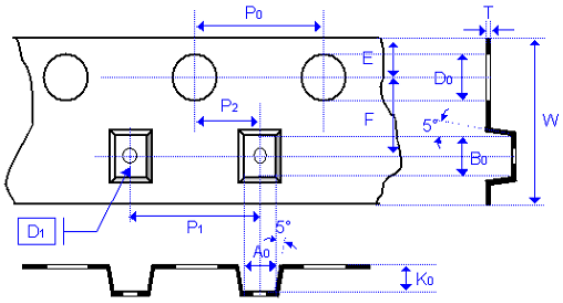


Size	0402		0603	
Chip Size	0.50 ±0.05	0.50±0.10	0.80 ±0.07	0.80±0.15 /-0.10
A_0	0.70±0.20	0.70±0.20	1.00+0.05 /-0.10	1.02+0.05 /-0.10
B_0	1.20±0.20	1.20±0.20	1.80±0.10	1.80±0.10
T	≤0.80	≤0.80	0.95±0.05	0.97±0.05
K_0	-	-	-	-
W	8.00±0.10	8.00±0.10	8.00±0.10	8.00±0.10
P_0	4.00±0.10	4.00±0.10	4.00±0.10	4.00±0.10
$10xP_0$	40.00±0.10	40.00±0.10	40.0±0.20	40.00±0.20
P_1	2.00±0.05	2.00±0.05	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
D_0	1.55±0.05	1.55±0.05	1.55±0.05	1.55±0.1/-0
D_1	-	-	-	-
E	1.75±0.05	1.75±0.05	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

Paper Tape:



Plastic Tape:



Size	0805		1206			1210		1808	
Chip Size	0.80 ±0.10	1.25 ±0.10	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 2.00±0.20	2.50±0.30	1.25±0.10 1.40±0.15 1.60±0.20	2.00±0.20
A_0	1.50±0.10	<1.65	2.00±0.10	<2.00	<2.00	<3.05	<3.10	<2.50	<2.50
B_0	2.30±0.10	<2.40	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	0.95±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	<2.50	<3.50	<2.50	<2.50
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	12.0±0.20	12.0±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±0.100	4.00±0.10	4.00±0.10	4.00±0.10
$10xP_0$	40.00±0.20	40.00±0.20	40.0±0.20	40.00±0.20	40.00±0.20	40.00±0.20	40.0±0.20	40.0±0.20	40.0±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	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	2.00±0.05	2.00±0.05
D_0	1.55±0.05	1.50±0.1/-0	1.50±0.05	1.50±0.1/-0	1.50±0.1/-0	1.50±0.1/-0	1.50±0.1/-0	1.50±0.1/-0	1.50+0.1/-0
D_1	-	1.00±0.10	-	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±0.05	1.75±0.10	1.75±0.10	1.75±0.10	1.75±0.10	1.75±0.10	1.75±0.10	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	5.50±0.05	5.50±0.05

PACKAGE DIMENSION (CONTINUED)

Size	1812		1825		2220		2225	
Chip Size	1.25±0.10 1.60±0.20 2.00±0.20	2.50 ±0.30	1.60±0.20 2.00±0.20	2.50 ±0.30	1.40±0.15 1.60±0.20 2.00±0.20	2.50 ±0.30	1.60±0.20 2.00±0.20	2.50 ±0.30
A_0	<3.90	<3.90	<6.80	<6.80	<5.80	<5.80	<6.80	<6.80
B_0	<5.30	<5.30	<5.30	<5.30	<6.50	<6.50	<6.50	<6.50
T	0.25±0.05	0.25±0.05	0.30±0.10	0.30±0.10	0.30±0.10	0.30±0.10	0.30±0.10	0.30±0.10
K_0	<3.0	<2.50	<3.10	<2.50	<3.10	<2.50	<3.10	<3.10
W	12.0±0.20	12.0±0.20	12.0±0.20	12.0±0.20	12.0±0.20	12.0±0.20	12.0±0.20	12.0±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	4.00±0.10
$10xP_0$	40.0±0.20	40.00±0.2	40.00±0.2	40.00±0.2	40.0±0.20	40.0±0.20	40.0±0.20	40.0±0.20
P_1	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	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	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	1.50 +0.10/-0
D_1	1.50±0.10	1.50+/-0.1	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+/-0.1	1.75±0.1	1.75±0.10	1.75±0.1	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	5.50±0.05	5.50±0.05

REEL DIMENSION AND QUANTITY

Size	Thickness (mm)	Paper Tape (pcs)		Plastic Tape (pcs)	
		7" reel	13" reel	7" reel	13" reel
0402 (1005)	0.50±0.05	10K	50K	-	-
0603 (1608)	0.80±0.07	4K	15K	-	-
	0.80±0.15	4k	15K		
0805 (2012)	0.60±0.10	4K	15K	-	-
	0.80±0.10	4K	15K	-	-
	0.95±0.10	-	-	3K	10K
	1.25±0.10	-	-	3K	-
1206 (3216)	0.80±0.10	4K	15K	-	-
	0.95±0.10	-	-	3K	10K
	1.25±0.10	-	-	3K	10K
	1.60±0.20	-	-	2K	-
1210 (3225)	0.95±0.10	-	-	3K	10K
	1.25±0.10	-	-	3K	10K
	1.60±0.20	-	-	2K	-
	2.00±0.20	-	-	1K	-
	2.50±0.30	-	-	1K	-
1808 (4520)	1.25±0.10	-	-	2K	-
	1.60±0.20	-	-	2K	-
	2.00±0.20	-	-	1K	-
1812 (4532)	1.25±0.10	-	-	1k	-
	1.60±0.20	-	-	1K	-
	2.00±0.20	-	-	1K	-
	2.50±0.30	-	-	0.5K	-
1825 (4563)	1.60±0.20	-	-	1K	-
	2.00±0.20	-	-	1K	-
	2.50±0.30	-	-	0.5K	-
2220 (5750)	1.60±0.20	-	-	1K	-
	2.00±0.20	-	-	1K	-
	2.50±0.30	-	-	0.5K	-
2225 (5763)	2.00±0.20	-	-	1K	-
	2.50±0.30	-	-	0.5K	-

APPLICATION NOTES

STORAGE

- To prevent the damage of solderability of terminations, the following storage conditions are recommended:
  Indoors under 5ºC~ 40ºC 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 6 months 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 4℃ per second. and the final preheat temperature should be within 100℃ of the soldering temperature for small chips such as 0805,1206, within 50℃ of the soldering temperature for bigger chips such as 1210, 1808, 1812, 1825, 2211, 2220 and 2225, etc.

SOLDERING

- Use middy activated rosin RA and RMA 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.

- Hand soldering with temperature-controlled iron not exceeding 30 watts and diameter of tip less than 1.2 mm is recommended, tip of iron should not contact the ceramic body directly, and the temperature of iron should be set to not more than 260℃.

- For bigger chips such as 1210, 1808, 1812, 2211, 2220 and 2225, etc. wave soldering and hand soldering are no recommended.

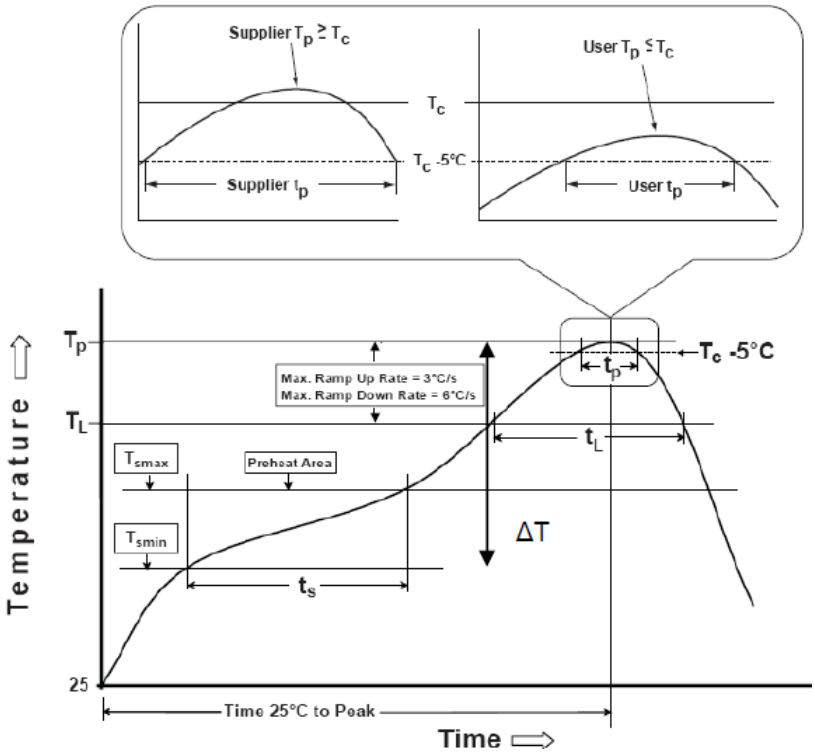
- Refer IPC/JEDEC J-STD-020D Method recommended soldering profiles:
  Reflow not sooner than 15 minutes and not longer than 4 hrs after removal from the temperature/humidity chamber, subject the sample to 3 cycle of the appropriate reflow conditions as the table description below.

Profile Feature		Pb-Free Assembly
Preheat/Soak	Temperature MIN (T_{smin}) Temperature MAX. (T_{SMAX}) Time(t_s) from (T_{smin} to T_{smax})	150ºC 200ºC 60~120 seconds
Ramp-up rate (T_L to T_P)		3^0C/second max.
Liquidous Temperature (T_L) Time(T_L) maintained above T_L		217^0C 60~150 seconds
Peek package body temperature(T_P)		For user T_p must not exceed the classification temp 260^0C For supplier T_p must equal or exceed the classification temp 260^0C
Time(T_P)* within 5^0C of the specified classification temperature(T_C)		30 seconds
Ramp-down rate (T_P to T_L)		6ºC/second MAX.
Time 25^0C to peak temperature 260^0C		8 minutes MAX.

- **Lead-free: Soldering temperature = 235 to 260℃, depending on product.**
- **Maximum temperature = Minimum temperature (235℃) + ΔT+ Tolerance for oven process and measurement (5 ~ 7℃)**
- **Time at peak temperature = 10sec, Dwell above 217℃ = 90sec, Ramping rate = 3℃/sec (heating) and 6℃/sec (heating).**

APPLICATION NOTES (CONTINUED)

CLASSIFICATION REFLOW PROFILES



Chip Size	ΔT
0805, 1206	100^0C
1210,1808, 1812, 1825, 2211, 2220, 2225	50^0C

Soldering	Solder Temp. (T_C)	Soldering Time (t_p)
Reflow	235~260^0C	< 15sec.

Note:
For example: Tc is 260℃ and time t_p is 15sec.
For user: The peak temperature must not exceed 260℃. The time above 255℃ must not exceed 15 seconds.

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. A cooling rate not exceeding 4 per second should ℃ be used when forced cooling is necessary.

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.