

SOFT TERMINATION

- GMX 6.3V~200V -

INTRODUCTION

- Cal-Chip's soft termination series MLCC is designed and with a polymer layer within end terminations of product, which can absorb mechanical stress caused by PCB handling in SMT line and reduce the mechanical impact for product. It will offer more robust and reliable performance in applications.

FEATURES

- MLCC's termination are with a soft & flexible polymer layer to withstand high bending stress in SMT line.
- Available for any item in standard series range.

APPLICATIONS

- Automotive industry.
- Power supply and related industries.
- Lighting industry.
- The other mechanical stress concerned products

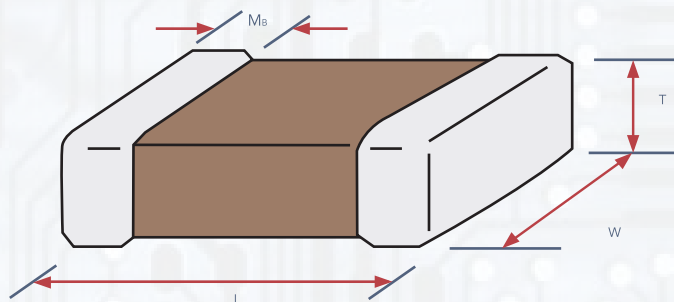
ORDERING INFORMATION

GMX	31	CG	104	K	50	C	T
SERIES	SIZE	DIELECTRIC	CAPACITANCE	TOLERANCE	RATED VOLTAGE	TERMINATION	PACKAGING
GMX - Soft Termination	04 - 0402 (1005) 10 - 0603 (1608) 21 - 0805 (2012) 31 - 1206 (3216) 32 - 1210 (3225) 43 - 1812 (4532) 45 - 1825 (4563) 55 - 2220 (5750) 57 - 2225 (5763)	CG - NPO (C0G) X7R - X7R X5R - X5R Y5V - Y5V	Two significant digits followed by no. of zeros. And R in place of decimal point. EG. 104 - 10X10 ⁴ - 100nF	B: ± 0.1pF C: ± 0.25pF D: ± 0.5pF F: ± 1% G: ± 2% J: ± 5% K: ± 10% M: ± 20% Z: -20/+80%	6R3 - 6.3 VDC 10 - 10 VDC 16 - 16 VDC 25 - 25 VDC 50 - 50 VDC 100 - 100 VDC 200 - 200 VDC	C - Cu/Polymer/Ni/Sn	T - 7" reeled G - 13" reeled

EXTERNAL DIMENSIONS & CONSTRUCTIONS

SIZE INCH (MM)	L (MM)	W (MM)	T (MM)	SYMBOL	REMARK	M _b (MM)
0402 (1005)	1.00±0.20	0.50±0.20	0.50±0.20	E		0.25 +0.05/-0.10
0603 (1608)	1.60±0.20	0.80±0.10	0.80±0.07	S		0.40±0.15
	1.60±0.30	0.80±0.30	0.80±0.30	X		
0805 (2012)	2.00±0.20	1.25±0.10	0.60±0.10	A		0.50±0.20
			0.80±0.10	B		
	1.25±0.10	D	#			
	1.25±0.30	I	#			
1206 (3216)	3.20±0.4/-0.1	1.60±0.15	0.80±0.10	B	#	0.60±0.20
			0.95±0.10	C	#	
			1.15±0.15	J	#	
	1.25±0.10	D	#			
	3.20±0.4/-0.1	1.60±0.20	1.60±0.20	G	#	
	3.20±0.50	1.60±0.50	1.60±0.50	P	#	
1210 (3225)	3.20±0.20	2.50±0.20	0.95±0.10	C	#	0.75±0.25
			1.25±0.10	D	#	
	1.60±0.20	G	#			
	2.00±0.20	K	#			
1812 (4532)	4.50±0.6/-0.4	3.20±0.30	2.50±0.30	M	#	0.75±0.25
			1.25±0.10	D	#	
	1.60±0.20	G	#			
	2.00±0.20	K	#			
1825 (4563)	4.50±0.6/-0.4	6.30±0.40	2.00±0.20 (K)	#	0.75±0.35	
2220 (5750)	5.70±0.50	5.00±0.40	2.50±0.30 (M)	#	0.85±0.35	
2225 (5763)	5.70±0.50	6.30±0.40	2.80±0.30 (U)	#	0.85±0.35	

#REFLOW SOLDERING ONLY IS RECOMMENDED



GENERAL ELECTRICAL DATA

DIELECTRIC	NPO	X7R	X5R	Y5V
SIZE	0402, 0603, 0805, 1206, 1210, 1812			
CAPACITANCE RANGE*	0.1pF to 0.039µF	100pF to 22µF	0.027µF to 10µF	0.01µF to 4.7µF
CAPACITANCE TOLERANCE**	Caps≤5pF: B (±0.1pF), C (±0.25pF) 5pF<Cap<10pF: C (±0.25pF), D (±0.5pF) Cap≥10pF: F (±1%), G (±2%), J (±5%), K (±10%)	K (±10%), M (±20%)		Z (-20/+80%)
RATED VOLTAGE (WVDC)	6.3V, 10V, 16V, 25V, 50V, 100V			
OPERATING TEMPERATURE	-55 TO +125°C	-55 TO +125°C	-55 TO +85°C	-25 TO +85°C
CAPACITANCE CHARACTERISTIC	±30ppm	±15%	±15%	+30%/-80%
TERMINATION	Ni/Sn (lead-free termination)			

* Measured at the condition of 30~70% related humidity.
NPO: Apply 1.0±0.2Vrms, 1.0MHz±10% for Caps<1000pF and 1.0±0.2Vrms, 1.0kHz±10% for Cap>1000pF, 25°C at ambient temperature X7R, X5R: Apply 1.0±0.2Vrms, 1.0kHz±10%, at 25°C ambient temperature.
Y5V: Apply 1.0±0.2Vrms, 1.0kHz±10%, at 20°C ambient temperature.
** 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.



CAPACITANCE RANGE (NPO DIELECTRIC)

DIELECTRIC		NPO														
SIZE		0402					0603					0805				
RATED VOLTAGE		10	16	25	50	100	10/16	25	50	100	200	10/16	25	50	100	200
CAP. RANGE																
0.1pF	0R1	E	E	E	E											
0.2pF	0R2	E	E	E	E											
0.3pF	0R3	E	E	E	E		S	S	S							
0.4pF	0R4	E	E	E	E		S	S	S							
0.5pF	0R5	E	E	E	E	E	S	S	S	S	S	A	A	A	A	A
0.6pF	0R6	E	E	E	E	E	S	S	S	S	S	A	A	A	A	A
0.7pF	0R7	E	E	E	E	E	S	S	S	S	S	A	A	A	A	A
0.8pF	0R8	E	E	E	E	E	S	S	S	S	S	A	A	A	A	A
0.9pF	0R9	E	E	E	E	E	S	S	S	S	S	A	A	A	A	A
1.0pF	1R0	E	E	E	E	E	S	S	S	S	S	A	A	A	A	A
1.2pF	1R2	E	E	E	E	E	S	S	S	S	S	A	A	A	A	A
1.5pF	1R5	E	E	E	E	E	S	S	S	S	S	A	A	A	A	A
1.8pF	1R8	E	E	E	E	E	S	S	S	S	S	A	A	A	A	A
2.2pF	2R2	E	E	E	E	E	S	S	S	S	S	A	A	A	A	A
2.7pF	2R7	E	E	E	E	E	S	S	S	S	S	A	A	A	A	A
3.3pF	3R3	E	E	E	E	E	S	S	S	S	S	A	A	A	A	A
3.9pF	3R9	E	E	E	E	E	S	S	S	S	S	A	A	A	A	A
4.7pF	4R7	E	E	E	E	E	S	S	S	S	S	A	A	A	A	A
5.6pF	5R6	E	E	E	E	E	S	S	S	S	S	A	A	A	A	A
6.8pF	6R8	E	E	E	E	E	S	S	S	S	S	A	A	A	A	A
8.2pF	8R2	E	E	E	E	E	S	S	S	S	S	A	A	A	A	A
10pF	100	E	E	E	E	E	S	S	S	S	S	A	A	A	A	A
12pf	120	E	E	E	E	E	S	S	S	S	S	A	A	A	A	A
15pf	150	E	E	E	E	E	S	S	S	S	S	A	A	A	A	A
18pf	180	E	E	E	E	E	S	S	S	S	S	A	A	A	A	A
22pf	220	E	E	E	E	E	S	S	S	S	S	A	A	A	A	A
27pf	270	E	E	E	E	E	S	S	S	S	S	A	A	A	A	A
33pf	330	E	E	E	E	E	S	S	S	S	S	A	A	A	A	A
39pf	390	E	E	E	E	E	S	S	S	S	S	A	A	A	A	A
47pf	470	E	E	E	E	E	S	S	S	S	S	A	A	A	A	A
56pf	560	E	E	E	E	E	S	S	S	S	S	A	A	A	A	A
68pf	680	E	E	E	E	E	S	S	S	S	S	A	A	A	A	A
82pf	820	E	E	E	E	E	S	S	S	S	S	A	A	A	A	A
100pf	101	E	E	E	E	E	S	S	S	S	S	A	A	A	A	A
120pf	121	E	E	E	E	E	S	S	S	S	S	A	A	A	A	A
150pf	151	E	E	E	E	E	S	S	S	S	S	A	A	A	A	B
180pf	181	E	E	E	E	E	S	S	S	S	S	A	A	A	A	B
220pf	221	E	E	E	E	E	S	S	S	S	S	A	A	A	A	D
270pf	271	E	E	E	E		S	S	S	S	X	A	A	A	A	D
330pf	331	E	E	E	E		S	S	S	S	X	A	A	A	A	D
470pf	471	E	E	E	E		S	S	S	S	X	B	B	B	B	D
560pf	561	E	E	E	E		S	S	S	S		B	B	B	B	D
680pf	681	E	E	E	E		S	S	S	S		B	B	B	B	D
820pf	821	E	E	E	E		S	S	S	S		B	B	B	B	D
1,000pf	102	E	E	E	E		S	S	S	S		B	B	B	B	D
1,200pf	122						X	X	X			B	B	B	B	D
1,500pf	152						X	X	X			B	B	B	B	D
1,800pf	182						X	X	X			B	B	B	B	D
2,200pf	222						X	X	X			B	B	B	B	D
2,700pf	272						X	X	X			D	D	D	D	
3,300pf	332						X	X	X			D	D	D	D	
3,900pf	392											D	D	D	D	
4,700pf	472											D	D	D	D	
5,600pf	562											D	D	D	D	
6,800pf	682											D	D	D	D	
8,200pf	822											D	D	D		
0.010uf	103											D	D	D		
0.012uf	123															





CAPACITANCE RANGE (NPO DIELECTRIC)

SIZE		NPO														
		1206					1210					1812				
RATED VOLTAGE		10/16	25	50	100	200	10/16	25	50	100	200	10/16	25	50	100	200
CAP. RANGE																
1.0pf	1R0															
1.2pf	1R2	B	B	B	B											
1.5pf	1R5	B	B	B	B	B										
1.8pf	1R8	B	B	B	B	B										
2.2pf	2R2	B	B	B	B	B										
2.7pf	2R7	B	B	B	B	B										
3.3pF	3R3	B	B	B	B	B										
3.9pf	3R9	B	B	B	B	B										
4.7pf	4R7	B	B	B	B	B										
5.6pF	5r6	B	B	B	B	B										
6.8pf	6r8	B	B	B	B	B										
8.2pf	8r2	B	B	B	B	B										
10pf	100	B	B	B	B	B	C	C	C	C	C	D	D	D	D	D
12pF	120	B	B	B	B	B	C	C	C	C	C	D	D	D	D	D
15pF	150	B	B	B	B	B	C	C	C	C	C	D	D	D	D	D
18pF	180	B	B	B	B	B	C	C	C	C	C	D	D	D	D	D
22pF	220	B	B	B	B	B	C	C	C	C	C	D	D	D	D	D
27pF	270	B	B	B	B	B	C	C	C	C	C	D	D	D	D	D
33pF	330	B	B	B	B	B	C	C	C	C	C	D	D	D	D	D
39pF	390	B	B	B	B	B	C	C	C	C	C	D	D	D	D	D
47pF	470	B	B	B	B	B	C	C	C	C	C	D	D	D	D	D
56pF	560	B	B	B	B	B	C	C	C	C	C	D	D	D	D	D
68pF	680	B	B	B	B	B	C	C	C	C	C	D	D	D	D	D
82pF	820	B	B	B	B	B	C	C	C	C	C	D	D	D	D	D
100pF	101	B	B	B	B	B	C	C	C	C	C	D	D	D	D	D
120pF	121	B	B	B	B	B	C	C	C	C	C	D	D	D	D	D
150pF	151	B	B	B	B	B	C	C	C	C	C	D	D	D	D	D
180pF	181	B	B	B	B	B	C	C	C	C	C	D	D	D	D	D
220pF	221	B	B	B	B	B	C	C	C	C	C	D	D	D	D	D
270pF	271	B	B	B	B	B	C	C	C	C	C	D	D	D	D	D
330pF	331	B	B	B	B	B	C	C	C	C	C	D	D	D	D	D
390pF	391	B	B	B	B	B	C	C	C	C	C	D	D	D	D	D
470pF	471	B	B	B	B	C	C	C	C	C	C	D	D	D	D	D
560pF	561	B	B	B	B	C	C	C	C	C	C	D	D	D	D	D
680pF	681	B	B	B	B	C	C	C	C	C	C	D	D	D	D	D
820pF	821	B	B	B	B	C	C	C	C	C	C	D	D	D	D	D
1000pF	102	B	B	B	B	C	C	C	C	C	C	D	D	D	D	D
1200pF	122	B	B	B	B	C	C	C	C	C	D	D	D	D	D	D
1500pF	152	B	B	B	B	D	C	C	C	C	D	D	D	D	D	D
1800pF	182	B	B	B	B	D	C	C	C	C	D	D	D	D	D	D
2200pF	222	B	B	B	B	D	C	C	C	C	D	D	D	D	D	D
2700pF	272	B	B	B	B	D	C	C	C	C	D	D	D	D	D	D
3300pF	332	B	B	B	B	D	C	C	C	C	D	D	D	D	D	D
3900pF	392	B	B	B	B	D	C	C	C	C	D	D	D	D	D	D
4700pF	472	B	B	B	B	D	C	C	C	C	G	D	D	D	D	D
5600pF	562	B	B	B	B		C	C	C	C	G	D	D	D	D	D
6800pF	682	C	C	C	C		C	C	C	C	G	D	D	D	D	D
8200pF	822	D	D	D	D		C	C	C	C	G	D	D	D	D	
0.010uF	103	D	D	D	D		C	C	C	C	G	D	D	D	D	
0.012uF	123	P	P	P	P		D	D	D	D		D	D	D	D	
0.015uF	153	P	P	P	P		D	D	D	D		D	D	D	D	
0.018uF	183	P	P	P	P							D	D	D	D	
0.022uF	223	P	P	P	P							D	D	D	D	
0.027uF	273	P	P		P							D	D	D	D	
0.033uF	333	P	P		P							D	D	D	D	
0.039uF	393	P	P													



CAPACITANCE RANGE (NPO DIELECTRIC)

		NPO								
SIZE		1825			2220			2225		
RATED VOLTAGE		50	100	200	50	100	200	50	100	200
CAP. RANGE										
10pf	100	K	K	K	K	K	K	K	K	K
12pF	120	K	K	K	K	K	K	K	K	K
15pF	150	K	K	K	K	K	K	K	K	K
18pF	180	K	K	K	K	K	K	K	K	K
22pF	220	K	K	K	K	K	K	K	K	K
27pF	270	K	K	K	K	K	K	K	K	K
33pF	330	K	K	K	K	K	K	K	K	K
39pF	390	K	K	K	K	K	K	K	K	K
47pF	470	K	K	K	K	K	K	K	K	K
56pF	560	K	K	K	K	K	K	K	K	K
68pF	680	K	K	K	K	K	K	K	K	K
82pF	820	K	K	K	K	K	K	K	K	K
100pF	101	K	K	K	K	K	K	K	K	K
120pF	121	K	K	K	K	K	K	K	K	K
150pF	151	K	K	K	K	K	K	K	K	K
180pF	181	K	K	K	K	K	K	K	K	K
220pF	221	K	K	K	K	K	K	K	K	K
270pF	271	K	K	K	K	K	K	K	K	K
330pF	331	K	K	K	K	K	K	K	K	K
390pF	391	K	K	K	K	K	K	K	K	K
470pF	471	K	K	K	K	K	K	K	K	K
560pF	561	K	K	K	K	K	K	K	K	K
680pF	681	K	K	K	K	K	K	K	K	K
820pF	821	K	K	K	K	K	K	K	K	K
1000pF	102	K	K	K	K	K	K	K	K	K
1200pF	122	K	K	K	K	K	K	K	K	K
1500pF	152	K	K	K	K	K	K	K	K	K
1800pF	182	K	K	K	K	K	K	K	K	K
2200pF	222	K	K	K	K	K	K	K	K	K
2700pF	272	K	K	K	K	K	K	K	K	K
3300pF	332	K	K	K	K	K	K	K	K	K
3900pF	392	K	K	K	K	K	K	K	K	K
4700pF	472	K	K	K	K	K	K	K	K	K
5600pF	562	K	K	K	K	K	K	K	K	K
6800pF	682	K	K	K	K	K	K	K	K	K
8200pF	822	K	K	K	K	K	K	K	K	K
0.010uF	103	K	K	K	K	K	K	K	K	K
0.012uF	123	K	K	K	K	K	K	K	K	K
0.015uF	153	K	K	K	K	K	K	K	K	K
0.018uF	183	K	K	K	K	K	K	K	K	K
0.022uF	223	K	K	K	K	K	K	K	K	K
0.027uF	273	K	K	K	K	K	K	K	K	K
0.033uF	333	K	K	K	K	K	K	K	K	K
0.039uF	393	K	K	K	K	K	K	K	K	K
0.047uF	473	K	K	K	K	K	M	K	K	M
0.056uF	563	K	K	M	K	K	M	K	K	M
0.068uF	683	K	K	M	K	K	M	K	K	M
0.082uF	823	M	M		M	M		K	K	M
0.1uF	104	M	M		M	M		M	M	
0.12uF	124									





CAPACITANCE RANGE (X7R DIELECTRIC)

DIELECTRIC		X7R														
SIZE		0402					0603					0805				
RATED VOLTAGE		10	16	25	50	100	10/16	25	50	100	200	10/16	25	50	100	200
CAP. RANGE																
100pF	101	E	E	E	E	E	S	S	S	S	X	D	D	D	D	D
120pF	121	E	E	E	E	E	S	S	S	S	X	D	D	D	D	D
150pF	151	E	E	E	E	E	S	S	S	S	X	D	D	D	D	D
180pF	181	E	E	E	E	E	S	S	S	S	X	D	D	D	D	D
220pF	221	E	E	E	E	E	S	S	S	S	X	D	D	D	D	D
270pF	271	E	E	E	E	E	S	S	S	S	X	D	D	D	D	D
330pF	331	E	E	E	E	E	S	S	S	S	X	D	D	D	D	D
390pF	391	E	E	E	E	E	S	S	S	S	X	D	D	D	D	D
470pF	471	E	E	E	E	E	S	S	S	S	X	D	D	D	D	D
560pF	561	E	E	E	E	E	S	S	S	S	X	D	D	D	D	D
680pF	681	E	E	E	E	E	S	S	S	S	X	D	D	D	D	D
820pF	821	E	E	E	E	E	S	S	S	S	X	D	D	D	D	D
1000pF	102	E	E	E	E	E	S	S	S	S	X	D	D	D	D	D
1200pF	122	E	E	E	E	E	S	S	S		X	D	D	D	D	D
1500pF	152	E	E	E	E	E	S	S	S	S	X	D	D	D	D	D
1800pF	182	E	E	E	E	E	S	S	S	S	X	D	D	D	D	D
2200pF	222	E	E	E	E	E	S	S	S	S	X	D	D	D	D	D
2700pF	272	E	E	E	E	E	S	S	S	S	X	D	D	D	D	D
3300pF	332	E	E	E	E	E	S	S	S	S	X	D	D	D	D	D
3900pF	392	E	E	E	E	E	S	S	S	S	X	D	D	D	D	D
4700pF	472	E	E	E	E	E	S	S	S	S	X	D	D	D	D	D
5600pF	562	E	E	E	E		S	S	S	S	X	D	D	D	D	D
6800pF	682	E	E	E	E		S	S	S	S	X	D	D	D	D	D
8200pF	822	E	E	E	E		S	S	S	S	X	D	D	D	D	D
0.010uF	103	E	E	E	E		S	S	S	S	X	D	D	D	D	D
0.012uF	123	E	E	E			S	S	S	X		D	D	D	D	D
0.015uF	153	E	E	E			S	S	S	X		D	D	D	D	D
0.018uF	183	E	E	E			S	S	S	X		D	D	D	D	D
0.022uF	23	E	E	E			S	S	S	X		D	D	D	D	D
0.027uF	273	E	E	E			S	S	S	X		D	D	D	D	D
0.033uF	333	E	E	E			S	S	X	X		D	D	D	D	D
0.039uF	393	E	E	E			S	S	X	X		D	D	D	D	D
0.047uF	473	E	E	E			S	S	X	X		D	D	D	D	D
0.056uF	563	E	E				S	S	X	X		D	D	D	D	D
0.068uF	683	E	E				S	S	X	X		D	D	D	D	D
0.082uF	823	E	E				S	S	X	X		D	D	D	D	D
0.10uF	104	E	E				S	S	X	X		D	D	D	D	D
0.12uF	124						S	X				D	D	D	I	
0.15uF	154						S	X				D	D	D	I	
0.18uF	184						S	X				D	D	D	I	
0.22uF	224						S	X				D	D	D	I	
0.27uF	274						X	X				I	I	I		
0.33uF	334						X	X				I	I	I		
0.39uF	394						X	X				I	I	I		
0.47uF	474						X	X				I	I	I		
0.56uF	564						X					I	I			
0.68uF	684						X					I	I			
0.82uF	824						X					I	I			
1.0uF	105						X					I	I	I		
1.5uF	155											I	I			
2.2uF	225											I	I			
4.7uF	475											I				



CAPACITANCE RANGE (X7R DIELECTRIC)

DIELECTRIC		X7R																			
SIZE		1206					1210					1812					2220				
RATED VOLTAGE		10/16	25	50	100	200	10/16	25	50	100	200	10/16	25	50	100	200	25	50	100	200	
CAP. RANGE																					
100pF	101				D	D															
120pF	121				D	D															
150pF	151	D	D	D	D	D															
180pF	181	D	D	D	D	D															
220pF	221	D	D	D	D	D															
270pF	271	D	D	D	D	D															
330pF	331	D	D	D	D	D															
390pF	391	D	D	D	D	D															
470pF	471	D	D	D	D	D															
560pF	561	D	D	D	D	D															
680pF	681	D	D	D	D	D															
820pF	821	D	D	D	D	D															
1000pF	102	D	D	D	D	D	C	C	C	C	C	D	D	D	D	D	K	K	K	K	
1200pF	122	D	D	D	D	D	C	C	C	C	C	D	D	D	D	D	K	K	K	K	
1500pF	152	D	D	D	D	D	C	C	C	C	C	D	D	D	D	D	K	K	K	K	
1800pF	182	D	D	D	D	D	C	C	C	C	C	D	D	D	D	D	K	K	K	K	
2200pF	222	D	D	D	D	D	C	C	C	C	C	D	D	D	D	D	K	K	K	K	
2700pF	272	D	D	D	D	D	C	C	C	C	C	D	D	D	D	D	K	K	K	K	
3300pF	332	D	D	D	D	D	C	C	C	C	C	D	D	D	D	D	K	K	K	K	
3900pF	392	D	D	D	D	D	C	C	C	C	C	D	D	D	D	D	K	K	K	K	
4700pF	472	D	D	D	D	D	C	C	C	C	C	D	D	D	D	D	K	K	K	K	
5600pF	562	D	D	D	D	D	C	C	C	C	C	D	D	D	D	D	K	K	K	K	
6800pF	682	D	D	D	D	D	C	C	C	C	C	D	D	D	D	D	K	K	K	K	
8200pF	822	D	D	D	D	D	C	C	C	C	C	D	D	D	D	D	K	K	K	K	
0.010uF	103	D	D	D	D	D	C	C	C	C	C	D	D	D	D	D	K	K	K	K	
0.012uF	123	D	D	D	D	D	C	C	C	C	C	D	D	D	D	D	K	K	K	K	
0.015uF	153	D	D	D	D	D	C	C	C	C	C	D	D	D	D	D	K	K	K	K	
0.018uF	183	D	D	D	D	D	C	C	C	C	C	D	D	D	D	D	K	K	K	K	
0.022uF	223	D	D	D	D	D	C	C	C	C	C	D	D	D	D	D	K	K	K	K	
0.027uF	273	D	D	D	D	D	C	C	C	C	C	D	D	D	D	D	K	K	K	K	
0.033uF	333	D	D	D	D	G	C	C	C	C	C	D	D	D	D	D	K	K	K	K	
0.039uF	393	D	D	D	D	G	C	C	C	C	C	D	D	D	D	D	K	K	K	K	
0.047uF	473	D	D	D	D	G	C	C	C	C	C	D	D	D	D	D	K	K	K	K	
0.056uF	563	D	D	D	D	G	C	C	C	C	C	D	D	D	D	D	K	K	K	K	
0.068uF	683	D	D	D	D	G	C	C	C	C	C	D	D	D	D	D	K	K	K	K	
0.082uF	823	D	D	D	D	G	C	C	C	C	G	D	D	D	D	D	K	K	K	K	
0.10uF	104	D	D	D	D	G	C	C	C	C	G	D	D	D	D	D	K	K	K	K	
0.12uF	124	D	D	D	D		C	C	C	C	G	D	D	D	D	D	K	K	K	K	
0.15uF	154	C	C	C	C		C	C	C	D	G	D	D	D	D	D	K	K	K	K	
0.18uF	184	C	C	C	C	G	C	C	C	D	M	D	D	D	D	D	K	K	K	K	
0.22uF	224	C	C	C	G		C	C	C	D	M	D	D	D	D	D	K	K	K	K	
0.27uF	274	C	C	D	G		C	C	C	G	M	D	D	D	D	D	K	K	K	K	
0.33uF	334	C	C	D	G		C	C	C	G	M	D	D	D	D	D	K	K	K	K	
0.39uF	394	C	J	J	G		C	C	D	M	M	D	D	D	D	D	K	K	K	K	
0.47uF	474	J	J	J	G		C	C	D	M	M	D	D	D	D	D	K	K	K	K	
0.56uF	564	J	J	P	P		D	D	D	M	M	D	D	D	D	D	K	K	K	K	
0.68uF	684	J	J	P	P		D	D	D	K	M	D	D	D	D	D	K	K	K	K	
0.82uF	824	J	J	P	P		D	D	D	K		D	D	D	D	D	K	K	K	K	
1.0uF	105	J	J	P	P		D	D	D	K		D	D	D	D	D	K	K	K	K	
1.5uF	155	J	P				K	G	M	M							K				
2.2uF	225	J	P	P			K	G	M	M							M	M			
3.3uF	335	P	P				K	G	M												
4.7uF	475	P	P				M	M	M												
6.8uF	685																				
10uF	106	P	P				K	M	M												
22uF	226	P					M														
47uF	476																				



■ CAPACITANCE RANGE (X5R DIELECTRIC)

DIELECTRIC		X5R																								
SIZE		0402					0603					0805					1206					1210				
RATED VOLTAGE		6.3	10	16	25	6.3	10	16	25	50	6.3/10	16	25	50	100	6.3	10	16	25	50	6.3	10	16	25	50	
CAP. RANGE																										
0.027uF	273			E																						
0.033uF	333			E																						
0.039uF	393			E																						
0.047uF	473			E																						
0.056uF	563		E	E																						
0.068uF	683		E	E																						
0.082uF	823	E	E	E																						
0.10uF	104	E	E	E	E																					
0.15uF	154	E	E	E	E	E																				
0.22uF	224	E	C	E	E																					
0.27uF	274							X	X	X																
0.33uF	334	E	E			X	X	X	X	X																
0.39uF	394					X	X	X	X	X																
0.47uF	474	E	E			X	X	X	X	X																
0.68uF	684	E	E			X	X	X	X	X																
0.82uF	824					X	X	X	X	X																
1.0uF	105	E	E			X	X	X	X	X	D	D	D	D	D											
1.5uF	155					X					I	I	I													
2.2uF	225					X	X	X			I	I	I			J	J					K	K			
3.3uF	335					X					I	I	I			J	J	P				K	K			
4.7uF	475					X										P	P	P	P				K	K	K	
6.8uF	685															P	P	P								
10uF	106															P	P	P					K	K	K	
22uF	226																									

■ CAPACITANCE RANGE (Y5V DIELECTRIC)

DIELECTRIC		Y5V								
SIZE		0402					0603			
RATED VOLTAGE		6.3	10	16	25	50	10	16	25	50
CAP. RANGE										
0.010uF	103		E	E	E	E	S	S	S	S
0.015uF	153		E	E	E	E	S	S	S	X
0.022uF	23		E	E	E	E	S	S	S	X
0.033uF	333		E	E	E	E	S	S	S	X
0.047uF	473		E	E	E		S	S	S	X
0.068uF	683		E	E	E		S	S	S	X
0.10uF	104		E	E	E		S	S	S	S
0.15uF	154		E	E			S	S	S	S
0.22uF	224	E	E	E			S	S	S	S
0.33uF	334	E	E	E			S	S	S	
0.47uF	474						S	S	X	X
0.68uF	684						S	X		
1.0uF	105						S	X	X	
2.2uF	225						S	X		
4.7uF	475						X			



PACKAGING STYLE AND QUANTITY

SIZE	THICKNESS (mm)/SYMBOL		PAPER TAPE		PLASTIC TAPE	
			7" REEL	13" REEL	7" REEL	13" REEL
0402 (1005)	0.50±0.20	E	10k	-	-	-
0603 (1608)	0.80±0.07	S	4k	15k	-	-
	0.80±0.30	X	4k	15k	-	-
0805 (2012)	0.60±0.10	A	4k	15k	-	-
	0.80±0.10	B	4k	15k	-	-
	1.25±0.10	D	-	-	3k	10k
	1.25±0.30	I	-	-	3k	10k
1206 (3216)	0.80±0.10	B	4k	4k	-	-
	0.95±0.10	C	-	-	3k	10k
	1.15±0.15	J	-	-	3k	10k
	1.25±0.10	D	-	-	3k	10k
	1.60±0.20	G	-	-	2k	10k
	1.60±0.50	P	-	-	2k	9k
1210 (3225)	0.95±0.10	C	-	-	3k	10k
	01.25±0.10	D	-	-	3k	10k
	01.60±0.20	G	-	-	2k	-
	2.00±0.20	K	-	-	1k	6k
	2.50±0.30	M	-	-	1k	6k
1812 (4532)	1.25±0.10	D	-	-	1k	5k
	1.60±0.20	G	-	-	1k	-
	2.00±0.20	K	-	-	1k	-
	2.50±0.50	M	-	-	0.5k	3k
1825 (4563)	2.00±0.20	K	-	-	1k	-
2220 (5750)	2.50±0.30	M	-	-	0.5k	-
2225 (5763)	2.80±0.30	U	-	-	0.5k	-

UNIT: PIECES



RELIABILITY TEST CONDITIONS AND REQUIREMENTS

NO.	ITEM	TEST CONDITION	REQUIREMENTS																																																																													
1.	Visual and Mechanical	----	- No remarkable defect. - Dimensions to conform to individual specification sheet.																																																																													
2.	Capacitance	Class I: (NPO) $\leq 1000\mu\text{F}$, $1.0 \pm 0.2\text{Vrms}$ $1\text{MHz} \pm 10\%$ $> 1000\mu\text{F}$, $1.0 \pm 0.2\text{Vrms}$ $1\text{KHz} \pm 10\%$ Class II: (X7R, X7E, X6S, X5R, Y5V) $C \leq 10\mu\text{F}$, $1.0 \pm 0.2\text{Vrms}$ $1\text{KHz} \pm 10\%$ ** $C > 10\mu\text{F}$, $0.5 \pm 0.2\text{Vrms}$ $120\text{Hz} \pm 20\%$ ** Test condition: $0.5 \pm 0.2\text{Vrms}$, $1\text{KHz} \pm 10\%$ X7R: $0805 = 106(6.3\text{V} \& 10\text{V})$ X5R: $01\text{R5} \geq 103$, $0201 \geq 224(6.3\text{V}, 10\text{V}) \#1$, $0402 \geq 475(6.3\text{V}, 16\text{V})$, $0402 \geq 225(10\text{V})$, $0603 = 106(6.3\text{V}, 10\text{V})$, TT18X $\geq 475(10\text{V})$, TT15X series X6S: $0201 \geq 104(6.3\text{V})$, $0402 \geq 225(6.3\text{V})$, $0603 \geq 106(6.3\text{V})$, #1 Excluding $0201\text{X}105\text{K6R3}(1.0 \pm 0.2\text{Vrms}, 1\text{KHz} \pm 10\%)$	- Shall not exceed the limits given in the detailed spec. NPO: $\text{Cap} \geq 30\mu\text{F}$, $\text{Qz} \geq 1000$; $\text{Cap} \geq 30\mu\text{F}$, $\text{Qz} \geq 400 + 20\text{C}$ X7R, X5R, X6S: <table border="1" style="width: 100%; border-collapse: collapse; font-size: 8px;"> <thead> <tr> <th>RATED VOL.</th> <th>D.F. \leq</th> <th>EXCEPTION OF D.F. \leq</th> </tr> </thead> <tbody> <tr> <td rowspan="2">$\geq 100\text{V}$</td> <td>$\leq 2.5\%$</td> <td>$\leq 3\%$ 1206 $\geq 0.47\mu\text{F}$</td> </tr> <tr> <td>$\leq 5\%$</td> <td>0805 $\geq 0.1\mu\text{F}$, 0603 $\geq 0.068\mu\text{F}$, 1206 $> 1\mu\text{F}$; 1210 $\geq 2.2\mu\text{F}$; TT series</td> </tr> <tr> <td rowspan="2">50V</td> <td>$\leq 2.5\%$</td> <td>$\leq 3\%$ 0201 (50V); 0603 $\geq 0.047\mu\text{F}$; 0805 $\geq 0.18\mu\text{F}$; 1206 $\geq 0.47\mu\text{F}$</td> </tr> <tr> <td>$\leq 5\%$</td> <td>$\leq 5\%$ 1206 $\geq 0.47\mu\text{F}$</td> </tr> <tr> <td rowspan="2">35V</td> <td>$\leq 2.5\%$</td> <td>$\leq 10\%$ 0402 $\geq 0.1\mu\text{F}$; 0603 $> 0.1\mu\text{F}$; 0805 $\geq 1\mu\text{F}$; 1206 $\geq 2.2\mu\text{F}$; 1210 $\geq 10\mu\text{F}$; TT series</td> </tr> <tr> <td>$\leq 3.5\%$</td> <td>$\leq 10\%$ 0201 $\geq 0.01\mu\text{F}$; 0805 $\geq 1\mu\text{F}$; 1210 $\geq 10\mu\text{F}$</td> </tr> <tr> <td rowspan="2">25V</td> <td>$\leq 2.5\%$</td> <td>$\leq 7\%$ 0603 $\geq 0.33\mu\text{F}$; 1206 $\geq 4.7\mu\text{F}$</td> </tr> <tr> <td>$\leq 3.5\%$</td> <td>$\leq 10\%$ 0201 $\geq 0.1\mu\text{F}$; 0402 $\geq 0.10\mu\text{F}$; 0603 $\geq 0.47\mu\text{F}$; 0805 $\geq 2.2\mu\text{F}$; 1206 $\geq 6.8\mu\text{F}$; 1210 $\geq 22\mu\text{F}$; TT series</td> </tr> <tr> <td rowspan="2">16V</td> <td>$\leq 2.5\%$</td> <td>$\leq 12.5\%$ 0402 $\geq 0.47\mu\text{F}$</td> </tr> <tr> <td>$\leq 3.5\%$</td> <td>$\leq 5\%$ 0201 $\geq 0.01\mu\text{F}$; 0402 $\geq 0.033\mu\text{F}$; 0603 $\geq 0.15\mu\text{F}$; 0805 $\geq 0.68\mu\text{F}$; 1206 $\geq 2.2\mu\text{F}$; 1210 $\geq 4.7\mu\text{F}$</td> </tr> <tr> <td rowspan="2">10V</td> <td>$\leq 2.5\%$</td> <td>$\leq 10\%$ 0201 $\geq 0.1\mu\text{F}$; 0402 $\geq 0.22\mu\text{F}$; 0603 $\geq 0.68\mu\text{F}$; 0805 $\geq 2.2\mu\text{F}$; 1206 $\geq 4.7\mu\text{F}$; 1210 $\geq 22\mu\text{F}$; TT series</td> </tr> <tr> <td>$\leq 5\%$</td> <td>$\leq 10\%$ 0201 $\geq 0.012\mu\text{F}$; 0402 $\geq 0.33\mu\text{F}$ (0402/X7R $\geq 0.22\mu\text{F}$); TT series</td> </tr> <tr> <td rowspan="2">6.3V</td> <td>$\leq 2.5\%$</td> <td>$\leq 15\%$ 0603 $\geq 0.33\mu\text{F}$; 0805 $\geq 2.2\mu\text{F}$; 1206 $\geq 2.2\mu\text{F}$; 1210 $\geq 22\mu\text{F}$; 01R5</td> </tr> <tr> <td>$\leq 5\%$</td> <td>$\leq 15\%$ 0201 $\geq 0.1\mu\text{F}$; 0402 $\geq 1\mu\text{F}$</td> </tr> <tr> <td rowspan="2">4V</td> <td>$\leq 2.5\%$</td> <td>$\leq 20\%$ 0201 $\geq 0.1\mu\text{F}$; 0402 $\geq 1\mu\text{F}$; 0603 $\geq 10\mu\text{F}$; 0805 $\geq 4.7\mu\text{F}$; 1206 $\geq 47\mu\text{F}$; 1210 $\geq 100\mu\text{F}$; TT series</td> </tr> <tr> <td>$\leq 15\%$</td> <td>$\leq 20\%$ 0402 $\geq 2.2\mu\text{F}$</td> </tr> </tbody> </table> 75V: <table border="1" style="width: 100%; border-collapse: collapse; font-size: 8px;"> <thead> <tr> <th>RATED VOL.</th> <th>D.F. \leq</th> <th>EXCEPTION OF D.F. \leq</th> </tr> </thead> <tbody> <tr> <td>$\geq 50\text{V}$</td> <td>$\leq 5\%$</td> <td>$\leq 7\%$ 0603 $\geq 0.1\mu\text{F}$; 0805 $\geq 0.47\mu\text{F}$; 1206 $\geq 4.7\mu\text{F}$; TT series</td> </tr> <tr> <td></td> <td></td> <td>$\leq 12.5\%$ 1210 $\geq 6.8\mu\text{F}$</td> </tr> <tr> <td>35V</td> <td>$\leq 7\%$</td> <td>---</td> </tr> <tr> <td rowspan="2">50V</td> <td>$\leq 2.5\%$</td> <td>0402 $\geq 0.047\mu\text{F}$; 0603 $\geq 0.1\mu\text{F}$; 0805 $\geq 0.33\mu\text{F}$; 1206 $\geq 1\mu\text{F}$; 1210 $\geq 4.7\mu\text{F}$</td> </tr> <tr> <td>$\leq 3.5\%$</td> <td>$\leq 9\%$ 0402 $\geq 0.068\mu\text{F}$; 0603 $\geq 0.47\mu\text{F}$; 1206 $\geq 4.7\mu\text{F}$; 1210 $\geq 22\mu\text{F}$; TT series</td> </tr> <tr> <td>16V (C < 1.0μF)</td> <td>$\leq 7\%$</td> <td>$\leq 9\%$ 0402 $\geq 0.068\mu\text{F}$; 0603 $\geq 0.68\mu\text{F}$</td> </tr> <tr> <td></td> <td></td> <td>$\leq 12.5\%$ 0402 $\geq 0.22\mu\text{F}$</td> </tr> <tr> <td rowspan="2">16V (C < 1.0μF)</td> <td>$\leq 2.5\%$</td> <td>$\leq 9\%$ 0603 $\geq 2.2\mu\text{F}$; 0805 $\geq 3.3\mu\text{F}$; 1206 $\geq 10\mu\text{F}$; 1210 $\geq 22\mu\text{F}$; 1812 $\geq 47\mu\text{F}$; TT series</td> </tr> <tr> <td>$\leq 3.5\%$</td> <td>$\leq 12.5\%$ 0402 $\geq 0.47\mu\text{F}$</td> </tr> <tr> <td>10V</td> <td>$\leq 12.5\%$</td> <td>$\leq 20\%$ 0402 $\geq 0.47\mu\text{F}$</td> </tr> <tr> <td>6.3V</td> <td>$\leq 20\%$</td> <td>---</td> </tr> </tbody> </table>	RATED VOL.	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5.	Insulation Resistance	- To apply rated voltage for max. 120 seconds	$\geq 10\text{G}\Omega$ or $\text{RxC} \geq 500\Omega\text{F}$ Whichever is smaller Class II: (X7R, X5R, X6S, Y5V) <table border="1" style="width: 100%; border-collapse: collapse; font-size: 8px;"> <thead> <tr> <th>RATED VOLTAGE</th> <th>INSULATION RESISTANCE</th> </tr> </thead> <tbody> <tr> <td>100V: X7R</td> <td rowspan="6">10GΩ or $\text{RxC} \geq 100\Omega\text{F}$ whichever is smaller.</td> </tr> <tr> <td>50V: 0402 $\geq 0.01\mu\text{F}$; 0603 $\geq 1\mu\text{F}$; 0805 $\geq 1\mu\text{F}$; 1206 $\geq 4.7\mu\text{F}$; 1210 $\geq 4.7\mu\text{F}$</td> </tr> <tr> <td>35V: 0805 $\geq 2.2\mu\text{F}$; 1206 $\geq 2.2\mu\text{F}$; 1210 $\geq 10\mu\text{F}$</td> </tr> <tr> <td>25V: 0402 $\geq 1\mu\text{F}$; 0603 $\geq 2.2\mu\text{F}$; 0805 $\geq 2.2\mu\text{F}$; 1206 $\geq 10\mu\text{F}$; 1210 $\geq 10\mu\text{F}$</td> </tr> <tr> <td>16V: 0201 $\geq 0.1\mu\text{F}$; 0402 $\geq 0.22\mu\text{F}$; 0603 $\geq 1\mu\text{F}$</td> </tr> <tr> <td>10V: 00201 $\geq 47\text{nF}$; 0402 $\geq 0.47\mu\text{F}$; 0603 $\geq 0.47\mu\text{F}$; 0805 $\geq 2.2\mu\text{F}$; 1206 $\geq 0.47\mu\text{F}$; 1210 $\geq 0.47\mu\text{F}$; 6.4V; 4V; TT series</td> </tr> <tr> <td>6.4V; 4V; TT series</td> <td rowspan="6">RxC $\geq 100\Omega\text{F}$</td> </tr> <tr> <td>100V: X7R</td> </tr> <tr> <td>50V: 0402 $\geq 0.1\mu\text{F}$; 0603 $\geq 2.2\mu\text{F}$; 0805 $\geq 10\mu\text{F}$; 1206 $\geq 10\mu\text{F}$</td> </tr> <tr> <td>35V: 0603 $\geq 1\mu\text{F}$</td> </tr> <tr> <td>25V: 0201 $\geq 0.1\mu\text{F}$; 0402 $\geq 0.22\mu\text{F}$; 0603 $\geq 10\mu\text{F}$; 0805 $\geq 10\mu\text{F}$; 1206 $\geq 22\mu\text{F}$</td> </tr> <tr> <td>16V: 0603 $\geq 10\mu\text{F}$</td> </tr> <tr> <td>10V: 0201 $> 0.1\mu\text{F}$; 0603 $\geq 10\mu\text{F}$; 0805 $\geq 47\mu\text{F}$; TT21 $> 4.7\mu\text{F}$</td> </tr> <tr> <td>6.3V: 0201 $\geq 0.1\mu\text{F}$; 0603 $> 4.7\mu\text{F}$; 1206 $\geq 10\mu\text{F}$</td> </tr> <tr> <td>4V: 0603 $\geq 22\mu\text{F}$; 0805 $\geq 47\mu\text{F}$; 1206 $\geq 100\mu\text{F}$</td> </tr> </tbody> </table>	RATED VOLTAGE	INSULATION RESISTANCE	100V: X7R	10G Ω or $\text{RxC} \geq 100\Omega\text{F}$ whichever is smaller.	50V: 0402 $\geq 0.01\mu\text{F}$; 0603 $\geq 1\mu\text{F}$; 0805 $\geq 1\mu\text{F}$; 1206 $\geq 4.7\mu\text{F}$; 1210 $\geq 4.7\mu\text{F}$	35V: 0805 $\geq 2.2\mu\text{F}$; 1206 $\geq 2.2\mu\text{F}$; 1210 $\geq 10\mu\text{F}$	25V: 0402 $\geq 1\mu\text{F}$; 0603 $\geq 2.2\mu\text{F}$; 0805 $\geq 2.2\mu\text{F}$; 1206 $\geq 10\mu\text{F}$; 1210 $\geq 10\mu\text{F}$	16V: 0201 $\geq 0.1\mu\text{F}$; 0402 $\geq 0.22\mu\text{F}$; 0603 $\geq 1\mu\text{F}$	10V: 00201 $\geq 47\text{nF}$; 0402 $\geq 0.47\mu\text{F}$; 0603 $\geq 0.47\mu\text{F}$; 0805 $\geq 2.2\mu\text{F}$; 1206 $\geq 0.47\mu\text{F}$; 1210 $\geq 0.47\mu\text{F}$; 6.4V; 4V; TT series	6.4V; 4V; TT series	RxC $\geq 100\Omega\text{F}$	100V: X7R	50V: 0402 $\geq 0.1\mu\text{F}$; 0603 $\geq 2.2\mu\text{F}$; 0805 $\geq 10\mu\text{F}$; 1206 $\geq 10\mu\text{F}$	35V: 0603 $\geq 1\mu\text{F}$	25V: 0201 $\geq 0.1\mu\text{F}$; 0402 $\geq 0.22\mu\text{F}$; 0603 $\geq 10\mu\text{F}$; 0805 $\geq 10\mu\text{F}$; 1206 $\geq 22\mu\text{F}$	16V: 0603 $\geq 10\mu\text{F}$	10V: 0201 $> 0.1\mu\text{F}$; 0603 $\geq 10\mu\text{F}$; 0805 $\geq 47\mu\text{F}$; TT21 $> 4.7\mu\text{F}$	6.3V: 0201 $\geq 0.1\mu\text{F}$; 0603 $> 4.7\mu\text{F}$; 1206 $\geq 10\mu\text{F}$	4V: 0603 $\geq 22\mu\text{F}$; 0805 $\geq 47\mu\text{F}$; 1206 $\geq 100\mu\text{F}$																																																										
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7.	Adhesive Strength of Termination	- Pressurizing force: 5N (≤ 0603) and 10N (> 0603) - Test time: 10 ± 1 sec.	- No remarkable damage or removal of the terminations.																																																																													

RELIABILITY TEST CONDITIONS AND REQUIREMENTS

NO.	ITEM	TEST CONDITION	REQUIREMENTS																																																													
8.	Vibration Resistance	- Vibration frequency: 10-55 Hz/min. - Total amplitude: 1.5mm - Test time: 6hrs. (Two hrs each in three mutually perpendicular directions.) - Measurement to be made after keeping at room temp. for 24±2 hrs.	- No remarkable damage - Cap change and Q/D.F.: To meet initial spec.																																																													
9.	Solderability	- Solder temperature: 235±5°C - Dipping time 2±0.5 sec.	- 95% min. coverage of all metalized area.																																																													
10.	Bending Test	- 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 : 5 mm and then the pressure shall be maintained for 5±1 sec. - Measurement to be made after keeping at room temp. for 24±2 hrs.. **SH21B224_101/SH31B226_100/SH31B106_160/SH31B106_250/SH31B225_500/SH31B474_101/SH31B105_101/SH32B476_6R3/SH32B226_160/SH32B106_250/SH32B225_500/SH32B475_500/SH32B106_500/SH32B225_101/SH21B105_500/SH21B225_250/SH21B475_160	- No remarkable damage - Cap change: NPO: within ±2.5% or ±0.5pF whichever is larger X7R, X5R, X6S : within ±12.5% Y5V: within ±30% (This capacitance change the means change of capacitance under specified flexure of substrate from the capacitance measured before the test.)																																																													
11.	Resistance to Soldering Heat	- Solder temperature: 260±5°C - Dipping time: 10±1sec - Preheating: 120 to 150°C for 1 minute before immerse the capacitor in a eutectic solder - Before initial measurement (Class II only): Perform 150+0/-10°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.	- No remarkable damage - Cap change: NPO: within ±2.5% or ±0.5pF whichever is larger X7R, X5R, X6S : within ±7.5% Y5V: within ±20% - Q/D.F., I.R. and dielectric strength: To meet initial requirements. - 25% max. leaching on each edge.																																																													
12.	Temperature Cycle	- Conduct the five cycles according to the temperatures and time. <table border="1" style="margin: 5px auto; border-collapse: collapse;"> <thead> <tr> <th>STEP</th> <th>TEMP. (°C)</th> <th>TIME (MIN.)</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">1</td> <td>Min. operating temp. +0/-3</td> <td style="text-align: center;">30±3</td> </tr> <tr> <td style="text-align: center;">2</td> <td>Room Temp</td> <td style="text-align: center;">2~3</td> </tr> <tr> <td style="text-align: center;">3</td> <td>Min. operating temp. +0/-3</td> <td style="text-align: center;">30±3</td> </tr> <tr> <td style="text-align: center;">4</td> <td>Room Temp</td> <td style="text-align: center;">2~3</td> </tr> </tbody> </table> - Before initial measurement (class ii only): perform 150+0/-10°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	STEP	TEMP. (°C)	TIME (MIN.)	1	Min. operating temp. +0/-3	30±3	2	Room Temp	2~3	3	Min. operating temp. +0/-3	30±3	4	Room Temp	2~3	- No remarkable damage - Cap change: NPO: within ±2.5% or ±0.25pF whichever is larger X7R, X5R, X6S : within ±7.5% Y5V: within ±20% - Q/D.F., I.R. and dielectric strength: To meet initial requirements.																																														
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Humidity (Damp Heat) Steady State	- Test temp.: 40±2°C - Humidity 90~95% RH - Test time: 500+24/-0 hrs - Before initial measurement (Class II only): Perform 150+0/-10C 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.	- No remarkable damage - Cap change: NPO: within ±5% or ±0.5pF whichever is larger X7R, X5R, X6S: ≥10V**, within ±12.5%; ≤6.3V within ±25%; TT series & C± 1µF, within ±25% **10V: 0603≥4.7µF;0402≥1µF;0201≥0.1µF, within ±25%; Y5V: ≥10V, within ±30%; ≤6.3V, within +30/-40% - Q/D.F. value: NPO: More than 30pF Q≥350, 10pF≤C≤30pF, Q≥275+2.5C Less than 10pF Q≥200+10C X7R, X5R, X6S: <table border="1" style="margin: 5px auto; border-collapse: collapse;"> <thead> <tr> <th>RATED</th> <th>D.F. ≤</th> <th>EXCEPTION OF D.F. ≤</th> </tr> </thead> <tbody> <tr> <td>≥100V</td> <td>≤3%</td> <td>≤6% 1206≥0.47µF ≤7.5% 0805>0.1µF; 0603≥0.068µF; 1206>1µF; 1210≥2.2µF; TT series</td> </tr> <tr> <td>≥50V</td> <td>≤3%</td> <td>≤6% 0201(50V); 0603≥0.047µF; 0805≥0.18µF; 1206≥0.47µF ≤10% 0201(50V); 0603≥0.047µF; 0805≥0.18µF; 1206≥0.47µF ≤20% 0402≥0.1µF; 0603>0.1µF; 0805≥1µF; 1206≥2.2µF; 1210≥10µF; TT series</td> </tr> <tr> <td>35V</td> <td>≤5%</td> <td>≤20% 1210≥0.047µF</td> </tr> <tr> <td>25V</td> <td>≤5%</td> <td>≤10% 0201≥0.01µF; 0805≥0.01µF; 1210≥10µF ≤14% 0603≥0.33µF; 1206≥4.7µF</td> </tr> <tr> <td>16V</td> <td>≤5%</td> <td>≤15% 0201≥0.1µF; 0402≥0.10µF; 0603≥0.47µF; 0805≥2.2µF; 1206≥6.8µF; 1210≥22µF; TT series ≤10% 0603≥0.5µF; 0805≥0.68µF; 1206≥2.2µF; 1210≥4.7µF</td> </tr> <tr> <td>10V</td> <td>≤7.5%</td> <td>≤15% 0201≥0.01µF; 0402≥0.33µF (0402/X7R≥0.22µF); 0603≥0.33µF; 0805≥2.2µF; 1206≥2.2µF; 1210≥22µF</td> </tr> <tr> <td>6.3V</td> <td>≤15%</td> <td>≤20% 0201≥0.1µF; 0402≥1µF; 0603≥10µF; 0805≥4.7µF; 1206≥47µF; 1210≥100µF; TT series</td> </tr> <tr> <td>4V</td> <td>≤20%</td> <td>---</td> </tr> </tbody> </table> Y5V: <table border="1" style="margin: 5px auto; border-collapse: collapse;"> <thead> <tr> <th>RATED VOL.</th> <th>D.F. ≤</th> <th>EXCEPTION OF D.F. ≤</th> </tr> </thead> <tbody> <tr> <td>≥50V</td> <td>≤7.5%</td> <td>≤10% 0603≥0.1µF; 0805≥0.47µF; 1206≥4.7µF ≤20% 1201≥6.8µF</td> </tr> <tr> <td>35V</td> <td>≤10%</td> <td>---</td> </tr> <tr> <td>25V</td> <td>≤7.5%</td> <td>≤10% 0402≥0.047µF; 0603≥0.1µF; 0805≥0.33µF; 1206≥1µF; 1210≥4.7µF ≤15% 0402≥0.068µF; 0603≥0.47µF; 1206≥4.7µF; 1210≥22µF</td> </tr> <tr> <td>16V (C<1.0µF)</td> <td>≤10%</td> <td>≤12.5% 0402≥0.068µF; 0603≥0.68µF ≤20% 0402≥2.2µF</td> </tr> <tr> <td>16V (C≥1.0µF)</td> <td>≤12.5%</td> <td>≤20% 0603≥2.2µF; 0805≥3.3µF; 1206≥10µF; 1210≥22µF; 1812≥47µF;</td> </tr> <tr> <td>10V</td> <td>≤20%</td> <td>≤30% 0402≥0.47µF</td> </tr> <tr> <td>10V</td> <td>≤20%</td> <td>---</td> </tr> </tbody> </table> *I.R.: ≥10V, 1GΩ OR 50 Ω-F whichever is smaller Class II (X7R, X5R, X6S, Y5V): <table border="1" style="margin: 5px auto; border-collapse: collapse;"> <thead> <tr> <th>RATED VOL.</th> <th>INSULATION RESISTANCE</th> </tr> </thead> <tbody> <tr> <td>100V: X7R</td> <td rowspan="10" style="text-align: center; vertical-align: middle;">1GΩ or RxCs: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≥0.1µF; 0402≥0.22µF; 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; TT series; All X6S items</td> </tr> </tbody> </table>	RATED	D.F. ≤	EXCEPTION OF D.F. ≤	≥100V	≤3%	≤6% 1206≥0.47µF ≤7.5% 0805>0.1µF; 0603≥0.068µF; 1206>1µF; 1210≥2.2µF; TT series	≥50V	≤3%	≤6% 0201(50V); 0603≥0.047µF; 0805≥0.18µF; 1206≥0.47µF ≤10% 0201(50V); 0603≥0.047µF; 0805≥0.18µF; 1206≥0.47µF ≤20% 0402≥0.1µF; 0603>0.1µF; 0805≥1µF; 1206≥2.2µF; 1210≥10µF; TT series	35V	≤5%	≤20% 1210≥0.047µF	25V	≤5%	≤10% 0201≥0.01µF; 0805≥0.01µF; 1210≥10µF ≤14% 0603≥0.33µF; 1206≥4.7µF	16V	≤5%	≤15% 0201≥0.1µF; 0402≥0.10µF; 0603≥0.47µF; 0805≥2.2µF; 1206≥6.8µF; 1210≥22µF; TT series ≤10% 0603≥0.5µF; 0805≥0.68µF; 1206≥2.2µF; 1210≥4.7µF	10V	≤7.5%	≤15% 0201≥0.01µF; 0402≥0.33µF (0402/X7R≥0.22µF); 0603≥0.33µF; 0805≥2.2µF; 1206≥2.2µF; 1210≥22µF	6.3V	≤15%	≤20% 0201≥0.1µF; 0402≥1µF; 0603≥10µF; 0805≥4.7µF; 1206≥47µF; 1210≥100µF; TT series	4V	≤20%	---	RATED VOL.	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RELIABILITY TEST CONDITIONS AND REQUIREMENTS

NO.	ITEM	TEST CONDITION	REQUIREMENTS																																																													
14.	Humidity (Damp Heat) Load	<ul style="list-style-type: none"> - Test temp.: 40±2°C - Humidity: 90~95%RH - Test time: 500+24/-0 hrs. - To apply voltage: rated voltage. - Before initial measurement (Class II only): To apply test voltage for 1hr at 40°C and then set for 24±2 hrs at room temp. - Measurement to be made after keeping at room temp. for 24±2 hrs. 	<ul style="list-style-type: none"> - No remarkable damage - Cap change: <ul style="list-style-type: none"> NP0: ±7.5% or 0.75pF whichever is larger. X7R, X5R, X6S: ≥10V**, within ±12.5%; ≤6.3V within ±25%; TT series & C_z ≥ 1uF, within ±25% **10V: 0603≥4.7μF; 0402≥1μF; 0201≥0.1μF, within ±25%; Y5V: ≥10V, within ±30%; ≤6.3V, within +30/-40% Q/D.F. value: <ul style="list-style-type: none"> NP0: C≥30pF, Q≥200; C<30pF, Q≥100+10/3C X7R, X5R, X6S: <table border="1" style="width: 100%; border-collapse: collapse; margin-top: 10px;"> <thead> <tr> <th>RATED</th> <th>D.F. ≤</th> <th>EXCEPTION OF D.F. ≤</th> </tr> </thead> <tbody> <tr> <td>≥100V</td> <td>≤3%</td> <td>≤6% 1206≥0.47μF ≤7.5% 0805>0.1μF, 0603≥0.068μF, 1206>1μF; 1210≥2.2μF; TT series</td> </tr> <tr> <td>≥50V</td> <td>≤3%</td> <td>≤6% 0201(50V); 0603>0.047μF; 0805>0.18μF; 1206>0.47μF ≤10% 1210>4.7μF</td> </tr> <tr> <td>35V</td> <td>≤5%</td> <td>≤20% 0402≥0.1μF; 0603>0.1μF; 0805≥1μF; 1206≥2.2μF; 1210≥10μF; TT series ≤10% 0603≥1μF; 0805≥2.2μF; 1206≥2.2μF; 1210≥10μF</td> </tr> <tr> <td>25V</td> <td>≤5%</td> <td>≤10% 0201≥0.01μF; 0805≥0.01μF; 1210≥10μF ≤14% 0603≥0.33μF; 1206≥4.7μF ≤15% 0201≥0.1μF; 0402≥0.10μF; 0603≥0.47μF; 0805≥2.2μF; 1206≥6.8μF; 1210≥22μF; TT series ≤20% 0402≥0.47μF</td> </tr> <tr> <td>16V</td> <td>≤5%</td> <td>≤10% 0603≥0.15μF; 0805≥0.68μF; 1206≥2.2μF, 1210≥4.7μF ≤15% 0201≥0.01μF; 0402≥0.33μF; 0603≥0.68μF; 0805≥2.2μF; 1206≥4.7μF; 1210≥22μF; TT series</td> </tr> <tr> <td>10V</td> <td>≤7.5%</td> <td>≤15% 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>6.3V</td> <td>≤15%</td> <td>≤20% 0201≥0.1μF; 0402≥1μF; TT series; 01R5</td> </tr> <tr> <td>4V</td> <td>≤20%</td> <td>0201≥0.1μF; 0402≥1μF; 0603≥10μF; 0805≥4.7μF; 1206≥47μF; 1210≥100μF; TT series</td> </tr> </tbody> </table> <table border="1" style="width: 100%; border-collapse: collapse; margin-top: 10px;"> <thead> <tr> <th>RATED VOL.</th> <th>D.F. ≤</th> <th>EXCEPTION OF D.F. ≤</th> </tr> </thead> <tbody> <tr> <td>≥50V</td> <td>≤7.5%</td> <td>≤10% 0603≥0.1μF; 0805≥0.47μF; 1206≥4.7μF ≤20% 1201≥6.8μF</td> </tr> <tr> <td>35V</td> <td>≤10%</td> <td>---</td> </tr> <tr> <td>25V</td> <td>≤7.5%</td> <td>≤10% 0402≥0.047μF; 0603≥0.1μF; 0805≥0.33μF; 1206≥1μF; 1210≥4.7μF ≤15% 0402≥0.068μF; 0603≥0.47μF; 1206≥4.7μF; 1210≥22μF</td> </tr> <tr> <td>16V (C<1.0μF)</td> <td>≤10%</td> <td>≤12.5% 0402≥0.068μF; 0603≥0.68μF ≤20% 0402≥2.2μF</td> </tr> <tr> <td>16V (C≥1.0μF)</td> <td>≤12.5%</td> <td>≤20% 0603≥2.2μF; 0805≥3.3μF; 1206≥10μF; 1210≥22μF; 1812≥47μF;</td> </tr> <tr> <td>10V</td> <td>≤20%</td> <td>≤30% 0402≥0.47μF</td> </tr> <tr> <td>6.3V</td> <td>≤30%</td> <td>---</td> </tr> </tbody> </table> <p style="margin-top: 10px;">*I.R.: ≥10V, 1GΩ OR 50 Ω-F whichever is smaller</p> <p style="margin-top: 10px;">Class II (X7R, X5R, X6S, Y5V)</p> <table border="1" style="width: 100%; border-collapse: collapse; margin-top: 10px;"> <thead> <tr> <th>RATED VOL.</th> <th>INSULATION RESISTANCE</th> </tr> </thead> <tbody> <tr> <td>100V: X7R</td> <td rowspan="7" style="text-align: center; vertical-align: middle;">500MΩ or RxC≥5 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≥0.1μF; 0402≥0.22μF; 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; TT series; All X6S items</td> </tr> </tbody> </table>	RATED	D.F. ≤	EXCEPTION OF D.F. ≤	≥100V	≤3%	≤6% 1206≥0.47μF ≤7.5% 0805>0.1μF, 0603≥0.068μF, 1206>1μF; 1210≥2.2μF; TT series	≥50V	≤3%	≤6% 0201(50V); 0603>0.047μF; 0805>0.18μF; 1206>0.47μF ≤10% 1210>4.7μF	35V	≤5%	≤20% 0402≥0.1μF; 0603>0.1μF; 0805≥1μF; 1206≥2.2μF; 1210≥10μF; TT series ≤10% 0603≥1μF; 0805≥2.2μF; 1206≥2.2μF; 1210≥10μF	25V	≤5%	≤10% 0201≥0.01μF; 0805≥0.01μF; 1210≥10μF ≤14% 0603≥0.33μF; 1206≥4.7μF ≤15% 0201≥0.1μF; 0402≥0.10μF; 0603≥0.47μF; 0805≥2.2μF; 1206≥6.8μF; 1210≥22μF; TT series ≤20% 0402≥0.47μF	16V	≤5%	≤10% 0603≥0.15μF; 0805≥0.68μF; 1206≥2.2μF, 1210≥4.7μF ≤15% 0201≥0.01μF; 0402≥0.33μF; 0603≥0.68μF; 0805≥2.2μF; 1206≥4.7μF; 1210≥22μF; TT series	10V	≤7.5%	≤15% 0201≥0.012μF; 0402≥0.33μF (0402/X7R≥0.22μF); 0603≥0.33μF; 0805≥2.2μF; 1206≥2.2μF; 1210≥22μF	6.3V	≤15%	≤20% 0201≥0.1μF; 0402≥1μF; TT series; 01R5	4V	≤20%	0201≥0.1μF; 0402≥1μF; 0603≥10μF; 0805≥4.7μF; 1206≥47μF; 1210≥100μF; TT series	RATED VOL.	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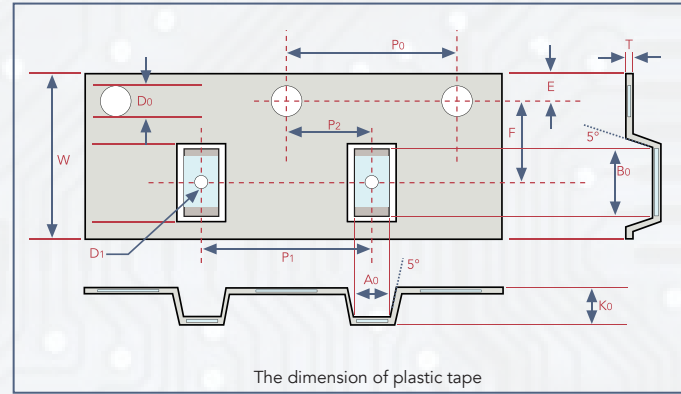
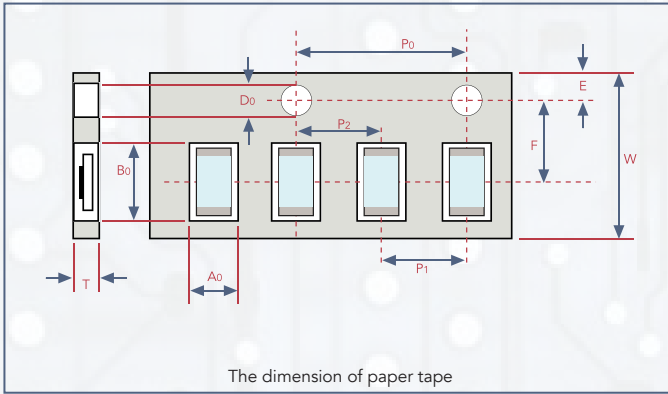


RELIABILITY TEST CONDITIONS AND REQUIREMENTS

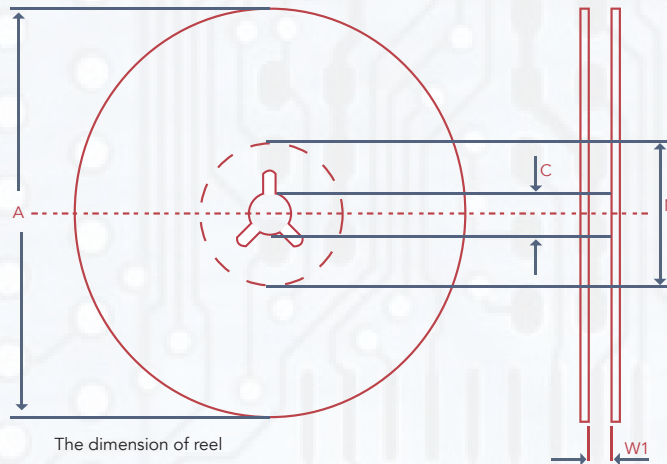
NO.	ITEM	TEST CONDITION	REQUIREMENTS																																																																																			
15.	High Temperature Load (Endurance)	- Test temp.: NP0, X7R/X7E: 125±3°C X6S: 105±3°C X5R, Y5V: 85±3°C - Test time: 1000+24/0 hrs - To apply voltage: (1) ≤6.3V or C≥10μF or TT series:150% of rated voltage. (2) 10V≤Ur<500V: 200% of rated voltage. (3) 500V: 150% of rated voltage. (4) Ur≥630V: 120% of rated voltage. (5) 100% of rated voltage for below range.	- No remarkable damage - Cap change: NP0: ±3.0% or ±0.3pF whichever is larger X7R, X5R, X6S: ≥10V**, within ±12.5%; ≤6.3V within ±25%; TT series & C≥ 1uF, within ±25% **10V: 0.603≥4.7μF; 0402≥1μF; 0201≥0.1μF, within ±25%; Y5V: ≥10V, within ±30%; ≤6.3V, within +30/-40% Q/D.F. value: NP0: More than 30pF, Q≥350 10pF≤C<30pF, Q≥275+2.5C Less than 10pF, Q≥200+10C																																																																																			
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TAPE & REEL DIMENSIONS

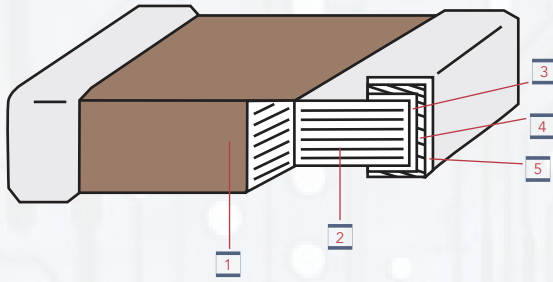


SIZE	0402	0603	0805			1206			1210		1812		1825		2220		2225	
THICKNESS	E	S, X	A	B	C, D, I	B	C, J, D	G, P	C, D, G, K	M	D, G, K	M, U	K	M, U	K	M, U	K	M, U
A ₀	0.70+/-0.2	1.05+/-0.30	1.05+/-0.20	1.05+/-0.20	<1.80	1.90+/-0.50	<2.00	<2.30	<3.05	<3.20	<3.90	<3.90	<6.80	<6.80	<5.80	<5.80	<6.80	<6.80
B ₀	1.20+/-0.2	1.80+/-0.30	2.30+/-0.20	2.30+/-0.20	<2.70	3.50+/-0.50	<3.70	<4.00	<3.80	<3.95	<5.30	<5.30	<5.30	<5.30	<6.50	<6.50	<6.50	<6.50
T	≤0.80	≤1.20	≤1.15	-	0.23+/-0.1	≤1.30	0.23+/-0.1	0.23+/-0.1	0.23+/-0.1	0.23+/-0.1	0.25+/-0.1	0.25+/-0.1	0.30+/-0.1	0.30+/-0.1	0.30+/-0.1	0.30+/-0.1	0.30+/-0.1	0.30+/-0.1
K ₀	-	-	-	-	<2.50	-	<2.50	<2.50	<2.50	<3.00	<2.50	<3.50	<2.50	<3.50	<2.50	<3.50	<2.50	<3.50
W	8.00+/-0.10	8.00+/-0.10	8.00+/-0.10	8.00+/-0.10	8.00+/-0.20	8.00+/-0.10	8.00+/-0.20	8.00+/-0.20	8.00+/-0.20	8.00+/-0.20	12.00+/-0.20	12.00+/-0.20	12.00+/-0.30	12.00+/-0.30	12.00+/-0.30	12.00+/-0.30	12.00+/-0.30	
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	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	
10 X P ₀	40.00+/-0.10	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	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	40.00+/-0.20	40.00+/-0.20	
P ₁	2.00+/-0.05	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	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	2.00+/-0.05	2.00+/-0.05	2.00+/-0.10	2.00+/-0.10	2.00+/-0.10	2.00+/-0.10	2.00+/-0.10	2.00+/-0.10	2.00+/-0.10	
D ₀	1.55+/-0.05	1.55+/-0.05	1.55+/-0.05	1.55+/-0.05	1.55+/-0.05	1.55+/-0.05	1.50+/-0.05	1.50+/-0.05	1.50+/-0.05	1.50+/-0.05	1.50+/-0.05	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	
D ₁	-	-	-	-	1.00+/-0.10	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	1.50+/-0.10	1.50+/-0.10	1.50+/-0.10	1.50+/-0.10	1.50+/-0.10	
E	1.75+/-0.05	1.75+/-0.05	1.75+/-0.05	1.75+/-0.05	1.75+/-0.05	1.75+/-0.05	1.75+/-0.05	1.75+/-0.05	1.75+/-0.05	1.75+/-0.05	1.75+/-0.05	1.75+/-0.05	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	3.50+/-0.05	3.50+/-0.05	3.50+/-0.05	5.50+/-0.10	5.50+/-0.10	5.50+/-0.05	5.50+/-0.05	5.50+/-0.05	5.50+/-0.05		



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
W ₁	8.4+1.5/-0	8.4+1.5/-0	8.4+1.5/-0	12.4+2.0/-0
A	178.0±1.0	250.0±1.0	330.0±1.0	178.0±1.0
N	60.0+1.0/-0	100+1.0	100+1.0	60.0+1.0/-0

CONSTRUCTION



	NAME	NP0, X7R, X5R, Y5V
1	Ceramic Material	BaTiO ₃ based
2	Inner electrode	Ni
3	Termination	Inner layer
		Middle layer
		Outer layer
4		Ni
5		Sn

STORAGE AND HANDLING CONDITIONS

- (1) To store products at 5 to 40°C ambient temperature and 20 to 70% related humidity conditions.
- (2) The product is recommended to be used within one year after shipment. Check solderability in case of shelf life extension is needed.

Cautions:

- a. The corrosive gas reacts on the terminal electrodes of capacitors, and results in the poor solderability. Do not store the capacitors in the ambience of corrosive gas (e.g., hydrogen sulfide, sulfur dioxide, chlorine, ammonia gas etc.)
- b. In corrosive atmosphere, solderability might be degraded, and silver migration might occur to cause low reliability.
- c. Due to the dewing by rapid humidity change, or the photochemical change of the terminal electrode by direct sunlight, the solderability and electrical performance may deteriorate. Do not store capacitors under direct sunlight or dewing condition. To store products on the shelf and avoid exposure to moisture.

RECOMMENDED SOLDERING CONDITIONS

The lead-free termination MLCCs are not only to be used on SMT against lead-free solder paste, but also suitable against lead-containing solder paste. If the optimized solder joint is requested, increasing soldering time, temperature and concentration of N₂ within oven are recommended.

