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WMC CHIP MULTILAYER CERAMIC CAPACITORS

General Purpose Series (4V to 4000V)

INTRODUCTION:

MLCC consists of a conducting material and electrodes. Ceramic condensers with high density and high efficiency are used to manufacture a chip-type SMT and achieve miniaturization. MLCC is made by NP0, X7R, X5R and Y5V dielectric material and which provides product with high electrical precision, stability and reliability.

FEATURES:

- A wide selection of sizes is available (0201 to 2225).
- High capacitance in given case size.
- RoHS REACH Compliance

APPLICATIONS:

- For general digital circuit.
- For power supply bypass capacitors.
- For consumer electronics.
- For telecommunication.

CONSTRUCTIONS:

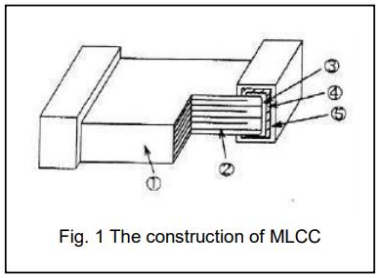


Fig. 1 The construction of MLCC

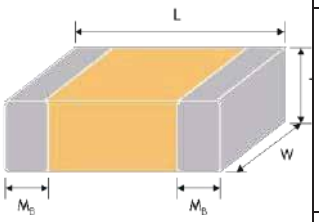
No.	Name		NP0	NPO/X7R/X5R/Y5V
①	Ceramic material		BaTiO3 based	
②	Inner electrode		AgPd alloy	Ni
③	Termination	Inner layer	Ag	Cu
④		Middle layer	Ni	
⑤		Outer layer	Sn	

EXPLANATIONS OF ORDERING CODE:

Eg: WMC1206X7R104K500N-

WMC	1206	X7R	104	K	500	N	-
Product Type	**Size** Inch (mm) 0201 (0603) 0402 (1005) 0603 (1608) 0805 (2012) 1206 (3216) 1210 (3225) 1808 (4520) 1812 (4532) 1825 (4563) 2211 (5728) 2220 (5750) 2225 (5763)	**Dielectric** NPO X7R Y5V X5R	**Capacitance** Two significant digits followed by no. of zeros. And R is in place of decimal point. eg.: 0R5=0.5pF 1R0=1.0pF 104=10x104 =100nF	**Tolerance** B = ±0.1pF C = ±0.25pF D = ±0.5pF F = ±1% G = ±2% J = ±5% K = ±10% M = ±20% Z = -20/+80%	**Rated Voltage** Two significant digits followed by no. of zeros. And R is in place of decimal point. eg.: 4R0=4 VDC 6R3=6.3 VDC 100=10 VDC 160=16 VDC 250=25 VDC 500=50 VDC 101=100 VDC 102=1000 VDC 202= 2000 VDC	**Termination** N = Cu/Ni/Sn	Additional characters may be added for special requirements

DIMENSIONS:

Outline	Size Inch (mm)	L (mm)	W (mm)	T (mm)/Symbol		Soldering Method *	M_B (mm)
	01R5 (0402)	0.4±0.02	0.2±0.02	0.2±0.02	V	R	0.10±0.03
	0201 (0603)	0.6±0.03	0.3±0.03	0.3±0.03	L	R	0.15±0.05
		0.6±0.05 #2	0.3±0.05 #2	0.3±0.05 #2			
		0.6±0.09 #3	0.3±0.09 #3	0.3±0.09 #3			0.15+0.1/-0.05
	0402 (1005)	1.00±0.05	0.50±0.05	0.50±0.05	N	R	0.25 +0.05/-0.10
				0.50+0.02/-0.05	Q	R	
		1.00±0.20	0.50±0.20	0.5±0.20	E	R	
	0603 (1608)	1.60±0.10	0.80±0.10	0.80±0.07	S	R / W	0.40±0.15
		1.60+0.15/-0.10	0.80+0.15/-0.10	0.50±0.10	H	R / W	
				0.80+0.15/-0.10	X	R / W	
		1.60±0.20 #1	0.80±0.20 #1	0.8±0.20 #1			
	0805 (2012)	2.00±0.15	1.25±0.10	0.50±0.10	H	R / W	0.50±0.20
				0.60±0.10	A	R / W	
				0.80±0.10	B	R / W	
				1.25±0.10	D	R	
		2.00±0.20	1.25±0.20	0.85±0.10	T	R / W	
				1.25±0.20	I	R	
	1206 (3216)	3.20±0.15	1.60±0.15	0.80±0.10	B	R / W	0.60±0.20 (0.5±0.25)***
				0.95±0.10	C	R	
				1.25±0.10	D	R	
		3.20±0.20		1.15±0.15	J	R	
			1.60±0.20	1.60±0.20	G	R	
				0.85±0.10	T	R / W	
		3.20 +0.30/-0.10	1.60 +0.30/-0.10	1.60+0.30/-0.10	P	R	
	1210 (3225)	3.20±0.30	2.50±0.20	0.95±0.10	C	R	0.75±0.25
				0.85±0.10	T	R	
				1.25±0.10	D	R	
		3.20±0.40	2.50±0.30	1.60±0.20	G	R	
				2.00±0.20	K	R	
				2.50±0.30	M	R	
		3.20±0.60 #4	2.50±0.50 #4	2.50±0.50 #4			
	1808 (4520)	4.50±0.40 (4.5+0.5/-0.3)**	2.03±0.25	1.25±0.10	D	R	0.75±0.25 (0.5±0.25)***
				1.40±0.15	F	R	
				1.60±0.20	G	R	
				2.00±0.20	K	R	
	1812 (4532)	4.50±0.40 (4.5+0.5/-0.3)**	3.20±0.30	1.25±0.10	D	R	0.75±0.25 (0.5±0.25)***
				1.60±0.20	G	R	
				2.00±0.20	K	R	
			3.20±0.40	2.50±0.30	M	R	
				2.80±0.30	U	R	
	1825 (4563)	4.60±0.50	6.30±0.40	1.60±0.20 (G) 2.00±0.20 (K) 2.50±0.30 (M) 2.80±0.30 (U)		R	≧0.26
	2211 (5728)	5.70±0.50	2.80±0.30			R	≧0.30
	2220 (5750)	5.70±0.50	5.00±0.40			R	≧0.30
	2225 (5763)	5.70±0.50	6.30±0.40			R	≧0.30

*R = Reflow soldering process; W = Wave soldering process.

** For 1808_200V ~3kV, 1812_200V~3kV

*** For 1206_1000V ~3kV, 1808_200V ~3kV, 1812_200V~3kV

#1: For 0603/Cap÷10μF or 0603(÷6.3V)/Cap÷4.7μ For 0603(>10V)/Cap>1μF products.

#2: For 0201/Cap÷0.68μF products.

#3: For 0201/Cap ÷1μF products.

#4: For 1210(100V)/ Cap>1μ F or 1210(250V)/Cap>0.47μ F or 1210(400V~630V)/Cap>0.22μ F

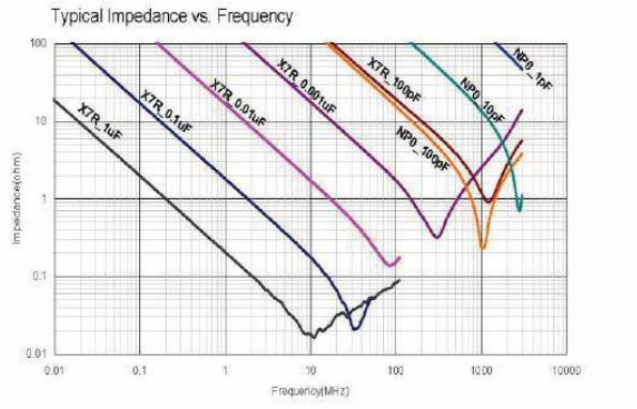
GENERAL ELECTRICAL DATA

Dielectric	NP0	X7R	X5R	Y5V
Size	0201, 0402, 0603, 0805, 1206, 1210, 1812, 1825, 2220, 2225			
Capacitance range	0.1pF to 0.27μF	100pF to 47μF	100pF to 220μF	0.01μF to 100μF
Capacitance tolerance	Cap≤5pF[#1]: A (±0.05pF), 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%)	J (±5%), K (±10%), M (±20%)	K (±10%), M (±20%)	M (±20%), Z (-20/+80%)
Rated voltage (WVDC)	10V, 16V, 25V, 50V, 100V	4V, 6.3V, 10V, 16V, 25V, 50V, 100V		
Operating temperature	-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)			

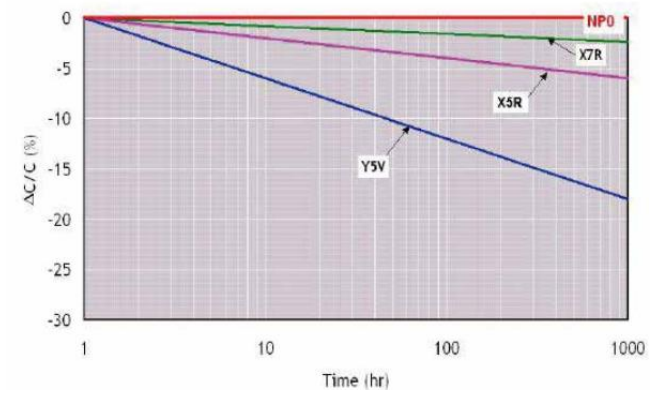
#1: NP0, 0.1pF product only provide B tolerance

ELECTRICAL CHARACTERISTICS:

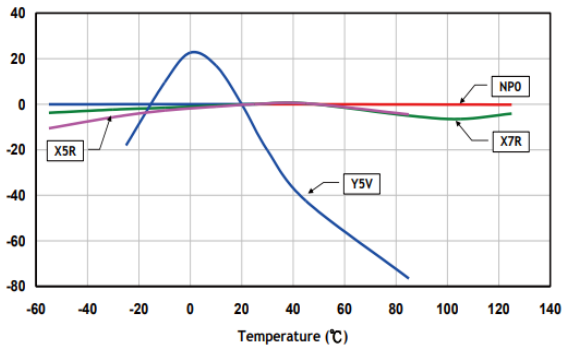
1) Frequency characteristics



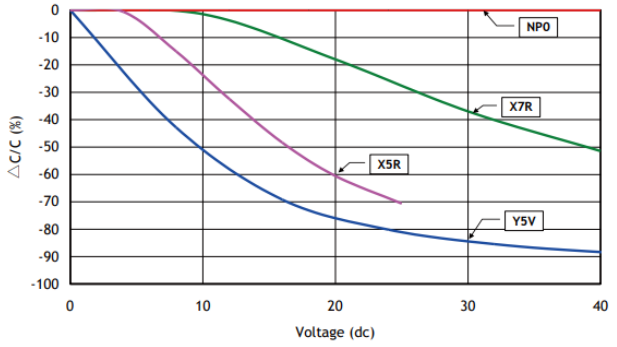
2) Capacitance Change - Typical aging rate



3) Temperature characteristics of capacitance (TCC)



4) DC Bias characteristics



*All above typical electronic characteristics are for reference only.

CAPACITANCE RANGE:
NP0 Dielectric

Dielectric		NP0																							
Size		0201		0402		0603		0805			1206			1210			1812		1825		2220		2225	
Rated Voltage (VDC)		16 25	50	10 16 25 50	10 0	10 16 25 50	10 0	10 16	25 50	10 0	10 16	25 50	100	10 16	25 50	100	10 16 25 50	100	50	100	50	100	50	100
Capacitance	0.3pF (0R3)	L	L	N		S																			
	0.4pF (0R4)	L	L	N		S																			
	0.5pF (0R5)	L	L	N	N	S	S	A	A	A															
	0.6pF (0R6)	L	L	N	N	S	S	A	A	A															
	0.7pF (0R7)	L	L	N	N	S	S	A	A	A															
	0.8pF (0R8)	L	L	N	N	S	S	A	A	A															
	0.9pF (0R9)	L	L	N	N	S	S	A	A	A															
	1.0pF (1R0)	L	L	N	N	S	S	A	A	A															
	1.2pF (1R2)	L	L	N	N	S	S	A	A	A	B	B	B												
	1.5pF (1R5)	L	L	N	N	S	S	A	A	A	B	B	B												
	1.8pF (1R8)	L	L	N	N	S	S	A	A	A	B	B	B												
	2.0pF (2R0)	L	L	N	N	S	S	A	A	A	B	B	B												
	2.2pF (2R2)	L	L	N	N	S	S	A	A	A	B	B	B												
	2.7pF (2R7)	L	L	N	N	S	S	A	A	A	B	B	B												
	3.0pF (3R0)	L	L	N	N	S	S	A	A	A	B	B	B												
	3.3pF (3R3)	L	L	N	N	S	S	A	A	A	B	B	B												
	3.9pF (3R9)	L	L	N	N	S	S	A	A	A	B	B	B												
	4.0pF (4R0)	L	L	N	N	S	S	A	A	A	B	B	B												
	4.7pF (4R7)	L	L	N	N	S	S	A	A	A	B	B	B												
	5.0pF (5R0)	L	L	N	N	S	S	A	A	A	B	B	B												
	5.6pF (5R6)	L	L	N	N	S	S	A	A	A	B	B	B												
	6.0pF (6R0)	L	L	N	N	S	S	A	A	A	B	B	B												
	6.8pF (6R8)	L	L	N	N	S	S	A	A	A	B	B	B												
	7.0pF (7R0)	L	L	N	N	S	S	A	A	A	B	B	B												
	8.0pF (8R0)	L	L	N	N	S	S	A	A	A	B	B	B												
	8.2pF (8R2)	L	L	N	N	S	S	A	A	A	B	B	B												
	9.0pF (9R0)	L	L	N	N	S	S	A	A	A	B	B	B												
	10pF (100)	L	L	N	N	S	S	A	A	A	B	B	B	C	C	C	D	D	G	G	G	G	G	G	
	12pF (120)	L	L	N	N	S	S	A	A	A	B	B	B	C	C	C	D	D	G	G	G	G	G	G	
	15pF (150)	L	L	N	N	S	S	A	A	A	B	B	B	C	C	C	D	D	G	G	G	G	G	G	
	18pF (180)	L	L	N	N	S	S	A	A	A	B	B	B	C	C	C	D	D	G	G	G	G	G	G	
	22pF (220)	L	L	N	N	S	S	A	A	A	B	B	B	C	C	C	D	D	G	G	G	G	G	G	
	27pF (270)	L	L	N	N	S	S	A	A	A	B	B	B	C	C	C	D	D	G	G	G	G	G	G	
	33pF (330)	L	L	N	N	S	S	A	A	A	B	B	B	C	C	C	D	D	G	G	G	G	G	G	
	39pF (390)	L	L	N	N	S	S	A	A	A	B	B	B	C	C	C	D	D	G	G	G	G	G	G	
	47pF (470)	L	L	N	N	S	S	A	A	A	B	B	B	C	C	C	D	D	G	G	G	G	G	G	
	56pF (560)	L	L	N	N	S	S	A	A	A	B	B	B	C	C	C	D	D	G	G	G	G	G	G	
	68pF (680)	L	L	N	N	S	S	A	A	A	B	B	B	C	C	C	D	D	G	G	G	G	G	G	
	82pF (820)	L	L	N	N	S	S	A	A	A	B	B	B	C	C	C	D	D	G	G	G	G	G	G	
	100pF (101)	L	L	N	N	S	S	A	A	A	B	B	B	C	C	C	D	D	G	G	G	G	G	G	
	120pF (121)	L	L	N	N	S	S	A	A	A	B	B	B	C	C	C	D	D	G	G	G	G	G	G	
	150pF (151)	L	L	N	N	S	S	A	A	A	B	B	B	C	C	C	D	D	G	G	G	G	G	G	
	180pF (181)			N	N	S	S	A	A	A	B	B	B	C	C	C	D	D	G	G	G	G	G	G	
	220pF (221)			N	N	S	S	A	A	A	B	B	B	C	C	C	D	D	G	G	G	G	G	G	
	270pF (271)	L		N		S	S	A	A	A	B	B	B	C	C	C	D	D	G	G	G	G	G	G	
	330pF (331)	L		N		S	S	A	A	A	B	B	B	C	C	C	D	D	G	G	G	G	G	G	
	390pF (391)	L		N		S	S	B	B	B	B	B	B	C	C	C	D	D	G	G	G	G	G	G	
	470pF (471)	L		N		S	S	B	B	B	B	B	B	C	C	C	D	D	G	G	G	G	G	G	
	560pF (561)	L		N		S	S	B	B	B	B	B	B	C	C	C	D	D	G	G	G	G	G	G	
	680pF (681)			N		S	S	B	B	B	B	B	B	C	C	C	D	D	G	G	G	G	G	G	
	820pF (821)			N		S	S	B	B	B	B	B	B	C	C	C	D	D	G	G	G	G	G	G	
	1,000pF (102)			N		S	S	B	B	B	B	B	B	C	C	C	D	D	G	G	G	G	G	G	
	1,200pF (122)					X	X	B	B	B	B	B	B	C	C	C	D	D	G	G	G	G	G	G	
	1,500pF (152)					X	X	B	B	B	B	B	B	C	C	C	D	D	G	G	G	G	G	G	
	1,800pF (182)					X		B	B	B	B	B	B	C	C	C	D	D	G	G	G	G	G	G	
	2,200pF (222)					X		B	B	B	B	B	B	C	C	C	D	D	G	G	G	G	G	G	
	2,700pF (272)					X		D	D	D	B	B	B	C	C	C	D	D	G	G	G	G	G	G	
	3,300pF (332)					X		D	D	D	B	B	B	C	C	C	D	D	G	G	G	G	G	G	
	3,900pF (392)					X		D	D	D	B	B	B	C	C	C	D	D	G	G	G	G	G	G	
	4,700pF (472)					X		D	D	D	B	B	B	C	C	C	D	D	G	G	G	G	G	G	
	5,600pF (562)					X		D	D	D	B	B	B	C	C	C	D	D	G	G	G	G	G	G	
	6,800pF (682)					X		D	D	D	C	C	C	C	C	C	D	D	G	G	G	G	G	G	
	8,200pF (822)					X		D	D		D	D	D	C	C	C	D	D	G	G	G	G	G	G	
	0.010uF (103)					X		D	D		D	D	D	C	C	C	D	D	G	G	G	G	G	G	
	0.012uF (123)							T	T		P	P	P	D	D	D	D	D	G	G	G	G	G	G	
	0.015uF (153)							T	T		P	P	P	D	D	D	D	D	G	G	G	G	G	G	
	0.018uF (183)							D	D		P	P	P	K	K	K	D	D	G	G	G	G	G	G	
	0.022uF (223)							D	D		P	P	P	K	K	K	D	D	G	G	G	G	G	G	
	0.027uF (273)										P	P		K	K	K	D	D	G	G	G	G	G	G	
	0.033uF (333)										P	P	T	K	K	K	D	D	G	G	G	G	G	G	
	0.039uF (393)										P	P		K	K	K	M	M	G	G	G	G	G	G	
	0.047uF (473)										J	J		K	K	K	M	M	G	G	G	G	G	G	
	0.056uF (563)										J	J					M	M	G	K	G	K	G	G	
	0.068uF (683)										G	G					M	M	G	K	K	K	G	K	
	0.082uF (823)										G	G					M	M	K	M	M	M	K	K	
	0.10uF (104)										G	G					M	M	M	M	M	M	K	M	
	0.12uF (124)																		M	M	M	M	M	M	
	0.15uF (154)																				M	M	M	M	
	0.18uF (184)																				M	M	M	M	
	0.22uF (224)																						M	M	
	0.27uF (274)																						M		

1. The letter in cell is expressed the symbol of product thickness.

X7R Dielectric:

Dielectric		X7R																																				
Size		0201			0402				0603				0805				1206				1210					1812		1825	2220		2225	
Rated Voltage (VDC)		6.3 10 16	25	50	6.3 10	16 25	50	100	6.3 10 16	25	50	100	6.3 10 16	25	50	100	6.3 10 16	25	50	100	10	16	25	50	100	10 16 25	50 100	50 100	25 50	100	25 50	100
Capacitanc	100pF (101)	L	L	L	N	N	N	N	S	S	S	S	B	B	B	B																					
	120pF (121)	L	L	L	N	N	N	N	S	S	S	S	B	B	B	B																					
	150pF (151)	L	L	L	N	N	N	N	S	S	S	S	B	B	B	B	B	B	B	B																	
	180pF (181)	L	L	L	N	N	N	N	S	S	S	S	B	B	B	B	B	B	B	B																	
	220pF (221)	L	L	L	N	N	N	N	S	S	S	S	B	B	B	B	B	B	B	B																	
	270pF (271)	L	L	L	N	N	N	N	S	S	S	S	B	B	B	B	B	B	B	B																	
	330pF (331)	L	L	L	N	N	N	N	S	S	S	S	B	B	B	B	B	B	B	B																	
	390pF (391)	L	L	L	N	N	N	N	S	S	S	S	B	B	B	B	B	B	B	B																	
	470pF (471)	L	L	L	N	N	N	N	S	S	S	S	B	B	B	B	B	B	B	B																	
	560pF (561)	L	L	L	N	N	N	N	S	S	S	S	B	B	B	B	B	B	B	B																	
	680pF (681)	L	L	L	N	N	N	N	S	S	S	S	B	B	B	B	B	B	B	B																	
	820pF (821)	L	L	L	N	N	N	N	S	S	S	S	B	B	B	B	B	B	B	B																	
	1,000pF (102)	L	L	L	N	N	N	N	S	S	S	S	B	B	B	B	B	B	B	B	C	C	C	C	C	D	D	K	K	K	K	K
	1,200pF (122)	L	L		N	N	N	N	S	S	S	S	B	B	B	B	B	B	B	B	C	C	C	C	C	D	D	K	K	K	K	K
	1,500pF (152)	L	L		N	N	N	N	S	S	S	S	B	B	B	B	B	B	B	B	C	C	C	C	C	D	D	K	K	K	K	K
	1,800pF (182)	L	L		N	N	N	N	S	S	S	S	B	B	B	B	B	B	B	B	C	C	C	C	C	D	D	K	K	K	K	K
	2,200pF (222)	L	L		N	N	N	N	S	S	S	S	B	B	B	B	B	B	B	B	C	C	C	C	C	D	D	K	K	K	K	K
	2,700pF (272)	L	L		N	N	N	N	S	S	S	S	B	B	B	B	B	B	B	B	C	C	C	C	C	D	D	K	K	K	K	K
	3,300pF (332)	L	L		N	N	N	N	S	S	S	S	B	B	B	B	B	B	B	B	C	C	C	C	C	D	D	K	K	K	K	K
	3,900pF (392)	L	L		N	N	N	N	S	S	S	S	B	B	B	B	B	B	B	B	C	C	C	C	C	D	D	K	K	K	K	K
	4,700pF (472)	L	L		N	N	N	N	S	S	S	S	B	B	B	B	B	B	B	B	C	C	C	C	C	D	D	K	K	K	K	K
	5,600pF (562)	L	L		N	N	N		S	S	S	S	B	B	B	B	B	B	B	B	C	C	C	C	C	D	D	K	K	K	K	K
	6,800pF (682)	L			N	N	N		S	S	S	S	B	B	B	B	B	B	B	B	C	C	C	C	C	D	D	K	K	K	K	K
	8,200pF (822)	L			N	N	N		S	S	S	S	B	B	B	B	B	B	B	B	C	C	C	C	C	D	D	K	K	K	K	K
	0.010uF (103)	L	L		N	N	N		S	S	S	S	B	B	B	B	B	B	B	B	C	C	C	C	C	D	D	K	K	K	K	K
	0.012uF (123)				N	N	E		S	S	S	X	B	B	B	B	B	B	B	B	C	C	C	C	C	D	D	K	K	K	K	K
	0.015uF (153)				N	N	E		S	S	S	X	B	B	B	B	B	B	B	B	C	C	C	C	C	D	D	K	K	K	K	K
	0.018uF (183)				N	N	E		S	S	S	X	B	B	B	B	B	B	B	B	C	C	C	C	C	D	D	K	K	K	K	K
	0.022uF (223)	L			N	N	E		S	S	S	X	B	B	B	B	B	B	B	B	C	C	C	C	C	D	D	K	K	K	K	K
	0.027uF (273)				N	N	E		S	S	S	X	B	B	B	D	B	B	B	B	C	C	C	C	C	D	D	K	K	K	K	K
	0.033uF (333)				N	N	E		S	S	X	X	B	B	B	D	B	B	B	B	C	C	C	C	C	D	D	K	K	K	K	K
	0.039uF (393)				N	N	E		S	S	X	X	B	B	B	D	B	B	B	B	C	C	C	C	C	D	D	K	K	K	K	K
	0.047uF (473)				N	N	E		S	S	X	X	B	B	B	D	B	B	B	B	C	C	C	C	C	D	D	K	K	K	K	K
	0.056uF (563)				N	N	E		S	S	X	X	B	B	B	D	B	B	B	B	C	C	C	C	C	D	D	K	K	K	K	K
	0.068uF (683)				N	N	E		S	S	X	X	B	B	B	D	B	B	B	B	C	C	C	C	C	D	D	K	K	K	K	K
	0.082uF (823)				N	N	E		S	S	X	X	B	B	B	D	B	B	B	D	C	C	C	C	C	D	D	K	K	K	K	K
	0.10uF (104)				N	N	E		S	S	X	X	B	B	B	D	B	B	B	D	C	C	C	C	C	D	D	K	K	K	K	K
	0.12uF (124)								S	X			B	B	D	I	B	B	B	D	C	C	C	C	C	D	D	K	K	K	K	K
	0.15uF (154)								S	X			D	D	D	I	C	C	C	G	C	C	C	C	D	D	D	K	K	K	K	K
	0.18uF (184)								S	X			D	D	D	I	C	C	C	G	C	C	C	C	D	D	D	K	K	K	K	K
	0.22uF (224)				N	N			S	X	X		D	D	D	I	C	C	C	G	C	C	C	C	D	D	D	K	K	K	K	K
	0.27uF (274)								X	X			D	D	I		C	C	D	G	C	C	C	C	G	D	D	K	K	K	K	K
	0.33uF (334)								X	X	X		D	D	I		C	C	D	G	C	C	C	D	G	D	D	K	K	K	K	K
	0.39uF (394)								X	X			D	D	I		C	J	P	G	C	C	C	D	M	D	D	K	K	K	K	K
	0.47uF (474)				N				X	X	X		D	D	I	I	J	J	P	G	C	C	C	D	M	D	D	K	K	K	K	K
	0.56uF (564)								X				D	D			J	J	P	P	D	D	D	D	M	D	D	K	K	K	K	K
	0.68uF (684)								X				D	D	I		J	J	P	P	D	D	D	D	K	D	K	K	K	K	K	K
	0.82uF (824)								X				D	D			J	J	P	P	D	D	D	D	K	D	K	K	K	K	K	K
	1.0uF (105)				N				X	X	X		D	D	I		J	J	P	P	D	D	D	D	K	D	K	K	K	K	K	K
	1.5uF (155)												I	I			J	P				G	G	M	M		K	K	K	K	K	K
	2.2uF (225)								X				I	I	I		J	P	P	P		G	G	M	M		M	K	K	K	K	K
	3.3uF (335)																P	P				G	G	M				K	K	K	K	K
	4.7uF (475)								X				I	I			P	P	P		K	K	K	M	M			K	K	M	K	
	6.8uF (685)																												M	U	M	
	10uF (106)												I	I			P	P			K	K	K	M					U	U	U	
	22uF (226)																P				M	M	M									
	47uF (476)																				M											

1. The letter in cell is expressed the symbol of product thickness.
2. 0402 size, Cap.1.0uF_6.3V only; 0603 size, Cap.4.7uF_6.3V only.

Y5V Dielectric (0402, 0603, 0805 Size):

Dielectric		Y5V															
Size		0402					0603					0805					
Rated Voltage (VDC)		6.3	10	16	25	50	6.3	10	16	25	50	6.3	10	16	25	50	100
Capacitance	0.010uF (103)		N	N	N	N		S	S	S	S		A	A	A	A	B
	0.015uF (153)		N	N	N	N		S	S	S	S		A	A	A	A	B
	0.022uF (223)		N	N	N	N		S	S	S	S		A	A	A	A	B
	0.033uF (333)		N	N	N	N		S	S	S	S		A	A	A	A	B
	0.047uF (473)		N	N	N			S	S	S	S		A	A	A	A	B
	0.068uF (683)		N	N	N			S	S	S	S		A	A	A	A	B
	0.10uF (104)		N	N	N			S	S	S	S		A	A	A	A	B
	0.15uF (154)		N	N				S	S	S	S		A	A	A	A	
	0.22uF (224)	N	N	N			S	S	S	S	S		A	A	A	A	
	0.33uF (334)	N	N	N				S	S	S	X		B	B	B	B	
	0.47uF (474)	N	N	N				S	S	X	X		B	B	B	B/D	
	0.68uF (684)	N						S	X	X			B	B	D	D	
	1.0uF (105)	N	N					S	X	X			B	B	D	D	
	1.5uF (155)							S					D	D			
	2.2uF (225)						S	S	X				D	D	I		
	3.3uF (335)												D	D			
	4.7uF (475)						X	X					D	D	I		
	6.8uF (685)												I				
	10uF (106)											I	I	I			
	22uF (226)											I	I				

Y5V Dielectric (1206, 1210, 1812 Size):

Dielectric		Y5V																		
Size		1206							1210							1812				
Rated Voltage (VDC)		6.3	10	16	25	35	50	100	6.3	10	16	25	35	50	100	10	16	25	50	100
Capacitance	0.010uF (103)		B	B	B		B	B							C					D
	0.015uF (153)		B	B	B		B	B							C					D
	0.022uF (223)		B	B	B		B	B							C					D
	0.033uF (333)		B	B	B		B	B							C					D
	0.047uF (473)		B	B	B		B	B							C					D
	0.068uF (683)		B	B	B		B	B							C					D
	0.10uF (104)		B	B	B		B	B		C	C	C		C	C	D	D	D	D	D
	0.15uF (154)		B	B	B		B	C		C	C	C		C	C	D	D	D	D	D
	0.22uF (224)		B	B	B		B	C		C	C	C		C	C	D	D	D	D	D
	0.33uF (334)		B	B	B		B			C	C	C		C	C	D	D	D	D	D
	0.47uF (474)		B	B	B		B			C	C	C		C		D	D	D	D	D
	0.68uF (684)		B	B	B		B			C	C	C		C		D	D	D	D	D
	1.0uF (105)		C	C	C		C/D			C	C	C		C		D	D	D	D	D
	1.5uF (155)		C	C	C					C	C	C				D	D	D	D	
	2.2uF (225)		C	C	C		J			C	C	C		G		D	D	D	D	
	3.3uF (335)		J	J	J					C	C	C				D	D	D	D	
	4.7uF (475)		J	J	J	J	P			C	C	D		G		D	D	D	D	
	6.8uF (685)		J	J						C	C	D		K		D	D	D	D	
	10uF (106)		J	J	P					D	D	G	K	K		D	D	D	K	
	22uF (226)		P	P						K	K									
	47uF (476)	P							K	K							M			
	100uF (107)								M											

X5R Dielectric:

Dielectric		X5R																														
Size		0201					0402					0603					0805					1206					1210				
Rated Voltage (VDC)		6.3	10	16	25	50	6.3	10	16	25	50	6.3	10	16	25	50	6.3	10	16	25	50	6.3	10	16	25	50	4	6.3	10 16	25	50
Capacitance	100pF (101)	L	L	L	L	L																										
	220pF (221)	L	L	L	L	L																										
	470pF (471)	L	L	L	L	L																										
	1000pF (102)	L	L	L	L	L																										
	2200pF (222)	L	L	L	L																											
	4700pF (472)	L	L	L	L																											
	0.010µF (103)	L	L	L	L	L																										
	0.027µF (273)	L	L						N																							
	0.033µF (333)	L	L						N																							
	0.039µF (393)	L	L						N																							
	0.047µF (473)	L	L						N																							
	0.056µF (563)	L	L					N	N																							
	0.068µF (683)	L	L					N	N																							
	0.082µF (823)	L	L				N	N	N																							
	0.10µF (104)	L	L	L	L		N	N	N	N	E																					
	0.15µF (154)						N	N	N	N																						
	0.22µF (224)	L	L	L			N	N	N	N	N			X	X	X																
	0.27uF (274)												X	X	X																	
	0.33µF (334)	L	L				N	N				X	X	X	X																	
	0.39µF (394)												X	X	X																	
	0.47µF (474)	L					N	N	E	E	E	X	X	X	X	X																
	0.68µF (684)						N	N				X	X	X	X																	
	0.82uF (824)											X	X	X	X																	
	1.0µF (105)	L	L	L			N	N	N	N		X	X	X	X	X		D	D	D	I											
	1.5µF (155)											X					I	I	I	I			J	J					K		
	2.2µF (225)	L	L				N	N	E	E		X	X	X	X	X	I	I	I	I	I		J	J	P	P			K		
	3.3µF (335)											X	X				I	I	I	I			P	P	P						
	4.7µF (475)						E	E	E			X	X	X	X		I	I	I	I	I	P	P	P	P	P			K	K	
	6.8uF (685)																					P	P								
	10µF (106)						E	E				X	X	X	X		I	I	I	I	I	P	P	P	P	P		K	K	K	M
	22µF (226)											X	X				I	I	I	I		P	P	P	P			M	M	M	
	33µF (336)																I														
	47µF (476)											X					I	I				P	P	P				M	M	M	
	100µF (107)																I					P						M	M		
	220µF (227)																										M	M			

1. The letter in cell is expressed the symbol of product thickness.

Middle & High Voltage Capacitors 200V~4000V

•FEATURES

*High voltage in a given case size.

*High stability and reliability.

GENERAL ELECTRICAL DATA:

Dielectric	NP0	X7R	Y5V
Size	0603, 0805, 1206, 1210, 1808, 1812, 1825, 2220, 2225		0805, 1206, 1210, 1812
Capacitance	0.5pF to 0.12μF	100pF to 2.2μF	0.01μF to 0.68μF
Capacitance tolerance	Cap≤5pF: C (±0.25pF) 5pF<Cap<10pF: D (±0.5pF) Cap≥10pF: J (±5%), K (±10%)	K (±10%), M (±20%)	Z (-20/+80%)
Rated voltage (WVDC)	200V to 4000V		200V, 250V
DF/ Q	Cap<30pF: Q≥400+20C Cap≥30pF: Q≥1000	≤2.5%	≤5%
Insulation resistance at Ur	Ur=200~630V: ≥10GΩ or RxC≥100Ω-F whichever is smaller Ur=1000~3000V: ≥10GΩ		
Dielectric strength	200~300V: ≥2 x WVDC 400V~450V: ≥1.2 x WVDC 500~999V: ≥1.5 x WVDC 1000~3000V: ≥1.2 x WVDC 4000: ≥1.1 x WVDC		
Operating temperature	-55 to +125°C		-25 to +85°C
Capacitance characteristic	±30ppm	±15%	+30/-80%
Termination	Ni/Sn (lead-free termination)		

CAPACITANCE RANGE:

Y5V Dielectric 200V to 250V

DIELECTRIC		Y5V							
SIZE		0805		1206		1210		1812	
RATED VOLTAGE (VDC)		200	250	200	250	200	250	200	250
Capacitance	0.010μF (103)	B	B	B	B	C	C	D	D
	0.015μF (153)	B	B	B	B	C	C	D	D
	0.022μF (223)	B	B	B	B	C	C	D	D
	0.033μF (333)	B	B	B	B	C	C	D	D
	0.047μF (473)	B	B	B	B	C	C	D	D
	0.068μF (683)	B	B	B	B	C	C	D	D
	0.10μF (104)			B	B	C	C	D	D
	0.15μF (154)			C	C	C	C	D	D
	0.22μF (224)							D	D
	0.33μF (334)							D	D
	0.47μF (474)							D	D
	0.68μF (684)							D	D

1. The letter in cell is expressed the symbol of product thickness.

NP0 Dielectric 200V to 4000V

	DIELECTRIC	NP0																																										
	SIZE	0402		0603	0805				1206					1210				1808					1812						1825						2220						2225					
	RATED VOLTAGE (VDC)	200	250	200, 250	200	250	500, 630	1000	200	250	500, 630	1000	1500, 2000	200, 250	500, 630	1000	1500 2000	500, 630	1000	1500, 2000	3000	4000	200, 250	500, 630	1000	1500, 2000	3000	4000	200, 250	500, 630	1000	2000	3000	4000	200, 250	500, 630	1000	2000	3000	4000	200, 250	500, 630	1000	2000	3000	4000
Capacitanc	0.5pF (0R5)	N	N	S	A	A	A	D																																						
	1.0pF (1R0)	N	N	S	A	A	A	D																																						
	1.2pF (1R2)	N	N	S	A	A	A	D																																						
	1.5pF (1R5)	N	N	S	A	A	A	D	B	B	B	B	B																																	
	1.8pF (1R8)	N	N	S	A	A	A	D	B	B	B	B	B																																	
	2.2pF (2R2)	N	N	S	A	A	A	D	B	B	B	B	B					D	D	D	D	D																								
	2.7pF (2R7)	N	N	S	A	A	A	D	B	B	B	B	B					D	D	D	D	D																								
	3.3pF (3R3)	N	N	S	A	A	A	D	B	B	B	B	B					D	D	D	D	D																								
	3.9pF (3R9)	N	N	S	A	A	A	D	B	B	B	B	B					D	D	D	D	D																								
	4.7pF (4R7)	N	N	S	A	A	A	D	B	B	B	B	B					D	D	D	D	D																								
	5.6pF (5R6)	N	N	S	A	A	A	D	B	B	B	B	B					D	D	D	D	D																								
	6.8pF (6R8)	N	N	S	A	A	A	D	B	B	B	B	B					D	D	D	D	D																								
	8.2pF (8R2)	N	N	S	A	A	A	D	B	B	B	B	B					D	D	D	D	D																								
	10pF (100)	N	N	S	A	A	A	D	B	B	B	B	B	C	C	C	C	D	D	D	D	D	D	D	D	D	D	D	G	G	K	K	K	K	G	G	K	K	K	K	G	G	K	K	K	K
	12pF (120)	N	N	S	A	A	A	D	B	B	B	B	B	C	C	C	C	D	D	D	D	D	D	D	D	D	D	D	G	G	K	K	K	K	G	G	K	K	K	K	G	G	K	K	K	K
	15pF (150)	N	N	S	A	A	A	D	B	B	B	B	B	C	C	C	C	D	D	D	D	D	D	D	D	D	D	D	G	G	K	K	K	K	G	G	K	K	K	K	G	G	K	K	K	K
	18pF (180)	N	N	S	A	A	A	D	B	B	B	B	B	C	C	C	C	D	D	D	D	D	D	D	D	D	D	D	G	G	K	K	K	K	G	G	K	K	K	K	G	G	K	K	K	K
	22pF (220)	N	N	S	A	A	A	D	B	B	B	B	B	C	C	C	C	D	D	D	D	G	D	D	D	D	D	D	G	G	K	K	K	K	G	G	K	K	K	K	G	G	K	K	K	K
	27pF (270)	N	N	S	A	A	A	D	B	B	B	B	B	C	C	C	C	D	D	D	D	G	D	D	D	D	D	D	G	G	K	K	K	K	G	G	K	K	K	K	G	G	K	K	K	K
	33pF (330)	N	N	S	A	A	A	D	B	B	B	B	C	C	C	C	C	D	D	D	D	K	D	D	D	D	D	D	G	G	K	K	K	K	G	G	K	K	K	K	G	G	K	K	K	K
	39pF (390)	N	N	S	A	A	A	D	B	B	B	B	C	C	C	C	C	D	D	D	D	K	D	D	D	D	D	D	G	G	K	K	K	K	G	G	K	K	K	K	G	G	K	K	K	K
	47pF (470)	N	N	S	A	A	A	D	B	B	B	C	C	C	C	C	C	D	D	D	D		D	D	D	D	D	G	G	G	K	K	K	K	G	G	K	K	K	K	G	G	K	K	K	K
	56pF (560)	N	N	S	A	A	A	D	B	B	B	C	D	C	C	C	D	D	D	D	D		D	D	D	D	D	G	G	G	K	K	K	K	G	G	K	K	K	K	G	G	K	K	K	K
	68pF (680)	N		S	A	A	A	D	B	B	B	C	D	C	C	C	D	D	D	D	D		D	D	D	D	D	K	G	G	K	K	K	K	G	G	K	K	K	K	G	G	K	K	K	K
	82pF (820)	N		S	A	A	B	D	B	B	B	D	D	C	C	C	D	D	D	D	D		D	D	D	D	D	K	G	G	K	K	K	K	G	G	K	K	K	K	G	G	K	K	K	K
	100pF (101)	N		S	A	B	B	D	B	B	B	D	D	C	C	D	D	D	D	D	K		D	D	D	D	D		G	G	K	K	K	K	G	G	K	K	K	K	G	G	K	K	K	K
	120pF (121)			S	A	B	D	D	B	B	B	D	G	C	C	D	D	D	D	D	K		D	D	D	D	D		G	G	K	K	K	K	G	G	K	K	K	K	G	G	K	K	K	K
	150pF (151)			S	B	D	D	D	B	B	B	D	G	C	C	D	G	D	D	K	K		D	D	D	D	D		G	G	K	K	K	K	G	G	K	K	K	K	G	G	K	K	K	K
	180pF (181)			S	B	D	D	D	B	B	B	G	G	C	C	D	G	D	D	K	K		D	D	D	D	K		G	G	K	K	K	K	G	G	K	K	K	K	G	G	K	K	K	K
	220pF (221)			S	D	D	D	D	B	B	B	G	G	C	C	G	G	D	D	K	K		D	D	D	D	K		G	G	K	K	K		G	G	K	K	K	K	G	G	K	K	K	K
	270pF (271)			X	D	D	D	D	B	C	C	G	P	C	C	G	K	K	K	K	K		D	D	D	K	K		G	G	K	K	K		G	G	K	K	K	M	G	G	K	K	K	
	330pF (331)			X	D	D	D	D	B	C	C	G	P	C	C	G	K	K	K	K	K		D	D	D	K	K		G	G	K	K	K		G	G	K	K	M	M	G	G	K	K	K	
	390pF (391)			X	D	D	D	D	B	C	C	G	P	C	C	G	M	K	K	K			D	D	D	K	K		G	G	K	K	K		G	G	K	K	M		G	G	K	K	K	
	470pF (471)			X	D	D	I		C	C	C	G		C	C	G	M	K	K	K			D	D	K	K	K		G	G	K	K	K		G	G	K	K	M		G	G	K	K	K	
	560pF (561)			X	D	D	I		C	D	D	G		C	C	G		K	K	K			D	D	K	K			G	G	K	K	K		G	G	K	K	M		G	G	K	K	K	
	680pF (681)				D	D	I		C	D	D	G		C	C	G		K	K	K			D	D	K	K			G	G	K	K	M		G	G	K	K	M		G	G	K	K	K	
	820pF (821)				D	D	I		C	G	G	G		C	C	G		K	K				D	D	K	K			G	G	K	K	M		G	G	K	K	M		G	G	K	M	M	
	1,000pF (102)				D	D	I		C	G	G	G		D	D	G		K	K				D	D	K	K			G	G	K	K	M		G	G	K	K	M		G	G	K	M	M	
	1,200pF (122)				D	D			C	G	G			D	D	G		K					D	D	K				G	G	K	K	M		G	G	M	M	M		G	G	K	M	M	
	1,500pF (152)				D	D			D	G	G			D	D	K		K					D	D	K				G	G	K	M	M		G	G	M	M	M		G	G	K	M	M	
	1,800pF (182)				D	D			D	G	G			D	D	M		K					D	D					G	G	K	M	M		G	G	M	M	M		G	G	K	M	M	
	2,200pF (222)				D	D			D	G	G			D	D	M		K					D	D					G	G	K	M	M		G	G	M	M	M		G	G	K	M	M	
	2,700pF (272)								D	G				D	D	M							D	D					G	G	K	M	M		G	G	M	M	M		G	G	K	M	M	
	3,300pF (332)								D	G				D	D	M							D	D					G	G	K	M			G	G	M	M			G	G	K	M	M	
	3,900pF (392)								D	G				D	D	M							D	K					G	G	M	M			G	G	M	M			G	G	K	M		
	4,700pF (472)								D	G				G									D	K					G	G	M	M			G	G	M	M			G	G	K	M		
	5,600pF (562)													G									D	K					G	G	M	M			G	G	M	M			G	G	M	M		
	6,800pF (682)													G									D	K					G	G	M		M		G	G	M	M			G	G	M	M		
	8,200pF (822)													G										M					G	G	M	M			G	G	M	M			G	G	M	M		
	0.010μF (103)													G															G	G	M				G	G	M				G	G	M	M		
	0.012μF (123)													K															G	G	M				G	G	M				G	G	M			
	0.015μF (153)													M															G	G					G	G					G	G				
	0.018μF (183)													M															G	G					G	G					G	G				
	0.022μF (223)													M															G	G					G	G					G	G				
	0.027μF (273)													M															G	K					G	K					G	G				
	0.033μF (333)													M															G	K					K	K					G	G				
	0.039μF (393)																												K	M					K	M					K	K				
	0.047μF (473)																												K	M					M	M					K	K				
	0.056μF (563)																												M	M					M	M					M	M				
	0.068μF (683)																												M	M					M						M	M				
	0.082μF (823)																												M						M						M	M				
	0.1μF (104)																												M						M						M					
	0.12μF (124)																																								M					

1. The letter in cell is expressed the symbol of product thickness.

X7R Dielectric 200V to 4000V

DIELECTRIC	X7R																																												
SIZE	0603	0805			1206							1210					1808					1812						1825						2220						2225					
RATED VOLTAGE (VDC)	200, 250	200, 250	500, 630	1000	200, 250	400, 450	500, 630	1000	1500	2000	2500	200, 250	400, 450	500, 630	1000	1500, 2000	500, 630	1000	1500, 2000	2500, 3000	4000	200, 250	500, 630	1000	1500, 2000	3000	4000	200, 250	500, 630	1000	1500, 2000	3000	4000	200, 250	500, 630	1000	1500, 2000	3000	4000	200, 250	500, 630	1000	1500, 2000	3000	4000
Capacitance																																													
100pF (101)	X	B	B	B	D		D	D	D	D	D	D		D	D	D																													
120pF (121)	X	B	B	B	D		D	D	D	D	D	D		D	D	D																													
150pF (151)	X	B	B	B	D		D	D	D	D	D	D		D	D	D	D	D	D	D	K																								
180pF (181)	X	B	B	B	D		D	D	D	D	D	D		D	D	D	D	D	D	D	K																								
220pF (221)	X	B	B	B	D		D	D	D	D	D	D		D	D	D	D	D	D	D	K																								
270pF (271)	X	B	B	B	D		D	D	D	D	D	D		D	D	D	D	D	D	D	K	D	D	D	D	K	K						K						K						K
330pF (331)	X	B	B	B	D		D	D	D	D	D	D		D	D	D	D	D	D	G	K	D	D	D	D	K	K						K						K						K
390pF (391)	X	B	B	B	D		D	D	D	D	D	D		D	D	D	D	D	D	G	K	D	D	D	D	K	K						K						K						K
470pF (471)	X	B	B	B	D		D	D	D	D	D	D		D	D	D	D	D	D	G	K	D	D	D	D	K	K						K						K						K
560pF (561)	X	B	B	B	D		D	D	D	D	D	D		D	D	D	D	D	D	G	K	D	D	D	D	K	K						K						K						K
680pF (681)	X	B	B	B	D		D	D	D	D	D	C		D	D	D	D	D	D	K	K	D	D	D	D	K	K						K						K						K
820pF (821)	X	B	B	B	D		D	D	D	D	D	C		D	D	D	D	D	D	K	K	D	D	D	D	K	K						K						K						K
1,000pF (102)	X	B	B	B	D		D	D	D	D	D	C		D	D	D	D	D	K	K	K	D	D	D	D	K	K	K	K	K	K	K	K	K	K	K	K	K	K	K	K	K	K	K	K
1,200pF (122)	X	B	B	B	D		D	D	G	G	G	C		D	D	M	D	D	K	K		D	D	D	D	K	M	K	K	K	K	K	M	K	K	K	K	K	M	K	K	K	K	K	M
1,500pF (152)	X	B	B	D	D		D	D	G	G	G	C		D	D	M	D	D	K	K		D	D	D	D	K	M	K	K	K	K	K	M	K	K	K	K	K	M	K	K	K	K	K	M
1,800pF (182)	X	B	B	D	D		D	D	G	G	G	C		D	D	M	D	D	K	K		D	D	D	D	M	M	K	K	K	K	K	M	K	K	K	K	K	M	K	K	K	K	K	M
2,200pF (222)	X	B	B	D	D		D	D	G	G	G	C		D	D	M	D	D	K			D	D	D	D	M		K	K	K	K	K		K	K	K	K	K		K	K	K	K	K	
2,700pF (272)	X	B	B	D	D		D	D	G	G		C		D	D	M	D	D	K			D	D	D	D	M		K	K	K	K	K		K	K	K	K	K		K	K	K	K	K	
3,300pF (332)	X	B	B	D	D		D	D	G	G		C		D	D	M	D	D	K			D	D	D	K	M		K	K	K	K	K		K	K	K	K	K		K	K	K	K	K	
3,900pF (392)	X	B	B	D	D		D	D	G			C		D	G	M	D	D	K			D	D	D	K			K	K	K	K	K		K	K	K	K	K		K	K	K	K	K	
4,700pF (472)	X	B	D	D	D		D	D	G			C		D	G	M	D	D	K			D	D	D	K			K	K	K	K	K		K	K	K	K	K		K	K	K	K	K	
5,600pF (562)	X	D	D	D	D		D	D	G			C		D	G	M	K	K	K			D	D	D	M			K	K	K	K	M		K	K	K	K	K		K	K	K	K	M	
6,800pF (682)	X	D	D	D	D		D	D	G			C		D	G	M	K	K	K			D	D	D	M			K	K	K	K	M		K	K	K	K	K		K	K	K	K	M	
8,200pF (822)	X	D	D	D	D		D	D				C		D	G	M	K	K				D	D	D	M			K	K	K	K	M		K	K	K	M	M		K	K	K	K	M	
0.010µF (103)	X	D	D		D		D	D				C		D	G		K	K				D	D	D	M			K	K	K	K	M		K	K	K	M	M		K	K	K	K	M	
0.012µF (123)		D	D		D		D	G				C		D	G		K	K				D	D	K				K	K	K	M	U		K	K	K	M	U		K	K	K	M	M	
0.015µF (153)		D	D		D		D	G				C		D	G		K	K				D	D	K				K	K	K	M	U		K	K	K	M	U		K	K	K	M	M	
0.018µF (183)		D	D		D		D					C		D	G		K	K				D	D	M				K	K	K	M	U		K	K	K	U	U		K	K	K	M	U	
0.022µF (223)		D	D		D		G					C		D	G		K	K				D	D	M				K	K	K	M			K	K	K	U			K	K	K	M		
0.027µF (273)		D			D		G					C		G	G		K	K				D	D	M				K	K	K	U			K	K	K	U			K	K	K	M		
0.033µF (333)		D			G		G					C		G	G		K	K				D	D	M				K	K	K	U			K	K	K	U			K	K	K	M		
0.039µF (393)		D			G		G					C		G	K		K	K				D	D	M				K	K	K	U			K	K	K	U			K	K	K	U		
0.047µF (473)		D			G		G					D		G	M		K	K				D	D	M				K	K	K	U			K	K	K	U			K	K	K	U		
0.056µF (563)		D			G		G					D		G	M		K	K				D	K	M				K	K	K	U			K	K	K	U			K	K	K	U		
0.068µF (683)		D			G	G						G		K	M		K					D	K	M				K	K	K				K	K	M				K	K	K			
0.082µF (823)		D			G	G						G		K			K					D	K	M				K	K	M				K	K	M				K	K	K			
0.10µF (104)		D			G	G						G		K								D	K	M				K	K	M				K	K	M				K	K	M			
0.12µF (124)					G							G	M	M								D	M					K	K	U				K	K	M				K	K	U			
0.15µF (154)					G							M	M	M								K	M					K	K	U				K	K	U				K	K	U			
0.18µF (184)					G							M	M									K	M					K	K	U				K	K	U				K	K	U			
0.22µF (224)					G							M	M									K	M					K	K	U				K	K	U				K	K	U			
0.27µF (274)												M	M									K	M					K	K	U				K	K	U				K	K	U			
0.33µF (334)												M	M									K	M					K	K	U				K	K	U				K	K	U			
0.39µF (394)												M										K	M					K	K					K	K	U				K	K	U			
0.47µF (474)												M										K	M					K	K					K	K					K	K				
0.56µF (564)												M										M						K	M					K	M					K	K				
0.68µF (684)												M										M						K	M					K	M					K	K				
0.82µF (824)																						M						K	U					K	U					K	M				
1.0µF (105)																						M						K						K	U					K	M				
1.5µF (155)																												M						M						M	U				
2.2µF (225)																												M						M						M					

1. The letter in cell is expressed the symbol of product thickness.

2. 0805 size, Cap.>0.068uF_200V only.

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 N_2 within oven are recommended.

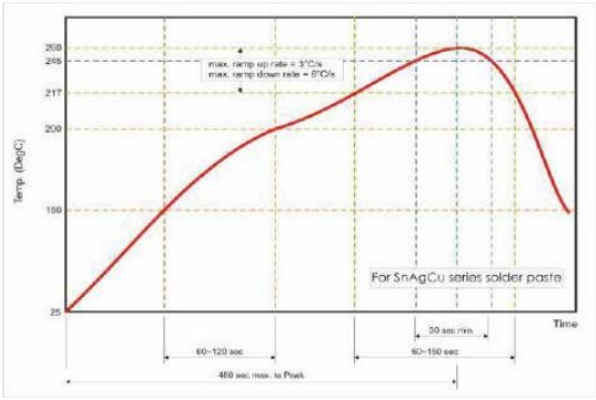


Fig. 2 Recommended reflow soldering profile for SMT process with SnAgCu series solder paste.

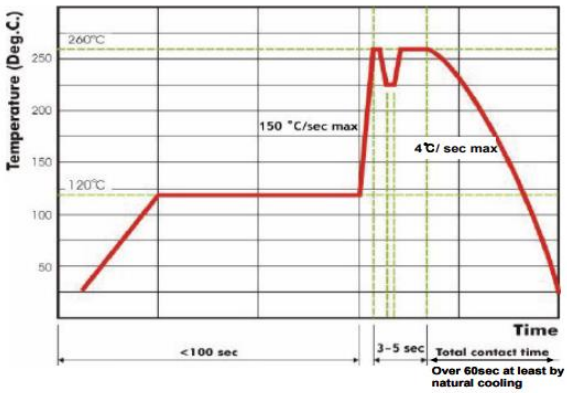


Fig. 3 Recommended wave soldering profile for SMT process with SnAgCu series solder.

Storage and handling conditions:

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

Cautions:

- 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.)
- In corrosive atmosphere, solderability might be degraded, and silver migration might occur to cause low reliability.
- 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.