Multilayer Ceramic Capacitors

Features:

- A wide selection of sizes is available (0402 to 1812)
- High capacitance in given case size
- Capacitor with lead-free termination (pure Tin)

Description

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

Applications

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

External Dimensions

Size Inches (mm)	L (mm)	W (mm)	T (mm)/Symbol		Remark	M_B (mm)
0603 (1608)	1.6 ±0.1	0.8 ±0.1	0.8 ±0.07	S		0.4 ±0.15
	1.6 +0.15 /- 0.1	0.8 +0.15 / -0.1	0.8 +0.15 / -0.1	X		
0805 (2012)	2 ±0.15	1.25 ±0.1	0.6 ±0.1	A		0.5 ±0.2
			0.8 ±0.1	B		
			1.25 ±0.1	D	#	
1206 (3216)	3.2 ±0.15	1.6 ±0.15	0.8 ±0.1	B		0.6 ±0.2
			0.95 ±0.1	C		
			1.15 ±0.15	J	#	
			1.25 ±0.1	D		
	3.2 ±0.2	1.6 ±0.2	1.6 ±0.2	G		
	3.2 +0.3 / -0.1	1.6 +0.3 / -0.1	1.6 +0.3 / -0.1	P		

Reflow soldering only is recommended.

Dimensions : Inches (Millimetres)

General Electrical Data

Dielectric	NPO	X7R	Y5V
Size	0603, 0805, 1206		
Capacitance range*	0.5 pF to 0.039 µF	100 pF to 1 µF	10 nF to 680 nF
Capacitance tolerance**	Cap ≤ 5 pF: B (±0.1 pF), C (±0.25 pF) 5 pF< Cap < 10 pF: C (±0.25 pF), D (±0.5 pF) Cap ≥ 10 pF: F (±1%), G (±2%), J (±5%), K (±10%)	J (±5%), K (±10%), M (±20%)	M (±20%), Z (-20 / +80%)

General Electrical Data

Dielectric	NPO	X7R	Y5V
Rated voltage (WVDC)	16 V, 25 V, 50 V, 100 V	10 V, 16 V, 25 V, 50 V, 100 V	
Tan δ*	Cap < 30 pF: Q ≥ 400+20C Cap ≥ 30 pF: Q ≥ 1,000	Note 1	
Insulation resistance at Ur	≥ 10 Ω or R × C ≥ 500 Ω × F whichever is less		
Operating temperature	-55°C to +125°C		-25 to +85°C
Capacitance characteristic	±30 ppm	±15%	+30 / -80%
Termination	Ni / Sn (lead-free termination)		

* Measured at the condition of 30 to 70% related humidity
NP0 : Apply 1 ±0.2 V_{rms}, 1 MHz ±10% for Cap ≤ 1,000 pF and 1 ±0.2 V_{rms}, 1 kHz ±10% for Cap>1,000 pF, 25°C at ambient temperature
X7R : Apply 1 ±0.2 V_{rms}, 1 kHz ± 10%, at 25°C ambient temperature
Y5V : Apply 1 ±0.2 V_{rms}, 1 kHz ±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.

Note 1:

X7R

Rated vol.	D.F.	Exception of D.F.	
≥ 50 V	≤ 2.5%	≤ 3%	0603 ≥ 0.047 µF; 0805 ≥ 0.18 µF, 1206 ≥ 0.47 µF
25 V	≤ 3.5%	≤ 5%	0805 ≥ 1 µF; 1210 ≥ 10 µF
		≤ 7%	0603 ≥ 0.33 µF
		10%	0402 ≥ 0.1 µF; 0603 ≥ 0.68 µF
16 V	≤ 3.5%	≤ 5%	0402 ≥ 0.033 µF; 0603 ≥ 0.15 µF; 0805 ≥ 0.68 µF; 1206 ≥ 2.2 µF
		≤ 10%	1210 ≥ 22 µF; 0603 ≥ 0.68 µF
10 V	≤ 5.0%	≤ 10%	0603 ≥ 0.33 µF; 0805 ≥ 2.2 µF

Y5V

Rated vol.	D.F.	Exception of D.F.	
≥ 50 V	≤ 5.0%	7.0%	0603 ≥ 0.1 µF; 0805 ≥ 0.47 µF
25V	≤ 5.0%	≤7%	0402 ≥ 0.047 µF; 0603 ≥ 0.1 µF; 0805 ≥ 0.33 µF; 1206 ≥ 1 µF
		≤ 9%	0402 ≥ 0.068 µF; 0603 ≥ 0.47 µF
16 V (C < 1 µF)	≤ 7.0%	≤ 9%	0402 ≥ 0.068 µF; 0603 ≥ 0.68 µF
16 V (C ≥ 1 µF)	≤ 9.0%	≤ 12.5%	0805 ≥ 3.3 µF; 1206 ≥ 10 µF; 1210 ≥ 22 µF; 1812 ≥ 47µF
10 V	≤ 12.5%		0402 ≥ 0.47 µF

Capacitance Range (0603)

Dielectric	NP0			X7R			Y5V		
Size	0603								
Rated Voltage (V dc)	16 (V)	25 (V)	50 (V)	16 (V)	25 (V)	50 (V)	16 (V)	25 (V)	50 (V)
22 pF (220)	S	S	S	-	-	-	-	-	-
100 pF (101)	S	S	S	S	S	S	-	-	-
220 pF (221)	S	S	S	S	S	S	-	-	-
1,000 pF (102)	S	S	S	S	S	S	-	-	-
0.1 µF (104)	-	-	-	S	S	S	S	S	S
220 pF (221)	S	S	S	S	S	S	-	-	-
470 pF (471)	S	S	S	S	S	S	-	-	-
0.010 µF (103)	-	-	-	-	-	-	S	S	S

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

Capacitance Range (0805)

Dielectric	NP0			X7R			Y5V		
Size	0805								
Rated Voltage (V dc)	16 (V)	50 (V)	100 (V)	16 (V)	50 (V)	100 (V)	16 (V)	50 (V)	100 (V)
1,000 pF (102)	B	B	B	B	B	B	-	-	-
2,200 pF (222)	B	B	B	B	B	B	-	-	-
0.22 µF (224)	-	-	-	D	D	-	-	-	-
0.33 µF (334)	-	-	-	D	D	-	-	-	-
0.47 µF (474)	-	-	-	D	D	-	-	-	-
100 pF	-	-	-	B	B	B	-	-	-
220 pF	A	A	A	B	B	B	-	-	-
470 pF	-	-	-	B	B	B	-	-	-
0.22 µF (224)	-	-	-	D	D	-	-	-	-
0.33 µF (334)	-	-	-	D	D	-	B	B	-
0.47 µF (474)	-	-	-	D	D	-	B	B	-
0.010 µF (103)	D	-	-	B	B	B	A	A	B
0.022 µF (223)	-	-	-	B	B	B	A	A	B
0.047 µF (473)	-	-	-	B	B	D	-	-	-
0.1 µF (104)	-	-	-	B	B	D	-	-	-

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

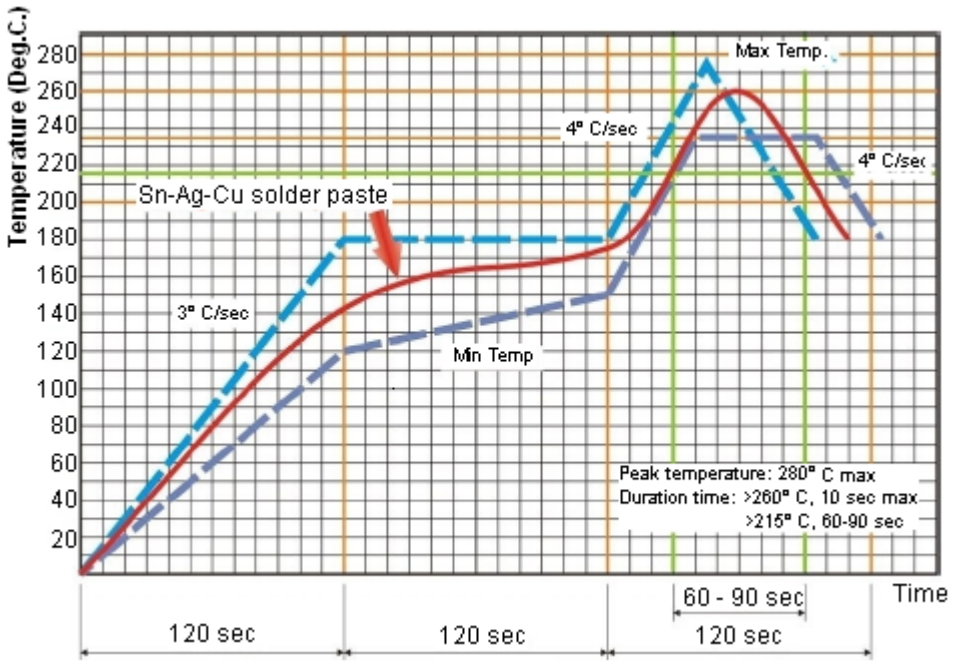
Capacitance Range (1206)

Dielectric	NP0		X7R		Y5V	
Size	1206					
Rated Voltage (V dc)	25 (V)	50 (V)	25 (V)	50 (V)	25 (V)	50 (V)
0.33 µF	-	-	C	D	B	B
0.47 µF	-	-	J	P	B	B
10 nF	-	-	-	-	-	-
100 nF	-	-	-	-	-	-

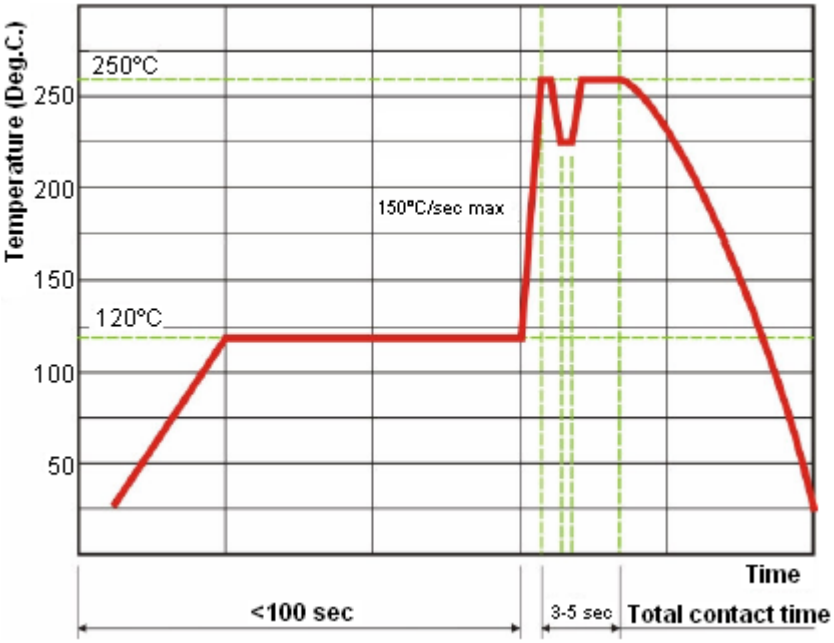
1. The letter in cell is expressed the symbol of product thickness.

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.



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



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

Part Number Explanation:

U	0603	C	220	J	C	T
Rated Voltage	Size	Dielectric	Capacitance	Tolerance	Termination	Packaging

Rated Voltage : Two significant digits followed by no. of zeros and R is in place of decimal point)
A = 100 V, B = 16 V, T = 25 V and U = 50 V
Size : 0603 inches (1608 mm), 0805 inches (2012 mm) and 1206 inches (3216 mm)
Dielectric : C = NP0 (C0G), R = X7R and F = Y5V
Capacitance : Two significant digits followed by number of zeros and R is in place of decimal point
eg: 102 = 10 x 10^2 = 1,000 pF
Tolerance : B = ±0.1 pF, C = ±0.25 pF, D = ±0.5 pF, F = ±1%, G = +2% and J = +5%
Termination : C = Cu / Ni / Sn
Packaging : T = 7 inches reeled