

1. Introduction

WTC middle and high voltage series MLCC is designed by a special internal electrode pattern, which can reduce voltage concentrations by distributing voltage gradients throughout the entire capacitor. This special design also affords increased capacitance values in a given case size and voltage rating.

Chips size 1206 and larger to use on reflow soldering process only. Capacitors with X7R dielectrics are not intended for AC line filtering applications. Capacitors may require protective surface coating to prevent external arcing.

2. Features

- a. High voltage in a given case size.
- b. High stability and reliability.

3. Applications

- a. Snubbers in high frequency power converters.
- b. High voltage coupling/DC blocking.
- c. DC-DC converters.
- d. Back-lighting inverters.

Dimensions Table

Size	L (mm)	W (mm)	Thickness (mm)/Symbol		Remark	MB (mm)
0805 (2012)	2.00 ±0.15	1.25 ±0.10	0.60 ±1.0	A	-	0.50 ±0.20
			0.80 ±0.10	B	-	
			1.25 ±0.10	D	#	
1206 (3216)	3.20 ±0.15	1.60±0.15	0.80 ±0.10	B	-	0.60±0.20
			0.95 ±0.10	C	-	
			1.25 ±0.10	D	-	
	3.20 ±0.20	1.60 ±0.20	1.60 ±0.20	G	-	

Dimensions : Millimetres

General Electrical Data

Dielectric	NP0	X7R
Size	0805, 1206	
Capacitance*	0.5pF to 6800pF	100pF to 0.47µF
Capacitance tolerance***	Cap.5pF: C (±0.25pF) 5pF<Cap<10pF: D (±0.5pF) Cap.10pF: J (±5%), K (±10%)	K (±10%), M (±20%)
Rated voltage (WVDC)	200V to 3kV	
Q*	Cap<30pF: Q≥400+20C Cap.30pF: Q≥1000	≤2.5%
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 WV DC 500~999V: ≥1.5 x WV DC 1000~3000V: ≥1.2 x WV DC	
Operating temperature	-55 to +125°C	
Capacitance characteristic	±30ppm	±15%
Termination	Ni/Sn (lead-free termination)	

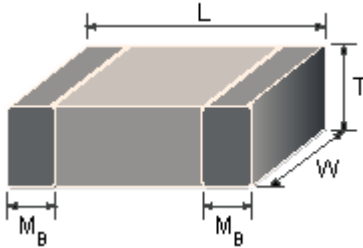
* Measured at the condition of 30~70% related humidity.

NP0: Apply 1.0 ±0.2Vrms, 1.0MHz ±10% for Cap ≤1000pF and 1.0 ±0.2Vrms, 1.0kHz ±10% for Cap >1000pF, 25°C at ambient temperature.

X7R: Apply 1.0 ±0.2Vrms, 1.0kHz ±10%, at 20°C ambient temperature.

** Measured at 500VDC for 60 seconds. for Ur >500V DC.

*** 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 (X7R Dielectric 200V to 630V)

Dielectric	X7R			
	0805		1206	
Size				
Rated Voltage (V dc)	200 (V)	630 (V)	200 (V)	630 (V)
0.18µF (184)	-	-	-	-
0.22µF (224)	-	-	-	-
0.27µF (274)	-	-	-	-
0.33µF (334)	-	-	-	-
0.39µF (394)	-	-	-	-
0.47µF (474)	-	-	-	-

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

2. The letter in cell with "A" mark is expressed product with Ag/Ni/Sn terminators.

Capacitance Range (NP0 Dielectric 200V to 630V)

Dielectric	NP0		
	0805	1206	
Size			
Rated Voltage (V dc)	200 (V)	200 (V)	630 (V)
0.5pF (0R5)	A	-	-
1.0pF (1R0)		-	-
1.2pF (1R2)		-	-
1.5pF (1R5)		B	B
1.8pF (1R8)			
2.2pF (2R2)			
2.7pF (2R7)			
3.3pF (3R3)			
3.9pF (3R9)			

Capacitance Range (NP0 Dielectric 200V to 630V)

Dielectric	NP0				
	0805	1206			
Size	200 (V)	200 (V)	630 (V)		
Rated Voltage (V dc)	200 (V)	200 (V)	630 (V)		
4.7pF (4R7)	A	B	B		
5.6pF (5R6)					
6.8pF (6R8)					
8.2pF (8R2)					
10pF (100)					
12pF (120)					
15pF (150)					
18pF (180)					
22pF (220)					
27pF (270)					
33pF (330)					
39pF (390)					
47pF (470)					
56pF (560)					
68pF (680)					
82pF (820)					
100pF (101)					
120pF (121)					
150pF (151)	B				
180pF (181)					
220pF (221)	D				
270pF (271)					
330pF (331)					
390pF (391)					
470pF (471)					
560pF (561)				C	C
680pF (681)					D
820pF (821)					G
1000pF (102)	-	-	-		
1200pF (122)					
1500pF (152)					
1800pF (182)					
2200pF (222)					
2700pF (272)					
3300pF (392)					
3900pF (392)					
4700pF (472)					
5600pF (562)					
6800pF (682)					

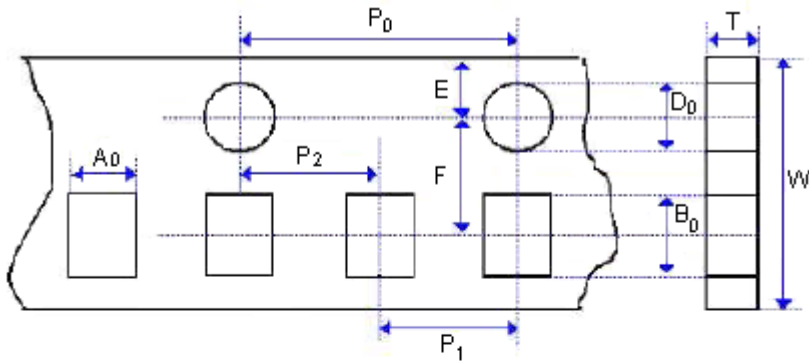
Capacitance Range (X7R Dielectric 200V to 630V)

Dielectric	X7R			
	0805		1206	
Size	200 (V)	630 (V)	200 (V)	630 (V)
Rated Voltage (V dc)	200 (V)	630 (V)	200 (V)	630 (V)
100pF (101)			-	-
120pF (121)			-	-
150pF (151)				
180pF (181)				
220pF (221)				
270pF (271)				
330pF (331)				
390pF (391)				
470pF (471)				
560pF (561)				
680pF (681)	B	B^		
820pF (821)				
1000pF (102)				
1200pF (122)				
1500pF (152)				
1800pF (182)			D	D^
2200pF (222)				
2700pF (272)				
3300pF (332)				
3900pF (392)		-		
4700pF (472)		-		
5600pF (562)		-		
6800pF (682)		-		
8200pF (822)		-		
0.010μF (103)		-		
0.012μF (123)	D	-		
0.015μF (153)		-		
0.018μF (183)		-		
0.022μF (223)		-		
0.027μF (273)	-	-		G^
0.033μF (333)	-	-	-	
0.039μF (393)	-	-	-	-
0.047μF (473)	-	-	-	-
0.056μF (563)	-	-	-	-
0.068μF (683)	-	-	-	-
0.082μF (823)	-	-	-	-
0.10μF (104)	-	-	-	-
0.12μF (124)	-	-	-	-
0.15μF (154)	-	-	-	-

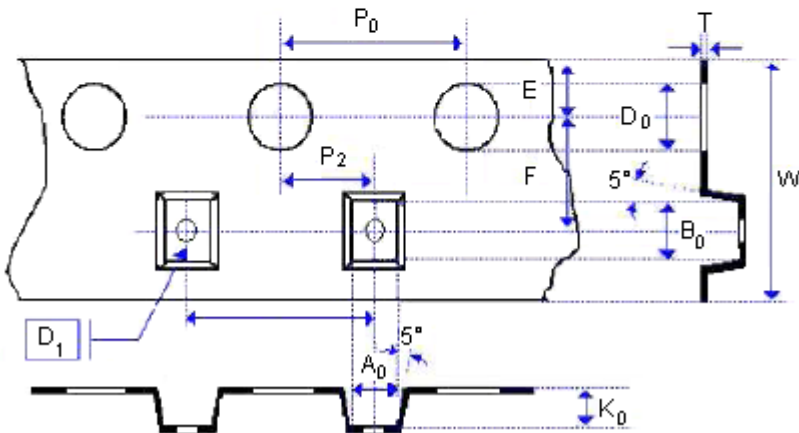
1. The letter in cell is expressed the symbol of product thickness.

Appendixes

Tape and reel dimensions

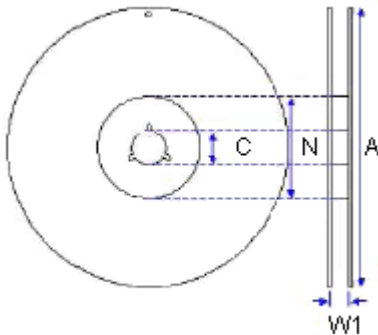


The dimension of paper tape



The dimension of plastic tape

Size	0805		1206		
Thickness	B	C, D, I	B	C, D	G
A0	1.50 ±0.10	<1.57	2.00 ±0.10	<1.85	<1.95
B0	2.30 ±0.10	<2.40	3.50 ±0.10	<3.46	<3.67
T	0.95 ±0.05	0.23 ±0.05	0.95 ±0.05	0.23 ±0.05	0.23 ±0.05
K0	-	<2.50	-	<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
P0	4.00 ±0.10	4.00 ±0.10	4.00 ±0.10	4.00 ±0.10	4.00 ±0.10
10xP0	40.0 ±0.10	40.0 ±0.10	40.0 ±0.10	40.0 ±0.10	40.0 ±0.10
P1	4.00 ±0.10	4.00 ±0.10	4.00 ±0.10	4.00 ±0.10	4.00 ±0.10
P2	2.00 ±0.05	2.00 ±0.05	2.00 ±0.05	2.00 ±0.05	2.00 ±0.05
D0	1.55 ±0.05	1.50 ±0.05	1.50 ±0.05	1.50 ±0.05	1.50 ±0.05
D1	-	1.00 ±0.10	-	1.00 ±0.10	1.00 ±0.10
E	1.75 ±0.05	1.75 ±0.10	1.75 ±0.10	1.75 ±0.10	1.75 ±0.10
F	3.50 ±0.05	3.50 ±0.05	3.50 ±0.05	3.50 ±0.05	3.50 ±0.05

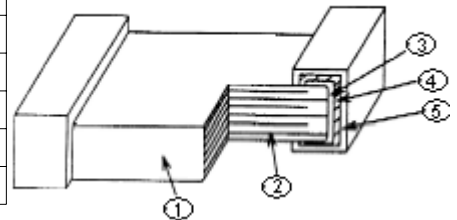


The dimension of reel

Size	0805, 1206		
Reel size	7"	10"	13"
C	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
A	178.0 ±0.10	250.0 ±1.0	330.0 ±1.0
N	60.0+1/-0	100.0 ±1.0	100 ±1.0

Constructions

Number	Name	NP0, X7R*	NPO, X7R,
1	Ceramic material	BaTiO ₃ based	
2	Inner electrode	AgPd alloy	Ni
3	Termination	Inner layer	Cu
4		Middle layer	Ni
5		Outer layer	Sn



The construction of MLCC

* Partial NP0;X7R items are with Ag/Ni/Sn terminations, please ref to product range of NP0;X7R dielectric for detail.

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:

- Don't store products in a corrosive environment such as sulfide, chloride gas, or acid. It may cause oxidization of electrode, which easily be resulted in poor soldering.
- To store products on the shelf and avoid exposure to moisture.
- Don't expose products to excessive shock, vibration, direct sunlight and so on.

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.

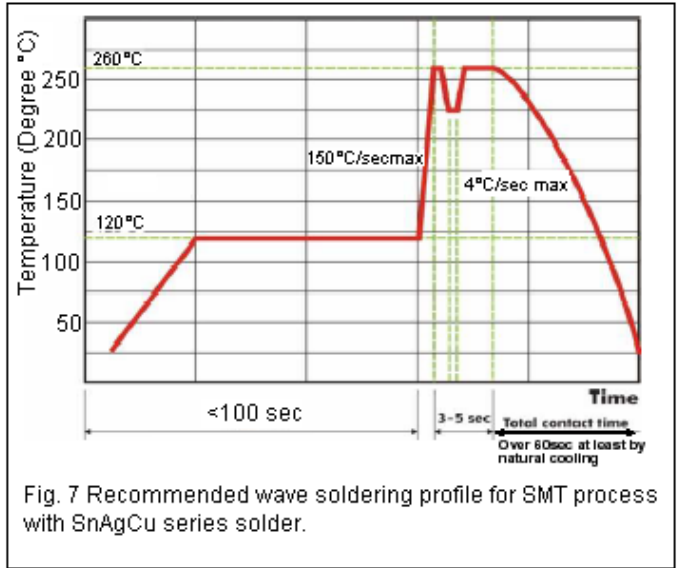
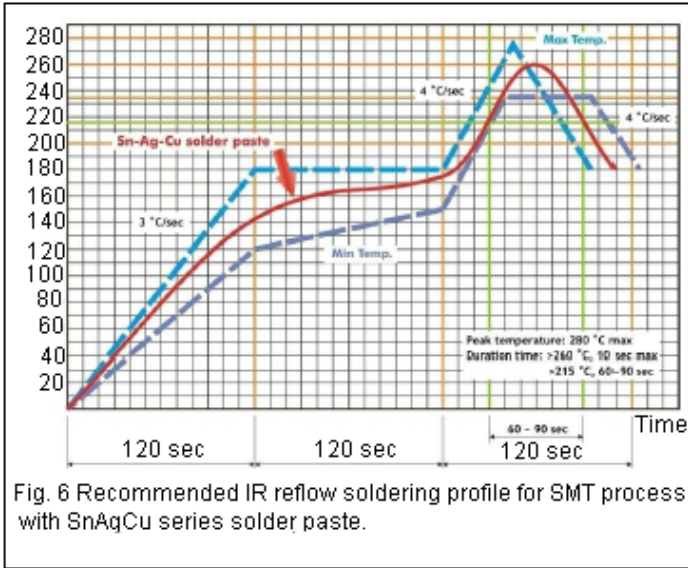


Fig. 6 Recommended IR reflow soldering profile for SMT process with SnAgCu series solder paste.

Fig. 7 Recommended wave soldering profile for SMT process with SnAgCu series solder.

Specification Table

Description	Dielectric	Size	Rated Voltage (V dc)	Capacitance (pF)	Part Number
MLCC, 0805, NP0, 200V, 15pF	NP0	0805	200	15 (150)	MCCA000606
MLCC, 0805, NP0, 200V, 22pF				22 (220)	MCCA000607
MLCC, 0805, NP0, 200V, 33pF				33 (330)	MCCA000608
MLCC, 0805, NP0, 200V, 47pF				47 (470)	MCCA000609
MLCC, 0805, NP0, 200V, 68pF				68 (680)	MCCA000610
MLCC, 0805, NP0, 200V, 100pF				100 (101)	MCCA000611
MLCC, 0805, NP0, 200V, 150pF				150 (151)	MCCA000612
MLCC, 0805, X7R, 200V, 220pF	X7R			220 (221)	MCCA000613
MLCC, 0805, NP0, 200V, 220pF	NP0				MCCA000614
MLCC, 0805, X7R, 200V, 330pF	X7R			330 (331)	MCCA000615
MLCC, 0805, NP0, 200V, 330pF	NP0				MCCA000616
MLCC, 0805, X7R, 200V, 470pF	X7R			470 (471)	MCCA000617
MLCC, 0805, X7R, 200V, 680pF				680 (681)	MCCA000618
MLCC, 0805, X7R, 200V, 1nF				1,000 (102)	MCCA000619
MLCC, 0805, X7R, 200V, 1.5nF				1,500 (152)	MCCA000620
MLCC, 0805, X7R, 200V, 2.2nF				2,200 (222)	MCCA000621
MLCC, 0805, X7R, 200V, 3.3nF				3,300 (332)	MCCA000622
MLCC, 0805, X7R, 200V, 4.7nF		4,700 (472)	MCCA000623		
MLCC, 0805, X7R, 200V, 6.8nF		6,800 (682)	MCCA000624		
MLCC, 0805, X7R, 200V, 10nF		10,000 (103)	MCCA000625		

Dimensions : Inches (Millimetres)

Specification Table

Description	Dielectric	Size	Rated Voltage (V dc)	Capacitance (pF)	Part Number
MLCC, 1206, NP0, 200V, 1nF	NP0	1206	200	1,000 (102)	MCCA000626
MLCC, 1206, X7R, 200V, 15nF	X7R			1,500 (152)	MCCA000627
MLCC, 1206, X7R, 200V, 22nF				2,200 (222)	MCCA000628
MLCC, 1206, NP0, 630V, 100pF	NP0		630	100 (101)	MCCA000629
MLCC, 1206, X7R, 630V, 1nF	X7R			1,000 (102)	MCCA000630
MLCC, 1206, X7R, 630V, 2.2nF				2,200 (222)	MCCA000631
MLCC, 1206, X7R, 630V, 4.7nF				4700 (472)	MCCA000632
MLCC, 1206, X7R, 630V, 10nF				10,000 (103)	MCCA000633

Dimensions : Inches (Millimetres)

Part Number Explanation:

MLCC 0805 (2012)

Size

N

Dielectric

200

Rated voltage

Size: : MLCC 1206 (3216)
Dielectric: : N : F = Y5V.
Rated voltage: : Two significant digits followed by no. of zeros and R is in place of decimal point.

201 = 200 VDC
 251 = 250 VDC
 501 = 500 VDC
 631 = 630 VDC
 102 = 1000 VDC
 202 = 2000 VDC
 302 = 3000 VDC

* Partial NP0;X7R items are with Ag/Ni/Sn terminations, please ref to below product range of NP0;X7R dielectric for detail.

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