

MULTILAYER CERAMIC CAPACITORS

Low Profile Series (TT)

1. 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.

WTC TT series MLCC is used in product having thickness concerned generally have high capacitance and thinner product thickness. The high dielectric constant material X7R, X5R and Y5V are used for this series product.

2. FEATURES

- Standard size with thin thickness.
- Small size with high capacitance.
- Capacitor with lead-free termination (pure Tin).

3. APPLICATIONS

- For LCD panels.
- For PCMCA cards.
- For IC packaging and modules.
- Any thickness concerned products.

4. HOW TO ORDER

<u>TT</u>	<u>31</u>	<u>X</u>	<u>225</u>	<u>K</u>	<u>100</u>	<u>C</u>	<u>I</u>
Series	Size	Dielectric	Capacitance	Tolerance	Rated voltage	Termination	Packaging style
TT=Low profile	18=0603 (1608) 21=0805 (2012) 31=1206 (3216) 32=1210 (3225)	X=X5R F=Y5V	Two significant digits followed by no. of zeros. And R is in place of decimal point. eg.: 225=22x10 ⁵ =2,200,000pF =2.2μF	K=±10% M=±20% Z=-20/+80%	Two significant digits followed by no. of zeros. And R is in place of decimal point. 6R3=6.3 VDC 100=10 VDC 160=16 VDC 250=25 VDC 500=50 VDC	C=Cu/Ni/Sn	T=7" reel (paper tape) P=7" reel (plastic tape)

5. EXTERNAL DIMENSIONS

Size Inch (mm)	L (mm)	W (mm)	T max (mm)/Symbol		M _B (mm)
0603(1608)	1.6+0.15/-0.10	0.8+0.15/-0.10	0.60	H	0.50±0.20
0805 (2012)	2.00±0.20	1.25±0.20	0.95	T	0.50±0.20
1206 (3216)	3.20±0.20	1.60±0.20	0.95	T	0.60±0.20
			1.30	J	
1210 (3225)	3.20±0.30	2.50±0.20	0.95	T	0.75±0.25

* Reflow soldering process only is recommended.

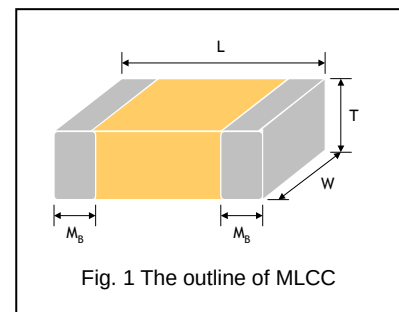


Fig. 1 The outline of MLCC

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6. GENERAL ELECTRICAL DATA

Dielectric	X5R	Y5V
Size	0603, 0805, 1206, 1210	
Capacitance range*	0.22μF to 10μF	2.2μF to 10μF
Capacitance tolerance**	K (±10%), M (±20%)	Z (-20/+80%)
Rated voltage (WVDC)	6.3V, 10V, 16V	10V, 16V
Tan δ*	16V, 10V: ≤10.0% 6.3V: ≤15.0%	16V, 10V: 12.5%
Insulation resistance at Ur	RxC≥500ΩxF	
Operating temperature	-55 to +85°C	-25 to +85°C
Capacitance characteristic	±15%	+30/-80%
Termination	Ni/Sn (lead-free termination)	

* Measured at 1.0±0.2Vrms, 1.0kHz±10%, 30~70% related humidity, 25°C ambient temperature for X7R, X5R and at 20°C for Y5V.

** 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.

7. CAPACITANCE RANGE

7-1 X7R & X5R dielectric

Dielectric		X5R							
Size		0603	0805			1206			1210
Rated voltage (VDC)		10	6.3	10	16	6.3	10	16	10
Capacitance	0.22μF (224)	H							
	1.0μF (105)			T	T		T	T	
	1.5μF (155)			T	T		T	T	
	2.2μF (225)		T	T	T		T	T	
	3.3μF (335)						T	T	T
	4.7μF (475)		T				T	T	T
	6.8μF (685)								
	10μF (106)					J	J		
22μF (226)									

7-2 Y5V dielectric

Dielectric	Y5V					
Size	0805		1206			1210
Rated voltage (VDC)	10	16	10	16	25	10
Capacitance	1.0μF (105)					
	1.5μF (155)					
	2.2μF (225)					
	3.3μF (335)	T				
	4.7μF (475)	T	T	T		
	6.8μF (685)		T			
	10μF (106)		T			T
	22μF (226)					

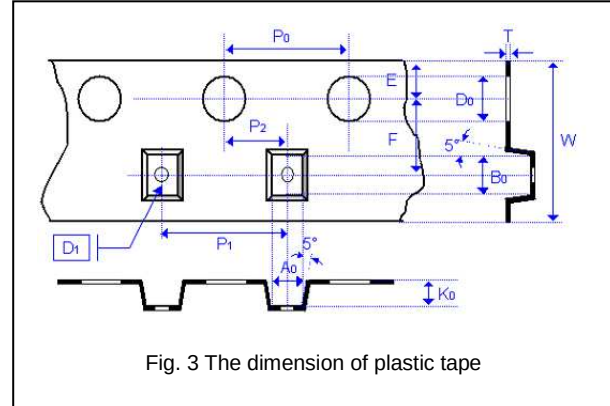
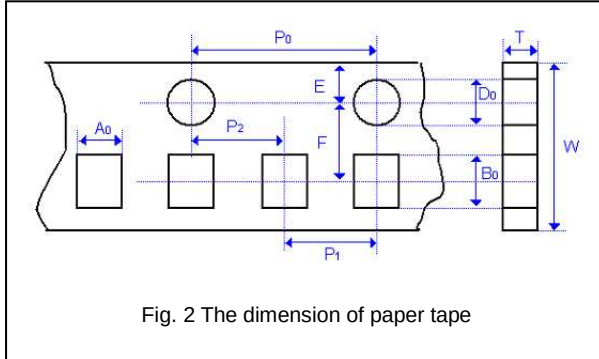
8. PACKAGING STYLE AND QUANTITY

Size	Thickness Max (mm)/Symbol		7" reel	
			Paper tape	Plastic tape
0603 (1608)	0.60	H	4k	-
0805 (2012)	0.95	T	4k	-
1206 (3216)	0.95	T	4k	-
	1.30	J	-	3k
1210 (3225)	0.95	T	-	3k

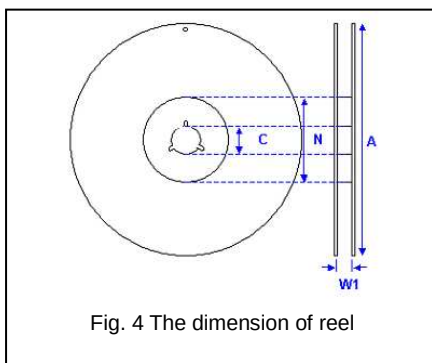
Unit: pieces

APPENDIXES

■ Tape & reel dimensions



Size	0603	0805	1206		1210
Thickness	H	T	T	J	T
A ₀	1.10±0.10	1.50±0.10	2.00±0.10	<1.85	<2.97
B ₀	1.90±0.10	2.30±0.10	3.50±0.10	<3.46	<3.73
T	0.60±0.05	0.95±0.05	0.95±0.05	0.23±0.05	0.23±0.05
K ₀	-	-	-	<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
P ₀	4.00±0.10	4.00±0.10	4.00±0.10	4.00±0.10	4.00±0.100
10xP ₀	40.0±0.10	40.0±0.10	40.0±0.10	40.0±0.10	40.0±0.10
P ₁	2.00±0.05	4.00±0.10	4.00±0.10	4.00±0.10	4.00±0.10
P ₂	2.00±0.05	2.00±0.05	2.00±0.05	2.00±0.05	2.00±0.05
D ₀	1.55±0.05	1.55±0.05	1.50±0.05	1.50±0.05	1.50±0.05
D ₁	-	-	-	1.00±0.10	1.00±0.10
E	1.75±0.05	1.75±0.05	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

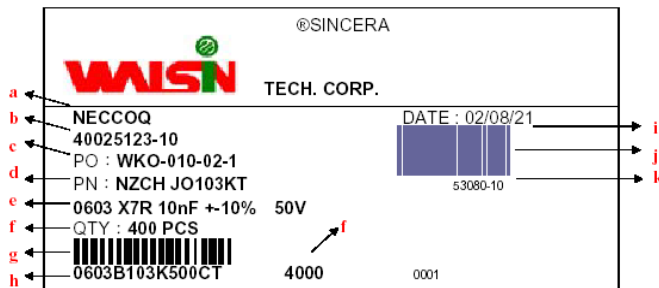


Size	0603, 0805, 1206, 1210		
Reel size	7"	10"	13"
C	13.0+0.5/-0.2	13.0+0.5/-0.2	13.0+0.5/-0.2
W ₁	8.4+1.5/-0	8.4+1.5/-0	8.4+1.5/-0
A	178.0±0.10	250.0±1.0	330.0±1.0
N	60.0+1.0/-0	100.0±1.0	100±1.0

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■ Description of customer label



- a. Customer name
- b. WTC order series and item number
- c. Customer P/O
- d. Customer P/N
- e. Description of product
- f. Quantity
- g. Bar code including quantity & WTC P/N or customer
- h. WTC P/N
- i. Shipping date
- j. Order bar code including series and item numbers
- k. Serial number of label

■ Constructions

No.	Name		X7R, X5R, Y5V
①	Ceramic material		BaTiO ₃ based
②	Inner electrode		Ni
③	Termination	Inner layer	Cu
④		Middle layer	Ni
⑤		Outer layer	Sn (Matt)

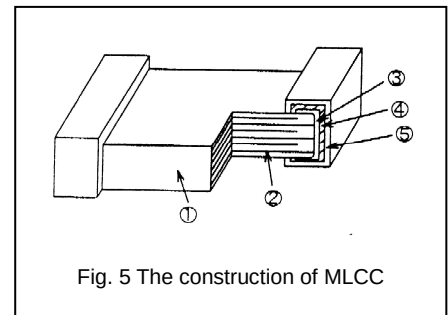


Fig. 5 The construction of MLCC

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

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■ 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.

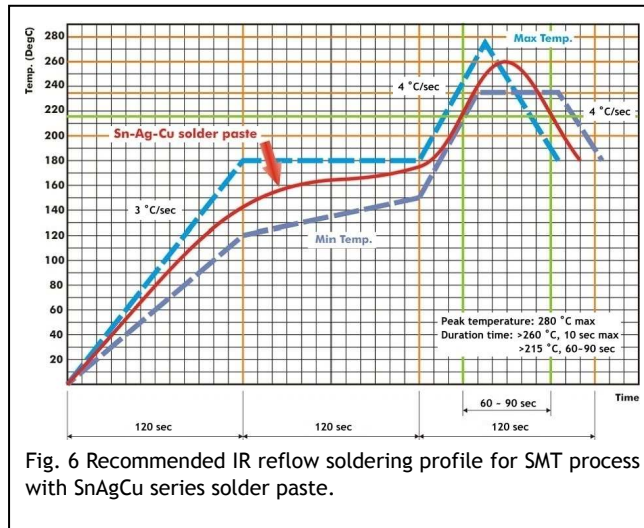


Fig. 6 Recommended IR reflow soldering profile for SMT process with SnAgCu series solder paste.

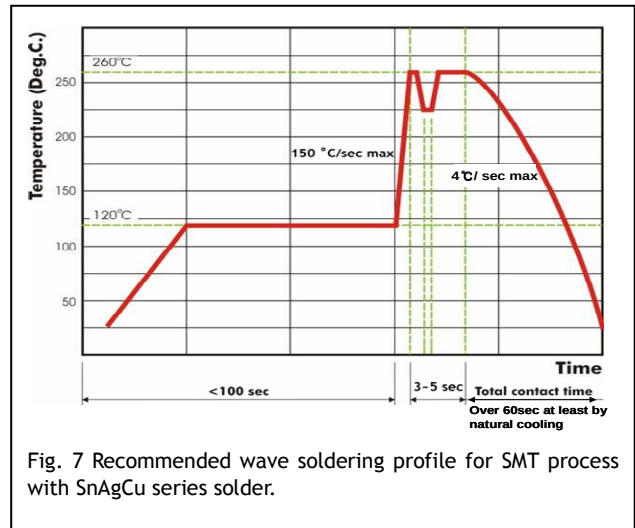


Fig. 7 Recommended wave soldering profile for SMT process with SnAgCu series solder.