MULTILAYER CERAMIC CAPACITORS
Middle and High Voltage Series (200V to 3kV)

華新科技股份有限公司
Walsin Technology Corporation

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

4. HOW TO ORDER

1808	N	100	J	202	L	T
Size	**Dielectric**	**Capacitance**	**Tolerance**	**Rated voltage**	**Termination**	**Packaging**
Inch (mm) **0603** (1608) **0805** (2012) **1206** (3216) **1210** (3225) **1808** (4520) **1812** (4532)	**N**=NP0 (C0G) **B**=X7R **F**=Y5V	Two significant digits followed by no. of zeros. And R is in place of decimal point. eg.: 0R5=0.5pF 1R0=1.0pF 100=10x10^0 =10pF	**B**=±0.1pF **C**=±0.25pF **D**=±0.5pF **G**=±2% **J**=±5% **K**=±10% **M**=±20% **Z**=-20/+80%	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	**C**=Cu/Ni/Sn (for NP0, X7R, Y5V dielectric) **L**=Ag/Ni/Sn (for partial NP0 items)	**T**=7" reeled **G**=13" reeled

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

5. EXTERNAL DIMENSIONS

Size Inch (mm)	L (mm)	W (mm)	T (mm)/Symbol		Remark	M_B (mm)
0603(1608)	1.60±0.10	0.80±0.10	0.80±0.07	S		0.40±0.15
0805 (2012)	2.00±0.15	1.25±0.10	0.60±0.10	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	#	
1210 (3225)	3.20±0.30	2.50±0.20	0.95±0.10	C	#	0.75±0.25
			1.25±0.10	D	#	
	3.20±0.40	2.50±0.30	1.60±0.20	G	#	
			2.50±0.30	M	#	
1808 (4520)	4.50+0.5/-0.3	2.03±0.25	1.25±0.10	D	#	0.50±0.25
			2.00±0.20	K	#	
1812 (4532)	4.50+0.5/-0.3	3.20±0.30	1.25±0.10	D	#	0.50±0.25
			1.60±0.20	G	#	
			2.00±0.20	K	#	

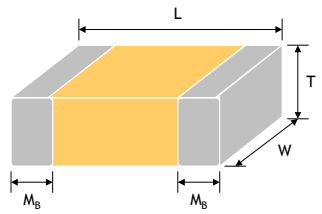


Fig. 1 The outline of MLCC

Reflow soldering only is recommended.

6. GENERAL ELECTRICAL DATA

Dielectric	NP0	X7R	Y5V
Size	0603, 0805, 1206, 1210, 1808, 1812		0805, 1206, 1210, 1812
Capacitance*	0.5pF to 6800pF	100pF to 0.47μF	0.01μnF 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 3kV		200V, 250V
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 500~999V: ≥1.5 x WVDC 1000~3000V: ≥1.2 x WVDC		
Operating temperature	-55 to +125°C		-25 to +85°C
Capacitance characteristic	±30ppm	±15%	+30/-80%
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, Y5V: Apply 1.0±0.2Vrms, 1.0kHz±10%, at 20°C ambient temperature.
** Measured at 500VDC for 60 sec. for Ur>500VDC.
*** 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 (MIDDLE VOLTAGE - 200V to 630V)

7-1 NP0 Dielectric

DIELECTRIC		NP0																		
SIZE		0603		0805				1206				1210				1812				
RATED VOLTAGE (VDC)		200	250	200	250	500	630	200	250	500	630	200	250	500	630	200	250	500	630	
Capacitance	0.5pF (0R5)	S	S	A	A	A	A													
	1.0pF (1R0)	S	S	A	A	A	A													
	1.2pF (1R2)	S	S	A	A	A	A													
	1.5pF (1R5)	S	S	A	A	A	A	B	B	B	B									
	1.8pF (1R8)	S	S	A	A	A	A	B	B	B	B									
	2.2pF (2R2)	S	S	A	A	A	A	B	B	B	B									
	2.7pF (2R7)	S	S	A	A	A	A	B	B	B	B									
	3.3pF (3R3)	S	S	A	A	A	A	B	B	B	B									
	3.9pF (3R9)	S	S	A	A	A	A	B	B	B	B									
	4.7pF (4R7)	S	S	A	A	A	A	B	B	B	B									
	5.6pF (5R6)	S	S	A	A	A	A	B	B	B	B									
	6.8pF (6R8)	S	S	A	A	A	A	B	B	B	B									
	8.2pF (8R2)	S	S	A	A	A	A	B	B	B	B									
	10pF (100)	S	S	A	A	A	A	B	B	B	B	C^	C^	C^	C^	D^	D^	D^	D^	
	12pF (120)	S	S	A	A	A	A	B	B	B	B	C^	C^	C^	C^	D^	D^	D^	D^	
	15pF (150)	S	S	A	A	A	A	B	B	B	B	C^	C^	C^	C^	D^	D^	D^	D^	
	18pF (180)	S	S	A	A	A	A	B	B	B	B	C^	C^	C^	C^	D^	D^	D^	D^	
	22pF (220)	S	S	A	A	A	A	B	B	B	B	C^	C^	C^	C^	D^	D^	D^	D^	
	27pF (270)	S	S	A	A	A	A	B	B	B	B	C^	C^	C^	C^	D^	D^	D^	D^	
	33pF (330)	S	S	A	A	A	A	B	B	B	B	C^	C^	C^	C^	D^	D^	D^	D^	
	39pF (390)	S	S	A	A	A	A	B	B	B	B	C^	C^	C^	C^	D^	D^	D^	D^	
	47pF (470)	S	S	A	A	A	A	B	B	B	B	C^	C^	C^	C^	D^	D^	D^	D^	
	56pF (560)	S	S	A	A	A	A	B	B	B	B	C^	C^	C^	C^	D^	D^	D^	D^	
	68pF (680)	S	S	A	A	A	A	B	B	B	B	C^	C^	C^	C^	D^	D^	D^	D^	
	82pF (820)	S	S	A	A	B	B	B	B	B	B	C^	C^	C^	C^	D^	D^	D^	D^	
	100pF (101)	S	S	A	B	B	B	B	B	B	B	C^	C^	C^	C^	D^	D^	D^	D^	
	120pF (121)	S	S	A	B	D	D	B	B	B	B	C^	C^	C^	C^	D^	D^	D^	D^	
	150pF (151)	S	S	B	D	D	D	B	B	B	B	C^	C^	C^	C^	D^	D^	D^	D^	
	180pF (181)	S	S	B	D	D	D	B	B	B	B	C^	C^	C^	C^	D^	D^	D^	D^	
	220pF (221)	S	S	D	D	D	D	B	B	B	B	C^	C^	C^	C^	D^	D^	D^	D^	
	270pF (271)			D	D	D	D	B	C	C	C	C^	C^	C^	C^	D^	D^	D^	D^	
	330pF (331)			D	D	D	D	B	C	C	C	C^	C^	C^	C^	D^	D^	D^	D^	
	390pF (391)			D	D	D	D	B	C	C	C	C^	C^	C^	C^	D^	D^	D^	D^	
	470pF (471)			D				C	C	C	C	C^	C^	C^	C^	D^	D^	D^	D^	
	560pF (561)			D				C	D	D	D	C^	C^	C^	C^	D^	D^	D^	D^	
	680pF (681)			D				C	D	D	D	C^	C^	C^	C^	D^	D^	D^	D^	
	820pF (821)			D				C	G	G	G	C^	C^	C^	C^	D^	D^	D^	D^	
	1,000pF (102)			D				C	G	G	G	D^	D^	D^	D^	D^	D^	D^	D^	
	1,200pF (122)							C				D^	D^	D^	D^	D^	D^	D^	D^	
	1,500pF (152)							D				D^	D^	D^	D^	D^	D^	D^	D^	
	1,800pF (182)							D				D^	D^	D^	D^	D^	D^	D^	D^	
	2,200pF (222)							D				D^	D^			D^	D^	D^	D^	
	2,700pF (272)											D^	D^			D^	D^	D^	D^	
	3,300pF (332)											D^				D^	D^	D^	D^	
	3,900pF (392)											D^				D^				
	4,700pF (472)															D^				
	5,600pF (562)															D^				
	6,800pF (682)															D^				

1. The letter in cell is expressed the symbol of product thickness.
2. The letter in cell with "^" mark is expressed product with Ag/Ni/Sn terminations.

7-2 X7R Dielectric

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

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

7-3 Y5V Dielectric

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
	1.0μF (105)								

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

8. CAPACITANCE RANGE (HIGH VOLTAGE - 1kV to 3kV)

8-1 NP0 Dielectric

DIELECTRIC		NP0									
SIZE		1206		1210		1808			1812		
RATED VOLTAGE (VDC)		1000	2000	1000	2000	1000	2000	3000	1000	2000	3000
Capacitance	1.5pF (1R5)	B	B								
	1.8pF (1R8)	B	B								
	2.0pF (2R0)	B	B			D	D	D			
	2.2pF (2R2)	B	B			D	D	D			
	2.7pF (2R7)	B	B			D	D	D			
	3.3pF (3R3)	B	B			D	D	D			
	3.9pF (3R9)	B	B			D	D	D			
	4.7pF (4R7)	B	B			D	D	D			
	5.6pF (5R6)	B	B			D	D	D			
	6.8pF (6R8)	B	B			D	D	D			
	8.2pF (8R2)	B	B			D	D	D			
	10pF (100)	B	B	C	C	D	D	D	D	D	D
	12pF (120)	B	B	C	C	D	D	D	D	D	D
	15pF (150)	B	B	C	C	D	D	D	D	D	D
	18pF (180)	B	B	C	C	D	D	D	D	D	D
	22pF (220)	B	B	C	C	D	D	D	D	D	D
	27pF (270)	B	B	C	C	D	D	D	D	D	D
	33pF (330)	B	C	C	C	D	D	D	D	D	D
	39pF (390)	B	C	C	C	D	D	D	D	D	D
	47pF (470)	C	C	C	C	D	D	D	D	D	D
	56pF (560)	C	D	C	D	D	D	D	D	D	D
	68pF (680)	C	D	C	D	D	D	D	D	D	D
	82pF (820)	D	D	C	D	D	D	D	D	D	D
	100pF (101)	D	D	D	D	D	D	K	D	D	D
	120pF (121)	D	G	D	D	D	D	K	D	D	D
	150pF (151)	D	G	D	G	D	K	K	D	D	D
	180pF (181)	G	G	D	G	D	K	K	D	D	K
	220pF (221)	G	G	G	G	D	K	K	D	D	K
	270pF (271)	G		G		K	K	K	D	K	K
	330pF (331)	G		G		K	K	K	D	K	K
	390pF (391)	G		G		K	K		D	K	K
	470pF (471)	G		G		K	K		K	K	K
	560pF (561)					K	K		K	K	
	680pF (681)					K	K		K	K	
	820pF (821)					K			K	K	
	1,000pF (102)					K			K	K	
	1,200pF (122)								K		
	1,500pF (152)								K		

1. The letter in cell is expressed the symbol of product thickness.
2. The letter in cell with "^" mark is expressed product with Ag/Ni/Sn terminations.

8-2 X7R Dielectric

DIELECTRIC		X7R								
SIZE		1206		1210	1808			1812		
RATED VOLTAGE (VDC)		1000	2000	1000	1000	2000	3000	1000	2000	3000
Capacitance	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	D	D	
	330pF (331)	D	D		D	D	K	D	D	
	390pF (391)	D	D		D	D	K	D	D	
	470pF (471)	D	D		D	D	K	D	D	
	560pF (561)	D	D		D	D	K	D	D	
	680pF (681)	D	D		D	D	K	D	D	K
	820pF (821)	D	G		D	D	K	D	D	K
	1,000pF (102)	D	G	D	D	K	K	D	D	K
	1,200pF (122)	D	G^	D	D	K		D	D	
	1,500pF (152)	D	G^	D	D	K		D	D	
	1,800pF (182)	D		D	D	K		D	G	
	2,200pF (222)	D		D	D	K^		D	G	
	2,700pF (272)	D		D	D			D	G	
	3,300pF (332)	D		D	D			D	K	
	3,900pF (392)	D		G	D			D	K	
	4,700pF (472)	D		G	D			D	K	
	5,600pF (562)	D		G	K			D		
	6,800pF (682)	D		G	K			D		
	8,200pF (822)	D		G	K			D		
	0.010μF (103)	D		G	K			D		
	0.012μF (123)							K		
	0.015μF (153)							K		

1. The letter in cell is expressed the symbol of product thickness.
2. The letter in cell with "^" mark is expressed product with Ag/Ni/Sn terminations.

9. PACKAGING DIMENSION AND QUANTITY

Size	Thickness/Symbol (mm)		Paper tape		Plastic tape	
			7" reel	13" reel	7" reel	13" reel
0603	0.80±0.07	S	4k	15k	-	-
0805	0.60±0.10	A	4k	15k	-	-
	0.80±0.10	B	4k	15k	-	-
	1.25±0.10	D	-	-	3k	10k
1206	0.80±0.10	B	4k	15k	-	-
	0.95±0.10	C	-	-	3k	10k
	1.25±0.10	D	-	-	3k	10k
	1.60±0.20	G	-	-	2k	10k
1210	0.95±0.10	C	-	-	3k	10k
	1.25±0.10	D	-	-	3k	10k
	1.60±0.20	G	-	-	2k	-
	2.50±0.30	M	-	-	1k	-
1808	1.25±0.10	D	-	-	2k	-
	2.00±0.20	K	-	-	1k	-
1812	1.25±0.10	D	-	-	1k	-
	1.60±0.20	G	-	-	1k	-
	2.00±0.20	K	-	-	1k	-

Unit: pieces

10. APPENDIXES

◙ Tape & reel dimensions

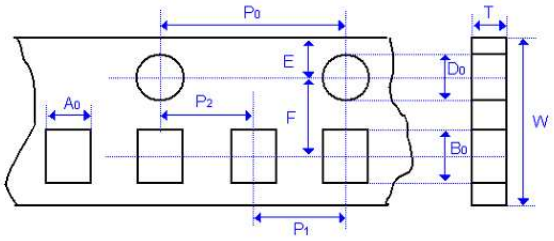


Fig. 2 The dimension of paper tape

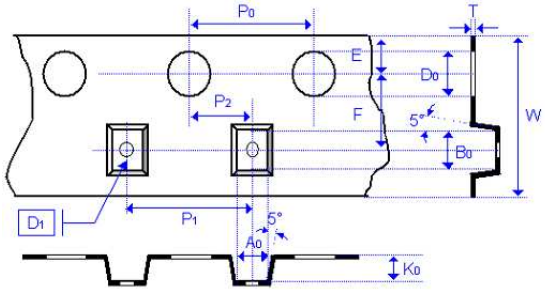


Fig. 3 The dimension of plastic tape

Size	0603	0805		1206			1210		1808		1812
Thickness	S, X	B	C, D, I	B	C, D	G	C, D, G	M	D	K	D, K
A_0	1.02±0.05	1.50±0.10	<1.57	2.00±0.10	<1.85	<1.95	<2.97	<2.97	<2.35	<2.35	<3.81
B_0	1.80±0.05	2.30±0.10	<2.40	3.50±0.10	<3.46	<3.67	<3.73	<3.73	<4.98	<5.00	<5.30
T	0.95±0.05	0.95±0.05	0.23±0.05	0.95±0.05	0.23±0.05	0.23±0.05	0.23±0.05	0.23±0.05	0.25±0.05	0.25±0.05	0.25±0.05
K_0	-	-	<2.50	-	<2.50	<2.50	<2.50	<3.0	<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	8.00±0.10	8.00±0.10	8.00±0.10	12.0±0.20	12.0±0.20	12.0±0.20
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±0.100	4.00±0.10	4.00±0.10	4.00±0.10	4.00±0.10
$10xP_0$	40.0±0.10	40.0±0.10	40.0±0.10	40.0±0.10	40.0±0.10	40.0±0.10	40.0±0.10	40.0±0.10	40.0±0.10	40.0±0.10	40.0±0.10
P_1	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	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±0.05
D_0	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±0.05	1.50±0.05	1.50±0.05
D_1	-	-	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
E	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	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	5.50±0.05	5.50±0.05	5.50±0.05

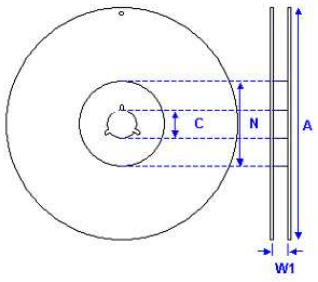
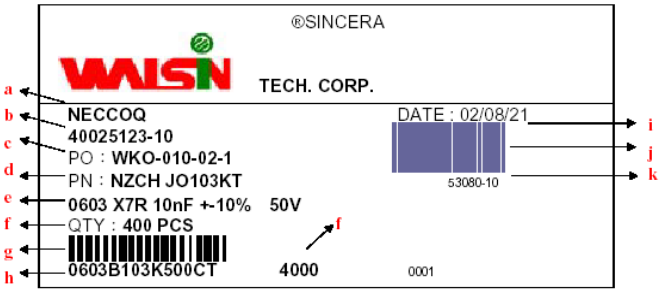


Fig. 4 The dimension of reel

Size	0603, 0805, 1206, 1210			1808, 1812
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±0.10	250.0±1.0	330.0±1.0	178.0±0.10
N	60.0+1/-0	100.0±1.0	100±1.0	60.5±1.0

◙ 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		NP0, X7R*	NPO, X7R, Y5V
①	Ceramic material		$BaTiO_3$ based	
②	Inner electrode		AgPd alloy	Ni
③	Termination	Inner layer	Ag	Cu
④		Middle layer	Ni	
⑤		Outer layer	Sn	

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

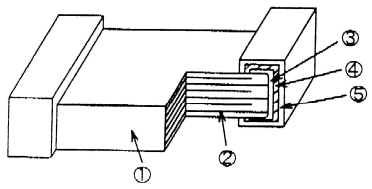


Fig. 5 The construction of MLCC

◙ 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 oxidization 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.

◙ 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.

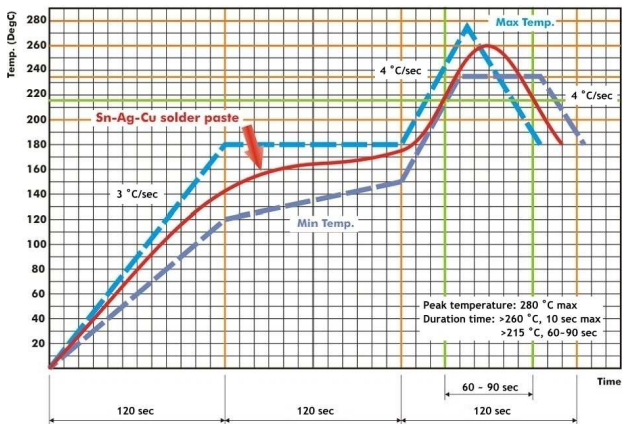


Fig. 6 Recommended IR reflow soldering profile for SMT process with SnAgCu series solder paste.

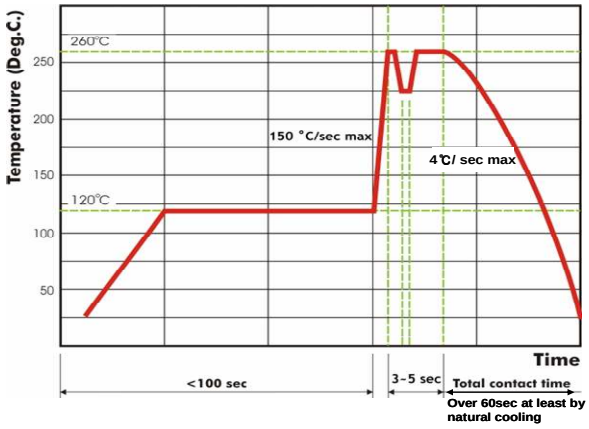


Fig. 7 Recommended wave soldering profile for SMT process with SnAgCu series solder.