MULTILAYER CERAMIC CAPACITORS

Microwave Series (MW)

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 HH series MLCC is used at high frequencies generally have a small temperature coefficient of capacitance, typical within the ±30ppm/℃ required for NP0 (C0G) classification and have excellent conductivity internal electrode. Thus, WTC HH series MLCC will be with the feature of low ESR and high Q characteristics.

2. FEATURES

a. High Q performance at high frequency.

b. Capacitance low to 0.1pF.

c. Narrow capacitance tolerance.

3. APPLICATIONS

a. Mobile telecommunication: Mobile phone, WLAN.

b. RF module: Power amplifier, VCO.

4. HOW TO ORDER

MW	15	N	100	G	500	L	T
Series	Size	Dielectric	Capacitance	Tolerance	Rated voltage	Termination	Packaging style
MW=Microwave	15=0402 (1005) 18=0603 (1608)	N=NP0 (C0J)	Two significant digits followed by no. of zeros. And R is in place of decimal point. eg.: R47=0.47pF 0R5=0.5pF 1R0=1.0pF 100=10x10^0 =10pF	A=±0.05pF B=±0.1pF C=±0.25pF F=±1% G=±2% J=±5%	Two significant digits followed by no. of zeros. And R is in place of decimal point. 500=50 VDC	L=Ag/Ni/Sn	T=7" reeled G=13" reeled

5. EXTERNAL DIMENSIONS

Size Inch (mm)	L (mm)	W (mm)	T (mm)/Symbol		M_B (mm)
0402 (1005)	1.00±0.05	0.50±0.05	0.50±0.05	N	0.25 +0.05/-0.10
0603 (1608)	1.60±0.10	0.80±0.10	0.80±0.07	S	0.40±0.15

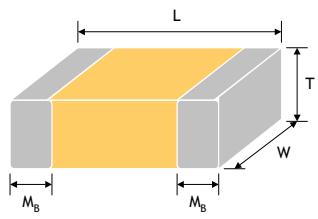

Fig. 1 The outline of MLCC

6. GENERAL ELECTRICAL DATA

Dielectric	NP0
Size	0402, 0603
Capacitance range*	0402: 0.1pF to 10pF 0603: 0.4pF to 22pF
Capacitance tolerance**	Cap<5pF: A (±0.05pF), B (±0.1pF) 5pF≤Cap<10pF: B (±0.1pF), C (±0.25pF) Cap≥10pF: F (±1%), G (±2%)
Rated voltage (WVDC)	50V
Q*	Cap<30pF: Q≥400+20C Cap≥30pF: Q≥1000
Insulation resistance at Ur	≥10GΩ
Operating temperature	-55 to +125°C
Capacitance coefficient	±120ppm
Termination	Ni/Sn (lead-free termination)

* Measured at 1.0±0.2Vrms, 1.0MHz±10%, 25°C ambient temperature and 30~70% related humidity.

** Capacitance tolerance J (±5%) is under requested.

7. CAPACITANCE RANGE

DIELECTRIC		NP0			
SIZE		0402		0603	
RATED VOLTAGE (VDC)		50	Q spec @ 1GHz	50	Q spec @ 1GHz
Capacitance	0.1pF (0R1)	N	300		
	0.2pF (0R2)	N	300		
	0.3pF (0R3)	N	300		
	0.4pF (0R4)	N	300	S	300
	0.5pF (0R5)	N	300	S	300
	0.6pF (0R6)	N	300	S	300
	0.7pF (0R7)	N	300	S	300
	0.8pF (0R8)	N	300	S	300
	0.9pF (0R9)	N	300	S	300
	1.0pF (1R0)	N	300	S	300
	1.2pF (1R2)	N	250	S	250
	1.5pF (1R5)	N	250	S	250
	1.8pF (1R8)	N	200	S	200
	2.0pF (2R0)	N	200	S	100
	2.2pF (2R2)	N	100	S	100
	2.7pF (2R7)	N	100	S	100
	3.0pF (3R0)	N	100	S	100
	3.3pF (3R3)	N	100	S	100
	3.9pF (3R9)	N	100	S	100
	4.0pF (4R0)	N	100	S	100
	4.7pF (4R7)	N	100	S	100
	5.0pF (5R0)	N	100	S	80
	5.6pF (5R6)	N	80	S	80
	6.0pF (6R0)	N	80	S	80
	6.8pF (6R8)	N	80	S	80
	7.0pF (7R0)	N	80	S	80
	8.0pF (8R0)	N	80	S	80
	8.2pF (8R2)	N	80	S	80
	9.0pF (9R0)	N	80	S	80
	10pF (100)	N	80	S	80
	12pF (120)			S	60
	15pF (150)			S	50
	18pF (180)			S	30
	22pF (220)			S	30

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

2. For more information about products with special capacitance or other data, please contact WTC local sales organization.

8. PACKAGING STYLE AND QUANTITY

Size	Thickness (mm) /Symbol		Paper tape	
			7" reel	13" reel
0402	0.50±0.05	N	10K	20K
0603	0.80±0.07	S	4K	10K

Unit: pieces

9. ELECTRICAL CHARACTERISTICS

◙ Q value criteria (min.) vs. capacitance at 1GHz

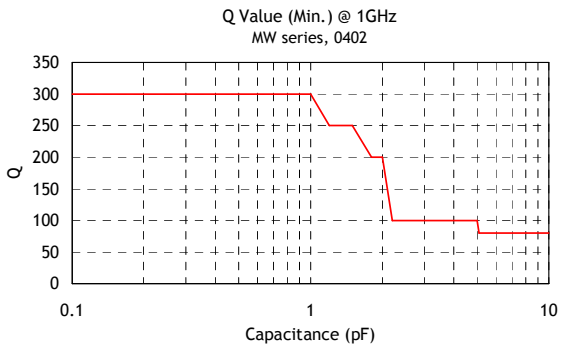

Fig. 2 0402 Q value criteria vs. capacitance

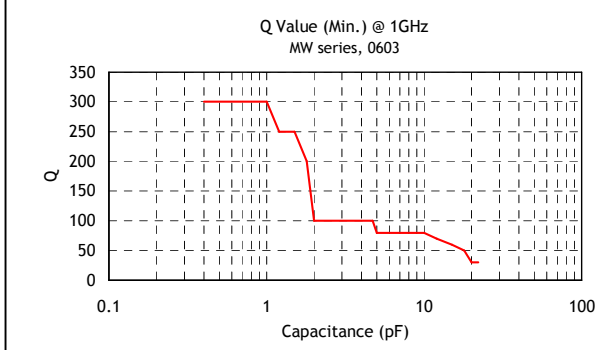

Fig. 3 0603 Q value criteria vs. capacitance

APPENDIXES

◙ Constructions

No.	Name		NP0
①	Ceramic material		$BaTiO_3$ based
②	Inner electrode		AgPd alloy
③	Termination	Inner layer	Ag
④		Middle layer	Ni
⑤		Outer layer	Sn

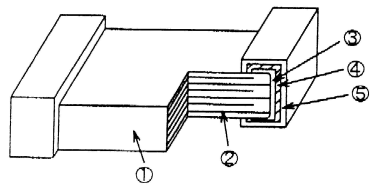

Fig. 4 The construction of MLCC

◙ 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.

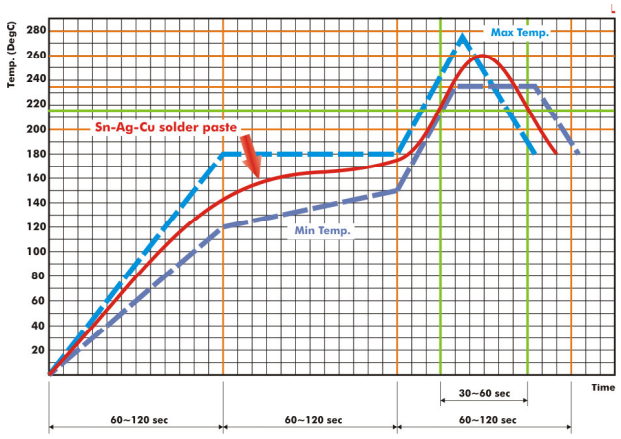

Fig. 5 IR reflow soldering profile for SMT process with SnAgCu series solder paste.

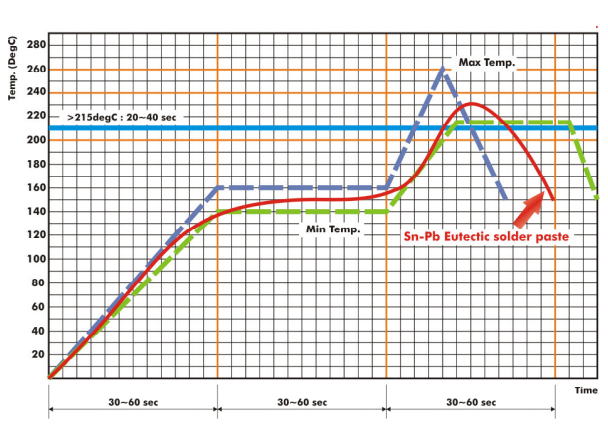

Fig. 6 IR reflow soldering profile for SMT process with eutectic SnPb solder paste.