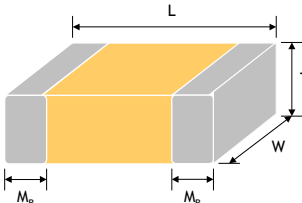


SURFACE MOUNTED MULTILAYER CERAMIC CAPACITORS

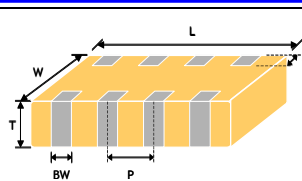
THE OUTLINES AND EXTERNAL DIMENSIONS OF CAPACITORS

Single chip capacitors

Outline	Size Inch (mm)	L (mm)	W (mm)	T (mm)/Symbol	Remark	M _B (mm)			
	0201 (0603)	0.6±0.03	0.3±0.03	0.3±0.03	L	#	0.15±0.05		
	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		
				0.80 +0.15/-0.10	X				
	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				
				1.25±0.20	I				
	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				
				1.60±0.20	G				
				1.60±0.20	J				
	1210 (3225)	3.20±0.20	1.60±0.20	1.15±0.15	J	#	0.75±0.25		
				1.60+0.30/-0.10	P				
3.20±0.30				2.50±0.20	0.95±0.10			C	#
					1.25±0.10			D	
					1.60±0.20			G	
1808 (4520)	4.50±0.40	2.03±0.25	2.00±0.20	K	#	0.75±0.25			
			1.25±0.10	D					
			2.50±0.30	M					
1812 (4532)	4.50±0.40	3.20±0.30	1.25±0.10	D	#	0.75±0.25			
			2.00±0.20	K					
			2.50±0.30	M					
			2.80±0.30	U					

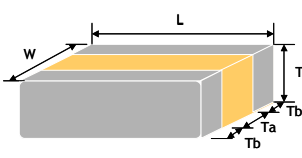
Reflow soldering only is recommended.

Capacitor arrays

Outline	Size Inch (mm)	L (mm)	W (mm)	T (mm)/Symbol	S (mm)	BW (mm)	P (mm)	
	0612 (1632)	3.20±0.15	1.60±0.15	0.80±0.10	B	0.30±0.20	0.40±0.15	0.80±0.15

Reflow soldering only.

Low inductance capacitors

Outline	Size Inch (mm)	L (mm)	W (mm)	T (mm)/Symbol	T _a min. (mm)	T _b min. (mm)	
	0612 (1632)	3.20±0.15	1.60±0.15	0.80±0.10	B	0.5	0.13

Reflow soldering only.

SURFACE MOUNTED MULTILAYER CERAMIC CAPACITORS

GENERAL PURPOSE CAPACITORS

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's MLCC is made by NP0, X7R and Y5V dielectric material and which provides product with high electrical precision, stability and reliability.

2. FEATURES

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

3. APPLICATIONS

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

4. HOW TO ORDER

<u>1206</u>	<u>F</u>	<u>104</u>	<u>Z</u>	<u>500</u>	<u>C</u>	<u>I</u>
<u>Size</u>	<u>Dielectric</u>	<u>Capacitance</u>	<u>Tolerance</u>	<u>Rated voltage</u>	<u>Termination</u>	<u>Packaging style</u>
Inch (mm)	N=NP0	Two significant digits	B=±0.1pF	Two significant digits	L=Ag/Ni/Sn	T=7" reeled
0402 (1005)	(COG)	followed by no. of zeros.	C=±0.25pF	followed by no. of zeros.	C=Cu/Ni/Sn	R=7" reel (2mm pitch for 0603 size; paper tape)
0603 (1608)	B=X7R	And R is in place of decimal	D=±0.5pF	And R is in place of		G=13" reeled
0805 (2012)	F=Y5V	point.	F=±1%	decimal point.		
1206 (3216)		eg.:	G=±2%	100=10 VDC		
1210 (3225)		R47=0.47pF	J=±5%	160=16 VDC		
1812 (4532)		0R5=0.5pF	K=±10%	250=25 VDC		
		1R0=1.0pF	M=±20%	500=50 VDC		
		104=10x10 ⁴	Z=-20/+80%	101=100 VDC		
		=100nF				

SURFACE MOUNTED MULTILAYER CERAMIC CAPACITORS

5. GENERAL ELECTRICAL DATA

Dielectric	NPO	X7R	Y5V
Size	0402, 0603, 0805, 1206, 1210, 1812		
Capacitance range*	0.5pF to 0.056 μ F	100pF to 1 μ F	10nF to 1 μ F
Capacitance tolerance	Cap \leq 5pF: B (\pm 0.1pF), C (\pm 0.25pF) 5pF<Cap<10pF: C (\pm 0.25pF), D (\pm 0.5pF) Cap \geq 10pF: F (\pm 1%), G (\pm 2%), J (\pm 5%)	J (\pm 5%), K (\pm 10%)	M (\pm 20%), Z (-20/+80%)
Rated voltage (WVDC)	16V, 25V, 50V, 100V	10V, 16V, 25V, 50V, 100V	
Tan δ *	Cap<30pF: Q \geq 400+20C Cap \geq 30pF: Q \geq 1000	Note 1	
Insulation resistance at Ur	\geq 10G Ω	\geq 10G Ω or RxC \geq 5000 Ω xF whichever is less	
Operating temperature	-55 to +125 $^{\circ}$ C		-25 to +85 $^{\circ}$ C
Capacitance characteristic	\pm 30ppm	\pm 15%	+30/-80%
Termination	Ni/Sn (lead-free termination)		

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

NPO: Apply 1.0 \pm 0.2Vrms, 1.0MHz \pm 10% for Cap \leq 1000pF and 1.0 \pm 0.2Vrms, 1.0kHz \pm 10% for Cap>1000pF, 25 $^{\circ}$ C at ambient temperature

X7R: Apply 1.0 \pm 0.2Vrms, 1.0kHz \pm 10%, at 25 $^{\circ}$ C ambient temperature.

Y5V: Apply 1.0 \pm 0.2Vrms, 1.0kHz \pm 10%, at 20 $^{\circ}$ C ambient temperature.

Note 1:

X7R Dielectric			
Ur.	DF	Exception of DF	
\geq 50V	\leq 2.5%	\leq 3.0%	0603, \geq 47nF; 0805, \geq 180nF; 1206, \geq 470nF
25V	\leq 3.5%	\leq 5.0%	-
16V	\leq 3.5%	\leq 5.0%	0402, \geq 33nF; 0603, \geq 150nF; 0805, \geq 680nF
10V	\leq 5.0%	-	-

Y5V Dielectric			
Ur.	DF	Exception of DF	
\geq 50V	\leq 5.0%	-	-
25V	\leq 5.0%	\leq 7.0%	0603, \geq 100nF; 0805, \geq 330nF
16V	\leq 7.0%	\leq 9.0%	0402, \geq 68nF
10V	\leq 12.5%	-	-

SURFACE MOUNTED MULTILAYER CERAMIC CAPACITORS

6. CAPACITANCE RANGE (NPO Dielectric)

6-1 0402, 0603, 0805 Sizes

DIELECTRIC	NPO															
	SIZE	0402					0603					0805				
	RATED VOLTAGE (VDC)	10	16	25	50	100	10	16	25	50	100	10	16	25	50	100
Capacitance	0.5pF (0R5)	N	N	N	N	N	S	S	S	S	S	A	A	A	A	A
	0.6pF (0R6)	N	N	N	N	N	S	S	S	S	S	A	A	A	A	A
	0.7pF (0R7)	N	N	N	N	N	S	S	S	S	S	A	A	A	A	A
	0.8pF (0R8)	N	N	N	N	N	S	S	S	S	S	A	A	A	A	A
	0.9pF (0R9)	N	N	N	N	N	S	S	S	S	S	A	A	A	A	A
	1.0pF (1R0)	N	N	N	N	N	S	S	S	S	S	A	A	A	A	A
	1.2pF (1R2)	N	N	N	N	N	S	S	S	S	S	A	A	A	A	A
	1.5pF (1R5)	N	N	N	N	N	S	S	S	S	S	A	A	A	A	A
	1.8pF (1R8)	N	N	N	N	N	S	S	S	S	S	A	A	A	A	A
	2.2pF (2R2)	N	N	N	N	N	S	S	S	S	S	A	A	A	A	A
	2.7pF (2R7)	N	N	N	N	N	S	S	S	S	S	A	A	A	A	A
	3.3pF (3R3)	N	N	N	N	N	S	S	S	S	S	A	A	A	A	A
	3.9pF (3R9)	N	N	N	N	N	S	S	S	S	S	A	A	A	A	A
	4.7pF (4R7)	N	N	N	N	N	S	S	S	S	S	A	A	A	A	A
	5.6pF (5R6)	N	N	N	N	N	S	S	S	S	S	A	A	A	A	A
	6.8pF (6R8)	N	N	N	N	N	S	S	S	S	S	A	A	A	A	A
	8.2pF (8R2)	N	N	N	N	N	S	S	S	S	S	A	A	A	A	A
	10pF (100)	N	N	N	N	N	S	S	S	S	S	A	A	A	A	A
	12pF (120)	N	N	N	N	N	S	S	S	S	S	A	A	A	A	A
	15pF (150)	N	N	N	N	N	S	S	S	S	S	A	A	A	A	A
	18pF (180)	N	N	N	N	N	S	S	S	S	S	A	A	A	A	A
	22pF (220)	N	N	N	N	N	S	S	S	S	S	A	A	A	A	A
	27pF (270)	N	N	N	N	N	S	S	S	S	S	A	A	A	A	A
	33pF (330)	N	N	N	N	N	S	S	S	S	S	A	A	A	A	A
	39pF (390)	N	N	N	N	N	S	S	S	S	S	A	A	A	A	A
	47pF (470)	N	N	N	N	N	S	S	S	S	S	A	A	A	A	A
	56pF (560)	N	N	N	N	N	S	S	S	S	S	A	A	A	A	A
	68pF (680)	N	N	N	N	N	S	S	S	S	S	A	A	A	A	A
	82pF (820)	N	N	N	N	N	S	S	S	S	S	A	A	A	A	A
	100pF (101)	N	N	N	N	N	S	S	S	S	S	A	A	A	A	A
	120pF (121)	N	N	N	N	N	S	S	S	S	S	A	A	A	A	A
	150pF (151)	N	N	N	N	N	S	S	S	S	S	A	A	A	A	A
	180pF (181)	N	N	N	N		S	S	S	S	S	A	A	A	A	A
	220pF (221)	N	N	N	N		S	S	S	S	S	A	A	A	A	A
	270pF (271)	N	N	N	N		S	S	S	S	S	A	A	A	A	A
	330pF (331)	N	N	N	N		S	S	S	S	S	A	A	A	A	A
	390pF (391)	N	N	N	N		S	S	S	S	S	B	B	B	B	B
	470pF (471)	N	N	N	N		S	S	S	S	S	B	B	B	B	B
	560pF (561)						S	S	S	S	S	B	B	B	B	B
	680pF (681)						S	S	S	S		B	B	B	B	B
820pF (821)						S	S	S	S		B	B	B	B	B	
1,000pF (102)						S	S	S	S		B	B	B	B	B	
1,200pF (122)						S	S	S	S		B	B	B	B	B	
1,500pF (152)						S	S	S	S		B	B	B	B	B	
1,800pF (182)						S	S	S	S		B	B	B	B	B	
2,200pF (222)						S	S	S	S		B	B	B	B	B	
2,700pF (272)						S	S				D	D	D	D	D	
3,300pF (332)						S	S				D	D	D	D	D	
3,900pF (392)											D	D	D	D	D	
4,700pF (472)											D	D	D			
5,600pF (562)											D	D				
6,800pF (682)											D	D				
8,200pF (822)											D	D				
0.010μF (103)											D	D		I		
0.012μF (123)											D	D				

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

SURFACE MOUNTED MULTILAYER CERAMIC CAPACITORS

6-2 1206, 1210, 1812 Sizes

DIELECTRIC		NPO											
SIZE		1206					1210					1812	
RATED VOLTAGE (VDC)		10	16	25	50	100	10	16	25	50	100	50	100
1.0pF (1R0)													
1.2pF (1R2)													
1.5pF (1R5)	B	B	B	B	B								
1.8pF (1R8)	B	B	B	B	B								
2.2pF (2R2)	B	B	B	B	B								
2.7pF (2R7)	B	B	B	B	B								
3.3pF (3R3)	B	B	B	B	B								
3.9pF (3R9)	B	B	B	B	B								
4.7pF (4R7)	B	B	B	B	B								
5.6pF (5R6)	B	B	B	B	B								
6.8pF (6R8)	B	B	B	B	B								
8.2pF (8R2)	B	B	B	B	B								
10pF (100)	B	B	B	B	B					C			D
12pF (120)	B	B	B	B	B					C			D
15pF (150)	B	B	B	B	B					C			D
18pF (180)	B	B	B	B	B					C			D
22pF (220)	B	B	B	B	B	C	C	C	C	C			D
27pF (270)	B	B	B	B	B	C	C	C	C	C			D
33pF (330)	B	B	B	B	B	C	C	C	C	C			D
39pF (390)	B	B	B	B	B	C	C	C	C	C			D
47pF (470)	B	B	B	B	B	C	C	C	C	C			D
56pF (560)	B	B	B	B	B	C	C	C	C	C			D
68pF (680)	B	B	B	B	B	C	C	C	C	C			D
82pF (820)	B	B	B	B	B	C	C	C	C	C			D
100pF (101)	B	B	B	B	B	C	C	C	C	C			D
120pF (121)	B	B	B	B	B	C	C	C	C	C			D
150pF (151)	B	B	B	B	B	C	C	C	C	C			D
180pF (181)	B	B	B	B	B	C	C	C	C	C			D
220pF (221)	B	B	B	B	B	C	C	C	C	C			D
270pF (271)	B	B	B	B	B	C	C	C	C	C			D
330pF (331)	B	B	B	B	B	C	C	C	C	C			D
390pF (391)	B	B	B	B	B	C	C	C	C	C			D
470pF (471)	B	B	B	B	B	C	C	C	C	C			D
560pF (561)	B	B	B	B	B	C	C	C	C	C			D
680pF (681)	B	B	B	B	B	C	C	C	C	C			D
820pF (821)	B	B	B	B	B	C	C	C	C	C			D
1,000pF (102)	B	B	B	B	B	C	C	C	C	C	D		D
1,200pF (122)	B	B	B	B	B	C	C	C	C	C	D		D
1,500pF (152)	B	B	B	B	B	C	C	C	C	C	D		D
1,800pF (182)	B	B	B	B	B	C	C	C	C	C	D		D
2,200pF (222)	B	B	B	B	B	C	C	C	C	C	D		D
2,700pF (272)	B	B	B	B	B	C	C	C	C	C	D		D
3,300pF (332)	B	B	B	B	B	C	C	C	C	C	D		D
3,900pF (392)	B	B	B	B	B	C	C	C	C	C	D		D
4,700pF (472)	B	B	B	B	B	C	C	C	C	C	D		D
5,600pF (562)	B	B	B	B	B	C	C	C	C	C	D		D
6,800pF (682)	C	C	C	C	C	C	C	C	C	C	D		D
8,200pF (822)	C	C	C	C	C	C	C	C	C	C	D		D
0.010μF (103)	D	D	D	D		C	C	C	C	C	D		D
0.012μF (123)	D	D	P	P		C	C	D	D	D	D		D
0.015μF (153)	D	D	P	P		C	C	D	D	D	D		D
0.018μF (183)	D	D									D		D
0.022μF (223)	D	D									D		D
0.027μF (273)	D	D									D		D
0.033μF (333)	D	D									D		D
0.039μF (393)	G	G											
0.047μF (473)													
0.056μF (563)													

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

SURFACE MOUNTED MULTILAYER CERAMIC CAPACITORS

7. CAPACITANCE RANGE (X7R Dielectric)

7-1 0402, 0603, 0805 Sizes

DIELECTRIC		X7R													
SIZE		0402				0603					0805				
RATED VOLTAGE (VDC)		10	16	25	50	10	16	25	50	100	10	16	25	50	100
Capacitance	100pF (101)	N	N	N	N	S	S	S	S	S	B	B	B	B	B
	120pF (121)	N	N	N	N	S	S	S	S	S	B	B	B	B	B
	150pF (151)	N	N	N	N	S	S	S	S	S	B	B	B	B	B
	180pF (181)	N	N	N	N	S	S	S	S	S	B	B	B	B	B
	220pF (221)	N	N	N	N	S	S	S	S	S	B	B	B	B	B
	270pF (271)	N	N	N	N	S	S	S	S	S	B	B	B	B	B
	330pF (331)	N	N	N	N	S	S	S	S	S	B	B	B	B	B
	390pF (391)	N	N	N	N	S	S	S	S	S	B	B	B	B	B
	470pF (471)	N	N	N	N	S	S	S	S	S	B	B	B	B	B
	560pF (561)	N	N	N	N	S	S	S	S	S	B	B	B	B	B
	680pF (681)	N	N	N	N	S	S	S	S	S	B	B	B	B	B
	820pF (821)	N	N	N	N	S	S	S	S	S	B	B	B	B	B
	1,000pF (102)	N	N	N	N	S	S	S	S	S	B	B	B	B	B
	1,200pF (122)	N	N	N	N	S	S	S	S	S	B	B	B	B	B
	1,500pF (152)	N	N	N	N	S	S	S	S	S	B	B	B	B	B
	1,800pF (182)	N	N	N	N	S	S	S	S	S	B	B	B	B	B
	2,200pF (222)	N	N	N	N	S	S	S	S	S	B	B	B	B	B
	2,700pF (272)	N	N	N	N	S	S	S	S	S	B	B	B	B	B
	3,300pF (332)	N	N	N	N	S	S	S	S	S	B	B	B	B	B
	3,900pF (392)	N	N	N	N	S	S	S	S	S	B	B	B	B	B
	4,700pF (472)	N	N	N	N	S	S	S	S	S	B	B	B	B	B
	5,600pF (562)	N	N	N	N	S	S	S	S	S	B	B	B	B	B
	6,800pF (682)	N	N	N	N	S	S	S	S	S	B	B	B	B	B
	8,200pF (822)	N	N	N		S	S	S	S	S	B	B	B	B	B
	0.010μF (103)	N	N	N		S	S	S	S	S	B	B	B	B	B
	0.012μF (123)	N	N	N		S	S	S	S		B	B	B	B	B
	0.015μF (153)	N	N	N		S	S	S	S		B	B	B	B	B
	0.018μF (183)	N	N	N		S	S	S	S		B	B	B	B	B
	0.022μF (223)	N	N	N		S	S	S	S		B	B	B	B	B
	0.027μF (273)	N	N			S	S	S	S		B	B	B	B	D
	0.033μF (333)	N	N			S	S	S	X		B	B	B	B	D
	0.039μF (393)	N				S	S	S	X		B	B	B	B	D
	0.047μF (473)	N	N	N		S	S	S	X		B	B	B	B	D
0.056μF (563)	N				S	S	S	X		B	B	B	B		
0.068μF (683)	N				S	S	S	X		B	B	B	B		
0.082μF (823)	N				S	S	S	X		B	B	B	B		
0.10μF (104)	N	N			S	S	S	X		B	B	B	B		
0.12μF (124)					S	S				B	B	B	D		
0.15μF (154)					S	S	X			D	D	D	D		
0.18μF (184)					S	S				D	D	D			
0.22μF (224)					S	S	X			D	D	D	I		
0.27μF (274)					X					D	D	D			
0.33μF (334)					X	X				D	D	D	I		
0.39μF (394)					X					D	D	D			
0.47μF (474)					X	X				D	D	D			
0.56μF (564)										D	D	D			
0.68μF (684)					X	X				D	D	D			
0.82μF (824)										D	D	D			
1.0μF (105)					X	X				D	D	D			

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

SURFACE MOUNTED MULTILAYER CERAMIC CAPACITORS

7-2 1206, 1210, 1812 Sizes

DIELECTRIC		X7R														
SIZE		1206					1210					1812				
RATED VOLTAGE (VDC)		10	16	25	50	100	10	16	25	50	100	10	16	25	50	100
Capacitance	100pF (101)															
	120pF (121)															
	150pF (151)	B	B	B	B	B										
	180pF (181)	B	B	B	B	B										
	220pF (221)	B	B	B	B	B										
	270pF (271)	B	B	B	B	B										
	330pF (331)	B	B	B	B	B										
	390pF (391)	B	B	B	B	B										
	470pF (471)	B	B	B	B	B										
	560pF (561)	B	B	B	B	B										
	680pF (681)	B	B	B	B	B										
	820pF (821)	B	B	B	B	B										
	1,000pF (102)	B	B	B	B	B	C	C	C	C	C	D	D	D	D	D
	1,200pF (122)	B	B	B	B	B	C	C	C	C	C	D	D	D	D	D
	1,500pF (152)	B	B	B	B	B	C	C	C	C	C	D	D	D	D	D
	1,800pF (182)	B	B	B	B	B	C	C	C	C	C	D	D	D	D	D
	2,200pF (222)	B	B	B	B	B	C	C	C	C	C	D	D	D	D	D
	2,700pF (272)	B	B	B	B	B	C	C	C	C	C	D	D	D	D	D
	3,300pF (332)	B	B	B	B	B	C	C	C	C	C	D	D	D	D	D
	3,900pF (392)	B	B	B	B	B	C	C	C	C	C	D	D	D	D	D
	4,700pF (472)	B	B	B	B	B	C	C	C	C	C	D	D	D	D	D
	5,600pF (562)	B	B	B	B	B	C	C	C	C	C	D	D	D	D	D
	6,800pF (682)	B	B	B	B	B	C	C	C	C	C	D	D	D	D	D
	8,200pF (822)	B	B	B	B	B	C	C	C	C	C	D	D	D	D	D
	0.010μF (103)	B	B	B	B	B	C	C	C	C	C	D	D	D	D	D
	0.012μF (123)	B	B	B	B	B	C	C	C	C	C	D	D	D	D	D
	0.015μF (153)	B	B	B	B	B	C	C	C	C	C	D	D	D	D	D
	0.018μF (183)	B	B	B	B	B	C	C	C	C	C	D	D	D	D	D
	0.022μF (223)	B	B	B	B	B	C	C	C	C	C	D	D	D	D	D
	0.027μF (273)	B	B	B	B	B	C	C	C	C	C	D	D	D	D	D
	0.033μF (333)	B	B	B	B	B	C	C	C	C	C	D	D	D	D	D
	0.039μF (393)	B	B	B	B	B	C	C	C	C	C	D	D	D	D	D
	0.047μF (473)	B	B	B	B	B	C	C	C	C	C	D	D	D	D	D
0.056μF (563)	B	B	B	B	B	C	C	C	C	C	D	D	D	D	D	
0.068μF (683)	B	B	B	B	B	C	C	C	C	C	D	D	D	D	D	
0.082μF (823)	B	B	B	B	D	C	C	C	C	C	D	D	D	D	D	
0.10μF (104)	B	B	B	B	D	C	C	C	C	C	D	D	D	D	D	
0.12μF (124)	B	B	B	B	D	C	C	C	C	C	D	D	D	D	D	
0.15μF (154)	C	C	C	C	G	C	C	C	C	D	D	D	D	D	D	
0.18μF (184)	C	C	C	C	G	C	C	C	C	D	D	D	D	D	D	
0.22μF (224)	C	C	C	C	G	C	C	C	C	D	D	D	D	D	D	
0.27μF (274)	C	C	C	D		C	C	C	C	G	D	D	D	D	D	
0.33μF (334)	C	C	C	D		C	C	C	D	G	D	D	D	D	D	
0.39μF (394)	C	C	J	P		C	C	C	D	M	D	D	D	D	D	
0.47μF (474)	J	J	J	P		C	C	C	D	M	D	D	D	D	K	
0.56μF (564)	J	J	J	P		D	D	D	D	M	D	D	D	D	K	
0.68μF (684)	J	J	J	P		D	D	D	D		D	D	D	K	K	
0.82μF (824)	J	J	J	P		D	D	D	D		D	D	D	K	K	
1.0μF (105)	J	J	J	P		D	D	D	D		D	D	D	K	K	

1. The letter in cell is expressed the symbol of product thickness.
2. [^] means the said item is made by NME (Noble Metal Electrode) process.

SURFACE MOUNTED MULTILAYER CERAMIC CAPACITORS

8. CAPACITANCE RANGE (Y5V Dielectric)

8-1 0402, 0603, 0805 Sizes

DIELECTRIC		Y5V														
SIZE		0402					0603					0805				
RATED VOLTAGE (VDC)		6.3	10	16	25	50	6.3	10	16	25	50	10	16	25	50	100
Capacitance	0.010 μ F (103)		N	N	N	N		S	S	S	S	A	A	A	A	B
	0.015 μ F (153)		N	N	N	N		S	S	S	S	A	A	A	A	B
	0.022 μ F (223)		N	N	N	N		S	S	S	S	A	A	A	A	B
	0.033 μ F (333)		N	N	N	N		S	S	S	S	A	A	A	A	B
	0.047 μ F (473)		N	N	N			S	S	S	S	A	A	A	A	B
	0.068 μ F (683)		N	N	N			S	S	S	S	A	A	A	A	B
	0.10 μ F (104)		N	N	N			S	S	S	S	A	A	A	A	B
	0.15 μ F (154)		N					S	S	S	S	A	A	A	A	
	0.22 μ F (224)		N				S	S	S	S	S	A	A	A	A	
	0.33 μ F (334)	N	N					S	S	S		B	B	B	B	
	0.47 μ F (474)	N	N					S	S	S		B	B	B		
	0.68 μ F (684)	N						S	X			B	B	D		
1.0 μ F (105)	N						S	X			B	B	D	I		

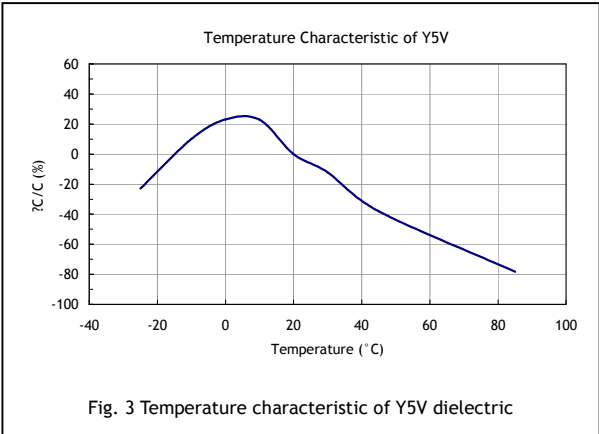
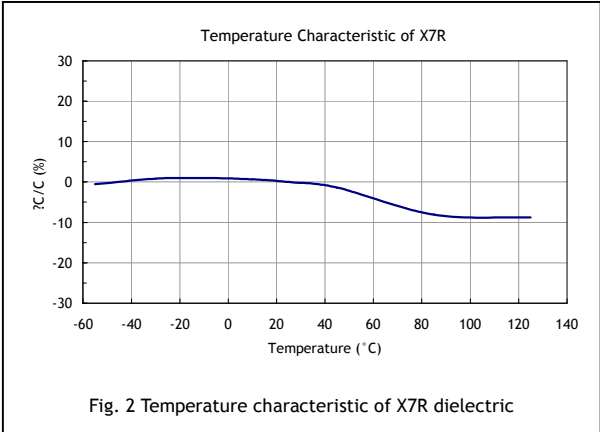
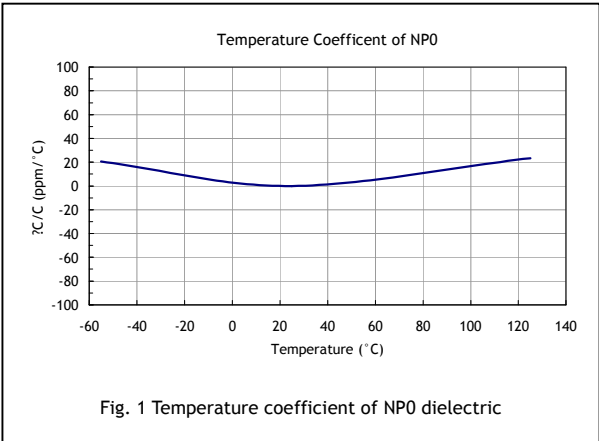
8-2 1206, 1210, 1812 Sizes

DIELECTRIC		Y5V														
SIZE		1206					1210					1812				
RATED VOLTAGE (VDC)		10	16	25	50	100	10	16	25	50	100	10	16	25	50	100
Capacitance	0.010 μ F (103)	B	B	B	B	B					C					D
	0.015 μ F (153)	B	B	B	B	B					C					D
	0.022 μ F (223)	B	B	B	B	B					C					D
	0.033 μ F (333)	B	B	B	B	B					C					D
	0.047 μ F (473)	B	B	B	B	B					C					D
	0.068 μ F (683)	B	B	B	B	B					C					D
	0.10 μ F (104)	B	B	B	B	B	C	C	C	C	C	D	D	D	D	D
	0.15 μ F (154)	B	B	B	B	C	C	C	C	C	C	D	D	D	D	D
	0.22 μ F (224)	B	B	B	B	C	C	C	C	C	C	D	D	D	D	D
	0.33 μ F (334)	B	B	B	B		C	C	C	C	C	D	D	D	D	D
	0.47 μ F (474)	B	B	B	B		C	C	C	C		D	D	D	D	D
	0.68 μ F (684)	B	B	B	B		C	C	C	C		D	D	D	D	D
1.0 μ F (105)	C	C	C	C		C	C	C	C		D	D	D	D	D	

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

SURFACE MOUNTED MULTILAYER CERAMIC CAPACITORS

9. TEMPERATURE COEFFICIENT and CHARACTERISTIC OF DIELECTRICS



SURFACE MOUNTED MULTILAYER CERAMIC CAPACITORS

HIGH CAPACITANCE CAPACITORS

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 high capacitance MLCC offers low ESR and excellent frequency characteristics to be suited for coupling and decoupling applications in circuit. The high dielectric constant material X7R, X5R and Y5V are used for this series product.

2. FEATURES

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

3. APPLICATIONS

- Digital circuit coupling or decoupling applications.
- For high frequency and high-density type power suppliers.
- For bypassing.

4. HOW TO ORDER

<u>1206</u>	<u>F</u>	<u>106</u>	<u>Z</u>	<u>100</u>	<u>C</u>	<u>I</u>
<u>Size</u>	<u>Dielectric</u>	<u>Capacitance</u>	<u>Tolerance</u>	<u>Rated voltage</u>	<u>Termination</u>	<u>Packaging style</u>
Inch (mm)	B=X7R	Two significant digits	K=±10%	Two significant digits	C=Cu/Ni/Sn	T=7" reeled
0402 (1005)	X=X5R	followed by no. of zeros.	M=±20%	followed by no. of zeros.		G=13" reeled
0603 (1608)	F=Y5V	And R is in place of decimal point.	Z=-20/+80%	And R is in place of decimal point.		
0805 (2012)						
1206 (3216)						
1210 (3225)		eg.:		6R3=6.3 VDC		
1812 (4532)		106=10x10 ⁶ =10μF		100=10 VDC		
				160=16 VDC		
				250=25 VDC		
				500=50 VDC		

SURFACE MOUNTED MULTILAYER CERAMIC CAPACITORS

5. GENERAL ELECTRICAL DATA

Dielectric	X7R	X5R	Y5V
Size	0402, 0603, 0805, 1206, 1210, 1812		
Capacitance range*	100nF	100nF to 100µF	150nF to 100µF
Capacitance tolerance	K (±10%), M (±20%)		Z (-20/+80%)
Rated voltage (WVDC)	6.3V, 10V, 16V, 25V, 50V		
Tan δ*	Note 1		
Insulation resistance at Ur	RxC≥500ΩxF		
Operating temperature	-55 to +125°C	-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% for C≤10µF; 0.5±0.2Vrms, 120Hz±20% for C>10µF, 30-70% related humidity, 25°C ambient temperature for X7R, X5R and at 20°C for Y5V.

* Note 1

X7R/X5R

Rated vol.	D.F.	Exception of D.F.	
≥50V	≤2.5%	≤3%	0603≥0.047µF; 0805≥0.18µF, 1206≥0.47µF
25V	≤3.5%	≤5%	0805≥1µF
16V	≤3.5%	≤5%	0402≥0.033µF; 0603≥0.15µF; 0805≥0.68µF; 1206≥2.2µF
10V	≤5.0%	---	---
6.3V	≤7.5%	---	---

Y5V

Rated vol.	D.F.	Exception of D.F.	
≥50V	≤5.0%	---	---
25V	≤5.0%	≤7%	0603≥0.1µF; 0805≥0.33µF; 1206≥1µF
16V (C<1.0µF)	≤7.0%	≤9%	0402≥0.068µF
16V (C≥1.0µF)	≤9.0%	---	---
≤10V	≤12.5%	---	---

6. CAPACITANCE RANGE

6-1 X7R Dielectric

DIELECTRIC		X7R																						
SIZE		0402		0603			0805			1206				1210				1812						
RATED VOLTAGE (VDC)		10	16	10	16	25	50	10	16	25	10	16	25	50	10	16	25	50	10	16	25	50		
Capacitance	0.10µF (104)	N	N	S	S	S	X																	
	0.15µF (154)			S	S																			
	0.22µF (224)			S	S																			
	0.33µF (334)			X	X																			
	0.47µF (474)			X	X																			
	0.68µF (684)			X	X																			
	1.0µF (105)			X	X			D	D	D	J	J	J	P	D	D	D	D	D	D	D	D	K	
	1.5µF (155)																							
	2.2µF (225)							I	I		J	J	P					G						
	3.3µF (335)											P	P					G						
	4.7µF (475)										P	P	P					K						
6.8µF (685)																								
10µF (106)											P				K	K	M			M	M			

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

SURFACE MOUNTED MULTILAYER CERAMIC CAPACITORS

6-2 X5R Dielectric

DIELECTRIC		X5R																			
SIZE		0402			0603				0805			1206			1210				1812		
RATED VOLTAGE (VDC)		6.3	10	16	6.3	10	16	25	6.3	10	16	6.3	10	16	6.3	10	16	25	6.3	10	16
Capacitance	0.027μF (273)			N																	
	0.033μF (333)			N																	
	0.039μF (393)			N																	
	0.047μF (473)			N																	
	0.056μF (563)		N																		
	0.068μF (683)		N																		
	0.082μF (823)		N																		
	0.10μF (104)	N	N	N																	
	0.15μF (154)																				
	0.22μF (224)	N						X													
	0.33μF (334)	N				X	X	X													
	0.47μF (474)	N				X	X	X													
	0.68μF (684)					X	X	X													
	1.0μF (105)	N				X	X	X	X												
	1.5μF (155)																				
	2.2μF (225)					X				I	I	I		J	J						
	3.3μF (335)									I	I			P	P						
	4.7μF (475)					X				I	I			P	P	P					
	6.8μF (685)													P							
	10μF (106)									I				P	P	P	K	K	K	M	
22μF (226)									I				P			M	M	M		M	M
47μF (476)																M				M	
100μF (107)																M				U	

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

6-3 Y5V Dielectric

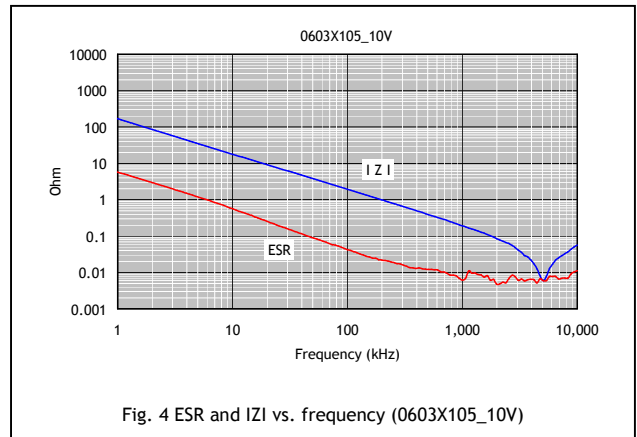
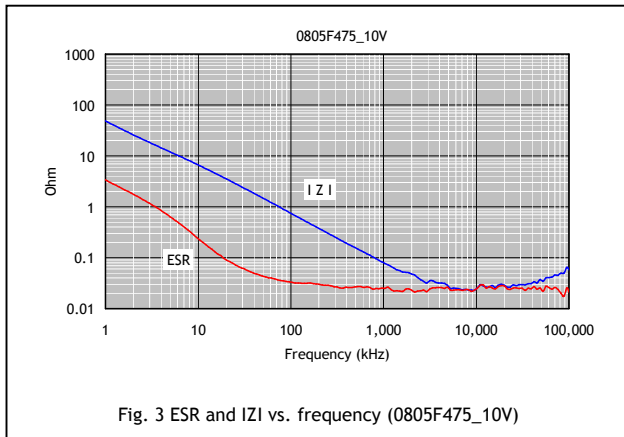
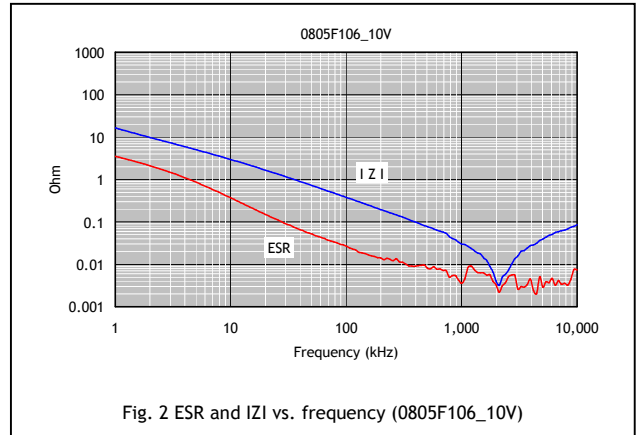
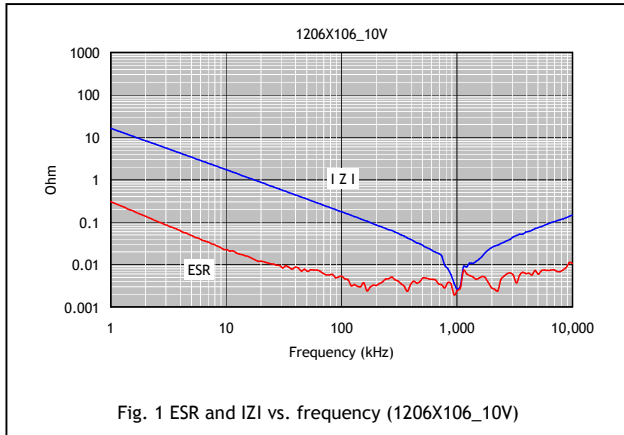
DIELECTRIC		Y5V																											
SIZE		0402			0603			0805					1206					1210					1812						
RATED VOLTAGE (VDC)		6.3	10	16	6.3	10	16	6.3	10	16	25	50	6.3	10	16	25	35	50	6.3	10	16	25	35	50	6.3	10	16	25	50
Capacitance	0.15μF (154)		N																										
	0.22μF (224)		N																										
	0.33μF (334)	N	N																										
	0.47μF (474)	N	N																										
	0.68μF (684)	N																											
	1.0μF (105)	N			S	X		B	B	D	I			C	C		C		C	C	C		C			D	D	D	D
	1.5μF (155)				S			D	D					C	C	C				C	C	C				D	D	D	D
	2.2μF (225)			S	S			D	D	I				C	C	C		J		C	C	C				D	D	D	D
	3.3μF (335)							D	D					J	J	J				C	C	C				D	D	D	D
	4.7μF (475)			S	X			D	D					J	J	J	J			C	C	C	D			D	D	D	D
	6.8μF (685)							I						J	J					C	C	G				D	D	D	D
	10μF (106)					I	I							J	J	J	P			D	D	G	K			D	D	D	K
	22μF (226)					I								P						K	K								K
	47μF (476)																			K							M		
100μF (107)																			M						M	M			

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

SURFACE MOUNTED MULTILAYER CERAMIC CAPACITORS

7. ELECTRICAL CHARACTERISTICS

Typical Impedance/ESR vs. Frequency



SURFACE MOUNTED MULTILAYER CERAMIC CAPACITORS

LOW PROFILE CAPACITORS

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>M</u>	<u>100</u>	<u>C</u>	<u>I</u>
Series	Size	Dielectric	Capacitance	Tolerance	Rated voltage	Termination	Packaging style
TT=Low profile	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" reeled

5. GENERAL ELECTRICAL DATA

	X5R	Y5V
Dielectric		
Size	0805, 1206, 1210	
Capacitance range*	1.0μF to 4.7μF	2.2μF to 22μF
Capacitance tolerance	K (±10%), M (±20%)	M (±20%), Z (-20/+80%)
Rated voltage (WVDC)	6.3V, 10V	6.3V, 10V, 16V, 25V, 50V
Tan δ*	10V: ≤5.0% 6.3V: ≤7.5%	16V: 9.0% 10V: 12.5%
Insulation resistance at Ur	Rx C ≥ 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.

SURFACE MOUNTED MULTILAYER CERAMIC CAPACITORS

6. CAPACITANCE RANGE

6-1 X5R Dielectric

DIELECTRIC		X5R				
SIZE		0805		1206		1210
RATED VOLTAGE (VDC)		10	6.3	10	10	10
Capacitance	1.0 μ F (105)	0.95				
	1.5 μ F (155)					
	2.2 μ F (225)			0.95		
	3.3 μ F (335)					0.95
	4.7 μ F (475)					0.95
	6.8 μ F (685)					
	10 μ F (106)		0.95		0.95	

1. The number in cell is expressed the product thickness maximum in mm.

6-2 Y5V Dielectric

DIELECTRIC		Y5V										
SIZE		0805				1206					1210	
RATED VOLTAGE (VDC)		10	16	25	50	6.3	10	16	25	50	10	16
Capacitance	1.0 μ F (105)			0.95	0.95							
	1.5 μ F (155)		0.95									
	2.2 μ F (225)	0.95	0.95							0.95		
	3.3 μ F (335)	0.95	0.95									
	4.7 μ F (475)	0.95	0.95				0.95	0.95	0.95			
	6.8 μ F (685)											
	10 μ F (106)	0.95				0.95	0.95	1.25				
	22 μ F (226)						1.25				1.25	1.25

1. The number in cell is expressed the product thickness maximum in mm.

SURFACE MOUNTED MULTILAYER CERAMIC CAPACITORS

ULTRA-SMALL (0201) CAPACITORS

1. INTRODUCTION

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.

0201 MLCC is performed by high precision technology achieve high capacitance in unit size and ensure the stability and reliability of products.

2. FEATURES

- High capacitance in unit size.
- High precision dimensional tolerances.
- Suitable used in high-accuracy automatic mounting machine.

3. APPLICATIONS

- Miniature microwave module.
- Portable equipments (ex. Mobile phone, PDA).
- High frequency circuits.

4. HOW TO ORDER

<u>0201</u>	<u>N</u>	<u>100</u>	<u>G</u>	<u>250</u>	<u>L</u>	<u>I</u>
<u>Size</u>	<u>Dielectric</u>	<u>Capacitance</u>	<u>Tolerance</u>	<u>Rated voltage</u>	<u>Termination</u>	<u>Packaging style</u>
Inch (mm) 0201 (0603)	N=NP0 (COG) B=X7R X=X5R F=Y5V	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	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. 4R0=4 VDC 6R3=6.3 VDC 100=10 VDC 160=16 VDC 250=25 VDC	L=Ag/Ni/Sn C=Cu/Ni/Sn	T=7" reeled

5. GENERAL ELECTRICAL DATA

Size	0201			
Dielectric	NP0	X7R	X5R	Y5V
Capacitance*	0.5pF to 100pF	330pF to 1nF	1.5nF to 10nF	22nF to 100nF
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)	16V, 25V	10V, 16V	10V, 16V	4V, 6.3V
Tan δ / Q*	Cap<30pF, Q≥400+20C Cap≥30pF, Q≥1000	≤3.5%	≤5.0%	6.3V: ≤16% 4V: ≤20%
Insulation resistance at Ur	≥10GΩ	≥10GΩ or RxC≥500ΩxF whichever is less		
Operating temperature	-55 to +125°C		-55 to +85°C	
Capacitance change	±30ppm	±15%		+30/-80%
Termination	Ni/Sn (lead-free termination)			

* Measured at 30-70% related humidity.

NP0: Apply 1.0±0.2Vrms, 1.0MHz±10% at the conditions of 25°C ambient temperature.

X7R, X5R: Apply 1.0±0.2Vrms, 1.0kHz±10% at the conditions of 25°C ambient temperature.

Y5V: Apply 1.0±0.2Vrms, 1.0kHz±10% at the conditions of 20°C ambient temperature.

SURFACE MOUNTED MULTILAYER CERAMIC CAPACITORS

6. CAPACITANCE RANGE

	SIZE	0201	
	DIELECTRIC	NPO	
	RATED VOLTAGE (VDC)	16	25
Capacitance	0.5pF (0R5)		L
	1.0pF (1R0)		L
	1.2pF (1R2)		L
	1.5pF (1R5)		L
	1.8pF (1R8)		L
	2.2pF (2R2)		L
	2.7pF (2R7)		L
	3.3pF (3R3)		L
	3.9pF (3R9)		L
	4.7pF (4R7)		L
	5.6pF (5R6)		L
	6.8pF (6R8)		L
	8.2pF (8R2)		L
	10pF (100)		L
	12pF (120)		L
	15pF (150)		L
	18pF (180)		L
	22pF (220)		L
	27pF (270)		L
	33pF (330)		L
39pF (390)		L	
47pF (470)		L	
56pF (560)	L	L	
68pF (680)	L	L	
82pF (820)	L	L	
100pF (101)	L	L	

	SIZE	0201					
	DIELECTRIC	X7R		X5R		Y5V	
	RATED VOLTAGE (VDC)	10V	16V	10V	16V	4V	6.3V
Capacitance	100pF (101)		L		L		
	120pF (121)		L		L		
	150pF (151)		L		L		
	180pF (181)		L		L		
	220pF (221)		L		L		
	270pF (271)		L		L		
	330pF (331)		L		L		
	390pF (391)		L		L		
	470pF (471)		L		L		
	560pF (561)		L		L		
	680pF (681)		L		L		
	820pF (821)		L		L		
	1,000pF (102)		L		L		
	1,500pF (152)	L	L	L	L		
	2,200pF (222)	L	L	L	L		
	3,300pF (332)	L	L	L	L		
	4,700pF (472)	L	L	L	L		
	6,800pF (682)			L			
	0.010μF (103)			L			
	0.015μF (153)						
0.022μF (223)						L	
0.033μF (333)							
0.047μF (473)						L	
0.068μF (683)							
0.10μF (104)					L		

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

SURFACE MOUNTED MULTILAYER CERAMIC CAPACITORS

MIDDLE AND HIGH VOLTAGE CAPACITORS

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

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

3. APPLICATIONS

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

4. HOW TO ORDER

1808	N	100	G	202	L	I
Size	Dielectric	Capacitance	Tolerance	Rated voltage	Termination	Packaging style
Inch (mm)	N=NP0 (COG)	Two significant digits followed by no. of zeros.	B=±0.1pF C=±0.25pF	Two significant digits followed by no. of zeros.	L=Ag/Ni/Sn C=Cu/Ni/Sn	T=7" reeled G=13" reeled
0805 (2012)						
1206 (3216)	B=X7R	And R is in place of decimal point.	D=±0.5pF	And R is in place of decimal point.		
1210 (3225)	F=Y5V	eg.:	G=±2%	201=200 VDC		
1808 (4520)		R47=0.47pF	J=±5%	251=250 VDC		
1812 (4532)		OR5=0.5pF	K=±10%	501=500 VDC		
		1R0=1.0pF	M=±20%	631=630 VDC		
		100=10x10 ⁰ =10pF	Z=-20/+80%	102=1000 VDC		
				152=1500 VDC		
				202=2000 VDC		
				302=3000 VDC		

5. GENERAL ELECTRICAL DATA

Dielectric	NP0	X7R	Y5V
Size	0805, 1206, 1210, 1808, 1812		0805, 1206, 1210, 1812
Capacitance*	0.5pF to 6800pF	100pF to 0.047µF	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**	≥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.

SURFACE MOUNTED MULTILAYER CERAMIC CAPACITORS

6. CAPACITANCE RANGE (MIDDLE VOLTAGE - 200V to 630V)

6-1 NPO Dielectric

DIELECTRIC		NPO																	
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)			A	A	A	A												
	1.0pF (1R0)			A	A	A	A												
	1.2pF (1R2)			A	A	A	A												
	1.5pF (1R5)			A	A	A	A	B	B	B	B								
	1.8pF (1R8)			A	A	A	A	B	B	B	B								
	2.2pF (2R2)			A	A	A	A	B	B	B	B								
	2.7pF (2R7)			A	A	A	A	B	B	B	B								
	3.3pF (3R3)			A	A	A	A	B	B	B	B								
	3.9pF (3R9)			A	A	A	A	B	B	B	B								
	4.7pF (4R7)			A	A	A	A	B	B	B	B								
	5.6pF (5R6)			A	A	A	A	B	B	B	B								
	6.8pF (6R8)			A	A	A	A	B	B	B	B								
	8.2pF (8R2)			A	A	A	A	B	B	B	B								
	10pF (100)			A	A	A	A	B	B	B	B	C	C	C	C	D	D	D	D
	12pF (120)			A	A	A	A	B	B	B	B	C	C	C	C	D	D	D	D
	15pF (150)			A	A	A	A	B	B	B	B	C	C	C	C	D	D	D	D
	18pF (180)			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	A	B	B	B	B	B	B	C	C	C	C	D	D	D	D
	120pF (121)			A	A	D	D	B	B	B	B	C	C	C	C	D	D	D	D
	150pF (151)			B	B	D	D	B	B	B	B	C	C	C	C	D	D	D	D
	180pF (181)			B	B	D	D	B	B	B	B	C	C	C	C	D	D	D	D
	220pF (221)			D	D	D	D	B	B	B	B	C	C	C	C	D	D	D	D
	270pF (271)			D	D	D	D	B	B	C	C	C	C	C	C	D	D	D	D
	330pF (331)			D	D	D	D	B	B	C	C	C	C	C	C	D	D	D	D
	390pF (391)			D	D	D	D	B	B	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	C	C	C	C	C	C	C	D	D	D	D	
680pF (681)			D				C	C	C	C	C	C	C	C	D	D	D	D	
820pF (821)			D				C	D	D	D	C	C	C	C	D	D	D	D	
1,000pF (102)							C	G	G	G	C	C	C	C	D	D	D	D	
1,200pF (122)							C					D	D	D	D	D	D	D	
1,500pF (152)							C					D	D	D	D	D	D	D	
1,800pF (182)							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.

SURFACE MOUNTED MULTILAYER CERAMIC CAPACITORS

6-2 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^	B	B	B^	B^								
	180pF (181)	B	B	B^	B^	B	B	B^	B^								
	220pF (221)	B	B	B^	B^	B	B	B^	B^								
	270pF (271)	B	B	B^	B^	B	B	B^	B^								
	330pF (331)	B	B	B^	B^	B	B	B^	B^								
	390pF (391)	B	B	B^	B^	B	B	B^	B^								
	470pF (471)	B	B	B^	B^	B	B	B^	B^								
	560pF (561)	B	B	B^	B^	B	B	B^	B^								
	680pF (681)	B	B	B^	B^	B	B	B^	B^								
	820pF (821)	B	B	B^	B^	B	B	B^	B^								
	1,000pF (102)	B	B	B^	B^	B	B	B^	B^	C	C	C^	C^	D	D	D^	D^
	1,200pF (122)	B	B	B^	B^	B	B	B^	B^	C	C	C^	C^	D	D	D^	D^
	1,500pF (152)	B	B	B^	B^	B	B	B^	B^	C	C	C^	C^	D	D	D^	D^
	1,800pF (182)	B	B	B^	B^	B	B	B^	B^	C	C	C^	C^	D	D	D^	D^
	2,200pF (222)	B	B	B^	B^	B	B	B^	B^	C	C	C^	C^	D	D	D^	D^
	2,700pF (272)	B	B	B^	B^	B	B	B^	B^	C	C	C^	C^	D	D	D^	D^
	3,300pF (332)	B	B			B	B	B^	B^	C	C	C^	C^	D	D	D^	D^
	3,900pF (392)	B	B			B	B	B^	B^	C	C	C^	C^	D	D	D^	D^
	4,700pF (472)	B	B			B	B	B^	B^	C	C	C^	C^	D	D	D^	D^
	5,600pF (562)	D	D			B	B	B^	B^	C	C	C^	C^	D	D	D^	D^
	6,800pF (682)	D	D			B	B	B^	B^	C	C	C^	C^	D	D	D^	D^
	8,200pF (822)	D	D			B	B	C^	C^	C	C	C^	C^	D	D	D^	D^
	0.010μF (103)	D	D			B	B	C^	C^	C	C	C^	C^	D	D	D^	D^
	0.012μF (123)	D	D			B	B	D^	D^	C	C	C^	C^	D	D	D^	D^
	0.015μF (153)	D	D			C	C	D^	D^	C	C	C^	C^	D	D	D^	D^
	0.018μF (183)	D	D			C	C	D^	D^	C	C	C^	C^	D	D	D^	D^
	0.022μF (223)	D	D			C	C	G^	G^	C	C	D^	D^	D	D	D^	D^
	0.027μF (273)					C	C	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)													D	D		
	0.15μF (154)													K	K		
	0.18μF (184)													K	K		
0.22μF (224)													K	K			
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 “^” mark is expressed product with Ag/Ni/Sn terminations.

SURFACE MOUNTED MULTILAYER CERAMIC CAPACITORS

6-3 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.

SURFACE MOUNTED MULTILAYER CERAMIC CAPACITORS

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

7-1 NPO Dielectric

DIELECTRIC		NPO									
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								
	2.2pF (2R2)	B	B								
	2.7pF (2R7)	B	B								
	3.3pF (3R3)	B	B								
	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	B	C	C	D	D	D	D	D	D
	39pF (390)	B	B	C	C	D	D	D	D	D	D
	47pF (470)	B	B	C	C	D	D	D	D	D	D
	56pF (560)	B	B	C	D	D	D	D	D	D	D
	68pF (680)	B	C	C	D	D	D	D	D	D	D
	82pF (820)	B	C	C	D	D	D	D	D	D	D
	100pF (101)	B	C	C	D	D	D	D	D	D	D
	120pF (121)	B	D	C	D	D	D	D	D	D	D
	150pF (151)	C	D	C	D	D	D	D	D	D	D
	180pF (181)	C	G	C	D	D	D	K	D	D	D
	220pF (221)	D	G	C	D	D	D	K	D	D	D
	270pF (271)	D		C		D	D	K	D	D	K
	330pF (331)	G		D		D	D		D	D	K
	390pF (391)	G		D		D	K		D	D	K
470pF (471)	G		D		D	K		D	D	K	
560pF (561)					K	K		D	D		
680pF (681)					K	K		D	K		
820pF (821)					K			D	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.

SURFACE MOUNTED MULTILAYER CERAMIC CAPACITORS

7-2 X7R Dielectric

DIELECTRIC		X7R										
SIZE		1206			1210	1808				1812		
RATED VOLTAGE (VDC)		1000	1500	2000	1000	1000	1500	2000	3000	1000	2000	3000
Capacitance	150pF (151)	B [^]	B [^]	B [^]		D [^]	D [^]	D [^]				
	180pF (181)	B [^]	B [^]	B [^]		D [^]	D [^]	D [^]				
	220pF (221)	B [^]	B [^]	B [^]		D [^]	D [^]	D [^]				
	270pF (271)	B [^]	B [^]	B [^]		D [^]	D [^]	D [^]		D [^]	D [^]	
	330pF (331)	B [^]	B [^]	B [^]		D [^]	D [^]	D [^]	K [^]	D [^]	D [^]	
	390pF (391)	B [^]	B [^]	C [^]		D [^]	D [^]	D [^]	K [^]	D [^]	D [^]	
	470pF (471)	B [^]	B [^]	C [^]		D [^]	D [^]	D [^]	K [^]	D [^]	D [^]	
	560pF (561)	B [^]	C [^]	C [^]		D [^]	D [^]	D [^]	K [^]	D [^]	D [^]	
	680pF (681)	B [^]	C [^]	C [^]		D [^]	D [^]	D [^]	K [^]	D [^]	D [^]	K [^]
	820pF (821)	B [^]	G [^]	G [^]		D [^]	D [^]	D [^]	K [^]	D [^]	D [^]	K [^]
	1,000pF (102)	B [^]	G [^]	G [^]	C [^]	D [^]	D [^]	K [^]	K [^]	D [^]	D [^]	K [^]
	1,200pF (122)	B [^]	G [^]		C [^]	D [^]	D [^]	K [^]		D [^]	D [^]	
	1,500pF (152)	C [^]	G [^]		C [^]	D [^]	D [^]	K [^]		D [^]	D [^]	
	1,800pF (182)	C [^]	G [^]		C [^]	D [^]	D [^]	K [^]		D [^]	D [^]	
	2,200pF (222)	D [^]	G [^]		C [^]	D [^]	D [^]	K [^]		D [^]	D [^]	
	2,700pF (272)	G [^]			C [^]	D [^]	D [^]			D [^]	D [^]	
	3,300pF (332)	G [^]			D [^]	D [^]	K [^]			D [^]	K [^]	
	3,900pF (392)	G [^]				D [^]				D [^]	K [^]	
	4,700pF (472)					D [^]				D [^]	K [^]	
	5,600pF (562)					K [^]				D [^]		
6,800pF (682)					K [^]				D [^]			
8,200pF (822)					K [^]				D [^]			
0.010μF (103)					K [^]				D [^]			
0.012μF (123)									K [^]			
0.015μF (153)									K [^]			

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

SURFACE MOUNTED MULTILAYER CERAMIC CAPACITORS

CAPACITOR ARRAYS

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.

WTC capacitor arrays are developed to offer designers the opportunity to lower placement costs increase assembly line output through lower component count per board.

2. FEATURES

- High density mounting due to mounting space saving.
- Mounting cost saving.
- Increased throughput.

3. APPLICATIONS

- For use as a bypass for digital and analog signal line noise
- Computer motherboards and peripherals.
- The other common electronic circuits.

4. HOW TO ORDER

<u>Y</u>	<u>4C</u>	<u>3</u>	<u>B</u>	<u>103</u>	<u>K</u>	<u>500</u>	<u>C</u>	<u>I</u>
Series	Cap. Nr.	Termination pitch	Dielectric	Capacitance	Tolerance	Rated voltage	Termination	Packaging style
Y=Capacitor array	4C=4xCap	3=0.03" pitch	N=NP0 (COG) B=X7R F=Y5V	Two significant digits followed by no. of zeros. And R is in place of decimal point. eg.: 103=10x10 ³ =10,000pF =10nF	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. 160=16 VDC 250=25 VDC 500=50 VDC	L=Ag/Ni/Sn C=Cu/Ni/Sn	T=7" reeled G=13" reeled

5. GENERAL ELECTRICAL DATA

Size	4 x 0603		
Dielectric	NP0	X7R	Y5V
Capacitance*	10pF to 470pF	180pF to 100nF	10nF to 100nF
Capacitance tolerance	J (±5%), K (±10%)	K (±10%), M (±20%)	Z (-20/+80%)
Rated voltage (WVDC)	50V	16V, 50V	50V
Q/Tan δ*	Cap<30pF: Q≥400+20C Cap≥30pF: Q≥1000	Ur=50V, ≤2.5% Ur=16V, ≤3.5%	≤5%
Insulation resistance at Ur	≥10GΩ	≥10GΩ or RxC≥500ΩxF whichever is less	
Operating temperature	-55 to +125 °C		-25 to +85 °C
Capacitance characteristic	±30ppm	±15%	+30/-80%
Termination	Ni/Sn (lead-free termination)		

* Measured at 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, at the conditions of 25 °C ambient temperature.

X7R: Apply 1.0±0.2Vrms, 1.0kHz±10%, at the conditions of 25 °C ambient temperature.

Y5V: Apply 1.0±0.2Vrms, 1.0kHz±10%, at the conditions of 20 °C ambient temperature.

SURFACE MOUNTED MULTILAYER CERAMIC CAPACITORS

6. CAPACITANCE RANGE

SIZE		4 x 0603			
DIELECTRIC		NPO	X7R		Y5V
RATED VOLTAGE (VDC)		50	16	50	50
Capacitance	10pF (100)	B			
	15pF (150)	B			
	22pF (220)	B			
	33pF (330)	B			
	47pF (470)	B			
	68pF (680)	B			
	100pF (101)	B			
	150pF (151)	B			
	180pF (181)	B		B	
	220pF (221)	B		B	
	330pF (331)	B		B	
	470pF (471)	B		B	
	680pF (681)			B	
	1,000pF (102)			B	
	1,500pF (152)			B	
	2,200pF (222)			B	
	3,300pF (332)			B	
	4,700pF (472)			B	
	6,800pF (782)			B	
	0.010μF (103)			B	B
0.015μF (153)		B			
0.022μF (223)		B		B	
0.033μF (333)		B			
0.047μF (473)		B		B	
0.068μF (683)		B			
0.10μF (104)		B		B	

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

SURFACE MOUNTED MULTILAYER CERAMIC CAPACITORS

HIGH Q AND LOW ESR CAPACITORS (HH)

1. INTRODUCTION

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 $\pm 30\text{ppm}/^\circ\text{C}$ required for NP0 (COG) 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

- High Q and low ESR performance at high frequency.
- Quality improvement of telephone calls for low power loss and better performance.

3. APPLICATIONS

- Mobile telecommunication: Mobile phone, WLAN.
- RF module: Power amplifier, VCO.
- Tuners.

4. HOW TO ORDER

HH	15	N	100	G	500	L	I
Series	Size	Dielectric	Capacitance	Tolerance	Rated voltage	Termination	Packaging style
HH=High Q/ Low ESR	15=0402 (1005) 18=0603 (1608)	N=NP0 (COG)	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	B=±0.1pF C=±0.25pF D=±0.5pF F=±1% G=±2% J=±5%	Two significant digits followed by no. of zeros. And R is in place of decimal point. 160=16 VDC 250=25 VDC 500=50 VDC	L=Ag/Ni/Sn	T=7" reeled G= 13" reeled

5. GENERAL ELECTRICAL DATA

Dielectric	NP0
Size	0402, 0603
Capacitance*	0402: 0.5pF to 470pF 0603: 0.5pF to 3300pF
Capacitance tolerance	Cap≤5pF: B (±0.1pF), C (±0.25pF) 5pF<Cap<10pF: C (±0.25pF), D (±0.5pF) Cap≥10pF: F (±1%), G (±2%), J (±5%)
Rated voltage (WVDC)	16V, 25V, 50V
Q*	Cap<30pF: Q≥400+20C Cap≥30pF: Q≥1000
Insulation resistance at Ur	≥10GΩ
Operating temperature	-55 to +125 °C
Capacitance change	±30ppm
ESR	Cap<2.2pF: ≤1000mΩ@900±100MHz 2.2pF≤Cap≤470pF: ≤500mΩ@900±100MHz Cap>470pF: ≤500mΩ@60±10MHz
Termination	Ni/Sn (lead-free termination)

* Measured at the conditions of 25 °C ambient temperature and 30-70% related humidity.

Apply 1.0±0.2Vrms, 1.0MHz±10% for Cap≤1000pF and 1.0±0.2Vrms, 1.0kHz±10% for Cap>1000pF.

SURFACE MOUNTED MULTILAYER CERAMIC CAPACITORS

6. CAPACITANCE RANGE

DIELECTRIC		NPO						
SIZE		0402			0603			
RATED VOLTAGE (VDC)		16	25	50	16	25	50	100
Capacitance	0.5pF (0R5)		N	N		S	S	S
	0.6pF (0R6)		N	N		S	S	S
	0.7pF (0R7)		N	N		S	S	S
	0.8pF (0R8)		N	N		S	S	S
	0.9pF (0R9)		N	N		S	S	S
	1.0pF (1R0)		N	N		S	S	S
	1.2pF (1R2)		N	N		S	S	S
	1.5pF (1R5)		N	N		S	S	S
	1.8pF (1R8)		N	N		S	S	S
	2.2pF (2R2)		N	N		S	S	S
	2.7pF (2R7)		N	N		S	S	S
	3.3pF (3R3)		N	N		S	S	S
	3.9pF (3R9)		N	N		S	S	S
	4.7pF (4R7)		N	N		S	S	S
	5.6pF (5R6)		N	N		S	S	S
	6.8pF (6R8)		N	N		S	S	S
	8.2pF (8R2)		N	N		S	S	S
	10pF (100)		N	N		S	S	S
	12pF (120)		N	N		S	S	S
	15pF (150)		N	N		S	S	S
	18pF (180)		N	N		S	S	S
	22pF (220)		N	N		S	S	S
	27pF (270)		N	N		S	S	S
	33pF (330)		N	N		S	S	S
	39pF (390)		N	N		S	S	S
	47pF (470)		N	N		S	S	S
	56pF (560)		N	N		S	S	S
	68pF (680)		N	N		S	S	S
	82pF (820)		N	N		S	S	S
	100pF (101)		N	N		S	S	S
	120pF (121)		N	N		S	S	S
	150pF (151)		N	N		S	S	S
	180pF (181)		N	N		S	S	S
220pF (221)		N	N		S	S	S	
270pF (271)	N				S	S	S	
330pF (331)	N				S	S	S	
390pF (391)	N				S	S	S	
470pF (471)	N				S	S	S	
560pF (561)					S	S		
680pF (681)					S	S		
820pF (821)					S	S		
1,000pF (102)					S	S		
1,200pF (122)					S			
1,500pF (152)					S			
1,800pF (182)					S			
2,200pF (222)					S			
2,700pF (272)					S			
3,300pF (332)					S			

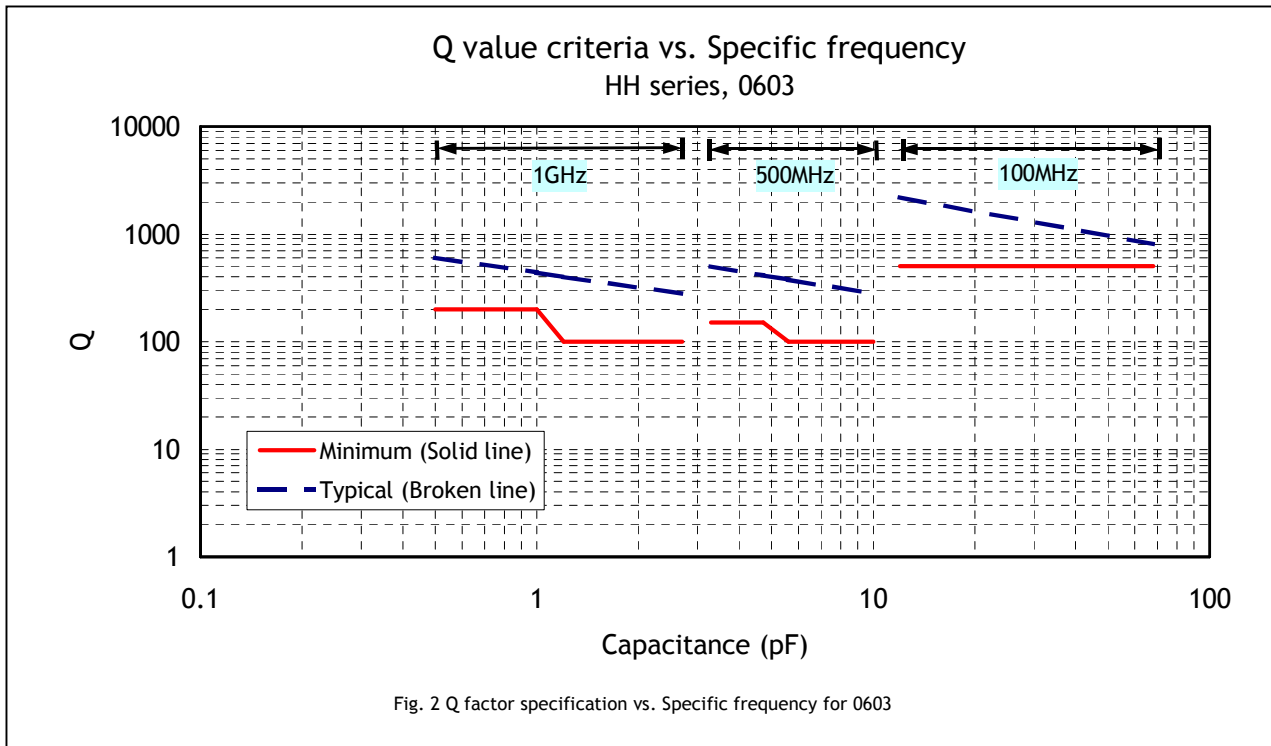
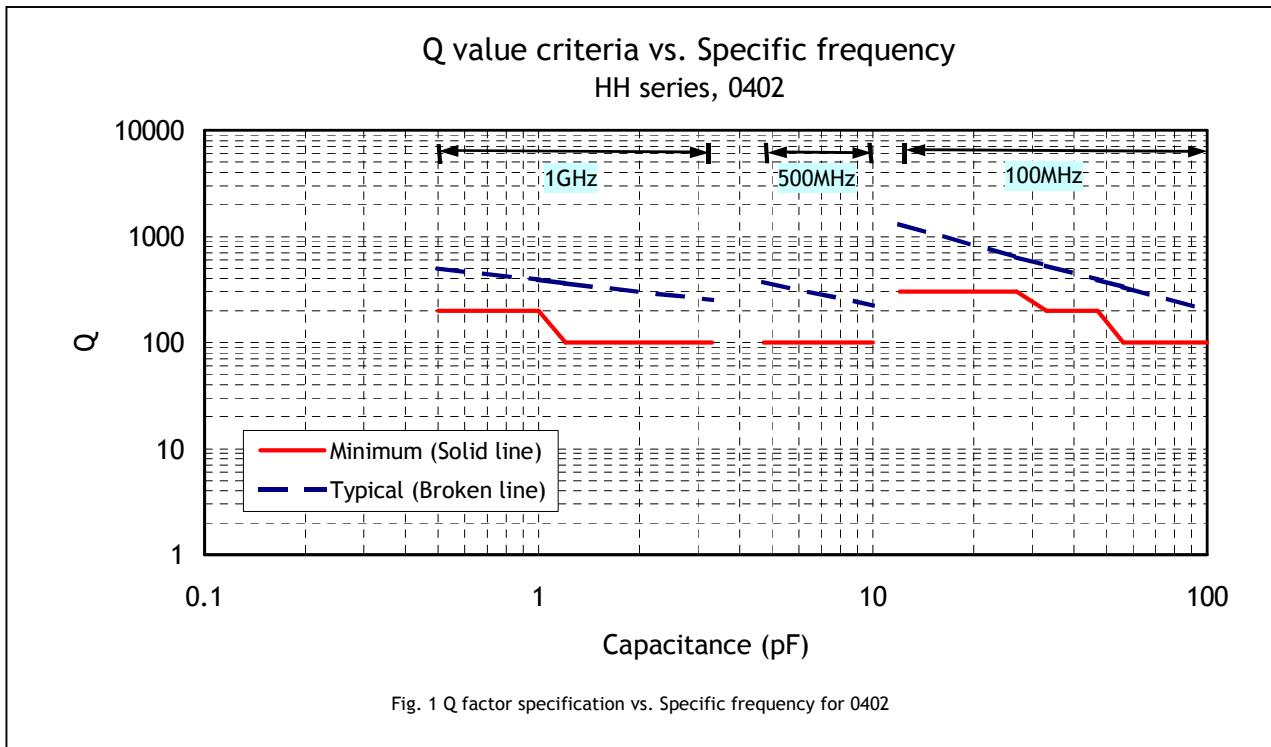
1. The letter in cell is expressed the symbol of product thickness.

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

SURFACE MOUNTED MULTILAYER CERAMIC CAPACITORS

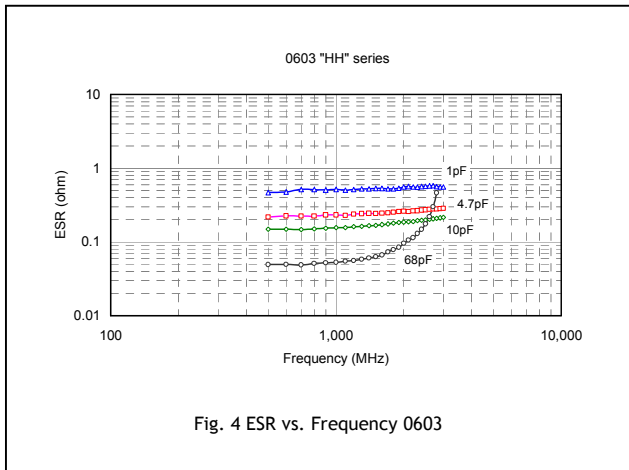
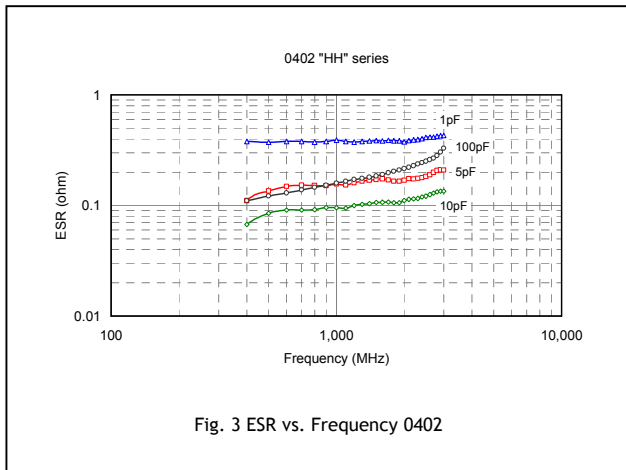
7. ELECTRICAL CHARACTERISTICS

Q factor specification vs. Specific frequency

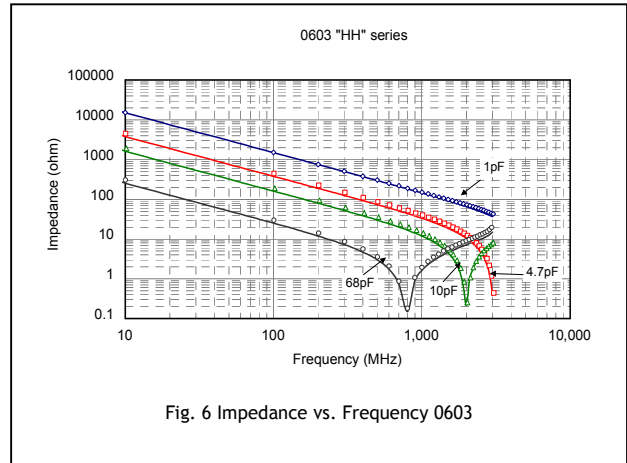
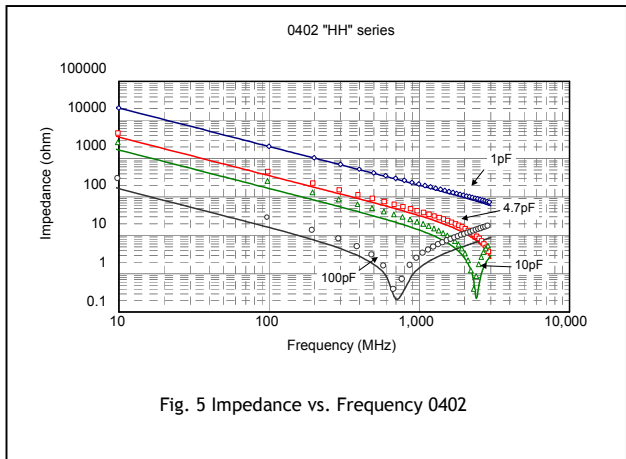


SURFACE MOUNTED MULTILAYER CERAMIC CAPACITORS

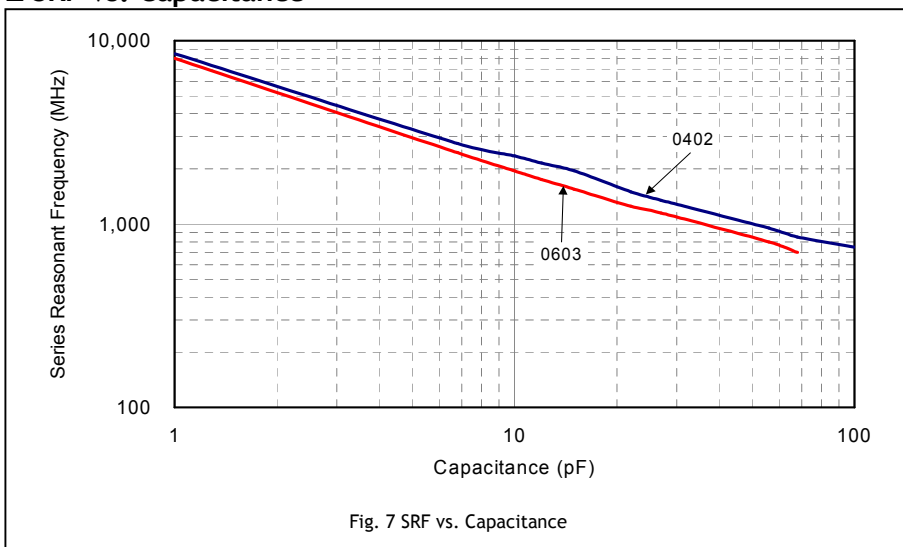
Typical ESR vs. Frequency



Typical Impedance vs. Frequency



SRF vs. Capacitance



SURFACE MOUNTED MULTILAYER CERAMIC CAPACITORS

MICROWAVE CAPACITORS (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 $\pm 30\text{ppm}/^\circ\text{C}$ required for NP0 (COG) 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

- High Q performance at high frequency.
- Capacitance low to 0.1pF.
- Narrow capacitance tolerance.

3. APPLICATIONS

- Mobile telecommunication: Mobile phone, WLAN.
- RF module: Power amplifier, VCO.

4. HOW TO ORDER

MW	15	N	100	G	500	L	I
Series	Size	Dielectric	Capacitance	Tolerance	Rated voltage	Termination	Packaging style
MW=microwave	15=0402 (1005) 18=0603 (1608)	N=NP0 (COG)	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= $\pm 0.05\text{pF}$ B= $\pm 0.1\text{pF}$ C= $\pm 0.25\text{pF}$ F= $\pm 1\%$ G= $\pm 2\%$ J= $\pm 5\%$	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. 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 ($\pm 0.05\text{pF}$), B ($\pm 0.1\text{pF}$) 5pF \leq Cap<10pF: B ($\pm 0.1\text{pF}$), C ($\pm 0.25\text{pF}$) Cap \geq 10pF: F ($\pm 1\%$), G ($\pm 2\%$)
Rated voltage (WVDC)	50V
Q*	Cap<30pF: Q \geq 400+20C Cap \geq 30pF: Q \geq 1000
Insulation resistance at Ur	$\geq 10\text{G}\Omega$
Operating temperature	-55 to +125 °C
Capacitance coefficient	$\pm 30\text{ppm}$
Termination	Ni/Sn (lead-free termination)

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

** Capacitance tolerance J ($\pm 5\%$) is under requested.

SURFACE MOUNTED MULTILAYER CERAMIC CAPACITORS

6. CAPACITANCE RANGE

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

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

SURFACE MOUNTED MULTILAYER CERAMIC CAPACITORS

7. ELECTRICAL CHARACTERISTICS

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

