

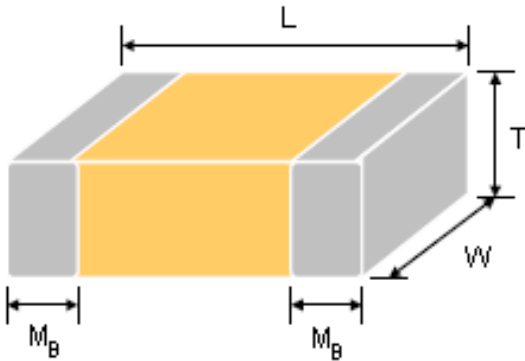
# Multilayer Ceramic Capacitor

## General Purpose



### Features:

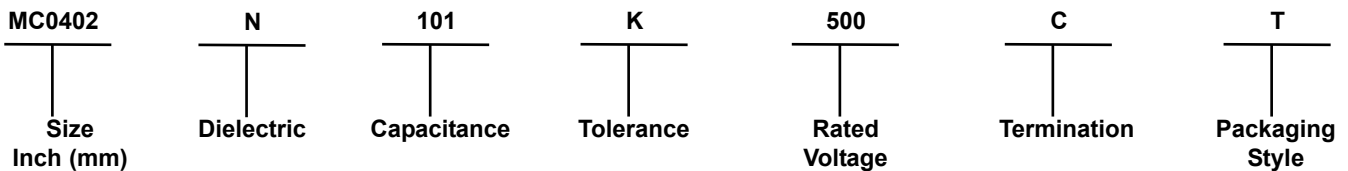
- High capacitance in given case size



### Applications:

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

### Part Number Explanation



- Size : 0402 (1005) and 0603 (1608)
- Dielectric : N = NP0 (C0G), B = X7R AND F = Y5V
- Capacitance : Two significant digits followed by no. of zeros and R is in place of decimal point  
eg.:  
0R5 = 0.5 pF  
1R0 = 1 pF  
104 =  $10 \times 10^4 = 100 \text{ nF}$
- Tolerance : C =  $\pm 0.25 \text{ pF}$ , D =  $\pm 0.5 \text{ pF}$ , F =  $\pm 1\%$ , J =  $\pm 5\%$ , K =  $\pm 10\%$ , M =  $\pm 20\%$ , Z = -20 / +80%
- Rated voltage : Two significant digits followed by no. of zeros. And R is in place of decimal point  
100 = 10 VDC  
160 = 16 VDC  
250 = 25 VDC  
500 = 50 V DC  
101 = 100 VDC
- Termination : C=Cu/Ni/Sn (for NP0, X7R, Y5V dielectric) L = Ag/Ni/Sn (for partial NP0 items)
- Packaging Style : T = 7" reeled

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

### External Dimensions

Size Inch (mm)	L (mm)	W (mm)	T (mm) / Symbol		Remark	MB (mm)
0402 (1005)	1 $\pm$ 0.05	0.5 $\pm$ 0.05	0.5 $\pm$ 0.05	N	#	0.25 $\pm$ 0.05 / -0.1
0603 (1608)	1.6 $\pm$ 0.1	0.8 $\pm$ 0.1	0.8 $\pm$ 0.07	S	-	0.4 $\pm$ 0.15
	1.6 $\pm$ 0.15 / -0.1	0.8 $\pm$ 0.15 / -0.1	0.8 $\pm$ 0.15 / -0.1	X	-	

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### General Electrical Data

Dielectric	NP0	X7R	Y5V
Size	0402, 0603		
Capacitance range*	0.5 pF to 0.039 uF	100 pF to 0.82 uF	10 nF to 0.68 uF
Capacitance tolerance**	Cap ≤5 pF: C (±0.25 pF) 5 pF < Cap < 10 pF: C (±0.25 pF), D (±0.5 pF) Cap ≥10 pF: F (~}1%), G (±2%), K (±10%)	K (±10%), M (±20%)	Z (-20 / +80%)
Rated voltage (WVDC)	10 V, 16 V, 25 V, 50 V, 100 V	6.3 V, 10 V, 16 V, 25 V, 50 V, 100 V	
Tan δ*	Cap < 30 pF: Q ≥ 400 +20C Cap ≥ 30 pF: Q ≥ 1,000	Note 1	
Insulation resistance at Ur	≥10 GΩ or R × C ≥500 Ω × F whichever is less		
Operating temperature	-55°C to +125°C	-25°C to +85°C	
Capacitance characteristic	±30 ppm	±15%	+30 / -80%
Termination	Ni / Sn (lead-free termination)		

\* Measured at the condition of 30 to 70% related humidity

NP0: Apply 1 ±0.2 Vrms, 1 MHz ±10% for Cap ≤ 1,000 pF and 1 ±0.2 Vrms, 1 kHz ±10% for Cap > 1,000 pF, 25°C at ambient temperature

X7R: Apply 1 ±0.2 Vrms, 1 kHz ±10%, at 25°C ambient temperature

Y5V: Apply 1 ±0.2 Vrms, 1 kHz ±10%, at 20°C ambient temperature

\*\* 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

### Note 1:

#### X7R

Rated Voltage	D.F	Exception of D.F.	
≥50 V	≤2.5%	≤3%	0603 ≥0.047 μF; 0805 ≥0.18 μF, 1206 ≥0.47 μF
25 V	≤3.5%	≤7%	0603 ≥0.33 μF
		≤10%	0402 ≥0.1 μF; 0603 ≥0.47 μF
16 V	≤3.5%	≤5%	0402 ≥0.033 μF; 0603 ≥0.15 μF; 0805 ≥0.68 μF
	≤5%	≤10%	0603 ≥0.68 μF
10 V	≤5%	≤10%	0402 ≥0.33 μF; 0603 ≥0.33 μF
6.3 V	≤10%	---	---

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Note 1:

Y5V

Rated Voltage	D.F	Exception of D.F.	
≥50 V	≤5%	≤7%	0603 ≥0.1 μF; 0805 ≥0.47 μF
25 V	≤5%	≤7%	0402 ≥0.047 μF; 0603 ≥0.1 μF; 0805 ≥0.33 μF
		≤9%	0402 ≥0.68 μF; 0603 ≥0.47 μF
16 V (C < 1 μF)	≤7%	≤9%	0402 ≥0.68 μF; 0603 ≥0.68 μF
16 V (C ≥ 1 μF)	≤9%	---	---
10 V	≤12.5%	---	---
6.3 V	≤20%	---	---

### Capacitance Range (NP0 Dielectric)

Dielectric		NP0									
Size		0402					0603				
Rated Voltage (Vdc)		10	16	25	50	100	10	16	25	50	100
Capacitance	0.5 pF (0R5)	N^	N^	N^	N^	N^	S	S	S	S	S
	0.6 pF (0R6)	N^	N^	N^	N^	N^	S	S	S	S	S
	0.7 pF (0R7)	N^	N^	N^	N^	N^	S	S	S	S	S
	0.8 pF (0R8)	N^	N^	N^	N^	N^	S	S	S	S	S
	0.9 pF (0R9)	N^	N^	N^	N^	N^	S	S	S	S	S
	1 pF (1R0)	N^	N^	N^	N^	N^	S	S	S	S	S
	1.2 pF (1R2)	N^	N^	N^	N^	N^	S	S	S	S	S
	1.5 pF (1R5)	N^	N^	N^	N^	N^	S	S	S	S	S
	1.8 pF (1R8)	N^	N^	N^	N^	N^	S	S	S	S	S
	2.2 pF (2R2)	N^	N^	N^	N^	N^	S	S	S	S	S
	2.7 pF (2R7)	N^	N^	N^	N^	N^	S	S	S	S	S
	3.3 pF (3R3)	N^	N^	N^	N^	N^	S	S	S	S	S
	3.9 pF (3R9)	N^	N^	N^	N^	N^	S	S	S	S	S
	4.7 pF (4R7)	N^	N^	N^	N^	N^	S	S	S	S	S
	5.6 pF (5R6)	N^	N^	N^	N^	N^	S	S	S	S	S
	6.8 pF (6R8)	N^	N^	N^	N^	N^	S	S	S	S	S
	8.2 pF (8R2)	N^	N^	N^	N^	N^	S	S	S	S	S
	10 pF (100)	N	N	N	N	N	S	S	S	S	S
12 pF (120)	N	N	N	N	N	S	S	S	S	S	
15 pF (150)	N	N	N	N	N	S	S	S	S	S	
18 pF (180)	N	N	N	N	N	S	S	S	S	S	

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### Capacitance Range (NP0 Dielectric)

Dielectric		NP0									
Size		0402					0603				
Rated Voltage (Vdc)		10	16	25	50	100	10	16	25	50	100
Capacitance	22 pF (220)	N	N	N	N	N	S	S	S	S	S
	27 pF (270)	N	N	N	N	N	S	S	S	S	S
	33 pF (330)	N	N	N	N	N	S	S	S	S	S
	39 pF (390)	N	N	N	N	N	S	S	S	S	S
	47 pF (470)	N	N	N	N	N	S	S	S	S	S
	56 pF (560)	N	N	N	N	N	S	S	S	S	S
	68 pF (680)	N	N	N	N	N	S	S	S	S	S
	82 pF (820)	N	N	N	N	N	S	S	S	S	S
	100 pF (101)	N	N	N	N	N	S	S	S	S	S
	120 pF (121)	N	N	N	N	N	S	S	S	S	S
	150 pF (151)	N	N	N	N	N	S	S	S	S	S
	180 pF (181)	N	N	N	N	N	S	S	S	S	S
	220 pF (221)	N	N	N	N	N	S	S	S	S	S
	270 pF (271)	N	N	N	N		S	S	S	S	S
	330 pF (331)	N	N	N	N		S	S	S	S	S
	390 pF (391)	N	N	N	N		S	S	S	S	S
	470 pF (471)	N	N	N	N		S	S	S	S	S
	560 pF (561)						S	S	S	S	S
	680 pF (681)						S	S	S	S	S
	820 pF (821)						S	S	S	S	S
	1,000 pF (102)						S	S	S	S	S
	1,200 pF (122)						X	X	X	X	
	1,500 pF (152)						X	X	X	X	
	1,800 pF (182)						X	X	X	X	
	2,200 pF (222)						X	X	X	X	
	2,700 pF (272)						X	X	X	X	
	3,300 pF (332)						X	X	X	X	
	3,900 pF (392)										
	4,700 pF (472)										
	5,600 pF (562)										
6,800 pF (682)											
8,200 pF (822)											
0.01uF (103)											
0.012 uF (123)											

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 terminations

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### Capacitance Range (X7R Dielectric)

Dielectric		X7R								
Size		0402				0603				
Rated Voltage (Vdc)		10	16	25	50	10	16	25	50	100
Capacitance	100 pF (101)	N	N	N	N	S	S	S	S	S
	120 pF (121)	N	N	N	N	S	S	S	S	S
	150 pF (151)	N	N	N	N	S	S	S	S	S
	180 pF (181)	N	N	N	N	S	S	S	S	S
	220 pF (221)	N	N	N	N	S	S	S	S	S
	270 pF (271)	N	N	N	N	S	S	S	S	S
	330 pF (331)	N	N	N	N	S	S	S	S	S
	390 pF (391)	N	N	N	N	S	S	S	S	S
	470 pF (471)	N	N	N	N	S	S	S	S	S
	560 pF (561)	N	N	N	N	S	S	S	S	S
	680 pF (681)	N	N	N	N	S	S	S	S	S
	820 pF (821)	N	N	N	N	S	S	S	S	S
	1,000 pF (102)	N	N	N	N	S	S	S	S	S
	1,200 pF (122)	N	N	N	N	S	S	S	S	S
	1,500 pF (152)	N	N	N	N	S	S	S	S	S
	1,800 pF (182)	N	N	N	N	S	S	S	S	S
	2,200 pF (222)	N	N	N	N	S	S	S	S	S
	2,700 pF (272)	N	N	N	N	S	S	S	S	S
	3,300 pF (332)	N	N	N	N	S	S	S	S	S
	3,900 pF (392)	N	N	N	N	S	S	S	S	S
	4,700 pF (472)	N	N	N	N	S	S	S	S	S
	5,600 pF (562)	N	N	N	N	S	S	S	S	S
	6,800 pF (682)	N	N	N	N	S	S	S	S	S
	8,200 pF (822)	N	N	N	N	S	S	S	S	S
	0.01 $\mu$ F (103)	N	N	N	N	S	S	S	S	S
	0.012 $\mu$ F (123)	N	N	N		S	S	S	S	
	0.015 $\mu$ F (153)	N	N	N		S	S	S	S	
	0.018 $\mu$ F (183)	N	N	N		S	S	S	S	
	0.022 $\mu$ F (223)	N	N	N		S	S	S	S	
	0.027 $\mu$ F (273)	N	N			S	S	S	S	
0.033 $\mu$ F (333)	N	N			S	S	S	X		
0.039 $\mu$ F (393)	N	N			S	S	S	X		
0.047 $\mu$ F (473)	N	N			S	S	S	X		
0.056 $\mu$ F (563)	N	N			S	S	S	X		

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### Capacitance Range (X7R Dielectric)

Dielectric		X7R								
Size		0402				0603				
Rated Voltage (Vdc)		10	16	25	50	10	16	25	50	100
Capacitance	0.068 $\mu$ F (683)	N	N			S	S	S	X	
	0.082 $\mu$ F (823)	N	N			S	S	S	X	
	0.10 $\mu$ F (104)	N	N			S	S	S	X	
	0.12 $\mu$ F (124)					S	S	X		
	0.15 $\mu$ F (154)					S	S	X		
	0.18 $\mu$ F (184)					S	S	X		
	0.22 $\mu$ F (224)					S	S	X		
	0.27 $\mu$ F (274)					X	X	X		
	0.33 $\mu$ F (334)					X	X	X		
	0.39 $\mu$ F (394)					X	X	X		
	0.47 $\mu$ F (474)					X	X	X		
	0.56 $\mu$ F (564)									
	0.68 $\mu$ F (684)									
	0.82 $\mu$ F (824)									

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

### Capacitance Range (Y5V Dielectric)

Dielectric		Y5V									
Size		0402				0603					
Rated Voltage (Vdc)		6.3	10	16	25	50	6.3	10	16	25	50
Capacitance	0.010 $\mu$ F (103)		N	N	N	N		S	S	S	S
	0.015 $\mu$ F (153)		N	N	N	N		S	S	S	S
	0.022 $\mu$ F (223)		N	N	N	N		S	S	S	S
	0.033 $\mu$ F (333)		N	N	N	N		S	S	S	S
	0.047 $\mu$ F (473)		N	N	N			S	S	S	S
	0.068 $\mu$ F (683)		N	N	N			S	S	S	S
	0.10 $\mu$ F (104)		N	N	N			S	S	S	S
	0.15 $\mu$ F (154)		N					S	S	S	S
	0.22 $\mu$ F (224)	N	N				S	S	S	S	S
	0.33 $\mu$ F (334)	N	N					S	S	S	
	0.47 $\mu$ F (474)	N	N					S	S		
	0.68 $\mu$ F (684)	N	N					S	X		

# Multilayer Ceramic Capacitor

## General Purpose



### Packaging Style and Quantity

Size	Thickness (mm) / Symbol		Paper tape 7" reel
0402 (1005)	0.5 ±0.05	N	10 k
0603 (1608)	0.8 ±0.07	S	4 k
	0.8 +0.15 / -0.1	X	4 k

### Reliability Test Conditions and Requirements

No.	Item	Test Condition	Requirements																																																										
1.	Visual and Mechanical	---	* No remarkable defect. * Dimensions to conform to individual specification sheet																																																										
2.	Capacitance	Class I:NPO	* Shall not exceed the limits given in the detailed specification																																																										
		Cap ≤ 1,000 pF 1±0.2 Vrms, 1 MHz ±10%																																																											
3	Q/ D.F. (Dissipation Factor)	Cap ≥ 1,000 pF 1 ±0.2 Vrms, 1 KHz ±10% Class II: X7R, Y5V Cap ≤ 10 μF, 1 ±0.2 Vrms, 1 kHz ±10% Cap > 10 μF, 0.5 ±0.2 Vrms, 120 Hz ±20%	NPO: Cap ≥ 30 pF, Q ≥ 1,000; Cap < 30 pF, Q ≥ 400 +20C <b>X7R</b> <table border="1"> <thead> <tr> <th>Rated Voltage</th> <th>D.F</th> <th colspan="2">Exception of D.F.</th> </tr> </thead> <tbody> <tr> <td>≥50 V</td> <td>≤2.5%</td> <td>≤3%</td> <td>0603 ≥0.047 μF; 0805 ≥0.18 μF, 1206 ≥0.47 μF</td> </tr> <tr> <td rowspan="2">25 V</td> <td rowspan="2">≤3.5%</td> <td>≤7%</td> <td>0603 ≥0.33 μF</td> </tr> <tr> <td>≤10%</td> <td>0402 ≥0.1 μF; 0603 ≥0.47 μF</td> </tr> <tr> <td rowspan="2">16 V</td> <td rowspan="2">≤3.5%</td> <td>≤5%</td> <td>0402 ≥0.033 μF; 0603 ≥0.15 μF; 0805 ≥0.68 μF</td> </tr> <tr> <td>≤10%</td> <td>0603 ≥0.68 μF</td> </tr> <tr> <td>10 V</td> <td>≤5%</td> <td>≤10%</td> <td>0402 ≥0.33 μF; 0603 ≥0.33 μF</td> </tr> <tr> <td>6.3 V</td> <td>≤10%</td> <td>---</td> <td>---</td> </tr> </tbody> </table> <b>Y5V</b> <table border="1"> <thead> <tr> <th>Rated Voltage</th> <th>D.F</th> <th colspan="2">Exception of D.F.</th> </tr> </thead> <tbody> <tr> <td>≥50 V</td> <td>≤5%</td> <td>≤7%</td> <td>0603 ≥0.1 μF; 0805 ≥0.47 μF</td> </tr> <tr> <td rowspan="2">25 V</td> <td rowspan="2">≤5%</td> <td>≤7%</td> <td>0402 ≥0.047 μF; 0603 ≥0.1 μF; 0805 ≥0.33 μF</td> </tr> <tr> <td>≤9%</td> <td>0402 ≥0.68 μF; 0603 ≥0.47 μF</td> </tr> <tr> <td>16 V (C &lt; 1 μF)</td> <td>≤7%</td> <td>≤9%</td> <td>0402 ≥0.68 μF; 0603 ≥0.68 μF</td> </tr> <tr> <td>16 V (C ≥ 1 μF)</td> <td>≤9%</td> <td>---</td> <td>---</td> </tr> <tr> <td>10 V</td> <td>≤12.5%</td> <td>---</td> <td>---</td> </tr> <tr> <td>6.3 V</td> <td>≤20%</td> <td>---</td> <td>---</td> </tr> </tbody> </table>	Rated Voltage	D.F	Exception of D.F.		≥50 V	≤2.5%	≤3%	0603 ≥0.047 μF; 0805 ≥0.18 μF, 1206 ≥0.47 μF	25 V	≤3.5%	≤7%	0603 ≥0.33 μF	≤10%	0402 ≥0.1 μF; 0603 ≥0.47 μF	16 V	≤3.5%	≤5%	0402 ≥0.033 μF; 0603 ≥0.15 μF; 0805 ≥0.68 μF	≤10%	0603 ≥0.68 μF	10 V	≤5%	≤10%	0402 ≥0.33 μF; 0603 ≥0.33 μF	6.3 V	≤10%	---	---	Rated Voltage	D.F	Exception of D.F.		≥50 V	≤5%	≤7%	0603 ≥0.1 μF; 0805 ≥0.47 μF	25 V	≤5%	≤7%	0402 ≥0.047 μF; 0603 ≥0.1 μF; 0805 ≥0.33 μF	≤9%	0402 ≥0.68 μF; 0603 ≥0.47 μF	16 V (C < 1 μF)	≤7%	≤9%	0402 ≥0.68 μF; 0603 ≥0.68 μF	16 V (C ≥ 1 μF)	≤9%	---	---	10 V	≤12.5%	---	---	6.3 V	≤20%	---	---
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## General Purpose



### Reliability Test Conditions and Requirements

No.	Item	Test Condition	Requirements		
4.	Dielectric Strength	<ul style="list-style-type: none"> <li>* To apply voltage (<math>\leq 100</math> V) 250%.</li> <li>* Duration: 1 to 5 s</li> <li>* Charge and discharge current less than 50 mA</li> </ul>	* No evidence of damage or flash over during test		
5.	Insulation Resistance	To apply rated voltage for maximum 120 s	$\geq 10$ G $\Omega$ or $R \times C \geq 500$ $\Omega$ F whichever is smaller		
6.	Temperature Coefficient	With no electrical load			
		<b>T.C.</b>	<b>Operating Temperature</b>	<b>T.C.</b>	<b>Capacitance Change</b>
		NPO	-55°C to 125°C at 5°C	NPO	Within $\pm 30$ ppm/°C
		X7R	-55°C to 125°C at 25°C	X7R	Within $\pm 15\%$
Y5V	-25°C to 85°C at 20°C	Y5V	Within +30% / -80%		
7.	Adhesive Strength of Termination	<ul style="list-style-type: none"> <li>* Pressurizing force : 5 N (<math>\leq 0603</math>) and 10 N (<math>&gt;0603</math>)</li> <li>* Test time: 10 <math>\pm</math>1 s</li> </ul>	* No remarkable damage or removal of the terminations		
8.	Vibration Resistance	<ul style="list-style-type: none"> <li>* Vibration frequency: 10 to 55 Hz / minimum</li> <li>* Total amplitude: 1.5 mm</li> <li>* Test time: 6 hours (Two hours each in three mutually perpendicular directions)</li> </ul>	<ul style="list-style-type: none"> <li>* No remarkable damage</li> <li>* Cap change and Q/D.F.: To meet initial specification</li> </ul>		
9.	Solderability	<ul style="list-style-type: none"> <li>* Solder temperature: 235 <math>\pm</math>5°C</li> <li>* Dipping time: 2 <math>\pm</math>0.5 s</li> </ul>	95% minimum coverage of all metalized area		
10.	Bending Test	<ul style="list-style-type: none"> <li>* The middle part of substrate shall be pressurized by means of the pressurizing rod at a rate of about 1 mm per second until the deflection becomes 1 mm and then the pressure shall be maintained for 5 <math>\pm</math>1 s</li> <li>* Measurement to be made after keeping at room temperature for 24 <math>\pm</math>2 hours</li> </ul>	<ul style="list-style-type: none"> <li>* No remarkable damage.</li> <li>Cap change: NPO: within <math>\pm 5\%</math> or <math>\pm 05</math> pF whichever is larger X7R, X5R: within <math>\pm 12.5\%</math> Y5V: within <math>\pm 30\%</math></li> <li>(This capacitance change means the change of capacitance under specified flexure of substrate from the capacitance measured before the test)</li> </ul>		
11.	Resistance to Soldering Heat	<ul style="list-style-type: none"> <li>* Solder temperature: 270 <math>\pm</math>5°C</li> <li>* Dipping time: 10 <math>\pm</math>1 s</li> <li>* Preheating: 120 to 150°C for 1 minute before immerse the capacitor in a eutectic solder</li> <li>* Before initial measurement (Class II only): Perform 150 <math>\pm</math>0 / -10°C for 1 hour and then set for 48 <math>\pm</math>4 hours at room temperature</li> <li>* Measurement to be made after keeping at room temperature for 48 <math>\pm</math>4 hours</li> </ul>	<ul style="list-style-type: none"> <li>* No remarkable damage.</li> <li>Cap change: NPO: within <math>\pm 2.5\%</math> or <math>\pm 0.25</math> pF whichever is larger X7R: within <math>\pm 7.5\%</math> Y5V: within <math>\pm 20\%</math></li> <li>* Q/D.F., I.R. and dielectric strength: To meet initial requirements</li> <li>* 25% maximum leaching on each edge</li> </ul>		



# Multilayer Ceramic Capacitor

## General Purpose



### Reliability Test Conditions and Requirements

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12.	Temperature Cycle	<p>* Conduct the five cycles according to the temperatures and time.</p> <table border="1"> <thead> <tr> <th>Step</th> <th>Temperature (°C)</th> <th>Time (minimum)</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Minimum operating temperature +0 / -3</td> <td>30 ±3</td> </tr> <tr> <td>2</td> <td>Room temperature</td> <td>2 to 3</td> </tr> <tr> <td>3</td> <td>Maximum operating temperature +3 / -0</td> <td>30 ±3</td> </tr> <tr> <td>4</td> <td>Room temperature</td> <td>2 to 3</td> </tr> </tbody> </table> <p>* Before initial measurement (Class II only): Perform 150 +0 / -10°C for 1 hour and then set for 48 ±4 hrs at room temperature                      * Measurement to be made after keeping at room temperature for 48 ±4 hours</p>	Step	Temperature (°C)	Time (minimum)	1	Minimum operating temperature +0 / -3	30 ±3	2	Room temperature	2 to 3	3	Maximum operating temperature +3 / -0	30 ±3	4	Room temperature	2 to 3	<p>* No remarkable damage.</p> <p>Cap change:                      NPO: within ±2.5% or ±0.25 pF whichever is larger                      X7R, X5R: within ±7.5%                      Y5V: within ±20%</p> <p>* Q/D.F., I.R. and dielectric strength: To meet initial requirements</p>													
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# Multilayer Ceramic Capacitor

## General Purpose



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# Multilayer Ceramic Capacitor

## General Purpose



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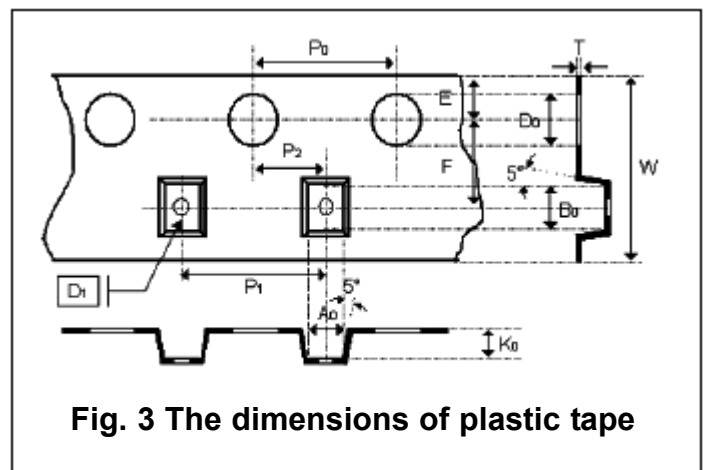
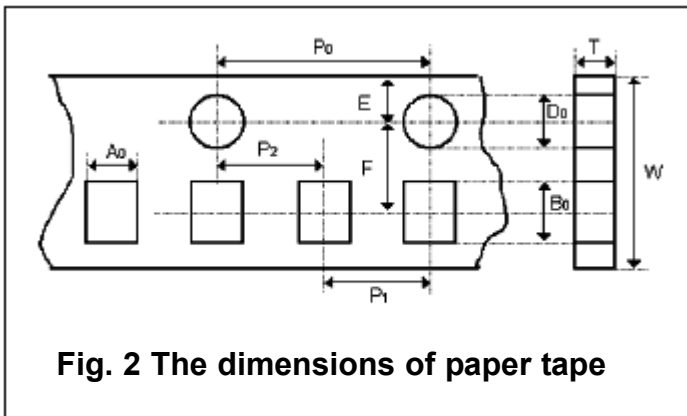
# Multilayer Ceramic Capacitor General Purpose



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## Tape & Reel Dimensions

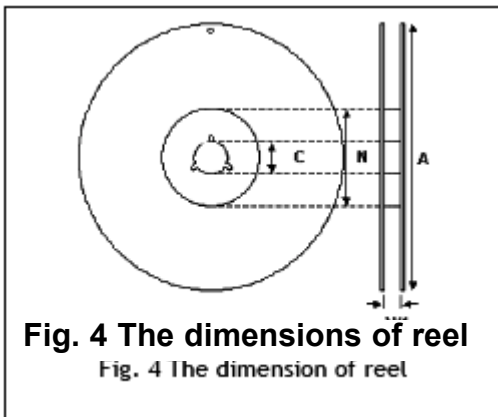


# Multilayer Ceramic Capacitor

## General Purpose



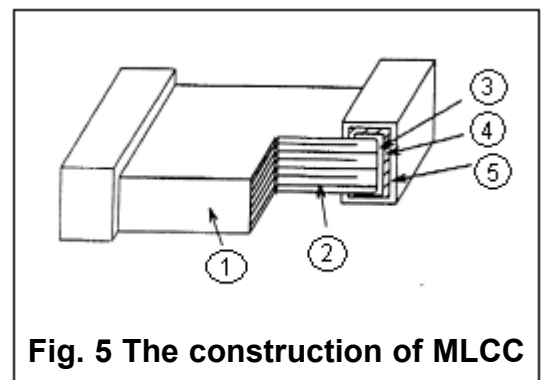
Size	0402	0603
Thickness	N	S, X
A0	0.62 ±0.05	1.02 ±0.05
B0	1.12 ±0.05	1.8 ±0.05
T	0.60 ±0.05	0.95 ±0.05
K0	-	-
W	8 ±0.1	8 ±0.1
P0	4 ±0.1	4 ±0.1
10 × P0	40 ±0.1	40 ±0.1
P1	2 ±0.05	4 ±0.1
P2	2 ±0.05	2 ±0.05
D0	1.55 ±0.05	1.55 ±0.05
D1	-	-
E	1.75 ±0.05	1.75 ±0.05
F	3.5 ±0.05	3.5 ±0.05



Size	0402 and 0603
Reel size	7"
C	13 +0.5 / -0.2
W1	8.4 +1.5 / -0
A	178 ±0.1
N	60 +1 / -0

### Constructions

No.	Name	NPO*	NPO, X7R, Y5V
1	Ceramic Material	BaTiO <sub>3</sub> based	
2	Inner Electrode	AgPd alloy	Ni
3	Termination	Inner Layer	Ag
4		Middle Layer	Ni
5		Outer Layer	Sn



Partial NPO items are with Ag / Ni / Sn terminations, please ref to product range of NPO dielectric for detail

# Multilayer Ceramic Capacitor

## General Purpose



### Storage and Handling Conditions

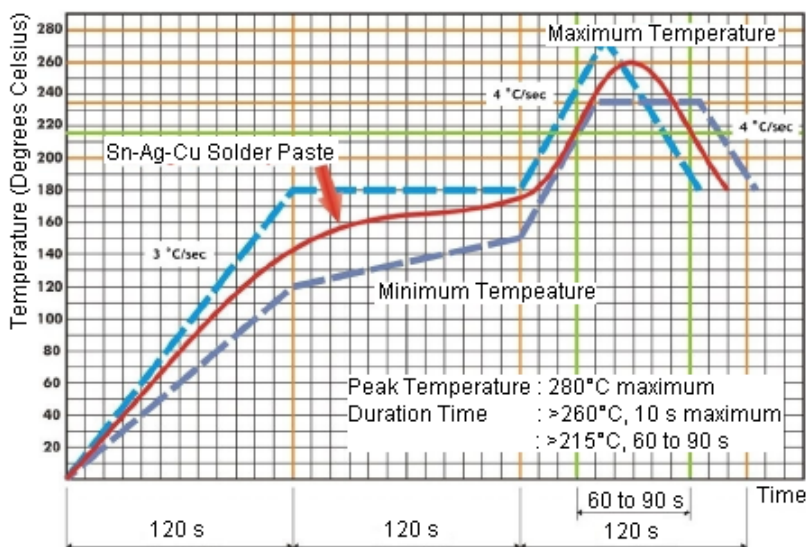
- (1) To store products at 5 to 40°C ambient temperature and 20 to 70% related humidity conditions
- (2) The product is recommended to be used within one year after shipment. Check solderability in case of shelf life extension is needed.

#### 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

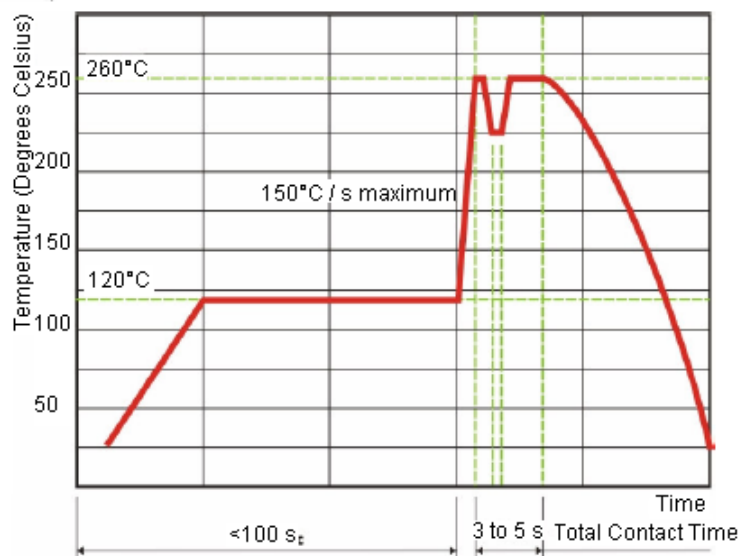
### Recommended Soldering Conditions

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<sub>2</sub> 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**



### Part Number Table

Description	Part Number
Multilayer Ceramic Capacitor	MC0402N101K500CT

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