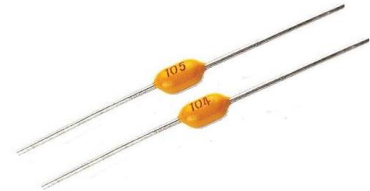


Multilayer Ceramic Capacitor - Axial Leded Type

Features

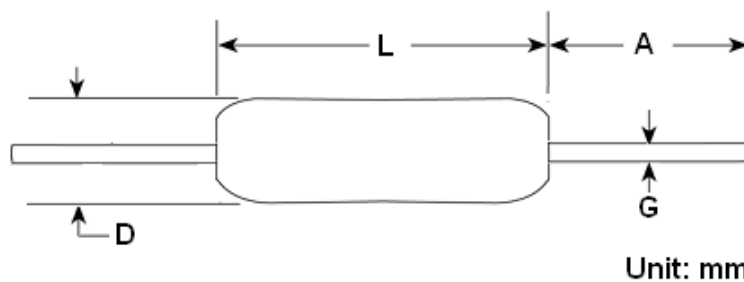
- Superior moisture and shock resistant epoxy coating
- Available in tape& reel, or ammo package
- Ideal for automatic insertion in printed circuit board



Applications

- Bypassing
- Coupling and Decoupling
- Filtering

Dimensions (in mm)



Size	Chip Size	L Max.	D Max.	A Min.	G
S	0603/0805	3.5	2.54	25.4	0.5±0.05
M	1206	5.0	3.0	25.4	0.5±0.05

Multilayer Ceramic Capacitor - Axial Leaded Type

TMA Series

Class I: NPO Dielectric

Description	Symbol	Value	Condition
Operation Temperature Range	T_{OP}	-55 ~ +125 °C	
Temperature Coefficient		0 ± 30 ppm/°C	
Capacitance Range	C_R	10 pF ~ 1,000 pF	1 ± 0.2 Vrms at 25°C and 1MHz
		1,200 pF ~ 0.01µF	1 ± 0.2 Vrms at 25°C and 1KHz
Capacitance Tolerance		± 5%(J)	
Rated Voltage	U_{RDC}	50/100/200V	
Max. Dissipation Factor	$\tan \delta$	0.1%	1 ± 0.2 Vrms at 25°C and 1MHz for 10 pF ~ 1,000 pF
			1 ± 0.2 Vrms at 25°C and 1KHz for 1,200 pF ~ 0.01µF
Insulation Resistance (Note)	R_{INS}	≥10 GΩ or 500 MΩ*µF Whichever is less	Rated voltage applied at 25°C, Test Time: 120 sec
Withstanding Voltage	U_{OL}	2.5 x U_R	Charging/discharging Current < 50mA for 1 □ 5 sec

Note: For example, $IR(.47\mu F) = 500M\Omega * \mu F = 500M\Omega * (1/.47\mu F)(\mu F) = 500M\Omega * 2.13 = 1064M\Omega = 1.06G\Omega$.

Size and Capitance Specifications

Cap. Value	Cap. Code	S			M			Cap. Value	Cap. Code	S			M		
		50V	100V	200V	50V	100V	200V			50V	100V	200V	50V	100V	200V
10 pF	100							560 pF	561						
18 pF	180							1000 pF	102						
22 pF	220							1200 pF	122						
30 pF	300							1500 pF	152						
33 pF	330							2200 pF	222						
39 pF	390							2700 pF	272						
47 pF	470							3300 pF	332						
56 pF	560							3900 pF	392						
68 pF	680							4700 pF	472						
100 pF	101							5600 pF	562						
180 pF	181							6800 pF	682						
220 pF	221							8200 pF	822						
390 pF	391							0.01 µF	103						
470 pF	471														

Note: Please consult factory if other capacitance or tolerance or voltage is required.

Multilayer Ceramic Capacitor - Axial Leaded Type

TMA Series

Class II: X7R Dielectric

Description	Symbol	Value	Condition
Operation Temperature Range	T _{OP}	-55 ~ +125 °C	
Temperature Coefficient	$\Delta C/C(25^{\circ}\text{C})$	± 15%	
Capacitance Range	C _R	220 pF ~10 μF	1 ± 0.2 Vrms at 25°C and 1KHz
Capacitance Tolerance		± 5%(J), 10%(K), 20%(M)	
Rated Voltage	U _R	50/100/200V	
Max. Dissipation Factor	tan δ	3.0%	1 ± 0.2 Vrms at 25°C and 1KHz
Insulation Resistance (Note)	R _{INS}	≥10 GΩ or 500 MΩ*μF Whichever is less	Rated voltage applied at 25°C Test Time: 120 sec
Withstanding Voltage	U _{OL}	2.5 x U _R	Charging/discharging Current < 50mA for 1 □ 5 sec

Note: For example, IR(.47μF)=500MΩ*μF=500MΩ*(1/.47μF)(μF)=500MΩ*2.13=1064MΩ=1.06GΩ.

Size and Capitance Specifications

Cap. Value	Cap. Code	S			M			Cap. Value	Cap. Code	S			M		
		50V	100V	200V	50V	100V	200V			50V	100V	200V	50V	100V	200V
220 pF	221							0.022 μF	223						
390 pF	391							0.027 μF	273						
470 pF	471							0.033 μF	333						
560 pF	561							0.039 μF	393						
1000 pF	102							0.047 μF	473						
1200 pF	122							0.056 μF	563						
1500 pF	152							0.068 μF	683						
2200 pF	222							0.082 μF	823						
2700 pF	272							0.1 μF	104						
3300 pF	332							0.15 μF	154						
3900 pF	392							0.18 μF	184						
4700 pF	472							0.22 μF	224						
5600 pF	562							0.33 μF	334						
6800 pF	682							0.47 μF	474						
8200 pF	822							0.68 μF	684						
0.01 μF	103							1.0 μF	105						
0.012 μF	123							2.2 μF	225						
0.015 μF	153							10 μF	106						

Note: Please consult factory if other capacitance or tolerance or voltage is required.

Multilayer Ceramic Capacitor - Axial Leaded Type

TMA Series

Class II: Y5V Dielectric

Description	Symbol	Value	Condition
Operation Temperature Range	T _{OP}	-30 ~ +85 °C	
Temperature Coefficient	ΔC/C(25°C)	- 82% ~+ 22%	
Capacitance Range	C _R	1000 pF ~ 10 μF	1 ± 0.2 Vrms at 25°C and 1KHz
Capacitance Tolerance		± 20%(M), +80%/-20%(Z)	
Rated Voltage	U _R	50/100V	
Max. Dissipation Factor	tan δ	5.0%	1 ± 0.2 Vrms at 25°C and 1KHz
Insulation Resistance (Note)	R _{INS}	≥10 GΩ or 100 MΩ*μF Whichever is less	Rated voltage applied at 25°C Test Time: 120 sec
Withstanding Voltage	U _{OL}	2.5 x U _R	Charging/discharging Current < 50mA for 1 □ 5 sec

Note: For example, IR(.47μF)=500MΩ*μF=500MΩ*(1/.47μF)(μF)=500MΩ*2.13=1064MΩ=1.06GΩ.

Size and Capitance Specifications

Cap. Value	Cap. Code	S		Cap. Value	Cap. Code	S	
		50V	100V			50V	100V
1000 pF	102			0.033 μF	333		
1200 pF	122			0.039 μF	393		
1500 pF	152			0.047 μF	473		
2200 pF	222			0.056 μF	563		
2700 pF	272			0.068 μF	683		
3300 pF	332			0.082 μF	823		
3900 pF	392			0.1 μF	104		
4700 pF	472			0.15 μF	154		
5600 pF	562			0.18 μF	184		
6800 pF	682			0.22 μF	224		
8200 pF	822			0.33 μF	334		
0.01 μF	103			0.47 μF	474		
0.012 μF	123			0.68 μF	684		
0.015 μF	153			1.0 μF	105		
0.022 μF	223			2.2 μF	225		
0.027 μF	273			10 μF	106		

Note: Please consult factory if other capacitance or tolerance or voltage is required.

Multilayer Ceramic Capacitor - Axial Leaded Type

TMA Series

Reliability Test Condition

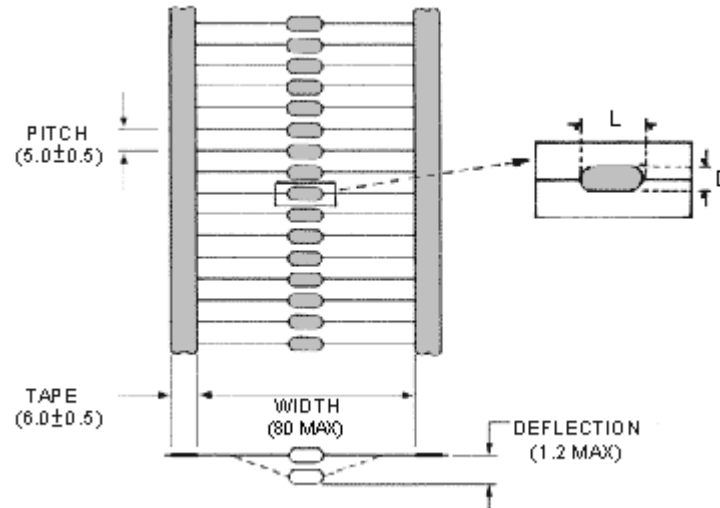
No	Item	Performance	Test Condition																																				
1	Solderability	Lead wire shall be soldered with uniformly coated on the Axial or Radial direction over 95% of the circumferential direction.	The lead wire of a capacitor shall be dipped into a rosin and then into molten solder of $235\pm 5^{\circ}\text{C}$ for 5 seconds, in both cases the depth of dipping is up to about 2.5 to 3.0 mm from the root of lead wires.																																				
2	Resistance to Soldering Heat	1. Appearance: No marked defect 2. Capacitance change: <table border="1"> <thead> <tr> <th></th><th>NPO</th><th>X7R</th><th>Y5V</th></tr> </thead> <tbody> <tr> <td>$\Delta C/C$</td><td>$\leq \pm 0.5\%$, or $\pm 0.5\text{pF}$</td><td>$\leq \pm 7.5\%$</td><td>$\leq \pm 20\%$</td></tr> </tbody> </table>		NPO	X7R	Y5V	$\Delta C/C$	$\leq \pm 0.5\%$, or $\pm 0.5\text{pF}$	$\leq \pm 7.5\%$	$\leq \pm 20\%$	The lead wire shall be immersed into the melted solder of $265\pm 5^{\circ}\text{C}$, up to about 2.5 to 3.0 mm from the main body and the specified items shall be measured after leaving for 24 ± 2 hours.																												
	NPO	X7R	Y5V																																				
$\Delta C/C$	$\leq \pm 0.5\%$, or $\pm 0.5\text{pF}$	$\leq \pm 7.5\%$	$\leq \pm 20\%$																																				
3	Life Test	1. Appearance: No marked defect 2. Change value: <table border="1"> <thead> <tr> <th></th><th>NPO</th><th>X7R</th><th>Y5V</th></tr> </thead> <tbody> <tr> <td>$\Delta C/C$</td><td>$\leq \pm 2\%$, or $\pm 2\text{pF}$</td><td>$\leq \pm 10\%$</td><td>$\leq \pm 30\%$</td></tr> <tr> <td>DF</td><td colspan="3">$\leq 1.5 \times \text{initial requirement}$</td></tr> <tr> <td>IR</td><td colspan="3">$\geq 0.25 \times \text{initial requirement}$</td></tr> </tbody> </table>		NPO	X7R	Y5V	$\Delta C/C$	$\leq \pm 2\%$, or $\pm 2\text{pF}$	$\leq \pm 10\%$	$\leq \pm 30\%$	DF	$\leq 1.5 \times \text{initial requirement}$			IR	$\geq 0.25 \times \text{initial requirement}$			<table border="1"> <thead> <tr> <th>Condition</th><th>NPO</th><th>X7R</th><th>Y5V</th></tr> </thead> <tbody> <tr> <td>Temperature</td><td colspan="2">$+125^{\circ}\text{C}$</td><td>$+85^{\circ}\text{C}$</td></tr> <tr> <td>Time</td><td colspan="3">1000 hours</td></tr> <tr> <td>Voltage</td><td colspan="3">$1.5 \times \text{rated voltage applied}$</td></tr> <tr> <td>Recovery time</td><td colspan="3">24 ± 2 hours</td></tr> </tbody> </table>	Condition	NPO	X7R	Y5V	Temperature	$+125^{\circ}\text{C}$		$+85^{\circ}\text{C}$	Time	1000 hours			Voltage	$1.5 \times \text{rated voltage applied}$			Recovery time	24 ± 2 hours		
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Voltage	$1.5 \times \text{rated voltage applied}$																																						
Recovery time	24 ± 2 hours																																						
4	Strength of Leads	Pull : > 4 kg	Fix the body of capacitor, apply a tensile weight gradually to each lead.																																				

Multilayer Ceramic Capacitor - Axial Leaded Type

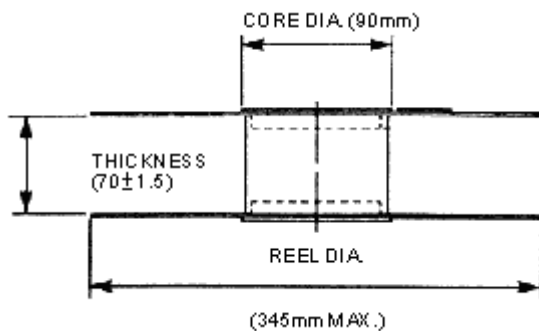
TMA Series

Packing Information (Unit:mm)

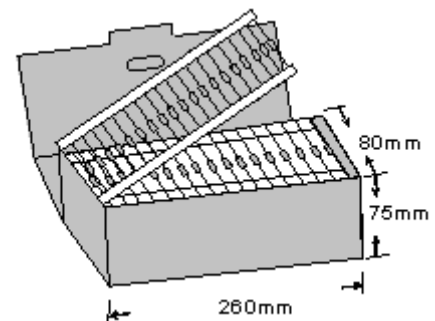
Tape:



Reel:



Ammo:

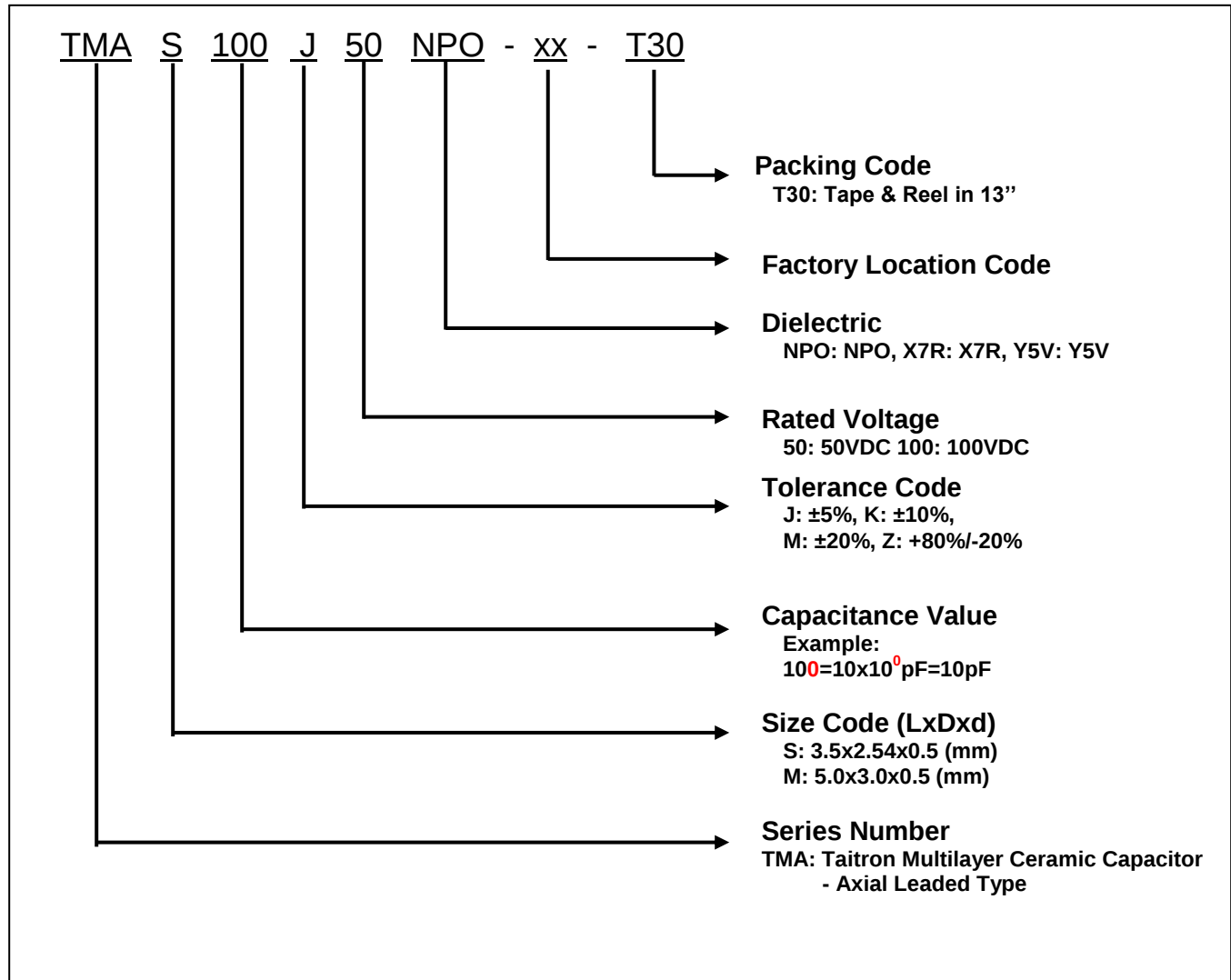


Packing	Size Code	QTY
Tape & Reel	S	7,500 pcs/Reel
	M	7,500 pcs/Reel
Tape & Ammo	S	5,000 pcs/Box
	M	5,000 pcs/Box

Multilayer Ceramic Capacitor - Axial Leaded Type

TMA Series

How to order:



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