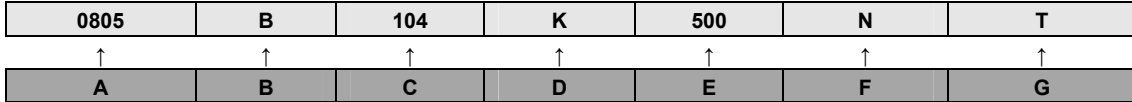


# Multilayer Ceramic Capacitors – X7R

## Features

- Miniature size
- Wide capacitance, TC, voltage and tolerance range
- Industry standard sizes
- Available for wave, reflow or vapor phase solder

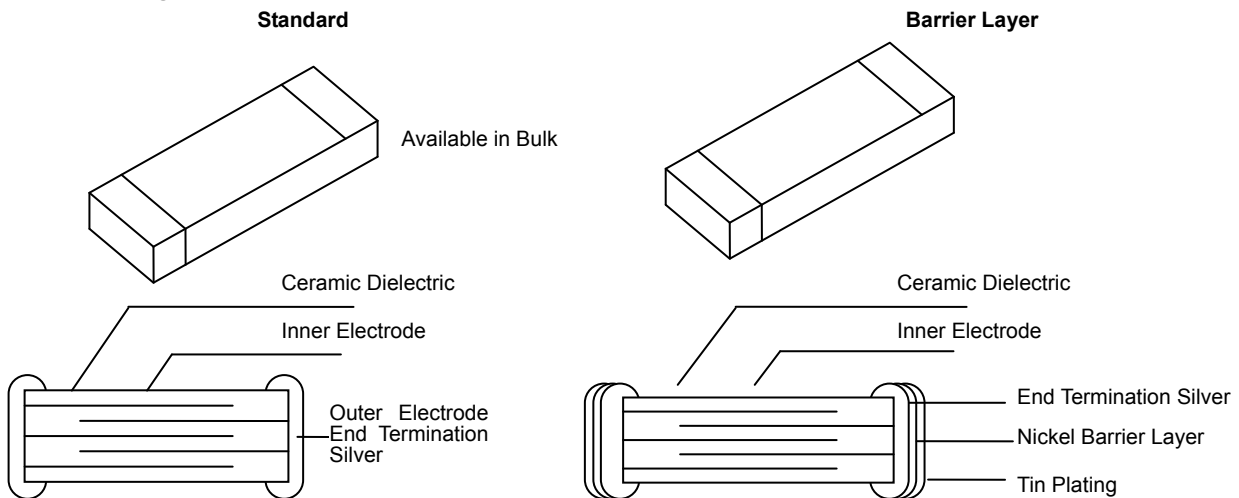
## How to Order



A		B		C	
<b>Size Code Inches</b>		<b>Dielectric</b>		<b>Normal Capacitance</b>	
0402	0.04×0.02	B	X7R	102	10×10 <sup>2</sup>
0603	0.06×0.03	X	X5R	103	10×10 <sup>3</sup>
0805	0.08×0.05				
1206	0.12×0.06	Express by three figures. Unit used is pF (pico-farad)  First two figures are significant digit, third figure expresses number of zeros which follow the two significant digit  If there is a decimal place it is represented by a "R". In this scenario all figures are significant digit			
1210	0.12×0.10				
1812	0.18×0.12				
2225	0.22×0.25				
3035	0.30×0.35				

D		E		F		G	
<b>Tolerance</b>		<b>Rated Voltage</b>		<b>Termination</b>		<b>Packaging Style</b>	
K	±10%	160	16×10 <sup>0</sup>	S	Silver	T	Tape & Reel
M	±20%	250	25×10 <sup>0</sup>	N	Nickel Barrier Tin plating	B	Bulk Package
		500	50×10 <sup>0</sup>				
		630	63×10 <sup>0</sup>				
		101	10×10 <sup>1</sup>				
		201	20×10 <sup>1</sup>				
		501	50×10 <sup>1</sup>				
		102	10×10 <sup>2</sup>				
		202	20×10 <sup>2</sup>				

## Termination Diagrams



NOTE: Other Termination Available Upon Request (Contact Factory)

## Multilayer Ceramic Capacitors – X7R

X7R - Dielectric Characteristic Introduction & Test Method (Table 1)

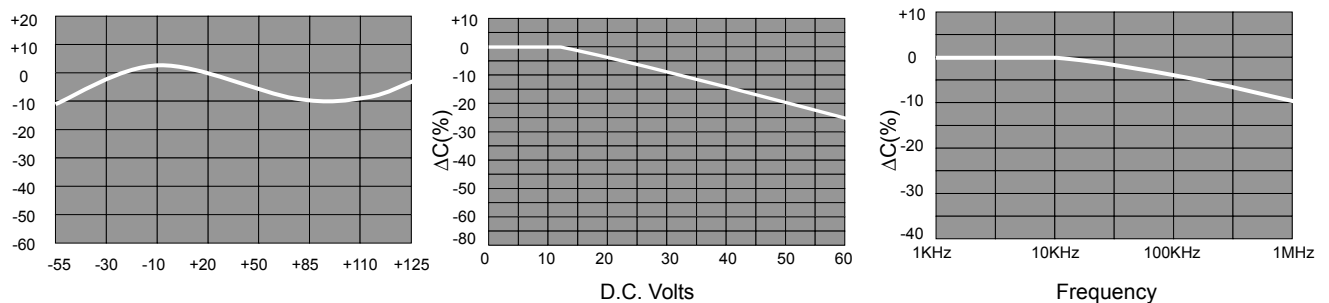
Item	Specification	Test Method	
Capacitance	(100PF~2.2uF)	1KHz±10%, 1.0±0.2Vrms	
Capacitance Tolerance	K=±10% M=±20% S=±50%/-20%		
Rated Voltage	16、25、50、63、100、200、 500、1000、2000VDC		
Dissipation Factor (DF)	1000、2000VDC DF:<0.25%(100V) <3.0%(50V、25V) <3.5%(16V)		
Insulation Resistance (IR)	C≤25nF:R>4000MΩ C>25nF:Rx C>100S	Test Voltage: rating voltage Charging time:1min Temperature:18~25°C Humidity:<80°C	
Dielectric Withstanding Voltage	There shall be no evidence of damage or flash over during the test.	Apply 2.5 x rating voltages to both Terminations for 5 seconds. Charge and discharge current are less than 50mA.	
Termination Adhesion	There shall be no evidence of damage during the test.	Test Condition:5N:10±1s	
Bending Strength	There shall be no evidence of damage during the test; capacitance tolerance shall be not more than 10%.	After soldering capacitor on the PCB, 1mm of bending shall be applied for 1 second as shown by Drawing.	
Solderability	Termination area shall be at least 80% covered with a new solder coating. There shall be no crack and ceramic exposure of terminated surface by melting.	The capacitors are completely immersed during 2 in the molten rosin, Then immersed 10mm during 2±1s in the molten solder with a temperature of 235±5°C.Pick up the capacitors-and cleaned with solvent, and put in on the> 10 times microscope.	
Resistance to Soldering Heat	Type		X7R(B)
	Temp		265±5°C
	Time		5±1s
	Cover%		≥85%
	△C/C	-5~+10%	

# Multilayer Ceramic Capacitors – X7R

X7R - Dielectric Characteristic Introduction & Test Method (Table 2)

Item	Specification		Test Method	
Temperature Cycling	Type	X7R	Condition	X7R
	$\Delta C/C$	$\leq 1\%$	Temp.Oa	$-55\pm 3^{\circ}\text{C}$
	There shall be no evidence of damage during the test.		Temp.Ob	$+125\pm 3^{\circ}\text{C}$
			Cycle times	5 times 30min/time
			Resume time	24h
Changing times	2~3min			
Humidity & Moisture Resistance	Type	X7R	Permanent moisture: T= $40\pm 2^{\circ}\text{C}$ t=21d Relative humidity: 93+2%-3% Resume time: 1~2h	
	$\Delta C/C$	$\leq 10\%$		
	DF	0.05		
	IR	RxC>25s		
There shall be no evidence of damage during the test.				
T.C. Characteristics	Dielectric	$\Delta C/C$	Dielectric	T.C
	X7R	$\pm 15^{\circ}\text{C}$	X7R	$+20^{\circ}\text{C}\rightarrow -55^{\circ}\text{C}\rightarrow +20^{\circ}\text{C}\rightarrow +125^{\circ}\text{C}$
Vibration	There shall be no evidence of damage during the test.		Vibration frequency: f=10~500HZ Vibration range:0.75mm/s2 in 3 direction:2h/direction	
Bump	Type	X7R	4000 addeleration :390m/s2 Pulse duration:6ms	
	$\Delta C/C$	$\leq 2\%$		
	There shall be no evidence of damage during the test.			
Life test	Type	X7R	Condition	X7R
	$\Delta C/C$	$\leq 2\%$	Temp	$+125^{\circ}\text{C}$
	DF	0.003	Time	T=100th
	IR	RxC>25s	Voltage	V=1.5Vr
	There shall be no evidence of damage during the test.		Resume time	24 $\pm$ 1h
6 grade failure test	Type	X7R	Condition	X7R
	$\Delta C/C$	$\leq 10\%$	Creditability	60%
	DF	0.05	Temp	$+125^{\circ}\text{C}$
	IR	RxC>25s	Voltage	Rating Voltage
	There shall be no evidence of damage during the test.		Time	1000h

## Typical Characteristic



# Multilayer Ceramic Capacitors – X7R

Size Code Capacitance And Voltage (Table 1)

Size Code	Dimension (mm)				Voltage	Capacitance (pF)
	L	W	T	Me		X7R
0402	1.0±0.05	0.5±0.05	0.5±0.05	0.1±0.05	10V	101~105
					16V	101~223
					25V	101~103
					50V	101~392
0603	1.6±0.1	0.8±0.10	0.8±0.1	0.3±0.1	25V	101~333
					50V	101~223
					100V	101~472
					200V	
0805	2.00±0.20	1.25±0.20	0.7± <sup>0.3</sup> <sub>0.2</sub>	0.5±0.25	25V	331~104
			1.25±0.15		50V	331~473
			1.0± <sup>0.3</sup> <sub>0.2</sub>		100V	331~223
					200V	222~153
1206	3.20±0.30	1.60±0.20	1.0± <sup>0.3</sup> <sub>0.2</sub>	0.5±0.25	500V	222~123
			1.25± <sup>0</sup> <sub>0.2</sub>		25V	102~224
					50V	102~104
			100V		102~683	
			200V		221~223	
			500V		221~223	
1000V	221~472					
1210	3.20±0.30	2.50±0.30	1.0± <sup>0.3</sup> <sub>0.2</sub>	0.70±0.25	2000V	680~102
			1.25±0.3		25V	102~334
					50V	102~224
			100V		102~104	
			200V		102~683	
			500V		222~473	
1000V	102~153					
1812	4.50±0.40	3.20±0.30	2.5	1.00±0.25	2000V	181~152
					25V	103~474
					50V	103~334
					100V	103~224
					200V	682~104
					500V	472~124
1000V	222~273					
					2000V	331~332

Size Code Capacitance and Voltage (Table 2)

Size Code	Dimension (mm)				Voltage	Capacitance (pF)
	L	W	T	Me		X7R
2225	5.70±0.50	6.40±0.50	2.5	1.00±0.25	25V	103~105
					50V	103~105
					100V	103~474
					200V	153~424
					500V	183~394
					1000V	822~104
3035	7.60±10.50	9.00±0.50	3.0	1.00±0.25	2000V	122~103
					25V	103~225
					50V	103~225
					100V	103~105
					200V	103~125
					500V	682~105
					1000V	
					2000V	

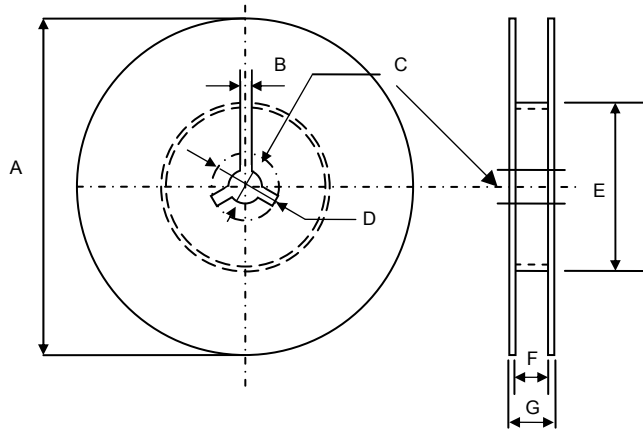
# Multilayer Ceramic Capacitors – X7R

## Packaging

### Structure and Dimension

#### Tape & Reel

A	B*	C	D*	E	F	G
178±2.0	3.0	13±0.5	φ32	50MIN	10.0±	14.9
				φ±1	1.5	12±2.0

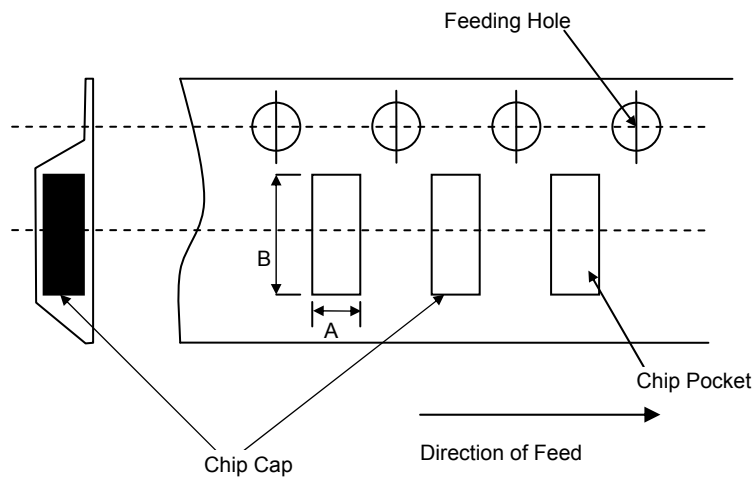


#### Paper Tape

Size	A	B
0402	0.6±0.2	1.1±0.2
0603	1.1±0.2	1.4±0.2
0805	1.45±0.2	2.3±0.2
1206	1.8±0.2	3.4±0.2

#### Plastic Tape (Te)

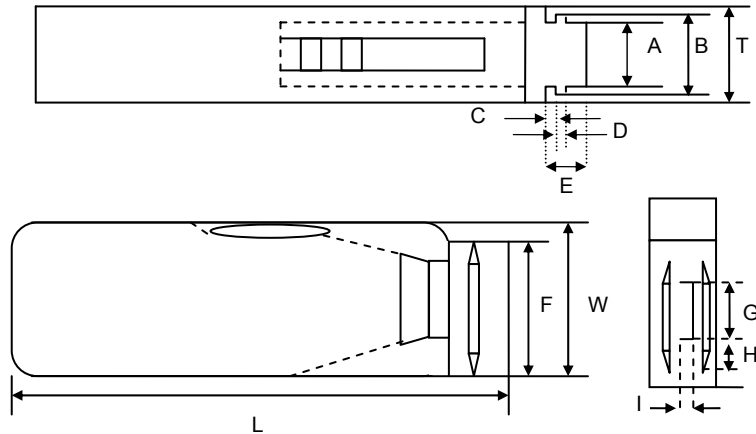
Size	A	B
0402	0.5±0.2	1.2±0.2
0603	0.8±0.2	2.0±0.2
0805	1.65±0.2	2.4±0.2
1206	2.0±0.2	3.6±0.2



# Multilayer Ceramic Capacitors – X7R

## Cartridge

Symbol	A	B	D	C	T	E
Dimension	6.8±0.1	8.8±0.1	12±0.1	15±0.1-0	2±0-0.1	4.7±0.1
Symbol	F	W	G	H	L	I
Dimension	31.5±0.2-0	36±0-0.2	19±0.35	7±0.35	110±0.7	5±0.35



## Packaging Quantity

Size	Quantity		
	Paper Tape Taping	Plastic Embossed Tapping	Bulk Packaging
0402	10000		10000
0603	4000		4000
0805	4000	2000 / 3000	4000
1206	4000	2000 / 3000	4000
1210		2000 / 3000	2000
1808		2000 / 3000	2000
1812		1000	2000
2225			
3035			