Multilayer Ceramic Chip Capacitors

NMC Series X7R

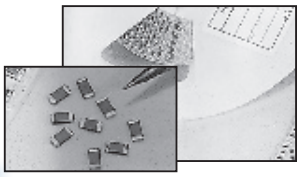
FEATURES

- CLASS II DIELECTRIC, TEMPERATURE STABLE
- EXCELLENT FREQUENCY CHARACTERISTICS, NON-LINEAR CAPACITANCE CHANGE
- HIGHER CAPACITANCE THAN NPO
- NICKEL BARRIER TERMINATIONS AND EXCELLENT MECHANICAL STRENGTH

RoHS Compliant

Includes all homogeneous materials

*See Part Number System for Details

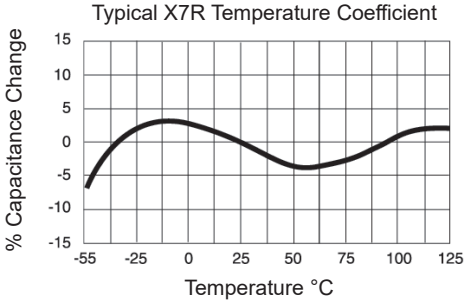


SPECIFICATIONS

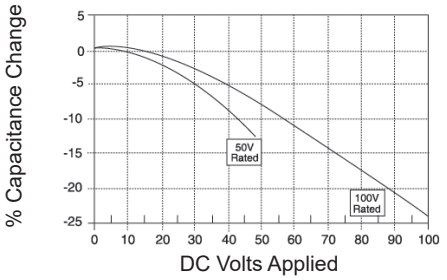
Capacitance Range	47pF ~ 0.82µF (see high CV datasheet for higher capacitance values)
Capacitance Tolerance	±5% (J), ±10% (K), ±20% (M)
Operating Temperature Range	-55°C ~ +125°C
Temperature Characteristics	±15%Δ max. over temperature range (with 0 Vdc applied)
Rated Voltages	10Vdc, 16Vdc, 25Vdc, 35Vdc, 50Vdc (see NMC-H Series for higher voltages)
Dissipation Factor	2.5% max. (50Vdc, 100Vdc); 3.5% max. (16Vdc, 25Vdc) 5% max. (10Vdc) @ 1.0Vrms and 1KHz, +25°C
insulation Resistance	10,000Megohms min. or 500Megohm/µF min. whichever is less @ +25°C
Dielectric Withstanding Voltage	250% of Rated Voltage for 1 ~ 5 seconds, 50mA maximum current
Test Conditions (EIA-198-2E)	1KHz, 1.0V ±0.2Vrms

Note: Reflow soldering allowed for all case sizes. Contact NIC for wave soldering restrictions.

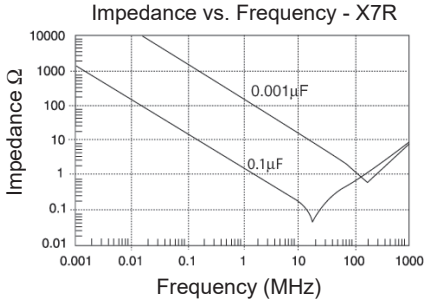
Typical X7R Temperature Coefficient



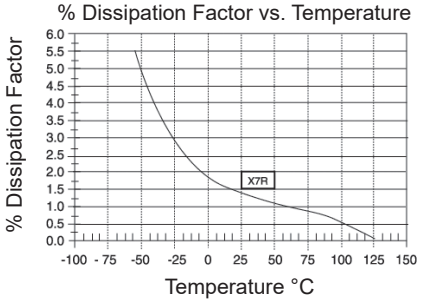
Voltage Coefficient of Capacitance - X7R



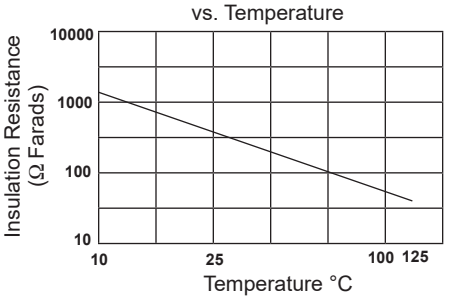
Impedance vs. Frequency - X7R



% Dissipation Factor vs. Temperature



Minimum Insulation Resistance vs. Temperature



PART NUMBER SYSTEM

NMC 0805 X7R 102 K 50 TRP or TRPLP 3K F

- F — RoHS Compliant
- 3K — Optional Reel Qty (3K=3,000pcs)
- TRPLP — Tape & Reel (Embossed Plastic Carrier)
- TRP — Tape & Reel (Punched carrier)
- 50 — Voltage (Vdc)
- K — Capacitance Tolerance Code (see chart)
- 102 — Capacitance Code, expressed in pF, first 2 digits are significant, 3rd digit is no. of zeros, "R" indicates decimal for under 10pF
- X7R — Temperature Characteristic
- 0805 — Size Code (see chart)
- NMC — Series

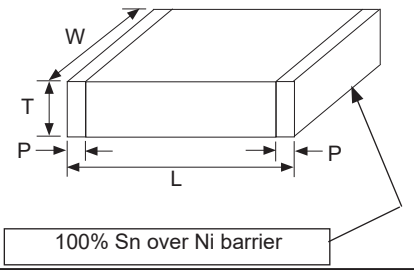
X7R CAPACITOR SIZE CHART (mm)

EIA Case Size	0201				0402				0603					0805				
Length (L)	0.6±0.03				1.0±0.05				1.6±0.15					2.0±0.2				
Width (W)	0.3±0.03				0.5±0.05				0.8±0.15					1.25±0.2				
Thickness max. (T)	0.33				0.6				1.0					1.35				
Termination Width (P)	0.15±0.05				0.2±0.1				0.12 ~ 0.51					0.25 ~ 0.71				
Capacitance	Working Voltage (Vdc)																	
	10	16	25	50	10	16	25	50	10	16	25	50	100	10	16	25	50	100
47pF ~ 91pF																		
100pF ~ 470pF																		
510pF																		
560pF																		
620pF																		
680pF																		
750pF																		
820pF																		
910pF																		
0.001µF																		
0.0012µF																		
0.0015µF																		
0.0018µF																		
0.0022µF																		
0.0027µF																		
0.0030µF																		
0.0033µF																		
0.0039µF																		
0.0047µF																		
0.0056µF																		
0.0068µF																		
0.0075µF																		
0.0082µF																		
0.01µF																		
0.012µF																		
0.015µF																		
0.018µF																		
0.022µF																		
0.027µF																		
0.033µF																		
0.039µF																		
0.047µF																		
0.056µF																		
0.068µF																		
0.082µF																		
0.1µF																		*
0.15µF															*	*	*	
0.18µF															*	*	*	
0.22µF															*	*	*	
0.27µF															*	*	*	
0.33µF															*	*	*	
0.39µF														*	*	*	*	
0.47µF														*	*	*	*	
0.56µF														*	*	*		
0.68µF														*	*	*		
0.82µF														*	*	*		

*1.45mm maximum thickness

See NMC High CV series for values above 0.82µF

(CONSULT FACTORY
FOR CAPACITANCE
VALUES NOT LISTED)



X7R CAPACITOR SIZE CHART (mm)

EIA Case Size	1206					1210						1812					2225		
Length (L)	3.2±0.2					3.2±0.2						4.5±0.3					5.7±0.4		
Width (W)	1.6±0.2					2.5±0.2						3.2±0.25					6.35±0.25		
Thickness max. (T)	1.80					1.80						1.8					1.80		
Termination Width (P)	0.25 ~ 0.71					0.25~0.75						0.25 ~ 0.75					0.25 ~ 1.02		
Capacitance	Working Voltage (Vdc)																		
	10	16	25	50	100	10	16	25	35	50	100	10	16	25	50	100	25	50	100
150pF ~ 910pF																			
0.001																			
0.0012µF																			
0.0015µF																			
0.0018µF																			
0.0022µF																			
0.0027µF																			
0.0033µF																			
0.0036µF																			
0.0039µF																			
0.0043µF																			
0.0047µF																			
0.0056µF																			
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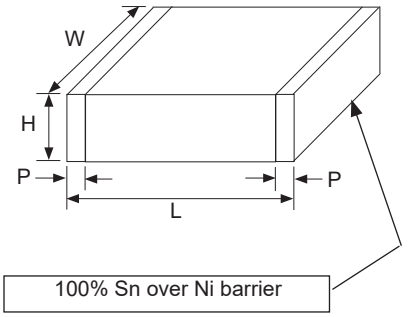
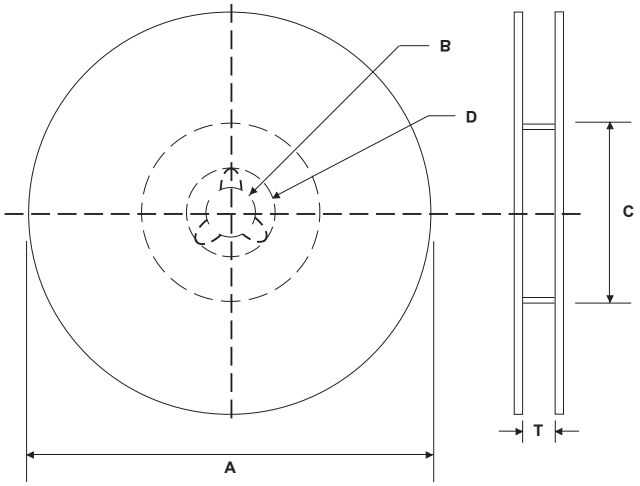
0.39µF																			
0.47µF																			
0.56µF																			
0.68µF																			
0.82µF															*	*			

* 2.20mm maximum thickness

See NMC High CV series for values above 0.82µF



REEL



REEL DIMENSIONS (mm)

Reel Diameter (A)	B	C	D	T max.
7" (178 ± 2.0)	13 ± 0.5	50 min.	21 ± 1.0	8.4 +1.0/-0 (1812 case size 12.4 +2.0/-0)
10" (250 ± 2.0)		100 ± 1.0		
13" (330 ± 2.0)		100 ± 1.0		

7 INCH REEL QUANTITIES*

Size	01005	0201	0402	0603	0805	1206	1210	1812
Tape Size	8mm	8mm	8mm	8mm	8mm	8mm	8mm	12mm
Min. Qty Per Reel	20,000	15,000	10,000	4,000	4,000	4,000	2,000	1,000
Max. Qty Per Reel	20,000	15,000	10,000	4,000	5,000	5,000	5,000	2,000

*Quantity dependent on chip thickness. Contact NIC for reel quantities on larger diameter reels.

CARRIER TAPE MATERIAL

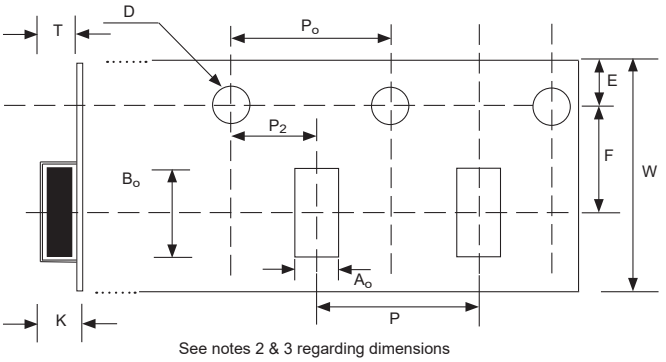
Parts with a thickness of ≥1mm will be taped on embossed plastic carrier. Parts with a thickness of less then 1mm will be taped on paper carrier

EMBOSSED PLASTIC CARRIER TAPE DIMENSIONS (mm)

Tape Size	W	F	E	P_0	P_2	D	K max.	T max.	P
8mm	8.0 ± 0.2	3.5 ± 0.05	1.75 ± 0.10	4.0 ± 0.1	2.0 ± 0.5	$1.5^{+0.1}_{-0.0}$	3.0	2.0	4.0 ± 0.1
12mm	12 ± 0.2	5.5 ± 0.05						4.5	8.0 ± 0.1

Notes:
1. Specifications are in compliance with EIA RS481-1-A "Taping of surface Mount Components for Automatic Placement"
2. Dimensions A_o (max.) equals component width dimension plus 0.5mm
3. Dimension B_o (max.) equals component length dimension plus 0.5mm

EMBOSSED PLASTIC CARRIER TAPE



See notes 2 & 3 regarding dimensions A_o and B_o

PUNCHED CARRIER TAPE DIMENSIONS (mm)

Type	A_o	B_o	W	F	E	P1	P0	D0	T1 max.	T2 max.	Mounting Hole
01005	0.25 ± 0.04	0.45 ± 0.04	8.0 ± 0.3	3.5 ± 0.05	1.75 ± 0.1	2.0 ± 0.05	4.0 ± 0.1	1.5 +0.1/-0.0	0.27	0.36	Angular Punch Hole
0201	0.37 ± 0.03	0.67 ± 0.05							0.45	0.80	
0402	0.65 ± 0.05	1.15 ± 0.05							1.1	1.4	
0603	1.1 ± 0.2	1.9 ± 0.2				4.0 ± 0.10					
0805	1.65 ± 0.2	2.4 ± 0.2									
1206	2.0 ± 0.2	3.6 ± 0.2									

PUNCHED CARRIER TAPE