

# Multilayer Ceramic Chip Capacitors

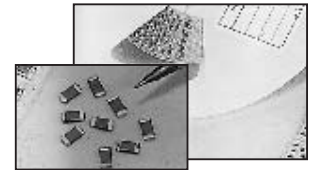
NMC-P Series

## FEATURES

- CRACK RESISTANT TERMINATION
- SOFT TERMINATION, OPEN MODE FAILURE
- WIDE VOLTAGE RANGE (16V TO 5KV)
- HIGH CAPACITANCE (UP TO 10 $\mu$ F)
- RoHS COMPLIANT
- SAC SOLDER COMPATIBLE\*\*

**RoHS  
Compliant**  
includes all homogeneous materials

\*See Part Number System for Details

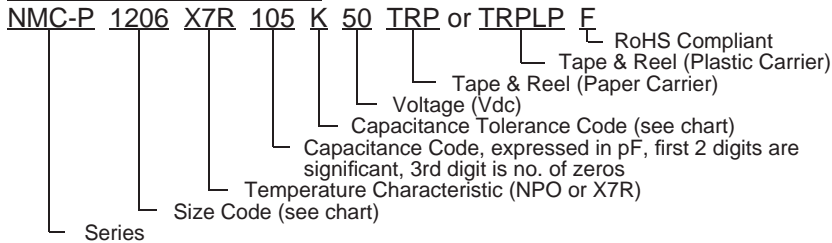


Temperature Coefficient	NPO	X7R
Capacitance Range	2.2pF ~ 0.22 $\mu$ F	180pF ~ 10 $\mu$ F
Capacitance Tolerance	For 2.2pF ~ 10pF: $\pm 0.1$ pF (B), $\pm 0.25$ pF (C), $\pm 0.5$ pF (D), $\pm 1$ pF (F) Above 10pF: $\pm 1\%$ (F), $\pm 2\%$ (G), $\pm 5\%$ (J), $\pm 10\%$ (K)	$\pm 10\%$ (K) & $\pm 20\%$ (M)
Operating Temperature Range	-55 $^{\circ}$ C ~ +125 $^{\circ}$ C	
Temperature Characteristics	$\pm 30$ ppm/ $^{\circ}$ C	$\pm 15\%$ $\Delta$ Cap.
Rated Voltages	16Vdc, 25Vdc, 50Vdc, 100Vdc, 200Vdc, 250Vdc, 500Vdc, 630Vdc, 1KVdc, 2Kvdc, 3Kvdc & 5Kvdc	
Q or Dissipation Factor	Q = $\geq 1000$ (more than 30pF)* Q = $\geq 400 + 20 \times C$ in pF (30pF and below)*	2.5% max. @ 1KHz, 1.0V $\pm$ 0.2Vrms
Insulation Resistance	10,000Megohm or 500Megohm/ $\mu$ F whichever is less @ +25 $^{\circ}$ C	
Dielectric Withstanding Voltage	200% of rated voltage for 5 seconds, 50mA max. (16V ~ 250V) 150% of rated voltage for 5 seconds, 50mA max. (500V ~ 630V) 120% of rated voltage for 5 seconds, 50mA max. (1KV ~ 5KV)	

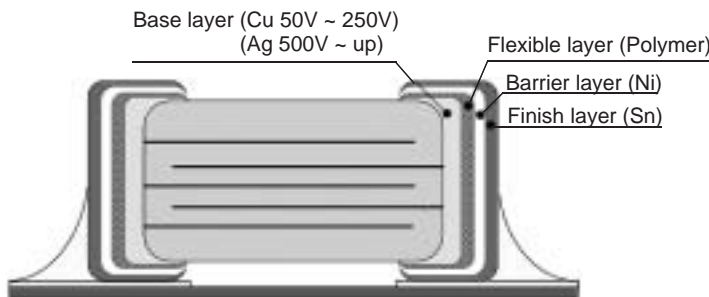
\*Test Frequency & Voltage: Up to 100pF 1MHz/1.0Vrms, Above 100pF 1KHz/1.0Vrms

\*\*Reflow soldering is recommended. Contact NIC regarding the use of other soldering methods.

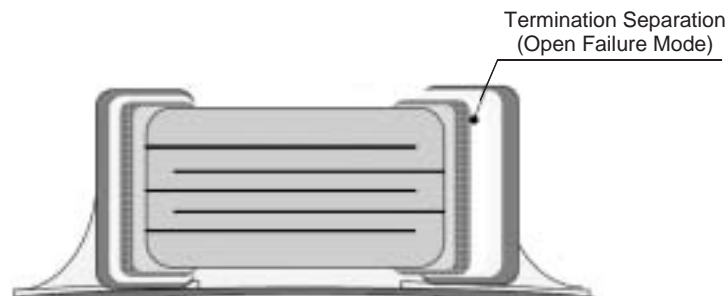
## PART NUMBER SYSTEM



## CONSTRUCTION



## OPEN MODE FAILURE AS A RESULT OF BENDING STRESS



### NPO VALUES AND SIZES (mm)

EIA Case Size	0603			0805			1206						1210											
Length (L)	1.60 ± 0.1			2.00 ± 0.2			3.20 ± 0.3						3.20 ± 0.30											
Width (W)	0.80 ± 0.1			1.25 ± 0.25			1.60 ± 0.2						2.50 ± 0.20											
Thickness max. (T)	0.90 max.			1.45 max.			1.80 max.						2.60 max.											
Termination Width (P)	0.15 min.			0.20 min.			0.30 min.						0.30 min.											
Capacitance	Working Voltage (Vdc)																							
	200V	16	25	50	200	250	500	16	25	50	200	250	500	1KV	2KV	3KV	16	25	50	200	250	500		
2.0pF																								
3.3																								
3.9																								
5.0																								
8.2																								
10																								
12																								
15																								
18																								
22																								
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0.001µF																								
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0.018																								
0.022																								
0.027																								
0.033																								
0.039																								
0.047																								
0.056																								
0.068																								
0.1																								

## NPO VALUES AND SIZES (mm)

EIA Case Size	1808				1812			1825			2220			2225				
Length (L)	4.60 ± 0.3				4.60 ± 0.3			4.60 ± 0.3			5.70 ± 0.4			5.70 ± 0.4				
Width (W)	2.00 ± 0.2				3.20 ± 0.3			6.35 ± 0.4			5.00 ± 0.4			6.35 ± 0.4				
Thickness max. (T)	2.20 max.				3.00 max.			2.60 max.			3.00 max.			3.00 max.				
Termination Width (P)	0.30 min.				0.30 min.			0.30 min.			0.30 min.			0.30 min.				
Capacitance	Working Voltage (Vdc)																	
	1KV	2KV	3KV	5KV	16	25	50	1KV	2KV	3KV	250	500	1KV	1KV	5KV	250	500	1KV
2.0pF																		
3.3																		
3.9																		
5.0																		
8.2																		
10																		
12																		
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0.033																		
0.039																		
0.047																		
0.056																		
0.068																		
0.1																		
0.12																		
0.15																		
0.22																		



### X7R LOW VOLTAGE VALUES AND SIZES (mm)

EIA Case Size	0805		1206		1210		1812		1825		2220		2225			
Length (L)	2.00 ± 0.2		3.20 ± 0.3		3.20 ± 0.3		4.60 ± 0.3		4.60 ± 0.3		5.70 ± 0.4		5.70 ± 0.4			
Width (W)	1.25 ± 0.25		1.60 ± 0.2		2.50 ± 0.2		3.20 ± 0.3		6.35 ± 0.4		5.00 ± 0.4		6.35 ± 0.4			
Thickness max. (T)	1.45 max.		1.80 max.		2.60 max.		3.00 max.		2.60 max.		3.00 max.		3.00 max.			
Termination Width (P)	0.20 min.		0.30 min.		0.30 min.		0.30 min.		0.30 min.		0.30 min.		0.30 min.			
Capacitance	Working Voltage (Vdc)															
	50		100		50		100		50		100		50		100	
0.1µF																
0.15																
0.22																
0.33																
0.47																
0.68																
1.0																
1.5																
2.2																
3.3																
4.7																
6.8																
10																

### X7R HIGH VOLTAGE VALUES AND SIZES (mm)

EIA Case Size	0805			1206				1210						
Length (L)	2.00 ± 0.2			3.20 ± 0.3				3.20 ± 0.3						
Width (W)	1.25 ± 0.25			1.60 ± 0.2				2.50 ± 0.2						
Thickness max. (T)	1.45 max.			1.80 max.				2.60 max.						
Termination Width (P)	0.20 min.			0.30 min.				0.30 min.						
Capacitance	Working Voltage (Vdc)													
	200		250		500		200		250		500		1K	
180pF														
220														
270														
330														
390														
470														
560														
680														
0.001µF														
0.0015µF														
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0.047µF														
0.056µF														
0.068µF														
0.1µF														
0.12µF														
0.15µF														
0.18µF														
0.22µF														



### X7R HIGH VOLTAGE VALUES AND SIZES (mm)

EIA Case Size	1808				1812				1825			2220				2225				
Length (L)	4.60 ± 0.3				4.60 ± 0.3				4.60 ± 0.3			5.70 ± 0.4				5.70 ± 0.4				
Width (W)	2.0 ± 0.2				3.2 ± 0.3				6.35 ± 0.4			5.00 ± 0.4				6.35 ± 0.4				
Thickness max. (T)	2.20 max.				3.00 max.				2.60 max.			3.00 max.				3.00 max.				
Termination Width (P)	0.30 min.				0.30 min.				0.30 min.			0.30 min.				0.30 min.				
Capacitance	Working Voltage (Vdc)																			
	500	1K	2K	3K	200	250	500	1K	2K	3K	250	500	1K	250	500	1K	2K	250	500	1K
150pF																				
180																				
220																				
270																				
330																				
390																				
470																				
560																				
680																				
0.001µF																				
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