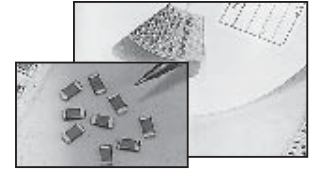


FEATURES

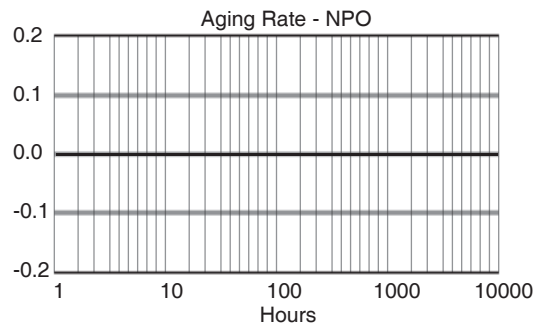
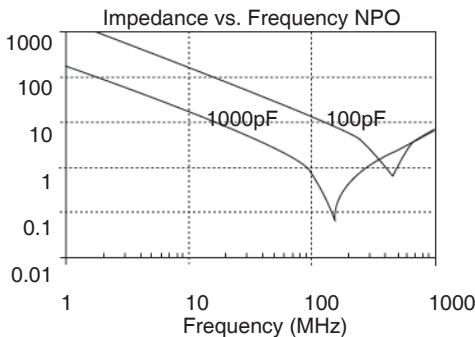
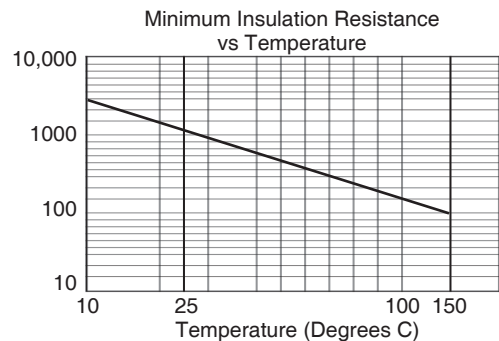
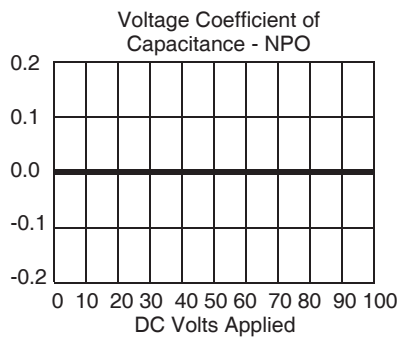
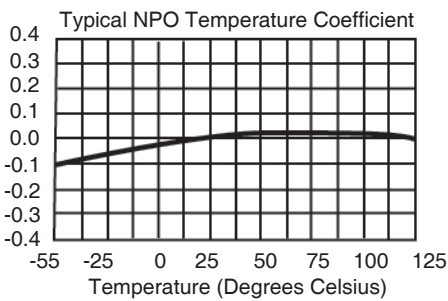
- CLASS I DIELECTRIC, TEMPERATURE COMPENSATING
- HIGH STABILITY OVER TIME, VOLTAGE AND TEMPERATURE CHANGES
- LOW DIELECTRIC LOSS
- NICKEL BARRIER TERMINATIONS AND EXCELLENT MECHANICAL STRENGTH

**Expanded
01005
Case Size**

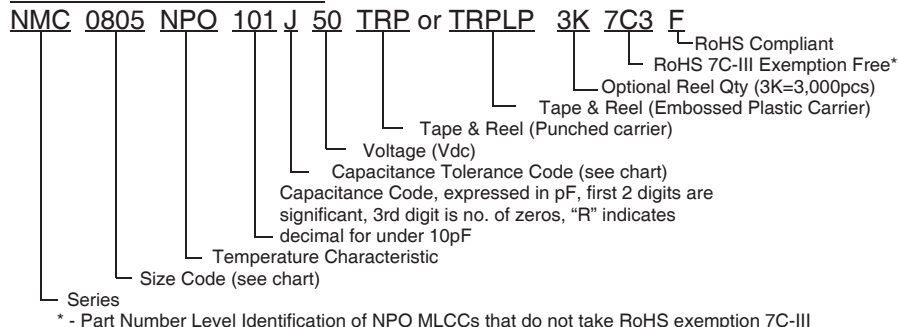


SPECIFICATIONS NPO

Capacitance Range	0.47pF to 0.068μF
Capacitance Tolerance	Below 10pF: ±0.1pF(B), ±0.25pF(C), ±0.5pF(D) 10pF and above: ±1%(F), ±2%(G), ±5% (J)
Operating Temperature Range	-55°C ~ +125°C
Temperature Characteristics	0 ± 30ppm/°C
Rated Voltages	25Vdc, 35Vdc, 50Vdc (see NMC-H Series for higher voltages)
Dissipation Factor	For values >30pF 0.1% @ 25°C; For values ≤ 30pF Q=400+20 x C (C in pF)
Insulation Resistance	10,000Megohms min. or 500Megohm/μF (min.), whichever is less @ +25°C
Dielectric Withstanding Voltage	250% of Rated Voltage for 5 ±1 seconds, 50mA maximum current
Test Conditions (EIA-198-2E)	<1000pF; 1MHz, 1.2Vrms max. or >1000pF; 1KHz, 1.2Vrms max.



PART NUMBER SYSTEM

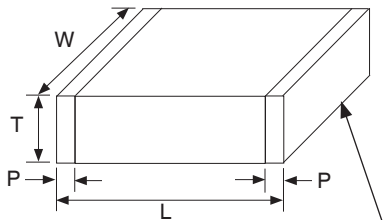


Multilayer Ceramic Chip Capacitors

NMC Series NPO

EIA Case Size	01005
Length (L)	0.4±0.02
Width (W)	0.2±0.02
Thickness max. (T)	0.22
Termination Width (P)	0.1±0.03
Capacitance	Working Voltage (Vdc)
	16
0.5pF	
1.0pF	
1.5pF	
2.0pF	
3.0pF	
4.0pF	
5.0pF	
6.0pF	
7.0pF	
8.0pF	
9.0pF	
10pF	
12pF	
15pF	
18pF	
22pF	
27pF	
33pF	
39pF	
47pF	
56pF	
68pF	
82pF	
100pF	

EIA Case Size	0201		0402		0603		0805					
	Length (L)	Width (W)	Thickness max. (T)	Termination Width (P)	Length (L)	Width (W)	Thickness max. (T)	Termination Width (P)				
0201	0.6±0.03	0.3±0.03	0.33	0.15±0.05	0402	1.0±0.05	0.5±0.05	0.6	0.2±0.1			
0603	1.6±0.15	0.8±0.15	1.0	0.12 ~ 0.51	0805	2.0±0.2	1.25±0.2	1.35	0.25 ~ 0.71			
Capacitance	Working Voltage (Vdc)											
	10	16	25	50	16	25	50	100	16	25	50	100
0.47pF ~ 22pF												
24pF												
27pF												
30pF												
33pF												
36pF												
39pF												
43pF												
47pF												
51pF												
56pF												
62pF												
68pF												
75pF												
82pF												
91pF												
100pF												
110pF												
120pF												
130pF												
150pF												
160pF												
180pF												
200pF												
220pF												
240pF												
270pF												
300pF												
330pF												
360pF												
390pF												
430pF												
470pF												
510pF												
560pF												
620pF												
680pF												
750pF												
820pF												
910pF												
0.001µF												
0.0012µF												
0.0015µF												
0.0018µF												
0.0022µF												
0.0027µF												*
0.0033µF												*
0.0039µF											*	*
0.0047µF											*	
0.0056µF										*	*	
0.0068µF										*	*	
0.0082µF										*	*	



100% Sn over Ni barrier
 (CONSULT FACTORY FOR CAPACITANCE VALUES NOT LISTED)

*1.45mm maximum thickness

EIA Case Size	0805				1206				1210				1812			2225			
Length (L)	2.0±0.2				3.2±0.2				3.2±0.2				4.5±0.3			5.70±0.4			
Width (W)	1.25±0.2				1.6±0.2				2.5±0.2				3.2±0.25			6.35±0.25			
Thickness max. (T)	1.45				1.80				1.80				1.80			1.80			
Termination Width (P)	0.25 ~ 0.71				0.25 ~ 0.71				0.25 ~ 0.71				0.25 ~ 0.76			0.25 ~ 1.02			
Capacitance	Working Voltage (Vdc)																		
	16	25	50	100	10	16	25	50	100	10	16	25	50	100	25	50	100	50	100
0.47pF ~ 9.1pF																			
10pF ~ 22pF																			
24pF ~ 0.001µF																			
0.0012µF																			
0.0015µF																			
0.0018µF																			
0.0022µF																			
0.0027µF																			
0.0033µF																			
0.0039µF																			
0.0047µF																			
0.0056µF																			
0.0068µF																			
0.0075µF																			
0.0082µF																			
0.0091µF																			
0.01µF																			
0.012µF																			
0.015µF								*											
0.018µF																			
0.022µF																			**
0.027µF																			**
0.033µF																			**
0.039µF																			**
0.047µF																			
0.056µF																			

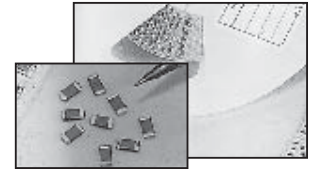
*1.90mm maximum thickness, **2.60mm maximum thickness

**See NMC High Capacitance datasheet for higher capacitance values
or NMC-H High Voltage datasheet for higher voltage ratings**

FEATURES

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

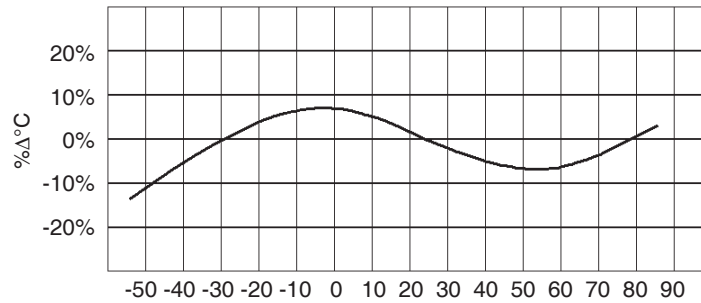
**Expanded
01005
Case Size**



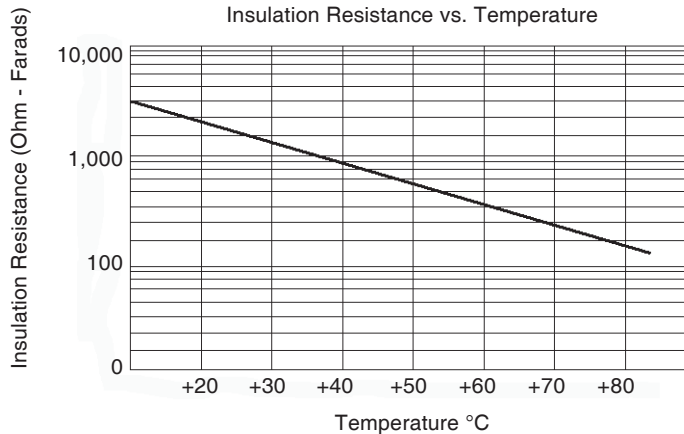
CHARACTERISTICS

Capacitance Range	100pF ~ 0.82μF (see high CV datasheet for higher capacitance values)
Capacitance Tolerance	±10% (K), ±20% (M)
Operating Temperature Range	-55°C ~ +85°C
Temperature Characteristics	±15%Δ max. over temperature range (with 0 Vdc applied)
Rated Voltages	6.3Vdc, 10Vdc, 16Vdc & 25Vdc (see NMC-H Series for higher voltages)
Dissipation Factor	3.5% max. (≤ 0.1μF, 25Vdc), 5% max. (all 16Vdc & >0.1μF, 25Vdc), 7.5% (10Vdc), 10% (6.3Vdc) @ 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 5 ±1 seconds, 50mA maximum current
Test Conditions (EIA-198-2E)	1KHz, 1.0V ±0.2Vrms

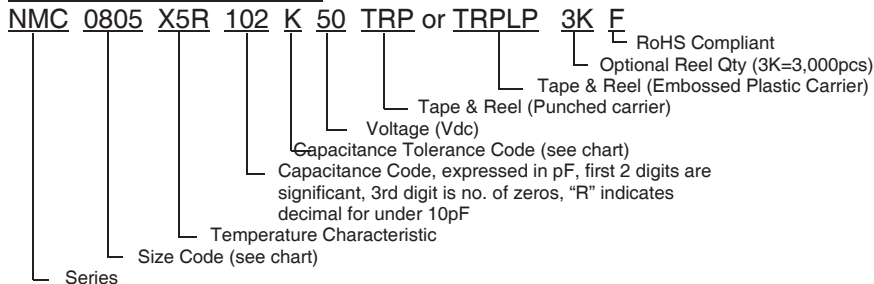
Typical X5R Temperature Coefficient



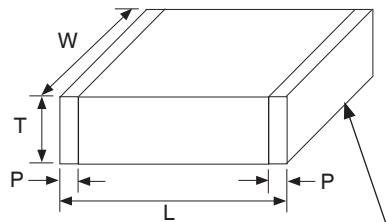
Insulation Resistance vs. Temperature



PART NUMBER SYSTEM



EIA Case Size	01005	
Length (L)	0.4±0.02	
Width (W)	0.2±0.02	
Thickness max. (T)	0.22	
Termination Width (P)	0.1±0.03	
Capacitance	Working Voltage (Vdc)	
	6.3	10
100pF		
150pF		
220pF		
330pF		
470pF		
680pF		
1,000pF		
1,500pF		
2,200pF		
3,300pF		
4,700pF		
6,800pF		
10,000pF		



100% Sn over Ni barrier

(CONSULT FACTORY FOR CAPACITANCE VALUES NOT LISTED)

EIA Case Size	0201		0402			0603			
	Length (L)	Width (W)	Thickness max. (T)	Termination Width (P)	Capacitance	Working Voltage (Vdc)			
						6.3	10	16	25
0.6 ± 0.05	0.3 ± 0.05	0.33	0.10 ~ 0.20						
1.0 ± 0.05	0.5 ± 0.05	0.6	0.2 ± 0.1						
1.6 ± 0.15	0.8 ± 0.15	1.0	0.12 ~ 0.51						
0.0012µF									
0.0015µF									
0.0018µF									
0.0022µF									
0.0027µF									
0.0033µF									
0.0039µF									
0.0047µF									
0.0056µF									
0.0068µF									
0.0075µF									
0.0082µF									
0.01µF									
0.015µF									
0.018µF									
0.022µF									
0.027µF									
0.033µF									
0.036µF									
0.039µF									
0.047µF									
0.056µF									
0.068µF									
0.075µF									
0.082µF									
0.1µF									
0.15µF									
0.18µF									
0.22µF									
0.27µF									
0.33µF									
0.36µF									
0.39µF									
0.47µF									
0.68µF									
0.82µF									

See NMC High Capacitance datasheet for higher capacitance values
or NMC-H High Voltage datasheet for higher voltage ratings

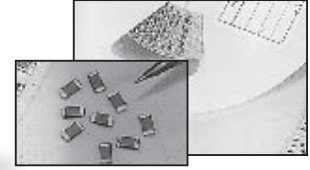
FEATURES

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

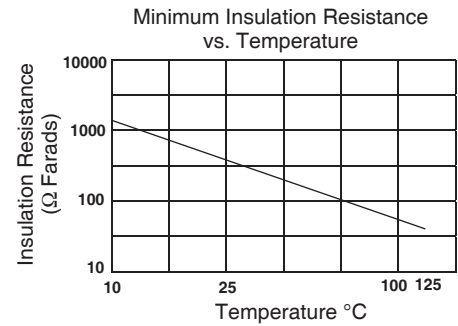
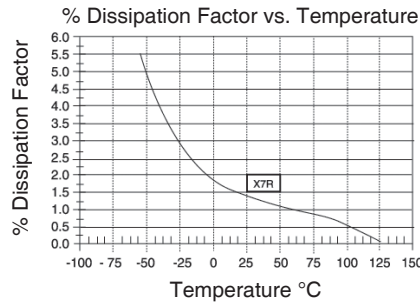
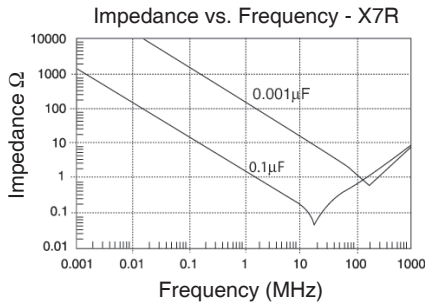
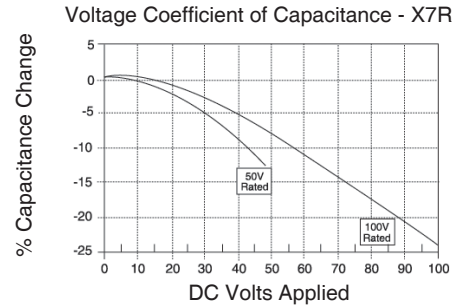
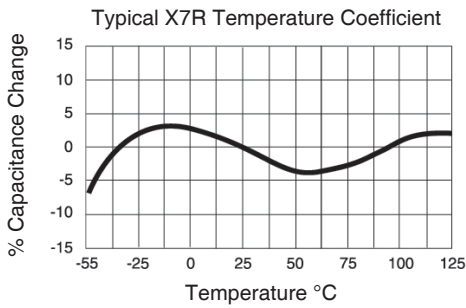
RoHS Compliant

Includes all homogeneous materials

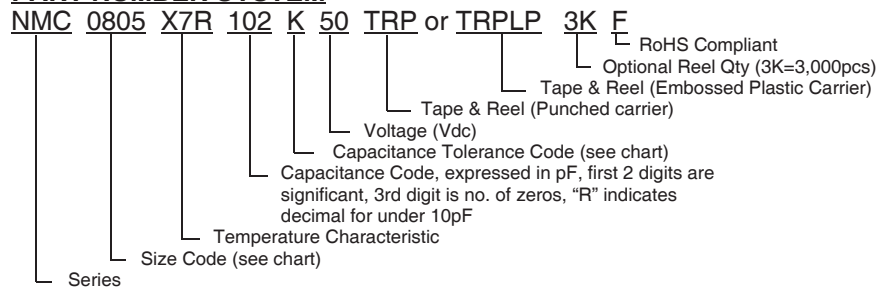
*See Part Number System for Details



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 5 ±1 seconds, 50mA maximum current
Test Conditions (EIA-198-2E)	1KHz, 1.0V ±0.2Vrms



PART NUMBER SYSTEM



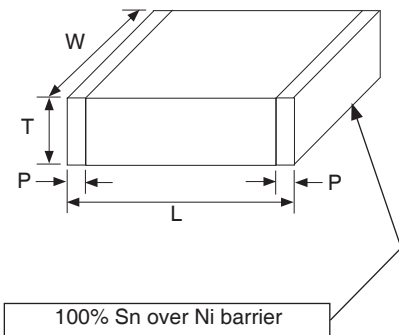
X7R CAPACITOR SIZE CHART (mm)

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)	0.3±0.03			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)																
	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																	
0.033µF																	
0.039µF																	
0.047µF																	
0.056µF																	
0.068µF																	
0.082µF																	
0.1µF																	*
0.15µF														*	*	*	
0.18µF														*	*	*	
0.22µF														*	*	*	
0.33µF														*	*	*	
0.39µF														*	*	*	*
0.47µF														*	*	*	*
0.56µF														*	*	*	
0.68µF														*	*	*	
0.82µF														*	*	*	

*1.45mm maximum thickness

(CONSULT FACTORY FOR CAPACITANCE VALUES NOT LISTED)

See NMC High CV series for values above 0.82µF

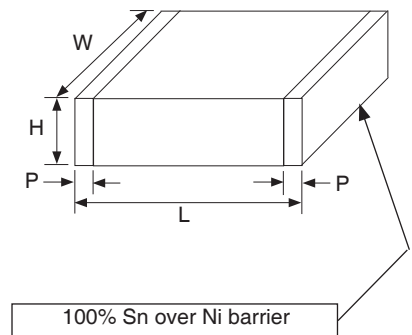


X7R CAPACITOR SIZE CHART (mm)

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																			
0.0068µF																			
0.0075µF																			
0.0082µF																			
0.01µF																			
0.012µF																			
0.015µF																			
0.018µF																			
0.022µF																			
0.027µF																			
0.033µF																			
0.036µF																			
0.039µF																			
0.043µF																			
0.047µF																			
0.056µF																			
0.068µF																			
0.082µF																			
0.1µF																			
0.12µF																			
0.15µF																			
0.18µF																			
0.22µF																			
0.27µF																			
0.33µF																			
0.39µF																			
0.47µF																			
0.56µF																			
0.68µF																			
0.82µF																	*	*	

* 2.20mm maximum thickness

See NMC High CV series for values above 0.82µF



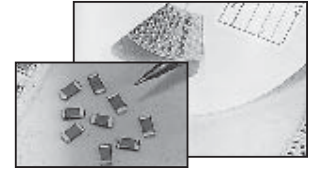
FEATURES

- HIGH K DIELECTRIC
- HIGH CAPACITANCE DENSITY
- EXCELLENT MECHANICAL STRENGTH
- NICKEL BARRIER TERMINATIONS

RoHS Compliant

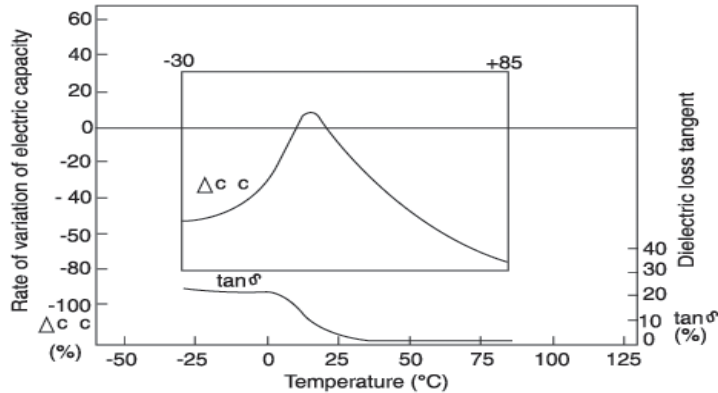
Includes all homogeneous materials

*See Part Number System for Details

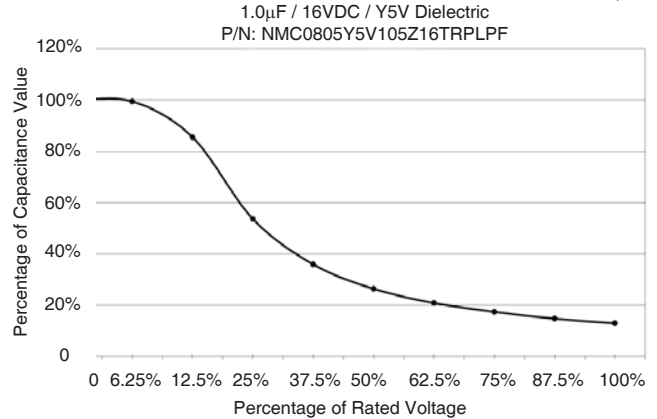


Capacitance Range	0.01 μ F ~ 0.82 μ F (see high CV datasheet for higher capacitance values)
Capacitance Tolerance	+80%/-20% (Z)
Operating Temperature Range	-30°C ~ +85°C
Temperature Characteristics	+22%, -82% max. capacitance Δ over temperature range
Rated Voltages	4Vdc, 6.3Vdc, 16Vdc, 25Vdc, 50Vdc & 100Vdc (see NMC-H Series for higher voltages)
Dissipation Factor	(See Values Table)
Insulation Resistance	10,000Megohms min. or 500Megohm/ μ F min. whichever is less @ +25°C
Dielectric Withstanding Voltage	150% of Rated Voltage for 5 \pm 1 seconds, 50mA maximum current
Test Conditions (EIA-198-2E)	1KHz, 1.0V \pm 0.2Vrms

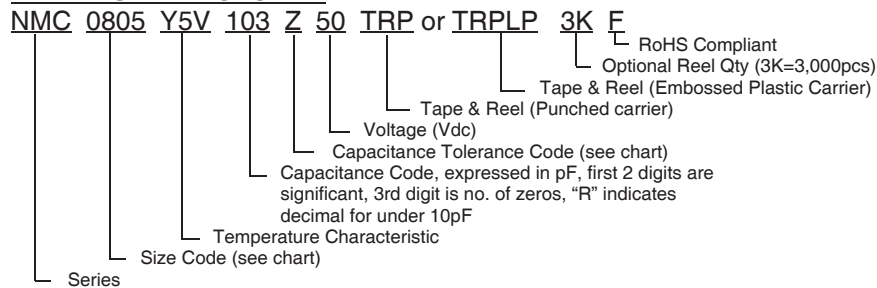
Typical Y5V C and DF Change over Temp.



CAPACITANCE CHANGE AS FUNCTION OF APPLIED VOLTAGE (VDC)



PART NUMBER SYSTEM



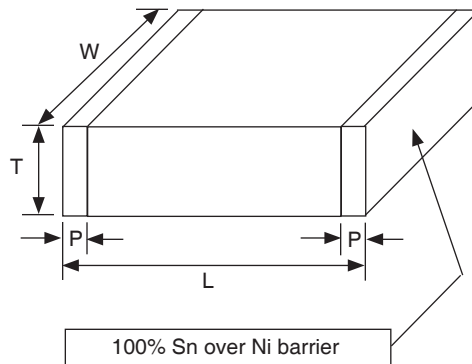
Y5V CAPACITOR SIZE AND DISSIPATION FACTOR CHART (mm)

EIA Case Size	0201			0402				0603				0805					1206								
Length (L)	0.6 ± 0.05			1.0 ± 0.05				1.6 ± 0.15				2.0 ± 0.2					3.2 ± 0.2								
Width (W)	0.3 ± 0.05			0.5 ± 0.05				0.8 ± 0.15				1.25 ± 0.2					1.6 ± 0.2								
Thickness max. (T)	0.33			0.6				1.0				1.30					1.80								
Termination Width (P)	0.10 ~ 0.20			0.2±0.1				0.12 ~ 0.51				0.25 ~ 0.71					0.25 ~ 0.71								
Capacitance	Working Voltage (Vdc)																								
	4	10	6.3	10	16	25	50	10	16	25	50	6.3	10	16	25	50	100	6.3	10	16	25	50	100		
0.01µF				12.5%	9%	7%	7%	12.5%	7%	5%	5%	16%	12.5%	9%	5%	5%	5%	16%	12.5%	9%	5%	5%	5%		
0.015µF				12.5%	9%	7%	7%	12.5%	7%	5%	5%	16%	12.5%	9%	5%	5%	5%	16%	12.5%	9%	5%	5%	5%		
0.022µF	16%	12.5%	16%	12.5%	9%	7%	7%	12.5%	7%	5%	5%	16%	12.5%	9%	5%	5%	5%	16%	12.5%	9%	5%	5%	5%		
0.027µF	16%	12.5%	16%	12.5%	9%	7%	7%	12.5%	7%	5%	5%	16%	12.5%	9%	5%	5%	5%	16%	12.5%	9%	5%	5%	5%		
0.033µF	16%	12.5%	16%	12.5%	9%	7%	7%	12.5%	7%	5%	5%	16%	12.5%	9%	5%	5%	5%	16%	12.5%	9%	5%	5%	5%		
0.036µF	16%	12.5%	16%	12.5%	9%	7%	7%	12.5%	7%	5%	5%	16%	12.5%	9%	5%	5%	5%	16%	12.5%	9%	5%	5%	5%		
0.039µF	16%	12.5%	16%	12.5%	9%	7%	7%	12.5%	7%	5%	5%	16%	12.5%	9%	5%	5%	5%	16%	12.5%	9%	5%	5%	5%		
0.047µF	16%	12.5%	16%	12.5%	9%	7%	7%	12.5%	7%	5%	5%	16%	12.5%	9%	5%	5%	5%	16%	12.5%	9%	5%	5%	5%		
0.056µF	16%		16%	12.5%	9%			12.5%	7%	5%	5%	16%	12.5%	9%	5%	5%	5%	16%	12.5%	9%	5%	5%	5%		
0.068µF	16%		16%	12.5%	9%			12.5%	7%	5%	5%	16%	12.5%	9%	5%	5%	5%	16%	12.5%	9%	5%	5%	5%		
0.075µF	16%		16%	12.5%	9%			12.5%	7%	5%	5%	16%	12.5%	9%	5%	5%	5%	16%	12.5%	9%	5%	5%	5%		
0.082µF	16%		16%	12.5%	9%			12.5%	7%	5%	5%	16%	12.5%	9%	5%	5%	5%	16%	12.5%	9%	5%	5%	5%		
0.1µF			16%	12.5%	9%			12.5%	7%	7%	7%	16%	12.5%	9%	5%	5%	5%	16%	12.5%	9%	5%	5%	5%		
0.15µF			16%	12.5%				12.5%	9%	9%	9%	16%	12.5%	9%	5%	5%		16%	12.5%	9%	5%	5%	5%		
0.18µF			16%	12.5%				12.5%	9%	9%	9%	16%	12.5%	9%	5%	5%		16%	12.5%	9%	5%	5%	5%		
0.22µF			16%	12.5%				12.5%	9%	9%	9%	16%	12.5%	9%	5%	5%		16%	12.5%	9%	5%	5%	5%		
0.27µF			16%	12.5%				12.5%	12.5%	9%		16%	12.5%	9%	5%	5%		16%	12.5%	9%	5%	5%			
0.33µF			16%	12.5%				12.5%	12.5%	9%		16%	12.5%	9%	7%	7%		16%	12.5%	9%	5%	5%			
0.36µF			16%	12.5%				12.5%	12.5%	9%		16%	12.5%	9%	9%			16%	12.5%	9%	5%	5%			
0.39µF			16%	12.5%				12.5%	12.5%	9%		16%	12.5%	9%	9%			16%	12.5%	9%	5%	5%			
0.47µF			16%	12.5%				12.5%	12.5%	9%		16%	12.5%	9%	9%			16%	12.5%	9%	5%	5%			
0.56µF			16%					12.5%	12.5%	9%		16%	12.5%	9%	9%			16%	12.5%	9%	5%	5%			
0.68µF			16%					12.5%	12.5%	9%		16%	12.5%	9%	9%*			16%	12.5%	9%	5%	5%			
0.82µF			16%					12.5%	12.5%	9%		16%	12.5%	9%	9%*			16%	12.5%	9%	5%	5%			

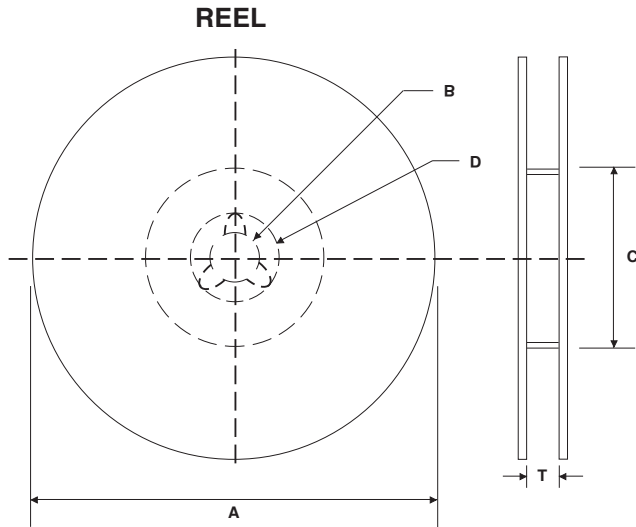
*1.35mm maximum thickness

Percentages in the table represent the dissipation factor for that value.

(CONSULT FACTORY FOR CAPACITANCE VALUES NOT LISTED)



See NMC High CV series for values above 0.82µF



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	20,000	10,000	4,000	4,000	4,000	2,000	1,000
Max. Qty Per Reel	20,000	20,000	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 than 1mm will be taped on paper carrier

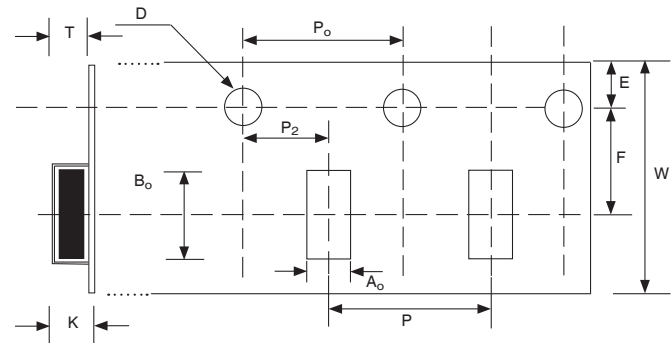
EMBOSSED PLASTIC CARRIER TAPE DIMENSIONS (mm)

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:

- Specifications are in compliance with EIA RS481-1-A "Taping of surface Mount Components for Automatic Placement"
- Dimensions A₀ (max.) equals component width dimension plus 0.5mm
- Dimension B₀ (max.) equals component length dimension plus 0.5mm

EMBOSSED PLASTIC CARRIER TAPE



See notes 2 & 3 regarding dimensions A₀ and B₀

PUNCHED CARRIER TAPE DIMENSIONS (mm)

Type	A ₀	B ₀	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			1.1	1.4	
0805	1.65 ± 0.2	2.4 ± 0.2									
1206	2.0 ± 0.2	3.6 ± 0.2									

PUNCHED CARRIER TAPE

