

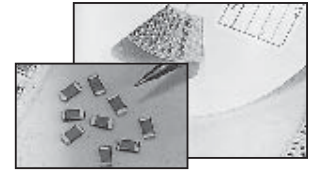
FEATURES

- X7R, X5R AND Y5V DIELECTRICS
- HIGH CAPACITANCE DENSITY
- ULTRA LOW ESR & ESL
- EXCELLENT MECHANICAL STRENGTH
- NICKEL BARRIER TERMINATIONS
- RoHS COMPLIANT
- SAC SOLDER COMPATIBLE*

RoHS Compliant

Includes all homogeneous materials

*See Part Number System for Details



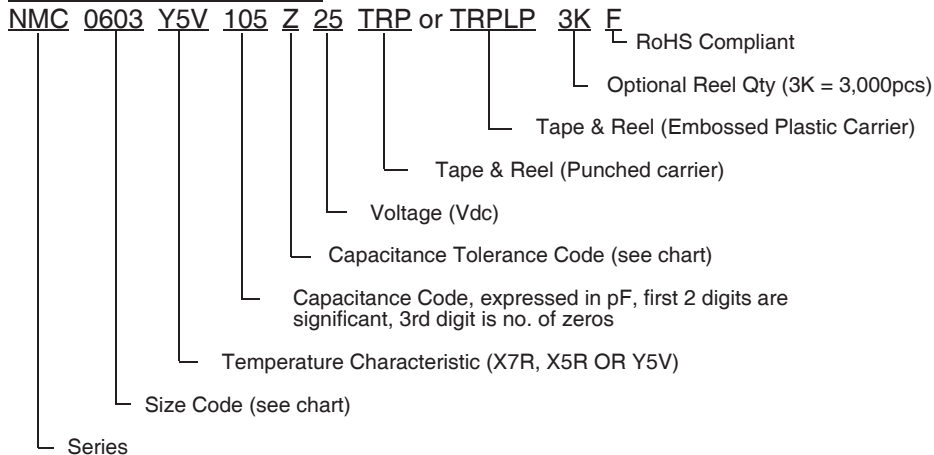
Temperature Coefficient	X7R	X5R	Y5V
Capacitance Range	1.0 μ F ~ 10 μ F	1.0 μ F ~ 100 μ F	1.0 μ F ~ 100 μ F
Capacitance Tolerance	10% (K) & 20% (M)	10% (K) & 20% (M)	+80%/-20% (Z)
Operating Temperature Range	-55°C ~ +125°C	-55°C ~ +85°C	-30°C ~ +85°C
Temperature Characteristics	$\pm 15\%$ Δ Cap.	$\pm 15\%$ Δ Cap.	+22%, -82% Δ Cap.
Rated Voltages	4Vdc, 6.3Vdc, 16Vdc, 25Vdc, 50Vdc & 100Vdc		
Dissipation Factor	See Sizes & Values Tables		
Insulation Resistance	100Megohm/ μ F minimum @ +25°C		
Dielectric Withstanding Voltage	250% of Rated Voltage for 5 $\pm$ 1 sec., 50mA max.		150% of Rated Voltage for 5 $\pm$ 1 sec., 50mA max.
Test Conditions (EIA-198-2E)	C $\leq$ 10 μ F 1KHz, 1.0V $\pm$ 0.2Vrms (ALC on) C > 10 μ F 120Hz, 0.5V $\pm$ 0.2Vrms (ALC on)		1KHz, 1.0V $\pm$ 0.1Vrms (ALC on)

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

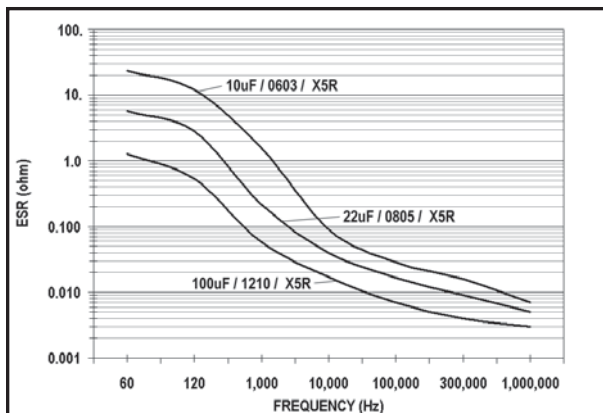
Capacitance value stability over applied VDC is not assured for class II MLCC (X7R, X5R & Y5V) and it is suggested to consider to use NPO MLCCs Ceramic Capacitors, Film Capacitors or Electrolytic Capacitors for applications where stability in capacitance value, over applied VDC, is performance requirement.

For additional information go to: <http://www.niccomp.com/help/VoltageCoefficientofCapacitors-032012-R1.pdf>.

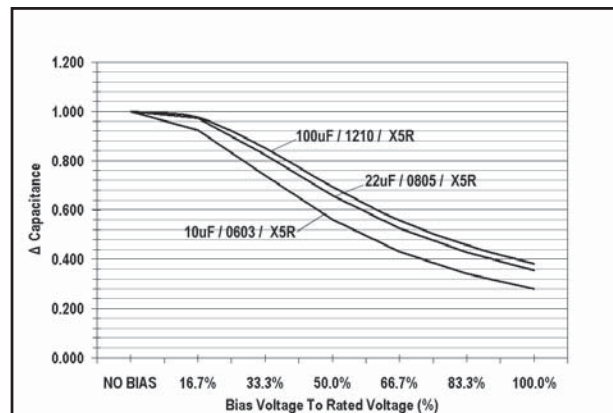
PART NUMBER SYSTEM



Typical ESR versus Frequency



Typical Capacitance versus Bias Voltage



X7R HIGH CV CAPACITOR VALUES AND SIZES (mm)

EIA Case Size	0603			0805				1206					
Length (L)	1.6 ± 0.15			2.0 ± 0.2				3.2±0.2					
Width (W)	0.8 ± 0.15			1.25 ± 0.2				1.6±0.2					
Thickness max. (T)	1.0			1.35				1.90					
Termination Width (P)	0.1 ~ 0.65			0.25 ~ 0.75				0.25 ~ 0.85					
Capacitance	Working Voltage (Vdc)												
	6.3V	10	16	6.3	10	16	25	6.3	10	16	25	35	50
1.0μF		5%	5%		5%	3.5%	5%		5%	5%	3.5%		3%
1.5μF													
2.2μF	10%			10%*	5%*	5%*	5%*		5%	5%	3.5%		
3.3μF				10%*					5%	5%	3.5%		
4.7μF				10%*					5%	5%	3.5%		
10μF				15%*				10%	5%	3.5%**			
* 1.45mm maximum thickness. **2.20mm maximum thickness													

* 1.45mm maximum thickness, **2.20mm maximum thickness

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

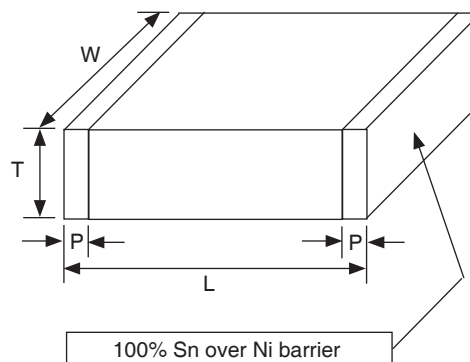
X7R HIGH CV CAPACITOR VALUES AND SIZES (mm)

EIA Case Size	1210						1812					2225		
Length (L)	3.2±0.2						4.5±0.4					5.7±0.4		
Width (W)	2.5±0.2						3.2±0.3					6.35±0.25		
Thickness max. (T)	2.20						1.8					2.20		
Termination Width (P)	0.25 ~ 1.00						0.25 ~ 1.5					0.25 ~ 1.02		
Capacitance	Working Voltage (Vdc)													
	10	16	25	35	50	100	10	16	25	50	100	25	50	100
1.0μF	5%	3.5%	3.5%		3.5%	2.5%**	5%	3.5%	3.5%	2.5%*	2.5%*	2.5%	2.5%	2.5%
1.5μF												2.5%		
2.2μF			3.5%									2.5%		
3.3μF			3.5%											
4.7μF		3.5%	5%	2.5%**										
10μF	5%	3.5%	5%**											
*2.20mm maximum thickness. **2.80mm maximum thickness														

*2.20mm maximum thickness, **2.80mm maximum thickness

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

(CONSULT FACTORY
FOR CAPACITANCE
VALUES NOT LISTED)



X5R HIGH CV CAPACITOR VALUES AND SIZES (mm)

EIA Case Size	0402				0603					0805				
Length (L)	1.0 ± 0.05				1.6 ± 0.15					2.0 ± 0.2				
Width (W)	0.5 ± 0.05				0.8 ± 0.15					1.25 ± 0.2				
Thickness max. (T)	0.6				1.0					1.45				
Termination Width (P)	0.1 ~ 0.3				0.1 ~ 0.65					0.20 ~ 0.75				
Capacitance	Working Voltage (Vdc)													
	4	6.3	10	16	4	6.3	10	16	25	4	6.3	10	16	25
1.0μF		10%	15%	10%		10%	10%	5%	5%		10%	7.5%	5%	5%
1.5μF														
2.2μF	10%	10%				10%	10%	3.5%			10%	10%	5%	5%
3.3μF						10%					10%	10%		
4.7μF	10%	12.5%*				10%	5%				10%	10%	10%	10%
6.8μF														
10μF					10%	10%					10%	10%	10%	
22μF					12.5%						15%			
47μF										10%				

*T max. 0.65mm, L & W tolerance -0/+0.15mm

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

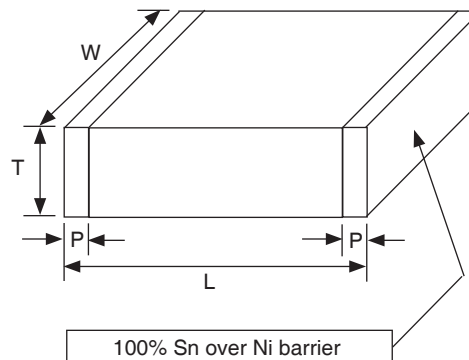
X5R HIGH CV CAPACITOR VALUES AND SIZES (mm)

EIA Case Size	1206					1210					1812	
Length (L)	3.2±0.2					3.2±0.3					4.5±0.4	
Width (W)	1.6±0.2					2.5±0.2					3.2±0.4	
Thickness max. (T)	1.90					2.2					3.1	
Termination Width (P)	0.25 ~ 0.85					0.25 ~ 1.0					0.2 min.	
Capacitance	Working Voltage (Vdc)											
	4	6.3	10	16	25	6.3	10	16	25	35	6.3	10
1.0μF												
1.5μF				5%								
2.2μF		10%	7.5%	5%	3.5%					3.5%		
3.3μF		10%	7.5%	5%	3.5%							
4.7μF		10%	7.5%	5%	5%	10%	5%	3.5%	3.5%*			
6.8μF		10%										
10μF		10%	10%	5%	5%	10%	5%	5%	5%*	10%		
22μF		10%	10%	3.5%		10%*	10%*	5%*	5%*			
47μF	10%	10%	10%			10%*	10%*					
100μF						15%*					10%	10%
*Length 3.2mm ± 0.4mm, 2.8mm maximum thickness												

*Length 3.2mm ± 0.4mm, 2.8mm maximum thickness

(CONSULT FACTORY
FOR CAPACITANCE
VALUES NOT LISTED)

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



Y5V HIGH CV CAPACITOR VALUES AND SIZES (mm)

EIA Case Size	0402		0603				0805				
Length (L)	1.0 ± 0.05		1.6 ± 0.15				2.0 ± 0.2				
Width (W)	0.5 ± 0.05		0.8 ± 0.15				1.25 ± 0.2				
Thickness max. (T)	0.6		1.0				1.45				
Termination Width (P)	0.1 ~ 0.3		0.1 ~ 0.65				0.25 ~ 0.75				
Capacitance	Working Voltage (Vdc)										
	6.3	10	6.3	10	16	25	6.3	10	16	25	50
1.0μF	20%	12.5%		16%	16%	9%	16%	12.5%	9%	9%	9%
1.5μF							16%	12.5%	9%		
2.2μF			20%	16%	16%		16%	12.5%	9%	9%	
3.3μF							16%	12.5%	9%		
4.7μF			20%	12.5%			16%	12.5%	12.5%		
6.8μF								16%			
10μF							20%	30%			
22μF							20%				
*2.5mm maximum thickness											

*2.5mm maximum thickness

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

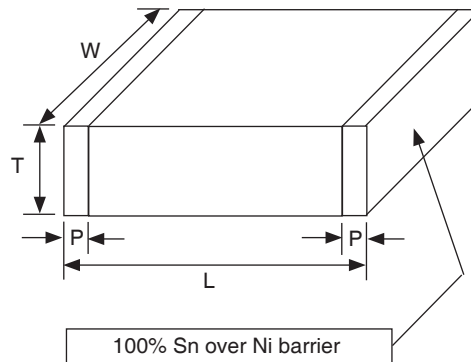
Y5V HIGH CV CAPACITOR VALUES AND SIZES (mm)

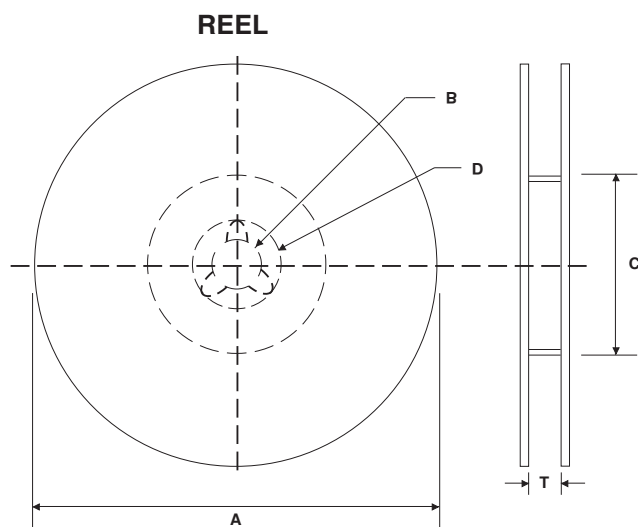
EIA Case Size	1206						1210						1812					
Length (L)	3.2±0.2						3.2±0.2						4.5±0.4					
Width (W)	1.6±0.2						2.5±0.2						3.2±0.3					
Thickness max. (T)	1.90						2.2						2.8					
Termination Width (P)	0.25 ~ 0.85						0.25 ~ 1.0						0.25 ~ 1.5					
Capacitance	Working Voltage (Vdc)																	
	6.3	10	16	25	35	50	6.3	10	16	25	35	50	10	16	25	50		
1.0μF		12.5%	12.5%	7%		7%		12.5%	12.5%	9%		7%	12.5%	9%	5%	5%		
1.5μF		12.5%	12.5%	9%				12.5%	12.5%	9%			12.5%	9%	5%	5%		
2.2μF		12.5%	12.5%	9%		9%		12.5%	12.5%	9%		7%	12.5%	9%	5%	5%		
3.3μF		12.5%	12.5%	9%				12.5%	12.5%	9%			12.5%	9%	5%	5%		
4.7μF		12.5%	12.5%	9%	7%		20%	12.5%	12.5%	9%		7%	12.5%	9%	5%	5%		
6.8μF		16%	12.5%					12.5%	12.5%	9%			12.5%	9%	5%	5%		
10μF	20%	16%	12.5%	9%	9%			16%	12.5%	9%	7%		12.5%	9%	5%			
22μF	20%	16%					20%	16%	16%									
33μF																		
47μF							20%	16%					16%	9%				
100μF							20%*											
*2.8mm maximum thickness																		

*2.8mm maximum thickness

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

(CONSULT FACTORY
FOR CAPACITANCE
VALUES NOT LISTED)





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	1,000	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 $\geq 1\text{mm}$ will be taped on embossed plastic carrier. Parts with a thickness of less than 1mm will be taped on paper carrier

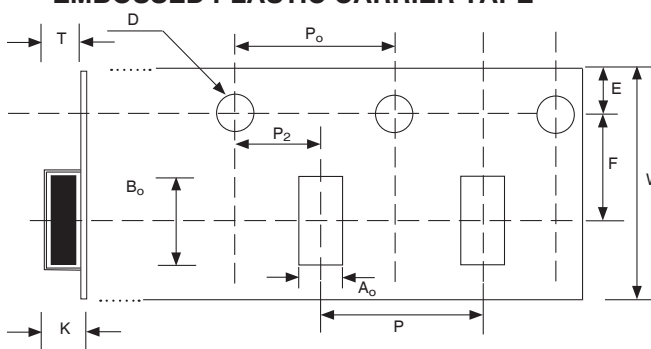
EMBOSSED PLASTIC CARRIER TAPE DIMENSIONS (mm)

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 _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				4.0 ± 0.10			1.1	1.4				
0603	1.1 ± 0.2	1.9 ± 0.2												
0805	1.65 ± 0.2	2.4 ± 0.2												
1206	2.0 ± 0.2	3.6 ± 0.2												

PUNCHED CARRIER TAPE

