

MLCCs for Non-magnetic applications

COG/NP0, High Q and X7R Copper Barrier MLCCs

Multilayer ceramic capacitors with silver/palladium (Ag/Pd) terminations have often been used in medical applications where non-magnetic components are required, for example in MRI equipment. The use of conventional nickel barrier terminations is not suitable due to nickel exhibiting magnetic properties.

However, RoHS requirements have dictated the use of lead-free solders, and the composition of these solders has resulted in an increase in soldering temperatures. This has caused solder leaching problems for the Ag/Pd termination, and meant alternative terminations have had to be found.



Specification

Capacitance Values

COG/NP0 & High Q

0.1pF - 15nF

X7R

47pF - 6.8μF

See overleaf for full list of values

Electrical

COG/NP0

High Q

X7R

Operating Temperature

-55°C to +125°C

-55°C to +125°C

-55°C to +125°C

Temperature Coefficient (Typical)

0 ± 30 ppm/°C

0 ± 30 ppm/°C

±15%

Insulation Resistance

Time constant (Ri xCr) (whichever is the least)

100GΩ or 1000s

100GΩ or 1000s

100GΩ or 1000s

Ageing Rate

None

None

Typical 1% per time decade

Mechanical

Termination Material

See ordering information below

Solderability

IEC 60068-2-58. Passed 3 times reflow profile defined in J-STD-020

Printing

Consult sales office

Lead Free Soldering

Termination codes 2 and 3 ranges are fully compliant with the RoHS and WEEE directives and parts are compatible with lead free solders.

Climatic Category

55/125/56

Reeled Quantities

See Capacitance tables overleaf

Ordering Information

1210	3	100	0103	J	X	T	---
Chip size	Termination	Voltage	Capacitance in picofarads (pF)	Capacitance tolerance	Dielectric	Packaging	Suffix
0402	2 (for COG/NP0 & High Q only)	016 = 16V 025 = 25V 050 = 50V 063 = 63V 100 = 100V 150 = 150V 200 = 200V 250 = 250V 500 = 500V 630 = 630V 1K0 = 1000V 1K2 = 1200V 1K5 = 1500V 2K0 = 2000V 3K0 = 3000V	<10pF Insert a P for the decimal point, eg P300 = 0.3pF, 8P20 = 8.2pF.	<4.7pF H = ±0.05pF B = ±0.1pF C = ±0.25pF D = ±0.5pF	C = COG/NP0 (1B) X = X7R (2R1) Q = High Q	T = 178mm (7") reel R = 330mm (13") reel B = Bulk pack - tubs	Used for specific customer requirements
0603	2 (for COG/NP0 & High Q only)	025 = 25V	≥10pF 1st digit is 0. 2nd and 3rd digits are significant figures of capacitance code. The 4th digit is number of 0's following eg. 0103 = 10000pF	≥4.7pF & <10pF B = ±0.1pF C = ±0.25pF D = ±0.5pF			
0505	= Sintered	050 = 50V	Values <1pF in 0.1pF steps, above this values are E24 series	≥10pF F = ±1% G = ±2% J = ±5% K = ±10%			
0805	silver base with copper barrier	063 = 63V					
1206		100 = 100V					
1111	(100% matte tin plating). RoHS compliant.	150 = 150V					
1210		200 = 200V					
1808		250 = 250V					
1812		500 = 500V					
2220		630 = 630V					
2225	3 = FlexiCap™ base with copper barrier (100% matte tin plating). RoHS compliant.	1K0 = 1000V 1K2 = 1200V 1K5 = 1500V 2K0 = 2000V 3K0 = 3000V					

As copper is non-magnetic, one solution is to use a copper barrier instead of a nickel barrier, with a tin finish on top, and this is the solution Syfer has developed.

This copper barrier termination is offered with selected non-magnetic COG/NP0, High Q and X7R dielectrics, providing a fully non-magnetic component.

To meet high temperature 260°C soldering reflow profiles as detailed in J-STD-020, COG/NP0 dielectrics are supplied with sintered termination and X7R dielectrics are supplied with Syfer's award winning FlexiCap™ termination.

COG/NP0 & High Q Maximum Capacitance Values

Chip Size	0402	0603	0505	0805	1206	1111 1210	1808	1812	2220	2225
Min Cap	0.1pF	0.1pF	0.2pF	0.2pF	0.5pF	0.3pF	1.0pF	1.0pF	2.0pF	2.0pF
Min Cap Tolerance	Minimum tolerance $\pm 0.05\text{pF}$ ($<4.7\text{pF}$), 0.1pF ($\geq 4.7\text{pF}$ & $<10\text{pF}$) and $\pm 1\%$ ($\geq 10\text{pF}$)									
50V 63V	22pF	100pF	220pF	470pF	1.5nF	-	-	-	-	-
100V	15pF	68pF	150pF	330pF	1.0nF	2.2nF	2.2nF	4.7nF	10nF	15nF
150V	10pF	47pF	100pF	220pF	680pF	1.5nF	1.5nF	3.3nF	6.8nF	10nF
200V 250V	6.8pF	33pF	56pF	56pF	470pF	1.0nF	1.0nF	2.2nF	4.7nF	6.8nF
300V	-	27pF	47pF	120pF	390pF	820pF	820pF	1.8nF	3.9nF	5.6nF
500V	-	-	-	68pF	270pF	680pF	680pF	1.5nF	3.3nF	4.7nF
630V	-	-	-	-	150pF	390pF	390pF	1.0nF	2.2nF	3.3nF
1000V	-	-	-	-	82pF	220pF	220pF	680pF	1.5nF	2.2nF
2000V	-	-	-	-	18pF	68pF	68pF	150pF	470pF	560pF
3000V	-	-	-	-	-	-	-	68pF	150pF	220pF
Reeled Quantities										
7" Reel	5000	4000	2500	3000	2500	1000 2000	2000	500	500	500
13" Reel	13" reel quantities available on request					8000	2000	2000	2000	2000

NOTE: Other capacitance values may become available, please contact our Sales Office if you need values other than those shown in the above tables.
For dimensions and soldering information, please go to our website (www.syfer.com) or see our MLC Catalogue.

X7R Maximum Capacitance Values

Chip Size	0402	0603	0805	1206	1210	1808	1812	2220	2225	
Min Cap	47pF	100pF	330pF	680pF	1.5nF	2.2nF	3.3nF	6.8nF	10nF	
Min Cap Tolerance	Minimum tolerance $\pm 5\%$									
16V	10nF	100nF	330nF	1.0 μF	1.5 μF	1.5 μF	3.3 μF	5.6 μF	6.8 μF	
25V	6.8nF	68nF	220nF	820nF	1.2 μF	1.2 μF	2.2 μF	4.7 μF	5.6 μF	
50V 63V	4.7nF	47nF	150nF	470nF	1.0 μF	680nF	1.5 μF	3.3 μF	3.3 μF	
100V	1.5nF	10nF	47nF	150nF	470nF	330nF	1.0 μF	1.5 μF	1.5 μF	
200V 250V	680pF	5.6nF	27nF	100nF	220nF	180nF	470nF	1.0 μF	1.0 μF	
500V	-	1.5nF	8.2nF	33nF	100nF	100nF	270nF	560nF	680nF	
630V	-	-	4.7nF	10nF	27nF	33nF	150nF	330nF	390nF	
1000V	-	-	3.3nF	4.7nF	15nF	18nF	56nF	120nF	150nF	
1200V	-	-	-	3.3nF	10nF	10nF	33nF	82nF	100nF	
1500V	-	-	-	2.7nF	6.8nF	6.8nF	22nF	47nF	68nF	
2000V	-	-	-	2.2nF	4.7nF	4.7nF	10nF	27nF	33nF	
Reeled Quantities										
7" Reel	5000	4000	3000	2500	2000	2000	500	500	500	
13" Reel	13" reel quantities available on request					8000	2000	2000	2000	

NOTE: Other capacitance values may become available, please contact our Sales Office if you need values other than those shown in the above tables.
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