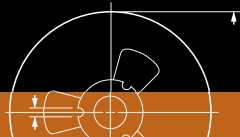


## SMD CERAMIC MULTILAYER CAPACITORS



# MLCC General Information

## Specification overview

Specification overview					
Description	TC code	Series	Capacitance range	Voltage range	Size
Discrete	NPO	General purpose	0.47 pF to 22 nF	10V to 50 V	01005, 0201, 0402, 0603, 0805, 1206, 1210, 1812
		Medium and High voltage	10 pF to 22 nF	100 V to 3000 V	0402, 0603, 0805, 1206, 1210, 1808, 1812
		High frequency	0.2 pF to 100 pF	16V to 250 V	01005, 0201, 0402, 0603, 0805
	X7R	General purpose & High capacitance	100 pF to 47 $\mu$ F	6.3 V to 50 V	01005, 0201, 0402, 0603, 0805, 1206, 1210, 1812, 2220
		Medium and High voltage	100 pF to 2.2 $\mu$ F	100 V to 3000 V	0603, 0805, 1206, 1210, 1812
		Low inductance	10 nF to 220 nF	10 V to 50 V	0306, 0508, 0612
		Soft termination	100 pF to 1 $\mu$ F	16 V to 630 V	0603, 0805, 1206, 1210, 1808, 1812
	X5R	General purpose & High capacitance	100 pF to 100 $\mu$ F	6.3 V to 50 V	01005, 0201, 0402, 0603, 0805, 1206, 1210, 1812
Automotive grade products	Y5V	General purpose & High capacitance	10 nF to 47 $\mu$ F	6.3 V to 50 V	0201, 0402, 0603, 0805, 1206, 1210
	NP0	Automotive grade	10 pF to 10 nF	50 V to 630 V	0402, 0603, 0805, 1206, 1210
Safety certification products	X7R	Automotive grade	100 pF to 2.2 $\mu$ F	16 V to 630 V	0402, 0603, 0805, 1206, 1210
	NP0	High voltage SC type	2.0 pF to 470 pF	X1/Y2, X2/Y3	1808, 1812
C-Arrays	X7R	High voltage SC type	150 pF to 1.5 nF	X1/Y2, X2/Y3	1808, 1812
	NP0	4C arrays	10 pF to 470 pF	50 V	0508, 0612
	X7R	4C arrays	180 pF to 100 nF	16 V to 50 V	0508, 0612
	Y5V	4C arrays	10 nF to 100 nF	25 V	0612

### Global part number

Ordering example: CC0201KRX7R8BB102

CC	0201	K	R	X7R	8	B	B	102
<p>Series name (code 1-2)</p> <p>CA = 4 x Capacitors array</p> <p>CC = Multilayer chip capacitors</p> <p>CL = Low inductance capacitors</p> <p>CQ = High frequency capacitors</p> <p>SC = Safety certification capacitors</p> <p>AC = Automotive grade capacitors</p> <p>CS = Soft termination capacitors</p>	<p>Size code (code 3-6)</p> <p>0100</p> <p>0201</p> <p>0402</p> <p>0603</p> <p>0805</p> <p>1206</p> <p>1210</p> <p>1808</p> <p>1812</p> <p>2220</p> <p>0306</p> <p>0508</p> <p>0612</p>	<p>Capacitance tolerance (code 7)</p> <p>A = <math>\pm 0.05</math> pF (CQ series only)</p> <p>B = <math>\pm 0.1</math> pF</p> <p>C = <math>\pm 0.25</math> pF</p> <p>D = <math>\pm 0.5</math> pF</p> <p>F = <math>\pm 1\%</math></p> <p>G = <math>\pm 2\%</math></p> <p>J = <math>\pm 5\%</math></p> <p>K = <math>\pm 10\%</math></p> <p>M = <math>\pm 20\%</math></p> <p>Z = -20% to +80%</p>	<p>Packing style (code 8)</p> <p>R = Paper / PE tape reel <math>\varnothing 7</math> inch</p> <p>P = Paper / PE tape reel <math>\varnothing 13</math> inch</p> <p>K = Embossed plastic tape reel <math>\varnothing 7</math> inch</p> <p>F = Embossed plastic tape reel <math>\varnothing 13</math> inch</p> <p>C = Bulk case</p>	<p>TC material (code 9-11)</p> <p>NPO</p> <p>X5R</p> <p>X7R</p> <p>Y5V</p>	<p>Capacitance value (code 15-17)</p> <p>102 = 1 000 pF</p> <p>(2 significant digits+number of zeros; the 3rd digit signifies the multiplying factor, and letter R is decimal point)</p> <p>0 = x 1</p> <p>1 = x <math>10^1</math></p> <p>2 = x <math>10^2</math></p> <p>3 = x <math>10^3</math></p> <p>4 = x <math>10^4</math></p> <p>5 = x <math>10^5</math></p> <p>6 = x <math>10^6</math></p> <p>7 = x <math>10^7</math></p> <p>X X R = Special capacitance</p> <p>(X X: capacitance before decimal point)</p>	<p>Process code (code 14)</p> <p>N = NP0</p> <p>B = Class 2 product</p>	<p>Termination (code 13)</p> <p>B = Ni-Barrier</p>	<p>Rated voltage (code 12)</p> <p>5 = 6.3 V</p> <p>6 = 10 V</p> <p>7 = 16 V</p> <p>8 = 25 V</p> <p>G = 35 V</p> <p>9 = 50 V</p> <p>0 = 100 V</p> <p>A = 200 V</p> <p>Y = 250 V</p> <p>B = 500 V</p> <p>Z = 630 V</p> <p>C = 1 kV</p> <p>D = 2 kV</p> <p>E = 3 kV</p> <p>T = X2 / Y3 for TUV / UL</p> <p>W = X1 / Y2 for TUV / UL</p> <p>U = X1 for UL (X7R, 1812)</p>



## Global part number

Ordering example: CCxxxxKRX5RxBBxxx (for Low profile)

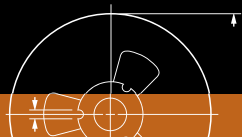
86



# MLCC General Information

## Thickness classes and packing quantities for all series

Thickness classes and packing quantities								
Description	Size code	Thickness classification (mm)	Quantity per reel					Quantity per bulk case
			Tape width	180 mm / 7"		330 mm / 13"		
				Paper	Blister	Paper	Blister	
Discrete capacitors	01005	0.2±0.02	8 mm	20 000	---	---	---	---
	0201	0.3 ±0.03 / ±0.05		15 000	---	50 000	---	---
	0402	0.5 ±0.05 / ±0.15 / ±0.20		10 000	---	50 000	---	50 000
	0603	0.8 ±0.1 / ±0.2		4 000	---	15 000	---	15 000
	0805	0.6 ±0.1		4 000	---	20 000	---	10 000
		0.85/1.0 ±0.1		4 000	---	15 000	---	8 000
		1.25 ±0.2		---	3 000	---	10 000	5 000
	1206	0.6 ±0.1		4 000	---	20 000	---	---
		0.85 ±0.1		4 000	---	15 000	---	---
		1.00 / 1.15 ±0.1		---	3 000	---	10 000	---
		1.25 ±0.2		---	3 000	---	10 000	---
		1.6 ±0.15		---	2 500	---	10 000	---
		1.6 ±0.2 / ±0.3		---	2 000	---	10 000	---
	1210	0.6 / 0.7 ±0.1		---	4 000	---	15 000	---
		0.85 ±0.1		---	4 000	---	10 000	---
		1.0 ±0.15		---	3 000	---	10 000	---
		1.15 ±0.1		---	3 000	---	10 000	---
		1.15 ±0.15		---	3 000	---	10 000	---
		1.25 ±0.2		---	3 000	---	---	---
		1.5 ±0.1		---	2 000	---	---	---
		1.6 / 1.9 ±0.2		---	2 000	---	---	---
		2.0 ±0.2		---	2 000 / 1 000	---	---	---
		2.5 ±0.2 / ±0.3		---	1 000 / 500	---	---	---
	1808	1.15 ±0.15	12 mm	---	3 000	---	---	---
		1.25 ±0.2		---	3 000	---	---	---
		1.35 ±0.15		---	2 000	---	---	---
		1.5 ±0.1		---	2 000	---	---	---
		1.6 ±0.2		---	2 000	---	8 000	---
		2.0 ±0.2		---	2 000	---	---	---
	1812	0.6 / 0.85 ±0.1		---	2 000	---	---	---
		1.15 ±0.1		---	1 000	---	---	---
		1.15 ±0.15		---	1 000	---	---	---
		1.25 ±0.2		---	1 000	---	---	---
		1.35 ±0.15		---	1 000	---	---	---
		1.5 ±0.1		---	1 000	---	---	---
		1.6 ±0.2		---	1 000	---	---	---
		2.0 ±0.2		---	1 000	---	---	---
	2220	0.85 ±0.1		---	1 500	---	---	---
		1.15 ±0.1		---	1 500	---	---	---
Low inductance	0306	0.5 ±0.1	8 mm	4 000	---	15 000	---	---
	0508	0.85 ±0.1		4 000	---	15 000	---	---
	0612	0.85 ±0.1		4 000	---	15 000	---	---
Arrays	0508	0.6 ±0.1		4 000	---	---	---	---
	0612	0.8 ±0.1		4 000	---	---	---	---



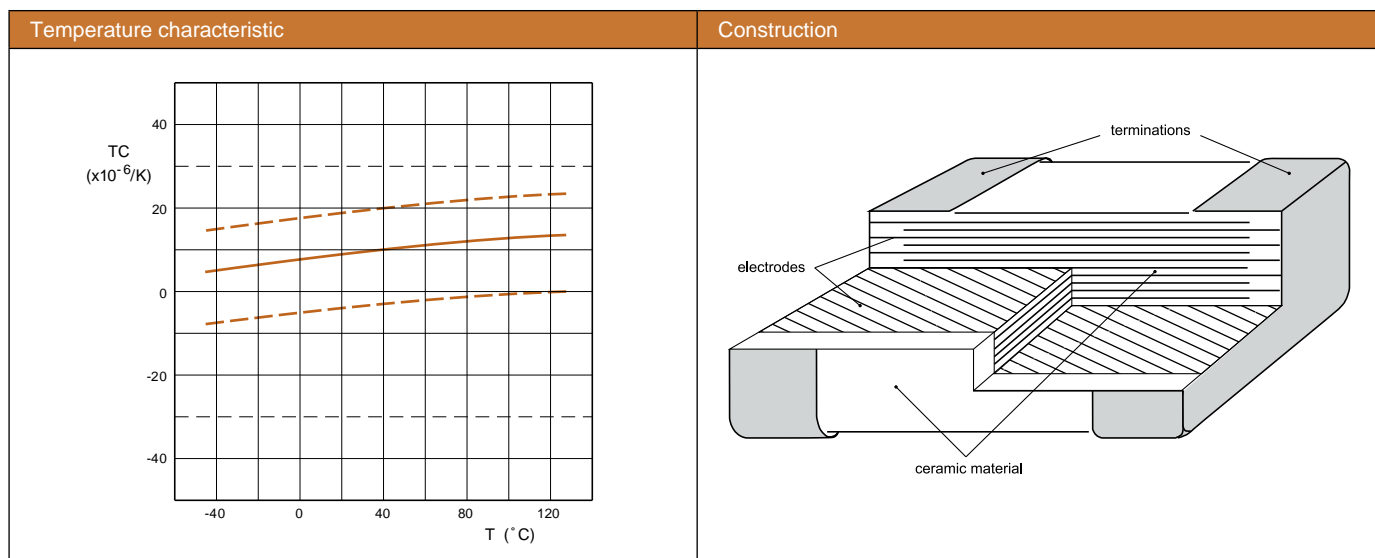
# MLCC Selection Charts

NPO - General purpose 16 to 50V, 01005 to 1812



## Features

- Ultra-stable on capacitance
- Tight tolerance available
- High reliability
- Low ESR
- Good frequency performance
- No aging of capacitance



Case dimensions							
Discrete capacitors - General purpose							
	Case size designation		Dimensions in mm				
	Inch-based	Metric	L <sub>1</sub>	W	L <sub>2</sub> / L <sub>3</sub> min	L <sub>2</sub> / L <sub>3</sub> max	L <sub>4</sub> min
	01005	0402M	0.4±0.02	0.2±0.02	0.07	0.14	0.14
	0201	0603M	0.6 ±0.03	0.3 ±0.03	0.10	0.20	0.20
	0402	1005M	1.0 ±0.05	0.5 ±0.05	0.15	0.30	0.40
	0603	1608M	1.6 ±0.10	0.8 ±0.10	0.20	0.60	0.40
	0805	2012M	2.0 ±0.10 <sup>(1)</sup>	1.25 ±0.10 <sup>(1)</sup>	0.25	0.75	0.55
			2.0 ±0.20 <sup>(2)</sup>	1.25 ±0.20 <sup>(2)</sup>	0.25	0.75	0.55
	1206	3216M	3.2 ±0.15 <sup>(1)</sup>	1.6 ±0.15 <sup>(1)</sup>	0.25	0.75	1.40
			3.2 ±0.30 <sup>(2)</sup>	1.6 ±0.20 <sup>(2)</sup>	0.25	0.75	1.40
	1210	3225M	3.2 ±0.20 <sup>(1)</sup>	2.5 ±0.20 <sup>(1)</sup>	0.25	0.75	1.40
			3.2 ±0.40 <sup>(2)</sup>	2.5 ±0.30 <sup>(2)</sup>	0.25	0.75	1.40
	1812	4532M	4.5 ±0.20 <sup>(1)</sup>	3.2 ±0.20 <sup>(1)</sup>	0.25	0.75	2.20
			4.5 ±0.40 <sup>(2)</sup>	3.2 ±0.40 <sup>(2)</sup>	0.25	0.75	2.20

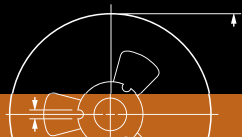
Note: 1. Dimension for size 0805 to 1812, C ≤ 1 nF  
2. Dimension for size 0805 to 1812, C > 1 nF

# MLCC Selection Charts

NPO - General purpose 16 to 50V, 01005 to 0603

NP0																
General purpose																
Capacitance	01005	0201			0402			0603								
	16 V	16 V	25 V	50 V	16 V	25 V	50 V	16 V	25 V	50 V						
0.22 pF		0.3 ±0.03	0.3 ±0.03	0.3 ±0.03												
0.47 pF																
0.56 pF					0.5 ±0.05	0.5 ±0.05	0.5 ±0.05	0.8 ±0.1	0.8 ±0.1	0.8 ±0.1						
0.68 pF																
0.82 pF																
1 pF																
1.2 pF																
1.5 pF																
1.8 pF																
2.2 pF																
2.7 pF																
3.3 pF																
3.9 pF																
4.7 pF																
5.6 pF																
6.8 pF																
8.2 pF																
10 pF	0.2 ±0.02	0.3 ±0.03	0.3 ±0.03	0.3 ±0.03												
12 pF																
15 pF																
18 pF																
22 pF																
27 pF																
33 pF																
39 pF																
47 pF																
56 pF																
68 pF																
82 pF																
100 pF																
120 pF																
150 pF																
180 pF																
220 pF																
270 pF																
330 pF																
390 pF																
470 pF																
560 pF																
680 pF																
820 pF																
1000 pF				0.5 ±0.05	0.5 ±0.05	0.5 ±0.05										
Tape width	8 mm															

**Note:** Values in shaded cells indicate thickness class (unit: mm)



# MLCC Selection Charts

## NPO - General purpose 16 to 50V, 01005 to 0603

NPO										
General purpose										
Capacitance	01005	0201			0402			0603		
	16 V	16 V	25 V	50 V	16 V	25 V	50 V	16 V	25 V	50 V
1.2 nF								0.8 ±0.1	0.8 ±0.1	0.8 ±0.1
1.5 nF										
1.8 nF										
2.2 nF										
2.7 nF										
3.3 nF										
3.9 nF										
4.7 nF										
5.6 nF										
6.8 nF										
8.2 nF										
10 nF										
12 nF										
15 nF										
18 nF										
22 nF										
33 nF										
39 nF										
Tape width	8 mm									

**Note:** Values in shaded cells indicate thickness class (unit: mm)





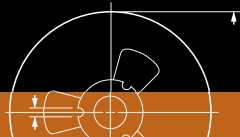
# MLCC Selection Charts

NPO - General purpose 16 to 50V, 0805 to 1812

NPO									
General purpose									
Capacitance	0805			1206			1210	1210	1812
	16 V	25 V	50 V	16 V	25 V	50 V	25 V	50 V	50 V
0.22 pF									
0.47 pF									
0.56 pF									
0.68 pF									
0.82 pF									
1 pF									
1.2 pF									
1.5 pF									
1.8 pF									
2.2 pF									
2.7 pF									
3.3 pF									
3.9 pF									
4.7 pF									
5.6 pF									
6.8 pF									
8.2 pF									
10 pF									
12 pF									
15 pF									
18 pF									
22 pF	0.6 ±0.1	0.6 ±0.1	0.6 ±0.1	0.6 ±0.1	0.6 ±0.1	0.6 ±0.1			
27 pF									
33 pF									
39 pF									
47 pF									
56 pF									
68 pF									
82 pF									
100 pF									
120 pF									
150 pF									
180 pF									
220 pF							1.25 ±0.2	1.25 ±0.2	
270 pF									1.25 ±0.2
330 pF									
390 pF									
470 pF									
560 pF									
680 pF									
820 pF									
1000 pF									
Tape width	8 mm								

Note: Values in shaded cells indicate thickness class (unit: mm)





# MLCC Selection Charts

## NPO - General purpose 16 to 50V, 0805 to 1812

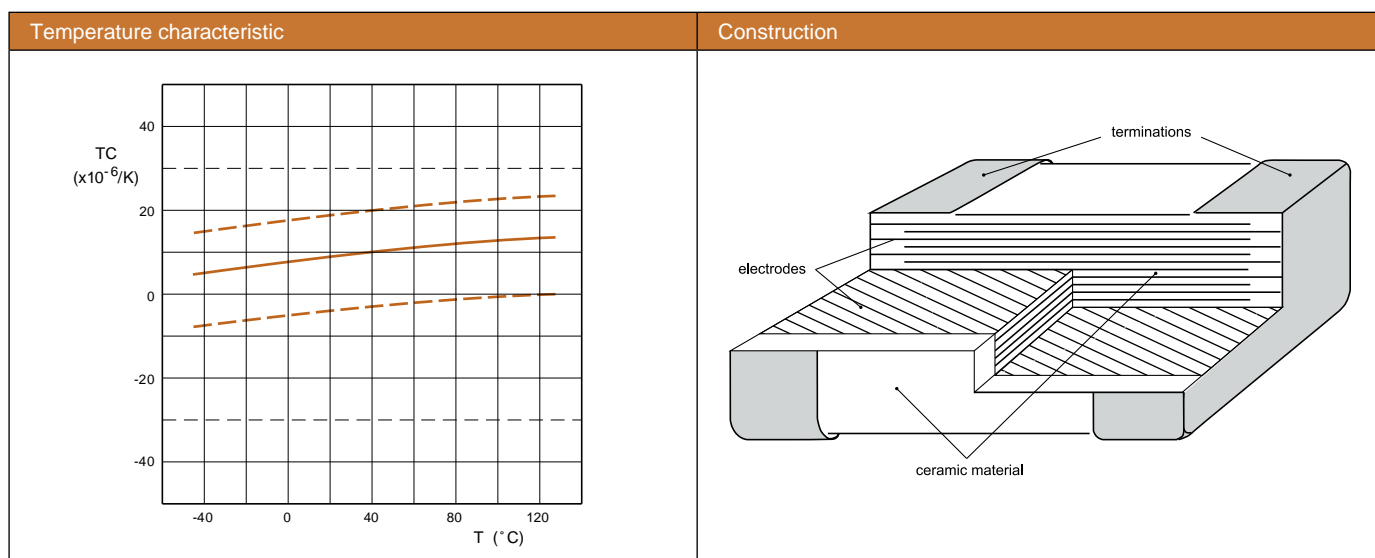
NP0										
General purpose										
Capacitance	0805			1206			1210	1210	1812	
	16 V	25 V	50 V	16 V	25 V	50 V	25 V	50 V	50 V	
1.2 nF	0.85 ±0.1	0.85 ±0.1	0.85 ±0.1	0.6 ±0.1	0.6 ±0.1	0.6 ±0.1	1.25 ±0.2	1.25 ±0.2	1.25 ±0.2	
1.5 nF										
1.8 nF										
2.2 nF										
2.7 nF	1.25 ±0.2	1.25 ±0.2	1.25 ±0.2	0.85 ±0.1	0.85 ±0.1	0.85 ±0.1				
3.3 nF										
3.9 nF										
4.7 nF										
5.6 nF										
6.8 nF										
8.2 nF				1.25 ±0.2	1.25 ±0.2	1.25 ±0.2				
10 nF	1.25 ±0.2	1.25 ±0.2	1.25 ±0.2							
12 nF										
15 nF										
18 nF										
22 nF					2.0 ±0.2	2.0 ±0.2				
33 nF				0.85 ±0.1	0.85 ±0.1	0.85 ±0.1				
39 nF										
47 nF										
56 nF										
68 nF				1.6 ±0.2	1.6 ±0.2	1.6 ±0.2				
82 nF										
100 nF										
Tape width	8 mm									

**Note:** Values in shaded cells indicate thickness class (unit: mm)

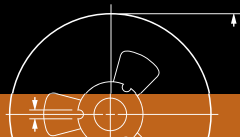


### Features

- Capable of operating at high voltage levels
- For high frequency snubber
- Decoupling / smoothing function



Dimensions							
Discrete capacitors - Medium and High voltage							
	Case size designation		Dimensions in mm				
	Inch-based	Metric	L <sub>1</sub>	W	L <sub>2</sub> / L <sub>3</sub> min	L <sub>2</sub> / L <sub>3</sub> max	L <sub>4</sub> min
	0402	1005M	1.0 ±0.05	0.5 ±0.05	0.15	0.30	0.40
	0603	1608M	1.6 ±0.10	0.8 ±0.10	0.20	0.60	0.40
	0805	2012M	2.0 ±0.20	1.25 ±0.20	0.25	0.75	0.55
	1206	3216M	3.2 ±0.30	1.6 ±0.20	0.25	0.75	1.40
	1210	3225M	3.2 ±0.40	2.5 ±0.30	0.25	0.75	1.40
	1808	4520M	4.5 ±0.40	2.0 ±0.30	0.25	0.75	2.20
	1812	4532M	4.5 ±0.40	3.2 ±0.30	0.25	0.75	2.20



# MLCC Selection Charts

## NPO - Medium voltage, 0402 to 0805

NP0							
Medium voltage							
Capacitance	0402	0603		0805			
	100 V	100 V	250 V	100 V	250 V	500 V	630 V
1 pF	0.5 ±0.05						
1.2 pF							
1.5 pF							
1.8 pF							
2.2 pF							
2.7 pF							
3.3 pF							
3.9 pF							
4.7 pF							
5.6 pF							
6.8 pF							
8.2 pF							
10 pF							
12 pF							
15 pF							
18 pF							
22 pF							
27 pF							
33 pF							
39 pF							
47 pF							
56 pF							
68 pF							
82 pF							
100 pF							
120 pF							
150 pF							
180 pF							
220 pF							
270 pF							
330 pF							
390 pF							
470 pF							
560 pF							
680 pF							
820 pF							
1000 pF							
1.2 nF				0.85 ±0.1			
1.5 nF							
1.8 nF				1.25 ±0.2			
2.2 nF							
2.7 nF							
3.3 nF							
3.9 nF							
4.7 nF							
Tape width	8 mm						

**Note:** Values in shaded cells indicate thickness class (unit: mm)

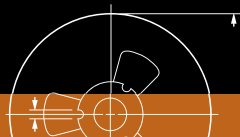


# MLCC Selection Charts

NPO - Medium voltage, 1206 / 1210

NPO								
Medium voltage								
Capacitance	1206				1210			
	100 V	250 V	500 V	630 V	100 V	250 V	500 V	630 V
1 pF								
1.2 pF								
1.5 pF								
1.8 pF								
2.2 pF								
2.7 pF								
3.3 pF								
3.9 pF								
4.7 pF								
5.6 pF								
6.8 pF								
8.2 pF								
10 pF								
12 pF								
15 pF								
18 pF								
22 pF								
27 pF								
33 pF								
39 pF			0.6 ±0.1					
47 pF								
56 pF								
68 pF								
82 pF								
100 pF				1.25 ±0.2				1.25 ±0.2
120 pF								
150 pF								
180 pF								
220 pF					1.25 ±0.2	1.25 ±0.2	1.25 ±0.2	
270 pF								
330 pF								
390 pF								
470 pF								
560 pF								
680 pF								
820 pF								
1000 pF		0.85 ±0.1	0.85 ±0.1					
1.2 nF								
1.5 nF								
1.8 nF	0.6 ±0.1		1.25 ±0.2					
2.2 nF		1.25 ±0.2				1.25 ±0.2	1.25 ±0.2	
2.7 nF								
3.3 nF					1.25 ±0.2			
3.9 nF								
4.7 nF	0.85 ±0.1							
5.6 nF								
6.8 nF								
8.2 nF								
10 nF	1.25 ±0.2							
Tape width	8 mm							

Note: Values in shaded cells indicate thickness class (unit: mm)



# MLCC Selection Charts

## NPO - High voltage, 0805 to 1210

NP0							
High voltage							
Capacitance	0805	1206		1210			
	1000 V	1000 V	2000 V	1000 V	2000 V		
10 pF	0.85 ±0.1						
12 pF							
15 pF							
18 pF							
22 pF							
27 pF							
33 pF				1.25 ±0.2	1.25 ±0.2	1.25 ±0.2	1.25 ±0.2
39 pF							
47 pF							
56 pF							
68 pF							
82 pF							
100 pF							
120 pF							
150 pF							
180 pF							
220 pF							
270 pF							
330 pF							
390 pF							
470 pF							
560 pF							
680 pF							
820 pF							
1000 pF							
1.2 nF							
1.5 nF							
1.8 nF							
2.2 nF							
2.7 nF							
3.3 nF							
3.9 nF							
4.7 nF							
5.6 nF							
6.8 nF							
8.2 nF							
10 nF							
12 nF							
15 nF							
18 nF							
22 nF							
33 nF							
Tape width	8 mm						

**Note:** Values in shaded cells indicate thickness class (unit: mm)

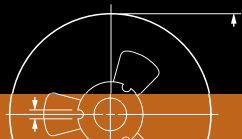


# MLCC Selection Charts

NPO - High voltage, 1808 / 1812

NPO						
High voltage						
Capacitance	1808			1812		
	1000 V	2000 V	3000 V	1000 V	2000 V	3000 V
10 pF			1.6 ±0.2	1.25 ±0.2	1.25 ±0.2	1.25 ±0.2
12 pF						
15 pF						
18 pF						
22 pF						
27 pF						
33 pF	1.25 ±0.2	1.25 ±0.2				
39 pF						
47 pF						
56 pF						
68 pF						
82 pF						
100 pF						
120 pF						
150 pF						
180 pF		2.0 ±0.2				
220 pF						
270 pF						
330 pF						
390 pF						
470 pF						
560 pF						
680 pF						
820 pF						
1000 pF	1.25 ±0.2					
1.2 nF						
1.5 nF						
1.8 nF						
2.2 nF						
2.7 nF						
3.3 nF						
3.9 nF						
4.7 nF						
5.6 nF						
6.8 nF						
8.2 nF						
10 nF						
12 nF						
15 nF						
18 nF						
22 nF						
33 nF						
Tape width	12 mm					

Note: Values in shaded cells indicate thickness class (unit: mm)



# MLCC Selection Charts

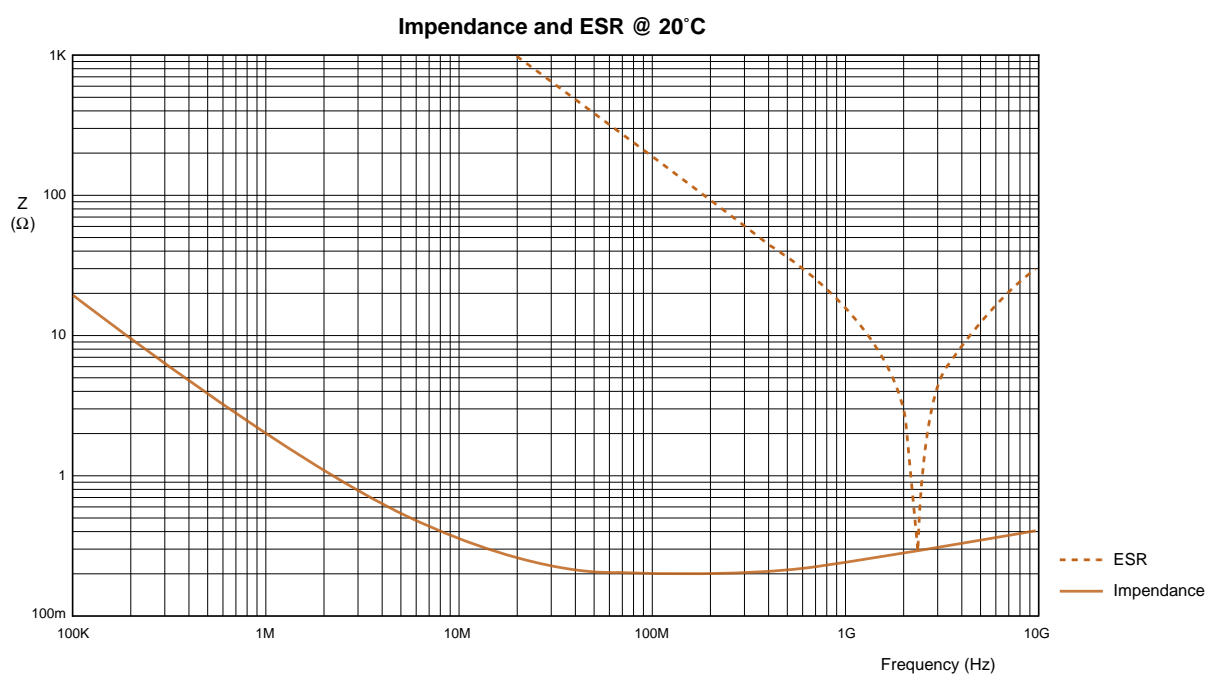
**NP0 - High frequency, 01005 to 0805**



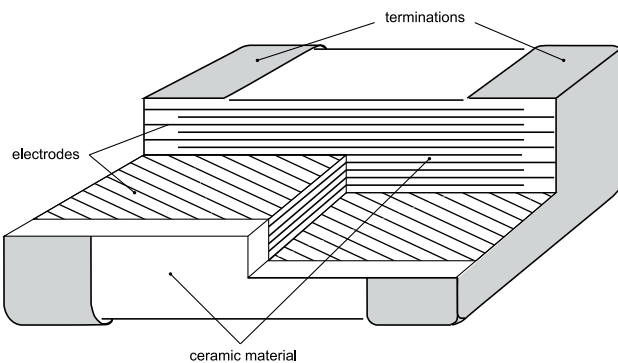
## Features

- Lowest ESR in high frequency
- Ultra small
- Noise filtering

## ESR characteristic



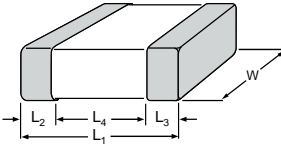
## Construction





# MLCC Selection Charts

**NP0 - High frequency, 01005 to 0805**

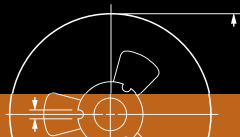
Case dimensions							
Discrete capacitors - High Frequency							
	Case size designation		Dimensions in mm				
	Inch-based	Metric	L <sub>1</sub>	W	L <sub>2</sub> / L <sub>3</sub> min	L <sub>2</sub> / L <sub>3</sub> max	L <sub>4</sub> min
	01005	0402M	0.4 ±0.02	0.2 ±0.02	0.07	0.14	0.13
	0201	0603M	0.6 ±0.03	0.3 ±0.03	0.10	0.20	0.20
	0402	1005M	1.0 ±0.05	0.5 ±0.05	0.15	0.30	0.40
	0603	1608M	1.6 ±0.10	0.8 ±0.10	0.20	0.60	0.40
	0805	2012M	2.0 ±0.10	1.25 ±0.10	0.25	0.75	0.55

NP0						
High frequency						
Capacitance	01005	0201		0402		
	16 V	16 V	25 V	16 V	25 V	50 V
0.2 pF						
0.3 pF						
0.4 pF						
0.5 pF						
0.6 pF						
0.7 pF						
0.8 pF						
0.9 pF						
1 pF						
1.2 pF						
1.5 pF	0.2 ±0.02	0.3 ±0.03	0.3 ±0.03			
1.8 pF						
2.2 pF						
2.7 pF				0.5 ±0.05	0.5 ±0.05	0.5 ±0.05
3.3 pF						
3.9 pF						
4.7 pF						
5.6 pF						
6.8 pF						
8.2 pF						
10 pF						
12 pF						
15 pF						
18 pF						
22 pF						
27 pF						
33 pF						
39 pF						
47 pF						
Tape width	8 mm					

**Note:** Values in shaded cells indicate thickness class (unit: mm)

NP0						
High frequency						
Capacitance	0603			0805		
	50 V	100 V	250 V	50 V	100 V	250 V
0.22 pF						
0.47 pF						
0.56 pF						
0.68 pF						
0.82 pF						
1 pF						
1.2 pF						
1.5 pF						
1.8 pF						
2.2 pF						
2.7 pF						
3.3 pF						
3.9 pF	0.8 ±0.1	0.8 ±0.1	0.8 ±0.1			
4.7 pF						
5.6 pF				0.6 ±0.1	0.6 ±0.1	0.6 ±0.1
6.8 pF						
8.2 pF						
10 pF						
12 pF						
15 pF						
18 pF						
22 pF						
27 pF						
33 pF						
39 pF						
47 pF						
56 pF						
68 pF						
82 pF						
100 pF						
Tape width	8 mm					

**Note:** Values in shaded cells indicate thickness class (unit: mm)



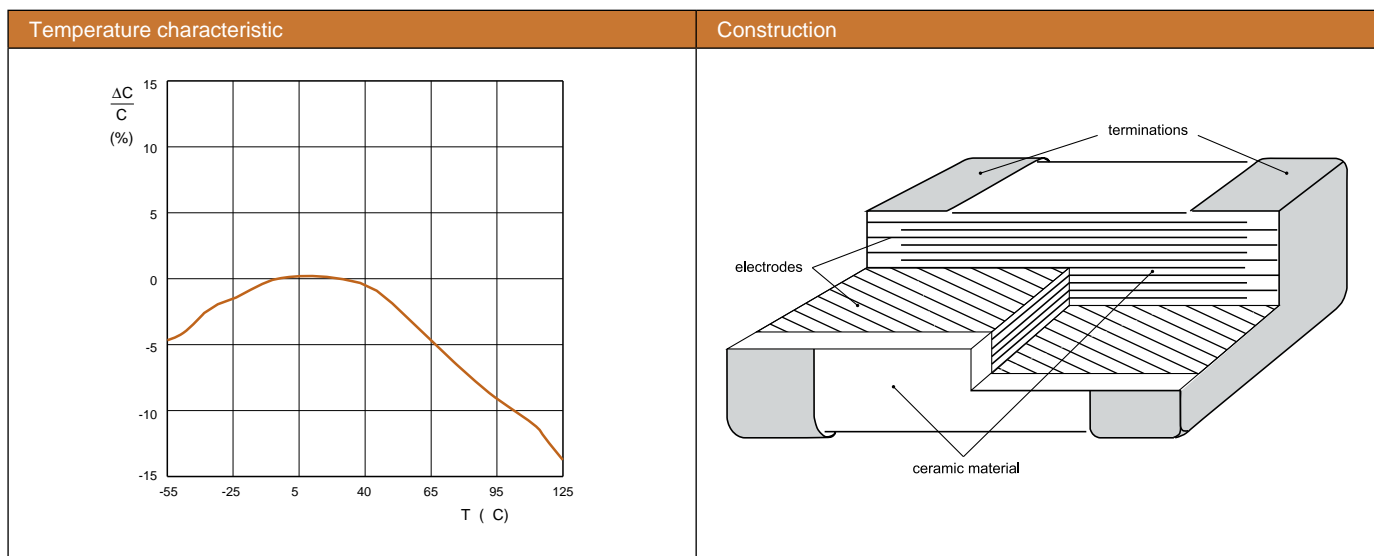
# MLCC Selection Charts

## X7R - General purpose & High capacitance, 01005 to 2220



### Features

- Semi-stable on capacitance and high K
- High volumetric efficiency
- Highly reliable in high temperature application
- High insulation resistance



Case dimensions							
Discrete capacitors - General purpose & High capacitance							
	Case size designation		Dimensions in mm				
	Inch-based	Metric	L <sub>1</sub>	W	L <sub>2</sub> / L <sub>3</sub> min	L <sub>2</sub> / L <sub>3</sub> max	L <sub>4</sub> min
	01005	0402M	0.4±0.02	0.2±0.02	0.07	0.14	0.14
	0201	0603M	0.6 ±0.03	0.3 ±0.03	0.10	0.20	0.20
			0.6 ±0.05	0.3 ±0.05	0.10	0.20	0.20
	0402	1005M	1.0 ±0.05 <sup>(1)</sup>	0.5 ±0.05 <sup>(1)</sup>	0.15	0.30	0.40
			1.0 ±0.20 <sup>(2)</sup>	0.5 ±0.20 <sup>(2)</sup>	0.15	0.30	0.40
	0603	1608M	1.6 ±0.10 <sup>(1)</sup>	0.8 ±0.10 <sup>(1)</sup>	0.20	0.60	0.40
			1.6 ±0.15 <sup>(2)</sup>	0.8 ±0.15 <sup>(2)</sup>	0.20	0.60	0.40
	0805	2012M	2.0 ±0.10 <sup>(1)</sup>	1.25 ±0.10 <sup>(1)</sup>	0.25	0.75	0.55
			2.0 ±0.20 <sup>(2)</sup>	1.25 ±0.20 <sup>(2)</sup>	0.25	0.75	0.55
	1206	3216M	3.2 ±0.15 <sup>(1)</sup>	1.6 ±0.15 <sup>(1)</sup>	0.25	0.75	1.40
			3.2 ±0.30 <sup>(2)</sup>	1.6 ±0.20 <sup>(2)</sup>	0.25	0.75	1.40
	1210	3225M	3.2 ±0.20 <sup>(1)</sup>	2.5 ±0.20 <sup>(1)</sup>	0.25	0.75	1.40
			3.2 ±0.40 <sup>(2)</sup>	2.5 ±0.30 <sup>(2)</sup>	0.25	0.75	1.40
	1808	4520M	4.5 ±0.40	2.0 ±0.30	0.25	0.75	2.20
	1812	4532M	4.5 ±0.20 <sup>(1)</sup>	3.2 ±0.20 <sup>(1)</sup>	0.25	0.75	2.20
			4.5 ±0.40 <sup>(2)</sup>	3.2 ±0.40 <sup>(2)</sup>	0.25	0.75	2.20
	2220	5750M	5.7 ±0.40	5.0 ±0.30	0.25	0.75	3.40

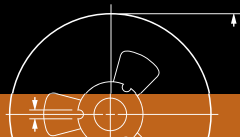
Note: 1. Dimension for size 0402, C < 4.7 μF; 0603, C < 10 μF; 0805 to 1812, C ≤ 100 nF  
 2. Dimension for size 0402, C ≥ 4.7 μF; 0603, C ≥ 10 μF; 0805 to 1812, C > 100 nF

# MLCC Selection Charts

## X7R - General purpose & High Capacitance , 01005 to 0402

X7R												
General purpose												
Capacitance	01005		0201					0402				
	6.3 V	10 V	6.3 V	10 V	16 V	25 V	50 V	6.3 V	10 V	16 V	25 V	50 V
10 pF												
15 pF												
22 pF												
33 pF												
47 pF												
68 pF												
100 pF												
150 pF												
220 pF												
330 pF	0.2 ±0.02	0.2 ±0.02					0.3 ±0.03					
470 pF												
680 pF			0.3 ±0.03	0.3 ±0.03	0.3 ±0.03	0.3 ±0.03						
1.0 nF												
1.5 nF												
2.2 nF												
3.3 nF								0.5 ±0.05	0.5 ±0.05	0.5 ±0.05	0.5 ±0.05	0.5 ±0.05
4.7 nF												
6.8 nF												
10 nF												
15 nF												
22 nF												
33 nF												
47 nF												
68 nF												
100 nF												
150 nF												
220 nF								0.5 ±0.05	0.5 ±0.05	0.5 ±0.05		
330 nF												
470 nF								0.5 ±0.05	0.5 ±0.05			
680 nF												
1000 nF								0.5 ±0.05				
2.2 µF												
4.7 µF												
10 µF												
22 µF												
47 µF												
100 µF												
Tape width			8 mm									

**Note:** Values in shaded cells indicate thickness class (unit: mm)



# MLCC Selection Charts

## X7R - General purpose & High capacitance, 0603 / 0805

X7R										
General purpose										
Capacitance	0603					0805				
	6.3 V	10 V	16 V	25 V	50 V	6.3 V	10 V	16 V	25 V	50 V
10 pF										
15 pF										
22 pF										
33 pF										
47 pF										
68 pF										
100 pF										
150 pF										
220 pF										
330 pF										
470 pF										
680 pF										
1.0 nF										
1.5 nF										
2.2 nF						0.6 ±0.1	0.6 ±0.1	0.6 ±0.1	0.6 ±0.1	0.6 ±0.1
3.3 nF										
4.7 nF				0.8 ±0.1	0.8 ±0.1					
6.8 nF										
10 nF	0.8 ±0.1	0.8 ±0.1	0.8 ±0.1							
15 nF										
22 nF										
33 nF										
47 nF										
68 nF						0.85 ±0.1	0.85 ±0.1	0.85 ±0.1	0.85 ±0.1	0.85 ±0.1
100 nF										
150 nF										
220 nF										
330 nF										
470 nF				0.8 ±0.1						
680 nF										
1000 nF				0.8 ±0.1	0.8 ±0.15	1.25 ±0.2	1.25 ±0.2	1.25 ±0.2	1.25 ±0.2	1.25 ±0.2
2.2 µF										
4.7 µF										
10 µF										
22 µF										
47 µF										
100 µF										
Tape width	8 mm									

**Note:** Values in shaded cells indicate thickness class (unit: mm)

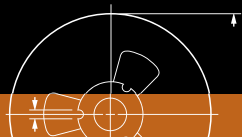


# MLCC Selection Charts

## X7R - General purpose & High capacitance, 1206 to 2220

X7R												
General purpose												
Capacitance	1206					1210					1812	2220
	6.3 V	10 V	16 V	25 V	50 V	6.3 V	10 V	16 V	25 V	50 V	50 V	50 V
10 pF												
15 pF												
22 pF												
33 pF												
47 pF												
68 pF												
100 pF												
150 pF												
220 pF												
330 pF												
470 pF												
680 pF												
1.0 nF												
1.5 nF												
2.2 nF												
3.3 nF												
4.7 nF					0.85 ±0.1							
6.8 nF												
10 nF	0.85 ±0.1	0.85 ±0.1	0.85 ±0.1	0.85 ±0.1								
15 nF										0.85 ±0.1	0.85 ±0.1	
22 nF						0.85 ±0.1	0.85 ±0.1	0.85 ±0.1	0.85 ±0.1			
33 nF												
47 nF												
68 nF												
100 nF												
150 nF					1.15 ±0.1					1.15 ±0.1	1.15 ±0.1	
220 nF					0.85 ±0.1							
330 nF					1.0 ±0.1							
470 nF						1.15 ±0.1	1.15 ±0.1	1.15 ±0.1	1.15 ±0.1	1.25 ±0.2	1.6 ±0.2	0.85 ±0.1
680 nF												
1000 nF	1.15 ±0.1	1.15 ±0.1	1.15 ±0.1	1.15 ±0.1		1.25 ±0.2	1.25 ±0.2	1.25 ±0.2	1.25 ±0.2			1.15 ±0.1
2.2 µF					1.6 ±0.2					1.9 ±0.2		
4.7 µF						1.9 ±0.2	1.9 ±0.2	1.9 ±0.2	1.9 ±0.2			
10 µF	1.6 ±0.2	1.6 ±0.2	1.6 ±0.2	1.6 ±0.2						2.5 ±0.2		
22 µF						2.5 ±0.2	2.5 ±0.2	2.5 ±0.2	2.5 ±0.2			
47 µF												
100 µF												
Tape width	8 mm											

**Note:** Values in shaded cells indicate thickness class (unit: mm)



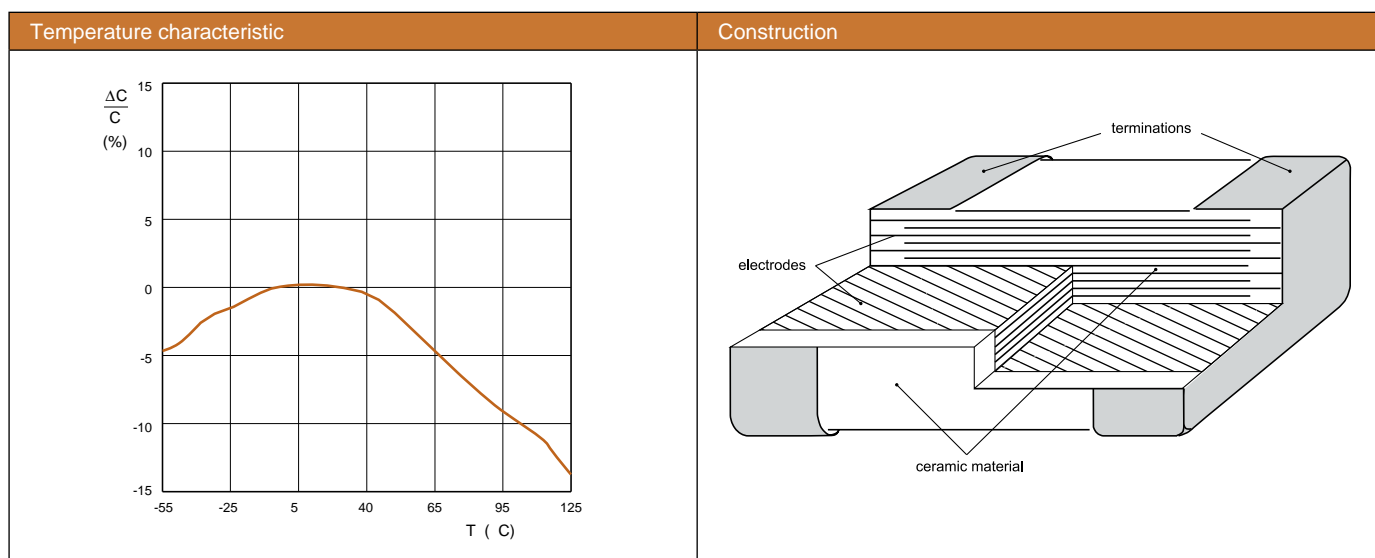
# MLCC Selection Charts

## X7R - Medium & High voltage, 0402 to 1812



### Features

- Capable of operating at high voltage levels
- For high frequency snubber
- Decoupling / smoothing function



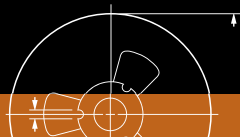
Dimensions							
Discrete capacitors - Medium and High voltage							
	Case size designation		Dimensions in mm				
	Inch-based	Metric	L <sub>1</sub>	W	L <sub>2</sub> / L <sub>3</sub> min	L <sub>2</sub> / L <sub>3</sub> max	L <sub>4</sub> min
	0402	1005M	1.0 ±0.05	0.5 ±0.05	0.15	0.30	0.40
	0603	1608M	1.6 ±0.10	0.8 ±0.10	0.20	0.60	0.40
	0805	2012M	2.0 ±0.20	1.25 ±0.20	0.25	0.75	0.55
	1206	3216M	3.2 ±0.30	1.6 ±0.20	0.25	0.75	1.40
	1210	3225M	3.2 ±0.40	2.5 ±0.30	0.25	0.75	1.40
	1808	4520M	4.5 ±0.40	2.0 ±0.30	0.25	0.75	2.20
	1812	4532M	4.5 ±0.40	3.2 ±0.30	0.25	0.75	2.20

# MLCC Selection Charts

## X7R - Medium and High voltage, 0402 to 0805

X7R								
Medium voltage & High voltage								
Capacitance	0402	0603		0805				
	100 V	100 V	250 V	100 V	250 V	500 V	630 V	1000 V
100 pF	0.5 ±0.05	0.8 ±0.1						
150 pF								
220 pF								
330 pF			0.8 ±0.1	0.6 ±0.1	0.85 ±0.1	0.85 ±0.1	0.85 ±0.1	0.85 ±0.1
470 pF								
680 pF								
1.0 nF								
1.5 nF								
2.2 nF								
3.3 nF		0.8 ±0.1						
4.7 nF								
6.8 nF					1.25 ±0.2	1.25 ±0.2	1.25 ±0.2	
10 nF								
15 nF				0.85 ±0.1		1.25 ±0.2		
22 nF								
33 nF				1.25 ±0.2				
47 nF								
68 nF								
100 nF								
150 nF								
220 nF								
330 nF								
470 nF								
680 nF								
1000 nF								
2.2 µF								
4.7 µF								
10 µF								
22 µF								
47 µF								
100 µF								
Tape width	12 mm							

**Note:** Values in shaded cells indicate thickness class (unit: mm)



# MLCC Selection Charts

## X7R - Medium and High voltage, 1206 / 1210

X7R												
Medium voltage & High voltage												
Capacitance	1206						1210					
	100 V	250 V	500 V	630 V	1000 V	2000 V	100 V	250 V	500 V	630 V	1000 V	2000 V
100 pF												
150 pF												
220 pF												
330 pF												
470 pF						1.25 ±0.2						
680 pF												
1.0 nF												
1.5 nF		0.85 ±0.1		1.25 ±0.2	1.25 ±0.2							
2.2 nF			1.25 ±0.2									
3.3 nF	0.85 ±0.1										1.25 ±0.2	1.25 ±0.2
4.7 nF								0.85 ±0.1		1.25 ±0.2		
6.8 nF									1.25 ±0.2			
10 nF												
15 nF							0.85 ±0.1					
22 nF		1.25 ±0.2	1.6 ±0.2	1.6 ±0.2						1.6 ±0.2	1.6 ±0.2	1.6 ±0.2
33 nF												
47 nF												
68 nF								1.25 ±0.2				
100 nF	1.25 ±0.2	1.6 ±0.2										
150 nF							1.25 ±0.2					
220 nF												
330 nF	1.6 ±0.2						1.6 ±0.2					
470 nF							1.25 ±0.2					
680 nF												
1000 nF	1.6 ±0.2						2.0 ±0.2					
2.2 µF												
4.7 µF												
10 µF												
22 µF												
47 µF												
100 µF												
Tape width	12 mm											

**Note:** Values in shaded cells indicate thickness class (unit: mm)

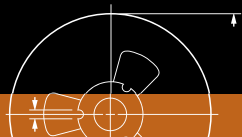


# MLCC Selection Charts

## X7R - Medium and High voltage, 1808 / 1812

X7R										
Medium voltage & High voltage										
Capacitance	1808			1812						
	1000 V	2000 V	3000 V	100 V	250 V	500 V	630 V	1000 V	2000 V	3000 V
100 pF										
150 pF										
220 pF										
330 pF			1.6 ±0.2							
470 pF										
680 pF		1.35 ±0.2								
1.0 nF			2.0 ±0.2							1.6 ±0.2
1.5 nF	1.35 ±0.2									
2.2 nF		1.6 ±0.2							1.35 ±0.2	
3.3 nF										
4.7 nF								1.35 ±0.2		
6.8 nF	1.6 ±0.2						1.25 ±0.2		1.6 ±0.2	
10 nF					0.85 ±0.1	1.25 ±0.2			2.0 ±0.2	
15 nF				0.85 ±0.1						
22 nF								1.6 ±0.2		
33 nF										
47 nF										
68 nF										
100 nF					1.25 ±0.2	1.6 ±0.2				
150 nF										
220 nF				1.25 ±0.2						
330 nF					1.6 ±0.2					
470 nF										
680 nF				1.6 ±0.2						
1000 nF										
2.2 µF										
4.7 µF										
10 µF										
22 µF										
47 µF										
100 µF										
Tape width	12 mm									

**Note:** Values in shaded cells indicate thickness class (unit: mm)



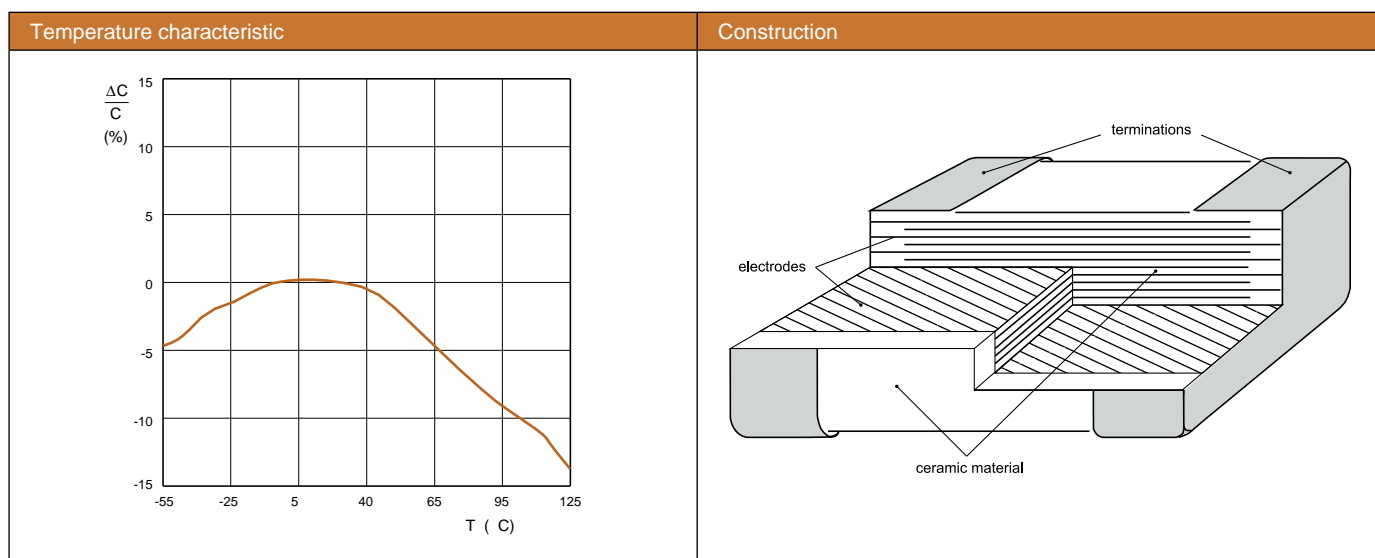
# MLCC Selection Charts

X7R / X5R - Low inductance, 0306 to 0612



## Features

- Good solution for anti resonance reduction with controlled ESR
- Suitable for high speed IC decoupling due to low inductance type



Dimensions								
Discrete capacitors - Low inductance types only								
	Case size designation		Dimensions in mm					
	Inch-based	Metric	L <sub>1</sub>	W	T	L <sub>2</sub> / L <sub>3</sub> min	L <sub>2</sub> / L <sub>3</sub> max	L <sub>4</sub> min
	0306	0816M	0.8 ±0.15	1.6 ±0.20	0.50 ±0.10	0.10	0.30	0.20
	0508	1220M	1.25 ±0.20	2.0 ±0.20	0.85 ±0.10	0.13	0.46	0.38
	0612	1632M	1.6 ±0.20	3.2 ±0.20	0.85 ±0.10	0.13	0.46	0.50

# MLCC Selection Charts

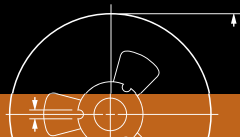
## X7R / X5R - Low inductance, 0306 to 0612

X7R							
Low Inductance series							
Capacitance	0306	0508			0612		
	10 V	10 V	16 V	25 V	16 V	25 V	50 V
10 nF				0.85 ±0.1	0.85 ±0.1	0.85 ±0.1	0.85 ±0.1
22 nF							
47 nF							
100 nF	0.5 ±0.1		0.85 ±0.1		0.85 ±0.1	1.15 ±0.1	1.15 ±0.1
220 nF							
470 nF		0.85 ±0.1					
1000 nF					1.15 ±0.1		
Tape width	8 mm						

**Note:** Values in shaded cells indicate thickness class (unit: mm)

X5R			
Low Inductance series			
Capacitance	0306		
	6.3 V	10 V	16 V
100 nF			
220 nF			
470 nF			0.5±0.1
1000 nF	0.5±0.1	0.5±0.1	
Tape width	8 mm		

**Note:** Values in shaded cells indicate thickness class (unit: mm)



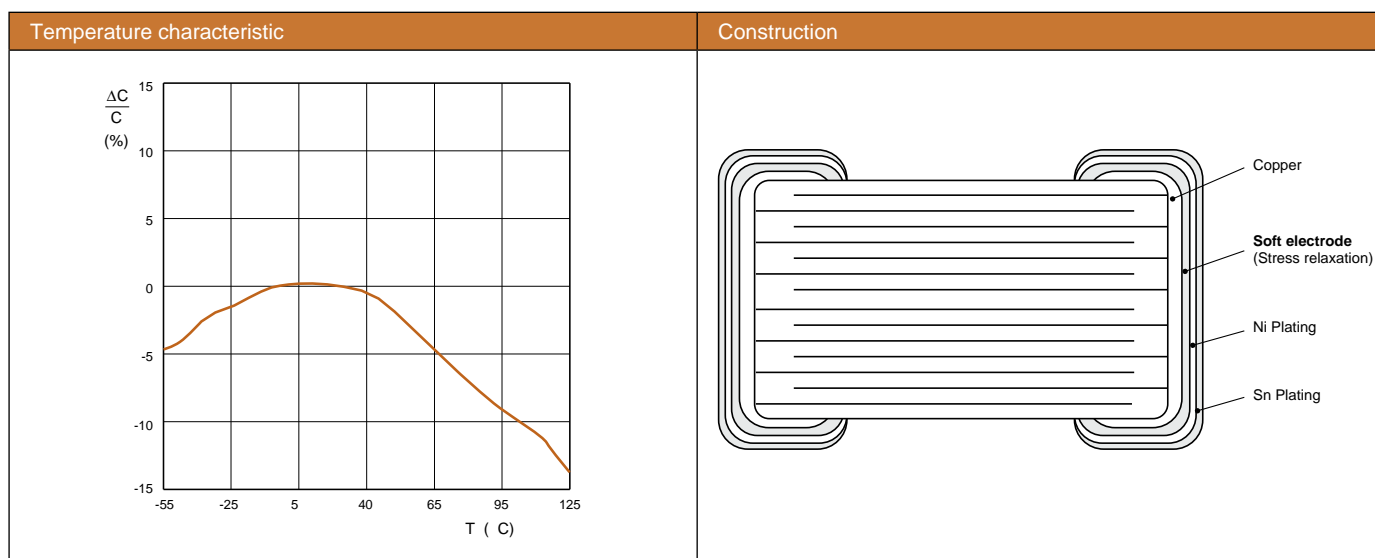
# MLCC Selection Charts

## X7R - Soft termination, 0603 to 1812



### Features

- Flexible termination system
- Improved resistance to thermal stresses
- Increased mechanical performance



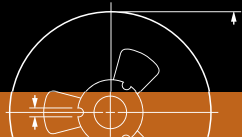
Dimensions							
Discrete capacitors - Soft termination							
	Case size designation		Dimensions in mm				
	Inch-based	Metric	L1	W	L2 / L3 min	L2 / L3 max	L4 min
	0603	1608M	1.6 ±0.20	0.8 ±0.15	0.20	0.50	0.40
	0805	2012M	2.0 ±0.30	1.25 ±0.20	0.25	0.75	0.55
	1206	3216M	3.2 ±0.40	1.6 ±0.20	0.25	0.85	1.40
	1210	3225M	3.2 ±0.40	2.5 ±0.30	0.25	0.85	1.40
	1812	4532M	4.5 ±0.40	3.2 ±0.20	0.25	0.85	2.20

# MLCC Selection Charts

X7R - Soft termination, 0603 / 0805

X7R															
Soft termination															
Capacitance	0603					0805									
	16 V	25 V	50 V	100 V	250 V	50 V	100 V	250 V	500 V	630 V	1000 V				
100 pF	0.8 ±0.15	0.8 ±0.15	0.8 ±0.15	0.8 ±0.15											
150 pF															
180 pF					0.8 ±0.15	0.6 ±0.15	0.6 ±0.15	0.85 ±0.15	0.85 ±0.15	0.85 ±0.15	0.85 ±0.15				
220 pF															
330 pF															
390 pF															
470 pF															
680 pF															
1.0 nF				0.8 ±0.15											
1.5 nF															
2.2 nF			0.8 ±0.15												
3.3 nF															
4.7 nF															
6.8 nF															
10 nF															
15 nF								1.25 ±0.2							
18 nF															
22 nF						0.85 ±0.15	0.85 ±0.15								
27 nF															
33 nF					1.25 ±0.2	1.25 ±0.2									
47 nF															
68 nF															
100 nF															
150 nF															
220 nF															
330 nF															
470 nF															
680 nF															
1000 nF															
2.2 μF															
4.7 μF															
10 μF															
22 μF															
47 μF															
100 μF															
Tape width	12 mm														

**Note:** Values in shaded cells indicate thickness class (unit: mm)



# MLCC Selection Charts

## X7R - Soft termination, 1206

X7R									
Soft termination									
Capaci- tance	1206								
	16 V	25 V	50 V	100 V	250 V	500 V	630 V	1000 V	2000 V
100 pF									
150 pF									
180 pF									
220 pF	0.85 ±0.15	0.85 ±0.15	0.85 ±0.15	0.85 ±0.15	0.85 ±0.15	1.25 ±0.2	1.25 ±0.2	1.25 ±0.2	1.25 ±0.2
330 pF									
390 pF									
470 pF									
680 pF									
1.0 nF									
1.5 nF									
2.2 nF									
3.3 nF									
4.7 nF									
6.8 nF									
10 nF									
15 nF									
18 nF									
22 nF									
27 nF									
33 nF									
47 nF									
68 nF									
100 nF									
150 nF									
220 nF									
330 nF									
470 nF									
680 nF									
1000 nF									
2.2 µF									
4.7 µF									
10 µF									
22 µF									
47 µF									
100 µF									
Tape width	12 mm								

**Note:** Values in shaded cells indicate thickness class (unit: mm)



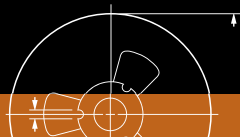
# MLCC Selection Charts

X7R - Soft termination, 1210/ 1812

X7R										
Soft termination										
Capacitance	1210					1812				
	16 V	25 V	50 V	100 V	250 V	50 V	100 V	250 V	500 V	630 V
100 pF										
150 pF										
180 pF										
220 pF										
330 pF										
390 pF										
470 pF										
680 pF										
1.0 nF										
1.5 nF										
2.2 nF										
3.3 nF										
4.7 nF										1.25 ±0.2
6.8 nF										
10 nF			0.85 ±0.15	0.85 ±0.15	0.85 ±0.15	0.85 ±0.15	0.85 ±0.15	1.6 ±0.2	1.25 ±0.2	
15 nF	0.85 ±0.15	0.85 ±0.15								
18 nF										
22 nF										
27 nF										
33 nF								1.25 ±0.2	1.6 ±0.2	
47 nF			1.15 ±0.2	1.25 ±0.2	1.25 ±0.2	1.25 ±0.2	1.25 ±0.2	1.6 ±0.2		
68 nF										
100 nF										
150 nF	1.15 ±0.2	1.15 ±0.2					1.6 ±0.2			
220 nF						1.6 ±0.2				
330 nF										
470 nF										
680 nF										
1000 nF										
2.2 µF										
4.7 µF										
10 µF										
22 µF										
47 µF										
100 µF										
Tape width	12mm									

**Note:** Values in shaded cells indicate thickness class (unit: mm)





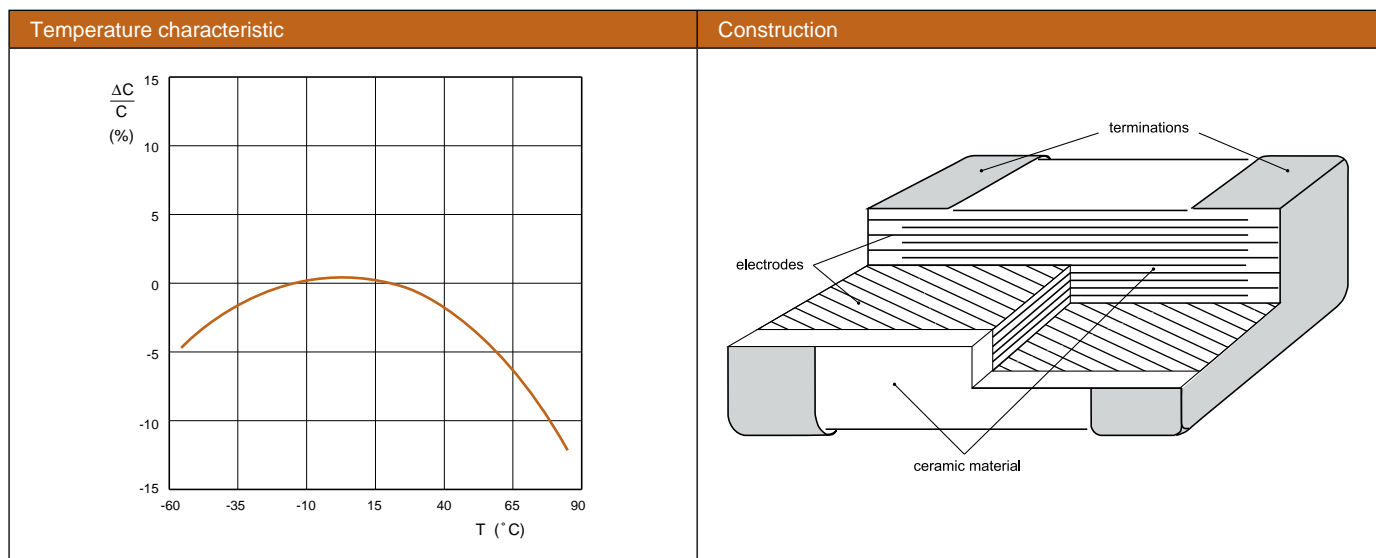
# MLCC Selection Charts

## X5R - General purpose & High capacitance, 01005 to 1812



### Features

- Semi-stable on capacitance and high K
- High volumetric efficiency
- Highly reliable in high temperature application
- High insulation resistance



Case dimensions							
Discrete capacitors - General purpose & High capacitance							
	Case size designation		Dimensions in mm				
	Inch-based	Metric	L <sub>1</sub>	W	L <sub>2</sub> / L <sub>3</sub> min	L <sub>2</sub> / L <sub>3</sub> max	L <sub>4</sub> min
		01005	0.4±0.02	0.2±0.02	0.07	0.14	0.14
		0201	0.6 ±0.03 <sup>(1)</sup>	0.3 ±0.03 <sup>(1)</sup>	0.10	0.20	0.20
			0.6 ±0.05 <sup>(2)</sup>	0.3 ±0.05 <sup>(2)</sup>	0.10	0.20	0.20
		0402	1.0 ±0.05 <sup>(1)</sup>	0.5 ±0.05 <sup>(1)</sup>	0.15	0.30	0.40
			1.0 ±0.20 <sup>(2)</sup>	0.5 ±0.20 <sup>(2)</sup>	0.15	0.30	0.40
		0603	1.6 ±0.10 <sup>(1)</sup>	0.8 ±0.10 <sup>(1)</sup>	0.20	0.60	0.40
			1.6 ±0.20 <sup>(2)</sup>	0.8 ±0.20 <sup>(2)</sup>	0.20	0.60	0.40
		0805	2.0 ±0.10 <sup>(1)</sup>	1.25 ±0.10 <sup>(1)</sup>	0.25	0.75	0.55
			2.0 ±0.20 <sup>(2)</sup>	1.25 ±0.20 <sup>(2)</sup>	0.25	0.75	0.55
		1206	3.2 ±0.15 <sup>(1)</sup>	1.6 ±0.15 <sup>(1)</sup>	0.25	0.75	1.40
			3.2 ±0.30 <sup>(2)</sup>	1.6 ±0.20 <sup>(2)</sup>	0.25	0.75	1.40
		1210	3.2 ±0.20 <sup>(1)</sup>	2.5 ±0.20 <sup>(1)</sup>	0.25	0.75	1.40
			3.2 ±0.40 <sup>(2)</sup>	2.5 ±0.30 <sup>(2)</sup>	0.25	0.75	1.40
		1808	4.5 ±0.40	2.0 ±0.30	0.25	0.75	2.20
		1812	4.5 ±0.20 <sup>(1)</sup>	3.2 ±0.20 <sup>(1)</sup>	0.25	0.75	2.20
			4.5 ±0.40 <sup>(2)</sup>	3.2 ±0.40 <sup>(2)</sup>	0.25	0.75	2.20

Note: 1. Dimension for size 0201, C < 1 µF; 0402, C < 4.7 µF; 0603, C < 10 µF; 0805 to 1812, C ≤ 100 nF  
 2. Dimension for size 0201, C ≥ 1 µF; 0402, C ≥ 4.7 µF; 0603, C ≥ 10 µF; 0805 to 1812, C > 100 nF

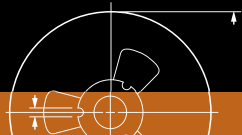


# MLCC Selection Charts

## X5R - General purpose & High capacitance, 01005 to 0402

X5R											
General purpose & High capacitance											
Capacitance	01005	0201					0402				
	6.3 V	6.3 V	10 V	16 V	25 V	50 V	6.3 V	10 V	16 V	25 V	50 V
100 pF	0.2 ±0.02	0.3 ±0.03	0.3 ±0.03	0.3 ±0.03	0.3 ±0.03	0.3 ±0.03	0.5 ±0.05	0.5 ±0.05	0.5 ±0.05	0.5 ±0.05	0.5 ±0.05
150 pF											
220 pF											
330 pF											
470 pF											
680 pF											
1.0 nF											
1.5 nF											
2.2 nF											
3.3 nF											
4.7 nF											
6.8 nF											
10 nF											
15 nF							0.5 ±0.05	0.5 ±0.05	0.5 ±0.05	0.5 ±0.05	0.5 ±0.05
22 nF											
33 nF											
47 nF											
68 nF											
100 nF	0.2 ±0.02	0.3 ±0.03	0.3 ±0.03	0.3 ±0.03	0.3 ±0.03						
150 nF											
220 nF		0.3 ±0.03	0.3 ±0.03							0.5 ±0.05	0.5 ±0.05
330 nF											
470 nF		0.3 ±0.03							0.5 ±0.05	0.5 ±0.05	0.5 ±0.05
680 nF											
1 000 nF		0.3 ±0.05							0.5 ±0.05	0.5 ±0.05	
2.2 µF									0.5 ±0.15		
4.7 µF							0.5 ±0.15	0.5 ±0.15			
10 µF							0.5 ±0.2				
Tape width		8 mm									

Note: Values in shaded cells indicate thickness class (unit: mm)



# MLCC Selection Charts

## X5R - General purpose & High capacitance, 0603 / 0805

X5R										
General purpose & High capacitance										
Capacitance	0603					0805				
	6.3 V	10 V	16 V	25 V	50 V	6.3 V	10 V	16 V	25 V	50 V
100 pF	0.8 ±0.1	0.8 ±0.1	0.8 ±0.1	0.8 ±0.1	0.8 ±0.1					
150 pF										
220 pF										
330 pF										
470 pF										
680 pF										
1.0 nF										
1.5 nF										
2.2 nF						0.6 ±0.1	0.6 ±0.1	0.6 ±0.1	0.6 ±0.1	0.6 ±0.1
3.3 nF										
4.7 nF										
6.8 nF										
10 nF										
15 nF										
22 nF										
33 nF										
47 nF										
68 nF										
100 nF						0.85 ±0.1	0.85 ±0.1	0.85 ±0.1	0.85 ±0.1	0.85 ±0.1
150 nF										
220 nF										
330 nF										
470 nF										
680 nF										
1 000 nF										
2.2 µF						1.25 ±0.2	1.25 ±0.2	1.25 ±0.2	1.25 ±0.2	1.25 ±0.2
4.7 µF			0.8 ±0.15	0.8 ±0.15						
10 µF	0.8 ±0.15	0.8 ±0.2	0.8 ±0.2	0.8 ±0.2						
22 µF	0.8 ±0.2									
47 µF										
100 µF										
Tape width	8 mm									

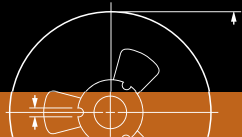
**Note:** Values in shaded cells indicate thickness class (unit: mm)

# MLCC Selection Charts

## X5R - General purpose & High capacitance, 1206

X5R					
General purpose & High capacitance					
Capacitance	1206				
	6.3 V	10 V	16 V	25 V	50 V
100 pF					
150 pF					
220 pF	0.85 ±0.1	0.85 ±0.1	0.85 ±0.1	0.85 ±0.1	0.85 ±0.1
330 pF					
470 pF					
680 pF					
1.0 nF					
1.5 nF					
2.2 nF					
3.3 nF					
4.7 nF					
6.8 nF					
10 nF					
15 nF					
22 nF					
33 nF					
47 nF					
68 nF					
100 nF					
150 nF					1.15 ±0.1
220 nF					1.0 ±0.1
330 nF					
470 nF					
680 nF	1.15 ±0.1	1.15 ±0.1	1.15 ±0.1	1.15 ±0.1	1.6 ±0.2
1 000 nF					
2.2 µF					1.6 ±0.3
4.7 µF	1.6 ±0.2	1.6 ±0.2	1.6 ±0.2	1.6 ±0.2	
10 µF				1.6 ±0.3	
22 µF					
47 µF					
100 µF	1.6 ±0.3				
Tape width	8 mm				

**Note:** Values in shaded cells indicate thickness class (unit: mm)



# MLCC Selection Charts

## X5R - High capacitance, 1210 / 1812

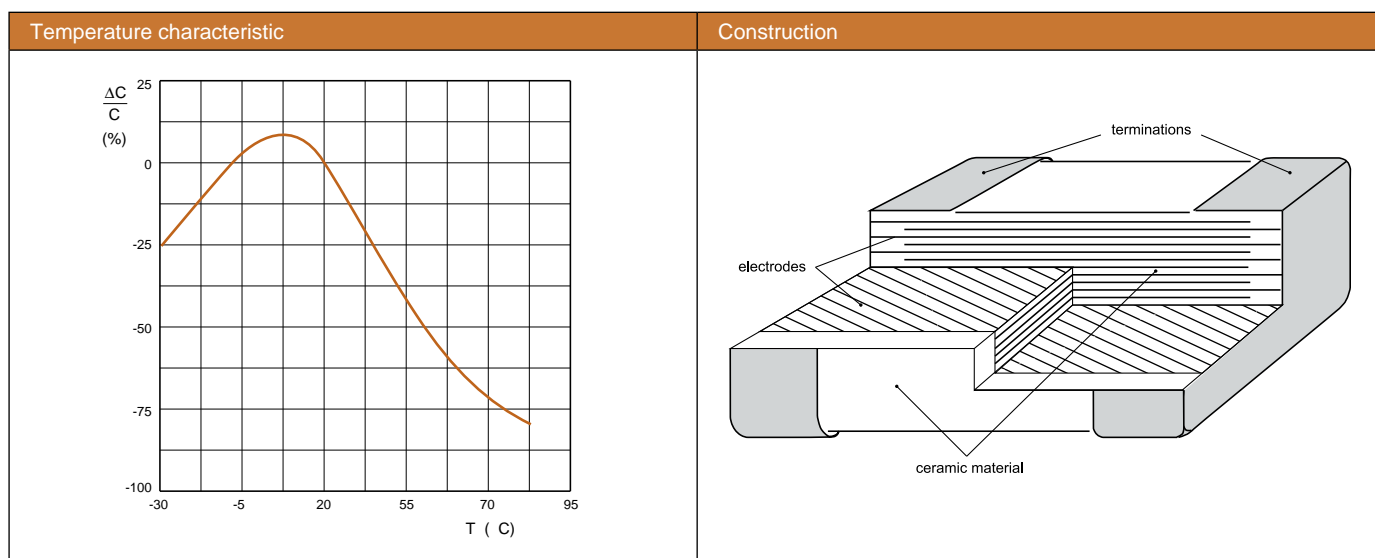
X5R						
General purpose & High capacitance						
Capacitance	1210					1812
	6.3 V	10 V	16 V	25 V	50 V	6.3 V
100 pF						
150 pF						
220 pF						
330 pF						
470 pF						
680 pF						
1.0 nF						
1.5 nF						
2.2 nF	0.85 ±0.1	0.85 ±0.1	0.85 ±0.1	0.85 ±0.1	0.85 ±0.1	
3.3 nF						
4.7 nF						
6.8 nF						
10 nF						
15 nF						
22 nF						
33 nF						
47 nF						
68 nF						
100 nF						
150 nF						
220 nF					1.15 ±0.1	
330 nF						
470 nF	1.15 ±0.1	1.15 ±0.1	1.15 ±0.1	1.15 ±0.1	1.25 ±0.2	
680 nF						
1 000 nF	1.25 ±0.2	1.25 ±0.2	1.25 ±0.2	1.25 ±0.2		
2.2 µF	1.9 ±0.2	1.9 ±0.2	1.9 ±0.2	1.9 ±0.2	1.9 ±0.2	
4.7 µF					2.5 ±0.2	
10 µF						
22 µF	2.5 ±0.2	2.5 ±0.2	2.5 ±0.2	2.5 ±0.3		
47 µF						2.5 ±0.2
100 µF	2.5 ±0.3	2.5 ±0.3	2.5 ±0.3			3.2 ±0.3
Tape width	8 mm					

**Note:** Values in shaded cells indicate thickness class (unit: mm)



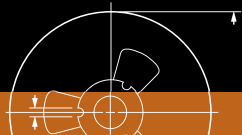
### Features

- High volumetric efficiency
- Non-polar construction



Case dimensions							
Discrete capacitors - General purpose & High capacitance							
	Case size designation		Dimensions in mm				
	Inch-based	Metric	L <sub>1</sub>	W	L <sub>2</sub> / L <sub>3</sub> min	L <sub>2</sub> / L <sub>3</sub> max	L <sub>4</sub> min
	0201	0603M	0.6 ±0.03	0.3 ±0.03	0.10	0.20	0.20
			0.6 ±0.05	0.3 ±0.05	0.10	0.20	0.20
	0402	1005M	1.0 ±0.05 <sup>(1)</sup>	0.5 ±0.05 <sup>(1)</sup>	0.15	0.30	0.40
			1.0 ±0.20 <sup>(2)</sup>	0.5 ±0.20 <sup>(2)</sup>	0.15	0.30	0.40
	0603	1608M	1.6 ±0.10 <sup>(1)</sup>	0.8 ±0.10 <sup>(1)</sup>	0.20	0.60	0.40
			1.6 ±0.15 <sup>(2)</sup>	0.8 ±0.15 <sup>(2)</sup>	0.20	0.60	0.40
	0805	2012M	2.0 ±0.10 <sup>(1)</sup>	1.25 ±0.10 <sup>(1)</sup>	0.25	0.75	0.55
			2.0 ±0.20 <sup>(2)</sup>	1.25 ±0.20 <sup>(2)</sup>	0.25	0.75	0.55
	1206	3216M	3.2 ±0.15 <sup>(1)</sup>	1.6 ±0.15 <sup>(1)</sup>	0.25	0.75	1.40
			3.2 ±0.30 <sup>(2)</sup>	1.6 ±0.20 <sup>(2)</sup>	0.25	0.75	1.40
	1210	3225M	3.2 ±0.20 <sup>(1)</sup>	2.5 ±0.20 <sup>(1)</sup>	0.25	0.75	1.40
			3.2 ±0.40 <sup>(2)</sup>	2.5 ±0.30 <sup>(2)</sup>	0.25	0.75	1.40

**Note:** 1. Dimension for size 0402, C < 4.7 μF; 0603, C < 10 μF; 0805 to 1210, C ≤ 100 nF  
 2. Dimension for size 0402, C ≥ 4.7 μF; 0603, C ≥ 10 μF; 0805 to 1210, C > 100 nF



# MLCC Selection Charts

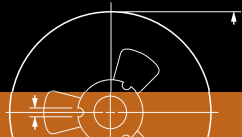
## Y5V - General purpose & High capacitance 6.3 to 25V, 0201 / 0402

Y5V					
General purpose & High capacitance					
Capacitance	0201	0402			
	6.3 V	6.3 V	10 V	16 V	25 V
10 nF	0.3 ±0.03	0.5 ±0.05	0.5 ±0.05	0.5 ±0.05	0.5 ±0.05
22 nF					
47 nF					
100 nF					
220 nF					
470 nF					
1 000 nF					
Tape width	8 mm				

**Note:** Values in shaded cells indicate thickness class (unit: mm)

Y5V									
General purpose & High capacitance									
Capacitance	0603				0805				
	6.3 V	10 V	16 V	25 V	6.3 V	10 V	16 V	25 V	
10 nF	0.8 ±0.1	0.8 ±0.1	0.8 ±0.1	0.8 ±0.1	0.6 ±0.1	0.6 ±0.1	0.6 ±0.1	0.6 ±0.1	
22 nF									
47 nF									
100 nF									
220 nF									
470 nF			0.85 ±0.1	0.85 ±0.1	0.85 ±0.1	0.85 ±0.1			
1 000 nF									
2.2 µF							1.25 ±0.2	1.25 ±0.2	1.25 ±0.2
4.7 µF									
10 µF					1.25 ±0.2	1.25 ±0.2	1.25 ±0.2		
22 µF									
Tape width	8 mm								

**Note:** Values in shaded cells indicate thickness class (unit: mm)



# MLCC Selection Charts

## Y5V - General purpose & High capacitance 6.3 to 25V, 1206 / 1210

Y5V								
General purpose & High capacitance								
Capacitance	1206				1210			
	6.3 V	10 V	16 V	25 V	6.3 V	10 V	16 V	25 V
10 nF	0.6 ±0.1	0.6 ±0.1	0.6 ±0.1	0.6 ±0.1				
22 nF								
47 nF								
100 nF								
220 nF								
470 nF	0.85 ±0.1	0.85 ±0.1	0.85 ±0.1	0.85 ±0.1				
1 000 nF								
2.2 µF								
4.7 µF			1.15 ±0.1					
10 µF				1.6 ±0.2	1.5 ±0.1	1.5 ±0.1	1.5 ±0.1	1.5 ±0.1
22 µF	1.6 ±0.2	1.6 ±0.2	1.6 ±0.2		1.6 ±0.2	1.6 ±0.2	1.6 ±0.2	
47 µF								
Tape width	8 mm							

**Note:** Values in shaded cells indicate thickness class (unit: mm)

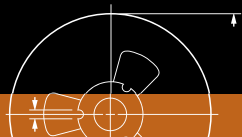


# MLCC Selection Charts

## Y5V - General purpose & High capacitance 50V, 0402 to 1206

Y5V				
General purpose & High capacitance				
Capacitance	0402	0603	0805	1206
	50 V	50 V	50 V	50 V
10 nF	0.5 ±0.05	0.8 ±0.1	0.6 ±0.1	0.6 ±0.1
22 nF				
47 nF				
100 nF				
220 nF				
470 nF			0.85 ±0.1	0.85 ±0.1
1 000 nF			1.25 ±0.2	
2.2 µF				1.15 ±0.1
Tape width	8 mm			

**Note:** Values in shaded cells indicate thickness class (unit: mm)



# MLCC Selection Charts

NP0 / X7R - Automotive grade, 0402 to 1210



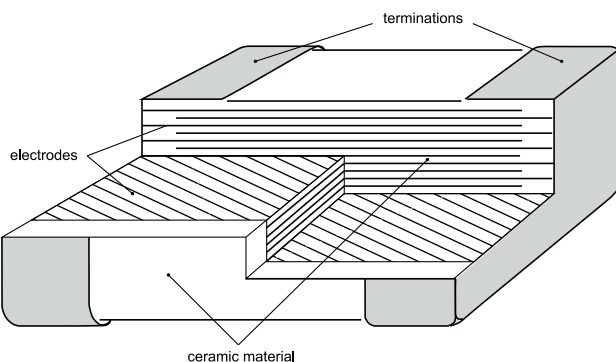
## Features

- Comply with AEC-Q200 standard
- MSL class: MSL 1
- J-STD-020D and TS-16949 compliant
- Halogen free epoxy
- RoHS compliant

## Applications

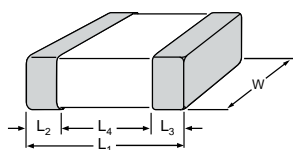
- All general purpose applications
- Entertainment applications
- Comfort / security applications
- Information applications

## Construction



## Dimensions

Discrete capacitors - Automotive grade



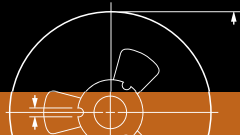
Case size designation		Dimensions in mm					
Inch-based	Metric	L1	W	L2 / L3 min	L2 / L3 max	L4 min	
0402	1005M	1.0 ±0.05	0.5 ±0.05	0.15	0.30	0.40	
0603	1608M	1.6 ±0.20	0.8 ±0.10	0.20	0.60	0.40	
0805	2012M	2.0 ±0.20	1.25 ±0.20	0.25	0.75	0.55	
1206	3216M	3.2 ±0.30	1.6 ±0.20	0.25	0.75	1.40	
1210	3225M	3.2 ±0.30	2.5 ±0.20	0.25	0.75	1.40	

# MLCC Selection Charts

NPO - Automotive grade, 0402 to 0805

NPO									
Automotive Grade									
Capacitance	0402	0603			0805				
	50 V	50 V	100V	250V	50 V	100 V	250 V	500 V	630 V
10 pF	0.5 ±0.05	0.8 ±0.1	0.8 ±0.1	0.8 ±0.1	0.6 ±0.1	0.6 ±0.1	0.6 ±0.1	0.6 ±0.1	0.6 ±0.1
12 pF									
15 pF									
18 pF									
22 pF									
27 pF									
33 pF									
39 pF									
47 pF									
56 pF									
68 pF									
82 pF									
100 pF									
120 pF									
150 pF									
180 pF									
220 pF									
270 pF									
330 pF									
390 pF									
470 pF									
560 pF									
680 pF									
820 pF									
1 000 pF							1.25 ±0.2		
1.2 nF									
1.5 nF									
1.8 nF									
2.2 nF									
2.7 nF									
3.3 nF									
3.9 nF									
4.7 nF									
5.6 nF									
6.8 nF									
8.2 nF									
10 nF									
Tape width	8mm								

**Note:** Values in shaded cells indicate thickness class (unit: mm)



# MLCC Selection Charts

## NP0 - Automotive grade, 1206 / 1210

NP0									
Automotive Grade									
Capacitance	1206					1210			
	50 V	100 V	250 V	500 V	630 V	50 V	100 V	250 V	500 V
10 pF	0.6 ±0.1	0.6 ±0.1	0.6 ±0.1	0.6 ±0.1	1.25 ±0.2	1.25 ±0.2	1.25 ±0.2	1.25 ±0.2	1.25 ±0.2
12 pF									
15 pF									
18 pF									
22 pF									
27 pF									
33 pF									
39 pF									
47 pF									
56 pF									
68 pF									
82 pF									
100 pF									
120 pF									
150 pF									
180 pF									
220 pF									
270 pF									
330 pF									
390 pF									
470 pF									
560 pF									
680 pF									
820 pF									
1 000 pF			0.85 ±0.1	0.85 ±0.1					
1.2 nF									
1.5 nF									
1.8 nF									
2.2 nF									
2.7 nF									
3.3 nF									
3.9 nF									
4.7 nF									
5.6 nF									
6.8 nF									
8.2 nF									
10 nF									
Tape width	8mm								

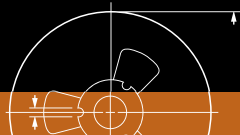
**Note:** Values in shaded cells indicate thickness class (unit: mm)

# MLCC Selection Charts

X7R - Automotive grade, 0402 / 0603

X7R									
Automotive grade									
Capacitance	0402				0603				
	10 V	16 V	25 V	50 V	10 V	16 V	25 V	50 V	100V
100 pF	0.5 ±0.05	0.5 ±0.05	0.5 ±0.05	0.5 ±0.05	0.8 ±0.1	0.8 ±0.1	0.8 ±0.1	0.8 ±0.1	0.8 ±0.1
150 pF									
180 pF									
220 pF									
330 pF									
390 pF									
470 pF									
680 pF									
1 000 pF									
1.5 nF									
2.2 nF									
3.3 nF									
4.7 nF									
6.8 nF									
10 nF									
15 nF									
18 nF									
22 nF									
27 nF									
33 nF									
47 nF									
68 nF									
100 nF									
150 nF									
220 nF									
270 nF									
330 nF									
390 nF									
470 nF									
680 nF									
1000 nF									
2.2 µF									
4.7 µF									
10 µF									
Tape width	8mm								

**Note:** Values in shaded cells indicate thickness class (unit: mm)



# MLCC Selection Charts

## X7R - Automotive grade, 0805

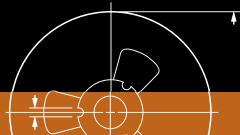
X7R							
Automotive grade							
Capacitance	0805						
	10 V	16 V	25 V	50 V	100 V	250 V	500 V
100 pF							
150 pF							
180 pF							
220 pF	0.85 ±0.1	0.85 ±0.1	0.85 ±0.1	0.85 ±0.1	0.85 ±0.1	0.85 ±0.1	0.85 ±0.1
330 pF							
390 pF							
470 pF							
680 pF							
1 000 pF							
1.5 nF							
2.2 nF							
3.3 nF							
4.7 nF							
6.8 nF						1.25 ±0.2	1.25 ±0.2
10 nF							
15 nF							
18 nF							
22 nF							
27 nF					1.25 ±0.2		
33 nF							
47 nF							
68 nF							
100 nF							
150 nF	1.25 ±0.2	1.25 ±0.2	1.25 ±0.2	1.25 ±0.2			
220 nF							
270 nF							
330 nF							
390 nF							
470 nF							
680 nF							
1000 nF							
2.2 µF							
4.7 µF							
10 µF							
Tape width	8mm						

**Note:** Values in shaded cells indicate thickness class (unit: mm)



X7R									
Automotive grade									
Capacitance	1206								
	6.3 V	10 V	16 V	25V	50V	100V	250 V	500 V	630 V
100 pF									
150 pF									
180 pF									
220 pF									
330 pF									
390 pF									
470 pF									
680 pF									
1 000 pF									
1.5 nF							0.85 ±0.1	1.25 ±0.2	1.25 ±0.2
2.2 nF									
3.3 nF						0.85 ±0.1			
4.7 nF					0.85 ±0.1				
6.8 nF									
10 nF									
15 nF	0.85 ±0.1	0.85 ±0.1	0.85 ±0.1	0.85 ±0.1					
18 nF							1.25 ±0.2		
22 nF									
27 nF									
33 nF									
47 nF									
68 nF									
100 nF									
150 nF					1.15 ±0.2	1.25 ±0.2			
220 nF									
270 nF					1.6 ±0.2	1.6 ±0.2			
330 nF									
390 nF									
470 nF									
680 nF	1.15 ±0.2	1.15 ±0.2	1.15 ±0.2	1.15 ±0.2					
1000 nF									
2.2 µF									
4.7 µF									
10 µF									
Tape width	8mm								

**Note:** Values in shaded cells indicate thickness class (unit: mm)



# MLCC Selection Charts

## X7R - Automotive grade, 1210

X7R								
Automotive grade								
Capacitance	1210							
	6.3 V	10 V	16 V	25V	50V	100V	250 V	500 V
100 pF								
150 pF								
180 pF								
220 pF								
330 pF								
390 pF								
470 pF								
680 pF								
1 000 pF								
1.5 nF								
2.2 nF	0.85 ±0.1	0.85 ±0.1	0.85 ±0.1	0.85 ±0.1	0.85 ±0.1	0.85 ±0.1	0.85 ±0.1	1.25 ±0.2
3.3 nF								
4.7 nF								
6.8 nF								
10 nF								
15 nF								
18 nF								
22 nF								
27 nF					1.25 ±0.2			
33 nF								
47 nF								
68 nF								
100 nF								
150 nF								
220 nF								
270 nF								
330 nF								
390 nF								
470 nF								
680 nF								
1000 nF								
2.2 µF	1.25 ±0.2							
4.7 µF								
10 µF								
Tape width	12mm							

**Note:** Values in shaded cells indicate thickness class (unit: mm)





# MLCC Selection Charts

NP0 / X7R - High voltage SC type, 1808 / 1812

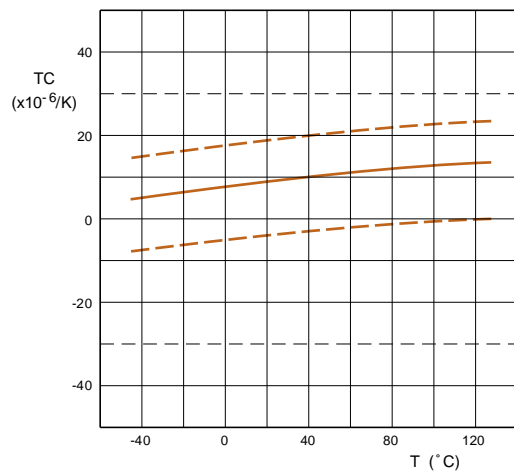


## Features

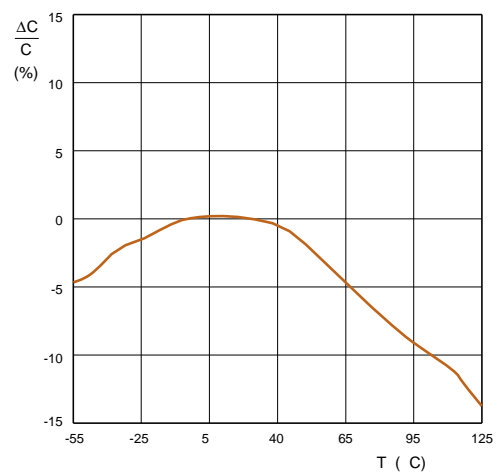
- Capable of operating at high voltage levels
- For high frequency snubber
- Decoupling/ Smoothing function
- TUV certificate No.: 50031668
- UL certificate No.: E238900

## Temperature characteristic

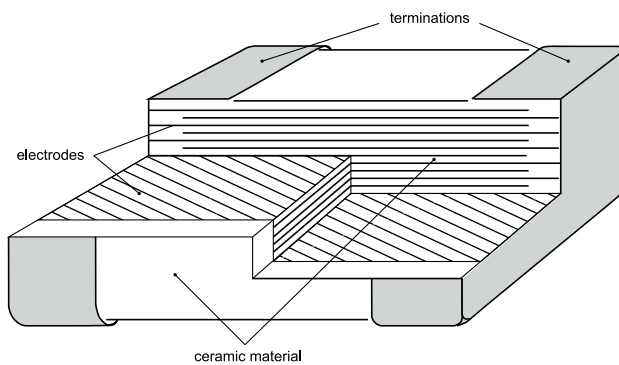
NP0



X7R

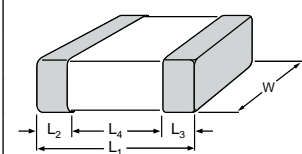


## Construction

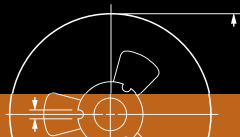


## Dimensions

Discrete capacitors - High voltage SC type



Case size designation		Dimensions in mm			
Inch-based	Metric	L <sub>1</sub>	W	L <sub>2</sub> / L <sub>3</sub> min	L <sub>2</sub> / L <sub>3</sub> max
1808	4520M	4.8 ±0.30	2.0 ±0.30	0.25	0.75
1812	4532M	4.8 ±0.30	3.2 ±0.30	0.25	0.75



# MLCC Selection Charts

## NP0 - High voltage SC type, 1808 / 1812

NP0				
Capacitance	1808		1808	1812
	X1/Y2 for TUV	X1/Y2 for UL	X2/Y3 for TUV/UL	X2/Y3 for TUV/UL
2 pF	1.6 ±0.2	1.6 ±0.2		
3.3 pF				
4.7 pF				
5 pF			1.6 ±0.2	1.6 ±0.2
10 pF				
12 pF				
15 pF				
18 pF				
22 pF				
27 pF				
33 pF				
39 pF				
47 pF				
56 pF				
68 pF				
82 pF				
100 pF	2.0 ±0.2	2.0 ±0.2	2.0 ±0.2	
120 pF				
150 pF				
180 pF				
220 pF				
240 pF				
270 pF				
330 pF				
390 pF				
430 pF				
470 pF				
560 pF				
680 pF				
820 pF				
1 000 pF				
Tape width	12 mm			

**Note:** Values in shaded cells indicate thickness class (unit: mm)

X7R				
Capacitance	1808		1812	
	X1/Y2 for TUV/UL	X2/Y3 for TUV/UL	X1/Y2 for TUV	X1 for UL
150 pF	1.6 ±0.2	1.6 ±0.2		
180 pF				
220 pF				
240 pF	2.0 ±0.2		1.6 ±0.2	1.6 ±0.2
270 pF				
330 pF				
390 pF			2.0 ±0.2	2.0 ±0.2
430 pF				
470 pF				
560 pF				
680 pF				
820 pF				
1 000 pF				
1.2 nF				
1.5 nF				
Tape width	12 mm			

**Note:** Values in shaded cells indicate thickness class (unit: mm)

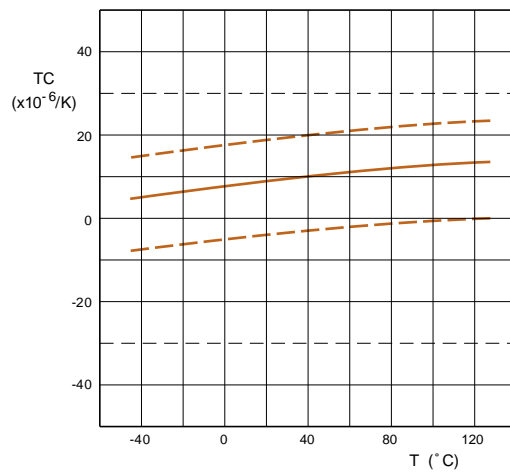


### Features

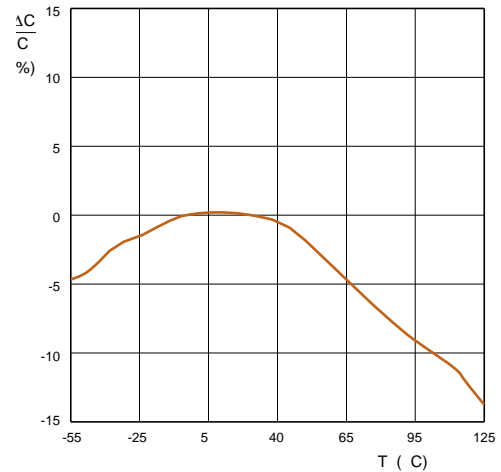
- Less than 50% board space of an equivalent discrete component
- High volumetric efficiency
- Increased throughput, by time saved in mounting

### Temperature characteristic

NP0

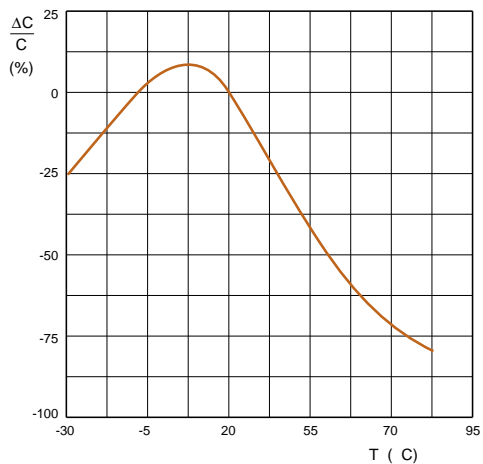


X7R

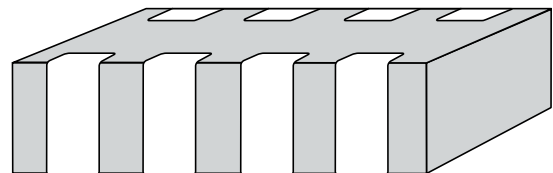


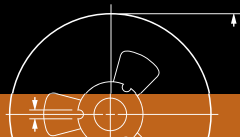
### Temperature characteristic

Y5V



### Construction





# MLCC Selection Charts

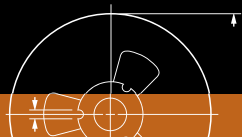
NP0 / X7R / Y5V - 4C Arrays, 0508 / 0612

Dimensions									
4C arrays									
	Case size designation		Dimensions in mm						
	Inch-based	Metric	L	W	T <sub>min</sub>	T <sub>max</sub>	A	B	P
	0508 (4 x 0402)	1220M (4 x 1005)	2.0 ±0.15	1.25 ±0.15	0.50	0.70	0.28 ±0.10	0.2 ±0.10	0.5 ±0.10
	0612 (4 x 0603)	1632M (4 x 1608)	3.2 ±0.15	1.60 ±0.15	0.70 <sup>(1)</sup> 0.50 <sup>(2)</sup>	0.90 <sup>(1)</sup> 0.70 <sup>(2)</sup>	0.4 ±0.10	0.3 ±0.20	0.8 ±0.10

Note: 1. Available for NP0 and X7R  
2. Available for Y5V

NP0				
4C arrays				
Capacitance	0508		0612	
	50 V	100 V	50 V	100 V
10 pF	0.6 ±0.1	0.6 ±0.1	0.8 ±0.1	0.8 ±0.1
15 pF				
18 pF				
22 pF				
27 pF				
47 pF				
100 pF				
150 pF				
180 pF				
220 pF				
270 pF				
330 pF				
390 pF				
470 pF				
560 pF				
680 pF				
820 pF				
1 000 pF				
Tape width	8 mm			

**Note:** Values in shaded cells indicate thickness class (unit: mm)



# MLCC Selection Charts

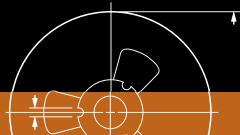
## X7R - 4C Arrays, 0508 / 0612

X7R						
4C arrays						
Capacitance	0508			0612		
	16 V	25 V	50 V	16 V	25 V	50 V
180 pF					0.8 ±0.1	0.8 ±0.1
220 pF						
270 pF						
330 pF						
390 pF						
470 pF						
560 pF						
680 pF						
820 pF						
1 000 pF	0.6 ±0.1	0.6 ±0.1	0.6 ±0.1			
1.2 nF						
1.5 nF						
1.8 nF						
2.2 nF						
2.7 nF						
3.3 nF						
3.9 nF						
4.7 nF						
5.6 nF						
6.8 nF						
8.2 nF						
10 nF				0.8 ±0.1		
12 nF						
15 nF						
18 nF						
22 nF						
27 nF						
33 nF						
47 nF						
56 nF						
68 nF						
82 nF						
100 nF						
Tape width	8 mm					

**Note:** Values in shaded cells indicate thickness class (unit: mm)

Y5V	
4C arrays	
Capacitance	0612
	25 V
10 nF	0.6 ±0.1
22 nF	
47 nF	
100 nF	
Tape width	8 mm

**Note:** Values in shaded cells indicate thickness class (unit: mm)



# MLCC Engineering Design Kits

Sample kits for 0201 / 0402

0201 sample kits					
NP0 50 V		NP0 25 V		X7R 50 V	
Capacitance (pF)	Tolerance	Capacitance (pF)	Tolerance	Capacitance (pF)	Tolerance
1	±0.25 pF	27	±5%	47	±10%
1.2	±0.25 pF	33	±5%	68	±10%
1.5	±0.25 pF	39	±5%	100	±10%
1.8	±0.25 pF	47	±5%	150	±10%
2.2	±0.25 pF	56	±5%	220	±10%
2.7	±0.25 pF	68	±5%	330	±10%
3.3	±0.25 pF	82	±5%	470	±10%
3.9	±0.25 pF	100	±5%	X7R 25 V	
4.7	±0.25 pF	Y5V 6.3V		Capacitance (pF)	Tolerance
5.6	±0.50 pF	Capacitance (pF)	Tolerance	680	±10%
6.8	±0.50 pF	100 000	-20% to +80%	1 000	±10%
8.2	±0.50 pF	X5R 6.3V		X7R 16V	
10	±5%	Capacitance (pF)	Tolerance	Capacitance (pF)	Tolerance
12	±5%	100 000	±10%	1 500	±10%
15	±5%			2 200	±10%
18	±5%			3 300	±10%
22	±5%			X7R 10 V	
				Capacitance (pF)	Tolerance
				10 000	±10%

**Note:** 100 pieces per value. Ordering code CC020100000000000 for Yageo brand product

0402 sample kits					
NP0 50 V		Y5V 16 V		X7R 50 V	
Capacitance (pF)	Tolerance	Capacitance (pF)	Tolerance	Capacitance (pF)	Tolerance
1	±0.25 pF	10 000	±20%	100	±10%
1.5	±0.25 pF	22 000	±20%	150	±10%
2.2	±0.25 pF	47 000	±20%	220	±10%
3.3	±0.25 pF	100 000	±20%	330	±10%
4.7	±0.25 pF	X5R 25V		470	±10%
6.8	±0.50 pF	Capacitance (pF)	Tolerance	680	±10%
10	±5%	100 000	±10%	1 000	±10%
15	±5%			1 500	±10%
22	±5%			2 200	±10%
33	±5%			3 300	±10%
47	±5%			X7R 25 V	
68	±5%			Capacitance (pF)	Tolerance
100	±5%			4 700	±10%
150	±5%			100 000	±10%
220	±5%			X7R 16 V	
				Capacitance (pF)	Tolerance
				6 800	±10%
				10 000	±10%
				15 000	±10%
				22 000	±10%

**Note:** 95 pieces per value. Ordering code CC040200000000000 for Yageo brand product



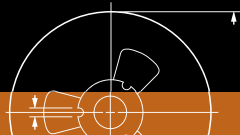


0603 sample kits					
NP0 50 V		NP0 25 V		X7R 50 V	
Capacitance (pF)	Tolerance	Capacitance (pF)	Tolerance	Capacitance (pF)	Tolerance
1	±0.25 pF	1 000	±5%	100	±10%
1.5	±0.25 pF	1 500	±5%	150	±10%
2.2	±0.25 pF	Y5V 50 V		220	±10%
3.3	±0.25 pF	Capacitance (pF)	Tolerance	330	±10%
4.7	±0.25 pF	10 000	±20%	470	±10%
6.8	±0.50 pF	22 000	±20%	680	±10%
10	±5%	47 000	±20%	1 000	±10%
15	±5%	100 000	±20%	1 500	±10%
22	±5%	Y5V 16 V		2 200	±10%
33	±5%	Capacitance (pF)	Tolerance	3 300	±10%
47	±5%	220 000	±20%	4 700	±10%
68	±5%	470 000	±20%	6 800	±10%
100	±5%			10 000	±10%
150	±5%			X7R 25 V	
220	±5%			Capacitance (pF)	Tolerance
330	±5%			15 000	±10%
470	±5%			22 000	±10%
680	±5%			X7R 16 V	
				Capacitance (pF)	Tolerance
				33 000	±10%
				47 000	±10%
				68 000	±10%
				100 000	±10%

**Note:** 48 pieces per value. Ordering code CC060300000000000 for Yageo brand product

0805 sample kits					
NP0 50 V		NP0 25 V		X7R 50 V	
Capacitance (pF)	Tolerance	Capacitance (pF)	Tolerance	Capacitance (pF)	Tolerance
1	±0.25 pF	3 300	±5%	220	±10%
1.5	±0.25 pF	4 700	±5%	330	±10%
2.2	±0.25 pF	Y5V 50 V		470	±10%
3.3	±0.25 pF	Capacitance (pF)	Tolerance	680	±10%
4.7	±0.25 pF	10 000	±20%	1 000	±10%
6.8	±0.50 pF	22 000	±20%	1 500	±10%
10	±5%	47 000	±20%	2 200	±10%
15	±5%	100 000	±20%	3 300	±10%
22	±5%	220 000	±20%	4 700	±10%
33	±5%	Y5V 16 V		6 800	±10%
47	±5%	Capacitance (pF)	Tolerance	10 000	±10%
68	±5%	470 000	±20%	15 000	±10%
100	±5%	1 000 000	±20%	22 000	±10%
150	±5%			33 000	±10%
220	±5%			47 000	±10%
330	±5%			68 000	±10%
470	±5%			100 000	±10%
680	±5%			X7R 16 V	
1 000	±5%			Capacitance (pF)	Tolerance
1 500	±5%			150 000	±10%
2 200	±5%			220 000	±10%
				330 000	±10%
				470 000	±10%

**Note:** 48 pieces per value. Ordering code CC080500000000000 for Yageo brand product



# MLCC Engineering Design Kits

## Sample kits for 1206

1206 sample kits					
NP0 50 V		NP0 25 V		X7R 50 V	
Capacitance (pF)	Tolerance	Capacitance (pF)	Tolerance	Capacitance (pF)	Tolerance
1	±0.25 pF	10 000	±5%	220	±10%
1.5	±0.25 pF	Y5V 50 V		330	±10%
2.2	±0.25 pF	Capacitance (pF)	Tolerance	470	±10%
3.3	±0.25 pF	100 000	±20%	680	±10%
4.7	±0.25 pF	220 000	±20%	1 000	±10%
6.8	±0.50 pF	470 000	±20%	1 500	±10%
10	±5%	1 000 000	±20%	2 200	±10%
15	±5%			3 300	±10%
22	±5%			4 700	±10%
33	±5%			6 800	±10%
47	±5%			10 000	±10%
68	±5%			15 000	±10%
100	±5%			22 000	±10%
150	±5%			33 000	±10%
220	±5%			47 000	±10%
330	±5%			68 000	±10%
470	±5%			100 000	±10%
680	±5%			150 000	±10%
1 000	±5%			220 000	±10%
1 500	±5%			X7R 16 V	
2 200	±5%			Capacitance (pF)	Tolerance
3 300	±5%			330 000	±10%
4 700	±5%			470 000	±10%
6 800	±5%			680 000	±10%
				1 000 000	±10%

**Note:** 48 pieces per value. Ordering code CC120600000000000 for Yageo brand product

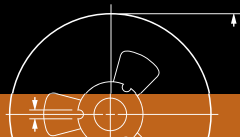


High capacitance sample kits								
X5R 0402			X7R 0603			Y5V 0402		
Capacitance	Rated voltage	Tolerance	Capacitance	Rated voltage	Tolerance	Capacitance	Rated voltage	Tolerance
1 $\mu$ F	6.3 V	$\pm 10\%$	1 $\mu$ F	16 V	$\pm 10\%$	1 $\mu$ F	6.3 V	-20% to +80%
1 $\mu$ F	10 V	$\pm 10\%$	X7R 0805			1 $\mu$ F	10 V	-20% to +80%
2.2 $\mu$ F	6.3 V	$\pm 20\%$	Capacitance	Rated voltage	Tolerance	Y5V 0603		
X5R 0603			1 $\mu$ F	25 V	$\pm 10\%$	Capacitance	Rated voltage	Tolerance
Capacitance	Rated voltage	Tolerance	2.2 $\mu$ F	16 V	$\pm 10\%$	1 $\mu$ F	10 V	-20% to +80%
1 $\mu$ F	16 V	$\pm 10\%$	2.2 $\mu$ F	25 V	$\pm 10\%$	1 $\mu$ F	16 V	-20% to +80%
1 $\mu$ F	25 V	$\pm 10\%$	X7R 1206			2.2 $\mu$ F	10 V	-20% to +80%
2.2 $\mu$ F	6.3 V	$\pm 10\%$	Capacitance	Rated voltage	Tolerance	2.2 $\mu$ F	16 V	-20% to +80%
2.2 $\mu$ F	10 V	$\pm 10\%$	1 $\mu$ F	25 V	$\pm 10\%$	4.7 $\mu$ F	6.3 V	-20% to +80%
2.2 $\mu$ F	16 V	$\pm 10\%$	2.2 $\mu$ F	25 V	$\pm 10\%$	Y5V 0805		
4.7 $\mu$ F	6.3 V	$\pm 10\%$	4.7 $\mu$ F	25 V	$\pm 10\%$	Capacitance	Rated voltage	Tolerance
4.7 $\mu$ F	10 V	$\pm 10\%$	10 $\mu$ F	16 V	$\pm 10\%$	1 $\mu$ F	16 V	-20% to +80%
10 $\mu$ F	6.3 V	$\pm 20\%$				1 $\mu$ F	25 V	-20% to +80%
X5R 0805						1 $\mu$ F	50 V	-20% to +80%
Capacitance	Rated voltage	Tolerance				2.2 $\mu$ F	16 V	-20% to +80%
2.2 $\mu$ F	25 V	$\pm 10\%$				4.7 $\mu$ F	10 V	-20% to +80%
4.7 $\mu$ F	6.3 V	$\pm 10\%$				10 $\mu$ F	10 V	-20% to +80%
4.7 $\mu$ F	10 V	$\pm 10\%$				Y5V 1206		
4.7 $\mu$ F	16 V	$\pm 10\%$				Capacitance	Rated voltage	Tolerance
10 $\mu$ F	6.3 V	$\pm 10\%$				4.7 $\mu$ F	16 V	-20% to +80%
10 $\mu$ F	10 V	$\pm 10\%$				10 $\mu$ F	10 V	-20% to +80%
10 $\mu$ F	16 V	$\pm 10\%$				10 $\mu$ F	16 V	-20% to +80%
22 $\mu$ F	6.3 V	$\pm 20\%$				22 $\mu$ F	16 V	-20% to +80%
X5R 1206								
Capacitance	Rated voltage	Tolerance						
4.7 $\mu$ F	16 V	$\pm 10\%$						
4.7 $\mu$ F	25 V	$\pm 10\%$						
10 $\mu$ F	16 V	$\pm 10\%$						
10 $\mu$ F	25 V	$\pm 10\%$						
22 $\mu$ F	6.3 V	$\pm 20\%$						

Note: 50 pieces per value. Ordering code CC88880000000000 for Yageo brand product

High capacitance sample kits for smart phone								
X5R 0201			X5R 0603			X5R 0805		
Capacitance	Rated voltage	Tolerance	Capacitance	Rated voltage	Tolerance	Capacitance	Rated voltage	Tolerance
100 nF	6.3 V	$\pm 10\%$	1 $\mu$ F	16 V	$\pm 10\%$	2.2 $\mu$ F	16 V	$\pm 10\%$
100 nF	10 V	$\pm 10\%$	1 $\mu$ F	25 V	$\pm 10\%$	2.2 $\mu$ F	25 V	$\pm 10\%$
220 nF	6.3 V	$\pm 20\%$	2.2 $\mu$ F	10 V	$\pm 10\%$	4.7 $\mu$ F	6.3 V	$\pm 10\%$
470 nF	6.3 V	$\pm 20\%$	2.2 $\mu$ F	16 V	$\pm 10\%$	4.7 $\mu$ F	10 V	$\pm 10\%$
1 $\mu$ F	6.3 V	$\pm 20\%$	4.7 $\mu$ F	6.3 V	$\pm 10\%$	4.7 $\mu$ F	16 V	$\pm 10\%$
X5R 0402			4.7 $\mu$ F	10 V	$\pm 10\%$	4.7 $\mu$ F	25 V	$\pm 10\%$
Capacitance	Rated voltage	Tolerance	10 $\mu$ F	6.3 V	$\pm 20\%$	10 $\mu$ F	6.3 V	$\pm 10\%$
1 $\mu$ F	6.3 V	$\pm 10\%$	22 $\mu$ F	6.3 V	$\pm 20\%$	10 $\mu$ F	10 V	$\pm 10\%$
1 $\mu$ F	10 V	$\pm 10\%$				10 $\mu$ F	16 V	$\pm 10\%$
1 $\mu$ F	16 V	$\pm 10\%$				22 $\mu$ F	6.3 V	$\pm 20\%$
2.2 $\mu$ F	6.3 V	$\pm 20\%$				47 $\mu$ F	6.3 V	$\pm 20\%$
4.7 $\mu$ F	6.3 V	$\pm 20\%$				X5R 1206		
10 $\mu$ F	6.3 V	$\pm 20\%$				Capacitance	Rated voltage	Tolerance
						10 $\mu$ F	16 V	$\pm 10\%$
						10 $\mu$ F	25 V	$\pm 10\%$
						22 $\mu$ F	6.3 V	$\pm 10\%$
						47 $\mu$ F	6.3 V	$\pm 20\%$

Note: 50 pieces per value. Ordering code SP8888000000000000 for Yageo brand product



# MLCC Engineering Design Kits

High voltage sample kits for general applications

High voltage sample kits for general applications					
NP0 1206			X7R 1206		
Capacitance	Rated voltage	Tolerance	Capacitance	Rated voltage	Tolerance
10 pF	1 kV	±5%	10 nF	1 kV	±10%
100 pF	1 kV	±5%	1 nF	2 kV	±10%
1 nF	1 kV	±5%	1 nF	1 kV	±10%
10 pF	2 kV	±5%	X7R 1210		
100 pF	2 kV	±5%	Capacitance	Rated voltage	Tolerance
NP0 1210			1 nF	1 kV	±10%
Capacitance	Rated voltage	Tolerance	10 nF	1 kV	±10%
10 pF	1 kV	±5%	1 nF	2 kV	±10%
100 pF	1 kV	±5%	X7R 1808		
1 nF	1 kV	±5%	Capacitance	Rated voltage	Tolerance
10 pF	2 kV	±5%	10 nF	1 kV	±10%
100 pF	2 kV	±5%	1 nF	3 kV	±10%
NP0 1808			1 nF	1 kV	±10%
Capacitance	Rated voltage	Tolerance	1 nF	2 kV	±10%
10 pF	1 kV	±5%	X7R 1812		
100 pF	1 kV	±5%	Capacitance	Rated voltage	Tolerance
1 nF	1 kV	±5%	10 nF	2 kV	±10%
10 pF	3 kV	±5%	1 nF	1 kV	±10%
100 pF	3 kV	±5%	10 nF	1 kV	±10%
10 pF	2 kV	±5%			
100 pF	2 kV	±5%			
NP0 1812					
Capacitance	Rated voltage	Tolerance			
10 pF	2 kV	±5%			
100 pF	2 kV	±5%			
1 nF	2 kV	±5%			
10 pF	1 kV	±5%			
100 pF	1 kV	±5%			
1 nF	1 kV	±5%			
10 pF	3 kV	±5%			
100 pF	3 kV	±5%			

**Note:** 50 pieces per value. Ordering code HV77770000000000 for Yageo brand product

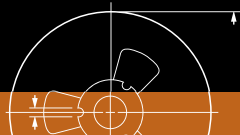


High frequency sample kits								
NP0 0201								
Capacitance	Rated voltage	Tolerance	Capacitance	Rated voltage	Tolerance	Capacitance	Rated voltage	Tolerance
0.2pF	25 V	±0.1pF	1.6pF	25 V	±0.1pF	5.0pF	25 V	±0.25pF
0.3pF	25 V	±0.1pF	1.8pF	25 V	±0.1pF	5.6pF	25 V	±0.25pF
0.4pF	25 V	±0.1pF	2.0pF	25 V	±0.1pF	6.0pF	25 V	±0.25pF
0.5pF	25 V	±0.1pF	2.2pF	25 V	±0.1pF	6.2pF	25 V	±0.25pF
0.6pF	25 V	±0.1pF	2.4pF	25 V	±0.1pF	6.8pF	25 V	±0.25pF
0.7pF	25 V	±0.1pF	2.7pF	25 V	±0.1pF	7.0pF	25 V	±0.25pF
0.8pF	25 V	±0.1pF	3.0pF	25 V	±0.1pF	7.5pF	25 V	±0.25pF
0.9pF	25 V	±0.1pF	3.3pF	25 V	±0.1pF	8.0pF	25 V	±0.25pF
1.0pF	25 V	±0.1pF	3.6pF	25 V	±0.1pF	8.2pF	25 V	±0.25pF
1.1pF	25 V	±0.1pF	3.9pF	25 V	±0.1pF	9.0pF	25 V	±0.25pF
1.2pF	25 V	±0.1pF	4.0pF	25 V	±0.1pF	9.1pF	25 V	±0.25pF
1.3pF	25 V	±0.1pF	4.3pF	25 V	±0.1pF	10pF	25 V	±5%
1.5pF	25 V	±0.1pF	4.7pF	25 V	±0.1pF			

**Note:** 10 pieces per value. Ordering code CQ0201000000SB000 for Yageo brand product

High frequency sample kits								
NP0 0402								
Capacitance	Rated voltage	Tolerance	Capacitance	Rated voltage	Tolerance	Capacitance	Rated voltage	Tolerance
0.2pF	50V	±0.1pF	2.0pF	50V	±0.1pF	6.8pF	50V	±0.25pF
0.3pF	50V	±0.1pF	2.2pF	50V	±0.1pF	7.0pF	50V	±0.25pF
0.4pF	50V	±0.1pF	2.4pF	50V	±0.1pF	7.5pF	50V	±0.25pF
0.5pF	50V	±0.1pF	2.7pF	50V	±0.1pF	8.0pF	50V	±0.25pF
0.6pF	50V	±0.1pF	3.0pF	50V	±0.1pF	8.2pF	50V	±0.25pF
0.7pF	50V	±0.1pF	3.3pF	50V	±0.1pF	9.0pF	50V	±0.25pF
0.8pF	50V	±0.1pF	3.6pF	50V	±0.1pF	9.1pF	50V	±0.25pF
0.9pF	50V	±0.1pF	3.9pF	50V	±0.1pF	10pF	50V	±5%
1.0pF	50V	±0.1pF	4.0pF	50V	±0.1pF	12pF	50V	±5%
1.1pF	50V	±0.1pF	4.3pF	50V	±0.1pF	15pF	50V	±5%
1.2pF	50V	±0.1pF	4.7pF	50V	±0.1pF	18pF	50V	±5%
1.3pF	50V	±0.1pF	5.0pF	50V	±0.25pF	22pF	50V	±5%
1.5pF	50V	±0.1pF	5.6pF	50V	±0.25pF	27pF	50V	±5%
1.6pF	50V	±0.1pF	6.0pF	50V	±0.25pF	33pF	50V	±5%
1.8pF	50V	±0.1pF	6.2pF	50V	±0.25pF			

**Note:** 10 pieces per value. Ordering code CQ0402000000SB000 for Yageo brand product



# MLCC Engineering Design Kits

## Sample kits for high frequency series

High frequency sample kits								
NP0 0603								
Capacitance	Rated voltage	Tolerance	Capacitance	Rated voltage	Tolerance	Capacitance	Rated voltage	Tolerance
0.2pF	250 V	±0.1pF	2.0pF	250 V	±0.1pF	6.8pF	250 V	±0.25pF
0.3pF	250 V	±0.1pF	2.2pF	250 V	±0.1pF	7.0pF	250 V	±0.25pF
0.4pF	250 V	±0.1pF	2.4pF	250 V	±0.1pF	7.5pF	250 V	±0.25pF
0.5pF	250 V	±0.1pF	2.7pF	250 V	±0.1pF	8.0pF	250 V	±0.25pF
0.6pF	250 V	±0.1pF	3.0pF	250 V	±0.1pF	8.2pF	250 V	±0.25pF
0.7pF	250 V	±0.1pF	3.3pF	250 V	±0.1pF	9.0pF	250 V	±0.25pF
0.8pF	250 V	±0.1pF	3.6pF	250 V	±0.1pF	9.1pF	250 V	±0.25pF
0.9pF	250 V	±0.1pF	3.9pF	250 V	±0.1pF	10pF	250 V	±5%
1.0pF	250 V	±0.1pF	4.0pF	250 V	±0.1pF	12pF	250 V	±5%
1.1pF	250 V	±0.1pF	4.3pF	250 V	±0.1pF	15pF	250 V	±5%
1.2pF	250 V	±0.1pF	4.7pF	250 V	±0.1pF	18pF	250 V	±5%
1.3pF	250 V	±0.1pF	5.0pF	250 V	±0.25pF	22pF	250 V	±5%
1.5pF	250 V	±0.1pF	5.6pF	250 V	±0.25pF	27pF	250 V	±5%
1.6pF	250 V	±0.1pF	6.0pF	250 V	±0.25pF	33pF	250 V	±5%
1.8pF	250 V	±0.1pF	6.2pF	250 V	±0.25pF	47pF	250 V	±5%

**Note:** 10 pieces per value. Ordering code CQ0603000000SB000 for Yageo brand product

High frequency sample kits								
NP0 0805								
Capacitance	Rated voltage	Tolerance	Capacitance	Rated voltage	Tolerance	Capacitance	Rated voltage	Tolerance
0.2pF	250 V	±0.1pF	2.4pF	250 V	±0.1pF	8.2pF	250 V	±0.25pF
0.3pF	250 V	±0.1pF	2.7pF	250 V	±0.1pF	9.0pF	250 V	±0.25pF
0.4pF	250 V	±0.1pF	3.0pF	250 V	±0.1pF	9.1pF	250 V	±0.25pF
0.5pF	250 V	±0.1pF	3.3pF	250 V	±0.1pF	10pF	250 V	±5%
0.6pF	250 V	±0.1pF	3.6pF	250 V	±0.1pF	12pF	250 V	±5%
0.7pF	250 V	±0.1pF	3.9pF	250 V	±0.1pF	15pF	250 V	±5%
0.8pF	250 V	±0.1pF	4.0pF	250 V	±0.1pF	18pF	250 V	±5%
0.9pF	250 V	±0.1pF	4.3pF	250 V	±0.1pF	22pF	250 V	±5%
1.0pF	250 V	±0.1pF	4.7pF	250 V	±0.1pF	27pF	250 V	±5%
1.1pF	250 V	±0.1pF	5.0pF	250 V	±0.25pF	33pF	250 V	±5%
1.2pF	250 V	±0.1pF	5.6pF	250 V	±0.25pF	47pF	250 V	±5%
1.3pF	250 V	±0.1pF	6.0pF	250 V	±0.25pF	56pF	250 V	±5%
1.5pF	250 V	±0.1pF	6.2pF	250 V	±0.25pF	68pF	250 V	±5%
1.6pF	250 V	±0.1pF	6.8pF	250 V	±0.25pF	82pF	250 V	±5%
1.8pF	250 V	±0.1pF	7.0pF	250 V	±0.25pF	100pF	250 V	±5%
2.0pF	250 V	±0.1pF	7.5pF	250 V	±0.25pF			
2.2pF	250 V	±0.1pF	8.0pF	250 V	±0.25pF			

**Note:** 10 pieces per value. Ordering code CQ0805000000SB000 for Yageo brand product

