

# PRODUCT SELECTION GUIDE

2003

MULTILAYER CERAMIC CAPACITORS

RESISTOR CHIPS

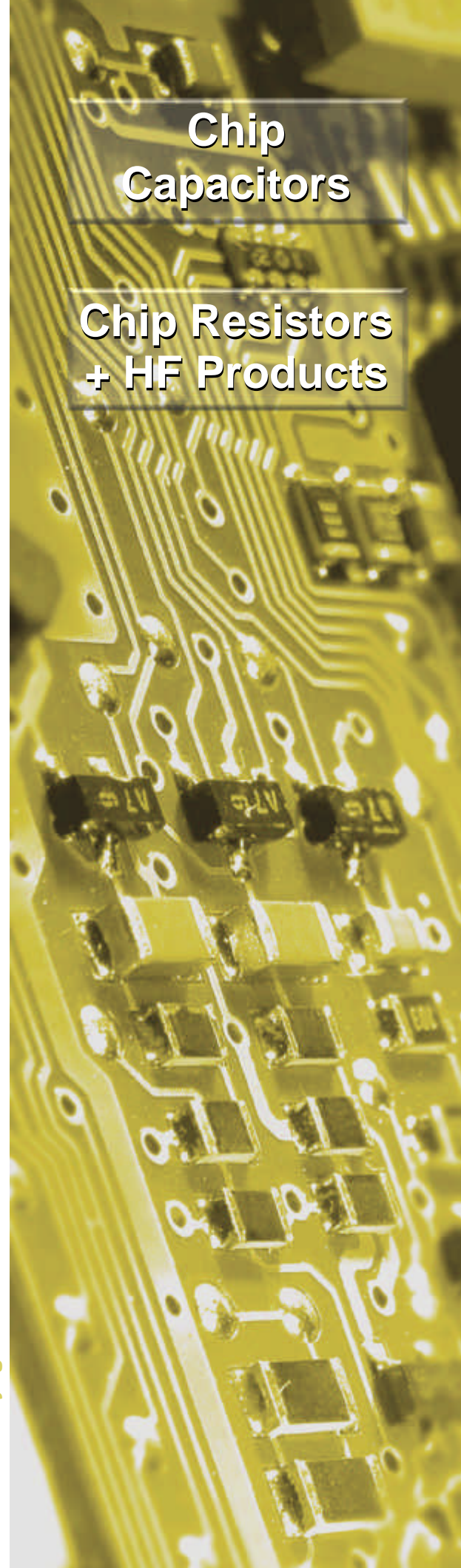
HF PRODUCTS

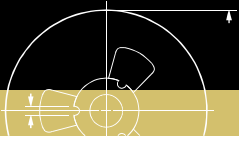
**Phycomp**

Chip  
Capacitors

Chip Resistors  
+ HF Products

[www.yageo.com](http://www.yageo.com)





## Part numbering system and ordering

You can order components from this catalogue in two ways. Both ways give logistic and packing information.

- **Clear text ordering code**  
This unique number is an easily-readable 15-digit code.
- **12 digit ordering code (preferred)**  
This unique 12NC number forms the basis of the Phycomp logistic system.

You will find details for ordering in the *Ordering* section next to each selection chart.

Minimum shipment quantities, prices and delivery details can be obtained from the Phycomp sales organization in your country or from one of our franchised distributors.

## Case size codes

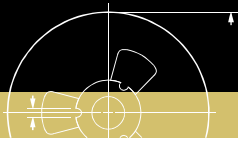
Throughout this catalogue, inch-based codes are used for the component sizes. According to IEC 60384-10, amendment 2 of Sept. 2000 for MLCCs, and IEC 60115-8, amendment 1 of July 2000 for R-chip. values for length and width should be in millimetres rather than in inches. To distinguish between inch-based codes and metric-based codes, metric-based codes will temporarily have the suffix "M". The table below shows the relation between inch-based case sizes versus the recommended metric case size designators.

Case size cross-reference	
Case size designation	
Inch-based	Metric
0201	0603M
0402	1005M
0508	1220M
0603	1608M
0612	1632M
0805	2012M
1206	3216M
1210	3225M
1812	4532M
2220	5750M

## Contacting us

Founded in 1977, the Yageo Corporation has become a world-class provider of passive-component services with capabilities on a global scale, including production and sales facilities in Asia, Europe and America. The corporation is uniquely positioned to provide one-stop-shopping, offering its complete product portfolio of resistors, capacitors and inductors in both commodity and specialty versions, plus design-in capability, distribution, e-commerce connection and logistics. Yageo markets its products under the product brand names Yageo, Phycomp and Vitrohm. All products can be obtained from our Yageo sales offices, of which contact details can be found on the backcover of this catalogue. For most up-to-date information, as well as contact details of our franchised distributors, please refer to our website: **[www.yageo.com](http://www.yageo.com)**





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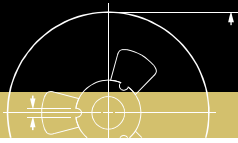
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TC code		Cap. range		Voltage range		Other	
	NP0	General purpose	270 pF to 33 nF	16 V		8	
		General purpose	150 pF to 22 nF	25 V		10	
		General purpose	0.47 pF to 22 nF	50 V		12	
		General purpose	10 pF to 22 nF	100 V		14	
		High voltage	10 pF to 5.6 nF	200 V, 250 V, 500V		16	
		High voltage	3.3 pF to 1.5 nF	1 kV to 4 kV		18	
		Microwave	0.47 pF to 120 pF	50 V		3 GHz	20
	X5R	General purpose	68 nF to 100 $\mu$ F	6.3 V, 10 V, 16 V		22	
	X7R	General purpose	27 nF to 4.7 $\mu$ F	10 V		24	
		General purpose	3.3 nF to 4.7 $\mu$ F	16 V, 25 V		26	
		General purpose	100 pF to 1 $\mu$ F	50 V, 100 V		28	
		High voltage	220 pF to 150 nF	200 V, 250 V, 500V		30	
		High voltage	470 pF to 10 nF	1 kV, 2 kV		32	
		Low inductance	10 nF to 220 nF	16 V to 50 V		<600 pH	33
	Y5V	General purpose	220 nF to 47 $\mu$ F	6.3 V, 10 V		34	
		General purpose	10 nF to 10 $\mu$ F	16 V to 50 V		36	
	Z5U	General purpose	10 nF to 1 $\mu$ F	25 V, 50 V		38	
	C-Arrays						
		NP0	2-C arrays	10 pF to 1 nF	16 V to 50 V		2-fold
X7R		2-C arrays	100 pF to 220 nF	10 V to 50 V		2-fold	42
NP0		4-C arrays	10 pF to 1 nF	50 V		4-fold	44
X7R		4-C arrays	10 nF to 100 nF	16 V		4-fold	46
		4-C arrays	220 pF to 68 nF	25 V, 50 V		4-fold	47
Y5V		4-C arrays	10 nF to 100 nF	25 V		4-fold	48
NP0		Multi value cap arrays	10 pF to 3.3 nF	16 V, 25 V, 50 V		4-fold	50
X7R		Multi value cap arrays	100 pF to 220 nF	10 V to 50 V		4-fold	50
Ultra Small MLCCs							
	NP0	Ultra small MLCCs	1 pF to 100 pF	25 V, 50 V		smallest size	52
	X5R	Ultra small MLCCs	100 nF	6.3 V		smallest size	54
	X7R	Ultra small MLCCs	47 pF to 3.3 nF	16 V to 50 V		smallest size	56
EMI Filter Capacitors							
	NP0	Filter capacitors X2Y	33 pF to 100 pF	100 V			58
	X7R	Filter capacitors X2Y	10 nF to 1 $\mu$ F	10 V to 63 V			58
	Y5V	Filter capacitors X2Y	220 nF to 4.7 $\mu$ F	16 V			59
Engineering Design Kits							
	0201 and 0402	General purpose	1 pF to 100 nF			NP0, X7R, Y5V	62
	0603 and 0805	General purpose	0.47 pF to 1 $\mu$ F			NP0, X7R, Y5V	63
	1206	General purpose	0.47 pF to 1 $\mu$ F			NP0, X7R, Y5V	64
	All sizes, all types, E1 series only			1 pF to 10 $\mu$ F			NP0, X7R, Y5V
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		Major features				
General		Power	Resistance range	Voltage range	Tolerance	
	General purpose and precision	0.05 W to 0.25 W	1 $\Omega$ to 10 M $\Omega$	15 V to 200 V	1%, 5%	74
	High precision	0.063 W to 0.25 W	90 $\Omega$ to 2.74 M $\Omega$	150 V, 200 V	0.1%, 0.25%, 0.5%	75
	High precision	0.063 W	100 $\Omega$ to 1 M $\Omega$	50 V	0.1%, 0.25%, 0.5%	76
	High precision - high stability	0.250 W	10 $\Omega$ to 1 M $\Omega$	200 V	0.05% to 1%	76
	High precision - high stability	0.125 W	10 $\Omega$ to 1 M $\Omega$	150 V, 200 V	0.05% to 1%	77
	High precision - high stability	0.063 W, 0.1 W	10 $\Omega$ to 332 k $\Omega$	50 V, 75 V	0.05% to 1%	78
	Arrays	0.063 W	10 $\Omega$ to 1 M $\Omega$	50 V	1%, 5%	79
	R-Networks	0.031 W	10 $\Omega$ to 100 k $\Omega$	25 V	1%, 5%	80
	RC-network	0.063 W	10 $\Omega$ to 1 k $\Omega$	25 V	5%	80
Power						
	Power	0.5 W, 1.0 W	1 $\Omega$ to 10 M $\Omega$	200 V, 250 V	1%, 5%	81
	Power - low ohmic	0.3 W to 1.0 W	0.01 $\Omega$ to 0.976 $\Omega$	200 V, 250 V	1%, 5%	82
	Power - high voltage	1.0 W	4.7 M $\Omega$ to 16 M $\Omega$	250 V	5%	83
	Metal strip	1.0 W	1 m $\Omega$ to 10 m $\Omega$	250 V	1%, 5%	83
Application specific						
	High voltage	0.125 W, 0.25 W	100 k $\Omega$ to 27 M $\Omega$	300 V, 400 V	1%, 5%	83
	High ohmic	0.1 W to 0.25 W	11 M $\Omega$ to 100 M $\Omega$	50 V to 200 V	5%	84
	Low ohmic	0.063 W to 0.25 W	0.01 $\Omega$ to 0.976 $\Omega$	50 V to 200 V	1%, 5%	84
	Trimmable	0.063 W to 0.25 W	1 $\Omega$ to 10 M $\Omega$	50 V to 200 V	0/-20%, 0/-30%	85
	Surge	0.25 W	1 $\Omega$ to 100 k $\Omega$	200 V	5%	85
	Fusible	0.063 W, 0.125 W	1 $\Omega$ to 510 $\Omega$	50 V, 200 V	5%	85
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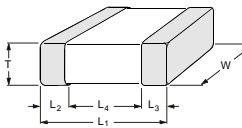


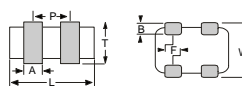
# MLCC GENERAL INFORMATION

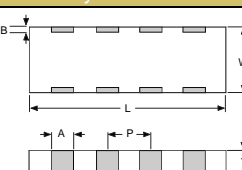
## Quick reference data

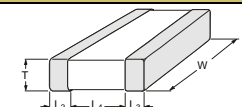
Quick reference data		
Rated voltage	NP0 (CG)	16 V, 25 V, 50 V, 100 V, 200 V, 250 V, 500 V, 1 kV, 2 kV, 3 kV, 4 kV
	X5R (2B)	6.3 V, 10 V, 16 V
	X7R (2R)	10 V, 16 V, 25 V, 50 V, 100 V, 200 V, 250 V, 500 V, 1 kV, 2 kV
	Y5V (2F)	6.3 V, 10 V, 16 V, 25 V, 50 V
	Z5U (2E)	25 V, 50 V
Tolerance	NP0 < 10 pF	±0.1 pF, ±0.25 pF, ±0.5 pF
	NP0 ≥ 10 pF	±1%, ±2%, ±5%
	X5R	±10%, ±20%
	X7R	±5%, ±10%
	Y5V	±20%, -20 to +80%
	Z5U	±20%, -20 to +80%
Dissipation factor	NP0 < 10pF	≤10(3/C + 0.7)10 <sup>-4</sup> ; max.30.10 <sup>-4</sup>
	NP0 ≥ 10pF	≤10.10 <sup>-4</sup>
	X5R 6.3 V	≤7%
	X5R 10 V	≤5%
	X7R 10 V	≤5%
	X7R 16 V	≤3.5%
	X7R ≥ 25 V	≤2.5%
	Y5V 10 V	≤12.5%
	Y5V 16 V	≤9% or ≤12.5% depending on capacitance value
	Y5V ≥ 25 V	≤5% or ≤7% depending on capacitance value
	Z5U 25 V	≤6%
	Z5U 50 V	≤4%
Temperature coefficient	NP0 16 V	0 ± 60 ppm/K
	NP0 > 16 V	0 ± 30 ppm/K
Temperature characteristic	X5R	± 15%
	X7R	± 15%
	Y5V	+ 22 to - 82%
	Z5U	+ 22 to - 56%
Climatic category	NP0	-55 to +125 °C
	X5R	-55 to +85 °C
	X7R	-55 to +125 °C
	Y5V	-30 to +85 °C
	Z5U	+ 10 to +85 °C
Measuring conditions	NP0 < 1000 pF	1 V, 1 MHz
	NP0 ≥ 1000 pF	1 V, 1 kHz
	X5R < 22 μF	1 V, 1 kHz
	X5R ≥ 22 μF	0.5 V, 120 Hz
	X7R	1 V, 1 kHz
	Y5V < 22 μF	1 V, 1 kHz
	Y5V ≥ 22 μF	0.5 V, 120 Hz
	Z5U	0.5 V, 1 kHz

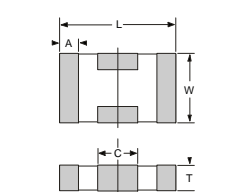


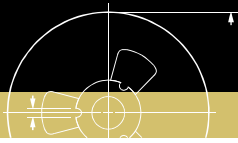
Case dimensions									
Discrete capacitors									
	Case size designation		Dimensions in mm						
	inch-based	Metric	L <sub>1</sub>	W	T <sub>min</sub>	T <sub>max</sub>	L <sub>2</sub> , L <sub>3min</sub>	L <sub>2</sub> , L <sub>3max</sub>	L <sub>4min</sub>
	0201	0603M	0.6±0.03	0.3±0.03	0.27	0.33	0.10	0.20	0.20
	0402	1005M	1.0±0.05	0.5±0.05	0.45	0.55	0.20	0.30	0.40
	0603	1608M	1.6±0.10	0.8±0.07	0.73	0.87	0.20	0.60	0.40
	0805	2012M	2.0±0.10	1.25±0.10	0.50	1.35	0.25	0.75	0.55
	1206	3216M	3.2±0.15	1.6±0.15	0.50	1.75	0.25	0.75	1.40
	1210	3225M	3.2±0.20	2.5±0.20	0.50	2.70	0.25	0.75	1.40
	1812	4532M	4.5±0.20	3.2±0.20	0.50	2.70	0.25	0.75	2.20
	2220	5750M	5.7±0.20	5.0±0.20	2.30	2.70	0.25	0.75	2.20

2-C arrays									
	Case size designation		Dimensions in mm						
	inch-based	Metric	L	W	T	A	P	B	F
	0405	1012M	1.37±0.15	1.0±0.15	0.60±0.10	0.25±0.1	0.64±0.1	0.20±0.1	0±0.1
0508	1220M	2.0±0.15	1.25±0.15	0.85±0.10	0.45±0.1	1.0±0.2	0.30±0.1	0±0.2	

4-C 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 0402)	2.0±0.15	1.25±0.15	0.50	0.95	0.28±0.10	0.2±0.10	0.5±0.10
0612 (4 x 0603)	1632M (4 x 0603)	3.2±0.15	1.6±0.15	0.50	1.20	0.4±0.10	0.3±0.20	0.8±0.10	

Discrete capacitors (Low-inductance types only)									
	Case size designation		Dimensions in mm						
	inch-based	Metric	L <sub>1</sub>	W	T <sub>min</sub>	T <sub>max</sub>	L <sub>2</sub> , L <sub>3min</sub>	L <sub>2</sub> , L <sub>3max</sub>	L <sub>4min</sub>
	0508	1220M	1.25±0.20	2.0±0.20	0.75	0.95	0.13	0.46	0.38
0612	1632M	1.6±0.20	3.2±0.20	0.75	0.95	0.13	0.46	0.50	

Filter capacitors X2Y									
	Case size designation		Dimensions in mm						
	inch-based	Metric	L	W	T <sub>min</sub>	T <sub>max</sub>	A <sub>min</sub>	A <sub>max</sub>	C
	0603	1608M	1.6±0.15	0.8±0.10	0.50	0.70	0.25	0.50	0.40±0.2
	0805	2012M	2.0±0.15	1.25±0.15	0.75	0.95	0.25	0.55	0.60±0.2
	1206	3216M	3.2±0.20	1.6±0.20	0.80	1.35	0.25	0.65	1.20±0.3
	1210	3225M	3.2±0.20	2.5±0.20	1.10	1.70	0.25	0.65	1.20±0.3
1812	4532M	4.5±0.20	3.2±0.20	1.10	1.70	0.25	0.65	1.30±0.3	



# PRODUCT SELECTION CHART

## NPO - 16 V, general purpose

NPO - 16 V					
General purpose					
Capacitance (pF)	Last two digits of 12NC	0402	0603	0805	1206
270	42				
330	43				
390	44	0.5±0.05			
470	45				
560	-				
680	-				
820	-				
1 000	-				
1 200	-				
1 500	-				
1 800	53				
2 200	54		0.8±0.07		
2 700	55				
3 300	56				
3 900	-				
4 700	-				
5 600	59				
6 800	61			0.85±0.10	
8 200	62				
10 000	63				
12 000	64				0.6±0.10
15 000	65				
18 000	66				0.85±0.10
22 000	67				
27 000	68				1.15±0.10
33 000	69				
Tape width		8 mm			

**Note 1:** Case size designators are inch-based; see General Information section for metric-based case size designators.

**Note 2:** Values in shaded cells indicate thickness class.





# PRODUCT SELECTION CHART

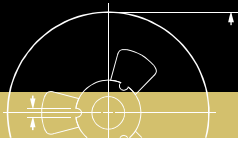
NPO - 16 V, general purpose

Thickness classes and packing quantities							
Thickness class (mm)	8 mm tape width quantity per reel				Quantity per bulk case		
	180 mm / 7"	180 mm / 7"	330 mm / 13"	330 mm / 13"			
	Paper	Blister	Paper	Blister	0402	0603	0805
0.5 ± 0.05	10 000	-	50 000	-	50 000	-	-
0.6 ± 0.10	4 000	-	20 000	-	-	-	-
0.8 ± 0.07	4 000	-	15 000	-	-	15 000	-
0.85 ± 0.10	4 000	-	15 000	-	-	-	8 000
1.15 ± 0.10	-	3 000	-	10 000	-	-	-

Ordering code 12NC	
<p>2 2 X X X X X X X 1 X X X</p> <p>Carrier tape 22 = blister 38 = paper 54 = bulk</p> <p>Voltage 78 = 16 V</p> <p>Size 7 = 0402 6 = 0603 0 = 0805 1 = 1206</p>	<p>Capacitance value see selection chart</p> <p>Tolerance 4 = ±2% 5 = ±5%</p> <p>Packing 1 = 180 mm / 7" reel 5 = 330 mm / 13" reel 4 = bulk case</p>

Ordering information (North America ONLY)								
Clear text code								
0603CH271J7B200 (example)								
0603	CH	271	J	7	B	2	0	0
Size code	Temp. char.	Cap. in pF	Tolerance	Voltage	Termination	Packing	Marking	Range identifier
0402 0603 0805 1206	CH = NPO	271 = 270 pF The third digit signifies the multiplying factor: 1 = x 10 2 = x 100 3 = x 1000	G = ±2% J = ±5%	7 = 16 V	B = NiSn	2 = 180 mm / 7" paper 3 = 330 mm / 13" paper B = 180 mm / 7" blister F = 330 mm / 13" blister P = bulk case	0 = no marking	0 = conv. ceramic





# PRODUCT SELECTION CHART

## NPO - 25 V, general purpose

NPO - 25 V						
General purpose						
Capacitance (pF)	Last two digits of 12NC	0402	0603	0805	1206	1210
150	38					
180	39					
220	41	0.5±0.05				
270	42					
330	-					
390	-					
470	-					
560	-					
680	-					
820	48					
1 000	49		0.8±0.07			
1 200	51					
1 500	52					
1 800	-					
2 200	-					
2 700	-					
3 300	56			0.85±0.1		
3 900	57			1.25±0.1		
4 700	58					
5 600	-					
6 800	-					
8 200	62				0.85±0.1	
10 000	63					
12 000	64					
15 000	65					0.5 to 1.0
18 000	66					
22 000	67					0.9 to 1.3
Tape width		8 mm				

**Note 1:** Case size designators are inch-based; see General Information section for metric-based case size designators.

**Note 2:** Values in shaded cells indicate thickness class.



# PRODUCT SELECTION CHART

NPO - 25 V, general purpose

Thickness classes and packing quantities							
Thickness class (mm)	8 mm tape width quantity per reel				Quantity per bulk case		
	180 mm / 7"	180 mm / 7"	330 mm / 13"	330 mm / 13"			
	Paper	Blister	Paper	Blister	0402	0603	0805
0.5±0.05	10 000	-	50 000	-	50 000	-	-
0.8±0.07	4 000	-	15 000	-	-	15 000	10 000
0.85±0.1	4 000	-	15 000	-	-	-	8 000
0.5 to 1.0	-	4 000	-	10 000	-	-	-
0.9 to 1.3	-	3 000	-	10 000	-	-	-
1.25±0.1	-	3 000	-	10 000	-	-	5 000

Ordering code 12NC

2 2 X X X X X X 1 X X X

Carrier tape  
22 = blister  
38 = paper  
54 = bulk

Voltage  
91 = 25 V

Size  
7 = 0402  
6 = 0603  
0 = 0805  
1 = 1206  
2 = 1210

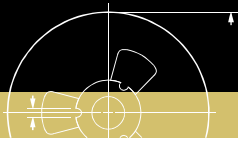
Capacitance value  
see selection chart

Tolerance  
3 = ±1%  
4 = ±2%  
5 = ±5%

Packing  
1 = 180 mm / 7" reel  
5 = 330 mm / 13" reel  
4 = bulk case

Ordering information (North America ONLY)								
Clear text code								
0603CG102J8B200 (example)								
0603	CG	102	J	8	B	2	0	0
Size code	Temp. char.	Cap. in pF	Tolerance	Voltage	Termination	Packing	Marking	Range identifier
0402	CG = NP0	102 = 1000 pF	F = ±1%	8 = 25 V	B = NiSn	2 = 180 mm / 7" paper	0 = no marking	0 = conv.
0603		The third digit	G = ±2%			3 = 330 mm / 13" paper		ceramic
0805		signifies the	J = ±5%			B = 180 mm / 7" blister		
1206		multiplying				F = 330 mm / 13" blister		
1210		factor:				P = bulk case		
		1 = x 10						
		2 = x 100						
		3 = x 1000						





# PRODUCT SELECTION CHART

## NPO - 50 V, general purpose

NPO 50 V								
General purpose								
Capacitance (pF)	Last three digits of 12NC	0402	0603	0805	1206	1210	1812	
0.47	477							
0.56	567							
0.68	687							
0.82	827							
1.0	108							
1.2	128							
1.5	158							
1.8	188							
2.2	228							
2.7	278							
3.3	338							
3.9	398							
4.7	478							
5.6	568							
6.8	688							
8.2	828							
10	109	0.5±0.05						
12	129							
15	159							
18	189		0.8±0.07					
22	229							
27	279							
33	339			0.6±0.1				
39	399							
47	479							
56	569				0.6±0.1			
68	689							
82	829							
100	101							
120	121							
150	151							
180	181							
220	221							
270	271							
330	331							
390	391							
470	471							
560	561							
680	681					0.5 to 1.0		
820	821							
1 000	102							
1 200	122							
1 500	152			0.85±0.1				
1 800	182							
2 200	222			1.25±0.1			0.5 to 1.0	
2 700	272							
3 300	332							
3 900	392				0.85±0.1			
4 700	472							
5 600	562							
6 800	682				1.15±0.1			
8 200	822							
10 000	103							
12 000	123							
15 000	153							
18 000	183						0.9 to 1.3	
22 000	223							
Tape width		8 mm					12 mm	

**Note 1:** Case size designators are inch-based; see General Information section for metric-based case size designators.

**Note 2:** Values in shaded cells indicate thickness class.



# PRODUCT SELECTION CHART

NPO - 50 V, general purpose

Thickness classes and packing quantities								
Thickness class (mm)	8 mm tape width quantity per reel				12 mm tape width quantity per reel	Quantity per bulk case		
	180 mm / 7"	180 mm / 7"	330 mm / 13"	330 mm / 13"	180 mm / 7" blister			
	Paper	Blister	Paper	Blister	1812	0402	0603	0805
0.5±0.05	10 000	-	50 000	-	-	50 000	-	-
0.6±0.1	4 000	-	20 000	-	-	-	-	10 000
0.8±0.07	4 000	-	15 000	-	-	-	15 000	-
0.85±0.1	4 000	-	15 000	-	-	-	-	8 000
0.5 to 1.0	-	4 000	-	10 000	2 000	-	-	-
0.9 to 1.3	-	3 000	-	10 000	1 500	-	-	-
1.15±0.1	-	3 000	-	10 000	-	-	-	-
1.25±0.1	-	3 000	-	10 000	-	-	-	5 000

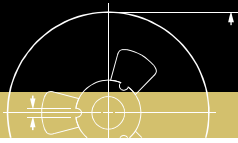
Ordering code 12NC	
<p>2 2 X X X X X X X X X</p> <p>Carrier tape 22 = blister 38 = paper 54 = bulk</p> <p>Voltage 86 = 50 V</p> <p>Size 9 = 0402<sup>(1)</sup> 7 = 0603<sup>(1)</sup> 1 = 0805<sup>(1)</sup> 3 = 1206<sup>(1)</sup> 2 = 1210 5 = 1812</p>	<p>Capacitance value see selection chart</p> <p>Tolerance 4 = ±0.1 pF for 0.47 pF ≤ C &lt; 5 pF ±0.25 pF for 5 pF ≤ C &lt; 10 pF ±2% for C ≥ 10 pF 5 = ±0.25 pF for C &lt; 5 pF ±0.5 pF for 5 pF ≤ C &lt; 10 pF ±5% for C ≥ 10 pF 8 = ±0.1 pF for 5 pF ≤ C &lt; 10 pF (see note 1) ±1% for C ≥ 10 pF</p> <p>Packing 1 = 180 mm / 7" reel 7 = 330 mm / 13" reel 4 = bulk case</p>

Note 1: ±1% only available in 0402, 0603, 0805 and 1206.

Ordering information (North America ONLY)								
Clear text code								
0805CG102J9B200 (example)								
0805	CG	102	J	9	B	2	0	0
Size code	Temp. char.	Cap. in pF	Tolerance	Voltage	Termination	Packing	Marking	Range identifier
0402 <sup>(1)</sup>	CG = NPO	102 = 1000 pF	B = ±0.1 pF	9 = 50 V	B = NiSn	2 = 180 mm / 7" paper	0 = no marking	0 = conv. ceramic
0603 <sup>(1)</sup>		The third digit	C = ±0.25 pF			3 = 330 mm / 13" paper		
0805 <sup>(1)</sup>		signifies the	D = ±0.5 pF			B = 180 mm / 7" blister		
1206 <sup>(1)</sup>		multiplying	F = ±1%			F = 330 mm / 13" blister		
1210		factor:	G = ±2%			P = bulk		
1812		8 = x 0.01	J = ±5%					
		9 = x 0.1						
		0 = x 1						
		1 = x 10						
		2 = x 100						
		3 = x 1000						

Note 1: ±1% only available in 0402, 0603, 0805 and 1206.





# PRODUCT SELECTION CHART

## NPO - 100 V, general purpose

NPO- 100 V							
General purpose							
Capacitance (pF)	Last two digits of 12NC	0603	0805	1206	1210	1812	
10	23						
12	24						
15	25						
18	26						
22	27						
27	28						
33	29						
39	31						
47	32						
56	33						
68	34						
82	35						
100	36						
120	37	0.8±0.07	0.6±0.1	0.6±0.1			
150	38						
180	39						
220	41						
270	42						
330	43						
390	44						
470	45						
560	46						
680	47						
820	48						
1 000	49						
1 200	51						
1 500	52		0.85±0.1				
1 800	53						
2 200	54		1.25±0.1				
2 700	55						
3 300	56						
3 900	57			0.85±0.1			
4 700	58						
5 600	59						
6 800	61			1.15±0.1			
8 200	62				0.5 to 1.0		
10 000	63						
12 000	64					0.5 to 1.0	
15 000	65						
18 000	66					0.9 to 1.3	
22 000	67						
Tape width		8 mm				12 mm	

**Note 1:** Case size designators are inch-based; see General Information section for metric-based case size designators.

**Note 2:** Values in shaded cells indicate thickness class.



# PRODUCT SELECTION CHART

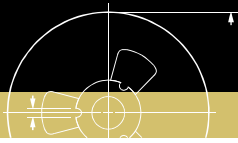
NPO - 100 V, general purpose

Thickness classes and packing quantities							
Thickness class (mm)	8 mm tape width quantity per reel				12 mm tape width quantity per reel	Quantity per bulk case	
	180 mm / 7"	180 mm / 7"	330 mm / 13"	330 mm / 13"	180 mm / 7"		
	Paper	Blister	Paper	Blister	1812	0603	0805
0.6±0.1	4 000	-	20 000	-	-	-	10 000
0.8±0.07	4 000	-	15 000	-	-	15 000	-
0.85±0.1	4 000	-	15 000	-	-	-	8 000
0.5 to 1.0	-	4 000	-	10 000	2 000	-	-
0.9 to 1.3	-	3 000	-	10 000	1 500	-	-
1.15±0.1	-	3 000	-	10 000	-	-	-
1.25±0.1	-	3 000	-	10 000	-	-	5 000

Ordering code 12NC	
<p>2 2 X X X X X X X 1 X X X</p> <p>Carrier tape 22 = blister 38 = paper 54 = bulk</p> <p>Voltage 60 = 100 V</p> <p>Size 6 = 0603 0 = 0805 1 = 1206 2 = 1210 4 = 1812</p>	<p>Capacitance value see selection chart</p> <p>Tolerance 4 = ±2% 5 = ±5%</p> <p>Packing 1 = 180 mm / 7" reel 5 = 330 mm / 13" reel 4 = bulk case</p>

Ordering information (North America ONLY)								
Clear text code								
0805CG102G0B200 (example)								
0805	CG	102	G	0	B	2	0	0
Size code	Temp. char.	Cap. in pF	Tolerance	Voltage	Termination	Packing	Marking	Range identifier
0603	CG = NP0	102 = 1000 pF	G = ±2%	0 = 100 V	B = NiSn	2 = 180 mm / 7" paper	0 = no marking	0 = conv.
0805		The third digit	J = ±5%			3 = 330 mm / 13" paper		ceramic
1206		signifies the				B = 180 mm / 7" blister		
1210		multiplying				F = 330 mm / 13" blister		
1812		factor:				P = bulk case		
		0 = x 1						
		1 = x 10						
		2 = x 100						
		3 = x 1000						





# PRODUCT SELECTION CHART

## NP0 - 200 V, 250 V and 500 V, high voltage

NP0 - 200V, 250 V and 500 V															
High voltage															
Capacitance (pF)	Last two digits of 12NC	200 V				250 V				500 V					
		0805	1206	1210	1812	0805	1206	1210	1812	1206	1210	1812			
10	23														
12	24														
15	25														
18	26														
22	27														
27	28														
33	29														
39	31														
47	32	0.6±0.1	0.6±0.1			0.6±0.1	0.6±0.1			0.6±0.1					
56	33														
68	34														
82	35														
100	36														
120	37														
150	38														
180	39										0.8 to 1.0				
220	41														
270	42														
330	43	0.85±0.1				0.85±0.1				0.85±0.1					
390	44														
470	45		0.85±0.1				0.85±0.1								
560	46	1.25±0.1				1.25±0.1									
680	47														
820	48									1.15±0.1					
1 000	49														
1 200	51										0.9 to 1.3				
1 500	52		1.15±0.1				1.15±0.1								
1 800	53			0.8 to 1.0				0.8 to 1.0			1.2 to 1.75				
2 200	54														
2 700	55			0.9 to 1.3				0.9 to 1.3				0.9 to 1.3			
3 300	56														
3 900	57				0.8 to 1.0				0.8 to 1.0						
4 700	58				0.9 to 1.3				0.9 to 1.3						
5 600	59														
Tape width		8 mm				12 mm		8 mm		12 mm		8 mm		12 mm	

**Note 1:** Case size designators are inch-based; see General Information section for metric-based case size designators.

**Note 2:** Values in shaded cells indicate thickness class.





# PRODUCT SELECTION CHART

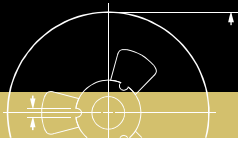
NPO - 200 V, 250 V and 500 V, high voltage

Thickness classes and packing quantities						
Thickness class (mm)	8 mm tape width quantity per reel				12 mm tape width quantity per reel	Quantity per bulk case
	180 mm / 7"	180 mm / 7"	330 mm / 13"	330 mm / 13"	180 mm / 7" blister	
	Paper	Blister	Paper	Blister	1812	
0.6±0.1	4 000	-	20 000	-	-	10 000
0.85±0.1	4 000	-	15 000	-	-	8 000
0.8 to 1.0	-	3 000	-	10 000	2 000	-
0.9 to 1.3	-	3 000	-	10 000	1 500	-
1.15±0.1	-	3 000	-	10 000	-	-
1.25±0.1	-	3 000	-	10 000	-	5 000
1.2 to 1.75	-	2 000	-	10 000	-	-

Ordering code 12NC	
<p>2 2 X X X X X X X 1 X X X</p> <p>Carrier tape 22 = blister 38 = paper 54 = bluk</p> <p>Voltage 93 = 200 V 83 = 250 V 97 = 500 V</p> <p>Size 0 = 0805 1 = 1206 2 = 1210 4 = 1812</p>	<p>Capacitance value see selection chart</p> <p>Tolerance 4 = ±2% 5 = ±5%</p> <p>Packing 1 = 180 mm / 7" reel 5 = 330 mm / 13" reel 4 = bulk case</p>

Ordering information (North America ONLY)								
Clear text code								
1206CG102GBB200 (example)								
1206	CG	102	G	B	B	2	0	0
Size code	Temp. char.	Cap. in pF	Tolerance	Voltage	Termination	Packing	Marking	Range identifier
0805 1206 1210 1812	CG = NP0	102 = 1000 pF The third digit signifies the multiplying factor: 0 = x 1 1 = x 10 2 = x 100 3 = x 1000	G = ±2% J = ±5%	B = 200 V C = 250 V D = 500 V	B = NiSn	2 = 180 mm / 7" paper 3 = 330 mm / 13" paper B = 180 mm / 7" blister F = 330 mm / 13" blister P = bulk case	0 = no marking	0 = conv. ceramic





# PRODUCT SELECTION CHART

## NPO - 1 kV to 4 kV, high voltage

NPO - 1 kV to 4 kV								
High voltage								
Capacitance (pF)	Last two digits of 12NC	1 kV		2 kV	3 kV		4 kV	
		1206	1812	1206	1808	1812	1808	1812
3.3	16							
3.9	17							
4.7	18							
5.6	19							
6.8	21							
8.2	22							
10	23							
12	24							
15	25						1.2 to 1.75	
18	26				0.9 to 1.3			
22	27							1.2 to 1.75
27	28							
33	29							
39	31							
47	32			0.9 to 1.3		0.9 to 1.3		
56	33							
68	34							
82	35							
100	36							
120	37							
150	38							
180	39							
220	41	0.9 to 1.3						
270	42		0.5 to 1.0					
330	43							
390	44							
470	45							
560	46							
680	47							
820	48							
1 000	49							
1 200	51		0.9 to 1.3					
1 500	52							
Tape width		8 mm	12 mm	8 mm	12 mm			

**Note 1:** Case size designators are inch-based; see General Information section for metric-based case size designators.

**Note 2:** Values in shaded cells indicate thickness class.



# PRODUCT SELECTION CHART

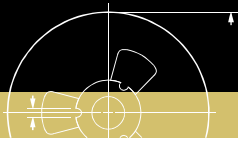
NPO - 1 kV to 4 kV, high voltage

Thickness classes and packing quantities				
Thickness class (mm)	8 mm tape width quantity per reel		12 mm tape width quantity per reel	
	180 mm / 7" blister		180 mm / 7" blister	
	1206	1808	1812	
0.5 to 1.0	-	-	2 000	
0.9 to 1.3	3 000	1 500	1 500	
1.2 to 1.75	-	1 000	1 000	

Ordering code 12NC	
<p>2 2 X X X X X X X 1 X X X</p> <p>Carrier tape 50 = blister</p> <p>Voltage 00 = 1 kV 02 = 2 kV 04 = 3 kV 50 = 4 kV</p> <p>Size 1 = 1206 3 = 1808 4 = 1812</p>	<p>Capacitance value see selection chart</p> <p>Tolerance 5 = ±5%</p> <p>Packing 1 = 180 mm / 7" reel</p>

Ordering information (North America ONLY)								
Clear text code								
1206CG220JFBB00 (example)								
1206	CG	220	J	F	B	B	0	0
Size code	Temp. char.	Cap. in pF	Tolerance	Voltage	Termination	Packing	Marking	Range identifier
1206 1808 1812	CG = NP0	220 = 22 pF The third digit signifies the multiplying factor: 0 = x 1 1 = x 10 2 = x 100	J = ±5%	E = 1 kV F = 2 kV G = 3 kV H = 4 kV	B = NiSn	B = 180 mm / 7" blister	0 = no marking	0 = conv. ceramic





# PRODUCT SELECTION CHART

## NPO - 50 V, microwave

NPO - 50 V				
Microwave				
Capacitance (pF)	Last two digits of 12NC	0603	0805	1206
0.47	05			
0.56	06			
0.68	07			
0.82	08			
1.0	09			
1.2	11			
1.5	12			
1.8	13			
2.2	14			
2.7	15			
3.3	16			
3.9	17	0.8±0.07	0.6±0.1	0.6±0.1
4.7	18			
5.6	19			
6.8	21			
8.2	22			
10	23			
12	24			
15	25			
18	26			
22	27			
27	28			
33	29			
39	31			
47	32			
56	33			
68	34			
82	35			
100	36			
120	37			
Tape width		8 mm		

**Note 1:** Case size designators are inch-based; see General Information section for metric-based case size designators.

**Note 2:** Values in shaded cells indicate thickness class.



# PRODUCT SELECTION CHART

NPO - 50 V, microwave

Thickness classes and packing quantities				
Thickness class (mm)	8 mm tape width quantity per reel		Quantity per bulk case	
	180 mm / 7"	330 mm / 13"		
	Paper	Paper	0603	0805
0.6±0.1	4 000	20 000	-	10 000
0.8±0.07	4 000	15 000	15 000	-

Ordering code 12NC

**2 2 X X X X X 1 X X X**

Carrier tape  
38 = paper  
54 = bulk

Size  
578 = 0603  
574 = 0805  
576 = 1206

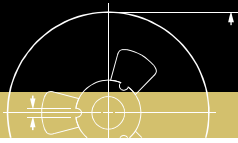
Capacitance value  
see selection chart

Tolerance  
0 = ±0.1 pF for C < 10 pF  
1 = ±0.25 pF for C < 10 pF  
2 = ±0.5 pF for 5 pF ≤ C < 10 pF  
3 = ±1% for C ≥ 10 pF  
4 = ±2% for C ≥ 10 pF  
5 = ±5% for C ≥ 10 pF

Packing  
1 = 180 mm / 7" reel  
5 = 330 mm / 13" reel  
4 = bulk case

Ordering information (North America ONLY)								
Clear text code								
0805CG100G9B20M (example)								
0805	CG	100	G	9	B	2	0	M
Size code	Temp. char.	Cap. in pF	Tolerance	Voltage	Termination	Packing	Marking	Range identifier
0603 0805 1206	CG = NP0	100 = 100 pF The third digit signifies the multiplying factor: 8 = x 0.01 9 = x 0.1 0 = x 1 1 = x 10	B = ±0.1 pF C = ±0.25 pF D = ±0.5 pF F = ±1% G = ±2% J = ±5%	9 = 50 V	B = NiSn	2 = 180 mm / 7" paper 3 = 330 mm / 13" paper P = bulk case	0 = no marking	M = microwave





# PRODUCT SELECTION CHART

## X5R - 6.3 V to 16 V, general purpose

X5R - 6.3 V								
General purpose								
Capacitance (nF)	Last two digits of 12NC	6.3 V						
		0603	0805	1206	1210	1812	2220	
680	61	0.8±0.07						
1 000	63							
1 500	65							
2 200	67							
3 300	69		1.25±0.1					
4 700	72			1.6±0.2				
6 800	74							
10 000	76			1.6±0.2				
15 000	78							
22 000	81				2.5±0.2			
33 000	83							
47 000	85					2.5±0.2		
100 000	89						2.5±0.2	
Tape width		8 mm				12 mm		

**Note 1:** Case size designators are inch-based; see General Information section for metric-based case size designators.

**Note 2:** Values in shaded cells indicate thickness class.

X5R - 10V and 16V									
General purpose									
Capacitance (nF)	Last two digits of 12NC	10 V						16 V	
		0402	0603	0805	1206	1210	1812	1206	
68	47	0.5±0.05							
100	49								
150	52								
220	54	0.5±0.05							
330	56								
470	58		0.8±0.07						
680	61								
1 000	63		0.8±0.07						
1 500	65								
2 200	67			1.25±0.1					
3 300	69				1.6±0.2				
4 700	72			1.25±0.1				1.6±0.2	
6 800	74								
10 000	76				1.6±0.2	2.0±0.2			
15 000	78								
22 000	81					2.5±0.2	2.5±0.2		
33 000	83								
47 000	85								
Tape width		8 mm				12 mm		8 mm	

**Note 1:** Case size designators are inch-based; see General Information section for metric-based case size designators.

**Note 2:** Values in shaded cells indicate thickness class.



# PRODUCT SELECTION CHART

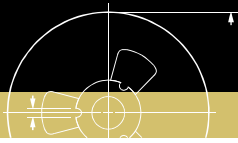
X5R - 6.3 V to 16 V, general purpose

Thickness classes and packing quantities								
Thickness class (mm)	8 mm tape width quantity per reel				12 mm tape width quantity per reel	Quantity per bulk case		
	180 mm / 7"	180 mm / 7"	330 mm / 13"	330 mm / 13"	180mm / 7" Blister			
	Paper	Blister	Paper	Blister	1812 / 2220	0402	0603	0805
0.5 ± 0.05	10 000	-	50 000	-	-	50 000	-	-
0.8 ± 0.07	4 000	-	15 000	-	-	-	15 000	-
1.25 ± 0.1	-	3 000	-	10 000	-	-	-	5 000
1.6 ± 0.2	-	2 500	-	8 000	-	-	-	-
2.0 ± 0.2	-	2 000	-	-	-	-	-	-
2.5 ± 0.2	-	1 000	-	-	500	-	-	-

Ordering code 12NC	
<p>2 2 X X X X X X X 3 X X X</p>	<p>Carrier tape            38 = paper (≥10 V)            22 = blister (≥10 V)            50 = blister (6.3 V)            55 = paper (6.3 V)            54 = bulk</p> <p>Voltage            20 = 6.3 V            24 = 10 V            78 = 16 V</p> <p>Size            7 = 0402            6 = 0603            0 = 0805            1 = 1206            2 = 1210            4 = 1812</p>
	<p>Capacitance value            see selection chart</p> <p>Tolerance            6 = ±10%            7 = ±20%</p> <p>Packing            1 = 180 mm / 7" reel            5 = 330 mm / 13" reel            4 = bulk case</p>

Ordering information (North America ONLY)								
Clear text code								
06032B334M6B20D (example)								
0603	2B	334	M	6	B	2	0	D
Size code	Temp. char.	Cap. in pF	Tolerance	Voltage	Termination	Packing	Marking	Range identifier
0402 0603 0805 1206 1210 1812	2B = X5R	334 = 330 000 pF The third digit signifies the multiplying factor: 4 = x 10 000 5 = x 100 000 6 = x 1 000 000	K = ±10% M = ±20%	5 = 6.3 V 6 = 10 V 7 = 16 V	B = NiSn	2 = 180 mm / 7" paper 3 = 330 mm / 13" paper B = 180 mm / 7" blister F = 330 mm / 13" blister P = bulk case	0 = no marking	D = BME





# PRODUCT SELECTION CHART

## X7R - 10 V, general purpose

X7R - 10 V					
General purpose					
Capacitance (pF)	Last two digits of 12NC	0402	0603	0805	1206
27 000	-				
33 000	43	0.5±0.05			
39 000	-				
47 000	45	0.5±0.05			
56 000	-				
68 000	47	0.5±0.05			
82 000	-				
100 000	49	0.5±0.05			
120 000	-				
150 000	52				
180 000	53		0.8±0.07		
220 000	54			0.6±0.1	
270 000	55				
330 000	56		0.8±0.07		
390 000	57			0.85±0.1	
470 000	58		0.8±0.07		
560 000	59				
680 000	61			1.25±0.1	
820 000	62				
1 000 000	63				
1 200 000	64				0.85±0.1
1 500 000	65				
1 800 000	66				1.15±0.1
2 200 000	67			1.25±0.1	
4 700 000	72				1.6±0.15
Tape width		8 mm			

**Note 1:** Case size designators are inch-based; see General Information section for metric-based case size designators.

**Note 2:** Values in shaded cells indicate thickness class.





# PRODUCT SELECTION CHART

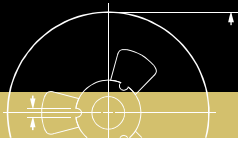
X7R - 10 V, general purpose

Thickness classes and packing quantities							
Thickness class (mm)	8 mm tape width quantity per reel				Quantity per bulk case		
	180 mm / 7"	180 mm / 7"	330 mm / 13"	330 mm / 13"			
	Paper	Blister	Paper	Blister	0402	0603	0805
0.5±0.05	10 000	-	50 000	-	50 000	-	-
0.6±0.1	4 000	-	20 000	-	-	-	10 000
0.8±0.07	4 000	-	15 000	-	-	15 000	-
0.85±0.1	4 000	-	15 000	-	-	-	8 000
1.15±0.1	-	3 000	-	10 000	-	-	-
1.25±0.1	-	3 000	-	10 000	-	-	5 000

Ordering code 12NC	
<p>2 2 X X X X X X X 5 X X X</p> <p>Carrier tape 22 = blister 38 = paper 54 = bulk</p> <p>Voltage 24 = 10 V</p> <p>Size 6 = 0603 7 = 0402 0 = 0805 1 = 1206</p>	<p>Capacitance value see selection chart</p> <p>Tolerance 6 = ±10%</p> <p>Packing 1 = 180 mm / 7" reel 5 = 330 mm / 13" reel 4 = bulk case</p>

Ordering information (North America ONLY)								
Clear text code								
06032R154K6BB0D (example)								
0603	2R	154	K	6	B	B	0	D
Size code	Temp. char.	Cap. in pF	Tolerance	Voltage	Termination	Packing	Marking	Range identifier
0402	2R = X7R	154 = 150 000 pF	K = ±10%	6 = 10 V	B = NiSn	2 = 180 mm / 7" paper	0 = no marking	D = BME
0603		The third digit signifies the multiplying factor:				3 = 330 mm / 13" paper		
0805		4 = x 10 000				B = 180 mm / 7" blister		
1206		5 = x 100 000				F = 330 mm / 13" blister		
						P = bulk case		





# PRODUCT SELECTION CHART

## X7R - 16 V and 25 V, general purpose

X7R - 16 V and 25 V										
General purpose										
Capacitance (pF)	Last two digits of 12NC	16 V					25 V			
		0402	0603	0805	1206	1210	0402	0603	0805	1206
3 300	29									
3 900	31						0.5±0.05			
4 700	32									
5 600	33									
6 800	34									
8 200	35									
10 000	36	0.5±0.05								
12 000	37									
15 000	38							0.8±0.07		
18 000	39								0.6±0.1	
22 000	41									
27 000	42									
33 000	43									
39 000	44									
47 000	45		0.8±0.07							
56 000	46			0.6±0.1					0.85±0.1	
68 000	47									
82 000	48									
100 000	49									
120 000	51									
150 000	52			0.85±0.1					0.85±0.1	
180 000	53									
220 000	54									
270 000	55				0.85±0.1				1.15±0.1	0.5 to 1.0
330 000	56									
390 000	57			1.25±0.1						
470 000	58									0.9 to 1.3
560 000	59									
680 000	61				1.15±0.1					
820 000	62									
1 000 000	63									1.2 to 1.75
4 700 000	72					1.9±0.2				
Tape width		8 mm					8 mm			

**Note 1:** Case size designators are inch-based; see General Information section for metric-based case size designators.

**Note 2:** Values in shaded cells indicate thickness class.



# PRODUCT SELECTION CHART

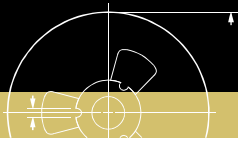
## X7R - 16 V and 25 V, general purpose

Thickness classes and packing quantities								
Thickness class (mm)	8 mm tape width quantity per reel				12 mm tape width quantity per reel	Quantity per bulk case		
	180 mm / 7"	180 mm / 7"	330 mm / 13"	330 mm / 13"	180 mm / 7" blister			
	Paper	Blister	Paper	Blister	1812	0402	0603	0805
0.5±0.05	10 000	-	50 000	-	-	50 000	-	-
0.6±0.1	4 000	-	20 000	-	-	-	-	10 000
0.8±0.07	4 000	-	15 000	-	-	-	15 000	-
0.85±0.1	4 000	-	15 000	-	-	-	-	8 000
0.5 to 1.0	-	4 000	-	10 000	-	-	-	-
0.9 to 1.3	-	3 000	-	10 000	1 500	-	-	-
1.15±0.1	-	3 000	-	10 000	-	-	-	-
1.25±0.1	-	3 000	-	10 000	-	-	-	5 000
1.2 to 1.75	-	2 000	-	-	-	-	-	-
1.9±0.2	-	-	-	-	2 000	-	-	-

Ordering code 12NC	
<p>2 2 X X X X X X X 5 X X X</p> <p>Carrier tape 22 = blister 38 = paper 54 = bulk</p> <p>Voltage 78 = 16 V 91 = 25 V</p> <p>Size 7 = 0402 6 = 0603 0 = 0805 1 = 1206 2 = 1210</p>	<p>Capacitance value see selection chart</p> <p>Tolerance 5 = ±5% 6 = ±10%</p> <p>Packing 1 = 180 mm / 7" reel 5 = 330 mm / 13" reel 4 = bulk case</p>

Ordering information (North America ONLY)								
Clear text code								
12062R104K8BB0D (example)								
1206	2R	104	K	8	B	B	0	D
Size code	Temp. char.	Cap. in pF	Tolerance	Voltage	Termination	Packing	Marking	Range identifier
0402 0603 0805 1206 1210	2R = X7R	104 = 100 000 pF The third digit signifies the multiplying factor: 1 = x 10 2 = x 100 3 = x 1 000 4 = x 10 000 5 = x 100 000	J = ±5% K = ±10%	7 = 16 V 8 = 25 V	B = NiSn	2 = 180 mm / 7" paper 3 = 330 mm / 13" paper B = 180 mm / 7" blister F = 330 mm / 13" blister P = bulk case	0 = no marking	D = BME





# PRODUCT SELECTION CHART

## X7R - 50 V and 100 V, general purpose

X7R - 50 V and 100 V												
General purpose												
Capacitance (pF)	Last two digits of 12NC	50 V						100 V				
		0402	0603	0805	1206	1210	1812	0805	1206	1210	1812	
100	09											
120	11											
150	12											
180	13											
220	14											
270	15											
330	16											
390	17											
470	18											
560	19	0.5±0.05										
680	21											
820	22											
1 000	23											
1 200	24											
1 500	25							0.6±0.1				
1 800	26		0.8±0.07									
2 200	27											
2 700	28			0.6±0.1								
3 300	29								0.85±0.1			
3 900	31				0.85±0.1							
4 700	32											
5 600	33											
6 800	34											
8 200	35											
10 000	36											
12 000	37											
15 000	38											
18 000	39							0.85±0.1				
22 000	41											
27 000	42											
33 000	43					0.5 to 1.0						
39 000	44			0.85±0.1								
47 000	45											
56 000	46											
68 000	47								1.15±0.1	0.5 to 1.0		
82 000	48			1.25±0.1								
100 000	49											
120 000	51											
150 000	52									0.9 to 1.3		
180 000	53				1.15±0.1	0.9 to 1.3					0.9 to 1.3	
220 000	54											
270 000	55						0.9 to 1.3					
330 000	56											
390 000	57											
470 000	58										1.2 to 1.75	
560 000	59											
680 000	61											
820 000	62						1.2 to 1.75					
1 000 000	63											
Tape width		8 mm					12 mm		8 mm		12 mm	

**Note 1:** Case size designators are inch-based; see General Information section for metric-based case size designators.

**Note 2:** Values in shaded cells indicate thickness class.



# PRODUCT SELECTION CHART

X7R - 50 V and 100 V, general purpose

Thickness classes and packing quantities								
Thickness class (mm)	8 mm tape width quantity per reel				12 mm tape width quantity per reel	Quantity per bulk case		
	180 mm / 7"	180 mm / 7"	330 mm / 13"	330 mm / 13"	180 mm / 7" blister			
	Paper	Blister	Paper	Blister	1812	0402	0603	0805
0.5±0.05	10 000	-	50 000	-	-	50 000	-	-
0.6±0.1	4 000	-	20 000	-	-	-	-	10 000
0.8±0.07	4 000	-	15 000	-	-	-	15 000	-
0.85±0.1	4 000	-	15 000	-	-	-	-	8 000
0.5 to 1.0	-	4 000	-	10 000	-	-	-	-
0.9 to 1.3	-	3 000	-	10 000	1 500	-	-	-
1.15±0.1	-	3 000	-	10 000	-	-	-	-
1.25±0.1	-	3 000	-	10 000	-	-	-	5 000
1.2 to 1.75	-	-	-	-	1 000	-	-	-

Ordering code 12NC

**2 2 X X X X X X 5 X X X**

Carrier tape  
22 = blister  
38 = paper  
54 = bulk

Voltage  
58 = 50 V  
60 = 100 V

Size  
7 = 0402  
6 = 0603  
0 = 0805  
1 = 1206  
2 = 1210  
4 = 1812

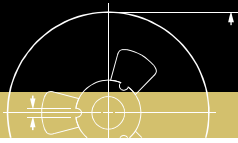
Capacitance value  
see selection chart

Tolerance  
5 = ±5%  
6 = ±10%

Packing  
1 = 180 mm / 7" reel  
5 = 330 mm / 13" reel  
4 = bulk case

Ordering information (North America ONLY)								
Clear text code								
18122R104K0BB0D (example)								
1812	2R	104	K	0	B	B	0	D
Size code	Temp. char.	Cap. in pF	Tolerance	Voltage	Termination	Packing	Marking	Range identifier
0402	2R = X7R	104 = 100 000 pF	J = ±5%	9 = 50 V	B = NiSn	2 = 180 mm / 7" paper	0 = no marking	D = BME
0603		The third digit	K = ±10%	0 = 100 V		3 = 330 mm / 13" paper		
0805		signifies the				B = 180 mm / 7" blister		
1206		multiplying				F = 330 mm / 13" blister		
1210		factor:				P = bulk case		
1812		1 = x 10						
		2 = x 100						
		3 = x 1 000						
		4 = x 10 000						
		5 = x 100 000						





# PRODUCT SELECTION CHART

## X7R - 200 V, 250 V and 500 V, high voltage

X7R - 200 V and 500 V											
High voltage											
Capacitance (pF)	Last two digits of 12NC	200 V				250 V		500 V			
		0805	1206	1210	1812	0805	1206	1206	1210	1812	
220	14										
270	15										
330	16										
390	17										
470	18										
560	19										
680	21										
820	22										
1 000	23										
1 200	24	0.85±0.1				0.85±0.1		1.15±0.1			
1 500	25										
1 800	26										
2 200	27										
2 700	28										
3 300	29		0.85±0.1				0.85±0.1				
3 900	31										
4 700	32								0.9 to 1.3		
5 600	33										
6 800	34	1.25±0.1				1.25±0.1					
8 200	35										
10 000	36										
12 000	37									0.9 to 1.3	
15 000	38										
18 000	39										
22 000	41		1.15±0.1				1.15±0.1				
27 000	42										
33 000	43										
39 000	44			0.9 to 1.3							
47 000	45										
56 000	46										
68 000	47				0.9 to 1.3						
82 000	48										
100 000	49										
120 000	-										
150 000	52				0.9 to 1.3						
Tape width		8 mm				12 mm		8 mm		8 mm	12 mm

**Note 1:** Case size designators are inch-based; see General Information section for metric-based case size designators.

**Note 2:** Values in shaded cells indicate thickness class.



# PRODUCT SELECTION CHART

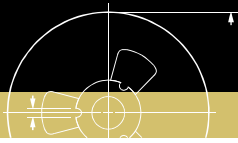
X7R - 200 V, 250 V and 500 V, high voltage

Thickness classes and packing quantities						
Thickness class (mm)	8 mm tape width quantity per reel				12 mm tape width quantity per reel	Quantity per bulk case
	180 mm / 7"	180 mm / 7"	330 mm / 13"	330 mm / 13"	180 mm / 7" blister	
	Paper	Blister	Paper	Blister	1812	
0.85±0.1	4 000	-	15 000	-	-	8 000
0.9 to 1.3	-	3 000	-	10 000	1 500	-
1.15±0.1	-	3 000	-	10 000	-	-
1.25±0.1	-	3 000	-	10 000	-	5 000

Ordering code 12NC	
<p>2 2 X X X X X X X 5 X X X</p> <p>Carrier tape 22 = blister 38 = paper 54 = bulk</p> <p>Voltage 93 = 200 V 83 = 250 V 97 = 500 V</p> <p>Size 0 = 0805 1 = 1206 2 = 1210 4 = 1812</p>	<p>Capacitance value see selection chart</p> <p>Tolerance 5 = ±5% 6 = ±10%</p> <p>Packing 1 = 180 mm / 7" reel 5 = 330 mm / 13" reel 4 = bulk case</p>

Ordering information (North America ONLY)								
Clear text code								
18122R104KBBB0D (example)								
1812	2R	104	K	B	B	B	0	D
Size code	Temp. char.	Cap. in pF	Tolerance	Voltage	Termination	Packing	Marking	Range identifier
0805 1206 1210 1812	2R = X7R	104 = 100 000 pF The third digit signifies the multiplying factor: 1 = x 10 2 = x 100 3 = x 1 000 4 = x 10 000	J = ±5% K = ±10%	B = 200 V C = 250 V D = 500 V	B = NiSn	2 = 180 mm / 7" paper 3 = 330 mm / 13" paper B = 180 mm / 7" blister F = 330 mm / 13" blister P = bulk case	0 = no marking	D = BME





# PRODUCT SELECTION CHART

## X7R - 1 kV and 2 kV, high voltage

X7R - 1 kV and 2 kV						
High voltage						
Capacitance (pF)	Last two digits of 12NC	1 kV			2 kV	
		1206	1808	1812	1808	1812
470	18					
560	19					
680	21					
820	22					
1 000	23				1.2 to 1.75	
1 200	24	0.9 to 1.3	1.2 to 1.75			
1 500	25					
1 800	26					
2 200	27					1.2 to 1.75
2 700	28					
3 300	29			1.2 to 1.75		
3 900	31					
4 700	32					
5 600	33					
6 800	34					
8 200	35					
10 000	36					
Tape width		8 mm	12 mm		12 mm	

**Note 1:** Case size designators are inch-based; see General Information section for metric-based case size designators.

**Note 2:** Values in shaded cells indicate thickness class.

Thickness classes and packing quantities				
Thickness class (mm)	8 mm tape width quantity per reel		12 mm tape width quantity per reel	
	180 mm / 7" blister	330 mm / 13" blister	180 mm / 7" blister	
	1206	1206	1808	1812
0.9 to 1.3	3 000	10 000	-	-
1.2 to 1.75	-	-	1 000	1 000

**Ordering code 12NC**

**2 2 X X X X X X X 5 X X X**

Carrier tape  
50 = blister

Voltage  
00 = 1 kV  
02 = 2 kV

Size  
1 = 1206  
3 = 1808  
4 = 1812

Capacitance value  
see selection chart

Tolerance  
6 = ±10%

Packing  
1 = 180 mm / 7" reel  
5 = 330 mm / 13" reel

Ordering information (North America ONLY)								
Clear text code								
12062R102KEBB0D (example)								
1206	2R	102	K	E	B	B	0	D
Size code	Temp. char.	Cap. in pF	Tolerance	Voltage	Termination	Packing	Marking	Range identifier
1206 1808 1812	2R = X7R	102 = 1000 pF The third digit signifies the multiplying factor: 1 = x 10 2 = x 100 3 = x 1000	K = ±10%	E = 1 kV F = 2 kV	B = NiSn	B = 180 mm / 7" blister F = 330 mm / 13" blister	0 = no marking	D = BME





# PRODUCT SELECTION CHART

X7R - 16 V to 50 V, low inductance

X7R - 16 V to 50 V				
Low inductance				
Capacitance (pF)	Last two digits of 12NC	16 V	25 V	50 V
		0508	0508	0612
10 000	36			
12 000	37			
15 000	38			
18 000	39			
22 000	41			
27 000	42			
33 000	43		0.85±0.1	0.85±0.1
39 000	44			
47 000	45			
56 000	46			
68 000	47			
82 000	48			
100 000	49			
120 000	51			
150 000	52	0.85±0.1		
180 000	53			
220 000	54			
Tape width		8 mm		

**Note 1:** Case size designators are inch-based; see General Information section for metric-based case size designators.

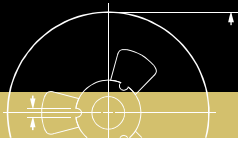
**Note 2:** Values in shaded cells indicate thickness class.

Thickness classes and packing quantities		
Thickness class (mm)	8 mm tape width quantity per reel	
	180 mm / 7"	330 mm / 13"
	Paper	Paper
0.85±0.1	4 000	15 000

Ordering code 12NC	
<p><b>2 2 X X X X X X 5 X X X</b></p> <p>Carrier tape 55 = paper</p> <p>Voltage 08 = 16 V 07 = 25 V 06 = 50 V</p> <p>Size 1 = 0508 0 = 0612</p>	<p>Capacitance value see selection chart</p> <p>Tolerance 6 = ±10%</p> <p>Packing 1 = 180 mm / 7" reel 5 = 330 mm / 13" reel</p>

Ordering information (North America ONLY)								
Clear text code								
06122R103K9BB0L (example)								
0612	2R	103	K	9	B	B	0	L
Size code	Temp. char.	Cap. in pF	Tolerance	Voltage	Termination	Packing	Marking	Range identifier
0508 0612	2R = X7R	103 = 10 000 pF The third digit signifies the multiplying factor: 3 = x 1 000 4 = x 10 000	K = ±10%	7 = 16 V 8 = 25 V 9 = 50 V	B = NiSn	2 = 180 mm / 7" paper 3 = 330 mm / 13" paper	0 = no marking	L = low inductance





# PRODUCT SELECTION CHART

## Y5V - 6.3 V and 10 V, general purpose

Y5V - 6.3 V and 10 V													
General purpose													
Capacitance (nF)	Last two digits of 12NC	6.3 V					10 V						
		0402	0603	0805	1206	1210	0402	0603	0805	1206	1210	1812	
220	54						0.5±0.05						
330	-												
470	58	0.5±0.05						0.8±0.07					
680	-												
1 000	63	0.5±0.05						0.8±0.07					
1 500	65												
2 200	67		0.8±0.07					0.8±0.07					
3 300	69								1.25±0.1				
4 700	72									1.15±0.1			
6 800	74												
10 000	76			1.25±0.1							1.9±0.2		
15 000	78												
22 000	81				1.6±0.15					1.6±0.15	2.0±0.2		
33 000	-												
47 000	85					2.0±0.2						2.5±0.2	
68 000	-												
100 000	89												
Tape width		8 mm					8 mm			12 mm			

**Note 1:** Case size designators are inch-based; see General Information section for metric-based case size designators.

**Note 2:** Values in shaded cells indicate thickness class.

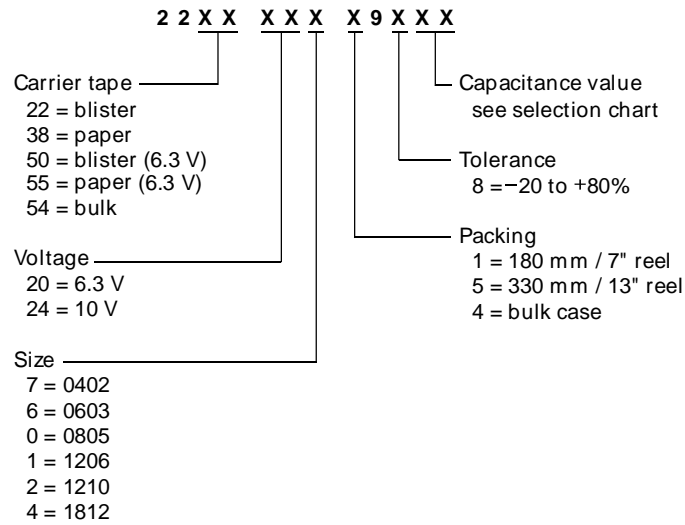
Thickness classes and packing quantities							
Thickness class (mm)	8 mm tape width quantity per reel				12mm tape width quantity per reel	Quantity per bulk case	
	180 mm / 7"	180 mm / 7"	330 mm / 13"	330 mm / 13"	180mm / 7" Blister	Quantity per bulk case	
	Paper	Blister	Paper	Blister	1812	0603	0805
0.5±0.05	10 000	-	50 000	-	-	50 000	-
0.8±0.07	4 000	-	15 000	-	-	15 000	-
0.85±0.1	4 000	-	15 000	-	-	-	-
1.15±0.1	-	3 000	-	10 000	-	-	-
1.25±0.1	-	3 000	-	10 000	-	-	5 000
1.6±0.15	-	2 500	-	7 000	-	-	-
1.9±0.2	-	2 000	-	-	-	-	-
2.0±0.2	-	1 000	-	-	-	-	-
2.5±0.2	-	-	-	-	500	-	-



# PRODUCT SELECTION CHART

Y5V - 6.3 V and 10 V, general purpose

## Ordering code 12NC



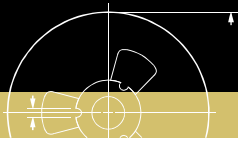
## Ordering information (North America ONLY)

### Clear text code

12062F105Z6BB0D (example)

1206	2F	105	Z	6	B	B	0	D
Size code	Temp. char.	Cap. in pF	Tolerance	Voltage	Termination	Packing	Marking	Range identifier
0402 0603 0805 1206 1210 1812	2F = Y5V	105 = 1 000 000 pF The third digit signifies the multiplying factor: 5 = x 100 000 6 = x 1 000 000	Z = -20 to +80%	5 = 6.3 V 6 = 10 V	B = NiSn	2 = 180 mm / 7" paper 3 = 330 mm / 13" paper B = 180 mm / 7" blister F = 330 mm / 13" blister P = bulk case	0 = no marking	D = BME





# PRODUCT SELECTION CHART

## Y5V - 16 V to 50 V, general purpose

Y5V - 16 V and 25 V										
General purpose										
Capacitance (nF)	Last two digits of 12NC	16 V					25 V			
		0402	0603	0805	1206	1210	0603	0805	1206	1210
10	36									
15	38									
22	41									
33	43	0.5±0.05					0.8±0.07			
47	45									
68	47									
100	49							0.6±0.1		
150	52							0.85±0.1	0.6±0.1	
220	54									
330	56		0.8±0.07							
470	58			0.85±0.1				1.25±0.1	0.85±0.1	
680	61									
1 000	63			1.25±0.1	0.85±0.1				1.15±0.1	
1 500	65									
2 200	67									
3 300	69				1.15±0.1					
4 700	72									
10 000	76					1.2 to 1.75				1.5±0.1
Tape width		8 mm					8 mm			

**Note 1:** Case size designators are inch-based; see General Information section for metric-based case size designators.

**Note 2:** Values in shaded cells indicate thickness class.

Y5V - 50 V				
General purpose				
Capacitance (pF)	Last two digits of 12NC	50 V		
		0603	0805	1206
10 000	05			
15 000	06			
22 000	07			
33 000	08	0.8±0.07	0.6±0.1	
47 000	09			
68 000	11			
100 000	12			
150 000	13			0.6±0.1
220 000	14		0.85±0.1	
330 000	15			0.85±0.1
470 000	16			1.15±0.1
680 000	17			
1 000 000	18			
Tape width		8 mm		

**Note 1:** Case size designators are inch-based; see General Information section for metric-based case size designators.

**Note 2:** Values in shaded cells indicate thickness class.



# PRODUCT SELECTION CHART

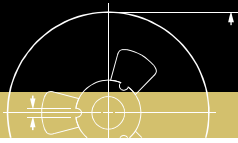
Y5V - 16 V to 50 V, general purpose

Thickness classes and packing quantities							
Thickness class (mm)	8 mm tape width quantity per reel				Quantity per bulk case		
	180 mm / 7"	180 mm / 7"	330 mm / 13"	330 mm / 13"			
	Paper	Blister	Paper	Blister	0402	0603	0805
0.5±0.05	10 000	-	50 000	-	50 000	-	-
0.6±0.1	4 000	-	20 000	-	-	-	10 000
0.8±0.07	4 000	-	15 000	-	-	15 000	-
0.85±0.1	4 000	-	15 000	-	-	-	8 000
1.15±0.1	-	3 000	-	10 000	-	-	-
1.25±0.1	-	3 000	-	10 000	-	-	5 000
1.5±0.1	-	3 000	-	-	-	-	-
1.2 to 1.75	-	-	-	-	-	-	-

Ordering code 12NC	
<p>2 2 X X X X X X X X X X</p> <p>Carrier tape 22 = blister 38 = paper 54 = bulk</p> <p>Voltage 78 = 16 V 91 = 25 V 58 = 50 V</p> <p>Size 7 = 0402 6 = 0603 0 = 0805 1 = 1206 2 = 1210</p>	<p>X 9 X X X</p> <p>Capacitance value see selection chart</p> <p>Tolerance 7 = ±20% 8 = -20 to +80%</p> <p>Packing 1 = 180 mm / 7" reel 5 = 330 mm / 13" reel 4 = bulk case</p>

Ordering information (North America ONLY)								
Clear text code								
12062F684M8BB0D (example)								
1206	2F	684	M	8	B	B	0	D
Size code	Temp. char.	Cap. in pF	Tolerance	Voltage	Termination	Packing	Marking	Range identifier
0402 0603 0805 1206 1210	2F = Y5V	684 = 680 000 pF The third digit signifies the multiplying factor: 2 = x 100 3 = x 1 000 4 = x 10 000 5 = x 100 000	M = ±20% Z = -20 to +80%	7 = 16 V 8 = 25 V 9 = 50 V	B = NiSn	2 = 180 mm / 7" paper 3 = 330 mm / 13" paper B = 180 mm / 7" blister F = 330 mm / 13" blister P = bulk case	0 = no marking	D = BME





# PRODUCT SELECTION CHART

## Z5U - 25 V and 50 V, general purpose

Z5U - 25 V and 50 V					
Capacitance (pF)	Last two digits of 12NC	25 V		50 V	
		0603	1206	0805	1206
10 000	36				
22 000	41				
47 000	45	0.8±0.07		0.6±0.1	0.6±0.1
100 000	49				
220 000	54			1.25±0.1	
470 000	58		1.15±0.1		0.5 to 1.0
1 000 000	63				0.9 to 1.3
Tape width		8 mm		8 mm	

**Note 1:** Case size designators are inch-based; see General Information section for metric-based case size designators.

**Note 2:** Values in shaded cells indicate thickness class.

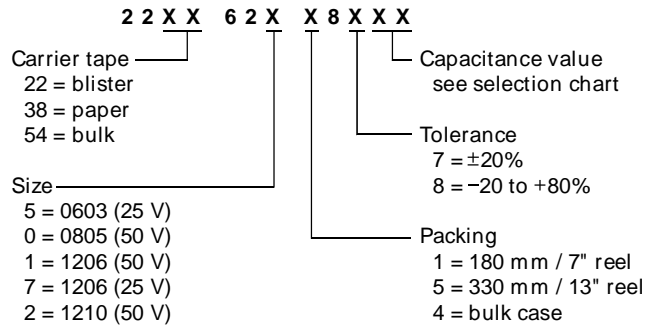
Thickness classes and packing quantities						
Thickness class (mm)	8 mm tape width quantity per reel				Quantity per bulk case	
	180 mm / 7"		330 mm / 13"			
	Paper	Blister	Paper	Blister	0603	0805
0.6±0.1	4 000	-	20 000	-	-	10 000
0.8±0.07	4 000	-	15 000	-	15 000	-
0.5 to 1.0	-	4 000	-	10 000	-	-
0.9 to 1.3	-	3 000	-	10 000	-	-
1.15±0.1	-	3 000	-	10 000	-	-
1.25±0.1	-	3 000	-	10 000	-	5 000



# PRODUCT SELECTION CHART

Z5U - 25 V and 50 V, general purpose

Ordering code 12NC



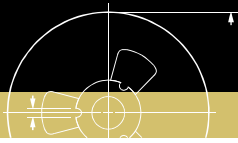
Ordering information (North America ONLY)

Clear text code

06032E104Z8B20D (example)

0603	2E	104	Z	8	B	2	0	D
Size code	Temp. char.	Cap. in pF	Tolerance	Voltage	Termination	Packing	Marking	Range identifier
0603 0805 1206 1210	2E = Z5U	104 = 100 000 pF The third digit signifies the multiplying factor: 3 = x 1 000 4 = x 10 000 5 = x 100 000	M = ±20% Z = -20 to +80%	8 = 25 V 9 = 50 V	B = NiSn	2 = 180 mm / 7" paper 3 = 330 mm / 13" paper B = 180 mm / 7" blister F = 330 mm / 13" blister P = bulk case	0 = no marking	D = BME





# PRODUCT SELECTION CHART

## NPO - 16 V to 50 V, 2-C arrays

NPO - 16 V to 50 V				
2-C arrays				
Capacitance (pF)	Last two digits of 12NC	0405		
		16 V	25 V	50 V
10	23			
12	24			
15	25			
18	26			
22	27			
27	28			
33	29			
39	31			
47	32			
56	33			0.60±0.1
68	34			
82	35			
100	36			
120	37			
150	38			
180	39			
220	41			
270	42			
330	43			
390	44			
470	45		0.60±0.1	
560	46			
680	47	0.60±0.1		
820	48			
1 000	49			

**Note 1:** Case size designators are inch-based; see General Information section for metric-based case size designators.

**Note 2:** Values in shaded cells indicate thickness class.

Thickness classes and packing quantities			
Thickness class (mm)	8 mm tape width quantity per reel		
	180 mm / 7"		330 mm / 13"
	Paper		Paper
0.60±0.1	5 000		20 000

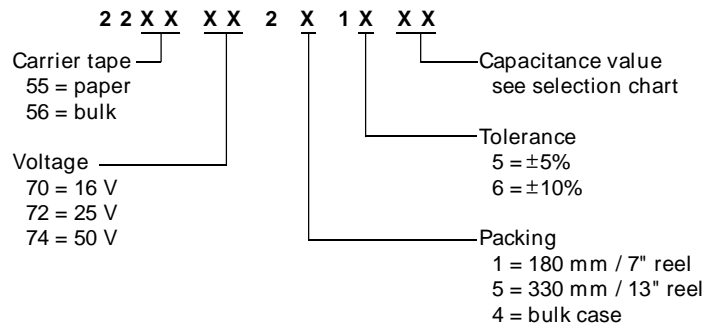




# PRODUCT SELECTION CHART

NPO - 16 V to 50 V, 2-C arrays

Ordering code 12NC



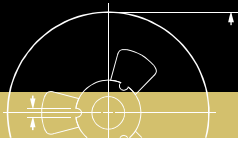
Ordering information (North America ONLY)

Clear text code

0405CG271J7B200 (example)

0405	CG	271	J	7	B	2	0	0
Size code	Temp. char.	Cap. in pF	Tolerance	Voltage	Termination	Packing	Marking	Range identifier
0405	CG = NPO	271 = 270 pF The third digit signifies the multiplying factor: 0 = x 1 1 = x 10 2 = x 100	J = ±5% K = ±10%	7 = 16 V 8 = 25 V 9 = 50 V	B = NiSn	2 = 180 mm / 7" paper 3 = 330 mm / 13" paper P = bulk case	0 = no marking	0 = conv. ceramic





# PRODUCT SELECTION CHART

## X7R - 10 V to 50 V, 2-C arrays

X7R - 10 V to 50 V						
2-C arrays						
Capacitance (pF)	Last two digits of 12NC	0405				0508
		10 V	16 V	25 V	50 V	16 V
100	09					
120	11					
150	12					
180	13					
220	14					
270	15					
330	16					
390	17					
470	18					
560	19					
680	21					
820	22				0.60±0.1	
1 000	23					
1 200	24					
1 500	25					
1 800	26					
2 200	27					
2 700	28					
3 300	29					
3 900	31					
4 700	32					
5 600	33					
6 800	34					
8 200	35					
10 000	36					
12 000	37					
15 000	38			0.60±0.1		
18 000	39					
22 000	41					
27 000	42					
33 000	43					
39 000	44		0.60±0.1			
47 000	45					
56 000	46					
68 000	47					
82 000	48					
100 000	49					0.85±0.1
120 000	51	0.60±0.1				
150 000	52					
220 000	54					0.85±0.1

**Note 1:** Case size designators are inch-based; see General Information section for metric-based case size designators.

**Note 2:** Values in shaded cells indicate thickness class.



# PRODUCT SELECTION CHART

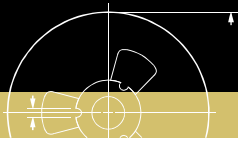
X7R - 10 V to 50 V, 2-C arrays

Thickness classes and packing quantities		
Thickness class (mm)	8 mm tape width quantity per reel	
	180 mm / 7"	330 mm / 13"
	Paper	Paper
0.60±0.1	5 000	20 000
0.85±0.1	4 000	15 000

Ordering code 12NC	
<p>2 2 X X X X X X 5 X X X</p> <p>Carrier tape 55 = paper 56 = bulk</p> <p>Voltage 79 = 10 V 70 = 16 V 72 = 25 V 74 = 50 V</p> <p>Size 2 = 0405 0 = 0508</p>	<p>Capacitance value see selection chart</p> <p>Tolerance 5 = ±5% 6 = ±10%</p> <p>Packing 1 = 180 mm / 7" reel 5 = 330 mm / 13" reel 4 = bulk case</p>

Ordering information (North America ONLY)								
Clear text code								
04052R473J7B20D (example)								
0405	2R	473	J	7	B	2	0	D
Size code	Temp. char.	Cap. in pF	Tolerance	Voltage	Termination	Packing	Marking	Range identifier
0405 2219 (T=0.85mm)	2R = X7R	473 = 47 000 pF The third digit signifies the multiplying factor: 1 = x 10 2 = x 100 3 = x 1 000 4 = x 10 000	J = ±5% K = ±10%	6 = 10 V 7 = 16 V 8 = 25 V 9 = 50 V	B = NiSn	2 = 180 mm / 7" paper	0 = no marking	D = BME





# PRODUCT SELECTION CHART

## NPO - 50 V, 4-C arrays

NPO - 50 V			
4-C arrays			
Capacitance (pF)	Last two digits of 12NC	50 V	
		0508 (4 x 0402)	0612 (4 x 0603)
10	23		
12	24		
15	25		
18	26		
22	27		
27	28		
33	29		
39	31		
47	32	0.6±0.1	0.8±0.1
56	33		
68	34		
82	35		
100	36		
120	37		
150	38		
180	39		
220	41		
270	42		
330	43		
390	44		
470	45		
560	46		
680	47		
820	48		
1 000	49		
Tape width		8 mm	

**Note 1:** Case size designators are inch-based; see General Information section for metric-based case size designators.

**Note 2:** Values in shaded cells indicate thickness class.

**Note 3:** On request, 0508 also available in 0.85±0.1mm.



# PRODUCT SELECTION CHART

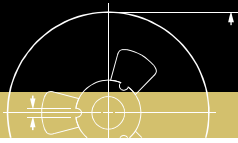
NPO - 50 V, 4-C arrays

Thickness classes and packing quantities	
Thickness class (mm)	8 mm tape width quantity per reel
	180 mm / 7"
	Paper
0.6±0.1	4 000
0.8±0.1	4 000

Ordering code 12NC	
<p>2 2 X X X X X X X X 1 X X X</p> <p>Carrier tape 55 = paper</p> <p>Voltage 14 = 50 V</p> <p>Size 7 = 0508 (4 x 0402) 6 = 0612 (4 x 0603)</p>	<p>Capacitance value see selection chart</p> <p>Tolerance 5 = ±5% 6 = ±10%</p> <p>Packing 1 = 180 mm / 7" reel</p>

Ordering information (North America ONLY)								
Clear text code								
0508CG221J9B100 (example)								
0508	CG	221	J	9	B	1	0	0
Size code	Temp. char.	Cap. in pF	Tolerance	Voltage	Termination	Packing	Marking	Range identifier
0508 (4 x 0402) 0612 (4 x 0603)	CG = NP0	221 = 220 pF The third digit signifies the multiplying factor: 0 = x 1 1 = x 10 2 = x 100	J = ±5% K = ±10%	9 = 50 V	B = NiSn	2 = 180 mm / 7" paper	0 = no marking	0 = conv. ceramic





# PRODUCT SELECTION CHART

## X7R - 16 V, 4-C arrays

X7R - 16 V			
4-C arrays			
Capacitance (pF)	Last two digits of 12NC	16 V	
		0508 (4 x 0402)	0612 (4 x 0603)
10 000	36		
15 000	38		
22 000	41	0.6±0.1	0.8±0.1
33 000	43		
47 000	45		
68 000	47		
100 000	49	0.8±0.1	
Tape width		8 mm	

**Note 1:** Case size designators are inch-based; see General Information section for metric-based case size designators.

**Note 2:** Values in shaded cells indicate thickness class.

**Note 3:** On request, 0508 also available in 0.85±0.1mm.

Thickness classes and packing quantities	
Thickness class (mm)	8 mm tape width
	quantity per reel
	180 mm / 7"
	Paper
0.6±0.1	4 000
0.8±0.1	4 000

Ordering code 12NC	
<p>2 2 X X X X X X X 5 X X X</p> <p>Carrier tape — 55 = paper</p> <p>Voltage — 10 = 16 V</p> <p>Size — 7 = 0508 (4 x 0402) 6 = 0612 (4 x 0603)</p>	<p>Capacitance value — see selection chart</p> <p>Tolerance — 6 = ±10%</p> <p>Packing — 1 = 180 mm / 7" reel</p>

Ordering information (North America ONLY)								
Clear text code								
06122R103K7B10D (example)								
0612	2R	103	K	7	B	1	0	D
Size code	Temp. char.	Cap. in pF	Tolerance	Voltage	Termination	Packing	Marking	Range identifier
0508 (4 x 0402) 0612 (4 x 0603)	2R = X7R	103 = 10 000 pF The third digit signifies the multiplying factor: 3 = x 1 000 4 = x 10 000	K = ±10%	7 = 16 V	B = NiSn	2 = 180 mm / 7" paper	0 = no marking	D = BME



# PRODUCT SELECTION CHART

## X7R - 25 V and 50 V, 4-C arrays

X7R - 25 V and 50 V				
4-C arrays				
Capacitance (pF)	Last two digits of 12NC	25 V	50 V	50 V
		0612 (4 x 0603)	0508 (4 x 0402)	0612 (4 x 0603)
220	14			
330	16			
470	18			
680	21			
1 000	23		0.6±0.1	
1 500	25			0.8±0.1
2 200	27			
3 300	29			
4 700	32			
6 800	34			
10 000	36			
15 000	38			
22 000	41	0.8±0.1		
33 000	43			
47 000	45			
68 000	47	1.2±0.1		
Tape width		8 mm		

**Note 1:** Case size designators are inch-based; see General Information section for metric-based case size designators.

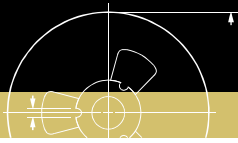
**Note 2:** Values in shaded cells indicate thickness class.

Thickness classes and packing quantities		
Thickness class (mm)	8 mm tape width quantity per reel	
	180 mm / 7" Paper	180 mm / 7" Blister
0.6±0.1	4 000	-
0.8±0.1	4 000	-
1.2±0.1	-	3 000

Ordering code 12NC	
<p>2 2 X X X X X X X X X X</p> <p>Carrier tape ————</p> <p>50 = blister</p> <p>55 = paper</p> <p>Voltage ————</p> <p>12 = 25 V</p> <p>14 = 50 V</p> <p>Size ————</p> <p>6 = 0612 (4 x 0603)</p> <p>7 = 0508 (4 x 0402)</p>	<p>Capacitance value see selection chart</p> <p>Tolerance</p> <p>6 = ±10%</p> <p>7 = ±20%</p> <p>Packing</p> <p>1 = 180 mm / 7" reel</p>

Ordering information (North America ONLY)								
Clear text code								
06122R104K7B20D (example)								
0612	2R	104	K	7	B	2	0	D
Size code	Temp. char.	Cap. in pF	Tolerance	Voltage	Termination	Packing	Marking	Range identifier
0508 (4 x 0402) 0612 (4 x 0603)	2R = X7R	104 = 100 000 pF The third digit signifies the multiplying factor: 1 = x 10 2 = x 100 3 = x 1 000 4 = x 10 000	K = ±10% M = ±20%	8 = 25 V 9 = 50 V	B = NiSn	2 = 180 mm / 7" paper B = 180 mm / 7" blister	0 = no marking	D = BME





# PRODUCT SELECTION CHART

## Y5V - 25 V, 4-C arrays

Y5V - 25 V		
4-C arrays		
Capacitance (pF)	Last two digits of 12NC	0612 (4 x 0603)
10 000	36	0.6±0.1
22 000	41	
47 000	45	
100 000	49	
Tape width		8 mm

**Note 1:** Case size designators are inch-based; see General Information section for metric-based case size designators.  
**Note 2:** Values in shaded cells indicate thickness class.

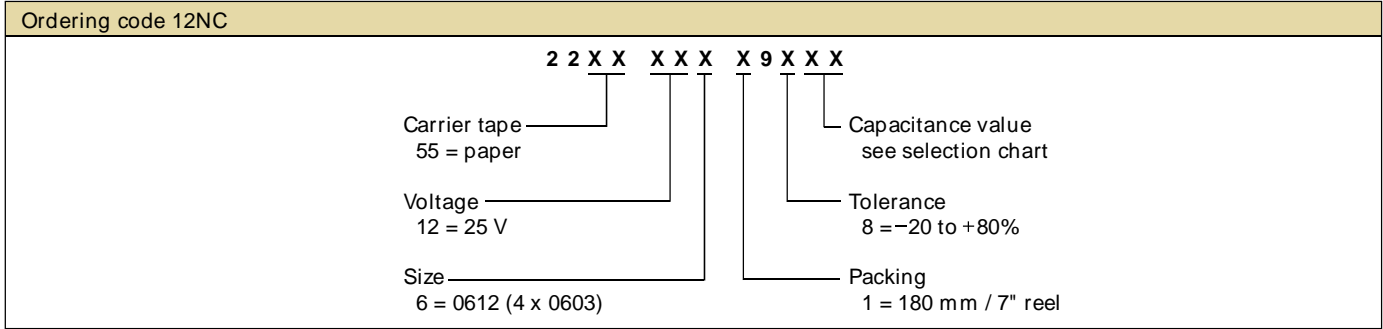
Thickness classes and packing quantities	
Thickness class (mm)	8 mm tape width quantity per reel
	180 mm / 7"
	Paper
0.6±0.1	4 000





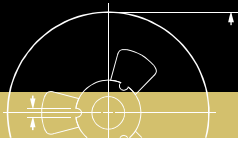
# PRODUCT SELECTION CHART

Y5V - 25 V, 4-C arrays



Ordering information (North America ONLY)								
Clear text code								
06122F104Z8B20D (example)								
0612	2F	104	Z	8	B	2	0	D
Size code	Temp. char.	Cap. in pF	Tolerance	Voltage	Termination	Packing	Marking	Range identifier
0612 (4 x 0603)	2F = Y5V	104 = 100 000 pF The third digit signifies the multiplying factor: 3 = x 1 000 4 = x 10 000	Z = -20 to +80%	8 = 25 V	B = NiSn	2 = 180 mm / 7" paper	0 = no marking	D = BME





# PRODUCT SELECTION CHART

## NPO & X7R Multi-value capacitors network (4-caps)

NPO - 16 V to 50 V			
Multi-value network (4-caps)			
High Cap (pF)	0612		
	16 V	25 V	50 V
10			
15			
22			
33			
47			
68			
82			
39			
47			0.8±0.1
100			
150			
180			
220			
330			
470			
680			
820			
1 000			
1 200		0.8±0.1	
1 500			
2 200	0.8±0.1		
3 300			
Tape width	8 mm		

**Note 1:** Case size designators are inch-based; see General Information section for metric-based case size designators.  
**Note 2:** Values in shaded cells indicate thickness class.

X7R - 10 V to 50 V				
Multi-value network (4-caps)				
High Cap (pF)	0612			
	10 V	16 V	25 V	50 V
100				
150				
220				
330				
470				
560				
680				
820				
1 000				
1 500				
2 200				0.8±0.1
3 300				
4 700				
5 600				
6 800				
8 200				
10 000				
15 000				
22 000				
33 000				
47 000				
56 000			0.8±0.1	
68 000				
82 000				
100 000		0.8±0.1		
150 000				
220 000	0.8±0.1			
Tape width	8 mm			

**Note 1:** Case size designators are inch-based; see General Information section for metric-based case size designators.  
**Note 2:** Values in shaded cells indicate thickness class.



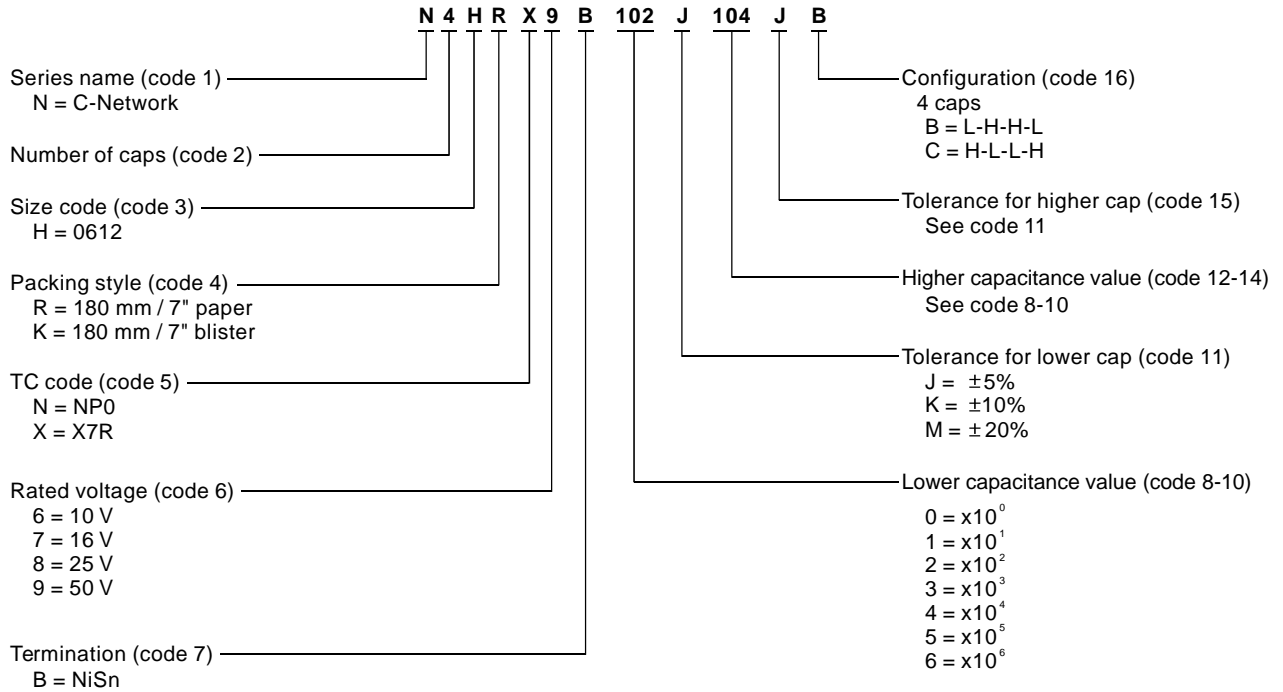
# PRODUCT SELECTION CHART

## NPO & X7R Multi-value capacitors network

### Thickness classes and packing quantities

Thickness class (mm)	8 mm tape width quantity per reel			
	180 mm / 7"		330 mm / 13"	
	Paper	Blister	Paper	Blister
0.8±0.1	4 000	4 000	-	-

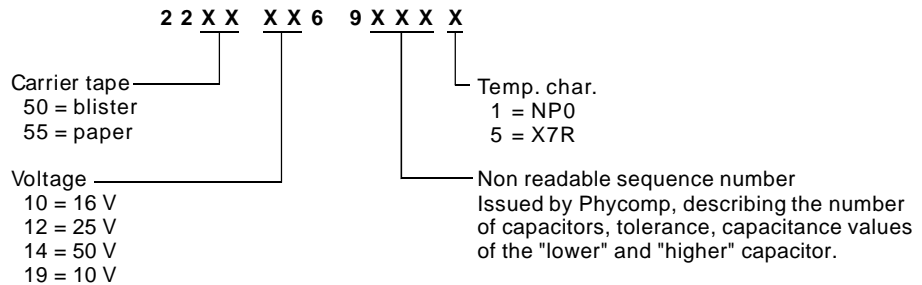
### Ordering information - Clear text code (preferred)



#### Example:

N4HRX7B102M104MA is a 4 cap network in 0612 size with Ni barrier termination, 16 V rated two lower caps of 1 nF and two higher caps of 100 nF each with ± 20% tolerance in X7R material with configuration low-high-high-low cap

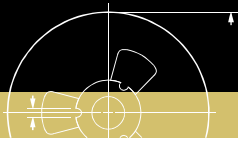
### Ordering code 12NC



#### Example:

225510691015 is a 0612 Network X7R 16 V NiSn paper tape. The sequence number 101 on position 9-11 means 4 caps, low-high-high-low configuration, with 100 pF/ 20%, 10 nF/ 20% tolerance 180mm paper tape.





# PRODUCT SELECTION CHART

## NPO - 25 V, ultra small MLCCs

NPO - 25 V		
Ultra small MLCCs		
Capacitance (pF)	Last three digits of 12NC	0201
27	28	
33	29	
39	31	
47	32	0.3±0.03
56	33	
68	34	
82	35	
100	36	
Tape width		8 mm

**Note 1:** Case size designators are inch-based; see General Information section for metric-based case size designators.

**Note 2:** Values in shaded cells indicate thickness class.

NPO - 50 V		
Ultra small MLCCs		
Capacitance (pF)	Last three digits of 12NC	0201
1.0	108	
1.2	128	
1.5	158	
1.8	188	
2.2	228	
2.7	278	
3.3	338	
3.9	398	
4.7	478	0.3±0.03
5.6	568	
6.8	688	
8.2	828	
10	109	
12	129	
15	159	
18	189	
22	229	
Tape width		8 mm

**Note 1:** Case size designators are inch-based; see General Information section for metric-based case size designators.

**Note 2:** Values in shaded cells indicate thickness class.

**Note 3:** on request 1 pF to 10 pF also available in E24.

Thickness classes and packing quantities			
Thickness class (mm)	8 mm tape width quantity per reel		Quantity per bulk case
	180 mm / 7"	330 mm / 13"	
	Paper	Paper	0201
0.3±0.03	15 000	t.b.d.	t.b.d.



# PRODUCT SELECTION CHART

NPO - 50 V, ultra small MLCCs

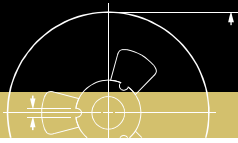
Ordering code 12NC		
<p>2 2 X X X X X X 1 X X X</p>	<p>Carrier tape 38 = paper 54 = bulk</p> <p>Voltage 91 = 25 V</p> <p>Size 8 = 0201</p>	<p>Capacitance value see selection chart</p> <p>Tolerance 4 = ±2% 5 = ±5%</p> <p>Packing 1 = 180 mm / 7" reel 7 = 330 mm / 13" reel 4 = bulk case</p>

Ordering information NP0 - 25 V (North America ONLY)								
Clear text code								
0201CG101J8B200 (example)								
0201	CG	101	J	8	B	2	0	0
Size code	Temp. char.	Cap. in pF	Tolerance	Voltage	Termination	Packing	Marking	Range identifier
0201	CG = NP0	101 = 100 pF The third digit signifies the multiplying factor: 1 = x 10 2 = x 100 3 = x 1 000	G = ±2% J = ±5%	8 = 25 V	B = NiSn	2 = 180 mm / 7" paper 3 = 330 mm / 7" paper P = bulk case	0 = no marking	0 = conv. ceramic

Ordering code 12NC		
<p>2 2 X X X X X X X X X</p>	<p>Carrier tape 38 = paper 54 = bulk</p> <p>Voltage 86 = 50 V</p> <p>Size 8 = 0201</p>	<p>Capacitance value see selection chart</p> <p>Tolerance 4 = ±2% for C ≥ 10 pF = ±0.25 pF for 5 pF ≤ C &lt; 10 pF 5 = ±5% for C ≥ 10 pF = ±0.5 pF for 5 pF &lt; C &lt; 10 pF = ±0.25 pF for C &lt; 5 pF</p> <p>Packing 1 = 180 mm / 7" reel 7 = 330 mm / 13" reel 4 = bulk case</p>

Ordering information NP0 - 50 V (North America ONLY)								
Clear text code								
0201CG479J9B200 (example)								
0201	CG	479	J	9	B	2	0	0
Size code	Temp. char.	Cap. in pF	Tolerance	Voltage	Termination	Packing	Marking	Range identifier
0201	CG = NP0	479 = 4.7 pF The third digit signifies the multiplying factor: 9 = x 0.1 0 = x 1	C = ±0.25 pF D = ±0.5 pF G = ±2% J = ±5%	9 = 50 V	B = NiSn	2 = 180 mm / 7" paper 3 = 330 mm / 7" paper P = bulk case	0 = no marking	0 = conv. ceramic





# PRODUCT SELECTION CHART

## X5R - 6.3 V, ultra small MLCCs

X5R - 6.3 V		
Ultra small MLCCs		
Capacitance (pF)	Last three digits of 12NC	6.3 V
10 000	36	0201
Tape width		0.3±0.03
		8 mm

**Note1:** Case size designators are inch-based; see General Information section for metric-based case size designators.

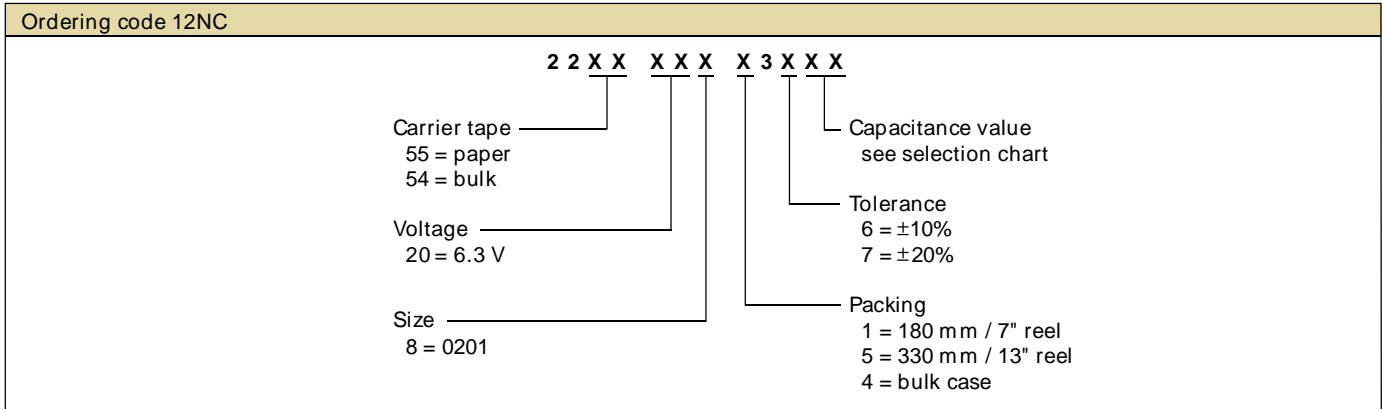
**Note2:** Values in shaded cells indicate thickness class.

Thickness classes and packing quantities			
Thickness class (mm)	8 mm tape width quantity per reel		Quantity per bulk case
	180 mm / 7"	330 mm / 13"	
	Paper	Paper	0201
0.3±0.03	15 000	t.b.d.	t.b.d.



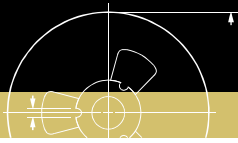
# PRODUCT SELECTION CHART

X5R - 6.3 V, ultra small MLCCs



Ordering information (North America ONLY)								
Clear text code								
02012B103K5B20D (example)								
0201	2B	103	K	5	B	2	0	D
Size code	Temp. char.	Cap. in pF	Tolerance	Voltage	Termination	Packing	Marking	Range identifier
0201	2R = X5R	103 = 10 nF The third digit signifies the multiplying factor: 3 = x 100	K = $\pm 10\%$ M = $\pm 20\%$	5 = 6.3 V	B = NiSn	2 = 180 mm / 7" paper 3 = 330 mm / 13" paper P = bulk case	0 = no marking	D = BME





# PRODUCT SELECTION CHART

## X7R - 16 V to 50 V, ultra small MLCCs

X7R - 16 V to 50 V				
Ultra small MLCCs				
Capacitance (pF)	Last three digits of 12NC	16 V	25 V	50 V
		0201	0201	0201
47	05			
56	06			
68	07			
82	08			
100	09			
120	11			
150	12			0.3±0.03
180	13			
220	14			
270	15			
330	16			
390	17			
470	18			
560	19			
680	21			
820	22		0.3±0.03	
1 000	23			
1 200	24			
1 500	25			
1 800	26			
2 200	27	0.3±0.03		
2 700	28			
3 300	29			
Tape width		8 mm		

**Note 1:** Case size designators are inch-based; see General Information section for metric-based case size designators.

**Note 2:** Values in shaded cells indicate thickness class.

Thickness classes and packing quantities			
Thickness class (mm)	8 mm tape width		Quantity per bulk case
	quantity per reel		
	180 mm / 7"	330 mm / 13"	
	Paper	Paper	0201
0.3±0.03	15 000	t.b.d.	t.b.d.

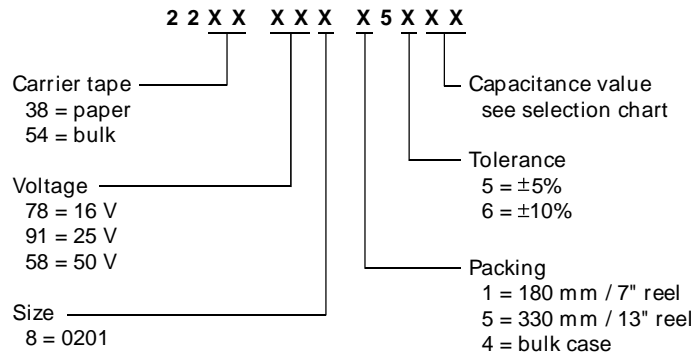




# PRODUCT SELECTION CHART

X7R - 16 V to 50 V, ultra small MLCCs

## Ordering code 12NC



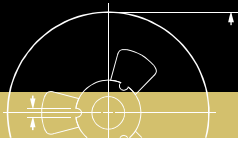
## Ordering information (North America ONLY)

### Clear text code

02012R102J8B20D (example)

0201	2R	102	J	7	B	2	0	D
Size code	Temp. char.	Cap. in pF	Tolerance	Voltage	Termination	Packing	Marking	Range identifier
0201	2R = X7R	102 = 1 000 pF The third digit signifies the multiplying factor: 0 = x 1 1 = x 10 3 = x 100	J = $\pm 5\%$ K = $\pm 10\%$	7 = 16 V 8 = 25 V 9 = 50 V	B = NiSn	2 = 180 mm / 7" paper 3 = 330 mm / 13" paper P = bulk case	0 = no marking	D = BME





# PRODUCT SELECTION CHART

## NP0, X7R and Y5V - X2Y series EMI filter capacitors

NP0					
Size	y-capacitor		x-capacitor		Thickness (mm)
	Capacitance (pF)	U <sub>R</sub> (V)	Capacitance (pF)	U <sub>R</sub> (V)	
0603	22	100	11	200	0.60±0.1
	47	100	24	200	0.60±0.1
	100	100	50	200	0.60±0.1
	220	100	110	200	0.60±0.1
0805	22	100	11	200	0.85±0.1
	47	100	24	200	0.85±0.1
	100	100	50	200	0.85±0.1
	220	100	110	200	0.85±0.1
	330	100	165	200	0.85±0.1

Note 1: Case size designators are inch-based; see General Information section for metric-based case size designators.

X7R					
Size	y-capacitor		x-capacitor		Thickness (mm)
	Capacitance (nF)	U <sub>R</sub> (V)	Capacitance (nF)	U <sub>R</sub> (V)	
0603	4.7	100	2.4	200	0.6±0.1
	10	50 / 63	5	100	0.6±0.1
	22	25	11	50	0.6±0.1
	47	16	24	25	0.6±0.1
	56	16	28	25	0.6±0.1
	100	10	50	16	0.6±0.1
0805	10	100	5	200	0.85±0.1
	15	50 / 63	8	100	0.85±0.1
	22	25	11	50	0.85±0.1
	39	25	20	50	0.85±0.1
	47	16	24	25	0.85±0.1
	100	16	50	25	0.85±0.1
1206	180	10	90	16	0.85±0.1
	22	100	11	200	1.20±0.15
	47	50 / 63	24	100	1.20±0.15
	100	50 / 63	50	100	1.20±0.15
	180	25	90	50	1.20±0.15
	220	16	110	25	1.20±0.15
	390	16	195	25	1.20±0.15
	470	10	235	16	1.20±0.15
1210	820	10	410	16	1.20±0.15
	47	100	24	200	1.20±0.15
	100	100	50	200	1.60±0.15
	220	50 / 63	110	100	1.60±0.15
	470	25	235	50	1.60±0.15
1812	560	25	280	50	1.90±0.15
	1 000	16	500	25	1.60±0.15
	100	100	50	200	1.20±0.15
	220	100	110	200	1.60±0.15
	330	100	165	200	1.90±0.15
1812	470	50 / 63	235	100	1.60±0.15
	560	50 / 63	280	100	1.90±0.15
	1 000	25	500	50	1.60±0.15

Note 1: Case size designators are inch-based; see General Information section for metric based case size designators.



# PRODUCT SELECTION CHART

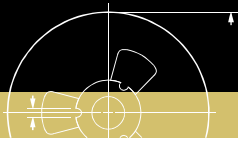
## NP0, X7R and Y5V - X2Y series EMI filter capacitors

Y5V					
Size	y-capacitor		x-capacitor		Thickness (mm)
	Capacitance (nF)	U <sub>R</sub> (V)	Capacitance (nF)	U <sub>R</sub> (V)	
0603	220	16	110	25	0.60±0.1
0805	470	16	235	25	0.85±0.1
1206	2 200	16	1 100	25	1.20±0.15
1210	4 700	16	2 350	25	1.20±0.15

**Note 1:** Case size designators are inch-based; see General Information section for metric-based case size designators.

Thickness classes and packing quantities					
Thickness class (mm)	8 mm tape width quantity per reel				12 mm tape width quantity per reel
	0603 to 1210				1812
	∅180 mm / 7"	∅180 mm / 7"	∅330 mm / 13"	∅330 mm / 13"	∅180 mm / 7"
	Paper	Blister	Paper	Blister	Blister
0.6±0.1	5 000	-	25 000	-	-
0.85±0.1	4 000	-	15 000	-	-
1.2±0.15	-	2 500	-	10 000	-
1.6±0.15	-	2 500	-	7 000	1 200
1.9±0.15	-	2 000	-	-	-





# PRODUCT SELECTION CHART

## NP0, X7R and Y5V - X2Y series EMI filter capacitors

Ordering information							
Clear text code to 12NC cross reference							
TC	Size	y-capacitor			CTC ordering code	12NC ordering code	
		Capacitance	Tolerance %	U <sub>R</sub> (V)			
NP0	0603	22 pF	10%	100	X 0603 KR NP0 0BN 220	225909611627	
		47 pF	10%	100	X 0603 KR NP0 0BN 470	225909611632	
		100 pF	10%	100	X 0603 KR NP0 0BN 101	225909611636	
		220 pF	10%	100	X 0603 KR NP0 0BN 221	225909611641	
	0805	22 pF	10%	100	X 0805 KR NP0 0BN 220	225909011627	
		47 pF	10%	100	X 0805 KR NP0 0BN 470	225909011632	
		100 pF	10%	100	X 0805 KR NP0 0BN 101	225909011636	
		220 pF	10%	100	X 0805 KR NP0 0BN 221	225909011641	
		330 pF	10%	100	X 0805 KR NP0 0BN 331	225909011643	
X7R	0603	4,7 nF	20%	100	X 0603 MR X7R 0BB 472	225909615732	
		10 nF	20%	50 / 63	X 0603 MR X7R 9BB 103	225908615736	
		22 nF	20%	25	X 0603 MR X7R 8BB 223	225907615741	
		47 nF	20%	16	X 0603 MR X7R 7BB 473	225906615745	
		56 nF	20%	16	X 0603 MR X7R 7BB 563	225906615746	
			100 nF	20%	10	X 0603 MR X7R 6BB 104	225905615749
	0805	10 nF	20%	100	X 0805 MR X7R 0BB 103	225909015736	
		15 nF	20%	50 / 63	X 0805 MR X7R 9BB 153	225908015738	
		22 nF	20%	25	X 0805 MR X7R 8BB 223	225907015741	
		39 nF	20%	25	X 0805 MR X7R 8BB 393	225907015744	
		47 nF	20%	16	X 0805 MR X7R 7BB 473	225906015745	
		100 nF	20%	16	X 0805 MR X7R 7BB 104	225906015749	
		180 nF	20%	10	X 0805 MR X7R 6BB 184	225905015753	
	1206	22 nF	20%	100	X 1206 MK X7R 0BB 223	225909125741	
		47 nF	20%	50 / 63	X 1206 MK X7R 9BB 473	225908125745	
		100 nF	20%	50 / 63	X 1206 MK X7R 9BB 104	225908125749	
		180 nF	20%	25	X 1206 MK X7R 8BB 184	225907125753	
		220 nF	20%	16	X 1206 MK X7R 7BB 224	225906125754	
		390 nF	20%	16	X 1206 MK X7R 7BB 394	225906125757	
		470 nF	20%	10	X 1206 MK X7R 6BB 474	225905125758	
		820 nF	20%	10	X 1206 MK X7R 6BB 824	225905125762	
	1210	47 nF	20%	100	X 1210 MK X7R 0BB 473	225909225745	
		100 nF	20%	100	X 1210 MK X7R 0BB 104	225909225749	
		220 nF	20%	50 / 63	X 1210 MK X7R 9BB 224	225908225754	
		470 nF	20%	25	X 1210 MK X7R 8BB 474	225907225758	
		560 nF	20%	25	X 1210 MK X7R 8BB 564	225907225759	
			1000 nF	20%	16	X 1210 MK X7R 7BB 105	225906225763
	1812	100 nF	20%	100	X 1812 MK X7R 0BB 104	225909425749	
		220 nF	20%	100	X 1812 MK X7R 0BB 224	225909425754	
		330 nF	20%	100	X 1812 MK X7R 0BB 334	225909425756	
		470 nF	20%	50 / 63	X 1812 MK X7R 9BB 474	225908425758	
		560 nF	20%	50 / 63	X 1812 MK X7R 9BB 564	225908425759	
		1000 nF	20%	25	X 1812 MK X7R 8BB 105	225907425763	
Y5V	0603	220 nF	-20% / +80%	16	X 0603 ZR Y5V 7BB 224	225906619854	
	0805	470 nF	-20% / +80%	16	X 0805 ZR Y5V 7BB 474	225906019858	
	1206	2200 nF	-20% / +80%	16	X 1206 ZR Y5V 7BB 225	225906119867	
	1210	4700 nF	-20% / +80%	16	X 1812 ZR Y5V 7BB 475	225906219872	

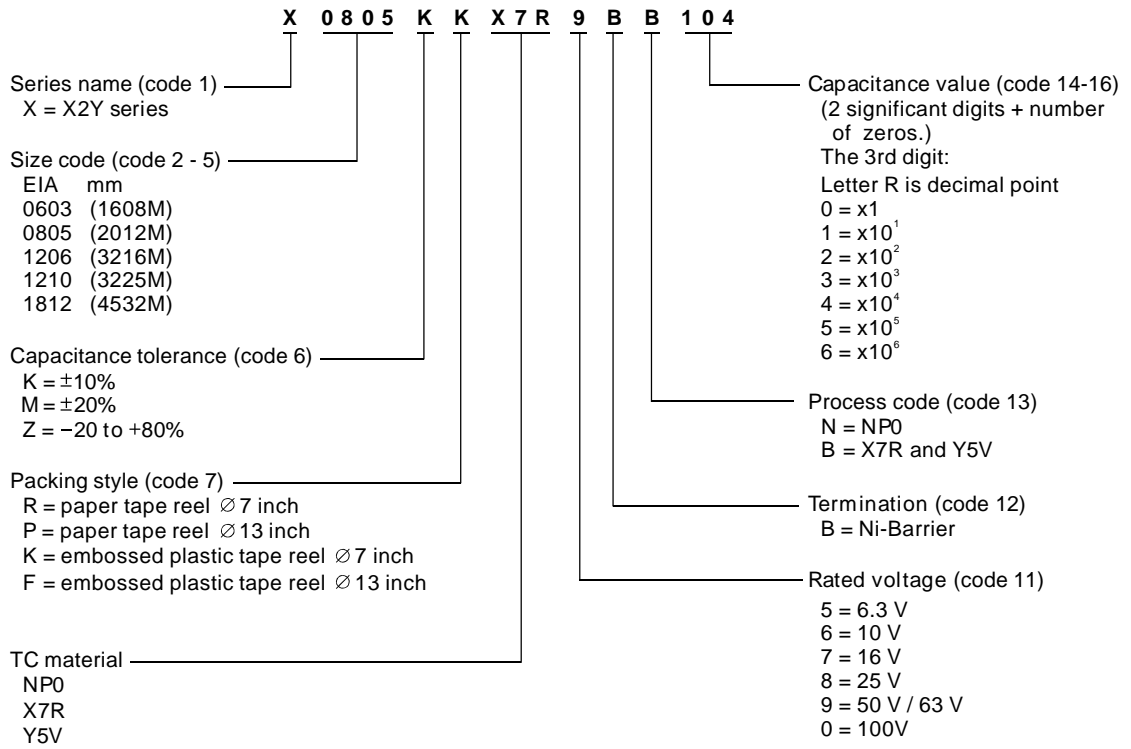
Note: X2Y products are coded according to the properties of the y-capacitors.

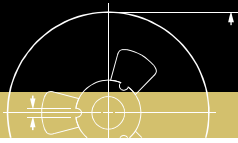


# PRODUCT SELECTION CHART

## NP0, X7R and Y5V - X2Y series EMI filter capacitors

### Clear text code (CTC)





# ENGINEERING DESIGN KITS

## 0201 and 0402 sample kits

0201 sample kit			
NP0 50 V		NP0 25 V	
Capacitance (pF)	Tolerance	Capacitance (pF)	Tolerance
1	±0.25 pF	27	±5%
1.2	±0.25 pF	33	±5%
1.5	±0.25 pF	39	±5%
1.8	±0.25 pF	47	±5%
2.2	±0.25 pF	56	±5%
2.7	±0.25 pF	68	±5%
3.3	±0.25 pF	82	±5%
3.9	±0.25 pF	100	±5%
4.7	±0.25 pF	<b>X7R 50 V</b>	
5.6	±0.50 pF	Capacitance (pF)	Tolerance
6.8	±0.50 pF	47	±10%
8.2	±0.50 pF	68	±10%
10	±5%	100	±10%
12	±5%	150	±10%
15	±5%	220	±10%
18	±5%	330	±10%
22	±5%	470	±10%
<b>X7R 25 V</b>		<b>X7R 16 V</b>	
Capacitance (pF)	Tolerance	Capacitance (pF)	Tolerance
680	±10%	1 500	±10%
1 000	±10%	2 200	±10%
		3 300	±10%

100 pieces per value; Ordering code: 432204407111.

0402 sample kit			
NP0 50 V		X7R 50 V	
Capacitance (pF)	Tolerance	Capacitance (pF)	Tolerance
0.47	±0.25 pF	100	±10%
0.68	±0.25 pF	150	±10%
1	±0.25 pF	220	±10%
1.5	±0.25 pF	330	±10%
2.2	±0.25 pF	470	±10%
3.3	±0.25 pF	680	±10%
4.7	±0.25 pF	1 000	±10%
6.8	±0.50 pF	1 500	±10%
10	±5%	2 200	±10%
15	±5%	3 300	±10%
22	±5%	<b>X7R 25 V</b>	
33	±5%	Capacitance (pF)	Tolerance
47	±5%	4 700	±10%
68	±5%	<b>X7R 16 V</b>	
100	±5%	Capacitance (pF)	Tolerance
150	±5%	6 800	±10%
220	±5%	10 000	±10%
		15 000	±10%
		22 000	±10%
<b>Y5V 16 V</b>			
Capacitance (pF)	Tolerance		
10 000	±20%		
22 000	±20%		
47 000	±20%		
100 000	±20%		

95 pieces per value; Ordering code: 432204409911.



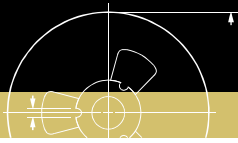
0603 sample kit					
NP0 50 V		NP0 25 V		X7R 16 V	
Capacitance (pF)	Tolerance	Capacitance (pF)	Tolerance	Capacitance (pF)	Tolerance
0.47	±0.25 pF	1 000	±5%	33 000	±10%
0.68	±0.25 pF	1 500	±5%	47 000	±10%
1	±0.25 pF	X7R 50 V		68 000	±10%
1.5	±0.25 pF	Capacitance (pF)	Tolerance	100 000	±10%
2.2	±0.25 pF	100	±10%	Y5V 50 V	
3.3	±0.25 pF	150	±10%	Capacitance (pF)	Tolerance
4.7	±0.25 pF	220	±10%	10 000	±20%
6.8	±0.50 pF	330	±10%	22 000	±20%
10	±5%	470	±10%	47 000	±20%
15	±5%	680	±10%	100 000	±20%
22	±5%	1 000	±10%	Y5V 16 V	
33	±5%	1 500	±10%	Capacitance (pF)	Tolerance
47	±5%	2 200	±10%	220 000	±20%
68	±5%	3 300	±10%	470 000	±20%
100	±5%	4 700	±10%		
150	±5%	6 800	±10%		
220	±5%	10 000	±10%		
330	±5%	X7R 25 V			
470	±5%	Capacitance (pF)	Tolerance		
680	±5%	15 000	±10%		
		22 000	±10%		

48 pieces per value; Ordering code: 432204407121.

0805 sample kit					
NP0 50 V		NP0 25 V		X7R 16 V	
Capacitance (pF)	Tolerance	Capacitance (pF)	Tolerance	Capacitance (pF)	Tolerance
0.47	±0.25 pF	3 300	±5%	150 000	±10%
0.68	±0.25 pF	4 700	±5%	220 000	±10%
1	±0.25 pF	X7R 50 V		330 000	±10%
1.5	±0.25 pF	Capacitance (pF)	Tolerance	470 000	±10%
2.2	±0.25 pF	220	±10%	Y5V 50 V	
3.3	±0.25 pF	330	±10%	Capacitance (pF)	Tolerance
4.7	±0.25 pF	470	±10%	10 000	±20%
6.8	±0.50 pF	680	±10%	22 000	±20%
10	±5%	1 000	±10%	47 000	±20%
15	±5%	1 500	±10%	100 000	±20%
22	±5%	2 200	±10%	220 000	±20%
33	±5%	3 300	±10%	Y5V 16 V	
47	±5%	4 700	±10%	Capacitance (pF)	Tolerance
68	±5%	6 800	±10%	470 000	±20%
100	±5%	10 000	±10%	1 000 000	±20%
150	±5%	15 000	±10%		
220	±5%	22 000	±10%		
330	±5%	33 000	±10%		
470	±5%	47 000	±10%		
680	±5%	68 000	±10%		
1 000	±5%	100 000	±10%		
1 500	±5%				
2 200	±5%				

48 pieces per value; Ordering code: 432204407131.





# ENGINEERING DESIGN KITS

## 1206 sample kit

1206 sample kit					
NP0 50 V		NP0 25 V		X7R 16 V	
Capacitance (pF)	Tolerance	Capacitance (pF)	Tolerance	Capacitance (pF)	Tolerance
0.47	±0.25 pF	10 000	±5%	330 000	±10%
0.68	±0.25 pF	<b>X7R 50 V</b>		470 000	±10%
1	±0.25 pF			Capacitance (pF)	Tolerance
1.5	±0.25 pF	220	±10%	1 000 000	±10%
2.2	±0.25 pF	330	±10%	<b>Y5V 50 V</b>	
3.3	±0.25 pF	470	±10%		
4.7	±0.25 pF	680	±10%	100 000	±20%
6.8	±0.50 pF	1 000	±10%	220 000	±20%
10	±5%	1 500	±10%	470 000	±20%
15	±5%	2 200	±10%	1 000 000	±20%
22	±5%	3 300	±10%		
33	±5%	4 700	±10%		
47	±5%	6 800	±10%		
68	±5%	10 000	±10%		
100	±5%	15 000	±10%		
150	±5%	22 000	±10%		
220	±5%	33 000	±10%		
330	±5%	47 000	±10%		
470	±5%	68 000	±10%		
680	±5%	100 000	±10%		
1 000	±5%	150 000	±10%		
1 500	±5%	220 000	±10%		
2 200	±5%				
3 300	±5%				
4 700	±5%				
6 800	±5%				

48 pieces per value; Ordering code: 432204407141.





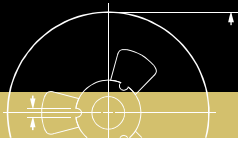
all sizes, all types, E1 series only			
0402		0805	
NPO 50 V		NPO 50 V	
Capacitance (pF)	Tolerance	Capacitance (pF)	Tolerance
1	0.25 pF	1	±0.25 pF
10	±5%	10	±5%
100	±5%	100	±5%
<b>X7R 50 V</b>		1 000	±5%
Capacitance (pF)	Tolerance	<b>X7R 50 V</b>	
100	±10%	Capacitance (pF)	Tolerance
1 000	±10%	1 000	±10%
<b>X7R 16 V</b>		10 000	±10%
Capacitance (pF)	Tolerance	100 000	±10%
10 000	10%	<b>X7R 10 V</b>	
<b>Y5V 16 V</b>		Capacitance (pF)	Tolerance
Capacitance (pF)	Tolerance	1 000 000	±10%
100 000	±20%	<b>Y5V 10 V</b>	
		Capacitance (pF)	Tolerance
		4 700 000	-20/+80%

0603		1206	
NPO 50 V		NPO 50 V	
Capacitance (pF)	Tolerance	Capacitance (pF)	Tolerance
1	±0.25 pF	1	±0.25 pF
10	±5%	10	±5%
100	±5%	100	±5%
<b>X7R 50 V</b>		1 000	±5%
Capacitance (pF)	Tolerance	<b>X7R 50 V</b>	
100	±10%	Capacitance (pF)	Tolerance
1 000	±10%	1 000	±10%
10 000	±10%	10 000	±10%
<b>X7R 16 V</b>		100 000	±10%
Capacitance (pF)	Tolerance	<b>X7R 16 V</b>	
100 000	±10%	Capacitance (pF)	Tolerance
<b>Y5V 10 V</b>		1 000 000	±10%
Capacitance (pF)	Tolerance	<b>Y5V 10 V</b>	
1 000 000	-20/+80%	Capacitance (pF)	Tolerance
		10 000 000	-20/+80%

Microwave 50 V				
Capacitance (pF)	Tolerance	Voltage	Size	Dillectric
1	±0.25 pF	50 V	0603	NPO
10	±5%	50 V	0805	NPO
100	±5%	50 V	1206	NPO
Array (4 x 0603)				
Capacitance (pF)	Tolerance	Voltage	Size	Dillectric
100	±5%	50 V	1206	NPO
1 000	±5%	50 V	1206	NPO
10 000	±10%	25 V	1206	X7R
100 000	±10%	16 V	1206	X7R
High voltage				
Capacitance (pF)	Tolerance	Voltage	Size	Dillectric
10	±5%	3 kV	1808	NPO
100	±5%	3 kV	1812	NPO
10 000	±10%	1 kV	1812	X7R

48 Pieces per value (95 pieces for 0402 and 25 pieces for 1812); Ordering code: 432204500581.





# 12NC CROSS REFERENCE

## 12NC to description cross reference

12NC to description cross reference					
12NC	Description	Page	12NC	Description	Page
222224..3...	X5R 10 V, General purpose	22	22504...1...	NP0 3 kV, High voltage	18
222224..5...	X7R 10 V, General purpose	24	225050..1...	NP0 4 kV, High voltage	18
222224..9...	Y5V 10 V, General purpose	34	225420..3	X5R 6.3 V, General purpose	22
222258..5...	X7R 50 V, General purpose	28	225420..9...	Y5V 6.3 V, General purpose	34
222258..9...	Y5V 50 V, General purpose	36	2254208.3...	X5R 6.3 V, Ultra small MLCCs	54
222260..1...	NP0 100 V, General purpose	14	225424..3	X5R 10 V, General purpose	22
222260..5...	X7R 100 V, General purpose	28	225424..5...	X7R 10 V, General purpose	24
222262..8...	Z5U 25 V and 50 V, General purpose	38	225424..9...	Y5V 10 V, General purpose	34
222278..1...	NP0 16 V, General purpose	8	2254574..1...	NP0 50 V, Microwave	20
222278..3...	X5R 16 V, General purpose	22	2254576..1...	NP0 50 V, Microwave	20
222278..5...	X7R 16 V, General purpose	26	2254578..1...	NP0 50 V, Microwave	20
222278..9...	Y5V 16 V, General purpose	36	225458..5...	X7R 50 V, General purpose	28
222283..1...	NP0 250 V, High voltage	16	225458..9...	Y5V 50 V, General purpose	36
222283..5...	X7R 250 V, High voltage	30	2254588.5...	X7R 50 V, Ultra small MLCCs	56
222286.....	NP0 50 V, General purpose	12	225460..1...	NP0 100 V, General purpose	14
222291..1...	NP0 25 V, General purpose	10	225460..5...	X7R 100 V, General purpose	28
222291..5...	X7R 25 V, General purpose	26	225462..8...	Z5U 25 V and 50 V, General purpose	38
222291..9...	Y5V 25 V, General purpose	36	225478..1...	NP0 16 V, General purpose	8
222293..1...	NP0 200 V, High voltage	16	225478..3	X5R 16 V, General purpose	22
222293..5...	X7R 200 V, High voltage	30	225478..5...	X7R 16 V, General purpose	26
222297..1...	NP0 500 V, High voltage	16	225478..9...	Y5V 16 V, General purpose	36
222297..5...	X7R 500 V, High voltage	30	2254788.5...	X7R 16 V, Ultra small MLCCs	56
223824..3...	X5R 10 V, General purpose	22	225483..1	NP0 250 V, High voltage	16
223824..5...	X7R 10 V, General purpose	24	225483..5	X7R 250 V, High voltage	30
223824..9...	Y5V 10 V, General purpose	34	225486.....	NP0 50 V, General purpose	12
2238574.1...	NP0 50 V, Microwave	20	2254868.....	NP0 50 V, Ultra small MLCCs	53
2238576.1...	NP0 50 V, Microwave	20	225491..1...	NP0 25 V, General purpose	10
2238578.1...	NP0 50 V, Microwave	20	225491..5...	X7R 25 V, General purpose	26
223858..5...	X7R 50 V, General purpose	28	225491..9...	Y5V 25 V, General purpose	36
223858..9...	Y5V 50 V, General purpose	36	2254918.....	NP0 25 V, Ultra small MLCCs	52
2238588.5...	X7R 50 V, Ultra small MLCCs	56	2254918.5...	X7R 25 V, Ultra small MLCCs	56
223860..1...	NP0 100 V, General purpose	14	225493..1...	NP0 200 V, High voltage	16
223860..5...	X7R 100 V, General purpose	28	225493..5...	X7R 200 V, High voltage	30
223862..8...	Z5U 25 V and 50 V, General purpose	38	225497..1...	NP0 500 V, High voltage	16
223878..1...	NP0 16 V, General purpose	8	225497..5...	X7R 500 V, High voltage	30
223878..3...	X5R 16 V, General purpose	22	225506..5...	X7R 50 V, Low inductance	33
223878..5...	X7R 16 V, General purpose	26	225507..5...	X7R 25 V, Low inductance	33
223878..9...	Y5V 16 V, General purpose	36	225508..5...	X7R 16 V, Low inductance	33
2238788.5...	X7R 16 V, Ultra small MLCCs	56	225510..5...	X7R 16 V, 4-C arrays	46
223883..1...	NP0 250 V, High voltage	16	22551069 1	NP0 16 V, Multi-value network	50
223883..5...	X7R 250 V, High voltage	30	22551069 5	X7R 16 V, Multi-value network	50
223886..1...	NP0 50 V, General purpose	12	225512..5...	X7R 25 V, 4-C arrays	46
2238868.....	NP0 50 V, Ultra small MLCCs	53	225512..9...	Y5V 25 V, 4-C arrays	48
223891..1...	NP0 25 V, General purpose	10	22551269 1	NP0 25 V, Multi-value network	50
223891..5...	X7R 25 V, General purpose	26	22551269 5	X7R 25 V, Multi-value network	50
223891..9...	Y5V 25 V, General purpose	36	225514..1...	NP0 50 V, 4-C arrays	44
2238918.....	NP0 25 V, Ultra small MLCCs	52	225514..5...	X7R 50 V, 4-C arrays	46
2238918.5...	X7R 25 V, Ultra small MLCCs	56	22551469 1	NP0 50 V, Multi-value network	50
223893..1...	NP0 200 V, High voltage	16	22551469 5	X7R 50 V, Multi-value network	50
223893..5...	X7R 200 V, High voltage	30	22551969 5	X7R 10 V, Multi-value network	50
223897..1...	NP0 500 V, High voltage	16	225520..3...	X5R 6.3 V, General purpose	22
223897..5...	X7R 500 V, High voltage	30	225520..9...	Y5V 6.3 V, General purpose	34
225000..1...	NP0 1 kV, High voltage	18	2255208.3...	X5R 6.3 V, Ultra small MLCCs	54
225000..5...	X7R 1 kV, High voltage	32	225570..5...	X7R 16 V, 2-C arrays	42
225002..1...	NP0 2 kV, High voltage	18	2255702.1...	NP0 16 V, 2-C arrays	40
22501069...1	NP0 16 V, Multi-value network	50	225572..5...	X7R 25 V, 2-C arrays	42
22501069...5	X7R 16 V, Multi-value network	50	2255722.1...	NP0 25 V, 2-C arrays	40
225012...5...	X7R 25 V, 4-C arrays	46	225574..5	X7R 50 V, 2-C arrays	42
22501269...1	NP0 25 V, Multi-value network	50	2255742.1...	NP0 50 V, 2-C arrays	40
22501269...5	X7R 25 V, Multi-value network	50	225579..5...	X7R 10 V, 2-C arrays	42
225014..5...	X7R 50 V, 4-C arrays	46	2259.....	NP0, X7R and Y5V X2Y series EMI filters	58
22501469...1	NP0 50 V, Multi-value network	50	432204407111	MLCC sample kit, 0201	62
22501469...5	X7R 50 V, Multi-value network	50	432204407121	MLCC sample kit, 0603	63
22501969...5	X7R 10 V, Multi-value network	50	432204407131	MLCC sample kit, 0805	63
225002..5...	X7R 2 kV, High voltage	32	432204407141	MLCC sample kit, 1206	64
225020..3...	X5R 6.3 V, General purpose	22	432204409911	MLCC sample kit, 0402	62
225020..9...	Y5V 6.3 V, General purpose	34	432204500581	MLCC sample kit, all sizes	65

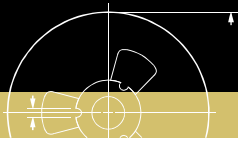


# DESCRIPTION CROSS REFERENCE

## Description to 12NC cross reference

12NC to description cross reference					
Description	12NC	Page	Description	12NC	Page
NP0 16 V, General purpose	222278..1...	8	X7R 50 V, General purpose	225458..5...	18
NP0 16 V, General purpose	223878..1...	8	X7R 100 V, General purpose	222260..5...	18
NP0 16 V, General purpose	225478..1...	8	X7R 100 V, General purpose	223860..5...	22
NP0 25 V, General purpose	222291..1...	10	X7R 100 V, General purpose	225460..5...	34
NP0 25 V, General purpose	223891..1...	10	X7R 200 V, High voltage	222293..5...	54
NP0 25 V, General purpose	225491..1...	10	X7R 200 V, High voltage	223893..5...	22
NP0 50 V, General purpose	222286.....	12	X7R 200 V, High voltage	225493..5...	24
NP0 50 V, General purpose	223886..1...	12	X7R 250 V, High voltage	222283..5...	34
NP0 50 V, General purpose	225486.....	12	X7R 250 V, High voltage	223883..5...	20
NP0 100 V, General purpose	222260..1...	14	X7R 250 V, High voltage	225483..5...	20
NP0 100 V, General purpose	223860..1...	14	X7R 500 V, High voltage	222297..5...	20
NP0 100 V, General purpose	225460..1...	14	X7R 500 V, High voltage	223897..5...	28
NP0 200 V, High voltage	222293..1...	16	X7R 500 V, High voltage	225497..5...	36
NP0 200 V, High voltage	223893..1...	16	X7R 1 kV, High voltage	225000..5...	56
NP0 200 V, High voltage	225493..1...	16	X7R 2 kV, High voltage	225002..5...	14
NP0 250 V, High voltage	222283..1...	16	X7R 16 V, Low inductance	225508..5...	28
NP0 250 V, High voltage	223883..1...	16	X7R 25 V, Low inductance	225507..5...	38
NP0 250 V, High voltage	225483..1...	16	X7R 50 V, Low inductance	225506..5...	8
NP0 500 V, High voltage	222297..1...	16	X7R 10 V, 2-C arrays	225579..5...	22
NP0 500 V, High voltage	223897..1...	16	X7R 16 V, 2-C arrays	225570..5...	26
NP0 500 V, High voltage	225497..1...	16	X7R 25 V, 2-C arrays	225572..5...	36
NP0 1 kV, High voltage	225000..1...	18	X7R 50 V, 2-C arrays	225574..5...	56
NP0 2 kV, High voltage	225002..1...	18	X7R 16 V, 4-C arrays	225510..5...	16
NP0 3 kV, High voltage	225004..1...	18	X7R 25 V, 4-C arrays	225012..5...	30
NP0 4 kV, High voltage	225050..1...	18	X7R 25 V, 4-C arrays	225512..5...	12
NP0 50 V, Microwave	2238574.1...	20	X7R 50 V, 4-C arrays	225014..5...	53
NP0 50 V, Microwave	2238576.1...	20	X7R 50 V, 4-C arrays	225514..5...	10
NP0 50 V, Microwave	2238578.1...	20	X7R 10 V, Multi-value network	22501969...5	26
NP0 50 V, Microwave	2254574..1...	20	X7R 10 V, Multi-value network	22551969...5	36
NP0 50 V, Microwave	2254576..1...	20	X7R 16 V, Multi-value network	22501069...5	52
NP0 50 V, Microwave	2254578..1...	20	X7R 16 V, Multi-value network	22551069...5	56
NP0 16 V, 2-C arrays	2255702.1...	40	X7R 25 V, Multi-value network	22501269...5	16
NP0 25 V, 2-C arrays	2255722.1...	40	X7R 25 V, Multi-value network	22551269...5	30
NP0 50 V, 2-C arrays	2255742.1...	40	X7R 50 V, Multi-value network	22501469...5	16
NP0 50 V, 4-C arrays	225514..1...	44	X7R 50 V, Multi-value network	22551469...5	30
NP0 16 V, Multi-value network	22501069...1	50	X7R 16 V, Ultra small MLCCs	2238788.5...	33
NP0 16 V, Multi-value network	22551069...1	50	X7R 16 V, Ultra small MLCCs	2254788.5...	33
NP0 25 V, Multi-value network	22501269...1	50	X7R 25 V, Ultra small MLCCs	2238918.5...	33
NP0 25 V, Multi-value network	22551269...1	50	X7R 25 V, Ultra small MLCCs	2254918.5...	46
NP0 50 V, Multi-value network	22501469...1	50	X7R 50 V, Ultra small MLCCs	2238588.5...	50
NP0 50 V, Multi-value network	22551469...1	50	X7R 50 V, Ultra small MLCCs	2254588.5...	50
NP0 25 V, Ultra small MLCCs	2238918.....	52	Y5V 6.3 V, General purpose	225020..9...	46
NP0 25 V, Ultra small MLCCs	2254918.....	52	Y5V 6.3 V, General purpose	225420..9...	48
NP0 50 V, Ultra small MLCCs	2238868.....	53	Y5V 6.3 V, General purpose	225520..9...	50
NP0 50 V, Ultra small MLCCs	2254868.....	53	Y5V 10 V, General purpose	222224..9...	50
X5R 6.3 V, General purpose	225020..3...	22	Y5V 10 V, General purpose	223824..9...	44
X5R 6.3 V, General purpose	225520..3...	22	Y5V 10 V, General purpose	225424..9...	46
X5R 6.3 V, General purpose	225420..3...	22	Y5V 16 V, General purpose	222278..9...	50
X5R 10 V, General purpose	222224..3...	22	Y5V 16 V, General purpose	223878..9...	50
X5R 10 V, General purpose	223824..3...	22	Y5V 16 V, General purpose	225478..9...	50
X5R 10 V, General purpose	225424..3...	22	Y5V 25 V, General purpose	222291..9...	22
X5R 16 V, General purpose	222278..3...	22	Y5V 25 V, General purpose	223891..9...	34
X5R 16 V, General purpose	223878..3...	22	Y5V 25 V, General purpose	225491..9...	54
X5R 16 V, General purpose	225478..3...	22	Y5V 50 V, General purpose	222258..9...	42
X5R 6.3 V, Ultra small MLCCs	2254208.3...	54	Y5V 50 V, General purpose	223858..9...	40
X5R 6.3 V, Ultra small MLCCs	2255208.3...	54	Y5V 50 V, General purpose	225458..9...	42
X7R 10 V, General purpose	222224..5...	24	Y5V 25 V, 4-C arrays	225512..9...	40
X7R 10 V, General purpose	223824..5...	24	Z5U 25 V and 50 V, General purpose	222262..8...	42
X7R 10 V, General purpose	225424..5...	24	Z5U 25 V and 50 V, General purpose	223862..8...	40
X7R 16 V, General purpose	222278..5...	26	Z5U 25 V and 50 V, General purpose	225462..8...	42
X7R 16 V, General purpose	223878..5...	26	NP0, X7R and Y5V X2Y series EMI filters	2259.....	58
X7R 16 V, General purpose	225478..5...	26	MLCC sample kit, 0201	432204407111	62
X7R 25 V, General purpose	222291..5...	26	MLCC sample kit, 0402	432204409911	63
X7R 25 V, General purpose	223891..5...	26	MLCC sample kit, 0603	432204407121	63
X7R 25 V, General purpose	225491..5...	26	MLCC sample kit, 0805	432204407131	64
X7R 50 V, General purpose	222258..5...	28	MLCC sample kit, 1206	432204407141	62
X7R 50 V, General purpose	223858..5...	28	MLCC sample kit, all sizes	432204500581	65





# COMPETITOR CROSS REFERENCE

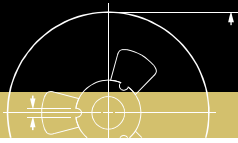
## MLCC cross reference

Manufacturer	Yageo	Phycomp	AVX	Kemet	Murata	NIC	Panasonic	Rohm	Samsung	TDK	Vishay Vitramon
1 Series	CC	-	-	C	GRM	NMC	ECU	MCH	CL	CC	VJ
Case size											
0402	0402	0402	0402	0402	15	0402	Q	15	5	0402	0402
2 0603	0603	0603	0603	0603	18	0603	V	18	10	0603	0603
0805	0805	0805	0805	0805	21	0805	N/G	21	21	0805	0805
1206	1206	1206	1206	1206	31	1206	M/H	31	31	1206	1206
Temperature coefficient											
NP0	NP0	CG	A	G	5C	NP0	C	A	C	NP0	A
X7R	X7R	2R	C	R	R7	X7R	B	C	B	X7R	X
Z5U	Z5U	2E	E	U	E4	Z5U	-	E	E	Z5U	U
Y5V	Y5V	2F	G	V	F5	Y5V	F	F	F	Y5V	-
4 Nominal capacitance	(examples)										
	0.01 $\mu$ F = 103		470 pF = 471			2.2 pF = 2R2			0.5 pF = 0R5		
5 Capacitance tolerance											
	B	C	D	F	G	J	K	M	Z		
	$\pm 0.1$ pF	$\pm 0.25$ pF	$\pm 0.50$ pF	$\pm 1.0\%$	$\pm 2.0\%$	$\pm 5.0\%$	$\pm 10\%$	$\pm 20\%$	80% - 20%		
Rated voltage											
6 16 V	7	7	Y	4	1C	16	1C	3	O	C	-
25 V	8	8	3	3	1E	25	1E	2	A	E	X
50 V	9	9	5	5	1H	50	1H	5	B	H	A
100 V	0	0	1	1	2A	100	-	-	C	-	B
7 Termination											
NiBar	B	B	T	C	(GRM)	-	-	(MCH)	N	-	X
AgPd	-	-	1	-	(GRP)	-	-	(MC)	-	-	F
8 Packing											
Bulk	-	-	B	-	B	-	X	-	B	B	B
Paper tape 7" reel	R	2	N	-	D	-	V	K	C	-	C
Paper tape 13" reel	P	3	S	-	J	-	Y	L	D	-	P
Blister tape 7" reel	K	B	M	-	L	-	W	P	E	T	T
Blister tape 13" reel	F	F	R	-	K	-	Z	Q	F	-	R
Bulk cassette	C	P	7	-	-	-	C	C	P	M	-

Company	Sample P/N	Description	MLCC	0402	20%	25 V	Y5V	NiBar		22nF
Yageo	CC0402MRY5V7BN223	1	2	5	8	3	6	7	BME	4
		CC	0402	M	R	Y5V	8	B	B	223
Phycomp	04022F223M8B20D	2	3	4	5	6	7	8	BME	
		0402	2F	223	M	8	B	2	D	
AVX	04023E223AT2	2	6	3	4	-	7	8		
		0402	3	E	223	A	T	2		
Kemet	C0402C223M3VAC	1	2	Std.	4	5	6	3	N/A	7
		C	0402	C	223	M	3	V	A	C
Murata	GRM188B11H102KA01K	1	2	Thickness	3	6	4	5	Std.	8
		GRM	18	8	B1	1H	102	K	A01	K
Panasonic	ECUE1E223MFQ	1	8	6	4	5	3	2		
		ECU	E	1E	223	M	F	Q		
Rohm	MCH15016F223ZK	1	2	6	3	4	5	8		
		MCH	15	025	F	223	M	K		
Vishay Vitramon	VJ0402 223MXXC	1	2	3	4	5	7	6	8	
		VJ	0402	-	223	M	X	X	C	







# GENERAL INFORMATION

## Standard series of values in a decade according to IEC 63

E6 series:	10	15	22	33	47	68						
E12 series:	10	12	15	18	22	27	33	39	47	56	68	82
E24 series:	10	11	12	13	15	16	18	20	22	24	27	30
	33	36	39	43	47	51	56	62	68	75	82	91
E96 series:	100	102	105	107	110	113	115	118	121	124	127	130
	133	137	140	143	147	150	154	158	162	165	169	174
	178	182	187	191	196	200	205	210	215	221	226	232
	237	243	249	255	261	267	274	280	287	294	301	309
	316	324	332	340	348	357	365	374	383	392	402	412
	422	432	442	453	464	475	487	499	511	523	536	549
	562	576	590	604	619	634	649	665	681	698	715	732
	750	768	787	806	825	845	866	887	909	931	953	976

## Ordering information 12NC

The first 8 or 9 digits of the 12 digit catalogue number are given under "Ordering information - preferred types" (see following pages).

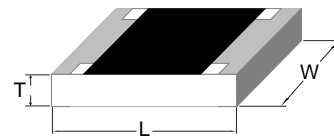
The remaining 4 or 3 digits represent the resistance value with the last digit indicating the multiplier as shown in the table.

Example:

0.02 Ω = 0200 or 200  
 0.3 Ω = 3007 or 307  
 1 Ω = 1008 or 108  
 33 kΩ = 3303 or 333  
 10 MΩ = 1006 or 106

Last digit of 12NC	
Resistance	Last digit
0.01 to 0.0976 Ω	0
0.1 to 0.976 Ω	7
1 to 9.76 Ω	8
10 to 97.6 Ω	9
100 to 976 Ω	1
1 to 9.76 kΩ	2
10 to 97.6 kΩ	3
100 to 976 kΩ	4
1 to 9.76 MΩ	5
10 to 97.6 MΩ	6

## Case size dimensions



Size code	L (mm)	W (mm)	T (mm)	Mass (g)
0201	0.6	0.3	0.3	0.02
0402	1.0	0.5	0.35	0.06
0603	1.6	0.8	0.45	0.20
0805	2.0	1.25	0.55	0.55
1206	3.2	1.6	0.55	1.0
1210	3.1	2.6	0.55	1.67
1218	3.0	4.6	0.44	3.0
2010	5.0	2.5	0.55	2.5
2512	6.4	3.1	0.55	4.25



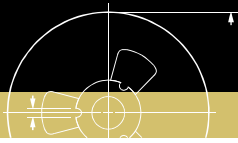
## Ordering information - Clear text code (North America ONLY)

		1-2	3-6	7-8	9-12	13	14	15-16	17			
		X	X	X	X	X	X	X	X			
<b>Series</b>	<b>Name (code 1-2)</b>									<b>Packing (code 17)</b>		
9C	Thick film chip resistors									T	5K paper	
9T	Thin film chip resistors									3	10K paper	
										4	20K paper	
										5	4K blister	
										6	5K blister	
										7	50K paper	
										P	25K bulk case	
<b>Size code (standard resistors, code 3-6)</b>										<b>Special coding (code 15-16)</b>		
0201	0201 ( 0603 )									HF	SnPb	
0402	0402 ( 1005 )									PF	100% Sn 2372	
0603	0603 ( 1608 )									AF	NiAu	
0805	0805 ( 2012 )									<b>TCR (code 14)</b>		
1206	1206 ( 3216 )									A	±25 ppm/ C	
1210	1210 ( 3225 )									B	±50 ppm/ C	
1218	1218 ( 3248 )									K	±100 ppm/ C	
2010	2010 ( 5025 )									L	±200 ppm/ C	
2512	2512 ( 6432 )									E	±250 ppm/ C	
AC34	0603 (1608) 4R concave array									M	±300 ppm/ C	
AV34	0603 (1608) 4R convex array									G	±500 ppm/ C	
AV22	0402 (1005) 2R convex array									P	±750 ppm/ C	
AV24	0402 (1005) 4R convex array									H	±1000 ppm/ C	
AV28	0402 (1005) 8R convex array									I	±1500 ppm/ C	
RN31	10P8R in convex network									J	±2000 ppm/ C	
RC21	10P4C4R in 1608 concave network									N	±3000 ppm/ C	
FR01	1206 (3216) Fusible									-	Base on spec.	
FR21	0603 (1608) Fusible									<b>Tolerance (code 13)</b>		
SR01	1206 (3216) Surge									P	±0.2%	
VR01	1206 (3216) High voltage 5%									L	±0.01%	
VR02	1206 (3216) High voltage 1%									W	±0.05%	
VR11	0805 (2012) High voltage 5%									B	±0.1%; ±0.2 dB	
VR12	0805 (2012) High voltage 1%									C	±0.25%; ±0.3 dB	
VR21	2512 (6432) High voltage 5%									D	±0.5 %; ±0.5 dB	
MR22	2512 (6432) Power metal strip									F	±1%; ±1 dB	
V321	0404 (1010) RF attenuator									G	±2%; ±2 dB	
										J	±5%	
										K	±10%	
										N	±20%; 0/-20%	
										R	±30%; 0/-30%	
<b>Power rating (code 7-8)</b>										<b>dB values apply to Attenuators</b>		
1A	1/16 W	0.063 W										
1A	1/10 W	0.10 W	← upgraded from 1/16 W (0603)									
2A	1/8 W	0.125 W										
3A	1/4 W	0.250 W										
4A	1/10 W	0.10 W										
5A	1/3 W	0.33 W										
7A	1/20 W	0.05 W										
8A	1/32 W	0.03125 W										
12	1/2 W	0.5 W										
1W	1 W	1 W										
<b>Resistance value (code 9-12)</b>										<b>Right values apply to trimmable resistors</b>		
OR00	Jumper											
R0XX	< 0.1R											
RXXX	0.1R - 0.976R											
XRXX	1R - 9.76R											
XXRX	10R - 97.6R											
XXX0	100R - 976R											
XXX1	1K - 9.76K											
XXX2	10K - 97.6K											
XXX3	100K - 976K											
XXX4	1M - 9.76M											
XXX5	10M - 97.6M											
XXX6	100M+											
XXdB	1 - 20 dB											
NXXX	RCB210											

dB values apply to Attenuators

Right values apply to trimmable resistors

Example:  
R-chip 0603 (RC22H), 10R0, 1%, 5K reel = 9C06031A10R0FKHFT



# PROGRAM SURVEY

General Purpose / Precision Resistors												
	SMD					R-Array (note)				R-network	RC-network	
	Thick film										1206	1608
	1206	0805	0603	0402	0201	4 x 0603	8 x 0402	4 x 0402	2 x 0402			
5%	RC01	RC11	RC21	RC31	RC41	ARC241 ARV241	ARV381	ARV341	ARV321	RNA310	RCB210	
1% (TC200)				RC32	RC42	ARV242	ARV382	ARV342	ARV322			
1% (TC100)	RC02H	RC12H	RC22H			ARC242						
1% (TC50)	RC02G	RC12G										

TC = Temperature coefficient ; ARC = conCave type termination; ARV = conVex type termination.

High Precision Resistors										
	Thick film				Thin film					
		0.5%	0.25%	0.1%		1%	0.5%	0.25%	0.1%	0.05%
1210					TC50	TF520	TF521	TF522	TF523	TF524
					TC25	TF510	TF511	TF512	TF513	TF514
1206	TC100		RC04H	RC05H	TC50	TF020	TF021	TF022	TF023	TF024
	TC50	RC03G	RC04G	RC05G	TC25	TF010	TF011	TF012	TF013	TF014
0805	TC100		RC14H	RC15H	TC50	TF120	TF121	TF122	TF123	TF124
	TC50	RC13G	RC14G	RC15G	TC25	TF110	TF111	TF112	TF113	TF114
0603	TC100	RC23H	RC24H	RC25H	TC50	TF220	TF221	TF222	TF223	TF224
					TC25	TF210	TF211	TF212	TF213	TF214
0402	TC200	RC33			TC50	TF320	TF321	TF322	TF323	TF324
					TC25	TF310	TF311	TF312	TF313	TF314



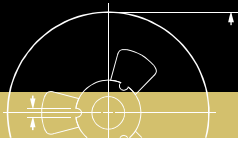


Power Resistors		
P <sub>nom</sub> at 70° C	SMD	
	Thick film	
	5%	1%
0.5 W	PRC101	PRC102
	LPRC101	LPRC102
0.5 W	PRC111	PRC111
	LPRC111	LPRC111
1.0 W	PRC201	PRC201
	LPRC201	LPRC201
	PRC221	PRC221
	LPRC221	LPRC221
	VPRC221	
	SMD	
	Metal strip	
	5%	1%
	MPRC221	MPRC221

Application Specific Resistors				
	1206	0805	0603	0402
High ohmic / High voltage	HRC01	HRC11	HRC21	
Low ohmic	LRC01(5%) - LRC02 (1%)	LRC11/11P - LRC12/12P	LRC21(5%) - LRC22 (1%)	LRC31(1%) - LRC32(1%)
Fusible	FRC01		FRC21	
Surge	SRC01			
Trimmable	RC02TR	RC12TR	RC22TR	RC32TR
High voltage	VRC01(5%) - VRC02 (1%)	VRC11(5%) - VRC12 (1%)		
NiAu - termination*	RC01 - RC02H	RC11 - RC12	RC21 - RC22H	RC31/RC32

\* = Special termination for hybrid board gluing / replaceAgPd termination.





# PRODUCT SELECTION CHART

## General purpose and precision

General purpose and Precision												
Series	RC01	RC02G	RC02H	RC11	RC12G	RC12H	RC21	RC22H	RC31	RC32	RC41	RC42
Case size	1206			0805			0603		0402		0201	
Tolerance	5%	1%		5%	1%		5%	1%	5%	1%	5%	1%
Power P <sub>70</sub>	0.25 W			0.125 W			0.1 W		0.063 W		0.05 W	
Temp range (°C)	-55 to 155			-55 to 155			-55 to 155		-55 to 125		-55 to 125	
U <sub>max</sub>	200 V			150 V			50 V		50 V		15 V	
E-Series	E24	E24/E96		E24	E24/E96		E24	E24/E96	E24	E24/E96	E24	E24/E96
Resistance range including temperature coefficient (TC)												
0 Ω	jumper			jumper	jumper			jumper	jumper	jumper	jumper	jumper
0.1 Ω												
1 Ω	1 Ω	1 Ω		1 Ω	1 Ω		1 Ω	1 Ω	1 Ω	1 Ω	1 Ω	1 Ω
10 Ω	TC 0/+500	TC 0/+500		TC 0/+500	TC 0/+500		TC 0/+500	TC 0/+500	TC 0/+500	TC 0/+500	TC 0/+500	TC 0/+500
100 Ω	90 Ω		90 Ω		90 Ω		90 Ω		90 Ω		90 Ω	
1 kΩ												
10 kΩ	TC 200	TC 50	TC 100	TC 200	TC 50	TC 100	TC 200	TC 100	TC 200	TC 200	TC 250	TC 250
100 kΩ												
1 MΩ												
10 MΩ	2.74 MΩ		2.74 MΩ		2.74 MΩ		2.74 MΩ		2.74 MΩ		2.74 MΩ	
100 MΩ	10 MΩ	10 MΩ		10 MΩ	10 MΩ		10 MΩ	10 MΩ	10 MΩ	10 MΩ	10 MΩ	10 MΩ
Remarks												

### Ordering information - Phycomp world wide - preferred types

Series	RC01	RC02G	RC02H	RC11	RC12G	RC12H	RC21	RC22H	RC31	RC32	RC41	RC42
Range	E24 5% 1 Ω-10 MΩ	E24/E96 1% 90 Ω-2.74 MΩ	E24/E96 1% 1 Ω-10 MΩ	E24 5% 1 Ω-10 MΩ	E24/E96 1% 90 Ω-2.74 MΩ	E24/E96 1% 1 Ω-10 MΩ	E24 5% 1 Ω-10 MΩ	E24/E96 1% 1 Ω-10 MΩ	E24 5% 1 Ω-10 MΩ	E24/E96 1% 1 Ω-10 MΩ	E24 5% 10 Ω-1 MΩ	E24/E96 1% 10 Ω-1 MΩ
Packing	paper tape	paper tape	paper tape	paper tape	paper tape	paper tape	paper tape	paper tape	paper tape	paper tape	paper tape	paper tape
Quantity	5 000	232271161...	23227222...	23227246...	232273061...	23227326...	23227346...	232270260...	23227046...	---	---	---
	10 000	232271151...	23227223...	23227247...	232273071...	23227327...	23227347...	232270270...	23227047...	232270570...	23227067...	232280370...
	20 000	232271181...	---	23227248...	232273081...	---	23227348...	232270281...	23227048...	---	---	232280380...
	50 000	---	---	---	---	---	---	---	232270587...	23227068...	---	---
Jumper	5 000	232271191032	---	---	232273091002	---	232273492006	232270296001	232270492006	---	---	---
	10 000	232271191005	---	---	232273091003	---	232273492007	232270297001	232270492007	232270591001	---	232280391001
	20 000	232271192004	---	---	232273092002	---	---	232270292002	---	---	---	---
	50 000	---	---	---	---	---	---	---	232270591007	---	---	---

For ordering rules: See page 70 for E24/E96 values and the last 4 or 3 digits of the 12NC catalogue number.

### Ordering information - Phycomp North America - preferred types

Series	RC01	RC02G	RC02H	RC11	RC12G	RC12H	RC21	RC22H	RC31	RC32	RC41	RC42
Range	E24 5% 1 Ω-10 MΩ	E24/E96 1% 90 Ω-2.74 MΩ	E24/E96 1% 1 Ω-10 MΩ	E24 5% 1 Ω-10 MΩ	E24/E96 1% 90 Ω-2.74 MΩ	E24/E96 1% 1 Ω-10 MΩ	E24 5% 1 Ω-10 MΩ	E24/E96 1% 1 Ω-10 MΩ	E24 5% 1 Ω-10 MΩ	E24/E96 1% 1 Ω-10 MΩ	E24 5% 10 Ω-1 MΩ	E24/E96 1% 10 Ω-1 MΩ
Packing	paper tape	paper tape	paper tape	paper tape	paper tape	paper tape	paper tape	paper tape	paper tape	paper tape	paper tape	paper tape
Quantity	5 000	9C12063A...J.HFT	9C12063A...FBHFT	9C12063A...FHFT	9C08052A...J.HFT	9C08052A...FBHFT	9C08052A...FHFT	9C06031A...J.HFT	9C06031A...FHFT	---	---	---
	10 000	9C12063A...J.HF3	9C12063A...FBHF3	9C12063A...FHF3	9C08052A...J.HF3	9C08052A...FBHF3	9C08052A...FHF3	9C06031A...J.HF3	9C06031A...FHF3	9C04021A...J.HF3	9C04021A...FHF3	9C02017A...FHF3
	20 000	9C12063A...J.HF4	9C12063A...FBHF4	9C12063A...FHF4	9C08052A...J.HF4	9C08052A...FBHF4	9C08052A...FHF4	9C06031A...J.HF4	9C06031A...FHF4	---	---	9C02017A...FHF4
	50 000	---	---	---	---	---	---	---	---	9C04021A...J.HF7	9C04021A...FHF7	---
Jumper	5 000	9C12063AOR00...HFT	---	---	9C08052AOR00...HFT	---	9C08052AOR00...HFT	9C06031AOR00...HFT	9C06031AOR00...HFT	---	---	---
	10 000	9C12063AOR00...HF3	---	---	9C08052AOR00...HF3	---	9C08052AOR00...HF3	9C06031AOR00...HF3	9C06031AOR00...HF3	9C04021AOR00...HF3	---	9C02017AOR00...HF3
	20 000	9C12063AOR00...HF4	---	---	9C08052AOR00...HF4	---	---	9C06031AOR00...HF4	---	---	---	---
	50 000	---	---	---	---	---	---	---	---	9C04021AOR00...HF7	---	---

For ordering rules: See page 70 for E24/E96 values and the last 4 or 3 digits for the resistance value; see page 71 for the TC values in clear text code.



# PRODUCT SELECTION CHART

High precision

High precision										
Series	RC03G	RC04G	RC04H	RC05G	RC05H	RC13G	RC14G	RC14H	RC15G	RC15H
Case size	1206					0805				
Tolerance	0.5%	0.25%		0.1%		0.5 %	0.25 %		0.1 %	
Power P <sub>70</sub>	0.25 W	0.125 W			0.125 W		0.1 W			
Temp range (°C)	- 55 to 125					- 55 to 125				
U <sub>max</sub>	200 V					150 V				
E-Series	E24/E96					E24/E96				
Resistance range including temperature coefficient (TC)										
0 Ω										
0.1 Ω										
1 Ω										
10 Ω	90 Ω	90 Ω	100 Ω	90 Ω	100 Ω	90 Ω	90 Ω	100 Ω	90 Ω	100 Ω
100 Ω										
1 kΩ										
10 kΩ	TC 50	TC 50	TC 100	TC 50	TC 100	TC 50	TC 50	TC 100	TC 50	TC 100
100 kΩ										
1 MΩ										
10 MΩ	2.74 MΩ	2.74 MΩ	1 MΩ	2.74 MΩ	1 MΩ	2.74 MΩ	2.74 MΩ	1 MΩ	2.74 MΩ	1 MΩ
100 MΩ										
Remarks	thick-film technology									

## Ordering information - Phycomp world wide - preferred types

Series	RC03G	RC04G	RC04H	RC05G	RC05H	RC13G	RC14G	RC14H	RC15G	RC15H
Range	E24/E96 0.5% 90 Ω-2.74 MΩ	E24/E96 0.25% 90 Ω-2.74 MΩ	E24/E96 0.25% 100 Ω-1 MΩ	E24/E96 0.1% 90 Ω-2.74 MΩ	E24/E96 0.1% 100 Ω-1 MΩ	E24/E96 0.5% 90 Ω-2.74 MΩ	E24/E96 0.25% 90 Ω-2.74 MΩ	E24/E96 0.25% 100 Ω-1 MΩ	E24/E96 0.1% 90 Ω-2.74 MΩ	E24/E96 0.1% 100 Ω-1 MΩ
Packing	paper tape	paper tape	paper tape	paper tape	paper tape	paper tape	paper tape	paper tape	paper tape	paper tape
Quantity 5 000	23227252....	23227072....	23505410....	23227082....	23505420....	23227382....	23227092....	23505440....	23227102....	23505450....

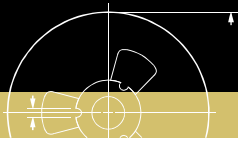
For ordering rules: See page 70 for E24/E96 values and the last 4 or 3 digits of the 12NC catalogue number.

## Ordering information - Phycomp North America - preferred types

Series	RC03G	RC04G	RC04H	RC05G	RC05H	RC13G	RC14G	RC14H	RC15G	RC15H
Range	E24/E96 0.5% 90 Ω-2.74 MΩ	E24/E96 0.25% 90 Ω-2.74 MΩ	E24/E96 0.25% 100 Ω-1 MΩ	E24/E96 0.1% 90 Ω-2.74 MΩ	E24/E96 0.1% 100 Ω-1 MΩ	E24/E96 0.5% 90 Ω-2.74 MΩ	E24/E96 0.25% 90 Ω-2.74 MΩ	E24/E96 0.25% 100 Ω-1 MΩ	E24/E96 0.1% 90 Ω-2.74 MΩ	E24/E96 0.1% 100 Ω-1 MΩ
Packing	paper tape	paper tape	paper tape	paper tape	paper tape	paper tape	paper tape	paper tape	paper tape	paper tape
Quantity 5 000	9C12063A...DBHFT	9C12062A...CBHFT	9C12062A...CKHFT	9C12062A...BBHFT	9C12062A...BKHFT	9C08052A...DBHFT	9C08051A...CBHFT	9C08051A...CKHFT	9C08051A...BBHFT	9C08051A...CKHFT

For ordering rules: See page 70 for E24/E96 values and the last 4 or 3 digits for the resistance value; see page 71 for the TC values in clear text code.





# PRODUCT SELECTION CHART

High precision / High precision - high stability

Series	High precision				High precision High stability				
	RC23H	RC24H	RC25H	RC33	TF510/520	TF511/521	TF512/522	TF513/523	TF514/524
Case size	0603			0402	1210				
Tolerance	0.5 %	0.25 %	0.1 %	0.5 %	1.0 %	0.5 %	0.25 %	0.1 %	0.05 %
Power P <sub>70</sub>	0.063 W			0.063 W	0.250 W				
Temp range (°C)	-55 to 125			-55 to 125	-55 to 125				
U <sub>max</sub>	50 V			50 V	200 V				
E-Series	E24/E96			E24/E96	E24/E96				
Resistance range including temperature coefficient (TC)									
0 Ω									
0.1 Ω									
1 Ω									
10 Ω					10 Ω	10 Ω	10 Ω	10 Ω	10 Ω
100 Ω	100 Ω	100 Ω	100 Ω	100 Ω					
1 kΩ									
10 kΩ	TC 100	TC 100	TC 100	TC 200	TC 25 / TC 50	TC 25 / TC 50	TC 25 / TC 50	TC 25 / TC 50	TC 25 / TC 50
100 kΩ									
1 MΩ	1 MΩ	1 MΩ	1 MΩ	1 MΩ	1 MΩ	1 MΩ	1 MΩ	1 MΩ	1 MΩ
10 MΩ									
100 MΩ									
Remarks	thick-film technology				thin-film technology				

## Ordering information - Phycomp world wide - preferred types

Series	RC23H	RC24H	RC25H	RC33	TF510/520	TF511 /521	TF512/522	TF513/523	TF514/524
Range	E24/E96 0.5% 100 Ω-1 MΩ	E24/E96 0.25% 100 Ω-1 MΩ	E24/E96 0.1% 100 Ω-1 MΩ	E24/E96 0.5% 100 Ω-1 MΩ	E24/E96 1% 10 Ω-1 MΩ	E24/E96 0.5% 10 Ω-1 MΩ	E24/E96 0.25% 10 Ω-1 MΩ	E24/E96 0.1% 10 Ω-1 MΩ	E24/E96 0.05% 10 Ω-1 MΩ
Packing	paper tape	paper tape	paper tape	paper tape	paper tape	paper tape	paper tape	paper tape	paper tape
Quantity 5 000	23505460....	23505470....	23505480....	---	---	---	---	---	---
10 000	---	---	---	23505497....	---	---	---	---	---
5 000 TC 25	---	---	---	---	23906127....	23906126....	23906125....	23906124....	23906123....
5 000 TC 50	---	---	---	---	23904127....	23904126....	23904125....	23904124....	23904123....

For ordering rules: See page 70 for E24/E96 values and the last 4 or 3 digits of the 12NC catalogue number.

## Ordering information - Phycomp North America - preferred types

Series	RC23H	RC24H	RC25H	RC33	TF510/520	TF511 /521	TF512/522	TF513/523	TF514/524
Range	E24/E96 0.5% 100 Ω-1 MΩ	E24/E96 0.25% 100 Ω-1 MΩ	E24/E96 0.1% 100 Ω-1 MΩ	E24/E96 0.5% 100 Ω-1 MΩ	E24/E96 1% 10 Ω-1 MΩ	E24/E96 0.5% 10 Ω-1 MΩ	E24/E96 0.25% 10 Ω-1 MΩ	E24/E96 0.1% 10 Ω-1 MΩ	E24/E96 0.05% 10 Ω-1 MΩ
Packing	paper tape	paper tape	paper tape	paper tape	paper tape	paper tape	paper tape	paper tape	paper tape
Quantity 5 000	9C06031A...DKHFT	9C06031A...CKHFT	9C06031A...BKHFT	---	---	---	---	---	---
10 000	---	---	---	9C04021A...DLHFT	---	---	---	---	---
5 000 TC 25	---	---	---	---	9T12103A...FAHFT	9T12103A...DAHFT	9T12103A...CAHFT	9T12103A...BAHFT	9T12103A...AAHFT
5 000 TC 50	---	---	---	---	9T12103A...FBHFT	9T12103A...BBHFT	9T12103A...CBHFT	9T12103A...BBHFT	9T12103A...ABHFT

For ordering rules: See page 70 for E24/E96 values and the last 4 or 3 digits for the resistance value; see page 71 for the TC values in clear text code.



# PRODUCT SELECTION CHART

High precision - high stability

	High precision High stability									
Series	TF010/020	TF011/021	TF012/022	TF013/023	TF014/024	TF110/120	TF111/121	TF112/122	TF113/123	TF114/124
Case size	1206					0805				
Tolerance	1.0 %	0.5 %	0.25 %	0.1 %	0.05 %	1.0 %	0.5 %	0.25 %	0.1 %	0.05 %
Power P <sub>70</sub>	0.125 W					0.125 W				
Temp range (°C)	-55 to 125					-55 to 125				
U <sub>max</sub>	200 V					150 V				
E-Series	E24/E96					E24/E96				
Resistance range including temperature coefficient (TC)										
0 Ω										
0.1 Ω										
1 Ω										
10 Ω	10 Ω	10 Ω	10 Ω	10 Ω	10 Ω	10 Ω	10 Ω	10 Ω	10 Ω	10 Ω
100 Ω										
1 kΩ	TC 25 / TC 50	TC 25 / TC 50	TC 25 / TC 50	TC 25 / TC 50	TC 25 / TC 50	TC 25 / TC 50	TC 25 / TC 50	TC 25 / TC 50	TC 25 / TC 50	TC 25 / TC 50
10 kΩ										
100 kΩ										
1 MΩ	1 MΩ	1 MΩ	1 MΩ	1 MΩ	1 MΩ	1 MΩ	1 MΩ	1 MΩ	1 MΩ	1 MΩ
10 MΩ										
100 MΩ										
Remarks	thin-film technology									

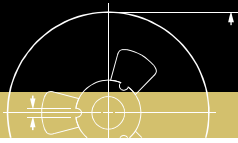
Ordering information - Phycomp world wide - preferred types										
Series	TF010/020	TF011/021	TF012/022	TF013/023	TF014/024	TF110/120	TF111/121	TF112/122	TF113/123	TF114/124
Range	E24/E96 1.0%	E24/E96 0.5%	E24/E96 0.25%	E24/E96 0.1%	E24/E96 0.05%	E24/E96 1%	E24/E96 0.5%	E24/E96 0.25%	E24/E96 0.1%	E24/E96 0.05%
	10 Ω-1 MΩ	10 Ω-1 MΩ	10 Ω-1 MΩ	10 Ω-1 MΩ	10 Ω-1 MΩ	10 Ω-1 MΩ	10 Ω-1 MΩ	10 Ω-1 MΩ	10 Ω-1 MΩ	10 Ω-1 MΩ
Packing	paper tape	paper tape	paper tape	paper tape	paper tape	paper tape	paper tape	paper tape	paper tape	paper tape
QTY 5 000 TC 25	23906117....	23906116....	23906115....	23906114....	23906113....	23906017....	23906016....	23906015....	23906014....	23906013....
5 000 TC 50	23904117....	23904116....	23904115....	23904114....	23904113....	23904017....	23904016....	23904015....	23904014....	23904013....

For ordering rules: See page 70 for E24/E96 values and the last 4 or 3 digits of the 12NC catalogue number.

Ordering information - Phycomp North America - preferred types										
Series	TF010/020	TF011/021	TF012/022	TF013/023	TF014/024	TF110/120	TF111/121	TF112/122	TF113/123	TF114/124
Range	E24/E96 1.0%	E24/E96 0.5%	E24/E96 0.25%	E24/E96 0.1%	E24/E96 0.05%	E24/E96 1%	E24/E96 0.5%	E24/E96 0.25%	E24/E96 0.1%	E24/E96 0.05%
	10 Ω-1 MΩ	10 Ω-1 MΩ	10 Ω-1 MΩ	10 Ω-1 MΩ	10 Ω-1 MΩ	10 Ω-1 MΩ	10 Ω-1 MΩ	10 Ω-1 MΩ	10 Ω-1 MΩ	10 Ω-1 MΩ
Packing	paper tape	paper tape	paper tape	paper tape	paper tape	paper tape	paper tape	paper tape	paper tape	paper tape
QTY 5 000 TC 25	9T12062A...FAHFT	9T12062A...DAHFT	9T12062A...CAHFT	9T12062A...BAHFT	9T12062A...AAHFT	9T08052A...FAHFT	9T08052A...DAHFT	9T08052A...CAHFT	9T08052A...BAHFT	9T08052A...AAHFT
5 000 TC 50	9T12062A...FBHFT	9T12062A...DBHFT	9T12062A...CBHFT	9T12062A...BBHFT	9T12062A...ABHFT	9T08052A...FBHFT	9T08052A...DBHFT	9T08052A...CBHFT	9T08052A...BBHFT	9T08052A...ABHFT

For ordering rules: See page 70 for E24/E96 values and the last 4 or 3 digits for the resistance value; see page 71 for the TC values in clear text code.





# PRODUCT SELECTION CHART

High precision - high stability

	High precision					High stability				
Series	TF210/220	TF211/221	TF212/222	TF213/223	TF214/224	TF310/320	TF311/321	TF312/322	TF313/323	TF314/324
Case size	0603					0402				
Tolerance	1.0 %	0.5 %	0.25 %	0.1 %	0.05 %	1.0 %	0.5 %	0.25 %	0.1 %	0.05 %
Power P <sub>70</sub>	0.1 W					0.063 W				
Temp range (°C)	- 55 to 125					- 55 to 125				
U <sub>max</sub>	75 V					50 V				
E-Series	E24/E96					E24/E96				
Resistance range including temperature coefficient (TC)										
0 Ω										
0.1 Ω										
1 Ω										
10 Ω	10 Ω	10 Ω	10 Ω	10 Ω	10 Ω	10 Ω	10 Ω	10 Ω	10 Ω	10 Ω
100 Ω										
1 kΩ	TC 25 / TC 50	TC 25 / TC 50	TC 25 / TC 50	TC 25 / TC 50	TC 25 / TC 50	TC 25 / TC 50	TC 25 / TC 50	TC 25 / TC 50	TC 25 / TC 50	TC 25 / TC 50
10 kΩ										
100 kΩ						100 kΩ	100 kΩ	100 kΩ	100 kΩ	100 kΩ
1 MΩ	332 kΩ	332 kΩ	332 kΩ	332 kΩ	332 kΩ					
10 MΩ										
100 MΩ										
Remarks	thin-film technology									

Ordering information - Phycomp world wide - preferred types										
Series	TF210/220	TF211/221	TF212/222	TF213/223	TF214/224	TF310/320	TF311/321	TF312/322	TF313/323	TF314/324
Range	E24/E96 1.0%	E24/E96 0.5%	E24/E96 0.25%	E24/E96 0.1%	E24/E96 0.05%	E24/E96 1%	E24/E96 0.5%	E24/E96 0.25%	E24/E96 0.1%	E24/E96 0.05%
	10 Ω-332 kΩ	10 Ω-332 kΩ	10 Ω-332 kΩ	10 Ω-332 kΩ	10 Ω-332 kΩ	10 Ω-100 kΩ	10 Ω-100 kΩ	10 Ω-100 kΩ	10 Ω-100 kΩ	10 Ω-100 kΩ
Packing	paper tape	paper tape	paper tape	paper tape	paper tape	paper tape	paper tape	paper tape	paper tape	paper tape
QTY 5 000 TC 25	23906047....	23906046....	23906045....	23906044....	23906043....	---	---	---	---	---
5 000 TC 50	23904047....	23904046....	23904045....	23904044....	23904043....	---	---	---	---	---
10 000 TC 25	---	---	---	---	---	23906077....	23906076....	23906075....	23906074....	23906073....
10 000 TC 50	---	---	---	---	---	23904077....	23904076....	23904075....	23904074....	23904073....

For ordering rules: See page 70 for E24/E96 values and the last 4 or 3 digits of the 12NC catalogue number.

Ordering information - Phycomp North America - preferred types										
Series	TF210/220	TF211/221	TF212/222	TF213/223	TF214/224	TF310/320	TF311/321	TF312/322	TF313/323	TF314/324
Range	E24/E96 1.0%	E24/E96 0.5%	E24/E96 0.25%	E24/E96 0.1%	E24/E96 0.05%	E24/E96 1%	E24/E96 0.5%	E24/E96 0.25%	E24/E96 0.1%	E24/E96 0.05%
	10 Ω-332 kΩ	10 Ω-332 kΩ	10 Ω-332 kΩ	10 Ω-332 kΩ	10 Ω-332 kΩ	10 Ω-100 kΩ	10 Ω-100 kΩ	10 Ω-100 kΩ	10 Ω-100 kΩ	10 Ω-100 kΩ
Packing	paper tape	paper tape	paper tape	paper tape	paper tape	paper tape	paper tape	paper tape	paper tape	paper tape
QTY 5 000 TC 25	9T06034A...FAHFT	9T06034A...DAHFT	9T06034A...CAHFT	9T06034A...BAHFT	9T06034A...AAHFT	---	---	---	---	---
5 000 TC 50	9T06034A...FBHFT	9T06034A...DBHFT	9T06034A...CBHFT	9T06034A...BBHFT	9T06034A...ABHFT	---	---	---	---	---
10 000 TC 25	---	---	---	---	---	9T04021A...FAHF3	9T04021A...DAHf3	9T04021A...CAHF3	9T04021A...BAHF3	9T04021A...AAHF3
10 000 TC 50	---	---	---	---	---	9T04021A...FBHF3	9T04021A...DBHF3	9T04021A...CBHF3	9T04021A...BBHF3	9T04021A...ABHF3

For ordering rules: See page 70 for E24/E96 values and the last 4 or 3 digits for the resistance value; see page 71 for the TC values in clear text code.



# PRODUCT SELECTION CHART

## Arrays

Arrays											
Series	ARC241	ARV241	ARC242	ARV242	ARV321	ARV322	ARV341	ARV342	ARV381	ARV382	
Case size	4 x 0603 (3.2 x 1.6 mm)				2 x 0402 (1.0 x 1.0 mm)		4 x 0402 (2.0 x 1.0 mm)		8 x 0402 (4.0 x 1.6 mm)		
Tolerance	5 %		1 %		5 %	1 %	5 %	1 %	5 %	1 %	
Power P <sub>70</sub>	0.063 W				0.063 W		0.063 W		0.063 W		
Temp range (°C)	-55 to 155				-55 to 125		-55 to 125		-55 to 125		
U <sub>max</sub>	50 V				50 V		50 V		50 V		
E-Series	E24		E96		E24	E96	E96	E24	E24		
Resistance range including temperature coefficient (TC)	0 Ω	jumper	jumper		jumper		jumper		jumper		
	0.1 Ω										
	1 Ω										
	10 Ω	10 Ω	10 Ω	10 Ω	10 Ω	10 Ω	10 Ω	10 Ω	10 Ω	10 Ω	
	100 Ω										
	1 kΩ	TC 200	TC 200	TC 100	TC 200	TC 200	TC 200	TC 300	TC 300	TC 200	TC 200
	10 kΩ										
	100 kΩ									100 kΩ	100 kΩ
	1 MΩ	1 MΩ	1 MΩ	1 MΩ	1 MΩ	1 MΩ	1 MΩ	1 MΩ	1 MΩ		
	10 MΩ										
100 MΩ											
Remarks	Concave terminations	Convex terminations	Concave terminations	Convex terminations	Convex terminations	Convex terminations	Convex terminations	Convex terminations	Convex terminations	Convex terminations	

Note: On request, ARC241 and ARC242 also available in values < 10 Ω.

### Ordering information - Phycomp world wide - preferred types

Series	ARC241	ARV241	ARC242	ARV242	ARV321	ARV322	ARV341	ARV342	ARV381	ARV382
Range	E24 5%	E24 5%	E96 1%	E24/E96 1%	E24 5%	E24/E96 1%	E96 5%	E24 1%	E24 5%	E24 1%
	10 Ω-1 MΩ	10 Ω-1 MΩ	10 Ω-1 MΩ	10 Ω-1 MΩ	10 Ω-1 MΩ	10 Ω-1 MΩ	10 Ω-1 MΩ	10 Ω-1 MΩ	10 Ω-100 kΩ	10 Ω-100 kΩ
Packing	paper tape	paper tape	paper tape	paper tape	paper tape	paper tape	paper tape	paper tape	paper tape	paper tape
Quantity 5 000	235003410...	235003510...	23500241....	23500251....	---	---	235003310...	23500231....	235005310...	23500431....
10 000	---	---	---	---	235001311...	23500132....	235003311...	23500232....	---	---
Jumper 5 000	235003491001	235003591001	---	---	235001391002	---	235003391002	---	235005391001	---
10 000	---	---	---	---	235001391001	---	235003391001	---	---	---

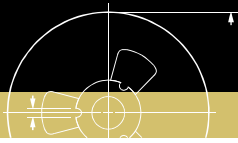
For ordering rules: See page 70 for E24/E96 values and the last 4 or 3 digits of the 12NC catalogue number.

### Ordering information - Phycomp North America - preferred types

Series	ARC241	ARV241	ARC242	ARV242	ARV321	ARV322	ARV341	ARV342	ARV381	ARV382
Range	E24 5%	E24 5%	E96 1%	E24/E96 1%	E24 5%	E24/E96 1%	E96 5%	E24 1%	E24 5%	E24 1%
	10 Ω-1 MΩ	10 Ω-1 MΩ	10 Ω-1 MΩ	10 Ω-1 MΩ	10 Ω-1 MΩ	10 Ω-1 MΩ	10 Ω-1 MΩ	10 Ω-1 MΩ	10 Ω-100 kΩ	10 Ω-100 kΩ
Packing	paper tape	paper tape	paper tape	paper tape	paper tape	paper tape	paper tape	paper tape	paper tape	paper tape
Quantity 5 000	9CAV341A...JLHFT	9CAV341A...JLHFT	9CAV341A...FKHFT	9CAV341A...FKHFT	---	---	9CAV241A...JMHFT	9CAV241A...FMHFT	9CAV281A...JLHFT	9CAV281A...FLHFT
10 000	---	---	---	---	9CAV221A...JLHF3	9CAV221A...FKHF3	9CAV241A...JMHF3	9CAV241A...FMHF3	---	---
Jumper 5 000	9CAV341AOR00-HFT	9CAV341AOR00-HFT	---	---	9CAV221AOR00-HFT	---	9CAV241AOR00-HFT	---	9CAV281AOR00-HFT	---
10 000	---	---	---	---	9CAV221AOR00-HF3	---	9CAV241AOR00-HF3	---	---	---

For ordering rules: See page 70 for E24/E96 values and the last 4 or 3 digits for the resistance value; see page 71 for the TC values in clear text code.





# PRODUCT SELECTION CHART

## R-networks / RC-networks

	R-Networks	RC-Networks	
Series	RNA310	RCB210	
Case size	8R-Network (3.3 x 1.6 mm)	RC-Network (5.1 x 3.4 mm)	
Tolerance	5 %	5 %	
Power P <sub>70</sub>	0.031 W	0.063 W	
Temp range (°C)	-55 to 125	-55 to 85	
U <sub>max</sub>	25 V	25 V	
E-Series	E24	E6	
Resistance range including temperature coefficient (TC)	0 Ω	jumper	
	0.1 Ω		
	1 Ω		
	10 Ω	10 Ω	
	100 Ω	TC 0/+500	
	1 kΩ	TC 200	
	10 kΩ	1 kΩ	
	100 kΩ		
	1 MΩ	100 kΩ	
	10 MΩ		
	100 MΩ		
	Remarks	Convex terminations	Concave terminations

Ordering information - Phycomp world wide - preferred types		
Series	RNA310	RCB210
Range	E24 5% 10 Ω-100 kΩ	E6 5% 10 Ω-1 kΩ
Packing	paper tape	blister tape
Quantity	5 000	235023010... <small>23503212... see table (*)</small>
Jumper	5 000	235023091001

**For ordering rules:** See page 70 for E24/E96 values and the last 4 or 3 digits of the 12NC catalogue number.

Ordering information - Phycomp North America - preferred types		
Series	RNA310	RCB210
Range	E24 5% 10 Ω-100 kΩ	E6 5% 10 Ω-1 kΩ
Packing	paper tape	blister tape
Quantity	5 000	9CRN318A...JLHFT <small>9CRC211A...JHF6 see table (*)</small>
Jumper	5 000	9CRN318A0R00-HFT

**For ordering rules:** See page 70 for E24/E96 values and the last 4 or 3 digits for the resistance value; see page 71 for the TC values in clear text code.

RC networks R and C values for 12NCs and CTC codes for North America							
12NC (*)	R (Ω)	C (pF)	NA (**)	12NC (*)	R (Ω)	C (pF)	NA (**)
235032120001	33	180	N001	235032120043	10	22	N043
235032120002	22	100	N002	235032120044	10	47	N044
235032120003	100	47	N003	235032120045	1k	10	N045
235032120004	22	10	N004	235032120046	220	10	N046
235032120005	47	22	N005	235032120047	470	10	N047
235032120006	22	22	N006	235032120048	22	180	N048
235032120007	22	47	N007	235032120049	47	180	N049
235032120008	47	47	N008	235032120051	4.7k	180	N051
235032120009	47	100	N009	235032120052	100	180	N052
235032120011	100	100	N011	235032120053	82	100	N053
235032120012	220	22	N012	235032120054	68	10	N054
235032120013	220	47	N013	235032120055	22	15	N055
235032120014	220	100	N014	235032120056	33	15	N056
235032120015	470	22	N015	235032120057	47	15	N057
235032120016	470	47	N016	235032120058	68	15	N058
235032120017	470	100	N017	235032120059	100	15	N059
235032120018	1k	22	N018	235032120061	33	22	N061
235032120019	1k	47	N019	235032120062	68	22	N062
235032120021	100k	22	N021	235032120063	10	33	N063
235032120022	33	47	N022	235032120064	15	33	N064
235032120023	33	33	N023	235032120065	68	33	N065
235032120024	100	33	N024	235032120066	15	47	N066
235032120025	1k	33	N025	235032120067	68	47	N067
235032120026	47	33	N026	235032120068	15	100	N068
235032120027	2.2k	47	N027	235032120069	68	100	N069
235032120028	82k	33	N028	235032120071	180	180	N071
235032120029	22	33	N029	235032120072	68	27	N072
235032120031	15k	47	N031	235032120073	75	47	N073
235032120032	33	10	N032	235032120074	33	220	N074
235032120033	47	10	N033	235032120075	47	220	N075
235032120034	330	100	N034	235032120076	100	22	N076
235032120035	10	10	N035	235032120077	1k	100	N077
235032120036	15	15	N036	235032120078	47k	100	N078
235032120037	10	15	N037	235032120079	33	100	N079
235032120038	15	10	N038	235032120081	68	180	N081
235032120039	27	47	N039	235032120082	15	22	N082
235032120041	100	10	N041	235032120083	150	10	N083
235032120042	10	100	N042				





# PRODUCT SELECTION CHART

Power / Power - low ohmic

	Power											
Series	PRC101		PRC102		PRC111		PRC201		PRC221			
Case size	1210				2010				1218		2512	
Tolerance	5%		1%		5%		1%		5%		1%	
Power P <sub>70</sub>	0.5 W				0.5 W				1.0 W		1.0 W	
Temp range (°C)	- 55 to 125				- 55 to 125				- 55 to 125		- 55 to 125	
U <sub>max</sub>	200 V				200 V				200 V		250 V	
E-Series	E24		E96		E24		E96		E24		E96	
Resistance range including temperature coefficient (TC)	0 Ω	jumper		jumper		jumper		jumper		jumper		
	0.1 Ω	1 Ω		1 Ω		1 Ω		1 Ω		1 Ω		
	1 Ω	TC 200		100 Ω		TC 300		TC 300		TC 300		
	10 Ω	TC 200		TC 200		TC 200		TC 200		TC 200		
	100 Ω	TC 100		TC 100		TC 100		TC 100		TC 100		
	1 kΩ	TC 100		TC 100		TC 100		TC 100		TC 100		
	10 kΩ	TC 100		TC 100		TC 100		TC 100		TC 100		
	100 kΩ	TC 100		TC 100		TC 100		TC 100		TC 100		
	1 MΩ	TC 200		TC 200		TC 200		TC 200		TC 200		
	10 MΩ	TC 200		2.2 MΩ		10 MΩ		10 MΩ		10 MΩ		
100 MΩ	22 MΩ		TC 200		TC 200		1 MΩ		1 MΩ		TC 200	
Remarks									SURGE POWER ON REQUEST			
									Termination on the long sides improves heat transfer and reduces stress			

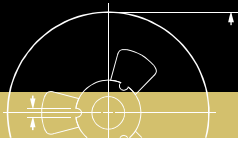
Ordering information - Phycomp world wide - preferred types												
Series	PRC101		PRC102		PRC111		PRC201		PRC221			
Range	E24 5% 1 Ω-22 MΩ		E96 1% 100 Ω-2.2 MΩ		E24 5% 1 Ω-10 MΩ		E96 1% 1 Ω-10 MΩ		E24 5% 1 Ω-10 MΩ		E96 1% 1 Ω-10 MΩ	
Packing	paper tape		paper tape		blister tape		blister tape		blister tape		blister tape	
Quantity	4 000	---	---	---	232276060...	23227616....	---	---	232273560...	23227352....	232276260...	23227636....
	5 000	239073570...	23907353....	---	---	---	---	232273560...	23227352....	---	---	---
Jumper	4 000	---	---	---	232276090003	---	---	---	---	---	232276290000	---
	5 000	239073590001	---	---	---	---	---	232273590006	---	---	---	---

For ordering rules: See page 70 for E24/E96 values and the last 4 or 3 digits of the 12NC catalogue number.

Ordering information - Phycomp North America - preferred types												
Series	PRC101		PRC102		PRC111		PRC201		PRC221			
Range	E24 5% 1 Ω-22 MΩ		E96 1% 100 Ω-2.2 MΩ		E24 5% 1 Ω-10 MΩ		E96 1% 1 Ω-10 MΩ		E24 5% 1 Ω-10 MΩ		E96 1% 1 Ω-10 MΩ	
Packing	paper tape		paper tape		blister tape		blister tape		blister tape		blister tape	
Quantity	4 000	---	---	---	9C1201012....FHF5	9C1201012....JHF5	---	---	9C12181W....JHF6	9C12181W....FHF6	9C25121W....JHF5	9C25121W....FHF5
	5 000	9C121012....JHFT	9C121012....FHFT	---	---	---	---	9C12181W....JHF6	9C12181W....FHF6	---	---	---
Jumper	4 000	---	---	---	9C1201120R00..HF5	---	---	---	---	---	9C25121W0R00..HF5	---
	5 000	9C1210120R00..HFT	---	---	---	---	---	9C12181W0R00..HF6	---	---	---	---

For ordering rules: See page 70 for E24/E96 values and the last 4 or 3 digits for the resistance value; see page 71 for the TC values in clear text code.





# PRODUCT SELECTION CHART

## Power - low ohmic

Power - low ohmic								
Series	LPRC101 / LPRC102		LPRC111		LPRC201		LPRC221	
Case size	1210		2010		1218		2512	
Tolerance	5%	1%	5%	1%	5%	1%	5%	1%
Power P <sub>70</sub>	0.5 W		0.5 W		1.0 W		1.0 W	
Temp range (°C)	-55 to 125		-55 to 125		-55 to 125		-55 to 125	
U <sub>max</sub>	200 V		200 V		200 V		250 V	
E-Series	E24	E96	E24	E96	E24	E96	E24	E96
Resistance range including temperature coefficient (TC)	0 Ω	0.01 Ω	0.01 Ω	0.01 Ω	0.01 Ω	0.02 Ω	0.01 Ω	0.05 Ω
	0.1 Ω	TC 2000 to TC 300	TC 2000 to TC 300	TC 2000 to TC 300	TC 2000 to TC 300	TC 2000 to TC 250	TC 2000 to TC 250	TC 1500 to TC 75
	1 Ω	0.976 Ω	0.976 Ω	0.976 Ω	0.976 Ω	0.976 Ω	0.976 Ω	0.976 Ω
	10 Ω							
	100 Ω							
	1 kΩ							
	10 kΩ							
	100 kΩ							
	1 MΩ							
	10 MΩ							
100 MΩ								
SURGE POWER ON REQUEST								
Remarks					Termination on the long sides improves heat transfer and reduces stress			

Ordering information - Phycomp world wide - preferred types								
Series	LPRC101 / LPRC102		LPRC111		LPRC201		LPRC221	
Range	E24 5% 0.01 Ω-0.976 Ω	E24/E96 1% 0.01 Ω-0.976 Ω	E24 5% 0.01 Ω-0.976 Ω	E24/E96 1% 0.02 Ω-0.976 Ω	E24 5% 0.01 Ω-0.976 Ω	E24/E96 1% 0.02 Ω-0.976 Ω	E24 5% 0.01 Ω-0.976 Ω	E24/E96 1% 0.05 Ω-0.976 Ω
Packing	paper tape	paper tape	blister tape	blister tape	blister tape	blister tape	blister tape	blister tape
Quantity 4 000	---	---	232276090..0/60..7	232276190..0/6...7	---	---	232276290..0/60..7	232276390..0/6...7
5 000	239073590..0/60..7	23907353...0	---	---	232273560...	23227352....	---	---
Jumper 4 000	---	---	---	---	---	---	---	---
5 000	---	---	---	---	---	---	---	---

For ordering rules: See page 70 for E24/E96 values and the last 4 or 3 digits of the 12NC catalogue number.

Ordering information - Phycomp North America - preferred types								
Series	LPRC101 / LPRC102		LPRC111		LPRC201		LPRC221	
Range	E24 5% 0.01 Ω-0.976 Ω	E24/E96 1% 0.01 Ω-0.976 Ω	E24 5% 0.01 Ω-0.976 Ω	E24/E96 1% 0.02 Ω-0.976 Ω	E24 5% 0.01 Ω-0.976 Ω	E24/E96 1% 0.02 Ω-0.976 Ω	E24 5% 0.01 Ω-0.976 Ω	E24/E96 1% 0.05 Ω-0.976 Ω
Packing	paper tape	paper tape	blister tape	blister tape	blister tape	blister tape	blister tape	blister tape
Quantity 4 000	---	---	9C201012...FHF5	9C21012...J.HF5	---	---	9C25121W...J.HF5	9C25121W...FHF5
5 000	9C121012...J.HFT	9C121012...F.HFT	---	---	9C12181W...J.HF6	9C12181W...F.HF6	---	---
Jumper 4 000	---	---	---	---	---	---	---	---
5 000	---	---	---	---	---	---	---	---

For ordering rules: See page 70 for E24/E96 values and the last 4 or 3 digits for the resistance value; see page 71 for the TC values in clear text code.



# PRODUCT SELECTION CHART

## Power, high voltage / Metal strip / High voltage

	High voltage	Metal strip		High voltage								
Series	VPRC221	MPRC221		VRC01	VRC02	VRC11	VRC12					
Case size	<b>2512</b>	<b>2512</b>		<b>1206</b>		<b>0805</b>						
Tolerance	5%	5%	1%	5%	1%	5%	1%					
Power P <sub>70</sub>	1.0 W	1.0 W		0.25 W		0.125 W						
Temp range (°C)	-55 to 125	-55 to 155		-55 to 125		-55 to 125						
U <sub>max</sub>	250 V	250 V		400 V		300 V						
E-Series	E24	1 mΩ - 10 mΩ		E24	E96	E24	E96					
Resistance range including temperature coefficient (TC)	0 Ω											
	0.1 Ω							1-2 mΩ TC200	1-2 mΩ TC200			
	1 Ω							3-10 mΩ TC75	3-10 mΩ TC75			
	10 Ω											
	100 Ω											
	1 kΩ											
	10 kΩ											
	100 kΩ							100 kΩ	100 kΩ	100 kΩ	100 kΩ	
	1 MΩ	4.7 MΩ							TC 300	TC 300	TC 300	TC 300
	10 MΩ	TC 200								10 MΩ	10 MΩ	10 MΩ
100 MΩ	16 MΩ			27 MΩ								
Remarks	Max. overload voltage 2500 V for 1 min.	Metal strip		Max. overload voltage 400 V for 1 min.		Max. overload voltage 300 V for 1 min.						

### Ordering information - Phycomp world wide - preferred types

Series	VPRC221	MPRC221		VRC01	VRC02	VRC11	VRC12	
Range	E24	5%	1%	E24	E96	E24	E96	
	5%			5%	1%	5%	1%	
	4.7 MΩ-16 MΩ	1 mΩ - 10 mΩ	1 mΩ - 10 mΩ	100 kΩ-27 MΩ	100 kΩ-10 MΩ	100 kΩ - 10 MΩ	100 kΩ-10 MΩ	
Packing	blister tape	blister tape	blister tape	paper tape	paper tape	paper tape	paper tape	
Quantity	4 000	232276298...	232276294..0	232276395..0	---	---	232279261...	23227936....
	5 000	---	---	---	232279061...	23227916....	---	---

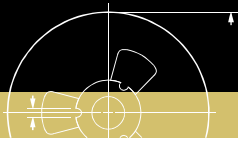
For ordering rules: See page 70 for E24/E96 values and the last 4 or 3 digits of the 12NC catalogue number.

### Ordering information - Phycomp North America - preferred types

Series	VPRC221	MPRC221		VRC01	VRC02	VRC11	VRC12	
Range	E24	5%	1%	E24	E96	E24	E96	
	5%			5%	1%	5%	1%	
	4.7 MΩ-16 MΩ	1 mΩ - 10 mΩ	1 mΩ - 10 mΩ	100 kΩ-27 MΩ	100 kΩ-10 MΩ	100 kΩ - 10 MΩ	100 kΩ-10 MΩ	
Packing	blister tape	blister tape	blister tape	paper tape	paper tape	paper tape	paper tape	
Quantity	4 000	9CVR211W...JLHF5	9CMR221W...J.HF5	9CMR221W...FHF5	---	---	---	---
	5 000	---	---	---	9CVR013A...JMHT	9CVR023A...FMHT	9CVR112A...JMHT	9CVR122A...FMHT

For ordering rules: See page 70 for E24/E96 values and the last 4 or 3 digits for the resistance value; see page 71 for the TC values in clear text code.





# PRODUCT SELECTION CHART

## High ohmic / Low ohmic

Series	High ohmic			Low ohmic									
	HRC01	HRC11	HRC21	LRC01	LRC02	LRC11	LRC12	LRC11P	LRC12P	LRC21	LRC22	LRC31	LRC32
Case size	1206	0805	0603	1206		0805		0805		0603		0402	
Tolerance	5%	5%	5%	5%	1%	5%	1%	5%	1%	5%	1%	5%	1%
Power P <sub>70</sub>	0.25 W	0.125 W	0.1 W	0.25 W		0.125 W	0.1 W	0.25 W		0.063 W		0.063 W	
Temp range (°C)	-55 to 125	-55 to 125	-55 to 155	-55 to 125		-55 to 125		-55 to 125		-55 to 155		-55 to 155	
U <sub>max</sub>	200 V	150 V	50 V	200 V		150 V		150 V		50 V		50 V	
E-Series	E24	E24	E24	E24	E96	E24	E96	E24	E96	E24	E96	E24	E96
Resistance range including temperature coefficient (TC)													
0 Ω				0.01 Ω	0.01 Ω	0.01 Ω	0.01 Ω	0.01 Ω	0.01 Ω	0.01 Ω	0.01 Ω	0.1 Ω	0.1 Ω
0.1 Ω				TC 1500 to TC 75	TC 1500 to TC 75	TC 1500 to TC 75	TC 1500 to TC 75	TC 1500 to TC 75	TC 1500 to TC 75	TC 1500 to TC 75	TC 600 to TC 300	TC 600 to TC 300	TC 700 to TC 500
1 Ω				0.976 Ω	0.976 Ω	0.976 Ω	0.976 Ω	0.976 Ω	0.976 Ω	0.976 Ω	0.976 Ω	0.976 Ω	0.976 Ω
10 Ω													
100 Ω													
1 kΩ													
10 kΩ													
100 kΩ													
1 MΩ													
10 MΩ	11 MΩ	11 MΩ	11 MΩ										
100 MΩ	TC 250	TC 300	TC 300										
	100 MΩ	100 MΩ	22 MΩ										
Remarks													

Ordering information - Phycomp world wide - preferred types													
Series	HRC01	HRC11	HRC21	LRC01	LRC02	LRC11	LRC12	LRC11P	LRC12P	LRC21	LRC22	LRC31	LRC32
Range	E24 5% 11 MΩ-100 MΩ	E24 5% 11 MΩ-100 MΩ	E24 5% 11 MΩ-22 MΩ	E24 5% 0.01Ω-0.976Ω	E96 1% 0.01Ω-0.976Ω	E24 5% 0.02Ω-0.976Ω	E96 1% 0.02Ω-0.976Ω	E24 5% 0.02Ω-0.976Ω	E96 1% 0.02Ω-0.976Ω	E24 5% 0.1Ω-0.976Ω	E96 1% 0.1Ω-0.976Ω	E24 5% 0.1Ω-0.976Ω	E96 1% 0.1Ω-0.976Ω
Packing	paper tape	paper tape	paper tape	paper tape	paper tape	paper tape	paper tape	paper tape	paper tape	paper tape	paper tape	paper tape	paper tape
Quantity	5 000	235052010...	235052110...	235052210...	235051010...	235051012...	235051110...	235051112...	235051115...	235051117...	235051210...	235051212...	---
	5 000	for 100 M	for 100 M	---	---	---	---	---	---	---	---	---	---
	10 000	235052091001	235052191001	---	---	---	---	---	---	---	---	---	235051320...
		---	---	---	---	---	---	---	---	---	---	---	235051322...

For ordering rules: See page 70 for E24/E96 values and the last 4 or 3 digits of the 12NC catalogue number.

Ordering information - Phycomp North America - preferred types													
Series	HRC01	HRC11	HRC21	LRC01	LRC02	LRC11	LRC12	LRC11P	LRC12P	LRC21	LRC22	LRC31	LRC32
Range	E24 5% 11 MΩ-100 MΩ	E24 5% 11 MΩ-100 MΩ	E24 5% 11 MΩ-22 MΩ	E24 5% 0.01Ω-0.976Ω	E96 1% 0.01Ω-0.976Ω	E24 5% 0.02Ω-0.976Ω	E96 1% 0.02Ω-0.976Ω	E24 5% 0.02Ω-0.976Ω	E96 1% 0.02Ω-0.976Ω	E24 5% 0.1Ω-0.976Ω	E96 1% 0.1Ω-0.976Ω	E24 5% 0.1Ω-0.976Ω	E96 1% 0.1Ω-0.976Ω
Packing	paper tape	paper tape	paper tape	paper tape	paper tape	paper tape	paper tape	paper tape	paper tape	paper tape	paper tape	paper tape	paper tape
Quantity	5 000	9C12063A...JEHFT	9C08052A...JEHFT	9C06031A...JM HFT	9C12063A...JHFT	9C12063A...FHFT	9C08052A...JHFT	9C08051A...FHFT	9C08053A...FHFT	9C08053A...FHFT	9C06031A...JHFT	9C06031A...FHFT	---
	10 000	---	---	---	---	---	---	---	---	---	---	---	9C04021A...JHF3
		---	---	---	---	---	---	---	---	---	---	---	9C04021A...FHF3

For ordering rules: See page 70 for E24/E96 values and the last 4 or 3 digits for the resistance value; see page 71 for the TC values in clear text code.



# PRODUCT SELECTION CHART

Trimmable / Surge / Fusible

Series	Trim mable				Surge	Fusible	
	RC02TR	RC12TR	RC22TR	RC32TR	SRC01	FRC01	FRC21
Case size	<b>1206</b>	<b>0805</b>	<b>0603</b>	<b>0402</b>	<b>1206</b>	<b>1206</b>	<b>0603</b>
Tolerance					5%	5%	5%
Power P <sub>70</sub>	0.25 W	0.125 W	0.063 W	0.063 W	0.25 W	0.125 W	0.063 W
Temp range (°C)	-55 to 155	-55 to 155	-55 to 125	-55 to 125	-55 to 155	-55 to 125	-55 to 155
U <sub>max</sub>	200 V	150 V	50 V	50 V	200 V	200 V	50 V
E-Series	E24	E24	E24	E24	E24	E24/E96	E24
Resistance range including temperature coefficient (TC)							
0 Ω							
0.1 Ω							
1 Ω	1 Ω	1 Ω	1 Ω	1 Ω	1 Ω	1 Ω	1 Ω
10 Ω	TC 0/+500	TC 0/+500	TC 0/+500	TC 0/+500	TC 200	TC 250 4.7	TC 0/+500
100 Ω	TC 100	TC 100	TC 100	TC 100		TC 200	TC 200
1 kΩ					510 Ω	240 Ω	
10 kΩ	TC 200	TC 200	TC 200	TC 200	100 kΩ	510 Ω	240 Ω
100 kΩ							
1 MΩ	TC 200	TC 200	TC 200	TC 200	100 kΩ	510 Ω	240 Ω
10 MΩ	10 MΩ	10 MΩ	10 MΩ	10 MΩ			
100 MΩ							
Remarks	Tolerance 0 /-20% and 0 /-30%					Non flammable specified interruptions	

## Ordering information - Phycomp world wide - preferred types

Series	RC02TR	RC12TR	RC22TR	RC32TR	SRC01	FRC01	FRC21
Range	E24 1 Ω-10 MΩ	E24 1 Ω-10 MΩ	E24 1 Ω-10 MΩ	E24 1 Ω-10 MΩ	E24 5% 1 Ω-100 kΩ	E24/E96 5% 1 Ω-510 kΩ	E24 5% 1 Ω-240 kΩ
Packing	paper tape	paper tape	paper tape	paper tape	paper tape	paper tape	paper tape
Quantity 5 000 0/-20%	235050011...	235050111...	235050211...	235050321...	---	---	---
5 000 0/-30%	235050010...	235051110...	235050210...	23505032...	---	---	---
Europe 5 000	232272494...	232273494...	on request	---	---	---	---
Quantity 5 000	---	---	---	---	235055010...	23227506....	232275660...

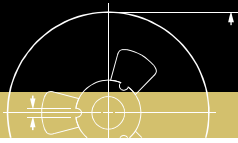
For ordering rules: See page 70 for E24/E96 values and the last 4 or 3 digits of the 12NC catalogue number.

## Ordering information - Phycomp North America - preferred types

Series	RC02TR	RC12TR	RC22TR	RC32TR	SRC01	FRC01	FRC21
Range	E24 1 Ω-10 MΩ	E24 1 Ω-10 MΩ	E24 1 Ω-10 MΩ	E24 1 Ω-10 MΩ	E24 5% 1 Ω-100 kΩ	E24/E96 5% 1 Ω-510 kΩ	E24 5% 1 Ω-240 kΩ
Packing	paper tape	paper tape	paper tape	paper tape	paper tape	paper tape	paper tape
Quantity 5 000 0/-20%	9C12063A...N.HFT	9C08052A...N.HFT	9C06031A...N.HFT	9C04021A...N.HFT	---	---	---
5 000 0/-30%	9C12063A...R.HFT	9C08052A...R.HFT	9C06031A...R.HFT	9C04021A...R.HFT	---	---	---
Quantity 5 000	---	---	---	---	9CSR013A...JLHFT	9CFR012A...J.HFT	9CFR211A...J.HFT

For ordering rules: See page 70 for E24/E96 values and the last 4 or 3 digits for the resistance value; see page 71 for the TC values in clear text code.





# PRODUCT SELECTION CHART

## NiAu terminations

NiAu terminations								
Series	RC01	RC02H	RC11	RC12	RC21	RC22H	RC31	RC32
Case size	1206		0805		0603		0402	
Tolerance	5%	1%	5%	1%	5%	1%	5%	1%
Power P <sub>70</sub>	0.25 W		0.125 W		0.063 W		0.063 W	
Temp range (°C)	-55 to 155		-55 to 155		-55 to 155		-55 to 155	
U <sub>max</sub>	200 V		150 V		50 V		50 V	
E-Series	E24	E24/E96	E24	E96	E24	E96	E24	E96
Resistance range including temperature coefficient (TC)								
0 Ω								
0.1 Ω								
1 Ω	1 Ω	1 Ω	1 Ω	1 Ω	1 Ω	1 Ω	1 Ω	6.8 Ω
10 Ω	TC 0/+500	TC 0/+500	TC 0/+500	TC 0/+500	TC 0/+500	TC 0/+500	TC 0/+500	TC 0/+500
100 Ω								
1 kΩ	TC 200	TC 200	TC 200	TC 200	TC 200	TC 200	TC 200	TC 200
10 kΩ								
100 kΩ								
1 MΩ								
10 MΩ								
100 MΩ	10 MΩ	10 MΩ	10 MΩ	10 MΩ	10 MΩ	10 MΩ	10 MΩ	10 MΩ
Remarks	Special terminations for hybrid board gluing / replaces AgPd terminations							

Ordering information - Phycomp world wide - preferred types								
Series	RC01	RC02H	RC11	RC12	RC21	RC22H	RC31	RC32
Range	E24 5% 1 Ω-10 MΩ	E24/E96 1% 1 Ω-10 MΩ	E24 5% 1 Ω-10 MΩ	E96 1% 1 Ω-10 MΩ	E24 5% 1 Ω-10 MΩ	E96 1% 1 Ω-10 MΩ	E24 5% 1 Ω-10 MΩ	E96 1% 6.8 Ω-10 MΩ
Packing	paper tape	paper tape	paper tape	paper tape	paper tape	paper tape	paper tape	paper tape
Quantity	5 000 232271111...	23227291....	232273011...	23227341....	232270211...	23227041....	---	---
	10 000 232271112...	23227291....	232273012...	---	232270212...	23227042....	232270512...	23227062....

For ordering rules: See page 70 for E24/E96 values and the last 4 or 3 digits of the 12NC catalogue number.

Ordering information - Phycomp North America - preferred types								
Series	RC01	RC02H	RC11	RC12	RC21	RC22H	RC31	RC32
Range	E24 5% 1 Ω-10 MΩ	E24/E96 1% 1 Ω-10 MΩ	E24 5% 1 Ω-10 MΩ	E96 1% 1 Ω-10 MΩ	E24 5% 1 Ω-10 MΩ	E96 1% 1 Ω-10 MΩ	E24 5% 1 Ω-10 MΩ	E96 1% 6.8 Ω-10 MΩ
Packing	paper tape	paper tape	paper tape	paper tape	paper tape	paper tape	paper tape	paper tape
Quantity	5 000 9C12063A...J.AFT	9C12063A...F.AFT	9C08052A...J.AFT	9C08052A...F.AFT	9C06031A...J.AFT	9C06031A...F.AFT	---	---
	10 000 ---	---	---	---	9C06031A...J.AF3	---	9C04021A...J.AF3	9C04021A...F.AF3

For ordering rules: See page 70 for E24/E96 values and the last 4 or 3 digits for the resistance value; see page 71 for the TC values in clear text code.

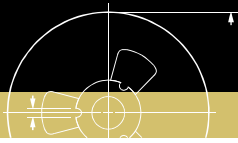


Sample kit data					
Phycomp order code: 3322073.....	30092	30095	30093	30096	30094
Type	RC01	RC01	RC11	RC11	RC21
Size	1206	1206	0805	0805	0603
Series	E6+jumper	E24+jumper	E6+jumper	E24+jumper	E6+jumper
Tolerance	5%	5%	5%	5%	5%
Resistor Range	1 Ω- 10 MΩ	1 Ω- 10 MΩ	1 Ω- 10 MΩ	1 Ω- 10 MΩ	1 Ω- 10 MΩ
Resistance Values	38	170	38	170	38
Resistor pieces	50	50	50	50	50
Maximum Wattage	1/4 W	1/4 W	1/10 W	1/10 W	1/16 W
Temp Coeff (ppm)	± 200	± 200	± 200	± 200	± 200
Maximum Voltage	200	200	150	150	50

Sample kit data				
Phycomp order code: 3322073.....	30098	30099	30101	30107
Type	RC02H	RC12H	RC22H	RC32H
Size	1206	0805	0603	0402
Series	E24+jumper	E24+jumper	E24+jumper	E12+jumper
Tolerance	1%	1%	1%	1%
Resistor Range	1 Ω- 10 MΩ	1 Ω- 10 MΩ	1 Ω- 10 MΩ	10 Ω- 1 MΩ
Resistance Values	170	170	170	62
Resistor pieces	50	50	50	100
Maximum Wattage	1/4 W	1/10 W	1/16 W	1/16 W
Temp Coeff (ppm)	±100	±100	±100	±200
Maximum Voltage	200	150	50	50

Sample kit data				
Phycomp order code: 3322073.....	30097	30104	30105	30106
Type	RC21	RC31	RC31	RC31
Size	0603	0402	0402	0402
Series	E24+jumper	E12+jumper	E24-E12	E24+jumper
Tolerance	5%	5%	5%	5%
Resistor Range	1 Ω- 10 MΩ	10 Ω- 2M2 Ω	10 Ω- 2M2 Ω	10 Ω- 2M2 Ω
Resistance Values	170	62	62	122
Resistor pieces	50	100	100	100
Maximum Wattage	1/16 W	1/16 W	1/16 W	1/16 W
Temp Coeff (ppm)	± 200	± 200	± 200	± 200
Maximum Voltage	50	50	50	50

Sample kit data				
Phycomp order code: 3322073.....	30108	30109	30102	30103
Type	RC32H	RC32H	ARC241	ARC241
Size	0402	0402	0603X4	0603X4
Series	E24-E12	E24+jumper	E6+jumper	E12+jumper
Tolerance	1%	1%	5%	5%
Resistor Range	10 Ω- 1 MΩ	10 Ω- 1 MΩ	10 Ω- 1 MΩ	10 Ω- 1 MΩ
Resistance Values	61	122	32	62
Resistor pieces	100	100	50	50
Maximum Wattage	1/16 W	1/16 W	1/16 W	1/16 W
Temp Coeff (ppm)	± 200	± 200	± 200	± 200
Maximum Voltage	50	50	50	50



# COMPETITOR CROSS REFERENCE

## Chip resistor cross reference

Manufacturer		Yageo	Vitrohm	Phycomp	AVX	BC Comp	Kamaya	KOA	Panasonic	Rohm	Vishay	Vishay dale
1	Series	RC	RGC	RC	CR	DC.	RMC	RM73/RK73	ERJ	MCR	D	CR/CRCW
2	0402 1/16 W	0402	512-0	31	05	-	RMC	1E	2GE	01	10	0402
	0603 1/16 W	0603	513-0	21/22H	10	DCT 0603	1/16	1J	3GS	03	11	0603
	0805 1/10 W	0805	503-0	11/12H	21	DCU 0805	1/10	2A	6GE	10	12	0805
	0805 1/8 W	0805	503-0	11/12H	-	DCU 0805	1/8	2A	-	-	12	0805
	1206 1/8 W	1206	502-0	01/02H	32	DCA 1206	-	2B	8GE	18	25	1206
	1206 1/4 W	1206	502-0	01/02H	-	DCA 1206	-	2B	8GC	-	25	1206
	1210 1/4 W	1210	507-0	-	-	-	1/4	2E	14	25	-	1210
	2010 1/2 W	2010	508-0	-	-	-	1/2	2H	12(1812)	50	-	2010
2512 1 W	2512	509-0	-	63	-	1	3A	1W	100	-	2512	
3	Tolerance	K ±10%		J ±5%		G ±2%		F ±1%				
4	Nominal resistance value	3-digit code 103 = 10k, 471 = 470R						4-digit code 1002 = 10k, 1471 = 1k47				
5	Packing											
	Paper tape	R	7A	-	T	PA	TP	TD	V	EZH	-	RT1
	Plastic tape	K	7D	-	H	-	TE	TE	U	JZH	-	RT2
	7" Reel	07	7A	-	-	PA	-	-	-	-	-	-
	10" Reel	10	-	-	D	-	-	-	-	FHZ	-	RT3
	13" Reel	13	7Q	-	S	-	-	-	-	QZH	-	-
	Cassette	C	-	-	-	-	-	-	-	PZHI	-	-
6	Marking (except 0402)											
	Top	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y

Company	Sample P/N	Description	Chip resistor			0603	1K47	1%
Yageo	RC0603FR-071K47	1	2	3	5	5	4	
		RC	0603	F	R	07	1K47	
Vitrohm	513-0 1K47 1% 7A	1	2	4	3	5		
			513-0	1K47	1%	7A		
AVX	CR10-1471F-T	1	2	4	3	5		
		CR	10	1471	F	T		
KOA	RK73H1JT1471F	1	-	2	5	4	3	
		RK73	H	1J	T	1471	F	
Panasonic	ERJ3ENF1471V	1	2	6	3	4	5	
		ERJ	3E	N	F	1471	V	
Rohm	MCR3EZH1471	1	2	5	3	4		
		MCR	3	EZH	F	1471		
Vishay	D11 1K47 1% 7"	1	2	4	3	5		
		D	11	1K47	1%	7"		
Vishay Dale	CRCW06031471FRT1	1	2	4	3	5		
		CRCW	0603	1471	F	RT1		





# PART NUMBER CROSS REFERENCE

## Part number to 12NC cross reference

Part number to 12NC cross reference									
P/N	12NC	Description	Size	Tol	Power	Qty	Reel size	TC	Page
ARC241	235003410...	Array 4x0603 5% Reel (7inch) concave	1206	5%	0.063	5 000	7"	200	79
ARC241	235003491001	Array 4x0603 5% Reel (7inch) concave	1206	jumper	0.063	5 000	7"	-	79
ARC242	23500241....	Array 4x0603 1% Reel (7inch) concave	1206	1%	0.063	5 000	7"	100	79
ARV241	235003510...	Array 4x0603 5% Reel (7inch) concex	1206	5%	0.063	5 000	7"	200	79
ARV241	235003591001	Array 4x0603 5% Reel (7inch) concex	1206	jumper	0.063	5 000	7"	-	79
ARV242	23500251....	Array 4x0603 1% Reel (7inch) convex	1206	1%	0.063	5 000	7"	200	79
ARV321	2350013111...	Array 2x0402 5% Reel (10inch) convex	0202	5%	0.063	10 000	10"	200	79
ARV321	235001391002	Array 2x0402 5% Reel (7inch) convex	0202	jumper	0.063	5 000	7"	-	79
ARV321	235001391001	Array 2x0402 5% Reel (10inch) convex	0202	jumper	0.063	10 000	10"	-	79
ARV322	23500132....	Array 2x0402 1% Reel (7inch) convex	0202	1%	0.063	10 000	7"	100	79
ARV341	235003310...	Array 4x0402 5% Reel (7inch) convex	0402	5%	0.063	5 000	7"	300	79
ARV341	235003311...	Array 4x0402 5% Reel (10inch) convex	0402	5%	0.063	10 000	10"	300	79
ARV341	235003391002	Array 4x0402 5% Reel (7inch) convex	0402	jumper	0.063	5 000	7"	-	79
ARV341	235003391001	Array 4x0402 5% Reel (10inch) convex	0402	jumper	0.063	10 000	10"	-	79
ARV342	23500231....	Array 4x0402 1% Reel (7inch) convex	0402	1%	0.063	5 000	7"	300	79
ARV342	23500232....	Array 4x0402 1% Reel (7inch) convex	0402	1%	0.063	10 000	10"	300	79
ARV381	235005310...	Array 8x0402 5% Reel (7inch) convex	1606	5%	0.063	5 000	7"	200	79
ARV381	235005391001	Array 8x0402 5% Reel (7inch) convex	1606	jumper	0.063	5 000	7"	-	79
ARV382	23500431....	Array 8x0402 1% Reel (7inch) convex	1606	1%	0.063	5 000	7"	200	79
FRC01	23227506....	Fuse resistor 1206 5% (7inch)	1206	5%	0.125	5 000	7"	-	85
FRC21	232275660...	Fuse resistor 0603 5% (7inch)	0603	1%	0.063	5 000	7"	-	85
HRC01	235052010...	High Ohmic resistor 1206 5% (7inch)	1206	5%	0.25	5 000	7"	250	84
HRC01	235052091001	High Ohmic resistor 1206 5% - 100M (7inch)	1206	5%	0.25	5 000	7"	250	84
HRC11	235052110...	High Ohmic resistor 0805 5% (7inch)	0805	5%	0.125	5 000	7"	250	84
HRC11	235052191001	High Ohmic resistor 0805 5% - 100M (7inch)	0805	5%	0.125	5 000	7"	250	84
HRC21	235052210...	High Ohmic resistor 0603 5% (7inch)	0603	5%	0.1	5 000	7"	300	84
LPRC101	239073570...	1210 power resistor 5% (7inch)	1210	5%	0.33	5 000	7"	-	82
LPRC102	23907353....	1210 power resistor 1% (7inch)	1210	1%	0.33	5 000	7"	-	82
LPRC111	232276090..0	2010 power resistor 5% (10inch) low ohmic	2010	5%	0.5	4 000	10"	-	82
LPRC111	232276060...	2010 power resistor 5% (10 inch) low ohmic	2010	5%	0.5	4 000	10"	-	82
LPRC111	232276190..0	2010 power resistor 1% (10inch) low ohmic	2010	1%	0.5	4 000	10"	-	82
LPRC111	23227616....	2010 power resistor 1% (10inch) low ohmic	2010	1%	0.5	4 000	10"	-	82
LPRC201	232273560...	1218 power resistor 5% (10 inch) low ohmic	1218	5%	1	5 000	10"	-	82
LPRC201	23227352....	1218 power resistor 1% (10inch) low ohmic	1218	1%	1	5 000	10"	-	82
LPRC221	232276290..0	2512 power resistor 5% (10inch) low ohmic	2512	5%	1	4 000	10"	-	82
LPRC221	232276260...	2512 power resistor 5% (10 inch) low ohmic	2512	5%	1	4 000	10"	-	82
LPRC221	232276390..0	2512 power resistor 1% (10inch) low ohmic	2512	1%	1	4 000	10"	-	82
LPRC221	23227636....	2512 power resistor 1% (10inch) low ohmic	2512	1%	1	4 000	10"	-	82
LRC01	235051010...	Low Ohmic resistor 1206 5% (7inch)	1206	5%	0.25	5 000	7"	-	84
LRC02	235051012...	Low Ohmic resistor 1206 1% (7inch)	1206	1%	0.25	5 000	7"	-	84
LRC11	235051110...	Low Ohmic resistor 0805 5% (7inch)	0805	5%	0.125	5 000	7"	-	84
LRC11P	235051115...	Low Ohmic resistor 0805 5% power (7inch)	0805	5%	0.25	5 000	7"	-	84
LRC12	235051112...	Low Ohmic resistor 0805 1% (7inch)	0805	1%	0.1	5 000	7"	-	84
LRC12P	235051117...	Low Ohmic resistor 0805 1% power (7inch)	0805	1%	0.25	5 000	7"	-	84
LRC21	235051210...	Low Ohmic resistor 0603 5% (7inch)	0603	5%	0.063	5 000	7"	-	84
LRC22	235051212...	Low Ohmic resistor 0603 1% (7inch)	0603	1%	0.063	5 000	7"	-	84
LRC31	235051320...	Low Ohmic resistor 0402 5% (7inch)	0402	5%	0.063	10 000	7"	-	84
LRC32	235051322...	Low Ohmic resistor 0402 1% (7inch)	0402	1%	0.063	10 000	7"	-	84
MPRC221	232276294..0	2512 power metal strip resistor 5% (10inch)	2512	5%	1	4 000	10"	-	83
MPRC221	232276395..0	2512 power metal strip resistor 1% (10inch)	2512	1%	1	4 000	10"	-	83
PRC101	239073570...	1210 power resistor 5% (7inch)	1210	5%	0.33	5 000	7"	-	81
PRC101	239073590001	1210 power resistor 5% (7inch)	1210	jumper	0.33	5 000	7"	-	81
PRC102	23907353....	1210 power resistor 1% (7inch)	1210	1%	0.33	5 000	7"	-	81
PRC111	232276060...	2010 power resistor 5% (10 inch)	2010	5%	0.5	4 000	10"	-	81
PRC111	232276090003	2010 power resistor 5% (10inch)	2010	jumper	0.5	4 000	10"	-	81
PRC111	23227616....	2010 power resistor 1% (10inch)	2010	1%	0.5	4 000	10"	-	81
PRC201	232273560...	1218 power resistor 5% (10inch)	1218	5%	1	5 000	10"	-	81
PRC201	232273590006	1218 power resistor 5% (10inch)	1218	jumper	1	5 000	10"	-	81
PRC201	23227352....	1218 power resistor 5% (10inch)	1218	1%	1	5 000	10"	-	81
PRC221	232276260...	2512 power resistor 5% (10inch)	2512	5%	1	4 000	10"	-	81
PRC221	232276290000	2512 power resistor 5% (10inch)	2512	jumper	1	4 000	10"	-	81
PRC221	23227636....	2512 power resistor 1% (10inch)	2512	1%	1	4 000	10"	-	81
RC01	232271161...	General 1206 5% Reel (7inch)	1206	5%	0.25	5 000	7"	-	74
RC01	232271151...	General 1206 5% Reel (10inch)	1206	5%	0.25	10 000	10"	-	74
RC01	232271181...	General 1206 5% Reel (13inch)	1206	5%	0.25	20 000	13"	-	74
RC01	232271191032	General 1206 5% Reel (7inch)	1206	jumper	0.25	5 000	7"	-	74
RC01	232271191005	General 1206 5% Reel (10inch)	1206	jumper	0.25	10 000	10"	-	74
RC01	232271192004	General 1206 5% Reel (13inch)	1206	jumper	0.25	20 000	13"	-	74
RC01	232271111...	General 1206 5% Reel - NiAu termination (7inch)	1206	5%	0.25	5 000	7"	-	86



# PART NUMBER CROSS REFERENCE

## Part number to 12NC cross reference

Part number to 12NC cross reference									
P/N	12NC	Description	Size	Tol	Power	Qty	Reel size	TC	Page
RC01	232271112...	General 1206 5% Reel - NiAu termination (10inch)	1206	5%	0.25	10 000	10"	-	86
RC02G	23227222....	General 1206 1% Reel (7inch) TC50	1206	1%	0.25	5 000	7"	50	74
RC02G	23227223....	General 1206 1% Reel (10inch) TC50	1206	1%	0.25	10 000	10"	50	74
RC02H	23227246....	General 1206 1% Reel (7inch)	1206	1%	0.25	5 000	7"	-	74
RC02H	23227247....	General 1206 1% Reel (10inch)	1206	1%	0.25	10 000	10"	-	74
RC02H	23227248....	General 1206 1% Reel (13inch)	1206	1%	0.25	20 000	13"	-	74
RC02H	232272492006	General 1206 1% Reel (7inch)	1206	jumper	0.25	5 000	7"	-	74
RC02H	232272492007	General 1206 1% Reel (10inch)	1206	jumper	0.25	10 000	10"	-	74
RC02H	23227291....	General 1206 1% Reel - NiAu termination (7inch)	1206	1%	0.25	5 000	7"	-	86
RC02H	23227292....	General 1206 1% Reel - NiAu termination (10inch)	1206	1%	0.25	10 000	10"	-	86
RC02TR	235050011...	Trimmable resistor 1206 0/-20% (7inch)	1206	0/-20	0.25	5 000	7"	-	85
RC02TR	235050010...	Trimmable resistor 1206 0/-30% (7inch)	1206	0/-30	0.25	5 000	7"	-	85
RC02TR	232272494...	Trimmable resistor 1206 (Europe style) (7inch)	1206	-	0.25	5 000	7"	-	85
RC03G	23227252....	High-precision 1206 0.5% Reel (7inch) TC50	1206	0.50%	0.25	5 000	7"	50	75
RC04G	23227072....	High-precision 1206 0.25% Reel (7inch) TC50	1206	0.25%	0.125	5 000	7"	50	75
RC04H	23505410....	High-precision 1206 0.25% Reel (7inch) TC100	1206	0.25%	0.25	5 000	7"	100	75
RC05G	23227082....	High-precision 1206 0.1% Reel (7inch) TC50	1206	0.10%	0.125	5 000	7"	50	75
RC05H	23505420....	High-precision 1206 0.1% Reel (7inch) TC100	1206	0.10%	0.125	5 000	7"	100	75
RC11	232273061...	General 0805 5% Reel (7inch)	0805	5%	0.125	5 000	7"	-	74
RC11	232273071...	General 0805 5% Reel (10inch)	0805	5%	0.125	10 000	10"	-	74
RC11	232273081...	General 0805 5% Reel (13inch)	0805	5%	0.125	20 000	13"	-	74
RC11	232273091002	General 0805 5% Reel (7inch)	0805	jumper	0.125	5 000	7"	-	74
RC11	232273091003	General 0805 5% Reel (10inch)	0805	jumper	0.125	10 000	10"	-	74
RC11	232273092002	General 0805 5% Reel (13inch)	0805	jumper	0.125	20 000	13"	-	74
RC11	232273011...	General 0805 5% Reel - NiAu termination (7inch)	0805	5%	0.125	5 000	7"	-	86
RC11	232273012...	General 0805 5% Reel - NiAu termination (10inch)	0805	5%	0.125	10 000	10"	-	86
RC12	23227341....	General 0805 1% Reel - NiAu termination (7inch)	0805	1%	0.125	5 000	7"	-	86
RC12	23227342....	General 0805 1% Reel - NiAu termination (10inch)	0805	1%	0.125	10 000	10"	-	86
RC12G	23227326....	General 0805 1% Reel (7inch) TC50	0805	1%	0.125	5 000	7"	50	74
RC12G	23227327....	General 0805 1% Reel (10inch) TC50	0805	1%	0.125	10 000	10"	50	74
RC12H	23227346....	General 0805 1% Reel (7inch)	0805	1%	0.125	5 000	7"	-	74
RC12H	23227347....	General 0805 1% Reel (10inch)	0805	1%	0.125	10 000	10"	-	74
RC12H	23227348....	General 0805 1% Reel (13inch)	0805	1%	0.125	20 000	13"	-	74
RC12H	232273492006	General 0805 1% Reel (7inch)	0805	jumper	0.125	5 000	7"	-	74
RC12H	232273492007	General 0805 1% Reel (10inch)	0805	jumper	0.125	10 000	10"	-	74
RC12TR	235050111...	Trimmable resistor 0805 0/-20% (7inch)	0805	0/-20	0.125	5 000	7"	-	85
RC12TR	235051110...	Trimmable resistor 0805 0/-30% (7inch)	0805	0/-30	0.125	5 000	7"	-	85
RC12TR	232273494...	Trimmable resistor 0805 (Europe style) (7inch)	0805	-	0.125	5 000	7"	-	85
RC13G	23227382....	High-precision 0805 0.5% Reel (7inch) TC50	0805	0.50%	0.125	5 000	7"	50	75
RC14G	23227092....	High-precision 0805 0.25% Reel (7inch) TC50	0805	0.25%	0.1	5 000	7"	50	75
RC14H	23505440....	High-precision 0805 0.25% Reel (7inch) TC100	0805	0.25%	0.1	5 000	7"	100	75
RC15G	23227102....	High-precision 0805 0.1% Reel (7inch) TC50	0805	0.10%	0.1	5 000	7"	50	75
RC15H	23505450....	High-precision 0805 0.1% Reel (7inch) TC100	0805	0.10%	0.1	5 000	7"	100	75
RC21	232270260...	General 0603 5% Reel (7inch)	0603	5%	0.1	5 000	7"	-	74
RC21	232270270...	General 0603 5% Reel (10inch)	0603	5%	0.1	10 000	10"	-	74
RC21	232270281...	General 0603 5% Reel (13inch)	0603	5%	0.1	20 000	13"	-	74
RC21	232270296001	General 0603 5% Reel (7inch)	0603	jumper	0.1	5 000	7"	-	74
RC21	232270297001	General 0603 5% Reel (10inch)	0603	jumper	0.1	10 000	10"	-	74
RC21	232270292002	General 0603 5% Reel (13inch)	0603	jumper	0.1	20 000	13"	-	74
RC21	232270211...	General 0603 5% Reel - NiAu termination (7inch)	0603	5%	0.063	5 000	7"	-	86
RC21	232270212...	General 0603 5% Reel - NiAu termination (10inch)	0603	5%	0.063	10 000	10"	-	86
RC22H	23227046....	General 0603 1% Reel (7inch)	0603	1%	0.1	5 000	7"	-	74
RC22H	23227047....	General 0603 1% Reel (10inch)	0603	1%	0.1	10 000	10"	-	74
RC22H	23227048....	General 0603 1% Reel (13inch)	0603	1%	0.1	20 000	13"	-	74
RC22H	232270492006	General 0603 1% Reel (7inch)	0603	jumper	0.1	5 000	7"	-	74
RC22H	232270492007	General 0603 1% Reel (10inch)	0603	jumper	0.1	10 000	10"	-	74
RC22H	23227041....	General 0603 1% Reel - NiAu termination (7inch)	0603	1%	0.063	5 000	7"	-	86
RC22H	23227042....	General 0603 1% Reel - NiAu termination (10inch)	0603	1%	0.063	10 000	10"	-	86
RC22TR	235050211...	Trimmable resistor 0603 0/-20% (7inch)	0603	0/-20	0.063	5 000	7"	-	85
RC22TR	235050210...	Trimmable resistor 0603 0/-30% (7inch)	0603	0/-30	0.063	5 000	7"	-	85
RC23H	23505460....	High-precision 0603 0.5% Reel (7inch) TC100	0603	0.50%	0.063	5 000	7"	100	76
RC24H	23505470....	High-precision 0603 0.25% Reel (7inch) TC100	0603	0.25%	0.063	5 000	7"	100	76
RC25H	23505480....	High-precision 0603 0.1% Reel (7inch) TC100	0603	0.10%	0.063	5 000	7"	100	76
RC31	232270570...	General 0402 5% Reel (7inch)	0402	5%	0.063	10 000	7"	-	74
RC31	232270587...	General 0402 5% Reel (10inch)	0402	5%	0.063	50 000	10"	-	74
RC31	232270591001	General 0402 5% Reel (7inch)	0402	jumper	0.063	10 000	7"	-	74
RC31	232270591007	General 0402 5% Reel (10inch)	0402	jumper	0.063	50 000	10"	-	74
RC31	232270512...	General 0402 5% Reel - NiAu termination (7inch)	0402	-	0.063	10 000	7"	-	86
RC32	23227067....	General 0402 1% Reel (7inch)	0402	1%	0.063	10 000	7"	-	74



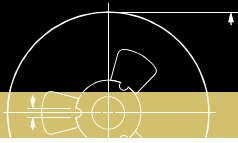
# PART NUMBER CROSS REFERENCE

## Part number to 12NC cross reference

Part number to 12NC cross reference									
P/N	12NC	Description	Size	Tol	Power	Qty	Reel size	TC	Page
RC32	23227068....	General 0402 1% Reel (10inch)	0402	1%	0.063	50 000	10"	-	74
RC32	23227062....	General 0402 1% Reel - NiAu termination (7inch)	0402	5%	0.063	10 000	7"	-	86
RC32TR	235050321...	Trimmable resistor 0402 0/-20% (7inch)	0402	0/-20	0.063	10 000	7"	-	85
RC32TR	23505032....	Trimmable resistor 0402 0/-30% (7inch)	0402	0/-30	0.063	10 000	7"	-	85
RC33	23505497....	High-precision 0402 0.5% Reel (7inch) TC200	0402	0.50%	0.063	5 000	7"	200	76
RC41	232280370	General 0201 5% Reel (7inch)	0201	5%	0.05	10 000	7"	-	74
RC41	232280391001	General 0201 5% Reel (7inch)	0201	jumper	0.05	10 000	7"	-	74
RC42	23228067....	General 0201 1% Reel (7inch)	0201	1%	0.05	10 000	7"	-	74
RCB210	23503122....	Network 4R4C 5% (7inch) concave	1608	5%	0.062	5 000	7"	200	80
RNA310	235023010...	8R-network 5% Reel (7inch) convex	1206	5%	0.031	5 000	7"	-	80
RNA310	235023091001	8R-network 5% Reel (7inch) convex	1206	jumper	0.031	5 000	7"	-	80
SRC01	235055010...	Surge resistor 1206 5% (7inch)	1206	5%	0.25	5 000	7"	200	85
TF010	23906117....	High-precision Thin Film 1206 1.0% Reel (7inch) TC25	1206	1.00%	0.125	5 000	7"	25	77
TF011	23906116....	High-precision Thin Film 1206 0.5% Reel (7inch) TC25	1206	0.50%	0.125	5 000	7"	25	77
TF012	23906115....	High-precision Thin Film 1206 0.25% Reel (7inch) TC25	1206	0.25%	0.125	5 000	7"	25	77
TF013	23906114....	High-precision Thin Film 1206 0.1% Reel (7inch) TC25	1206	0.10%	0.125	5 000	7"	25	77
TF014	23906113....	High-precision Thin Film 1206 0.05% Reel (7inch) TC25	1206	0.05%	0.125	5 000	7"	25	77
TF020	23904117....	High-precision Thin Film 1206 1.0% Reel (7inch) TC50	1206	1.00%	0.125	5 000	7"	50	77
TF021	23904116....	High-precision Thin Film 1206 0.5% Reel (7inch) TC50	1206	0.50%	0.125	5 000	7"	50	77
TF022	23904115....	High-precision Thin Film 1206 0.25% Reel (7inch) TC50	1206	0.25%	0.125	5 000	7"	50	77
TF023	23904114....	High-precision Thin Film 1206 0.1% Reel (7inch) TC50	1206	0.10%	0.125	5 000	7"	50	77
TF024	23904113....	High-precision Thin Film 1206 0.05% Reel (7inch) TC50	1206	0.05%	0.125	5 000	7"	50	77
TF110	23906017....	High-precision Thin Film 0805 1.0% Reel (7inch) TC25	0805	1.00%	0.125	5 000	7"	25	77
TF111	23906016....	High-precision Thin Film 0805 0.5% Reel (7inch) TC25	0805	0.50%	0.125	5 000	7"	25	77
TF112	23906015....	High-precision Thin Film 0805 0.25% Reel (7inch) TC25	0805	0.25%	0.125	5 000	7"	25	77
TF113	23906014....	High-precision Thin Film 0805 0.1% Reel (7inch) TC25	0805	0.10%	0.125	5 000	7"	25	77
TF114	23906013....	High-precision Thin Film 0805 0.05% Reel (7inch) TC25	0805	0.05%	0.125	5 000	7"	25	77
TF120	23904017....	High-precision Thin Film 0805 1.0% Reel (7inch) TC50	0805	1.00%	0.125	5 000	7"	50	77
TF121	23904016....	High-precision Thin Film 0805 0.5% Reel (7inch) TC50	0805	0.50%	0.125	5 000	7"	50	77
TF122	23904015....	High-precision Thin Film 0805 0.25% Reel (7inch) TC50	0805	0.25%	0.125	5 000	7"	50	77
TF123	23904014....	High-precision Thin Film 0805 0.1% Reel (7inch) TC50	0805	0.10%	0.125	5 000	7"	50	77
TF124	23904013....	High-precision Thin Film 0805 0.05% Reel (7inch) TC50	0805	0.05%	0.125	5 000	7"	50	77
TF210	23906047....	High-precision Thin Film 0603 1.0% Reel (7inch) TC25	0603	1.00%	0.063	5 000	7"	25	78
TF211	23906046....	High-precision Thin Film 0603 0.5% Reel (7inch) TC25	0603	0.50%	0.063	5 000	7"	25	78
TF212	23906045....	High-precision Thin Film 0603 0.25% Reel (7inch) TC25	0603	0.25%	0.063	5 000	7"	25	78
TF213	23906044....	High-precision Thin Film 0603 0.1% Reel (7inch) TC25	0603	0.10%	0.063	5 000	7"	25	78
TF214	23906043....	High-precision Thin Film 0603 0.05% Reel (7inch) TC25	0603	0.05%	0.063	5 000	7"	25	78
TF220	23904047....	High-precision Thin Film 0603 1.0% Reel (7inch) TC50	0603	1.00%	0.063	5 000	7"	50	78
TF221	23904046....	High-precision Thin Film 0603 0.5% Reel (7inch) TC50	0603	0.50%	0.063	5 000	7"	50	78
TF222	23904045....	High-precision Thin Film 0603 0.25% Reel (7inch) TC50	0603	0.25%	0.063	5 000	7"	50	78
TF223	23904044....	High-precision Thin Film 0603 0.1% Reel (7inch) TC50	0603	0.10%	0.063	5 000	7"	50	78
TF224	23904043....	High-precision Thin Film 0603 0.05% Reel (7inch) TC50	0603	0.05%	0.063	5 000	7"	50	78
TF310	23906077....	High-precision Thin Film 0402 1.0% Reel (7inch) TC25	0402	1.00%	0.063	10 000	7"	25	78
TF311	23906076....	High-precision Thin Film 0402 0.5% Reel (7inch) TC25	0402	0.50%	0.063	10 000	7"	25	78
TF312	23906075....	High-precision Thin Film 0402 0.25% Reel (7inch) TC25	0402	0.25%	0.063	10 000	7"	25	78
TF313	23906074....	High-precision Thin Film 0402 0.1% Reel (7inch) TC25	0402	0.10%	0.063	10 000	7"	25	78
TF314	23906073....	High-precision Thin Film 0402 0.05% Reel (7inch) TC25	0402	0.05%	0.063	10 000	7"	25	78
TF320	23904077....	High-precision Thin Film 0402 1.0% Reel (7inch) TC50	0402	1.00%	0.063	10 000	7"	50	78
TF321	23904076....	High-precision Thin Film 0402 0.5% Reel (7inch) TC50	0402	0.50%	0.063	10 000	7"	50	78
TF322	23904075....	High-precision Thin Film 0402 0.25% Reel (7inch) TC50	0402	0.25%	0.063	10 000	7"	50	78
TF323	23904074....	High-precision Thin Film 0402 0.1% Reel (7inch) TC50	0402	0.10%	0.063	10 000	7"	50	78
TF324	23904073....	High-precision Thin Film 0402 0.05% Reel (7inch) TC50	0402	0.05%	0.063	10 000	7"	50	78
TF510	23906127....	High-precision Thin Film 1210 1.0% Reel (7inch) TC25	1210	1.00%	0.25	5 000	7"	25	76
TF511	23906126....	High-precision Thin Film 1210 0.5% Reel (7inch) TC25	1210	0.50%	0.25	5 000	7"	25	76
TF512	23906125....	High-precision Thin Film 1210 0.25% Reel (7inch) TC25	1210	0.25%	0.25	5 000	7"	25	76
TF513	23906124....	High-precision Thin Film 1210 0.1% Reel (7inch) TC25	1210	0.10%	0.25	5 000	7"	25	76
TF514	23906123....	High-precision Thin Film 1210 0.05% Reel (7inch) TC25	1210	0.05%	0.25	5 000	7"	25	76
TF520	23904127....	High-precision Thin Film 1210 1.0% Reel (7inch) TC50	1210	1.00%	0.25	5 000	7"	50	76
TF521	23904126....	High-precision Thin Film 1210 0.5% Reel (7inch) TC50	1210	0.50%	0.25	5 000	7"	50	76
TF522	23904125....	High-precision Thin Film 1210 0.25% Reel (7inch) TC50	1210	0.25%	0.25	5 000	7"	50	76
TF523	23904124....	High-precision Thin Film 1210 0.1% Reel (7inch) TC50	1210	0.10%	0.25	5 000	7"	50	76
TF524	23904123....	High-precision Thin Film 1210 0.05% Reel (7inch) TC50	1210	0.05%	0.25	5 000	7"	50	76
VPRC221	232276298...	2512 high voltage power resistor 5% (10inch)	2512	5%	1	4 000	10"	200	83
VRC01	232279061...	High voltage resistor 1206 5% (7inch)	1206	5%	0.25	5 000	7"	300	83
VRC02	23227916....	High voltage resistor 1206 1% (7 inch)	1206	1%	0.25	5 000	7"	300	83
VRC11	232279261...	High voltage resistor 0805 5% (7inch)	0805	5%	0.125	5 000	7"	300	83
VRC12	23227936....	High voltage resistor 0805 1% (7inch)	0805	1%	0.125	5 000	7"	300	83
Sample kits	332207330...	Samples kits	-	1%	-	-	-	-	87







# 12NC CROSS REFERENCE

## 12NC to part number cross reference

12NC to part number cross reference									
12NC	P/N	Description	Size	Tol	Power	Qty	Reel size	TC	Page
232270211...	RC21	General 0603 5% Reel - NiAu termination (7inch)	0603	5%	0.063	5 000	7"	-	82
232270212...	RC21	General 0603 5% Reel - NiAu termination (10inch)	0603	5%	0.063	10 000	10"	-	82
232270260...	RC21	General 0603 5% Reel (7inch)	0603	5%	0.1	5 000	7"	-	70
232270270...	RC21	General 0603 5% Reel (10inch)	0603	5%	0.1	10 000	10"	-	70
232270281...	RC21	General 0603 5% Reel (13inch)	0603	5%	0.1	20 000	13"	-	70
232270292002	RC21	General 0603 5% Reel (13inch)	0603	jumper	0.1	20 000	13"	-	70
232270296001	RC21	General 0603 5% Reel (7inch)	0603	jumper	0.1	5 000	7"	-	70
232270297001	RC21	General 0603 5% Reel (10inch)	0603	jumper	0.1	10 000	10"	-	70
23227041....	RC22H	General 0603 1% Reel - NiAu termination (7inch)	0603	1%	0.063	5 000	7"	-	82
23227042....	RC22H	General 0603 1% Reel - NiAu termination (10inch)	0603	1%	0.063	10 000	10"	-	82
23227046....	RC22H	General 0603 1% Reel (7inch)	0603	1%	0.1	5 000	7"	-	70
23227047....	RC22H	General 0603 1% Reel (10inch)	0603	1%	0.1	10 000	10"	-	70
23227048....	RC22H	General 0603 1% Reel (13inch)	0603	1%	0.1	20 000	13"	-	70
232270492006	RC22H	General 0603 1% Reel (7inch)	0603	jumper	0.1	5 000	7"	-	70
232270492007	RC22H	General 0603 1% Reel (10inch)	0603	jumper	0.1	10 000	10"	-	70
232270512...	RC31	General 0402 5% Reel - NiAu termination (7inch)	0402	-	0.063	10 000	7"	-	82
232270570...	RC31	General 0402 5% Reel (7inch)	0402	5%	0.063	10 000	7"	-	70
232270587...	RC31	General 0402 5% Reel (10inch)	0402	5%	0.063	5 000	10"	-	70
232270591001	RC31	General 0402 5% Reel (7inch)	0402	jumper	0.063	10 000	7"	-	70
232270591007	RC31	General 0402 5% Reel (10inch)	0402	jumper	0.063	5 000	10"	-	70
23227062....	RC32	General 0402 1% Reel - NiAu termination (7inch)	0402	5%	0.063	10 000	7"	-	82
23227067....	RC32	General 0402 1% Reel (7inch)	0402	1%	0.063	10 000	7"	-	70
23227068....	RC32	General 0402 1% Reel (10inch)	0402	1%	0.063	5 000	10"	-	70
23227072....	RC04G	High-precision 1206 0.25% Reel (7inch) TC50	1206	0.25%	0.125	5 000	7"	50	71
23227082....	RC05G	High-precision 1206 0.1% Reel (7inch) TC50	1206	0.10%	0.125	5 000	7"	50	71
23227092....	RC14G	High-precision 0805 0.25% Reel (7inch) TC50	0805	0.25%	0.1	5 000	7"	50	71
23227102....	RC15G	High-precision 0805 0.1% Reel (7inch) TC50	0805	0.10%	0.1	5 000	7"	50	71
232271111...	RC01	General 1206 5% Reel - NiAu termination (7inch)	1206	5%	0.25	5 000	7"	-	82
232271112...	RC01	General 1206 5% Reel - NiAu termination (10inch)	1206	5%	0.25	10 000	10"	-	82
232271151...	RC01	General 1206 5% Reel (10inch)	1206	5%	0.25	10 000	10"	-	70
232271161...	RC01	General 1206 5% Reel (7inch)	1206	5%	0.25	5 000	7"	-	70
232271181...	RC01	General 1206 5% Reel (13inch)	1206	5%	0.25	20 000	13"	-	70
232271191005	RC01	General 1206 5% Reel (10inch)	1206	jumper	0.25	10 000	10"	-	70
232271191032	RC01	General 1206 5% Reel (7inch)	1206	jumper	0.25	5 000	7"	-	70
232271192004	RC01	General 1206 5% Reel (13inch)	1206	jumper	0.25	20 000	13"	-	70
23227222....	RC02G	General 1206 1% Reel (7inch) TC50	1206	1%	0.25	5 000	7"	50	70
23227223....	RC02G	General 1206 1% Reel (10inch) TC50	1206	1%	0.25	10 000	10"	50	70
23227246....	RC02H	General 1206 1% Reel (7inch)	1206	1%	0.25	5 000	7"	-	70
23227247....	RC02H	General 1206 1% Reel (10inch)	1206	1%	0.25	10 000	10"	-	70
23227248....	RC02H	General 1206 1% Reel (13inch)	1206	1%	0.25	20 000	13"	-	70
232272492006	RC02H	General 1206 1% Reel (7inch)	1206	jumper	0.25	5 000	7"	-	70
232272492007	RC02H	General 1206 1% Reel (10inch)	1206	jumper	0.25	10 000	10"	-	70
232272494...	RC02TR	Trimmable resistor 1206 (Europe style) (7inch)	1206	-	0.25	5 000	7"	-	81
23227252....	RC03G	High-precision 1206 0.5% Reel (7inch) TC50	1206	0.50%	0.25	5 000	7"	50	71
23227291....	RC02H	General 1206 1% Reel - NiAu termination (7inch)	1206	1%	0.25	5 000	7"	-	82
23227292....	RC02H	General 1206 1% Reel - NiAu termination (10inch)	1206	1%	0.25	10 000	10"	-	82
232273011...	RC11	General 0805 5% Reel - NiAu termination (7inch)	0805	5%	0.125	5 000	7"	-	82
232273012...	RC11	General 0805 5% Reel - NiAu termination (10inch)	0805	5%	0.125	10 000	10"	-	82
232273061...	RC11	General 0805 5% Reel (7inch)	0805	5%	0.125	5 000	7"	-	70
232273071...	RC11	General 0805 5% Reel (10inch)	0805	5%	0.125	10 000	10"	-	70
232273081...	RC11	General 0805 5% Reel (13inch)	0805	5%	0.125	20 000	13"	-	70
232273091002	RC11	General 0805 5% Reel (7inch)	0805	jumper	0.125	5 000	7"	-	70
232273091003	RC11	General 0805 5% Reel (10inch)	0805	jumper	0.125	10 000	10"	-	70
232273092002	RC11	General 0805 5% Reel (13inch)	0805	jumper	0.125	20 000	13"	-	70
23227326....	RC12G	General 0805 1% Reel (7inch) TC50	0805	1%	0.125	5 000	7"	50	70
23227327....	RC12G	General 0805 1% Reel (10inch) TC50	0805	1%	0.125	10 000	10"	50	70
23227341....	RC12	General 0805 1% Reel - NiAu termination (7inch)	0805	1%	0.125	5 000	7"	-	82
23227342....	RC12	General 0805 1% Reel - NiAu termination (10inch)	0805	1%	0.125	10 000	10"	-	82
23227346....	RC12H	General 0805 1% Reel (7inch)	0805	1%	0.125	5 000	7"	-	70
23227347....	RC12H	General 0805 1% Reel (10inch)	0805	1%	0.125	10 000	10"	-	70
23227348....	RC12H	General 0805 1% Reel (13inch)	0805	1%	0.125	20 000	13"	-	70
232273492006	RC12H	General 0805 1% Reel (7inch)	0805	jumper	0.125	5 000	7"	-	70
232273492007	RC12H	General 0805 1% Reel (10inch)	0805	jumper	0.125	10 000	10"	-	70
232273494...	RC12TR	Trimmable resistor 0805 (Europe style) (7inch)	0805	-	0.125	5 000	7"	-	81
23227352....	PRC201	1218 power resistor 5% (10inch)	1218	1%	1	5 000	10"	-	77
23227352....	LPRC201	1218 power resistor 1% (10inch) low ohmic	1218	1%	1	5 000	10"	-	78
232273560...	PRC201	1218 power resistor 5% (10inch)	1218	5%	1	5 000	10"	-	77
232273560...	LPRC201	1218 power resistor 5% (10 inch) low ohmic	1218	5%	1	5 000	10"	-	78
232273590006	PRC201	1218 power resistor 5% (10inch)	1218	jumper	1	5 000	10"	-	77



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## 12NC to part number cross reference

12NC to part number cross reference									
12NC	P/N	Description	Size	Tol	Power	Qty	Reel size	TC	Page
23227382....	RC13G	High-precision 0805 0.5% Reel (7inch) TC50	0805	0.50%	0.125	5 000	7"	50	71
23227506....	FRC01	Fuse resistor 1206 5%(7inch)	1206	5%	0.125	5 000	7"	-	81
232275660...	FRC21	Fuse resistor 0603 5%(7inch)	0603	1%	0.063	5 000	7"	-	81
232276060...	PRC111	2010 power resistor 5% (10 inch)	2010	5%	0.5	4 000	10"	-	77
232276060...	LPRC111	2010 power resistor 5% (10inch) low ohmic	2010	5%	0.5	4 000	10"	-	78
232276090..0	LPRC111	2010 power resistor 5% (10inch) low ohmic	2010	5%	0.5	4 000	10"	-	78
232276090003	PRC111	2010 power resistor 5% (10inch)	2010	jumper	0.5	4 000	10"	-	77
23227616....	PRC111	2010 power resistor 1% (10inch)	2010	1%	0.5	4 000	10"	-	77
23227616....	LPRC111	2010 power resistor 1% (10inch) low ohmic	2010	1%	0.5	4 000	10"	-	78
232276190..0	LPRC111	2010 power resistor 1% (10inch) low ohmic	2010	1%	0.5	4 000	10"	-	78
232276260...	PRC221	2512 power resistor 5% (10inch)	2512	5%	1	4 000	10"	-	77
232276260...	LPRC221	2512 power resistor 5% (10 inch) low ohmic	2512	5%	1	4 000	10"	-	78
232276290..0	LPRC221	2512 power resistor 5% (10inch) low ohmic	2512	5%	1	4 000	10"	-	78
232276290000	PRC221	2512 power resistor 5% (10inch)	2512	jumper	1	4 000	10"	-	77
232276294..0	MPRC221	2512 power metal strip resistor 5%(10inch)	2512	5%	1	4 000	10"	-	79
232276298...	VPRC221	2512 high voltage power resistor 5% (10inch)	2512	5%	1	4 000	10"	200	79
23227636....	PRC221	2512 power resistor 1% (10inch)	2512	1%	1	4 000	10"	-	77
23227636....	LPRC221	2512 power resistor 1% (10inch) low ohmic	2512	1%	1	4 000	10"	-	78
232276390..0	LPRC221	2512 power resistor 1% (10inch) low ohmic	2512	1%	1	4 000	10"	-	78
232276395..0	MPRC221	2512 power metal strip resistor 1%(10inch)	2512	1%	1	4 000	10"	-	79
232279061....	VRC01	High voltage resistor 1206 5% (7inch)	1206	5%	0.25	5 000	7"	300	79
23227916....	VRC02	High voltage resistor 1206 1% (7 inch)	1206	1%	0.25	5 000	7"	300	79
232279261....	VRC11	High voltage resistor 0805 5% (7inch)	0805	5%	0.125	5 000	7"	300	79
23227936....	VRC12	High voltage resistor 0805 1% (7inch)	0805	1%	0.125	5 000	7"	300	79
232280370	RC41	General 0201 5% Reel (7inch)	0201	5%	0.05	10 000	7"	-	70
232280391001	RC41	General 0201 5% Reel (7inch)	0201	jumper	0.05	10 000	7"	-	70
23228067....	RC42	General 0201 1% Reel (7inch)	0201	1%	0.05	10 000	7"	-	70
235001311....	ARV321	Array 2x0402 5% Reel (10inch) convex	0202	5%	0.063	10 000	10"	200	75
23500132....	ARV322	Array 2x0402 1% Reel (7inch) convex	0202	1%	0.063	10 000	7"	100	75
235001391001	ARV321	Array 2x0402 5% Reel (10inch) convex	0202	jumper	0.063	10 000	10"	-	75
235001391002	ARV321	Array 2x0402 5% Reel (7inch) convex	0202	jumper	0.063	5 000	7"	-	75
23500231....	ARV342	Array 4x0402 1% Reel (7inch) convex	0402	1%	0.063	5 000	7"	300	75
23500232....	ARV342	Array 4x0402 1% Reel (7inch) convex	0402	1%	0.063	10 000	10"	300	75
23500241....	ARC242	Array 4x0603 1% Reel (7inch) concave	1206	1%	0.063	5 000	7"	100	75
23500251....	ARV242	Array 4x0603 1% Reel (7inch) convex	1206	1%	0.063	5 000	7"	200	75
235003310....	ARV341	Array 4x0402 5% Reel (7inch) convex	0402	5%	0.063	5 000	7"	300	75
235003311...	ARV341	Array 4x0402 5% Reel (10inch) convex	0402	5%	0.063	10 000	10"	300	75
235003391001	ARV341	Array 4x0402 5% Reel (10inch) convex	0402	jumper	0.063	10 000	10"	-	75
235003391002	ARV341	Array 4x0402 5% Reel (7inch) convex	0402	jumper	0.063	5 000	7"	-	75
235003410....	ARC241	Array 4x0603 5% Reel (7inch) concave	1206	5%	0.063	5 000	7"	200	75
235003491001	ARC241	Array 4x0603 5% Reel (7inch) concave	1206	jumper	0.063	5 000	7"	-	75
235003510...	ARV241	Array 4x0603 5% Reel (7inch) concex	1206	5%	0.063	5 000	7"	200	75
235003591001	ARV241	Array 4x0603 5% Reel (7inch) concex	1206	jumper	0.063	5 000	7"	-	75
23500431....	ARV382	Array 8x0402 1% Reel (7inch) convex	1606	1%	0.063	5 000	7"	200	75
235005310....	ARV381	Array 8x0402 5% Reel (7inch) convex	1606	5%	0.063	5 000	7"	200	75
235005391001	ARV381	Array 8x0402 5% Reel (7inch) convex	1606	jumper	0.063	5 000	7"	-	75
235023010...	RNA310	8R-network 5% Reel (7inch) convex	1206	5%	0.031	5 000	7"	-	76
235023091001	RNA310	8R-network 5% Reel (7inch) convex	1206	jumper	0.031	5 000	7"	-	76
23503122....	RCB210	Network 4R4C 5% (7inch) concave	1608	5%	0.062	5 000	7"	200	76
235050010...	RC02TR	Trimmable resistor 1206 0/-30% (7inch)	1206	0/-30	0.25	5 000	7"	-	81
235050011...	RC02TR	Trimmable resistor 1206 0/-20% (7inch)	1206	0/-20	0.25	5 000	7"	-	81
235050111...	RC12TR	Trimmable resistor 0805 0/-20% (7inch)	0805	0/-20	0.125	5 000	7"	-	81
235050210...	RC22TR	Trimmable resistor 0603 0/-30% (7inch)	0603	0/-30	0.063	5 000	7"	-	81
235050211...	RC22TR	Trimmable resistor 0603 0/-20% (7inch)	0603	0/-20	0.063	5 000	7"	-	81
23505032....	RC32TR	Trimmable resistor 0402 0/-30% (7inch)	0402	0/-30	0.063	10 000	7"	-	81
235050321...	RC32TR	Trimmable resistor 0402 0/-20% (7inch)	0402	0/-20	0.063	10 000	7"	-	81
235051010...	LRC01	Low Ohmic resistor 1206 5%(7inch)	1206	5%	0.25	5 000	7"	-	80
235051012...	LRC02	Low Ohmic resistor 1206 1%(7inch)	1206	1%	0.25	5 000	7"	-	80
235051110...	LRC11	Low Ohmic resistor 0805 5%(7inch)	0805	5%	0.125	5 000	7"	-	80
235051110...	RC12TR	Trimmable resistor 0805 0/-30% (7inch)	0805	0/-30	0.125	5 000	7"	-	81
235051112...	LRC12	Low Ohmic resistor 0805 1%(7inch)	0805	1%	0.1	5 000	7"	-	80
235051115...	LRC11P	Low Ohmic resistor 0805 5%power (7inch)	0805	5%	0.25	5 000	7"	-	80
235051117...	LRC12P	Low Ohmic resistor 0805 1%power (7inch)	0805	1%	0.25	5 000	7"	-	80
235051210...	LRC21	Low Ohmic resistor 0603 5%(7inch)	0603	5%	0.063	5 000	7"	-	80
235051212...	LRC22	Low Ohmic resistor 0603 1%(7inch)	0603	1%	0.063	5 000	7"	-	80
235051320...	LRC31	Low Ohmic resistor 0402 5%(7inch)	0402	5%	0.063	10 000	7"	-	80
235051322...	LRC32	Low Ohmic resistor 0402 1%(7inch)	0402	1%	0.063	10 000	7"	-	80
235052010...	HRC01	High Ohmic resistor 1206 5%(7inch)	1206	5%	0.25	5 000	7"	250	80
235052091001	HRC01	High Ohmic resistor 1206 5%-100M(7inch)	1206	5%	0.25	5 000	7"	250	80



# 12NC CROSS REFERENCE

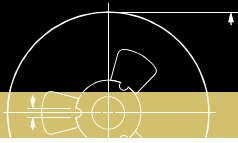
## 12NC to part number cross reference

12NC to part number cross reference									
12NC	P/N	Description	Size	Tol	Power	Qty	Reel size	TC	Page
235052110...	HRC11	High Ohmic resistor 0805 5% (7inch)	0805	5%	0.125	5 000	7"	250	80
235052191001	HRC11	High Ohmic resistor 0805 5% - 100M (7inch)	0805	5%	0.125	5 000	7"	250	80
235052210...	HRC21	High Ohmic resistor 0603 5% (7inch)	0603	5%	0.1	5 000	7"	300	80
23505410....	RC04H	High-precision 1206 0.25% Reel (7inch) TC100	1206	0.25%	0.25	5 000	7"	100	71
23505420....	RC05H	High-precision 1206 0.1% Reel (7inch) TC100	1206	0.10%	0.125	5 000	7"	100	71
23505440....	RC14H	High-precision 0805 0.25% Reel (7inch) TC100	0805	0.25%	0.1	5 000	7"	100	71
23505450....	RC15H	High-precision 0805 0.1% Reel (7inch) TC100	0805	0.10%	0.1	5 000	7"	100	71
23505460....	RC23H	High-precision 0603 0.5% Reel (7inch) TC100	0603	0.50%	0.063	5 000	7"	100	72
23505470....	RC24H	High-precision 0603 0.25% Reel (7inch) TC100	0603	0.25%	0.063	5 000	7"	100	72
23505480....	RC25H	High-precision 0603 0.1% Reel (7inch) TC100	0603	0.10%	0.063	5 000	7"	100	72
23505497....	RC33	High-precision 0402 0.5% Reel (7inch) TC200	0402	0.50%	0.063	5 000	7"	200	72
235055010...	SRC01	Surge resistor 1206 5% (7inch)	1206	5%	0.25	5 000	7"	200	81
23904013....	TF124	High-precision Thin Film 0805 0.05% Reel (7inch) TC50	0805	0.05%	0.125	5 000	7"	50	73
23904014....	TF123	High-precision Thin Film 0805 0.1% Reel (7inch) TC50	0805	0.10%	0.125	5 000	7"	50	73
23904015....	TF122	High-precision Thin Film 0805 0.25% Reel (7inch) TC50	0805	0.25%	0.125	5 000	7"	50	73
23904016....	TF121	High-precision Thin Film 0805 0.5% Reel (7inch) TC50	0805	0.50%	0.125	5 000	7"	50	73
23904017....	TF120	High-precision Thin Film 0805 1.0% Reel (7inch) TC50	0805	1.00%	0.125	5 000	7"	50	73
23904043....	TF224	High-precision Thin Film 0603 0.05% Reel (7inch) TC50	0603	0.05%	0.063	5 000	7"	50	74
23904044....	TF223	High-precision Thin Film 0603 0.1% Reel (7inch) TC50	0603	0.10%	0.063	5 000	7"	50	74
23904045....	TF222	High-precision Thin Film 0603 0.25% Reel (7inch) TC50	0603	0.25%	0.063	5 000	7"	50	74
23904046....	TF221	High-precision Thin Film 0603 0.5% Reel (7inch) TC50	0603	0.50%	0.063	5 000	7"	50	74
23904047....	TF220	High-precision Thin Film 0603 1.0% Reel (7inch) TC50	0603	1.00%	0.063	5 000	7"	50	74
23904073....	TF324	High-precision Thin Film 0402 0.05% Reel (7inch) TC50	0402	0.05%	0.063	10 000	7"	50	74
23904074....	TF323	High-precision Thin Film 0402 0.1% Reel (7inch) TC50	0402	0.10%	0.063	10 000	7"	50	74
23904075....	TF322	High-precision Thin Film 0402 0.25% Reel (7inch) TC50	0402	0.25%	0.063	10 000	7"	50	74
23904076....	TF321	High-precision Thin Film 0402 0.5% Reel (7inch) TC50	0402	0.50%	0.063	10 000	7"	50	74
23904077....	TF320	High-precision Thin Film 0402 1.0% Reel (7inch) TC50	0402	1.00%	0.063	10 000	7"	50	74
23904113....	TF024	High-precision Thin Film 1206 0.05% Reel (7inch) TC50	1206	0.05%	0.125	5 000	7"	50	73
23904114....	TF023	High-precision Thin Film 1206 0.1% Reel (7inch) TC50	1206	0.10%	0.125	5 000	7"	50	73
23904115....	TF022	High-precision Thin Film 1206 0.25% Reel (7inch) TC50	1206	0.25%	0.125	5 000	7"	50	73
23904116....	TF021	High-precision Thin Film 1206 0.5% Reel (7inch) TC50	1206	0.50%	0.125	5 000	7"	50	73
23904117....	TF020	High-precision Thin Film 1206 1.0% Reel (7inch) TC50	1206	1.00%	0.125	5 000	7"	50	73
23904123....	TF524	High-precision Thin Film 1210 0.05% Reel (7inch) TC50	1210	0.05%	0.25	5 000	7"	50	72
23904124....	TF523	High-precision Thin Film 1210 0.1% Reel (7inch) TC50	1210	0.10%	0.25	5 000	7"	50	72
23904125....	TF522	High-precision Thin Film 1210 0.25% Reel (7inch) TC50	1210	0.25%	0.25	5 000	7"	50	72
23904126....	TF521	High-precision Thin Film 1210 0.5% Reel (7inch) TC50	1210	0.50%	0.25	5 000	7"	50	72
23904127....	TF520	High-precision Thin Film 1210 1.0% Reel (7inch) TC50	1210	1.00%	0.25	5 000	7"	50	72
23906013....	TF114	High-precision Thin Film 0805 0.05% Reel (7inch) TC25	0805	0.05%	0.125	5 000	7"	25	73
23906014....	TF113	High-precision Thin Film 0805 0.1% Reel (7inch) TC25	0805	0.10%	0.125	5 000	7"	25	73
23906015....	TF112	High-precision Thin Film 0805 0.25% Reel (7inch) TC25	0805	0.25%	0.125	5 000	7"	25	73
23906016....	TF111	High-precision Thin Film 0805 0.5% Reel (7inch) TC25	0805	0.50%	0.125	5 000	7"	25	73
23906017....	TF110	High-precision Thin Film 0805 1.0% Reel (7inch) TC25	0805	1.00%	0.125	5 000	7"	25	73
23906043....	TF214	High-precision Thin Film 0603 0.05% Reel (7inch) TC25	0603	0.05%	0.063	5 000	7"	25	74
23906044....	TF213	High-precision Thin Film 0603 0.1% Reel (7inch) TC25	0603	0.10%	0.063	5 000	7"	25	74
23906045....	TF212	High-precision Thin Film 0603 0.25% Reel (7inch) TC25	0603	0.25%	0.063	5 000	7"	25	74
23906046....	TF211	High-precision Thin Film 0603 0.5% Reel (7inch) TC25	0603	0.50%	0.063	5 000	7"	25	74
23906047....	TF210	High-precision Thin Film 0603 1.0% Reel (7inch) TC25	0603	1.00%	0.063	5 000	7"	25	74
23906073....	TF314	High-precision Thin Film 0402 0.05% Reel (7inch) TC25	0402	0.05%	0.063	10 000	7"	25	74
23906074....	TF313	High-precision Thin Film 0402 0.1% Reel (7inch) TC25	0402	0.10%	0.063	10 000	7"	25	74
23906075....	TF312	High-precision Thin Film 0402 0.25% Reel (7inch) TC25	0402	0.25%	0.063	10 000	7"	25	74
23906076....	TF311	High-precision Thin Film 0402 0.5% Reel (7inch) TC25	0402	0.50%	0.063	10 000	7"	25	74
23906077....	TF310	High-precision Thin Film 0402 1.0% Reel (7inch) TC25	0402	1.00%	0.063	10 000	7"	25	74
23906113....	TF014	High-precision Thin Film 1206 0.05% Reel (7inch) TC25	1206	0.05%	0.125	5 000	7"	25	73
23906114....	TF013	High-precision Thin Film 1206 0.1% Reel (7inch) TC25	1206	0.10%	0.125	5 000	7"	25	73
23906115....	TF012	High-precision Thin Film 1206 0.25% Reel (7inch) TC25	1206	0.25%	0.125	5 000	7"	25	73
23906116....	TF011	High-precision Thin Film 1206 0.5% Reel (7inch) TC25	1206	0.50%	0.125	5 000	7"	25	73
23906117....	TF010	High-precision Thin Film 1206 1.0% Reel (7inch) TC25	1206	1.00%	0.125	5 000	7"	25	73
23906123....	TF514	High-precision Thin Film 1210 0.05% Reel (7inch) TC25	1210	0.05%	0.25	5 000	7"	25	72
23906124....	TF513	High-precision Thin Film 1210 0.1% Reel (7inch) TC25	1210	0.10%	0.25	5 000	7"	25	72
23906125....	TF512	High-precision Thin Film 1210 0.25% Reel (7inch) TC25	1210	0.25%	0.25	5 000	7"	25	72
23906126....	TF511	High-precision Thin Film 1210 0.5% Reel (7inch) TC25	1210	0.50%	0.25	5 000	7"	25	72
23906127....	TF510	High-precision Thin Film 1210 1.0% Reel (7inch) TC25	1210	1.00%	0.25	5 000	7"	25	72
23907353....	PRC102	1210 power resistor 1% (7inch)	1210	1%	0.33	5 000	7"	-	77
23907353....	LPRC102	1210 power resistor 1% (7inch)	1210	1%	0.33	5 000	7"	-	78
239073570...	PRC101	1210 power resistor 5% (7inch)	1210	5%	0.33	5 000	7"	-	77
239073570...	LPRC101	1210 power resistor 5% (7inch)	1210	5%	0.33	5 000	7"	-	78
239073590001	PRC101	1210 power resistor 5% (7inch)	1210	jumper	0.33	5 000	7"	-	77
332207330...	Sample kits	Samples kits	-	1%	-	-	-	-	83









# PRODUCT SELECTION CHART

## HF product - Antennas

Description	UHF antenna ceramic			TDMA antenna ceramic	Dual-band antenna (900/1800MHz) PCB	Dual-band antenna (900/1800MHz) ceramic	Triple-band antenna (900/1800/1900MHz) PCB vertical
Dimensions (mm)	37.5x6.8x0.9			16.5x14x0.9	24x10x6	20.5x11.8x0.9	30x9.4x0.8
Frequency range	433 MHz	460 MHz	490 MHz	850 to 950 MHz	880 to 960 MHz 1710 to 1880 MHz	880 to 960 MHz 1710 to 1880 MHz	880 to 960 MHz 1710 to 1880 MHz
Bandwidth (MHz)	20 MHz			80 MHz	80 MHz 170 MHz	80 MHz 170 MHz	80 MHz 170 MHz
Gain (dBi max)	0.5			1.5	0 to 0.5 0.5 to 1	0 to 0.5 0.5 to 1	0 to 0.5 0.5 to 1
Polarization	Linear			Linear	Linear	Linear	Linear
Azimuth	Omni-directional			Omni-directional	Omni-directional	Omni-directional	Omni-directional
VSWR	<2.0			<2.0	<2.7	<2.7	<2.5
Temp range (°C)	-55 to 125			-55 to 125	-55 to 125	-55 to 125	-55 to 125

Packing							
Bulk	431312120043	431312120046	431312120049	431311900087	431331600918	431311800918	431332400918
Tape 1000 pcs	---	---	---	431111900087	---	431111800918	---
Tape 2500 pcs	431112120043	431312120043	431112120049	---	---	---	---

Description	GPS antenna (CP mode) (1.575 GHz)	GPS antenna (CP mode) (1.575 GHz)	GPS antenna (LP mode) (1.575 GHz)	GPS antenna (LP mode) (1.575 GHz)	DECT / WCDMA antenna
Dimensions (mm)	12x12x4	18x18x4	18x18x4	12.5x6.6x0.9	8.8x6.8x0.9
Frequency range	1.580 GHz	1.580 GHz	1.580 GHz	1.597 GHz	1.88 to 2.1 GHz
Bandwidth (MHz)	6 MHz	6 MHz	6 MHz	100 MHz	100 MHz
Gain (dBi max)	3	4	3	1.5	2
Polarization	Right-hand circular polarization	Right-hand circular polarization	Right-hand circular polarization	Linear	Linear
Azimuth	-	-	-	Omni-directional	Omni-directional
VSWR	<2.5	<2.5	<2.0	<2.0	<2
Temp range (°C)	-55 to 125	-55 to 125	-55 to 125	-55 to 125	-55 to 125

Packing					
Bulk	431321306158	431342306158	431342806158	431311400158	---
Tape 1000 pcs	---	---	---	---	431111200188
Tape 2500 pcs	---	---	---	---	---





# PRODUCT SELECTION CHART

## HF product - Antennas

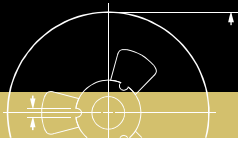
Description	Bluetooth antenna - long shape			Bluetooth antenna				
	7.8x3.6x0.9	7.8x3.6x0.9	7.8x3.6x0.9	7.8x3.6x0.9	7.3x5.5x1.3	7.3x5.5x1.3	7.3x5.5x1.3	7.3x5.5x1.3
Dimensions (mm)	7.8x3.6x0.9	7.8x3.6x0.9	7.8x3.6x0.9	7.8x3.6x0.9	7.3x5.5x1.3	7.3x5.5x1.3	7.3x5.5x1.3	7.3x5.5x1.3
Frequency range (GHz)	2.3	2.45	2.60	2.70	2.45	2.60	2.70	2.80
Bandwidth (MHz)	> 100	> 100	> 100	> 100	> 100	> 100	> 100	> 100
Gain (dBi max)	0	0	0	0	1.2	1.2	1.2	1.2
Polarization	Linear	Linear	Linear	Linear	Linear	Linear	Linear	Linear
Azimuth	Omni-directional	Omni-directional	Omni-directional	Omni-directional	Omni-directional	Omni-directional	Omni-directional	Omni-directional
VSWR	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Temp range (°C)	-55 to 125	-55 to 125	-55 to 125	-55 to 125	-55 to 125	-55 to 125	-55 to 125	-55 to 125

Packing								
Bulk	431311500230	431311500245	431311500260	431311500270	431311100245	431311100260	431311100270	431311100280
Tape 1000 pcs	431111500230	431111500245	431111500260	431111500270	431111100245	431111100260	431111100270	431111100280

Description	Bluetooth/WLAN IEEE802.11 Antenna FR4 w/cable conn.	Dual-band WLAN 2.45 / 5.2 GHz	Bluetooth/WLAN IEEE802.11 Antenna FR4 w/cable conn.	Triple-band/WLAN 802.11b/a, 2.45/5.2G FR4 w/cable conn.
	Dimensions (mm)	28x5.6x0.8	8.7x7.8x0.9	56.5x5.65x0.4
Frequency range (GHz)	2.4 - 2.5	2.45/ 5.2	2.4-2.5/ 5.1 5.3	2.45-2.5 5.1-5.3
Bandwidth (MHz)	100	> 100	100/ 200	> 200/ > 600
Gain (dBi max)	1	0	1	3 / 2.45 GHz 6 / 5 GHz
Polarization	Linear	Linear	Linear	Linear
Azimuth	Omni-directional	Omni-directional	Omni-directional	Omni-directional
VSWR	<2.5	<2.0	<2.8	1.8 for 2.45 GHz 2 for 5 GHz
Temp range (°C)	-55 to 125	-55 to 125	-55 to 125	-55 to 125

Packing				
Bulk	431332500245	431311700252	431332600252	431333501250 431332502250
Tape 1000 pcs	---	431111700252	---	---





# PRODUCT SELECTION CHART

## HF product - Attenuators

Attenuator	
Series	<b>ATV321</b>
Case size	<b>0404</b>
Attenuation range	1 dB / 20 dB
Attenuation tolerance	1 to 5 dB $\pm 0.3$ dB / $\pm 0.2$ dB
	6 to 10 dB $\pm 0.5$ dB / $\pm 0.3$ dB
	15 dB $\pm 1$ dB / $\pm 0.5$ dB
	20 dB $\pm 2$ dB / $\pm 1.0$ dB
Frequency range	1 to 10 dB DC to 2.5 GHz
	15 and 20 dB DC to 2.0 GHz
Maximum permissible voltage (V)	50
Power rating (mW)	40
Temp range (°C)	-55 to 125

Ordering information - Phycomp world wide - preferred types	
Series	<b>ATV321</b>
Packing	paper tape
Quantity	5 000 235070310...
	10 000 235070311...
Remark	for last three digits see table 12NC

Ordering information - Phycomp North America - preferred types	
Series	<b>ATV321</b>
Packing	paper tape
Quantity	5 000 9CV3218Axxxxx-HFT
	10 000 9CV3218Axxxxx-HF3
Remark	for xxxxx see table NA code

Attenuation						
Value (dB)	Standard			Optional		
	Tolerance (dB)	12NC	NA code	Tolerance (dB)	12NC	NA code
1	$\pm 0.3$	012	01dBC	$\pm 0.2$	011	01dBB
2	$\pm 0.3$	022	02dBC	$\pm 0.2$	021	02dBB
3	$\pm 0.3$	032	03dBC	$\pm 0.2$	031	03dBB
4	$\pm 0.3$	042	04dBC	$\pm 0.2$	041	04dBB
5	$\pm 0.3$	052	05dBC	$\pm 0.2$	051	05dBB
6	$\pm 0.5$	063	06dBD	$\pm 0.3$	062	06dBC
7	$\pm 0.5$	073	07dBD	$\pm 0.3$	072	07dBC
8	$\pm 0.5$	083	08dBD	$\pm 0.3$	082	08dBC
9	$\pm 0.5$	093	09dBD	$\pm 0.3$	092	09dBC
10	$\pm 0.5$	103	10dBD	$\pm 0.3$	102	10dBC
15	$\pm 1.0$	154	15dBF	$\pm 0.5$	153	15dBD
20	$\pm 2.0$	205	20dBG	$\pm 1.0$	204	20dBF





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