

PRODUCT SELECTION GUIDE

2012

SMD RESISTORS + MLCC

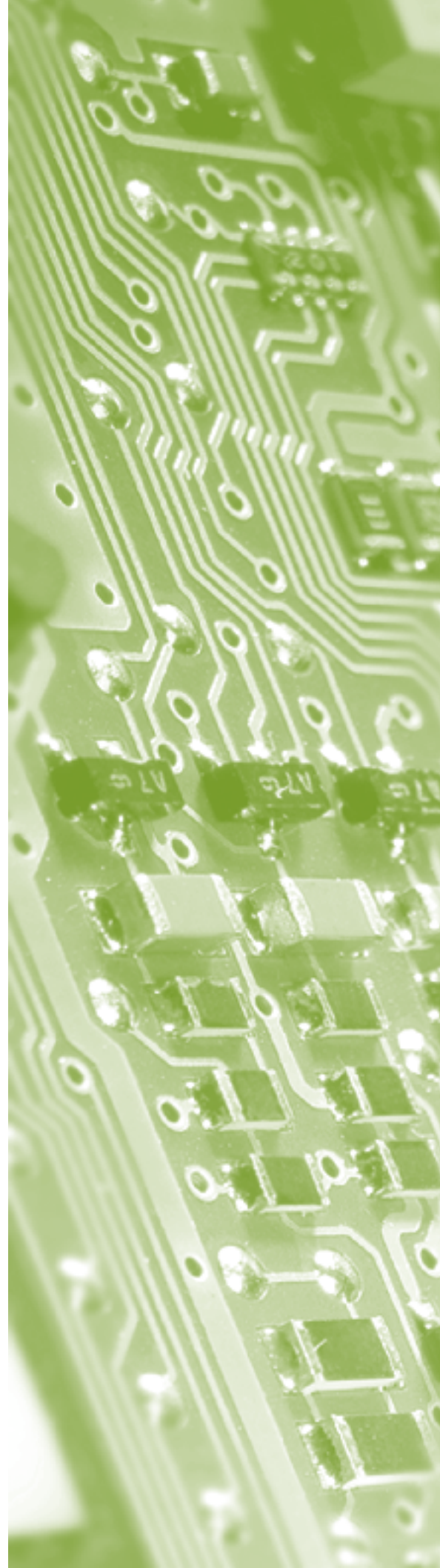
SMD CERAMIC EMI FILTER CAPACITORS - X2Y®

HIGH FREQUENCY PRODUCTS

MULTILAYER CHIP VARISTORS



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 code.

- 15 digits code (PHYCOMP CTC)

- 14 to 17 digits code (GLOBAL PART NUMBER for both Yageo and Phycomp branded products)

- **12 digits ordering code**

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 delivering details can be obtained from the Yageo 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 September 2000 for MLCCs, and IEC 60115-8, amendment 1 of July 2000 for R-chip. Values for length and width should be in millimeters 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 right next shows the relation between inch-based case sizes versus the recommended metric case size designators. Please note that HF products use metric case size only.

Case size designation and cross-reference					
Inch-based	Metric	Inch-based	Metric	Inch-based	Metric
01005	0402M	0612	1632M	1224	3250M
0201	0603M	0616	1640M	1225	3264M
0202	0605M	0805	2012M	1812	4532M
0402	1005M	0815	2037M	2007	5320M
0404	1010M	0830	2075M	2010	5025M
0408	1020M	1008	2520M	2220	5750M
0508	1220M	1206	3216M	2512	6432M
0603	1608M	1210	3225M	3014	7836M
0606	1616M	1218	3245M	4527	11070M

Contact 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 franchise distributors, please refer to our website: www.yageo.com

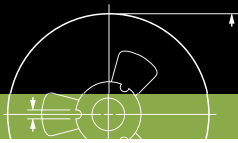


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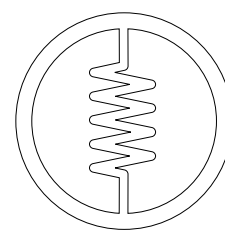




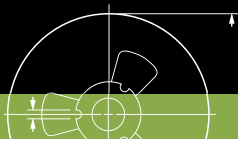
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SURFACE-MOUNT CHIP RESISTORS



Chip Resistors General Information

Specification overview

Global part number	Series	Size	Power rating	Max. voltage	Operating Temp. range	Resistance range	Tolerance	T. C. R.				
!RC0100xR-07xxxxL	RC	01005	1/32W	15V	-55°C to 125°C	10Ω ≤ R ≤ 1MΩ Jumper < 50mΩ	±1% ±5%	10Ω ≤ R ≤ 1MΩ ±250 ppm/°C				
RC0201xR-07xxxxL		0201	1/20W	25V		1Ω ≤ R ≤ 10MΩ Jumper < 50mΩ	Max./Min.: 1MΩ/10Ω ±0.5% Max.: 10MΩ ±1%,±5%	1Ω ≤ R ≤ 10Ω -100/+350 ppm/°C 10Ω < R ≤ 10MΩ ±200 ppm/°C				
RC0402xR-07xxxxL		-55°C to 155°C	0402	1/16W	50V	1Ω ≤ R ≤ 22MΩ Jumper < 50mΩ	Max./Min.: 1MΩ/10Ω ±0.5% Max.: 10MΩ ±1% Max.: 22MΩ ±5%	1Ω ≤ R ≤ 10Ω ±200 ppm/°C 10Ω < R ≤ 10MΩ ±100 ppm/°C 10MΩ < R ≤ 22MΩ ±200 ppm/°C				
RC0603xR-07xxxxL			0603	1/10W	50V							
RC0805xR-07xxxxL			0805	1/8W	150V							
RC1206xR-07xxxxL			1206	1/4W	200V							
RC1210xR-07xxxxL			1210	1/2W	200V							
RC1218xK-07xxxxL			1218	1W	200V							
RC2010xK-07xxxxL			2010	3/4W	200V							
RC2512xK-07xxxxL			2512	1W	200V							
!RC0603xR-7WxxxxL	RC		0603	1/5W	50V				-55°C to 155°C	1Ω ≤ R ≤ 10 KΩ Jumper < 50mΩ	±1% ±5%	±200 ppm/°C
RC0805xR-7WxxxxL			0805	1/4W	150V							
RC1206xR-7WxxxxL		1206	1/2W	200V								
RC2512xK-7WxxxxL		2512	2W	200V								
RC0805xR-07xxxxL		0805	1/8W	150V	24MΩ ≤ R ≤ 100MΩ	±5%, ±10%, ±20%	±300 ppm/°C					
RC1206xR-07xxxxL		1206	1/4W	200V	24MΩ ≤ R ≤ 100MΩ							
RE0402xRE07xxxxL		RE	0402	1/16W	50V	-55°C to 155°C	10Ω ≤ R ≤ 1MΩ	±0.5% ±1% ±5%		±50 ppm/°C		
RE0603xRE07xxxxL			0603	1/10W	50V							
RE0805xRE07xxxxL			0805	1/8W	150V							
RE1206xRE07xxxxL			1206	1/4W	200V							
RT0402xRx07xxxxL	RT	0402	1/16W	50V	-55°C to 155°C	10Ω ≤ R ≤ 121KΩ	±0.05% ±0.1% ±0.25% ±0.5% ±1%	±10 ppm/°C ±15 ppm/°C ±25 ppm/°C ±50 ppm/°C				
RT0603xRx07xxxxL		0603	1/10W	75V		5.1Ω ≤ R ≤ 681KΩ						
RT0805xRx07xxxxL		0805	1/8W	150V		5.1Ω ≤ R ≤ 1.5MΩ						
RT1206xRx07xxxxL		1206	1/4W	200V	-55°C to 125°C	5.1Ω ≤ R ≤ 1.5MΩ						
RT1210xRx07xxxxL		1210	1/4W			5.1Ω ≤ R ≤ 1MΩ						
RT2010xKx07xxxxL		2010	1/2W			10Ω ≤ R ≤ 1MΩ						
RT2512xKx07xxxxL		2512	3/4W			10Ω ≤ R ≤ 1MΩ						
RJ0402FRE07xxxxL	RJ	0402	1/16W	25V	-55°C to 125°C	10Ω ≤ R ≤ 121KΩ	±1%	±50 ppm/°C				
RJ0603FRE07xxxxL		0603	1/16W	50V		5.1Ω ≤ R ≤ 681KΩ						
RJ0805FRE07xxxxL		0805	1/10W	100V		5.1Ω ≤ R ≤ 1.5MΩ						
RJ1206FRE07xxxxL		1206	1/8W	150V		-55°C to 125°C			5.1Ω ≤ R ≤ 1.5MΩ			
RJ1210FRE07xxxxL		1210	1/4W						5.1Ω ≤ R ≤ 1MΩ			
RJ2010FKE07xxxxL		2010	1/2W						10Ω ≤ R ≤ 1MΩ			
RJ2512FKE07xxxxL		2512	3/4W						10Ω ≤ R ≤ 1MΩ			
YC102-xR-07xxxxL	YC	2*0201	1/32W	15V	-55°C to 125°C	10Ω ≤ R ≤ 1MΩ Jumper < 50mΩ	±1% ±5%	±200 ppm/°C				
!YC104-xR-07xxxxL		4*0201	1/32W	12.5V		1Ω ≤ R ≤ 1MΩ Jumper < 50mΩ			Max./Min.: 1MΩ/10Ω ±1% Max.: 1MΩ ±5%			
YC122-xR-07xxxxL		2*0402	1/16W	50V	-55°C to 155°C	1Ω ≤ R ≤ 1MΩ Jumper < 50mΩ	±1% ±5%	1Ω ≤ R < 10Ω ±250 ppm/°C 10Ω ≤ R ≤ 1MΩ ±200 ppm/°C				
YC124-xR-07xxxxL		4*0402	1/16W	25V		10Ω ≤ R ≤ 1MΩ Jumper < 50mΩ			±5%			
YC162-xR-07xxxxL		2*0603	1/16W	50V		10Ω ≤ R ≤ 1MΩ Jumper < 50mΩ			±1% ±5%			
YC164-xR-07xxxxL		4*0603	1/16W	50V		1Ω ≤ R ≤ 1MΩ Jumper < 50mΩ						
YC248-xR-07xxxxL		8*0602	1/16W	50V		10Ω ≤ R ≤ 1MΩ Jumper < 50mΩ			±1% ±5%			
YC324-xR-07xxxxL		4*1206	1/8W	200V		10Ω ≤ R ≤ 1MΩ						
TC122-xR-07xxxxL		2*0402	1/16W	50V		-55°C to 125°C				10Ω ≤ R ≤ 1MΩ Jumper < 50mΩ	±1% ±5%	
TC124-xR-07xxxxL		4*0402	1/16W	50V					10Ω ≤ R ≤ 1MΩ Jumper < 50mΩ			
TC164-xR-07xxxxL	4*0603	1/16W	50V	-55°C to 155°C					1Ω ≤ R ≤ 1MΩ			

Note: " ! " is the symbol for new product

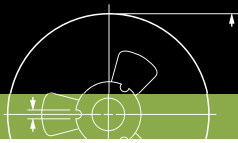


Chip Resistors General Information

Specification overview

Global part number	Series	Size	Power rating	Max. voltage	Operating Temp. range	Resistance range	Tolerance	T. C. R.	
YC158TJR-07xxxxL	YC158	10P8R (0612)	1/16W	25V	-55°C to 155°C	10Ω ≤ R ≤ 100KΩ	±5%	±200 ppm/°C	
YC358xJK-07xxxxL	YC358	10P8R (1225)	1/16W	50V		10Ω ≤ R ≤ 330KΩ		±200 ppm/°C	
RL0402xR-07xxxxL	RL	0402	1/16W	(PxR) ^{1/2}	-55°C to 125°C	50mΩ ≤ R < 1Ω	±1% ±2% ±5%	See page 31, table "T. C. R. - RL series"	
RL0603xR-07xxxxL		0603	1/10W						
RL0805xR-07xxxxL		0805	1/8W						
RL0805xR-7WxxxxL			1/4W						
RL1206xR-07xxxxL		1206	1/4W						
RL1206xR-7WxxxxL			1/2W						
RL1210xR-07xxxxL		1210	1/2W						
RL1218xK-07xxxxL		1218	1W						
RL2010xK-07xxxxL		2010	3/4W						
RL2512xK-07xxxxL		2512	1W						
!PT0402xR-07xxxxL	PT	0402	1/16W	(PxR) ^{1/2}	-55°C to 155°C	50mΩ ≤ R < 1Ω	±1% ±2% ±5%	50mΩ ≤ R < 68mΩ ±600 ppm/°C 68mΩ ≤ R < 100mΩ ±300 ppm/°C 100mΩ ≤ R < 1Ω ±200 ppm/°C	
!PT0402xR-7WxxxxL			1/8W			68mΩ		±300 ppm/°C	
!PT0402xR-7TxxxxL			1/6W			50mΩ ≤ R < 1Ω Jumper < 8mΩ		50mΩ ≤ R < 1Ω 0/+400 ppm/°C 50mΩ < R < 68mΩ 0/+350 ppm/°C 68mΩ ≤ R < 100mΩ 0/+300 ppm/°C 100mΩ ≤ R < 1Ω ±200 ppm/°C	
!PT0603xR-07xxxxL		0603	1/10W			50mΩ ≤ R ≤ 68mΩ		50mΩ 0/+350 ppm/°C 50mΩ < R < 68mΩ 0/+300 ppm/°C 68mΩ ≤ R < 100mΩ 0/+250 ppm/°C 100mΩ ≤ R < 1Ω ±100 ppm/°C	
!PT0603xR-7WxxxxL			1/5W			100mΩ ≤ R < 1Ω Jumper < 5mΩ			100mΩ ≤ R < 1Ω 100mΩ < R < 1Ω ±75 ppm/°C
!PT0603xR-7TxxxxL			1/3W						
!PT0805xR-07xxxxL		0805	1/8W			50mΩ ≤ R < 1Ω		100mΩ ≤ R < 1Ω	
!PT0805xR-7WxxxxL			1/4W						
!PT1206xR-07xxxxL		1206	1/4W			100mΩ ≤ R < 1Ω Jumper < 5mΩ		100mΩ ≤ R < 1Ω	
!PT1206xR-7WxxxxL			1/2W						
PT2010xK-07xxxxL		2010	3/4W			100mΩ ≤ R < 1Ω		100mΩ ≤ R < 1Ω	
PT2010xK-7WxxxxL			1W						
PT2512xK-07xxxxL		2512	1W			100mΩ ≤ R < 1Ω		100mΩ ≤ R < 1Ω	
PT2512xK-7WxxxxL			2W						
PT0815xK-07xxxxL		PT (Wide)	0815			1/2W		(PxR) ^{1/2}	-55°C to 155°C
PT0815xK-7WxxxxL	1W								
!PR1206xKx07xxxxxx	PR	1206	1/4W	(PxR) ^{1/2}	-55°C to 155°C	1mΩ ≤ R ≤ 6mΩ	±1% ±2% ±5%	±50 ppm/°C	
!PR1206xKx7Wxxxxxx			1/2W						
!PR1206xKx47xxxxxx			1W						
PR2010xKx07xxxxxx		2010	1/2W			1mΩ ≤ R < 100mΩ			
PR2010xKx7Wxxxxxx			1W						
PR2512xKx07xxxxxx		2512	1W			0.5mΩ ≤ R ≤ 5mΩ			0.5mΩ ≤ R ≤ 2mΩ ±200 ppm/°C 3mΩ ≤ R ≤ 5mΩ ±100 ppm/°C
PR2512xKx7Wxxxxxx			2W			0.5mΩ ≤ R ≤ 10mΩ			±50 ppm/°C
!PR2512xKx7Txxxxxx			3W						
!PR2512DKx07xxxxxx			1W			7mΩ ≤ R ≤ 75mΩ			±0.5%
!PR2512DKx7Wxxxxxx			2W						
!PA2512xKF07xxxxL	PA	2512	1W	(PxR) ^{1/2}	-55°C to 155°C	1mΩ ≤ R ≤ 10mΩ	±1% ±5%	±100 ppm/°C	
!PA2512xKF7WxxxxL			2W						
!PA2512xKF7TxxxxL			3W						
!PF0603xRx57xxxxxx	PF	0603	1/2W	(PxR) ^{1/2}	-55°C to 155°C	5mΩ ≤ R ≤ 100mΩ	±1% ±2% ±5%	±75 ppm/°C	
PF0805xRx07xxxxxx			0805			1/8W			4mΩ ≤ R ≤ 100mΩ
PF0805xRx7Wxxxxxx						1/4W			
PF0805xRx7Txxxxxx		1/3W							
!PF0805xRx47xxxxxx		1/2W							
PF1206xxx07xxxxxx		1206				1/4W			
PF1206xxx7Wxxxxxx			1/2W						
!PF2010xKx7Wxxxxxx			2010			1W			5mΩ ≤ R < 100mΩ

Note: "!" is the symbol for new product



Chip Resistors General Information

Specification overview

Global part number	Series	Size	Power rating	Max. voltage	Operating Temp. range	Resistance range	Tolerance	T. C. R.		
PF2512xKx07xxxxxx	PF	2512	1W	(PxR) ^{1/2}	-55°C to 155°C	1mΩ ≤ R < 100mΩ	±1% ±2% ±5%	±75 ppm/°C		
PF2512xKx7Wxxxxxx			2W						1mΩ ≤ R ≤ 50mΩ	
!PF2512xKx7Txxxxxx			3W							
!PF4527xKx7Wxxxxxx		4527	3W			6mΩ ≤ R < 1Ω				
!PF0612xKx07xxxxxx	PF (Wide)	0612	1W	(PxR) ^{1/2}	-55°C to 155°C	1mΩ ≤ R ≤ 50mΩ	±1% ±2% ±5%	±75 ppm/°C		
!PF0815xKx7Wxxxxxx		0815	1W			1mΩ ≤ R ≤ 20mΩ				
!PF0830xKx07xxxxxx		0830	2W			1mΩ ≤ R ≤ 100mΩ				
!PH0805xRx07xxxxxx	PH	0805	4/5W	(PxR) ^{1/2}	-55°C to 155°C	4mΩ ≤ R ≤ 50mΩ	±1% ±2% ±5%	±75 ppm/°C		
PH1206xRx07xxxxxx		1206	1W							
!PE0603xRx57xxxxxx	PE	0603	1/2W	(PxR) ^{1/2}	-55°C to 155°C	5mΩ ≤ R < 100mΩ	±1% ±2% ±5%	±75 ppm/°C		
!PE0805xRx47xxxxxx		0805	1/2W			4mΩ ≤ R < 100mΩ				
!PE1206xRx47xxxxxx		1206	1W			3mΩ ≤ R < 100mΩ				
PE2512xKx7Wxxxxxx		2512	2W			1mΩ ≤ R < 100mΩ				
AR0402xR-07xxxxL	AR	0402	1/16W	50V	-55°C to 155°C	1Ω ≤ R ≤ 10MΩ Jumper < 50mΩ	±1% ±5%	1Ω ≤ R ≤ 10Ω ±200 ppm/°C 10Ω < R ≤ 10MΩ ±100 ppm/°C		
AR0603xR-07xxxxL		0603	1/10W							
AR0805xR-07xxxxL		0805	1/8W							
AR1206xR-07xxxxL		1206	1/4W							
SR0805xR-07xxxxL	SR	0805	1/8W	150V	-55°C to 155°C	1Ω ≤ R ≤ 100KΩ	±5% ±10% ±20%	±200 ppm/°C		
SR1206xR-07xxxxL		1206	1/4W							
SR1218xK-07xxxxL		1218	1W							
SR2010xK-07xxxxL		2010	3/4W							
SR2512xK-07xxxxL		2512	1W							
RV0805xR-07xxxxL	RV	0805	1/8W	400V	-55°C to 155°C	100KΩ ≤ R ≤ 10MΩ	±1% ±5%	±200 ppm/°C		
RV1206xR-07xxxxL		1206	1/4W			500V			100KΩ ≤ R ≤ 27MΩ	Max.: 10MΩ ±1% Max.: 27MΩ ±5%
RV2512JK-07xxxxL		2512	1W			500V			4.7MΩ ≤ R ≤ 16MΩ	±5%
TR0402xR-07xxxxL	TR	0402	1/16W	50V	-55°C to 125°C	1Ω ≤ R ≤ 10MΩ	+0/-10% +0/-20% +0/-30%	1Ω ≤ R ≤ 10Ω ±200 ppm/°C 10Ω < R ≤ 1MΩ ±100 ppm/°C 1MΩ < R ≤ 10MΩ ±200 ppm/°C		
TR0603xR-07xxxxL		0603	1/16W		-55°C to 155°C					
TR0805xR-07xxxxL		0805	1/8W							
TR1206xR-07xxxxL		1206	1/4W							
AF0402xR-07xxxxL	AF	0402	1/16W	50V	-55°C to 155°C	1Ω ≤ R ≤ 22MΩ Jumper < 50mΩ	Max.: 10MΩ ±1% Max.: 22MΩ ±5%	1Ω ≤ R ≤ 10Ω ±200 ppm/°C 10Ω < R ≤ 10MΩ ±100 ppm/°C 10MΩ < R ≤ 22MΩ ±200 ppm/°C		
AF0603xR-07xxxxL		0603	1/10W							
AF0805xR-07xxxxL		0805	1/8W							
AF1206xR-07xxxxL		1206	1/4W							
!AC0402xR-07xxxxL	AC	0402	1/16W	50V	-55°C to 155°C	1Ω ≤ R ≤ 10MΩ Jumper < 50mΩ	±1% ±5%	1Ω ≤ R ≤ 10Ω ±200 ppm/°C 10Ω < R ≤ 10MΩ ±100 ppm/°C		
!AC0603xR-07xxxxL		0603	1/10W							
!AC0805xR-07xxxxL		0805	1/8W							
!AC1206xR-07xxxxL		1206	1/4W							
!AC1210xR-07xxxxL		1210	1/2W							
!AC1218xK-07xxxxL		1218	1W							
!AC2010xK-07xxxxL		2010	3/4W							
!AC2512xK-07xxxxL		2512	1W							
ATV321xR-07xxxxL	AT	0404	40mW	50V	-55°C to 125°C	-1dB to -20dB	±0.3dB ±0.5dB ±1.0dB ±2.0dB	---		

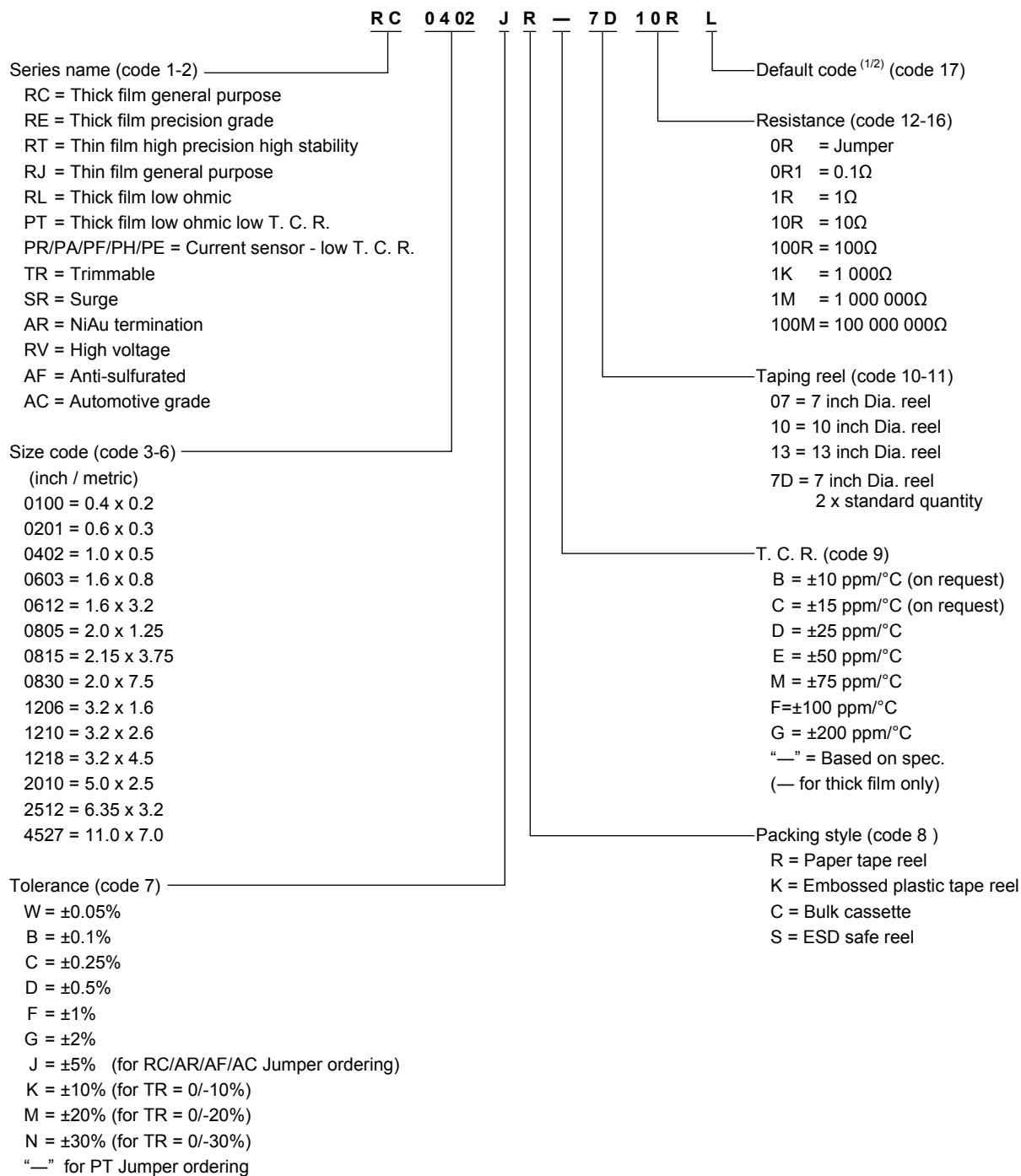
Note: "!" is the symbol for new product



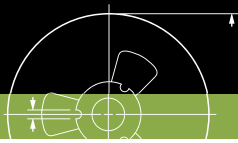
Chip Resistors General Information

Ordering information - Global part number

Global part number - Single resistor ⁽³⁾



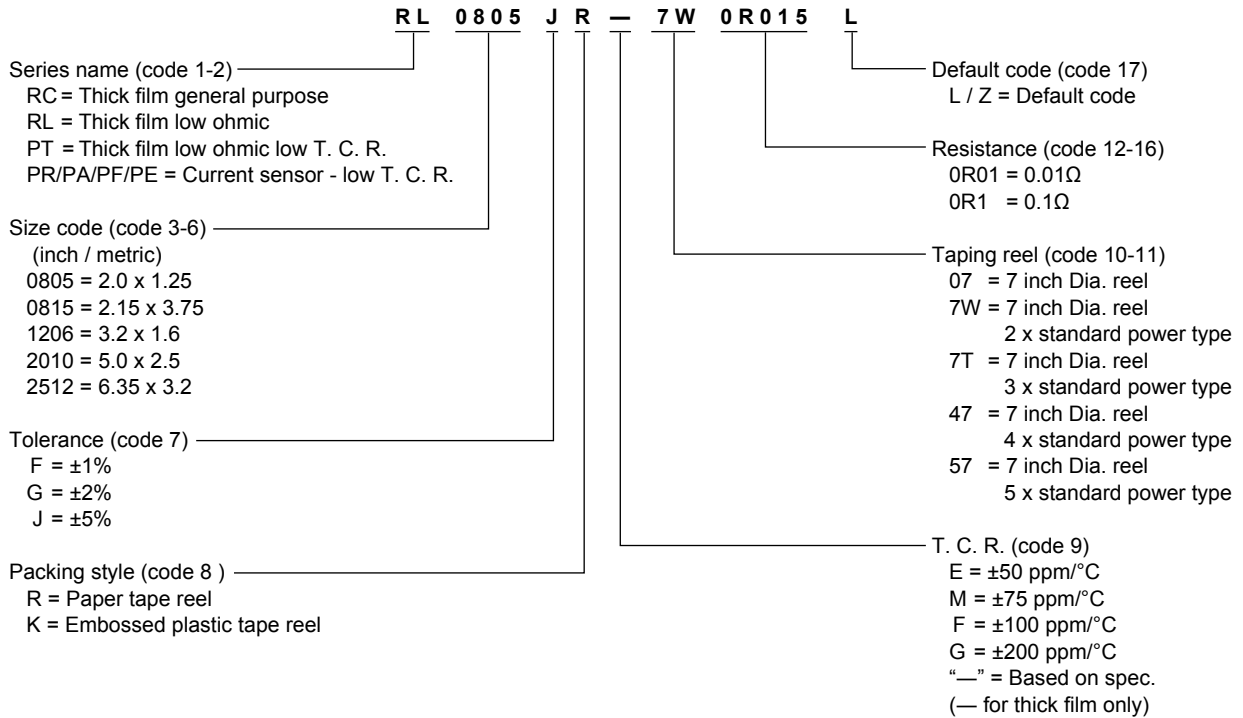
Note: 1. All of our RSMD products are RoHS compliant. "LFP" of the internal 2D reel label mentions "Lead Free Process"
 2. Letter L is system default code for ordering only
 3. Global Part Number is the preferred clear text code for ordering Yageo and Phycomp branded products.



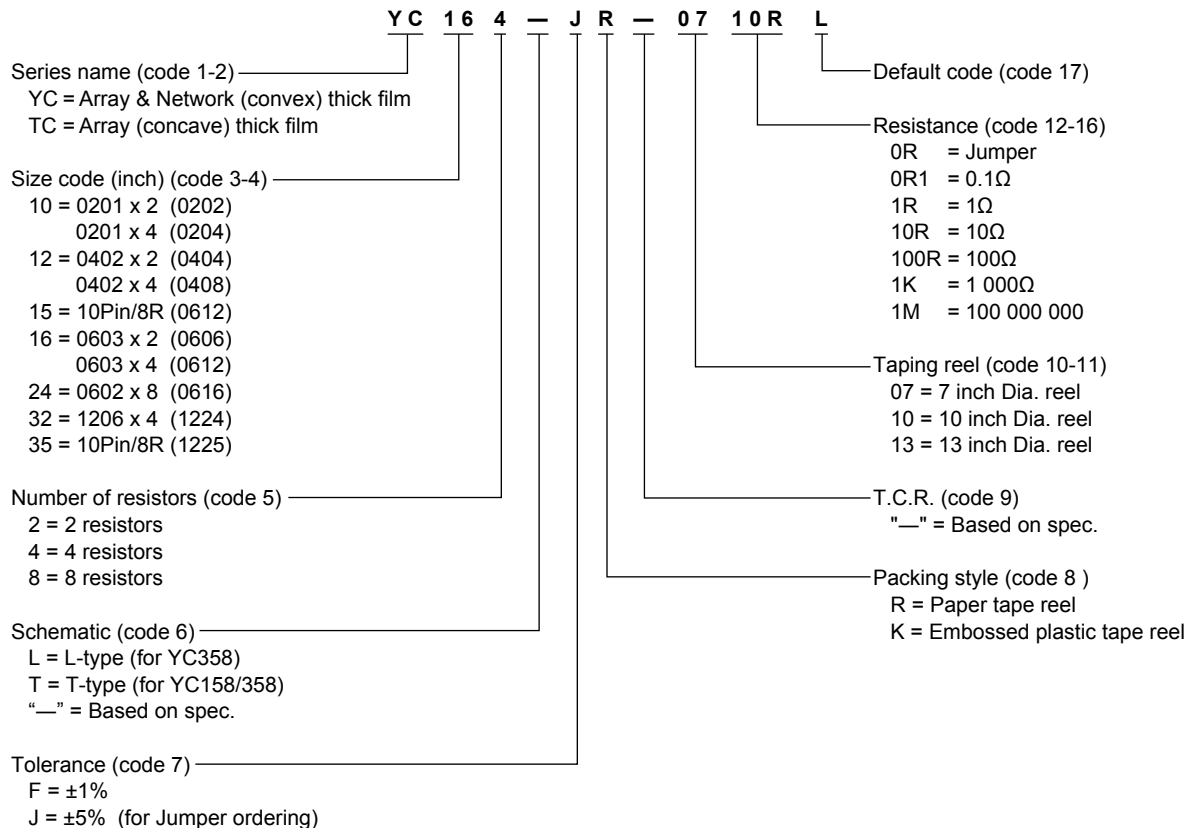
Chip Resistors General Information

Ordering information - Global part number

Global part number - Power enhancement



Global part number - Arrays & Networks



Chip Resistors General Information

Ordering information - North America

Phycomp CTC ordering code - North America

Ordering example: 9C06031A10R0FKHFT = R-Chip 0603, 10R0, 1%, 5K reel

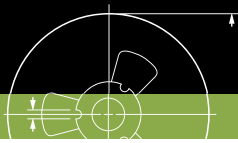
	1-2	3-6	7-8	9-12	13	14	15-16	17	
	XX	XXXX	XX	XXXX	X	X	XX	X	

<p>Series name (code 1-2)</p> <p>9C = Phycomp thick film chip resistors 9T = Phycomp thin film chip resistors</p> <p>Size code (standard resistors, code 3-6)</p> <p>0201 0201 (0603) 0402 0402 (1005) 0603 0603 (1608) 0805 0805 (2012) 1206 1206 (3216) 1210 1210 (3225) 1218 1218 (3248) 2010 2010 (5025) 2512 2512 (6432)</p> <p>AC34 0603 (1608) 4R concave array AV34 0603 (1608) 4R convex array AV22 0402 (1005) 2R convex array AV24 0402 (1005) 4R convex array AV28 0402 (1005) 8R convex array RN31 10P8R in 1206 convex network FR01 1206 (3216) Fusible FR21 0603 (1608) Fusible SR01 1206 (3216) Surge VR01 1206 (3216) High voltage 5% VR02 1206 (3216) High voltage 1% VR11 0805 (2012) High voltage 5% VR12 0805 (2012) High voltage 1% VR21 2512 (6432) High voltage 5% MR22 2512 (6432) Current sensor - low T. C. R. MF22 2512 (6432) Current sensor - low T. C. R. V321 0404 (1010) RF attenuator</p> <p>Power rating (code 7-8)</p> <table border="0"> <tr><td>1A</td><td>1/16W</td><td>0.063W</td><td>(0402)</td></tr> <tr><td>1A</td><td>1/10W</td><td>0.10W</td><td>(0603)</td></tr> <tr><td>2A</td><td>1/8W</td><td>0.125W</td><td>(0805)</td></tr> <tr><td>3A</td><td>1/4W</td><td>0.25W</td><td>(1206)</td></tr> <tr><td>5A</td><td>1/2W</td><td>0.5W</td><td>(1210)</td></tr> <tr><td>7A</td><td>1/20W</td><td>0.05W</td><td>(0201)</td></tr> <tr><td>8A</td><td>1/32W</td><td>0.03125W</td><td>(RN31)</td></tr> <tr><td>12</td><td>3/4W</td><td>0.75W</td><td>(2010)</td></tr> <tr><td>1W</td><td>1W</td><td>1W</td><td>(1218/2512)</td></tr> <tr><td>2W</td><td>2W</td><td>2W</td><td></td></tr> </table> <p>Resistance value (code 9-12)</p> <p>0R00 = Jumper R0XX < 0.1Ω RXXX = 0.1Ω - 0.976Ω XRXX = 1Ω - 9.76Ω XXRX = 10Ω - 97.6Ω XXX0 = 100Ω - 976Ω XXX1 = 1K - 9.76K XXX2 = 10K - 97.6K XXX3 = 100K - 9.78K XXX4 = 1M - 9.76M XXX5 = 10M - 97.6M XXX6 = 100M+ XXDB = 1 - 20DB</p>	1A	1/16W	0.063W	(0402)	1A	1/10W	0.10W	(0603)	2A	1/8W	0.125W	(0805)	3A	1/4W	0.25W	(1206)	5A	1/2W	0.5W	(1210)	7A	1/20W	0.05W	(0201)	8A	1/32W	0.03125W	(RN31)	12	3/4W	0.75W	(2010)	1W	1W	1W	(1218/2512)	2W	2W	2W		<p>Packing style (code 17)</p> <p>T = 5K paper 3 = 10K paper 4 = 20K paper 5 = 4K blister 6 = 5K blister 7 = 50K paper P = 25K bulk case</p> <p>Special coding (code 15-16)</p> <p>HF = SnPb PF = Lead-free AF = NiAu</p> <p>T. C. R. (code 14)</p> <p>C = ±10 ppm/°C D = ±15 ppm/°C A = ±25 ppm/°C B = ±50 ppm/°C K = ±100 ppm/°C L = ±200 ppm/°C E = ±250 ppm/°C M = ±300 ppm/°C G = ±500 ppm/°C F = 0/+500 ppm/°C R = ±600 ppm/°C Q = -100/+600 ppm/°C P = ±750 ppm/°C H = ±1000 ppm/°C I = ±1500 ppm/°C J = ±2000 ppm/°C N = ±3000 ppm/°C</p> <p>Tolerance (code 13)</p> <p>E = ±0.01% A = ±0.05% B = ±0.1%; 0.2dB C = ±0.25%; 0.3dB D = ±0.5%; 0.5dB F = ±1%; 1dB G = ±2%; 2dB J = ±5% N = 0/-20% R = 0/-30%</p>
1A	1/16W	0.063W	(0402)																																						
1A	1/10W	0.10W	(0603)																																						
2A	1/8W	0.125W	(0805)																																						
3A	1/4W	0.25W	(1206)																																						
5A	1/2W	0.5W	(1210)																																						
7A	1/20W	0.05W	(0201)																																						
8A	1/32W	0.03125W	(RN31)																																						
12	3/4W	0.75W	(2010)																																						
1W	1W	1W	(1218/2512)																																						
2W	2W	2W																																							

dB values apply to attenuators

Right values apply to trimmable resistors





Chip Resistors General Information

IEC publication 63, SPQ, last digit of 12NC

Standard of values in a decade according to "IEC publication 63"												
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

Packing quantities								
Size code	Tape width	178mm / Ø7" reel		254mm / Ø10" reel	330mm / Ø13" reel		Weight g /100pcs	Volume mm ³
		Paper	Embossed	Paper	Paper	Embossed		
0100	8mm	20 000	---	---	---	---	0.007	0.0104
0201	8mm	10 000 / 20 000	---	---	50 000	---	0.016	0.041
0402	8mm	10 000 / 20 000	---	20 000	50 000	---	0.058	0.175
0603	8mm	5 000	---	10 000	20 000	---	0.192	0.576
0612	8mm	---	5 000	---	---	---	0.862	2.728
0805	8mm	4 000 / 5 000	---	10 000	20 000	---	0.450	1.250
0815	8mm	---	4 000	---	---	---	1.71	4.44
0830	12mm	---	4 000	---	---	---	4.594	5.55
1206	8mm	4 000 / 5 000	4 000	10 000	20 000	---	0.862	2.728
1210	8mm	5 000	---	10 000	20 000	---	1.471	4.030
1218	12mm	---	4 000	---	---	---	2.703	7.590
2010	12mm	---	4 000 / 2 000	---	---	16 000	2.273	6.875
2512	12mm	---	4 000 / 2 000	---	---	---	3.704	10.827
4527	24mm	---	2 000	---	---	---	16.225	48.3
YC102	8mm	10 000	---	---	---	---	0.052	---
YC104	8mm	10 000	---	---	---	---	0.099	---
YC122	8mm	10 000	---	---	50 000	---	0.100	---
TC122	8mm	10 000	---	---	50 000	---	0.112	---
ATV321	8mm	10 000	---	---	---	---	0.100	---
YC124	8mm	10 000	---	20 000	40 000	---	0.281	---
TC124	8mm	10 000	---	20 000	40 000	---	0.311	---
YC162	8mm	5 000	---	---	---	---	0.376	---
YC164	8mm	5 000	---	10 000	20 000	---	0.833	---
TC164	8mm	5 000	---	10 000	20 000	---	1.030	---
YC158	8mm	5 000	---	---	20 000	---	0.855	---
YC248	12mm	5 000	4 000	---	---	---	0.885	---
YC324	12mm	---	4 000	---	---	---	2.703	---
YC358	12mm	---	4 000	---	---	---	3.333	---

12NC Ordering information

The first 8 or 9 digits of the 12 digit catalogue number are given under section "Phycomp worldwide - Traditional type" on following pages.

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

Example:

0.001 Ω = 0010 or 010

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
0.001 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



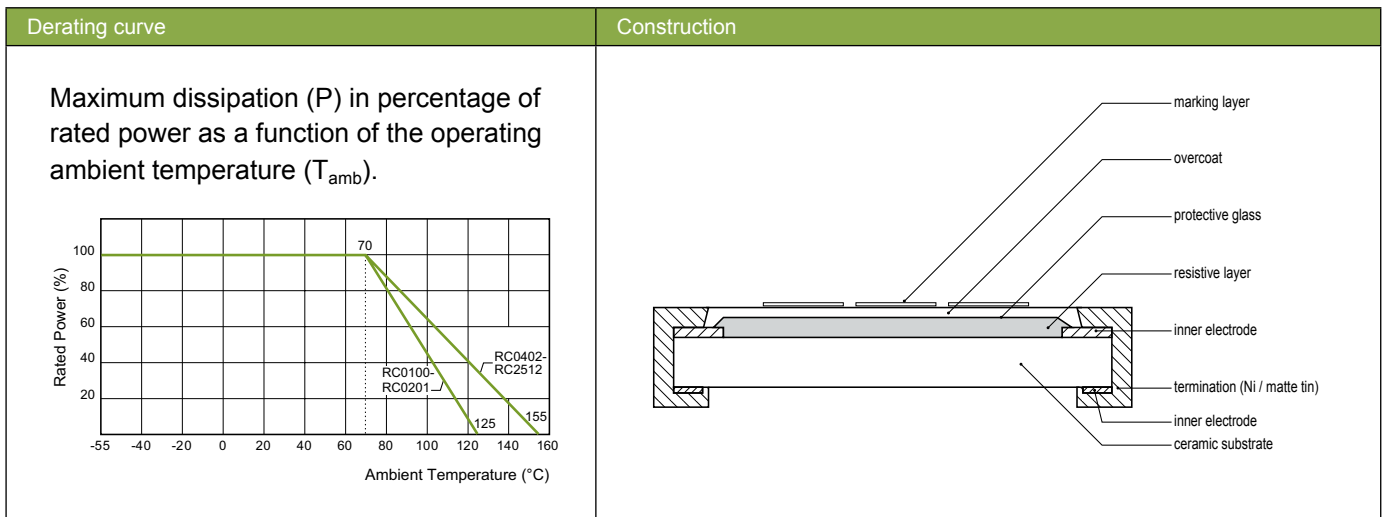
Chip Resistors Selection Charts

Thick film general purpose chip resistors, 01005 to 2512

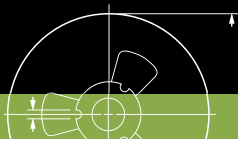


Features

- Extremely thin and light
- Highly reliable multilayer electrode construction
- Compatible with all soldering processes
- Highly stable in auto-placement surface mounting applications
- Barrier layer end termination
- Jumper is available
- Available in 8mm tape & reel per IEC 60286-3 (EIA -RS 481)



Dimensions					
Type	L	W	H	l_1	l_2
RC0100	0.40 ±0.02	0.20 ±0.02	0.13 ±0.02	0.10 ±0.03	0.10 ±0.03
RC0201	0.60 ±0.03	0.30 ±0.03	0.23 ±0.03	0.10 ±0.05	0.15 ±0.05
RC0402	1.00 ±0.05	0.50 ±0.05	0.35 ±0.05	0.20 ±0.10	0.25 ±0.10
RC0603	1.60 ±0.10	0.80 ±0.10	0.45 ±0.10	0.25 ±0.15	0.25 ±0.15
RC0805	2.00 ±0.10	1.25 ±0.10	0.50 ±0.10	0.35 ±0.20	0.35 ±0.20
RC1206	3.10 ±0.10	1.60 ±0.10	0.55 ±0.10	0.45 ±0.20	0.40 ±0.20
RC1210	3.10 ±0.10	2.60 ±0.15	0.50 ±0.10	0.45 ±0.15	0.50 ±0.20
RC1218	3.10 ±0.10	4.60 ±0.10	0.55 ±0.10	0.45 ±0.20	0.40 ±0.20
RC2010	5.00 ±0.10	2.50 ±0.15	0.55 ±0.10	0.45 ±0.15	0.50 ±0.20
RC2512	6.35 ±0.10	3.10 ±0.15	0.55 ±0.10	0.60 ±0.20	0.50 ±0.20



Chip Resistors Selection Charts

Thick film general purpose chip resistors, 01005 to 2512

Electrical characteristics											
Type	Power P ₇₀	Operating Temp. range	MWV	RCOV	DWV	Resistance range & tolerance		T. C. R. (ppm/°C)		Jumper criteria (unit: A)	
RC0100	1/32W	-55°C to +125°C	15V	30V	30V	E24 ±1%, 5% Jumper	10Ω≤R≤1MΩ <50mΩ	10Ω≤R≤1MΩ	±250	Rated current Max. current	0.5 1.0
RC0201	1/20W	-55°C to +125°C	25V	50V	50V	E24 ±5% E24/E96 ±1% E24/E96 ±0.5% Jumper	1Ω≤R≤10MΩ 1Ω≤R≤10MΩ 10Ω≤R≤1MΩ <50mΩ	10Ω<R≤10MΩ 1Ω≤R≤10Ω	±200 -100/+350	Rated current Max. current	0.5 1.0
RC0402	1/16W	-55°C to +155°C	50V	100V	100V	E24 ±5% E24/E96 ±1% E24/E96 ±0.5% Jumper	1Ω≤R≤22MΩ 1Ω≤R≤10MΩ 10Ω≤R≤1MΩ <50mΩ	1Ω≤R≤10Ω 10Ω<R≤10MΩ 10MΩ<R≤22MΩ	±200 ±100 ±200	Rated current Max. current	1.0 2.0
RC0603	1/10W	-55°C to +155°C	50V	100V	100V	E24 ±5% E24/E96 ±1% E24/E96 ±0.5% Jumper	1Ω≤R≤1KΩ 1Ω≤R≤1KΩ <50mΩ	1Ω≤R≤10KΩ	±200	Rated current Max. current	1.0 2.0
	1/5W	-55°C to +155°C	50V	100V	100V	E24 ±5% E24/E96 ±1% E24/E96 ±0.5% Jumper	1Ω≤R≤1KΩ 1Ω≤R≤1KΩ <50mΩ	1Ω≤R≤10KΩ	±200	Rated current Max. current	1.0 2.0
RC0805	1/8W	-55°C to +155°C	150V	300V	300V	E24 ±5% E24/E96 ±1% E24/E96 ±0.5% Jumper	1Ω≤R≤22MΩ 1Ω≤R≤10MΩ 10Ω≤R≤1MΩ <50mΩ	1Ω≤R≤10Ω 10Ω<R≤10MΩ 10MΩ<R≤22MΩ	±200 ±100 ±200	Rated current Max. current	2.0 5.0
	1/4W	-55°C to +155°C	150V	300V	300V	E24 ±5% E24/E96 ±1% E24/E96 ±0.5% Jumper	1Ω≤R≤1MΩ 1Ω≤R≤1MΩ <50mΩ	1Ω≤R≤1MΩ	±200	Rated current Max. current	2.0 5.0
RC1206	1/4W	-55°C to +155°C	200V	400V	500V	E24 ±5% E24/E96 ±1% E24/E96 ±0.5% Jumper	10Ω≤R≤22MΩ 1Ω≤R≤10MΩ 10Ω≤R≤1MΩ <50mΩ	1Ω≤R≤10Ω 10Ω<R≤10MΩ 10MΩ<R≤22MΩ	±200 ±100 ±200	Rated current Max. current	2.0 10.0
	1/2W	-55°C to +155°C	200V	400V	500V	E24 ±5% E24/E96 ±1% E24/E96 ±0.5% Jumper	1Ω≤R≤1MΩ 1Ω≤R≤1MΩ <50mΩ	1Ω≤R≤1MΩ	±200	Rated current Max. current	3.0 7.5
RC1210	1/2W	-55°C to +155°C	200V	500V	500V	E24 ±5% E24/E96 ±1% E24/E96 ±0.5% Jumper	1Ω≤R≤22MΩ 1Ω≤R≤10MΩ 10Ω≤R≤1MΩ <50mΩ	1Ω≤R≤10Ω 10Ω<R≤10MΩ 10MΩ<R≤22MΩ	±200 ±100 ±200	Rated current Max. current	2.0 10.0
RC1218	1W	-55°C to +155°C	200V	500V	500V	E24 ±5% E24/E96 ±1% E24/E96 ±0.5% Jumper	1Ω≤R≤1MΩ 1Ω≤R≤1MΩ 10Ω≤R≤1MΩ <20mΩ			Rated current Max. current	6.0 10.0
RC2010	3/4W	-55°C to +155°C	200V	500V	500V	E24 ±5% E24/E96 ±1% E24/E96 ±0.5% Jumper	1Ω≤R≤22MΩ 1Ω≤R≤10MΩ 10Ω≤R≤1MΩ <50mΩ			Rated current Max. current	2.0 10.0
RC2512	1W	-55°C to +155°C	200V	500V	500V	E24 ±5% E24/E96 ±1% E24/E96 ±0.5% Jumper	1Ω≤R≤1MΩ 1Ω≤R≤1MΩ <50mΩ	1Ω≤R≤150Ω	±200	Rated current Max. current	2.0 10.0
	2W	-55°C to +155°C	200V	400V	500V	E24 ±5% E24/E96 ±1% E24/E96 ±0.5% Jumper	1Ω≤R≤150Ω 1Ω≤R≤150Ω <50mΩ			Rated current Max. current	6.0 15.0

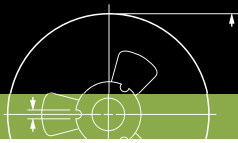


Chip Resistors Selection Charts

Thick film general purpose chip resistors, 01005 to 2512

Environmental characteristics				
Performance test		Test method	Procedure	Requirements
Life		MIL-STD-202G-method 108A	1 000 hours at 70 ±5°C applied RCWV 1.5 hours on, 0.5 hours off, still air required	01005: ±(3% +0.05Ω) < 100mΩ for jumper Others: ±(1% +0.05Ω) for 1% tol. ±(3% +0.05Ω) for 5% tol. < 100mΩ for jumper
High temperature exposure		MIL-STD-202G-method 108A	1 000 hours at maximum operating temperature depending on specification, unpowered	01005: ±(1% +0.05Ω) < 50mΩ for jumper Others: ±(1% +0.05Ω) for 1% tol. ±(2% +0.05Ω) for 5% tol. < 50mΩ for jumper
Moisture resistance		MIL-STD-202G-method 106F	Each temperature / humidity cycle is defined as 8 hours (method 106F), 3 cycles / 24 hours for 10d with 25°C / 65°C 95% R.H	01005: ±(2.0% +0.05Ω) < 100mΩ for jumper Others: ±(0.5% +0.05Ω) for 1% tol. ±(2% +0.05Ω) for 5% tol. < 100mΩ for jumper
Thermal shock		MIL-STD-202G-method 107G	LCT / UCT, number of cycles required is 300 Maximum transfer time is 20 seconds	01005: ±(1% +0.05Ω) < 50mΩ for jumper Others: ±(0.5% +0.05Ω) for 1% tol. ±(1% +0.05Ω) for 5% tol. < 50mΩ for jumper
Solderability	Wetting	J-STD-002B testB	Electrical test not required. Magnification 50X Lead-free solder bath at 245 ±3°C Dipping time: 3 ±0.5 seconds	Well tinned (≥95% covered) No visible damage
	Resistance to soldering heat	MIL-STD-202G-method 210F	Lead-free solder, 260°C, 10 seconds immersion time	01005: ±(1% +0.05Ω) < 50mΩ for jumper Others: ±(0.5% +0.05Ω) for 1% tol. ±(1% +0.05 Ω) for 5% tol. < 50mΩ for jumper No visible damage
Short time overload		MIL-R-55342D-para 4.7.5	2.5 times RCWV or maximum overload voltage whichever is less for 5 seconds at room temperature	01005: ±(2% +0.05Ω) < 50mΩ for jumper Others: ±(1% +0.05Ω) for 1% tol. ±(2% +0.05Ω) for 5% tol. < 50mΩ for jumper No visible damage



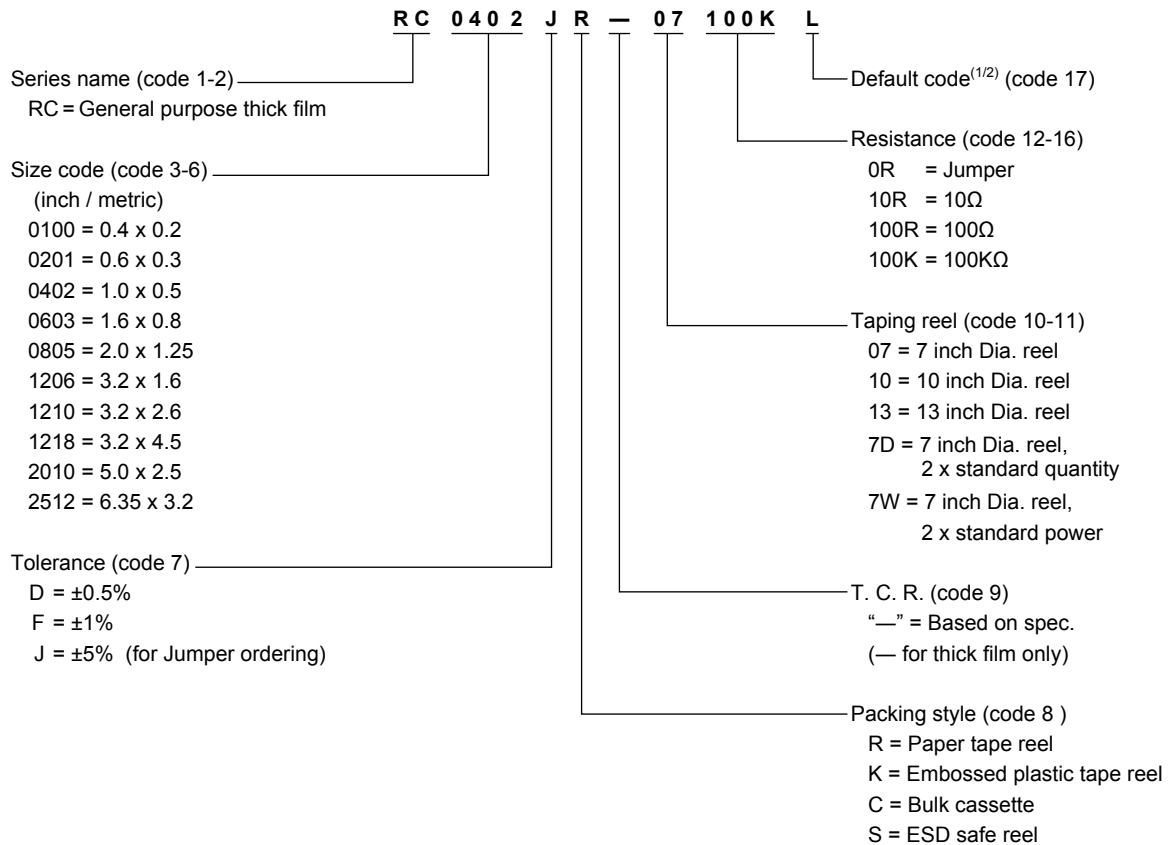


Chip Resistors Selection Charts

Thick film general purpose chip resistors, 01005 to 2512

Global part number - Preferred type for ordering Yageo / Phycomp branded products

Ordering example: RC0402JR-07100KL



Note: 1. All of our RSMD products are RoHS compliant. "LFP" of the internal 2D reel label mentions "Lead Free Process"
2. Letter L is system default code for ordering only



Chip Resistors Selection Charts

Thick film general purpose chip resistors, 01005 to 2512

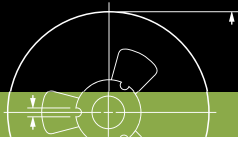
Phycomp worldwide - Traditional type										
General purpose thick film / RC series										
Size: inch (mm)	0201 (0603)		0402 (1005)		0603 (1608)		0805 (2012)			
Power	1/20 W		1/16 W		1/10 W		1/8 W			
Tolerance	+5%	+1%	+5%	+1%	+5%	+1%	+5%	+1%	+1%	
Resistance	E24	E24 / E96	E24	E24 / E96	E24	E24 / E96	E24	E24 / E96	E24 / E96	
Packing	paper tape		paper tape		paper tape		paper tape			
Quantity	5 000	---	---	---	---	---	2322 702 60...L	2322 704 6...L	2322 730 61...L	2322 734 6...L
	10 000	2322 803 70...L	2322 806 7...L	2322 705 70...L	2322 706 7...L	---	2322 702 70...L	2322 704 7...L	2322 730 71...L	2322 734 7...L
	20 000	2322 806 80...L	2322 806 8...L	---	---	---	2322 702 81...L	2322 704 8...L	2322 730 81...L	2322 734 8...L
	50 000	2322 803 60...L	2322 806 6...L	2322 705 87...L	2322 706 8...L	---	---	---	---	---
Jumper	5 000	---	---	---	---	---	2322 702 96001L	---	2322 730 91002L	---
	10 000	2322 803 91001L	---	2322 705 91001L	---	---	2322 702 97001L	---	2322 730 91003L	---
	20 000	---	---	---	---	---	2322 702 92002L	---	2322 730 92002L	---
	50 000	---	---	2322 705 91007L	---	---	---	---	---	---

For ordering rules: See page 14 for E24 / E96 values and the last 4 or 3 digits of the 12NC catalogue number

Phycomp worldwide - Traditional type												
General purpose thick film / RC series												
Size: inch (mm)	1206 (3216)		1210 (3225)		1218 (3248)		2010 (5025)		2512 (6432)			
Power	1/4 W		1/2 W		1 W		3/4 W		1 W			
Tolerance	+5%	+1%	+5%	+1%	+5%	+1%	+5%	+1%	+5%	+1%		
Resistance	E24	E24 / E96	E24	E24 / E96	E24	E24 / E96	E24	E24 / E96	E24	E24 / E96		
Packing	paper tape		paper tape		blister tape		blister tape		blister tape			
Quantity	4 000	---	---	---	---	---	2322 735 64...L	2322 735 7...L	2322 760 60...L	2322 761 6...L	2322 762 60...L	2322 763 6...L
	5 000	2322 711 61...L	2322 724 6...L	2390 735 70...L	2390 735 3...L	---	---	---	---	---	---	---
	10 000	2322 711 51...L	2322 724 7...L	---	---	---	---	---	---	---	---	---
	20 000	2322 711 81...L	2322 724 8...L	2390 735 71...L	2390 735 5...L	---	---	---	---	---	---	---
Jumper	4 000	---	---	---	---	---	2322 735 90007L	---	2322 760 90003L	---	2322 762 90000L	---
	5 000	2322 711 91032L	---	2390 735 90001L	---	---	---	---	---	---	---	---
	10 000	2322 711 91005L	---	---	---	---	---	---	---	---	---	---
	20 000	2322 711 92004L	---	---	---	---	---	---	---	---	---	---

For ordering rules: See page 14 for E24 / E96 values and the last 4 or 3 digits of the 12NC catalogue number

Phycomp CTC ordering code - Traditional type - North America
Regional code for ordering Phycomp branded products. Please see page 13 for details.



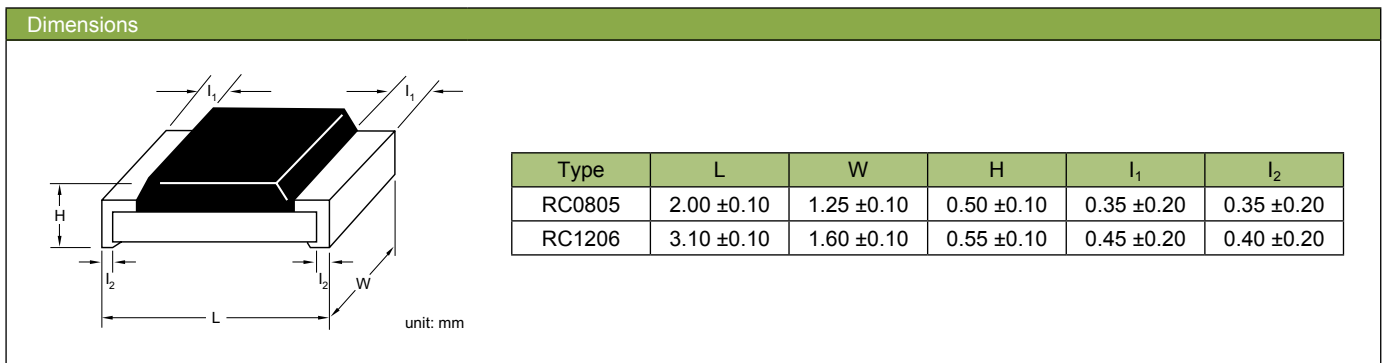
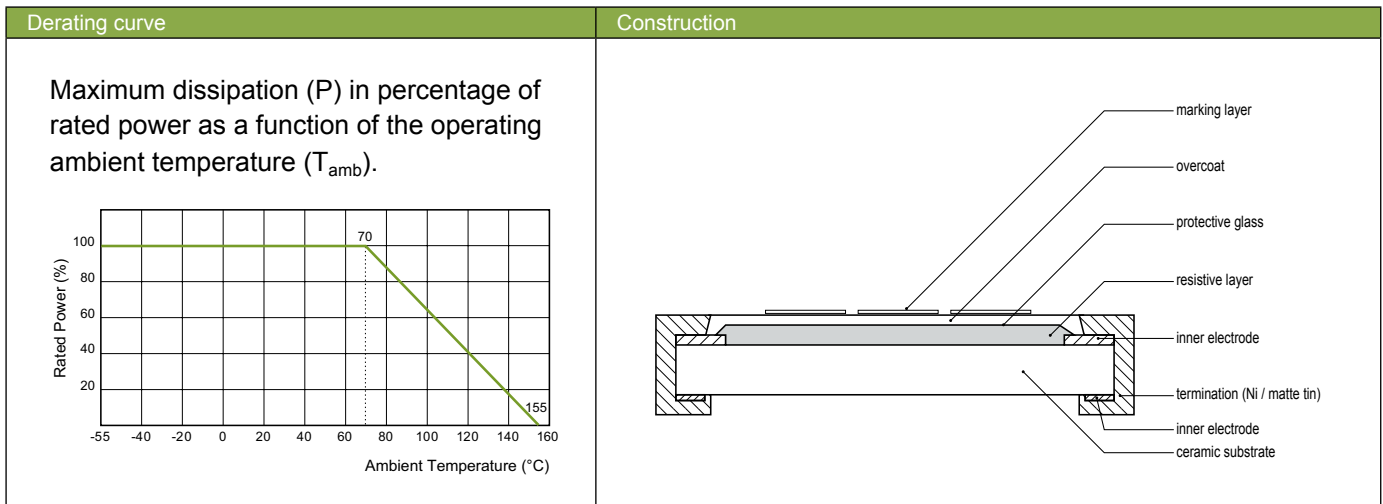
Chip Resistors Selection Charts

Thick film high ohmic chip resistors, 0805 / 1206



Features

- Reduced size of final equipment
- Low assembly costs
- Higher component and equipment reliability
- High ohmic values up to 100MΩ
- Suitable for power supplies in small equipment



Chip Resistors Selection Charts

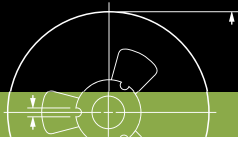
Thick film high ohmic chip resistors, 0805 / 1206

Electrical characteristics								
Type	Power P ₇₀	Operating Temp. range	MWV	RCOV	DWV	Resistance range & tolerance		T. C. R.
RC0805	1/8W	-55°C to +155°C	150V	300V	300V	E24 ±5%, ±10%, ±20%	24MΩ ≤ R ≤ 100MΩ	±300 ppm/°C
RC1206	1/4W	-55°C to +155°C	200V	400V	500V			

Note: See page 11 for ordering code. For more detailed, please contact our sales offices, distributors and representatives in your region.

Environmental characteristics				
Performance test		Test method	Procedure	Requirements
Life		MIL-STD-202G-method 108A	1 000 hours at 70 ±5°C applied RCWV 1.5 hours on, 0.5 hours off, still air required	±(2% +0.05Ω)
High temperature exposure		MIL-STD-202G-method 108A	1 000 hours at maximum operating temperature depending on specification, unpowered	±(1% +0.05Ω)
Moisture resistance		MIL-STD-202G-method 106F	Each temperature / humidity cycle is defined as 8 hours (method 106F), 3 cycles / 24 hours for 10d with 25°C / 65°C 95% R.H	±(2% +0.05Ω)
Thermal shock		MIL-STD-202G-method 107G	LCT / UCT, number of cycles required is 300 Maximum transfer time is 20 seconds	±(1% +0.05Ω)
Solderability	Wetting	J-STD-002B testB	Electrical test not required. Magnification 50X Lead-free solder bath at 245 ±3°C Dipping time: 3 ±0.5 seconds	Well tinned (≥95% covered) No visible damage
	Resistance to soldering heat	MIL-STD-202G-method 210F	Lead-free solder, 260°C, 10 seconds immersion time	±(1% +0.05Ω) No visible damage
Short time overload		MIL-R-55342D-para 4.7.5	2.5 times RCWV or maximum overload voltage whichever is less for 5 seconds at room temperature	±(2% +0.05Ω) No visible damage





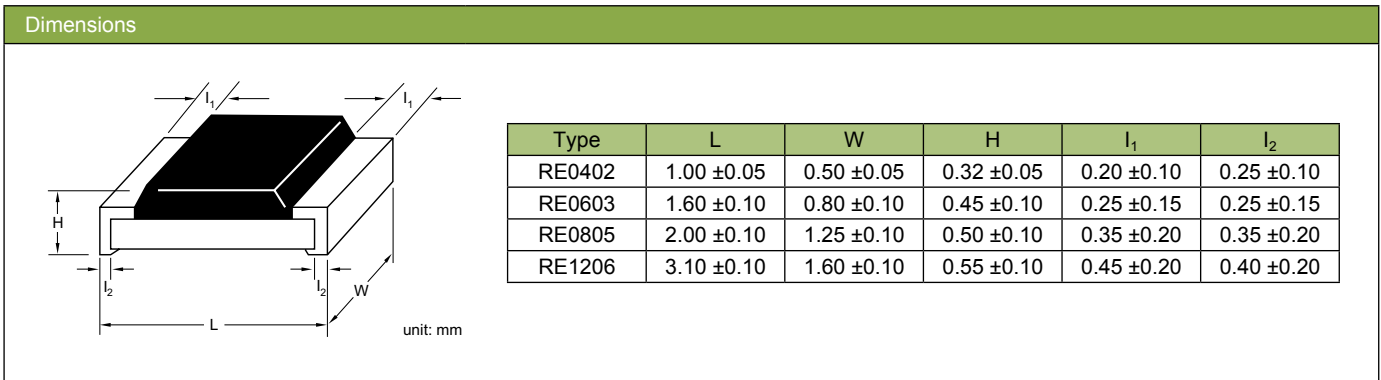
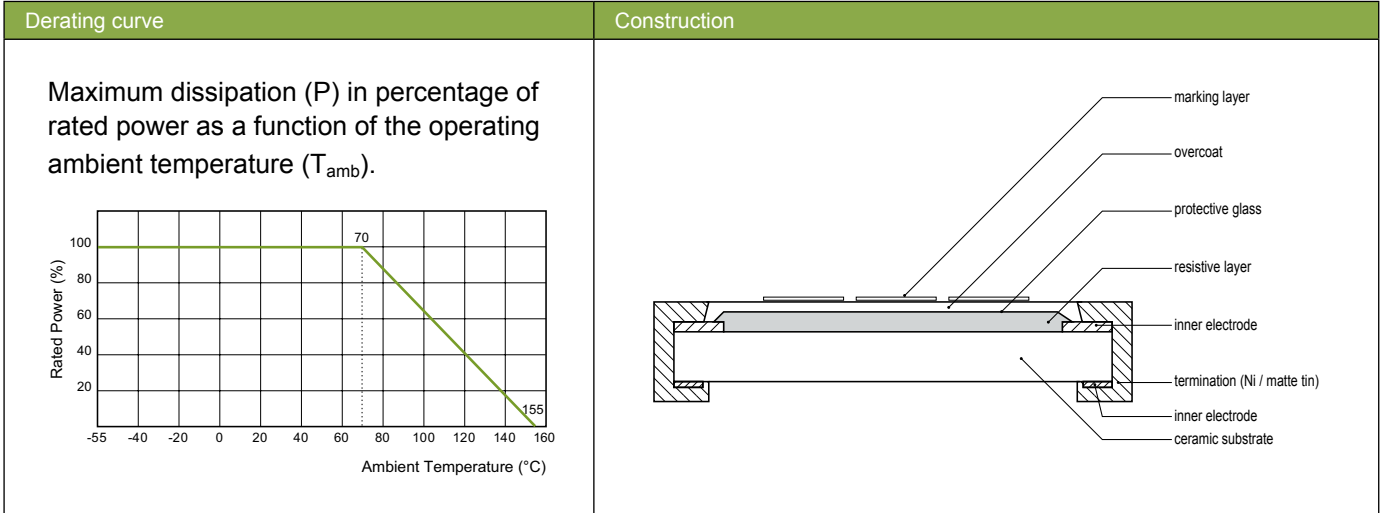
Chip Resistors Selection Charts

Thick film precision grade chip resistors, 0402 to 1206



Features

- Narrow tolerance
- Low T. C. R.
- Highly reliable multilayer electrode construction
- Compatible with all soldering processes
- Suitable for auto-placement surface mounting applications
- Available in 8mm tape & reel per EIA RS481



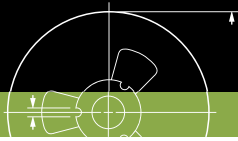
Chip Resistors Selection Charts

Thick film precision grade chip resistors, 0402 to 1206

Electrical characteristics								
Type	Power P_{70}	Operating Temp. range	MWV	RCOV	DWV	Resistance range & tolerance		T. C. R.
RE0402	1/16W	-55°C to +155°C	50V	100V	100V	E24/E96 $\pm 0.5\%$, $\pm 1\%$	$10\Omega \leq R \leq 1M\Omega$	$\pm 50 \text{ ppm}/^\circ\text{C}$
RE0603	1/10W	-55°C to +155°C	50V	100V	100V			
RE0805	1/8W	-55°C to +155°C	150V	300V	300V			
RE1206	1/4W	-55°C to +155°C	200V	400V	500V			

Environmental characteristics				
Performance test		Test method	Procedure	Requirements
Life		MIL-STD-202G-method 108A	1 000 hours at $70 \pm 5^\circ\text{C}$ applied RCWV 1.5 hours on, 0.5 hours off, still air required	$\pm(3\% + 0.05\Omega)$
High temperature exposure		MIL-STD-202G-method 108A	1 000 hours at maximum operating temperature depending on specification, unpowered	$\pm(3\% + 0.05\Omega)$
Moisture resistance		MIL-STD-202G-method 106F	Each temperature / humidity cycle is defined as 8 hours (method 106F), 3 cycles / 24 hours for 10d with $25^\circ\text{C} / 65^\circ\text{C}$ 95% R.H	$\pm(3\% + 0.05\Omega)$
Thermal shock		MIL-STD-202G-method 107G	LCT / UCT, number of cycles required is 300 Maximum transfer time is 20 seconds	$\pm(1\% + 0.05\Omega)$
Solderability	Wetting	IPC/JEDECJ-STD-002B testB	Electrical test not required. Magnification 50X Lead-free solder bath at $245 \pm 3^\circ\text{C}$ Dipping time: 3 ± 0.5 seconds	Well tinned ($\geq 95\%$ covered) No visible damage
	Resistance to soldering heat	MIL-STD-202G-method 210F	Lead-free solder, 260°C , 10 seconds immersion time	$\pm(0.5\% + 0.05\Omega)$ No visible damage
Short time overload		MIL-R-55342D-para 4.7.5	2.5 times RCWV or maximum overload voltage which- ever is less for 5 seconds at room temperature	$\pm(1\% + 0.05\Omega)$ No visible damage



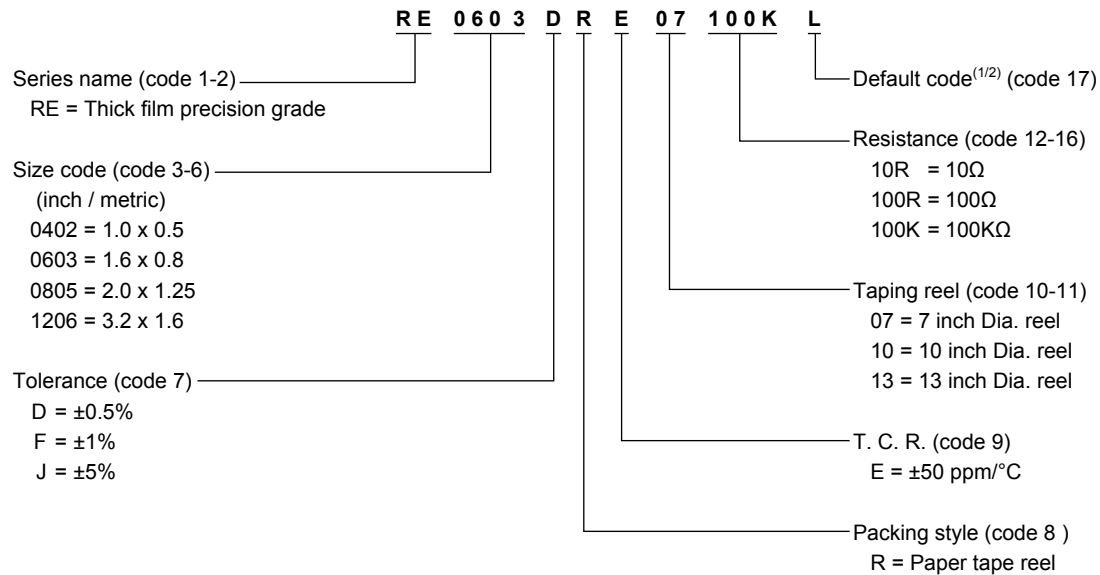


Chip Resistors Selection Charts

Thick film precision grade chip resistors, 0402 to 1206

Global part number - Preferred type for ordering Yageo / Phycomp branded products

Ordering example: RE0603DRE07100KL



- Note:** 1. All of our RSMD products are RoHS compliant. "LFP" of the internal 2D reel label mentions "Lead Free Process"
 2. Letter L is system default code for ordering only
 3. RE series products are available by "Global part number" only

Phycomp CTC ordering code - Traditional type - North America

Regional code for ordering Phycomp branded products. Please see page 13 for details.



Chip Resistors Selection Charts

Thin film high precision high stability chip resistors, 0402 to 2512



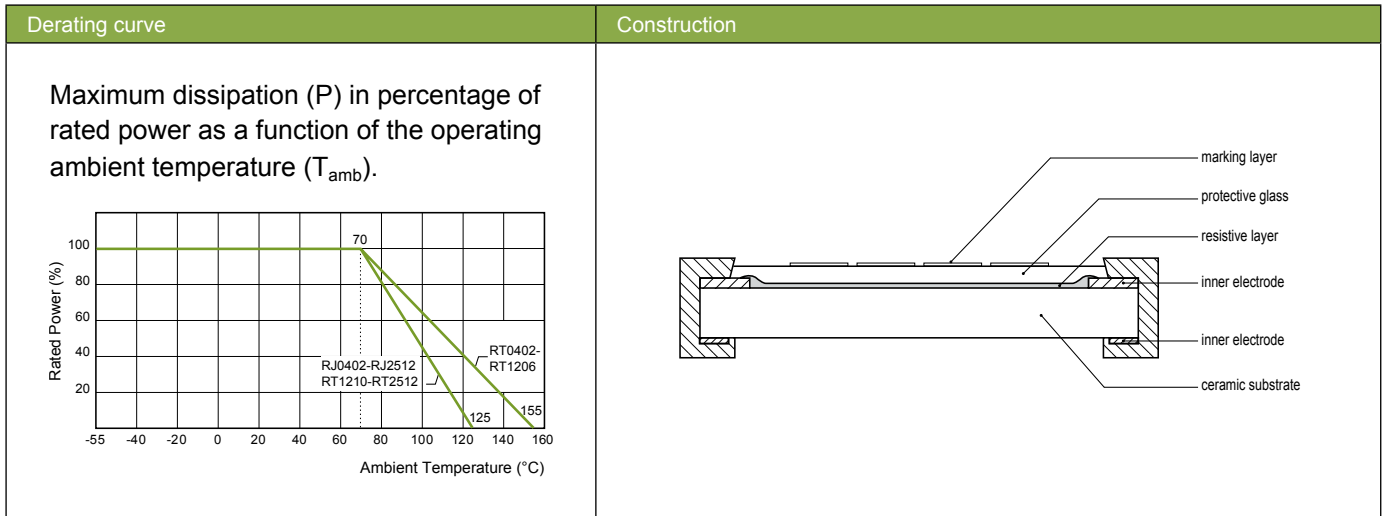
Features

RT series

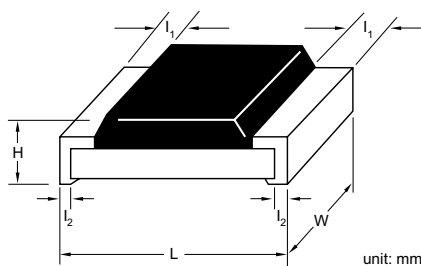
- High precision - High stability
- Low T. C. R. / low noise
- High accuracy ($\pm 0.05\%$, $\pm 0.1\%$, $\pm 0.25\%$, $\pm 0.5\%$, $\pm 1\%$)

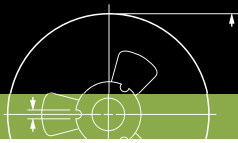
RJ series

- General purpose
- T. C. R.: ± 50 ppm/ $^{\circ}\text{C}$
- Tolerance: $\pm 1\%$



Dimensions						
Type	L	W	H	l_1	l_2	
RT / RJ0402	1.00 ± 0.10	0.50 ± 0.05	0.30 ± 0.05	0.20 ± 0.10	0.25 ± 0.10	
RT / RJ0603	1.60 ± 0.10	0.80 ± 0.10	0.45 ± 0.10	0.25 ± 0.15	0.25 ± 0.15	
RT / RJ 0805	2.00 ± 0.10	1.25 ± 0.10	0.50 ± 0.10	0.35 ± 0.20	0.35 ± 0.20	
RT / RJ1206	3.10 ± 0.10	1.60 ± 0.10	0.55 ± 0.10	0.45 ± 0.20	0.40 ± 0.20	
RT / RJ1210	3.10 ± 0.10	2.60 ± 0.15	0.55 ± 0.10	0.50 ± 0.20	0.50 ± 0.20	
RT / RJ2010	5.00 ± 0.10	2.50 ± 0.15	0.55 ± 0.10	0.60 ± 0.20	0.50 ± 0.20	
RT / RJ2512	6.35 ± 0.10	3.20 ± 0.15	0.55 ± 0.10	0.60 ± 0.20	0.50 ± 0.20	





Chip Resistors Selection Charts

Thin film high precision high stability chip resistors, 0402 to 2512

Electrical characteristics								
Type	Power P ₇₀	Operating Temp. range	MWV	RCOV	DWV	Resistance range & tolerance		T. C. R.
RT0402	1/16W	-55°C to +155°C	50V	100V	75V	E24/E96 ±0.05%, ±0.1%, ±0.25%, ±0.5%, ±1%	10Ω ≤ R ≤ 121KΩ	±50 ppm/°C ±25 ppm/°C ±15 ppm/°C ±10 ppm/°C
RT0603	1/10W		75V	150V	100V		5.1Ω ≤ R ≤ 681KΩ	
RT0805	1/8W		150V	300V	200V		5.1Ω ≤ R ≤ 1.5MΩ	
RT1206	1/4W		200V	400V	300V		5.1Ω ≤ R ≤ 1MΩ	
RT1210	1/4W	-55°C to +125°C	200V	400V	400V	E24/E96 ±1%	5.1Ω ≤ R ≤ 1MΩ	±50 ppm/°C
RT2010	1/2W		200V	400V	400V		10Ω ≤ R ≤ 1MΩ	
RT2512	3/4W		200V	400V	400V			
RJ0402	1/16W		25V	100V	100V		10Ω ≤ R ≤ 121KΩ	
RJ0603	1/16W		50V	100V	100V		5.1Ω ≤ R ≤ 681KΩ	
RJ0805	1/10W		100V	200V	250V		5.1Ω ≤ R ≤ 1.5MΩ	
RJ1206	1/8W		150V	250V	250V			
RJ1210	1/4W	150V	300V	400V				
RJ2010	1/2W	150V	300V	400V				
RJ2512	3/4W	150V	300V	400V				

Environmental characteristics				
Performance test	Test method	Procedure	Requirements	
Life	MIL-STD-202G-method 108A	1 000 hours at 70 ±5°C applied RCWV 1.5 hours on, 0.5 hours off, still air required	±(0.5%+ 0.05Ω) for RT ±(1%+ 0.05Ω) for RJ	
High temperature exposure	MIL-STD-202G-method 108A	1 000 hours at maximum operating temperature depending on specification, unpowered	±(0.5%+ 0.05Ω)	
Moisture resistance	MIL-STD-202G-method 106F	Each temperature / humidity cycle is defined as 8 hours (method 106F), 3 cycles / 24 hours for 10d with 25°C / 65°C 95% R.H	±(0.5%+ 0.05Ω)	
Thermal shock	MIL-STD-202G-method 107G	LCT / UCT, number of cycles required is 300 Maximum transfer time is 20 seconds	±(0.5%+ 0.05Ω)	
Short time overload	MIL-R-55342D-para 4.7.5	2.5 times RCWV or maximum overload voltage which- ever is less for 5 seconds at room temperature	±(0.5%+ 0.05Ω) for RT ±(1%+ 0.05Ω) for RJ No visible damage	
Solderability	Resistance to soldering heat	MIL-STD-202G-method 210F	Lead-free solder, 260°C, 10 seconds immersion time	±(0.5%+ 0.05Ω) No visible damage
	Wetting	J-STD-002B testB	Electrical test not required. Magnification 50X Lead-free solder bath at 245 ±3°C Dipping time: 3 ±0.5 seconds	Well tinned (≥95% covered) No visible damage

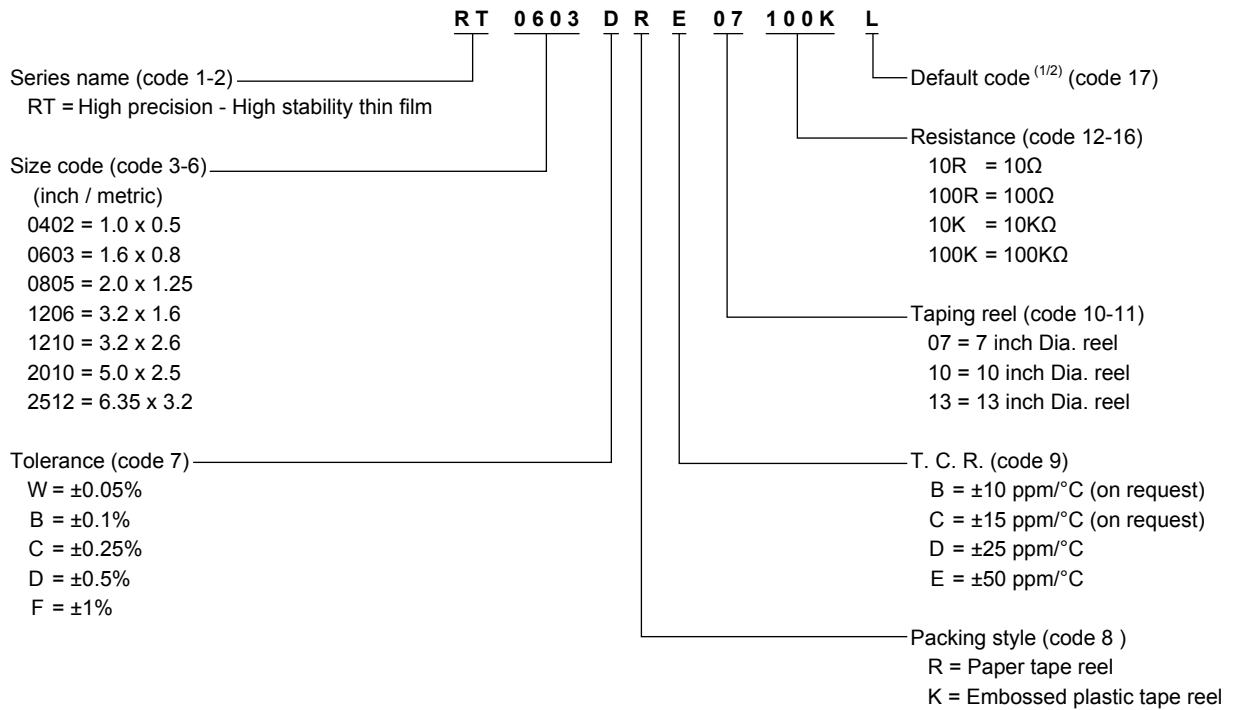


Chip Resistors Selection Charts

Thin film high precision high stability chip resistors, 0402 to 2512

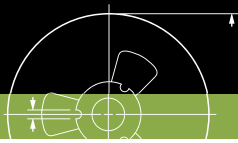
Global part number - Preferred type for ordering Yageo / Phycomp branded products

Ordering example: RT0603DRE07100KL



Note: 1. All of our RSMD products are RoHS compliant. "LFP" of the internal 2D reel label mentions "Lead Free Process"
 2. Letter L is system default code for ordering only





Chip Resistors Selection Charts

Thin film high precision high stability chip resistors, 0402 to 2512

Phycomp worldwide - Traditional type								
High precision - High stability								
Size: inch (mm)	0402 (1005)				0603 (1608)			
Power	1/16 W				1/10 W			
Tolerance	±1%	±0.5%	±0.25%	±0.1%	±1%	±0.5%	±0.25%	±0.1%
Resistance	E24 / E96				E24 / E96			
Packing	paper tape				paper tape			
Quantity TC25 5 000	---	---	---	---	2390 604 7....L	2390 604 6....L	2390 604 5....L	2390 604 4....L
TC50 5 000	---	---	---	---	2390 404 7....L	2390 404 6....L	2390 404 5....L	2390 404 4....L
TC25 10 000	2390 607 7....L	2390 607 6....L	2390 607 5....L	2390 607 4....L	---	---	---	---
TC50 10 000	2390 407 7....L	2390 407 6....L	2390 407 5....L	2390 407 4....L	---	---	---	---

For ordering rules: See page 14 for E24 / E96 values and the last 4 or 3 digits of the 12NC catalogue number

Phycomp worldwide - Traditional type												
High precision - High stability												
Size: inch (mm)	0805 (2012)				1206 (3216)				1210 (3225)			
Power	1/8 W				1/4 W				1/2 W			
Tolerance	±1%	±0.5%	±0.25%	±0.1%	±1%	±0.5%	±0.25%	±0.1%	±1%	±0.5%	±0.25%	±0.1%
Resistance	E24 / E96				E24 / E96				E24 / E96			
Packing	paper tape				paper tape				paper tape			
Quantity TC10 5 000	2390 801 7....L	2390 801 6....L	2390 801 5....L	2390 801 4....L	2390 811 7....L	2390 811 6....L	2390 811 5....L	2390 811 4....L	2390 812 7....L	2390 812 6....L	2390 812 5....L	2390 812 4....L
TC15 5 000	2390 701 7....L	2390 701 6....L	2390 701 5....L	2390 701 4....L	2390 711 7....L	2390 711 6....L	2390 711 5....L	2390 711 4....L	2390 712 7....L	2390 712 6....L	2390 712 5....L	2390 712 4....L
TC25 5 000	2390 601 7....L	2390 601 6....L	2390 601 5....L	2390 601 4....L	2390 611 7....L	2390 611 6....L	2390 611 5....L	2390 611 4....L	2390 612 7....L	2390 612 6....L	2390 612 5....L	2390 612 4....L
TC50 5 000	2390 401 7....L	2390 401 6....L	2390 401 5....L	2390 401 4....L	2390 411 7....L	2390 411 6....L	2390 411 5....L	2390 411 4....L	2390 412 7....L	2390 412 6....L	2390 412 5....L	2390 412 4....L

For ordering rules: See page 14 for E24 / E96 values and the last 4 or 3 digits of the 12NC catalogue number

Phycomp worldwide - Traditional type								
High precision - High stability								
Size: inch (mm)	2010 (5025)				2512 (6432)			
Power	1/2 W				3/4 W			
Tolerance	±1%	±0.5%	±0.25%	±0.1%	±1%	±0.5%	±0.25%	±0.1%
Resistance	E24 / E96				E24 / E96			
Packing	blister tape				blister tape			
Quantity TC10 4 000	2390 815 7....L	2390 815 6....L	2390 815 5....L	2390 815 4....L	2390 818 7....L	2390 818 6....L	2390 818 5....L	2390 818 4....L
TC15 4 000	2390 731 7....L	2390 731 6....L	2390 731 5....L	2390 731 4....L	2390 735 7....L	2390 735 6....L	2390 735 5....L	2390 735 4....L
TC25 4 000	2390 615 7....L	2390 615 6....L	2390 615 5....L	2390 615 4....L	2390 618 7....L	2390 618 6....L	2390 618 5....L	2390 618 4....L
TC50 4 000	2390 415 7....L	2390 415 6....L	2390 415 5....L	2390 415 4....L	2390 418 7....L	2390 418 6....L	2390 418 5....L	2390 418 4....L

For ordering rules: See page 14 for E24 / E96 values and the last 4 or 3 digits of the 12NC catalogue number

Phycomp CTC ordering code - Traditional type - North America
Regional code for ordering Phycomp branded products. Please see page 13 for details.

Thin film product range against tolerance / T. C. R. (ordering code)														
Tolerance	±0.05% (W)			±0.1% (B)				±0.25% (C)				±0.5% (D)		±1% (F)
T. C. R. (ppm/°C)	±10 (B)	±15 (C)	±25 (D)	±10 (B)	±15 (C)	±25 (D)	±50 (E)	±10 (B)	±15 (C)	±25 (D)	±50 (E)	±25 (D)	±50 (E)	±50 (E)
RT0402	--	--	--	10R - 100K	10R - 100K	10R - 121K	10R - 121K	10R - 100K	10R - 100K	10R - 121K	10R - 121K	10R - 121K	10R - 121K	10R - 121K
RT0603	1K - 47K	1K - 47K	1K - 47K	10R - 100K	10R - 100K	10R - 681K	10R - 681K	10R - 100K	10R - 100K	10R - 681K	5R1 - 681K	10R - 681K	5R1 - 681K	5R1 - 681K
RT0805	100R - 100K	100R - 100K	100R - 100K	10R - 100K	10R - 100K	10R - 1.5M	10R - 1.5M	10R - 100K	10R - 100K	10R - 1.5M	5R1 - 1.5M	10R - 1.5M	5R1 - 1.5M	5R1 - 1.5M
RT1206	100R - 100K	100R - 100K	100R - 100K	10R - 100K	10R - 100K	10R - 1.5M	10R - 1.5M	10R - 100K	10R - 100K	10R - 1.5M	5R1 - 1.5M	10R - 1.5M	5R1 - 1.5M	5R1 - 1.5M
RT1210	100R - 100K	100R - 100K	100R - 100K	10R - 100K	10R - 100K	10R - 1M	10R - 1M	10R - 100K	10R - 100K	10R - 1M	5R1 - 1M	10R - 1M	5R1 - 1M	5R1 - 1M
RT2010	100R - 100K	100R - 100K	100R - 100K	10R - 100K	10R - 100K	10R - 1M	10R - 1M	10R - 100K	10R - 100K	10R - 1M	10R - 1M	10R - 1M	10R - 1M	10R - 1M
RT2512	100R - 100K	100R - 100K	100R - 100K	10R - 100K	10R - 100K	10R - 1M	10R - 1M	10R - 100K	10R - 100K	10R - 1M	10R - 1M	10R - 1M	10R - 1M	10R - 1M

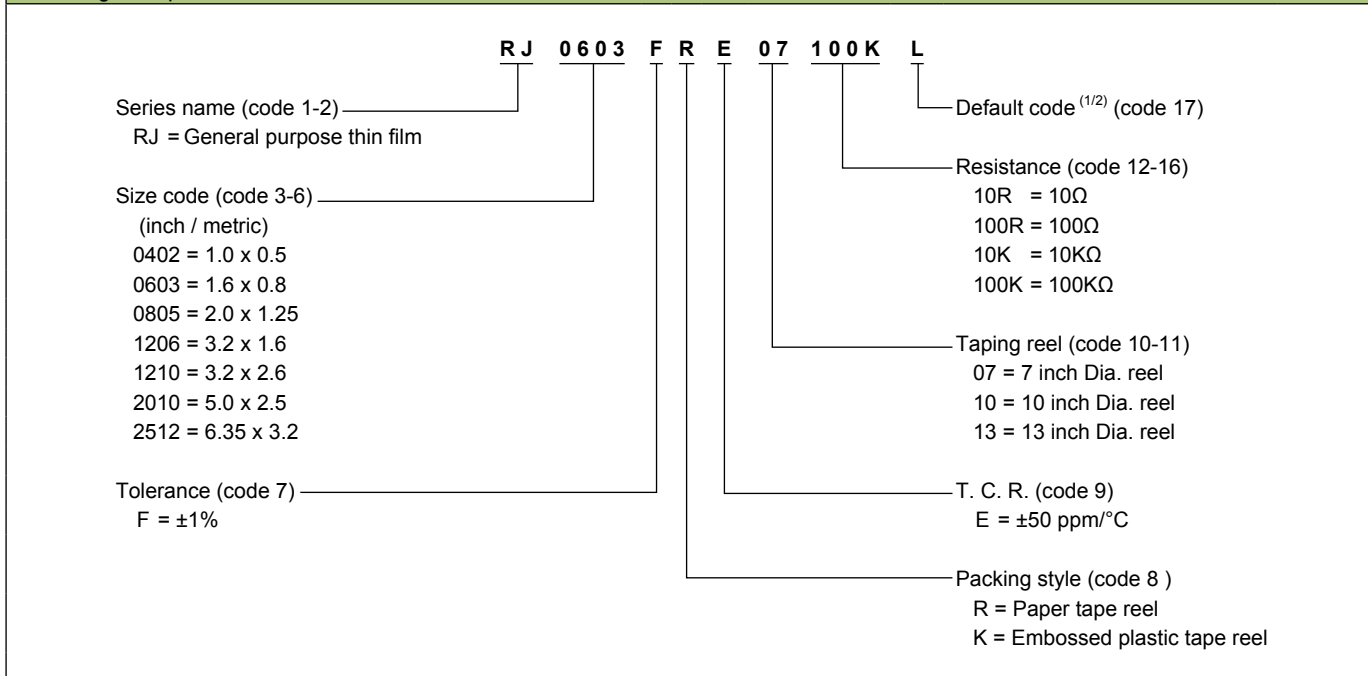


Chip Resistors Selection Charts

Thin film general purpose chip resistors, 0402 to 2512

Global part number - Preferred type for ordering Yageo / Phycomp branded products

Ordering example: RJ0603FRE07100KL



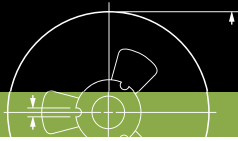
Note: 1. All of our RSMD products are RoHS compliant. "LFP" of the internal 2D reel label mentions "Lead Free Process"
 2. Letter L is system default code for ordering only

Phycomp worldwide - Traditional type							
General purpose thin film / RJ series							
Size: inch (mm)	0402 (1005)	0603 (1608)	0805 (2012)	1206 (3216)	1210 (3225)	2010 (5025)	2512 (6432)
Power	1/16 W	1/16 W	1/10 W	1/8 W	1/4 W	1/2 W	3/4 W
Tolerance	+1%	+1%	+1%	+1%	+1%	+1%	+1%
Resistance	E24 / E96	E24 / E96	E24 / E96	E24 / E96	E24 / E96	E24 / E96	E24 / E96
Packing	paper tape	paper tape	paper tape	paper tape	paper tape	blister tape	blister tape
Quantity	4 000	---	---	---	---	2390 415 8....L	2390 418 8....L
	5 000	---	2390 404 8....L	2390 401 8....L	2390 411 8....L	2390 412 0....L	---
	10 000	2390 407 8....L	2391 424 8....L	2391 421 8....L	2391 431 8....L	2391 432 8....L	---
	20 000	2390 427 8....L	2392 444 8....L	2392 441 8....L	2392 451 8....L	2392 412 8....L	---
	50 000	2390 447 8....L	---	---	---	---	---

For ordering rules: See page 14 for E24 / E96 values and the last 4 or 3 digits of the 12NC catalogue number

Phycomp CTC ordering code - Traditional type - North America
Regional code for ordering Phycomp branded products. Please see page 13 for details.

Thin film product range against tolerance / T. C. R. (ordering code)	
Tolerance	±1% (F)
T. C. R. (ppm/°C)	±50 (E)
RJ0402	10R - 121K
RJ0603	5R1 - 681K
RJ0805	5R1 - 1.5M
RJ1206	5R1 - 1.5M
RJ1210	10R - 1M
RJ2010	10R - 1M
RJ2512	10R - 1M



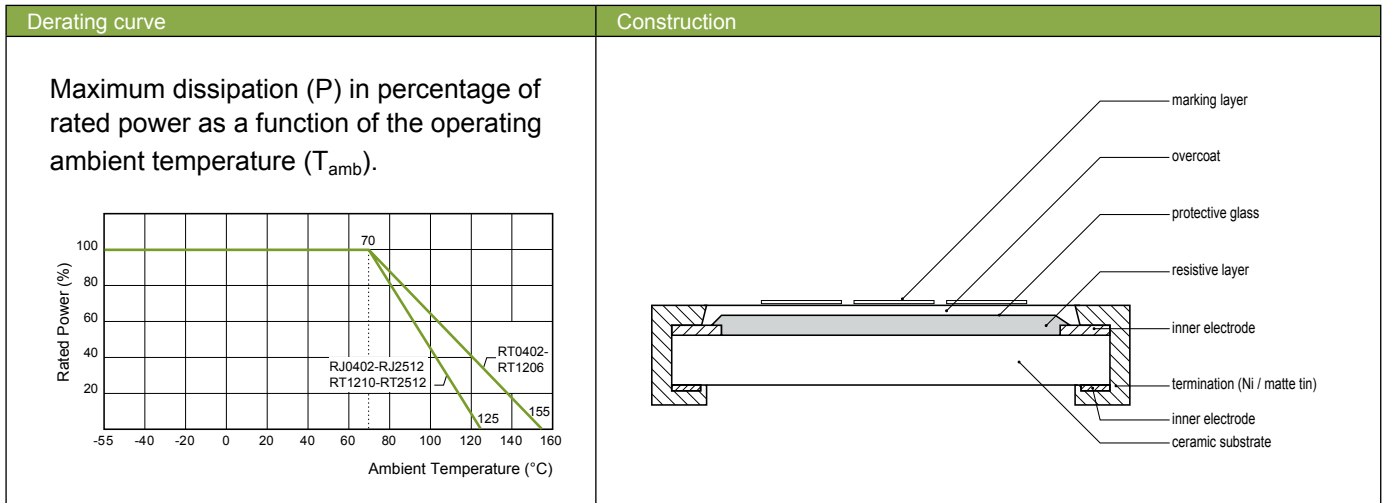
Chip Resistors Selection Charts

Thick film low ohmic chip resistors, 0402 to 2512



Features

- Current sensing of desktop & notebook PC
- Resistance values down to 0.01Ω
- Highly reliable multilayer electrode construction
- Low inductance
- High speed logic circuits



Dimensions					
Type	L	W	H	l_1	l_2
RL0402	1.00 ±0.10	0.50 ±0.05	0.35 ±0.05	0.20 ±0.10	0.25 ±0.10
RL0603	1.60 ±0.10	0.80 ±0.10	0.45 ±0.10	0.25 ±0.15	0.25 ±0.15
RL0805	2.00 ±0.10	1.25 ±0.10	0.50 ±0.10	0.35 ±0.20	0.35 ±0.20
RL1206	3.10 ±0.10	1.60 ±0.10	0.55 ±0.10	0.45 ±0.20	0.45 ±0.20
RL1210	3.10 ±0.10	2.60 ±0.15	0.55 ±0.10	0.50 ±0.20	0.50 ±0.20
RL1218	3.05 ±0.15	4.60 ±0.20	0.55 ±0.10	0.45 ±0.25	0.50 ±0.25
RL2010	5.00 ±0.10	2.50 ±0.15	0.55 ±0.10	0.60 ±0.20	0.50 ±0.20
RL2512	6.35 ±0.10	3.20 ±0.15	0.55 ±0.10	0.60 ±0.20	0.50 ±0.20



Chip Resistors Selection Charts

Thick film low ohmic chip resistors, 0402 to 2512

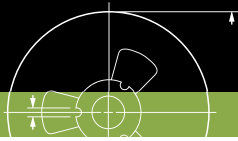
Electrical characteristics					
Type	Power P ₇₀	Operating Temp. range	Resistance range & tolerance		T. C. R. (ppm/°C)
RL0402	1/16W	-55°C to +125°C	E24 ±1%, ±2%, ±5%	50mΩ ≤ R < 1Ω	See following table "T.C.R.- RL series"
RL0603	1/10W	-55°C to +125°C		10mΩ ≤ R < 1Ω	
RL0805	1/8W	-55°C to +125°C		10mΩ ≤ R < 1Ω	
	1/4W	-55°C to +125°C		15mΩ ≤ R < 1Ω	
RL1206	1/4W	-55°C to +125°C		10mΩ ≤ R < 1Ω	
	1/2W	-55°C to +125°C		15mΩ ≤ R < 1Ω	
RL1210	1/2W	-55°C to +125°C		10mΩ ≤ R < 1Ω	
RL1218	1W	-55°C to +125°C		10mΩ ≤ R < 1Ω	
RL2010	3/4W	-55°C to +125°C		10mΩ ≤ R < 1Ω	
RL2512	1W	-55°C to +125°C		10mΩ ≤ R < 1Ω	

Note: The partial values of 25 / 40 / 50 / 60 / 250 / 400 / 500 mΩ are also available

T. C. R. - RL series							
Type	Operating Temp. range	Resistance range	T. C. R.				
			50mΩ ≤ R < 100mΩ	100mΩ ≤ R < 500mΩ	500mΩ ≤ R < 1Ω		
RL0402	-55°C to +125°C	50mΩ ≤ R < 1Ω	±1000 ppm/°C		±800 ppm/°C		±300 ppm/°C
			10mΩ ≤ R ≤ 36mΩ	36mΩ ≤ R ≤ 91mΩ	91mΩ < R ≤ 500mΩ	500mΩ < R < 1Ω	
RL0603	-55°C to +125°C	10mΩ ≤ R < 1Ω	±1 500 ppm/°C		±1 200 ppm/°C		±800 ppm/°C
			10mΩ ≤ R ≤ 18mΩ	18mΩ < R ≤ 47mΩ	47mΩ < R ≤ 91mΩ	91mΩ < R ≤ 360mΩ	360mΩ < R ≤ 500mΩ
RL0805	-55°C to +125°C	10mΩ ≤ R < 1Ω	±1 500 ppm/°C	±1 200 ppm/°C	±1 000 ppm/°C	±600 ppm/°C	±300 ppm/°C
RL1206							
RL1210	-55°C to +125°C	10mΩ ≤ R < 1Ω	±1 500 ppm/°C	±1 000 ppm/°C	±800 ppm/°C	±600 ppm/°C	±300 ppm/°C
			10mΩ ≤ R ≤ 30mΩ	30mΩ < R ≤ 56mΩ	56mΩ < R ≤ 180mΩ	180mΩ < R < 1Ω	
RL1218	-55°C to +125°C	10mΩ ≤ R < 1Ω	±2 000 ppm/°C		±1 000 ppm/°C		±700 ppm/°C
			10mΩ ≤ R ≤ 18mΩ	18mΩ < R ≤ 47mΩ	47mΩ < R ≤ 91mΩ	91mΩ < R ≤ 360mΩ	360mΩ < R ≤ 500mΩ
RL2010	-55°C to +125°C	10mΩ ≤ R < 1Ω	±1 500 ppm/°C	±1 200 ppm/°C	±1 000 ppm/°C	±600 ppm/°C	±300 ppm/°C
RL2512							
			±1 500 ppm/°C	±1 000 ppm/°C	±800 ppm/°C	±600 ppm/°C	±300 ppm/°C

Environmental characteristics			
Performance test	Test method	Procedure	Requirements
Life	MIL-STD-202G-method 108A	1 000 hours at 70°C ±5°C applied RCWV 1.5 hours on, 0.5 hours off, still air required	±2%
High temperature exposure	MIL-STD-202G-method 108A	1 000 hours at maximum operating temperature depending on specification, unpowered	±1%
Moisture resistance	MIL-STD-202G-method 106F	Each temperature / humidity cycle is defined as 8 hours (method 106F), 3 cycles / 24 hours for 10d with 25°C / 65°C 95% R.H	±2%
Thermal shock	MIL-STD-202G-method 107G	LCT / UCT, number of cycles required is 300 Maximum transfer time is 20 seconds	±1%
Solderability	Wetting	J-STD-002B testB Electrical test not required. Magnification 50X Lead-free solder bath at 245 ±3°C Dipping time: 3 ±0.5 seconds	Well tinned (≥95% covered) No visible damage
	Resistance to soldering heat	MIL-STD-202G-method 210F	Lead-free solder, 260°C, 10 seconds immersion time
Short time overload	MIL-R-55342D-para 4.7.5	RL standard power: 6.25 times of rated power for 5 seconds at room temperature RL high power: 5 times of rated power for 5 seconds at room temperature	±2% No visible damage





Chip Resistors Selection Charts

Thick film low ohmic chip resistors, 0402 to 2512

Global part number - Preferred type

Ordering example: RL0603JR-070R01L

<p>Series name (code 1-2)</p> <p>RL = Thick Film Low ohmic</p> <p>Size code (code 3-6)</p> <p>(inch / metric)</p> <p>0402 = 1.0 x 0.5</p> <p>0603 = 1.6 x 0.8</p> <p>0805 = 2.0 x 1.25</p> <p>1206 = 3.2 x 1.6</p> <p>1210 = 3.2 x 2.6</p> <p>1218 = 3.2 x 4.5</p> <p>2010 = 5.0 x 2.5</p> <p>2512 = 6.35 x 3.2</p> <p>Tolerance (code 7)</p> <p>F = ±1%</p> <p>G = ±2%</p> <p>J = ±5%</p>	<p>RL 0603 J R - 07 0R01 L</p>	<p>Default code^(1/2) (code 17)</p> <p>Resistance (code 12-16)</p> <p>0R01 = 0.01Ω</p> <p>0R1 = 0.1Ω</p> <p>0R2 = 0.2Ω</p> <p>Taping reel (code 10-11)</p> <p>07 = 7 inch Dia. reel</p> <p>10 = 10 inch Dia. reel</p> <p>13 = 13 inch Dia. reel</p> <p>T. C. R. (code 9)</p> <p>“—” = Based on spec.</p> <p>(— for thick film only)</p> <p>Packing style (code 8)</p> <p>R = Paper tape reel</p> <p>K = Embossed plastic tape reel</p>
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Note: 1. All of our RSMD products are RoHS compliant. "LFP" of the internal 2D reel label mentions "Lead Free Process"
 2. Letter L is system default code for ordering only



Chip Resistors Selection Charts

Thick film low ohmic chip resistors, 0402 to 2512

Phycomp worldwide - Traditional type								
Low ohmic chip resistors								
Size: inch (mm)	0402 (1005)		0603 (1608)		0805 (2012)		1206 (3216)	
Power	1/16 W		1/10 W		1/8 W		1/4 W	
Tolerance	+5%	+1%	+5%	+1%	+5%	+1%	+5%	+1%
Resistance	E24	E24	E24	E24	E24	E24	E24	E24
Packing	paper tape		paper tape		paper tape		paper tape	
Quantity 5 000	---	---	2350 512 10...L	2350 512 12...L	2350 511 10...L	2350 511 12...L	2350 510 10...L	2350 510 12...L
10 000	2350 513 20...L	2350 513 22...L	---	---	---	---	---	---

For ordering rules: See page 14 for E24 / E96 values and the last 4 or 3 digits of the 12NC catalogue number

Phycomp worldwide - Traditional type								
Low ohmic chip resistors								
Size: inch (mm)	1210 (3225)		1218 (3248)		2010 (5025)		2512 (6432)	
Power	1/2 W		1 W		3/4 W		1 W	
Tolerance	+5%	+1%	+5%	+1%	+5%	+1%	+5%	+1%
Resistance	E24	E24	E24	E24	E24	E24	E24	E24
Packing	paper tape		blister tape		blister tape		blister tape	
Quantity 4 000	---	---	2322 735 64...L	2322 735 7...L	2322 760 90..0L/60..7L	2322 761 90..0L/6...7L	2322 762 90..0L/60..7L	2322 763 90..0L/6...7L
5 000	2390 735 90..0L/60..7L	2390 735 3...L	---	---	---	---	---	---

For ordering rules: See page 14 for E24 / E96 values and the last 4 or 3 digits of the 12NC catalogue number

Phycomp CTC ordering code - Traditional type - North America
Regional code for ordering Phycomp branded products. Please see page 13 for details.



Chip Resistors Selection Charts

Thick film low ohmic, high power chip resistors, 0805 / 1206

Global part number - Preferred type

Ordering example: RL0805JR-7W0R01L

RL 0805 J R — 7W 0R01 L

Series name (code 1-2) RL = Thick film low ohmic	Size code (code 3-6) (inch / metric) 0805 = 2.0 x 1.25 1206 = 3.2 x 1.6	Tolerance (code 7) F = ±1% G = ±2% J = ±5%	Packing style (code 8) R = Paper tape reel	Default code (code 17)	Resistance (code 12-16) 0R01 = 0.01Ω 0R1 = 0.1Ω 0R2 = 0.2Ω	Taping reel (code 10-11) 7W = 7 inch Dia. reel and 2 x standard power type	T. C. R. (code 9) "—" = Based on spec. (— for thick film only)
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Note: 1. All of our RSMD products are RoHS compliant. "LFP" of the internal 2D reel label mentions "Lead Free Process"
2. Letter L is system default code for ordering only

Phycomp worldwide - Traditional type				
Low ohmic high power chip resistors				
Size: inch (mm)	0805 (2012)		1206 (3216)	
Power	1/4 W		1/2 W	
Tolerance	+5%	+1%	+5%	+1%
Resistance	E24	E24 / E96	E24	E24 / E96
Packing	paper tape		paper tape	
Quantity	5 000	2350 511 15...L	2350 511 17...L	2350 519 01...L
				2350 519 1...L

For ordering rules: See page 14 for E24 / E96 values and the last 4 or 3 digits of the 12NC catalogue number

Phycomp CTC ordering code - Traditional type - North America

Regional code for ordering Phycomp branded products. Please see page 13 for details.



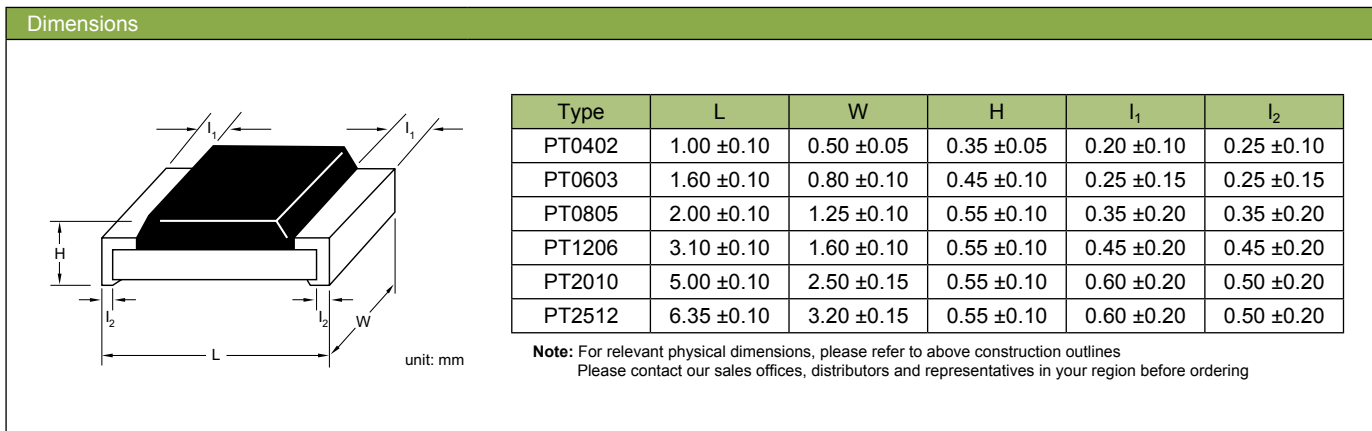
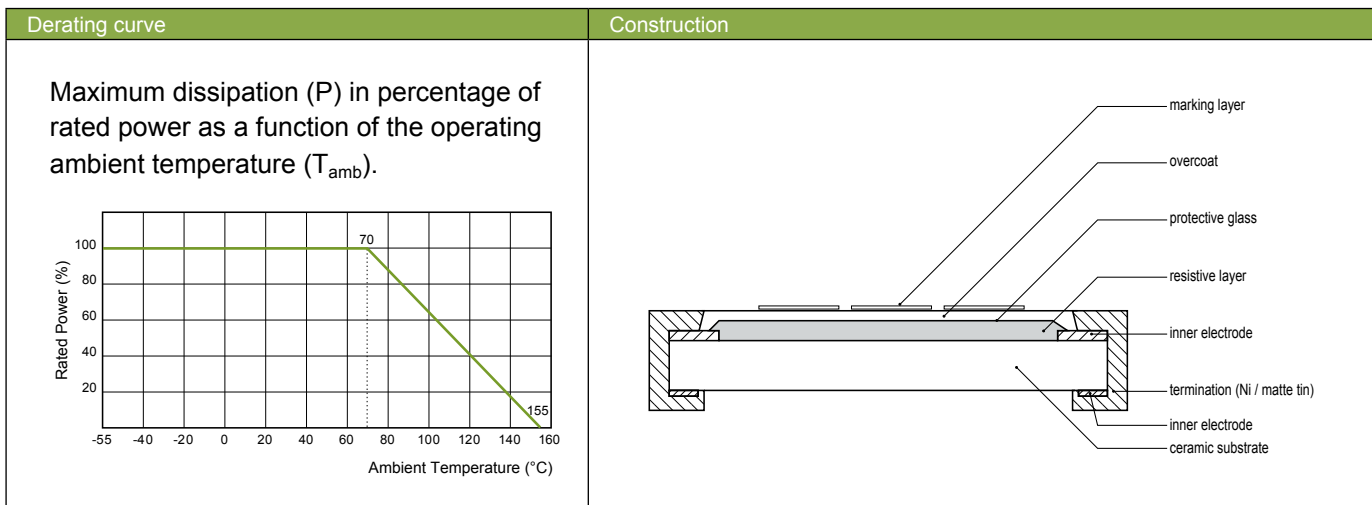
Chip Resistors Selection Charts

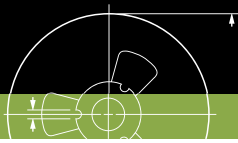
Thick film low ohmic low T. C. R. chip resistors, 0402 to 2512



Features

- Excellent T. C. R.
- Precision current sensing control
- Excellent performance for current sensing applications
- Low ohmic and high power





Chip Resistors Selection Charts

Thick film low ohmic low T. C. R. chip resistors, 0402 to 2512

Electrical characteristics										
Type	Power P ₇₀	Operating Temp. range	Max. working voltage	Tolerance	Resistance range & T. C. R.		Jumper criteria			
PT0402	1/16W	-55°C to +155°C	(PxR) ^{1/2}	E24 ±2%, ±5% E24/E96 ±1%	50mΩ ≤ R < 68mΩ	±600 ppm/°C	Max. resistance	---		
	1/8W				68mΩ ≤ R < 100mΩ	±300 ppm/°C			Rated current	---
	1/6W				100mΩ ≤ R < 1Ω	±200 ppm/°C				
PT0603	1/10W				50mΩ	0/+400 ppm/°C	Max. resistance	8mΩ		
	1/5W				50mΩ < R < 68mΩ	0/+350 ppm/°C			Rated current	5A
					68mΩ ≤ R < 100mΩ	0/+300 ppm/°C				
PT0805	1/8W				100mΩ ≤ R < 1Ω	±100 ppm/°C	Max. resistance	---		
					1/4W				Rated current	---
	PT1206				1/4W	100mΩ				
1/2W					Rated current		10A			
PT2010	3/4W	100mΩ < R < 1Ω	±75 ppm/°C	Max. resistance				---		
	1W	Rated current	---							
PT2512	1W			Rated current	---					
	2W	Rated current	---							

Environmental characteristics			
Performance test	Test method	Procedure	Requirements
Life	MIL-STD-202G-method 108A	1 000 hours at 70 ±5°C applied RCWV 1.5 hours on, 0.5 hours off, still air required	±(1% +0.0005Ω) < 20mΩ for jumper
High temperature exposure	MIL-STD-202G-method 108A	1 000 hours at maximum operating temperature depending on specification, unpowered	±(1% +0.0005Ω) < 20mΩ for jumper
Moisture resistance	MIL-STD-202G-method 106F	Each temperature / humidity cycle is defined as 8 hours (method 106F), 3 cycles / 24 hours for 10d with 25°C / 65°C 95% R.H	±(0.5% +0.0005Ω) < 20mΩ for jumper
Thermal shock	MIL-STD-202G-method 107G	LCT / UCT, number of cycles required is 300 Maximum transfer time is 20 seconds	±(1% +0.0005Ω) < 10mΩ for jumper
Solderability	Wetting	J-STD-002B testB Electrical test not required. Magnification 50X Lead-free solder bath at 245 ±3°C Dipping time: 3 ±0.5 seconds	Well tinned (≥95% covered) No visible damage
	Resistance to soldering heat	MIL-STD-202G-method 210F Lead-free solder, 260°C, 10 seconds immersion time	±(0.5% +0.0005Ω) No visible damage < 10mΩ for jumper
Short time overload	MIL-R-55342D-para 4.7.5	PT standard power: 6.25 times of rated power for 5 seconds at room temperature PT high power: 5 times of rated power for 5 seconds at room temperature PT jumper: 2.5 times of rated current for 5 seconds at room temperature	±(1% +0.0005Ω) No visible damage < 10mΩ for jumper



Chip Resistors Selection Charts

Thick film low ohmic low T. C. R. chip resistors, 0402 to 2512

Global part number - Preferred type

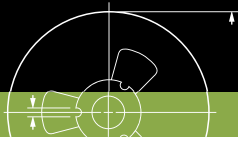
Ordering example: PT2512FK-070R01L

<p>P T 2 5 1 2 F K — 0 7 0 R 0 1 L</p> <p>Series name (code 1-2) ————</p> <p>PT = Thick film low ohmic low T. C. R.</p> <p>Size code (code 3-6) ————</p> <p>(inch / metric)</p> <p>0402 = 1.0 x 0.5</p> <p>0603 = 1.6 x 0.8</p> <p>0805 = 2.0 x 1.25</p> <p>1206 = 3.2 x 1.6</p> <p>2010 = 5.0 x 2.5</p> <p>2512 = 6.35 x 3.2</p> <p>Tolerance (code 7) ————</p> <p>F = ±1%</p> <p>G = ±2%</p> <p>J = ±5%</p> <p>“—” for Jumper ordering</p> <p>Packing style (code 8) ————</p> <p>R = Paper tape reel</p> <p>K = Embossed plastic tape reel</p>	<p>Default code^(1/2) (code 17)</p> <p>Resistance (code 12-16)</p> <p>0R = Jumper</p> <p>0R1 = 0.1Ω</p> <p>0R2 = 0.2Ω</p> <p>Taping reel (code 10-11)</p> <p>07 = 7 inch Dia. reel</p> <p>13 = 13 inch Dia. reel</p> <p>7W = 7 inch Dia. reel and 2 x standard power type</p> <p>T. C. R. (code 9)</p> <p>“—” = Based on spec.</p>
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- Note:** 1. All of our RSMD products are RoHS compliant. "LFP" of the internal 2D reel label mentions "Lead Free Process"
2. Letter L is system default code for ordering only
3. PT series products are available by "Global part number" only

Phycomp CTC ordering code - Traditional type - North America

Regional code for ordering Phycomp branded products. Please see page 13 for details.



Chip Resistors Selection Charts

Thick film low ohmic low T. C. R. chip resistors, wide termination, 0815



Features

- Excellent T. C. R.
- Precision current sensing control
- Excellent performance for current sensing applications
- Low ohmic and high power

Derating curve	Construction																												
<p>Maximum dissipation (P) in percentage of rated power as a function of the operating ambient temperature (T_{amb}).</p> <table border="1"> <caption>Derating Curve Data</caption> <thead> <tr> <th>Ambient Temperature (°C)</th> <th>Rated Power (%)</th> </tr> </thead> <tbody> <tr><td>-55</td><td>100</td></tr> <tr><td>-40</td><td>100</td></tr> <tr><td>-20</td><td>100</td></tr> <tr><td>0</td><td>100</td></tr> <tr><td>20</td><td>100</td></tr> <tr><td>40</td><td>100</td></tr> <tr><td>60</td><td>100</td></tr> <tr><td>70</td><td>100</td></tr> <tr><td>80</td><td>90</td></tr> <tr><td>100</td><td>70</td></tr> <tr><td>120</td><td>50</td></tr> <tr><td>140</td><td>30</td></tr> <tr><td>155</td><td>0</td></tr> </tbody> </table>	Ambient Temperature (°C)	Rated Power (%)	-55	100	-40	100	-20	100	0	100	20	100	40	100	60	100	70	100	80	90	100	70	120	50	140	30	155	0	
Ambient Temperature (°C)	Rated Power (%)																												
-55	100																												
-40	100																												
-20	100																												
0	100																												
20	100																												
40	100																												
60	100																												
70	100																												
80	90																												
100	70																												
120	50																												
140	30																												
155	0																												

Dimensions					
Type	L	W	H	I_1	I_2
PT0815	2.00 ±0.10	3.70 ±0.10	0.50 ±0.10	0.35 ±0.20	0.40 ±0.20



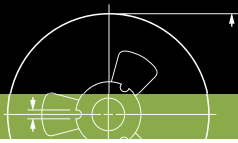
Chip Resistors Selection Charts

Thick film low ohmic low T. C. R. chip resistors, wide termination, 0815

Electrical characteristics						
Type	Power P_{70}	Operating Temp. range	Max. working voltage	Tolerance	Resistance range & T. C. R.	
PT0815	1/2W	-55°C to +155°C	$(P \times R)^{1/2}$	E24 $\pm 2\%$, $\pm 5\%$ E24/E96 $\pm 1\%$	25m Ω \leq R \leq 50m Ω	± 100 ppm/°C
	1W					

Environmental characteristics				
Performance test		Test method	Procedure	Requirements
Life		MIL-STD-202G-method 108A	1 000 hours at 70 $\pm 5^\circ\text{C}$ applied RCWV 1.5 hours on, 0.5 hours off, still air required	$\pm(1\% + 0.0005\Omega)$
High temperature exposure		MIL-STD-202G-method 108A	1 000 hours at maximum operating temperature depending on specification, unpowered	$\pm(1\% + 0.0005\Omega)$
Moisture resistance		MIL-STD-202G-method 106F	Each temperature / humidity cycle is defined as 8 hours (method 106F), 3 cycles / 24 hours for 10d with 25°C / 65°C 95% R.H	$\pm(0.5\% + 0.0005\Omega)$
Solderability	Wetting	J-STD-002B testB	Electrical test not required. Magnification 50X Lead-free solder bath at 245 $\pm 3^\circ\text{C}$ Dipping time: 3 ± 0.5 seconds	Well tinned ($\geq 95\%$ covered) No visible damage
	Resistance to soldering heat	MIL-STD-202G-method 210F	Lead-free solder, 260°C, 10 seconds immersion time	$\pm(0.5\% + 0.0005\Omega)$ No visible damage
Short time overload		MIL-R-55342D- para 4.7.5	PT standard power: 6.25 times of rated power for 5 seconds at room temperature PT high power: 5 times of rated power for 5 seconds at room temperature	$\pm(1\% + 0.0005\Omega)$ No visible damage



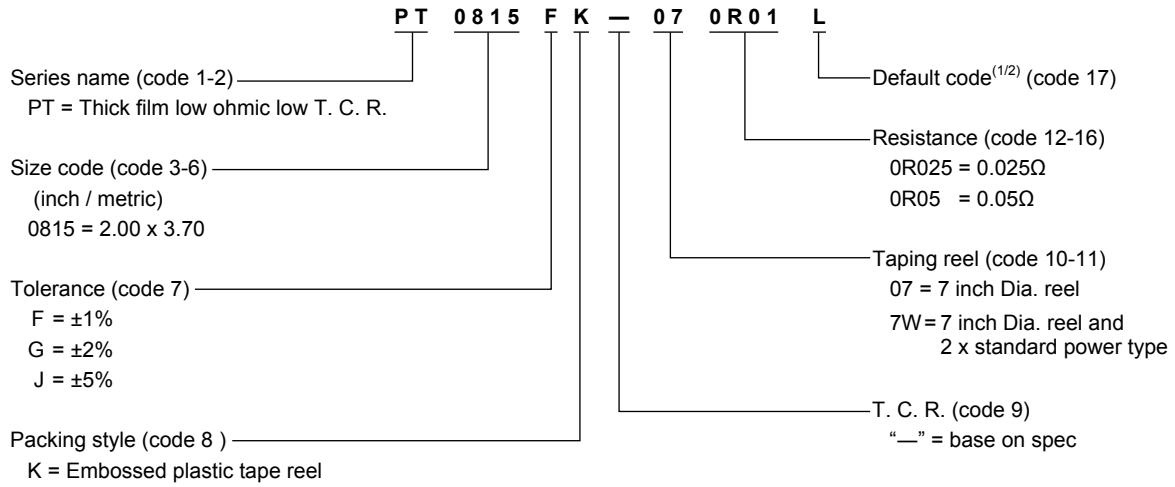


Chip Resistors Selection Charts

Thick film low ohmic low T. C. R. chip resistors, wide termination, 0815

Global part number - Preferred type

Ordering example: PT0815FK-070R01L



- Note:** 1. All of our RSMD products are RoHS compliant. "LFP" of the internal 2D reel label mentions "Lead Free Process"
 2. Letter L is system default code for ordering only
 3. PT series products are available by "Global part number" only



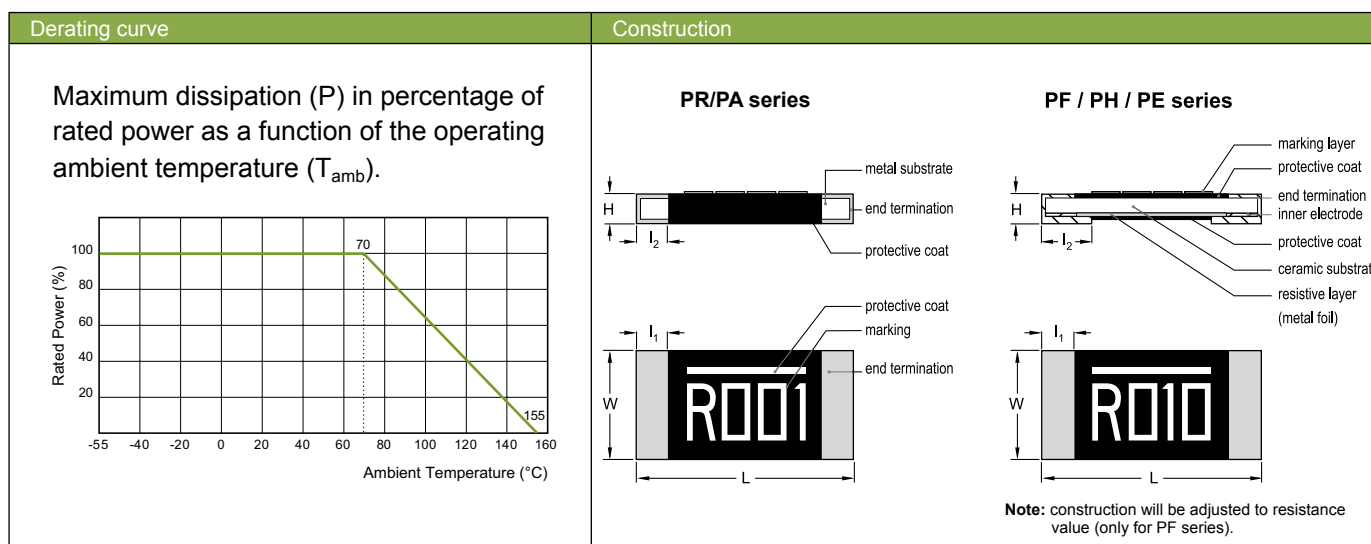
Chip Resistors Selection Charts

Current sensors - low T. C. R. chip resistors, 0603 to 4527



Features

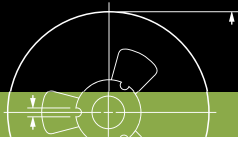
- Excellent T. C. R. compared to thick film low ohmic
- Precision current sensing control
- Excellent performance for current sensing applications
- Ultra low ohmic down to 0.0005Ω



Dimensions						
PR series						unit: mm
Type	Resistance range	L	W	H	l_1	l_2
PR1206	$1m\Omega \leq R \leq 6m\Omega$	3.20 ± 0.25	1.60 ± 0.25	0.64 ± 0.25	0.50 ± 0.25	0.50 ± 0.25
PR2010	$1m\Omega \leq R \leq 3m\Omega$	5.10 ± 0.25	2.54 ± 0.25	0.80 ± 0.25	1.30 ± 0.25	1.30 ± 0.25
	$4m\Omega \leq R \leq 100m\Omega$	5.10 ± 0.25	2.54 ± 0.25	0.64 ± 0.25	0.80 ± 0.25	0.80 ± 0.25
PR2512 ⁽¹⁾	$1m\Omega \leq R \leq 2m\Omega$	6.40 ± 0.20	3.20 ± 0.20	0.75 ± 0.15	1.20 ± 0.20	1.20 ± 0.20
	$3m\Omega \leq R \leq 5m\Omega$			0.55 ± 0.10	0.60 ± 0.20	0.60 ± 0.20
PR2512 ⁽²⁾	$0.5m\Omega \leq R \leq 4m\Omega$	6.25 ± 0.25	3.30 ± 0.25	0.78 ± 0.25	1.88 ± 0.25	1.88 ± 0.25
	$5m\Omega \leq R \leq 75m\Omega$			0.64 ± 0.25	1.11 ± 0.25	1.11 ± 0.25

PA series						unit: mm
Type	Resistance range	L	W	H	l_1	l_2
PA2512	$1m\Omega \leq R \leq 10m\Omega$	6.50 ± 0.20	3.20 ± 0.20	0.65 ± 0.15	0.90 ± 0.20	0.90 ± 0.20

Note: 1. Apply to ordering codes ending in "L"
 2. Apply to ordering codes ending in "Z"
 Please contact sales offices, distributors and representatives in your region before ordering



Chip Resistors Selection Charts

Current sensors - low T. C. R. chip resistors, 0603 to 4527

Dimensions

PF / PH / PE series

unit: mm

Type	Resistance range	L	W	H	l_1	l_2
PF / PE0603 ⁽²⁾	$5\text{m}\Omega \leq R < 100\text{m}\Omega$	1.60 ± 0.20	0.80 ± 0.20	0.60 ± 0.15	---	0.30 ± 0.15
PF / PH0805 ⁽¹⁾	$10\text{m}\Omega < R \leq 50\text{m}\Omega$	2.03 ± 0.25	1.27 ± 0.25	0.33 ± 0.12	0.38 ± 0.25	0.38 ± 0.25
PF / PH / PE0805 ⁽²⁾	4mΩ	2.00 ± 0.20	1.25 ± 0.20	0.60 ± 0.15	---	0.70 ± 0.15
	5mΩ					0.63 ± 0.15
	$6\text{m}\Omega \leq R \leq 7\text{m}\Omega$					0.55 ± 0.15
	$8\text{m}\Omega \leq R < 100\text{m}\Omega$					0.40 ± 0.15
PF / PH1206 ⁽¹⁾	$10\text{m}\Omega < R \leq 50\text{m}\Omega$	3.20 ± 0.25	1.60 ± 0.25	0.60 ± 0.25	0.50 ± 0.25	0.65 ± 0.25
PF / PH / PE1206 ⁽²⁾	3mΩ	3.20 ± 0.20	1.60 ± 0.20	0.60 ± 0.15	---	1.30 ± 0.20
	4mΩ					1.20 ± 0.20
	$5\text{m}\Omega \leq R \leq 8\text{m}\Omega$					1.15 ± 0.20
	$9\text{m}\Omega \leq R < 100\text{m}\Omega$					0.58 ± 0.20
PF2010 ⁽²⁾	$5\text{m}\Omega \leq R \leq 9\text{m}\Omega$	5.00 ± 0.20	2.50 ± 0.20	0.60 ± 0.15	---	1.50 ± 0.20
	$10\text{m}\Omega \leq R < 100\text{m}\Omega$					0.60 ± 0.20
PF2512 ⁽¹⁾	6mΩ	6.45 ± 0.25	3.25 ± 0.25	0.70 ± 0.25	0.75 ± 0.25	1.85 ± 0.25
	$7\text{m}\Omega \leq R \leq 15\text{m}\Omega$					1.55 ± 0.25
	$20\text{m}\Omega \leq R \leq 50\text{m}\Omega$ (1W)					0.75 ± 0.25
	$20\text{m}\Omega \leq R \leq 50\text{m}\Omega$ (2W)					1.30 ± 0.25
PF / PE2512 ⁽²⁾	1mΩ	6.30 ± 0.20	3.10 ± 0.20	0.60 ± 0.15	---	2.93 ± 0.20
	2mΩ					2.70 ± 0.20
	3mΩ					2.50 ± 0.20
	4mΩ					2.15 ± 0.20
	5mΩ					1.95 ± 0.20
	$6\text{m}\Omega \leq R \leq 8\text{m}\Omega$					1.90 ± 0.20
	$9\text{m}\Omega \leq R < 100\text{m}\Omega$					0.95 ± 0.20
	PF4527 ⁽²⁾					$6\text{m}\Omega \leq R < 1\Omega$

Note: 1. Apply to ordering codes ending in "L"
 2. Apply to ordering codes ending in "Z"
 3. For relevant physical dimensions, please refer to above construction outlines.
 Please contact with sales offices, distributors and representatives in your region before ordering



Chip Resistors Selection Charts

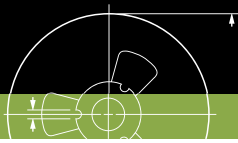
Current sensors - low T. C. R. chip resistors, 0603 to 2512

Electrical characteristics									
Type	Technology	Size	Power P70	Operating Temp. range	Max. working voltage	Tolerance	Resistance range	Min. T. C. R.	
PE	Metal Foil	0603	1/2W	-55°C to 155°C	(PxR) ^{1/2}	±1%, ±2%, ±5%	5mΩ ≤ R < 100mΩ	±75 ppm/°C	
		0805	1/2W				4mΩ ≤ R < 100mΩ		
		1206	1W				3mΩ ≤ R < 100mΩ		
		2512	2W				1mΩ ≤ R < 100mΩ		
PF	Metal Foil	0603	1/2W	-55°C to 155°C	(PxR) ^{1/2}	±1%, ±2%, ±5%	5mΩ ≤ R < 100mΩ	±75 ppm/°C	
			1/8W				4mΩ ≤ R < 100mΩ		
			1/4W						
			1/3W						
		0805	1/2W				3mΩ ≤ R < 100mΩ		
			1/4W						
		1206	1/2W				5mΩ ≤ R < 100mΩ		
			1W						
		2512	1W				1mΩ ≤ R < 100mΩ		
			2W						
3W									
4527	3W	6mΩ ≤ R < 1Ω							
PH	Metal Foil	0805	4/5W	-55°C to 155°C	(PxR) ^{1/2}	±1%, ±2%, ±5%	4mΩ ≤ R ≤ 50mΩ	±75 ppm/°C	
		1206	1W						
PR	Metal Plate	1206	1/4W	-55°C to 155°C	(PxR) ^{1/2}	±1%, ±2%, ±5%	1mΩ ≤ R ≤ 6mΩ	±50 ppm/°C	
			1/2W						
			1W						
		2010	1/2W			±1%, ±2%, ±5%	1mΩ ≤ R < 100mΩ		
			1W						
		2512	1W			±0.5%	7mΩ ≤ R ≤ 75mΩ		0.5mΩ ≤ R ≤ 2mΩ ±200 ppm/°C 3mΩ ≤ R ≤ 5mΩ ±100 ppm/°C
						±1%, ±2%, ±5%	0.5mΩ ≤ R ≤ 5mΩ		
			2W			±0.5%	7mΩ ≤ R ≤ 75mΩ		±50 ppm/°C
						±1%, ±2%, ±5%	0.5mΩ ≤ R ≤ 5mΩ		0.5mΩ ≤ R ≤ 2mΩ ±200 ppm/°C 3mΩ ≤ R ≤ 5mΩ ±100 ppm/°C
						±1%, ±2%, ±5%	0.5mΩ ≤ R ≤ 10mΩ		±50 ppm/°C
PA	Metal Plate	2512	1W	-55°C to 155°C	(PxR) ^{1/2}	±1%, ±5%	1mΩ ≤ R ≤ 10mΩ	±100 ppm/°C	
			2W						
			3W						

Note: Please contact with sales offices, distributors and representatives in your region before ordering

Environmental characteristics			
Performance test	Test method	Procedure	Requirements
Life	MIL-STD-202G-method 108A	1 000 hours at 70 ±5°C applied RCWV 1.5 hours on, 0.5 hours off, still air required	±(1% +0.0005Ω)
High temperature exposure	MIL-STD-202G-method 108A	1 000 hours at maximum operating temperature depending on specification, unpowered	±(1% +0.0005Ω)
Moisture resistance	MIL-STD-202G-method 106F	Each temperature / humidity cycle is defined as 8 hours (method 106F), 3 cycles / 24 hours for 10d with 25°C / 65°C 95% R.H	±(0.5% +0.0005Ω)
Thermal shock	MIL-STD-202G-method 107G	LCT / UCT, number of cycles required is 300 Maximum transfer time is 20 seconds	±(0.5% +0.0005Ω)
Solderability	Wetting	J-STD-002B testB Electrical test not required. Magnification 50X Lead-free solder bath at 245 ±3°C Dipping time: 3 ±0.5 seconds	Well tinned (≥95% covered)
	Resistance to soldering heat	MIL-STD-202G-method 210F Lead-free solder, 260°C, 10 seconds immersion time	±(0.5% +0.0005Ω) No visible damage
Short time overload	MIL-R-55342D-para 4.7.5	5 times of rated power for 5 seconds at room temperature	±(0.5% +0.0005Ω) No visible damage





Chip Resistors Selection Charts

Current sensors - low T. C. R. chip resistors, 0603 to 2512

Global part number - Preferred type

Ordering example: PF2512FKF070R01L

<p>Series name (code 1-2) ——— PF</p> <p>PR/PA/PF/PH/PE = Current sensors - low T. C. R.</p> <p>Size code (code 3-6) ——— 2512</p> <p>(inch / metric)</p> <p>0603 = 1.6 x 0.8</p> <p>0805 = 2.0 x 1.25</p> <p>1206 = 3.2 x 1.6</p> <p>2010 = 5.0 x 2.5</p> <p>2512 = 6.35 x 3.2</p> <p>4527 = 11.0 x 7.0</p> <p>Tolerance (code 7) ——— F</p> <p>F = ±1%</p> <p>G = ±2%</p> <p>J = ±5%</p> <p>Packing style (code 8) ——— K</p> <p>R = Paper tape reel</p> <p>K = Embossed plastic tape reel</p>	<p>Default code^(1/2) (code 17)</p> <p>L / Z = Default code</p> <p>Resistance (code 12-16)</p> <p>0R01 = 0.01Ω</p> <p>0R1 = 0.1Ω</p> <p>0R2 = 0.2Ω</p> <p>Taping reel (code 10-11)</p> <p>07 = 7 inch Dia. reel</p> <p>7W = 7 inch Dia. reel</p> <p>2 x standard power type</p> <p>7T = 7 inch Dia. reel</p> <p>3 x standard power type</p> <p>47 = 7 inch Dia. reel</p> <p>4 x standard power type</p> <p>57 = 7 inch Dia. reel</p> <p>5 x standard power type</p> <p>T. C. R. (code 9)</p> <p>E = ±50 ppm/°C</p> <p>M = ±75 ppm/°C</p> <p>F = ±100 ppm/°C</p> <p>G = ±200 ppm/°C</p>
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Note: 1. All of our RSMD products are RoHS compliant. "LFP" of the internal 2D reel label mentions "Lead Free Process"
 2. PH series products are available by "Global part number" only

Phycomp worldwide - Traditional type									
Current Sensor - Low T. C. R. / PR series									
Size: inch (mm)	2010 (5025)				2512 (6432)				
Power	1/2 W		1 W		1 W		2 W		
Tolerance	+5%	+1%	+5%	+1%	+5%	+1%	+5%	+1%	
Packing	blister tape				blister tape				
Quantity	4 000	2322 760 63..0L	2322 761 11..0L	2322 760 65..0L	2322 761 13..0L	2322 762 94..0L	2322 763 95..0L	2322 762 10..0L	2322 763 10..0L

For ordering rules: See page 14 for E24 / E96 values and the last 4 or 3 digits of the 12NC catalogue number

Phycomp worldwide - Traditional type					
Current Sensor - Low T. C. R. / PF series					
Size: inch (mm)	2512 (6432)				
Power	1 W		2 W		
Tolerance	+5%	+1%	+5%	+1%	
Packing	blister tape				
Quantity	4 000	2322 764 96..L	2322 764 97..L	2322 764 10..L	2322 764 30..L

For ordering rules: See page 14 for E24 / E96 values and the last 4 or 3 digits of the 12NC catalogue number

Phycomp CTC ordering code - Traditional type - North America

Regional code for ordering Phycomp branded products. Please see page 13 for details.



Chip Resistors Selection Charts

Current sensors - low T. C. R. chip resistors, wide termination, 0612 to 0830



Features

- Excellent T. C. R. compared to thick film low ohmic
- Precision current sensing control
- Excellent performance for current sensing applications
- Low ohmic and high power

Derating curve	Construction																												
<p>Maximum dissipation (P) in percentage of rated power as a function of the operating ambient temperature (T_{amb}).</p> <table border="1"> <caption>Derating Curve Data</caption> <thead> <tr> <th>Ambient Temperature (°C)</th> <th>Rated Power (%)</th> </tr> </thead> <tbody> <tr><td>-55</td><td>100</td></tr> <tr><td>-40</td><td>100</td></tr> <tr><td>-20</td><td>100</td></tr> <tr><td>0</td><td>100</td></tr> <tr><td>20</td><td>100</td></tr> <tr><td>40</td><td>100</td></tr> <tr><td>60</td><td>100</td></tr> <tr><td>70</td><td>100</td></tr> <tr><td>80</td><td>90</td></tr> <tr><td>100</td><td>60</td></tr> <tr><td>120</td><td>30</td></tr> <tr><td>140</td><td>0</td></tr> <tr><td>155</td><td>0</td></tr> </tbody> </table>	Ambient Temperature (°C)	Rated Power (%)	-55	100	-40	100	-20	100	0	100	20	100	40	100	60	100	70	100	80	90	100	60	120	30	140	0	155	0	
Ambient Temperature (°C)	Rated Power (%)																												
-55	100																												
-40	100																												
-20	100																												
0	100																												
20	100																												
40	100																												
60	100																												
70	100																												
80	90																												
100	60																												
120	30																												
140	0																												
155	0																												

Dimensions						
Type	Resistance range	L	W	H	l_1	l_2
PF0612 ⁽²⁾	$1\text{m}\Omega \leq R \leq 50\text{m}\Omega$	1.60 ± 0.20	3.20 ± 0.20	0.60 ± 0.15	---	0.60 ± 0.20
PF0815 ⁽²⁾	$1\text{m}\Omega \leq R \leq 20\text{m}\Omega$	2.15 ± 0.20	3.75 ± 0.20	0.60 ± 0.125	---	0.60 ± 0.20
PF0815 ⁽¹⁾	10 / 15 / 20mΩ	2.15 ± 0.20	3.75 ± 0.25	0.65 ± 0.25	0.65 ± 0.25	0.70 ± 0.25
PF0830 ⁽²⁾	$1\text{m}\Omega \leq R \leq 9\text{m}\Omega$	2.5 ± 0.20	7.50 ± 0.30	0.60 ± 0.15	---	0.60 ± 0.15
	$10\text{m}\Omega \leq R \leq 100\text{m}\Omega$	2.5 ± 0.20	7.50 ± 0.30	0.60 ± 0.15	---	0.58 ± 0.15

Note: 1. Apply to ordering codes ending in "L"
 2. Apply to ordering codes ending in "Z"
 Please contact sales offices, distributors and representatives in your region before ordering



Chip Resistors Selection Charts

Current sensors - low T. C. R. chip resistors, wide termination, 0612 to 0830

Electrical characteristics							
Type	Technology	Size	Power P ₇₀	Operating Temp. range	Max. working voltage	Tolerance	Resistance range & T. C. R.
PF	Metal Foil wide termination	0612	1W	-55°C to 155°C	(PxR) ^{1/2}	±1%, ±2%, ±5%	1mΩ ≤ R ≤ 50mΩ
		0815	1W				1mΩ ≤ R ≤ 20mΩ
		0830	2W				1mΩ ≤ R ≤ 100mΩ
							±75 ppm/°C

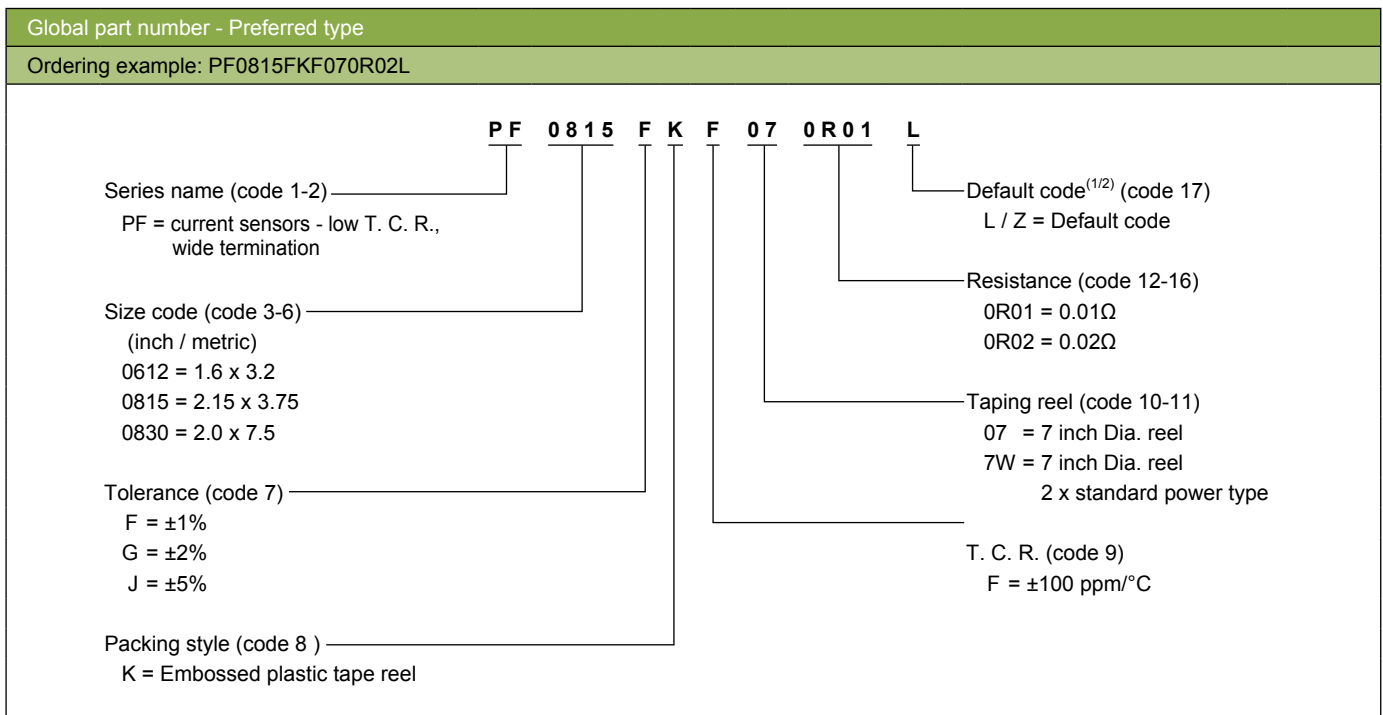
Note: Please contact with sales offices, distributors and representatives in your region before ordering

Environmental characteristics			
Performance test	Test method	Procedure	Requirements
Life	MIL-STD-202G-method 108A	1 000 hours at 70 ±5°C applied RCWV 1.5 hours on, 0.5 hours off, still air required	±(1% +0.0005Ω)
High temperature exposure	MIL-STD-202G-method 108A	1 000 hours at maximum operating temperature depending on specification, unpowered	±(1% +0.0005Ω)
Moisture resistance	MIL-STD-202G-method 106F	Each temperature / humidity cycle is defined as 8 hours (method 106F), 3 cycles / 24 hours for 10d with 25°C / 65°C 95% R.H	±(0.5% +0.0005Ω)
Solderability	Wetting	J-STD-002B testB Electrical test not required. Magnification 50X Lead-free solder bath at 245 ±3°C Dipping time: 3 ±0.5 seconds	Well tinned (≥95% covered)
	Resistance to soldering heat	MIL-STD-202G-method 210F Lead-free solder, 260°C, 10 seconds immersion time	±(0.5% +0.0005Ω) No visible damage
Short time overload	MIL-R-55342D-para 4.7.5	5 times of rated power for 5 seconds at room temperature	±(0.5% +0.0005Ω) No visible damage

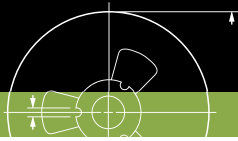


Chip Resistors Selection Charts

Current sensors - low T. C. R. chip resistors, wide termination, 0612 to 0830

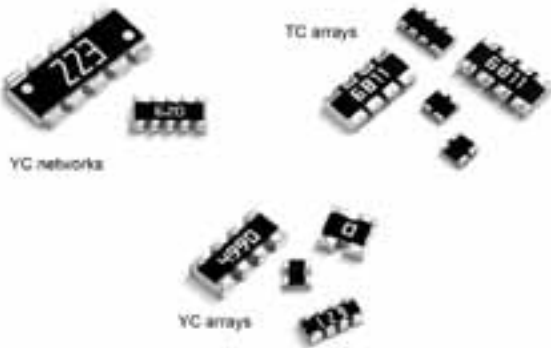


Note: 1. All of our RSMD products are RoHS compliant. "LFP" of the internal 2D reel label mentions "Lead Free Process"
 2. PF series wide termination type products are available by "Global part number" only



Chip Resistors Selection Charts

Thick film array / network chip resistors

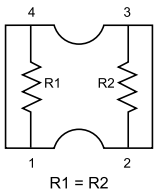


Features

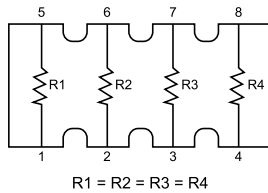
- Integrated discrete chip resistors from 2 to 8 pcs
- More efficient in pick & place application
- Low assembly costs
- Reduced size of final equipment
- Higher component and equipment reliability

Schematics

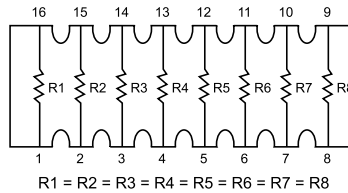
YC102/122/162



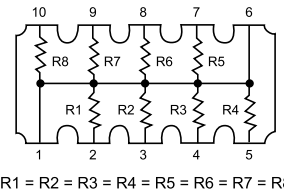
YC104/124/164/324



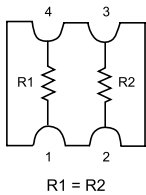
YC248



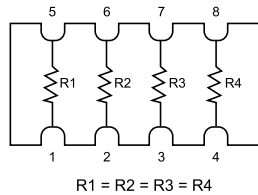
YC358 (L-Type)



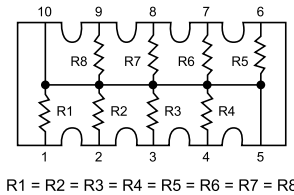
TC122



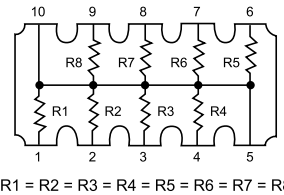
TC124/164



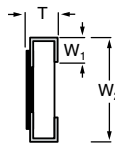
YC158



YC358 (T-Type)

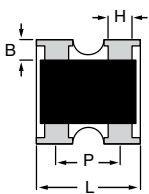


Dimensions

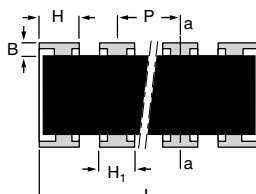


Side view for all types

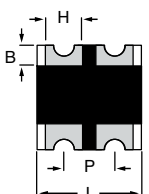
YC 102/122/162



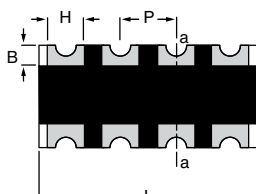
**YC 104/124/164/324
158/358/248**



TC 122



TC 124/164



unit: mm

Type	H / H ₁	B	P	L	T	W ₁	W ₂
YC102	H: 0.35 ±0.10	0.20 ±0.10	0.50 ±0.05	0.80 ±0.10	0.35 ±0.10	0.15 ±0.10	0.60 ±0.10
YC104	H: 0.20 ±0.10	0.15 ±0.05	0.40 (Typical)	1.40 ±0.10	0.35 ±0.10	0.15 ±0.10	0.60 ±0.10
YC122	H: 0.21 +0.10/-0.05	0.20 ±0.10	0.67 ±0.05	1.00 ±0.10	0.30 ±0.10	0.25 ±0.10	1.00 ±0.10
YC162	H: 0.30 ±0.10	0.30 ±0.10	0.80 ±0.05	1.60 ±0.10	0.40 ±0.10	0.30 ±0.10	1.60 ±0.10
YC124	H: 0.45 ±0.05 H ₁ : 0.30 ±0.05	0.20 ±0.15	0.50 ±0.05	2.00 ±0.10	0.45 ±0.10	0.30 ±0.15	1.00 ±0.10
YC164	H: 0.65 ±0.05 H ₁ : 0.50 ±0.15	0.30 ±0.15	0.80 ±0.05	3.20 ±0.15	0.60 ±0.10	0.30 ±0.15	1.60 ±0.15
YC324	H: 1.10 ±0.15 H ₁ : 0.90 ±0.15	0.50 ±0.20	1.27 ±0.05	5.08 ±0.20	0.60 ±0.10	0.50 ±0.15	3.20 ±0.20
YC248	H: 0.45 ±0.05 H ₁ : 0.30 ±0.05	0.30 ±0.15	0.50 ±0.05	4.00 ±0.20	0.45 ±0.10	0.40 ±0.15	1.60 ±0.15
TC122	H: 0.30 ±0.05	0.25 ±0.15	0.50 ±0.05	1.00 ±0.10	0.30 ±0.10	0.25 ±0.15	1.00 ±0.10
TC124	H: 0.30 ±0.10	0.20 ±0.10	0.50 ±0.05	2.00 ±0.10	0.40 ±0.10	0.25 ±0.10	1.00 ±0.10
TC164	H: 0.60 ±0.15	0.30 ±0.15	0.80 ±0.05	3.20 ±0.15	0.60 ±0.10	0.30 ±0.15	1.60 ±0.15
YC158	H: 0.45 ±0.05	0.30 ±0.15	0.64 ±0.05	3.20 ±0.20	0.60 ±0.10	0.35 ±0.15	1.60 ±0.15
YC358	H: 1.10 ±0.15 H ₁ : 0.90 ±0.15	0.50 ±0.15	1.27 ±0.05	6.40 ±0.20	0.60 ±0.10	0.50 ±0.15	3.20 ±0.20



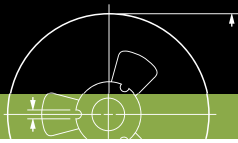
Chip Resistors Selection Charts

Thick film array / network chip resistors

Electrical characteristics											
Type	Power P ₇₀	Operating Temp. range	MWV	RCOV	DWV	Resistance range & tolerance		T. C. R.		Jumper criteria (unit: A)	
YC102	1/32W	-55°C to +125°C	15V	30V	30V	E24 ±5% E24/E96 ±1% Jumper	10Ω ≤ R ≤ 1MΩ 10Ω ≤ R ≤ 1MΩ < 0.05Ω	±200 ppm/°C		Rated current	0.5
YC104	1/32W	-55°C to +125°C	12.5V	25V	25V	E24 ±5% E24/E96 ±1% Jumper	10Ω ≤ R ≤ 1MΩ 10Ω ≤ R ≤ 1MΩ < 0.05Ω			Max. current	1.0
YC122	1/16W	-55°C to +125°C	50V	100V	100V	E24 ±5% E24/E96 ±1% Jumper	1Ω ≤ R ≤ 1MΩ 10Ω ≤ R ≤ 1MΩ < 0.05Ω			Rated current	0.5
YC162	1/16W	-55°C to +125°C	50V	100V	100V	E24 ±5% Jumper	10Ω ≤ R ≤ 1MΩ < 0.05Ω			Max. current	1.0
YC124	1/16W	-55°C to +155°C	25V	50V	100V	E24 ±5% E24/E96 ±1% Jumper	1Ω ≤ R ≤ 1MΩ 1Ω ≤ R ≤ 1MΩ < 0.05Ω	1Ω ≤ R ≤ 10MΩ 10Ω ≤ R ≤ 1MΩ	±250 ppm/°C ±200 ppm/°C	Rated current	1.0
YC164	1/16W	-55°C to +155°C	50V	100V	100V	E24 ±5% E24/E96 ±1% Jumper	1Ω ≤ R ≤ 1MΩ 1Ω ≤ R ≤ 1MΩ < 0.05Ω			Max. current	2.0
YC324	1/8W	-55°C to +155°C	200V	500V	500V	E24 ±5% E24/E96 ±1%	10Ω ≤ R ≤ 1MΩ 10Ω ≤ R ≤ 1MΩ			--	--
YC248	1/16W	-55°C to +155°C	50V	100V	100V	E24 ±5% E24/E96 ±1% Jumper	10Ω ≤ R ≤ 1MΩ 10Ω ≤ R ≤ 1MΩ < 0.05Ω			Rated current	2.0
TC122	1/16W	-55°C to +125°C	50V	100V	100V	E24 ±5% E24/E96 ±1% Jumper	10Ω ≤ R ≤ 1MΩ 10Ω ≤ R ≤ 1MΩ < 0.05Ω	±200 ppm/°C		Max. current	10.0
TC124	1/16W	-55°C to +125°C	50V	100V	100V	E24 ±5% E24/E96 ±1% Jumper	10Ω ≤ R ≤ 1MΩ 10Ω ≤ R ≤ 1MΩ < 0.05Ω			Rated current	1.0
TC164	1/16W	-55°C to +155°C	50V	100V	100V	E24 ±5% E24/E96 ±1% Jumper	10Ω ≤ R ≤ 1MΩ 10Ω ≤ R ≤ 1MΩ < 0.05Ω			Max. current	1.5
YC158	1/16W	-55°C to +155°C	25V	50V	50V	E24 ±5%	10Ω ≤ R ≤ 100KΩ				
YC358	1/16W	-55°C to +155°C	50V	100V	100V	E24 ±5%	10Ω ≤ R ≤ 330KΩ			--	--

Environmental characteristics				
Performance test		Test method	Procedure	Requirements
Life		MIL-STD-202G-method 108A	1 000 hours at 70 ±5°C applied RCWV 1.5 hours on, 0.5 hours off, still air required	±(2% +0.05Ω) < 100mΩ for jumper
High temperature exposure		MIL-STD-202G-method 108A	1 000 hours at maximum operating temperature depending on specification, unpowered	±(1% +0.05Ω) < 50mΩ for jumper
Moisture resistance		MIL-STD-202G-method 106F	Each temperature / humidity cycle is defined as 8 hours (method 106F), 3 cycles / 24 hours for 10d with 25°C / 65°C 95% R.H	±(2% +0.05Ω) < 100mΩ for jumper
Thermal shock		MIL-STD-202G-method 107G	LCT / UCT, number of cycles required is 300 Maximum transfer time is 20 seconds	±(0.5% +0.05Ω) for 10K to 10M ±(1% +0.05Ω) for others < 50mΩ for jumper
Solderability	Wetting	J-STD-002B testB	Electrical test not required. Magnification 50X Lead-free solder bath at 245 ±3°C Dipping time: 3 ±0.5 seconds	Well tinned (≥95% covered)
	Resistance to soldering heat	MIL-STD-202G-method 210F	Lead-free solder, 260°C, 10 seconds immersion time	±(1% +0.05Ω) < 50mΩ for jumper No visible damage
Short time overload		MIL-R-55342D-para 4.7.5	2.5 times RCWV or maximum overload voltage which- ever is less for 5 seconds at room temperature	±(2% +0.05Ω) < 50mΩ for jumper No visible damage



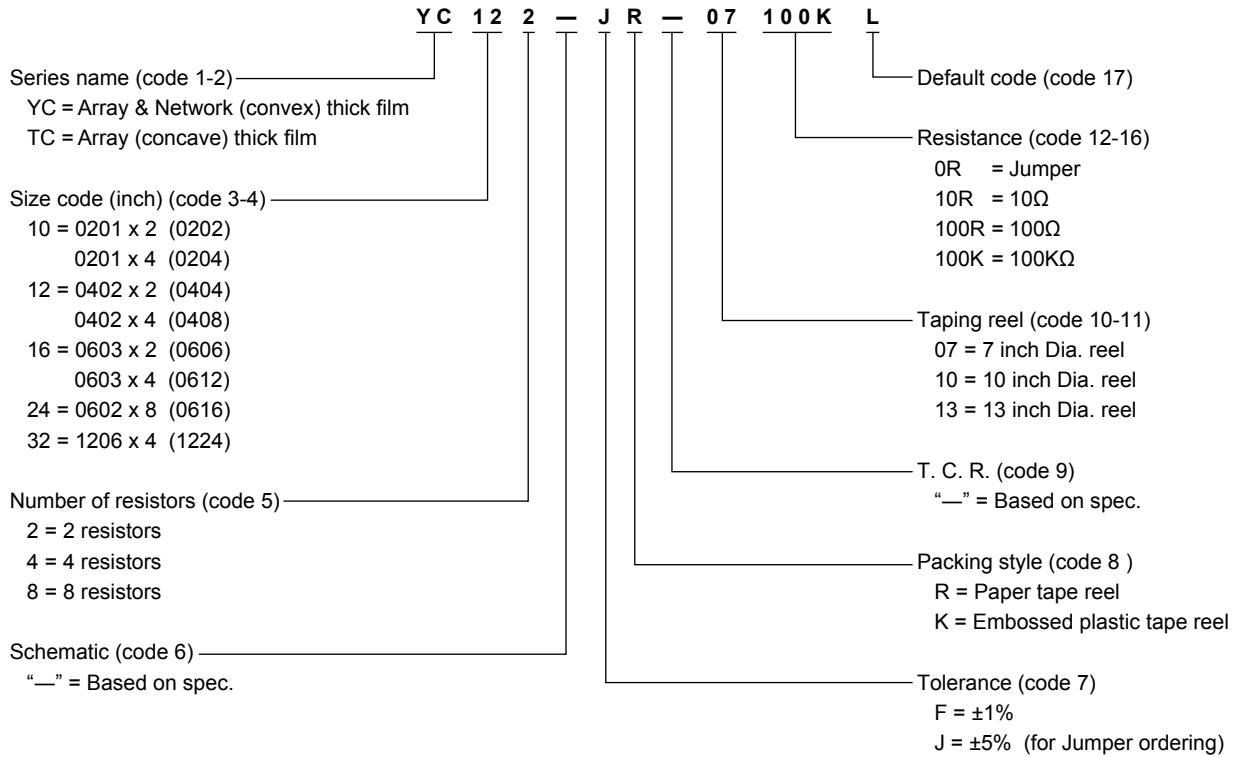


Chip Resistors Selection Charts

Arrays, convex / concave

Global part number - Arrays

Ordering example: YC122-JR-07100KL



Note: 1. All of our RSMD products are RoHS compliant. "LFP" of the internal 2D reel label mentions "Lead Free Process"
 2. Letter L is system default code for ordering only

Phycomp worldwide - Traditional type

Array thick film chip resistors

Size: inch / mm	2 X 0402 / 1 X 1		4 X 0402 / 2 X 1		8 X 0602 / 4.0 X 1.6		4 X 0603 / 3.2 X 1.3				4 X 1206 / 5.2 X 3.1
Power	1/16 W		1/16 W		1/16 W		1/16 W				1/8 W
Tolerance	+5%	+1%	+5%	+1%	+5%	+1%	+5%	+1%	+5%	+1%	+5%
Type	R-array / R-network (convex)	R-array / R-network (convex)	R-array / R-network (convex)	R-array / R-network (convex)	R-array / R-network (convex)	R-array / R-network (convex)	R-array / R-network (convex)	R-array / R-network (convex)	R-array / R-network (convex)	R-array / R-network (convex)	R-array / R-network (convex)
Resistance	E24	E24 / E96	E24	E24 / E96	E24	E24 / E96	E24	E24 / E96	E24	E24/E96	E24
Packing	paper tape		paper tape		paper tape		paper tape				blister tape
Quantity 4 000	---	---	---	---	---	---	---	---	---	---	2350 039 10...L
5 000	---	---	---	---	2350 053 10...L	2350 043 1...L	2350 035 10...L	2350 025 1...L	2350 034 10...L	2350 024 1...L	---
10 000	2350 013 11...L	2350 013 2...L	2350 033 11...L	2350 023 2...L	---	---	---	---	---	---	---
Jumper 5 000	---	---	---	---	2350 053 91001L	---	2350 035 91001L	---	2350 034 91001L	---	---
10 000	2350 013 91001L	---	2350 033 91001L	---	---	---	---	---	---	---	---

For ordering rules: See page 14 for E24 / E96 values and the last 4 or 3 digits of the 12NC catalogue number

Phycomp CTC ordering code - Traditional type - North America

Regional code for ordering Phycomp branded products. Please see page 13 for details.



Chip Resistors Selection Charts

Networks, T-type / L-type

Global part number - Networks

Ordering example: YC158TJR-07100KL

Y C 1 5 8 T J R - 0 7 1 0 0 K L

Series name (code 1-2) ———— Y C
YC = Array & Network (convex) thick film

Size code (inch) (code 3-4)
15 = 10Pin/8R (0612)
35 = 10Pin/8R (1225)

Number of resistors (code 5) ———— 8
8 = 8 resistors

Schematic (code 6) ———— T J R
L = L-type (for YC358)
T = T-type (for YC158/358)

Default code (code 17) ———— L

Resistance (code 12-16)
0R = Jumper
10R = 10Ω
100R = 100Ω
100K = 100KΩ

Taping reel (code 10-11)
07 = 7 inch Dia. reel
13 = 13 inch Dia. reel

T. C. R. (code 9)
"—" = Based on spec.

Packing style (code 8)
R = Paper tape reel
K = Embossed plastic tape reel

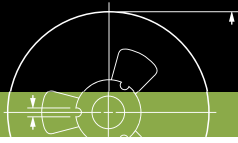
Tolerance (code 7)
F = ±1%
J = ±5%

Note: 1. All of our RSMD products are RoHS compliant. "LFP" of the internal 2D reel label mentions "Lead Free Process"
2. Letter L is system default code for ordering only

Phycomp worldwide - Traditional type			
Network thick film chip resistors			
Size: inch (mm)	0612 (1632)		1225 (3264)
Power	1/16 W		1/16 W
Tolerance	+5%		+5%
Type	T-type 10 Pin / 8R PIN 5 and PIN 10 no resistance	T-type 10 Pin / 8R PIN 5 and PIN 10 no resistance	L-type 10 Pin / 8R PIN 1 and PIN 6 no resistance
Resistance	E24		E24
Packing	paper tape		blister tape
Quantity	4 000	---	2350 201 10...L
	5 000	2350 230 10...L	---

For ordering rules: See page 14 for E24 / E96 values and the last 4 or 3 digits of the 12NC catalogue number

Phycomp CTC ordering code - Traditional type - North America
Regional code for ordering Phycomp branded products. Please see page 13 for details.



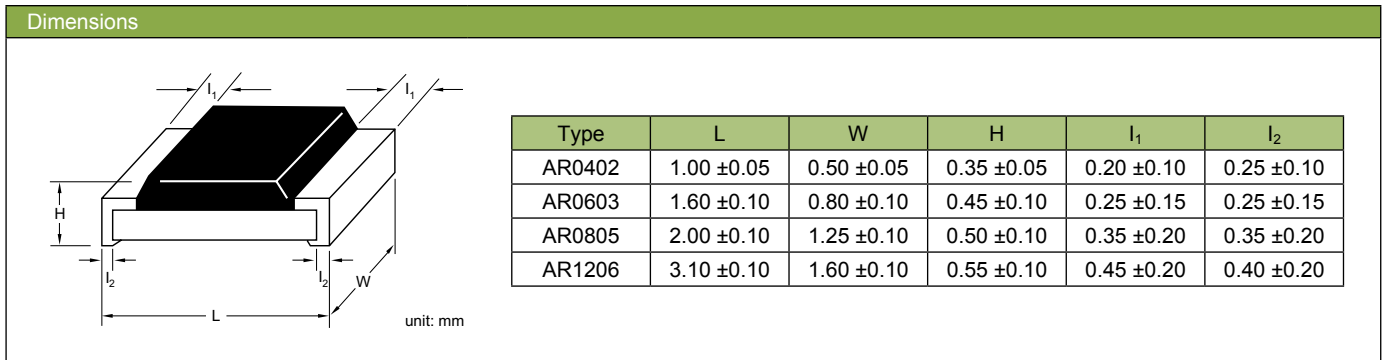
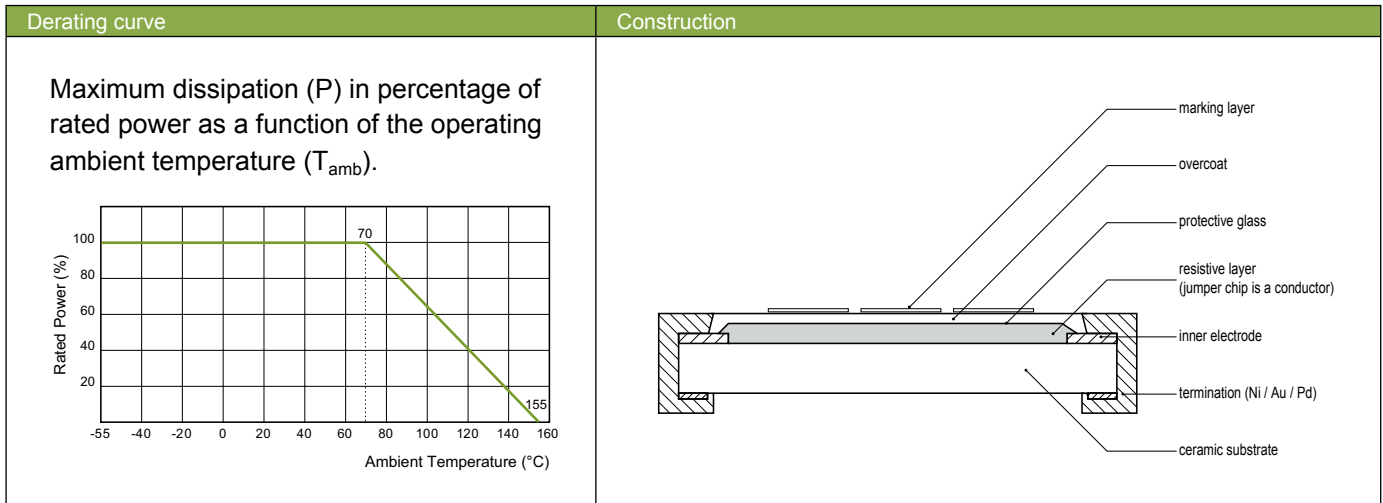
Chip Resistors Selection Charts

NiAu termination chip resistors, 0402 to 1206



Features

- New NiAu terminations provide special application for hybrid board gluing
- Competitive with AgPd terminations
- Special use in high temperature environment
- Higher component and equipment reliability



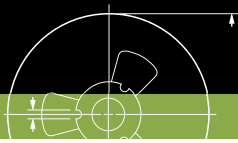
Chip Resistors Selection Charts

NiAu termination chip resistors, 0402 to 1206

Electrical characteristics															
Type	Power P_{70}	Operating Temp. range	MWV	RCOV	DWV	Resistance range & tolerance		T. C. R. (ppm/°C)		Jumper criteria (unit: A)					
AR0402	1/16W	-55°C to +155°C	50V	100V	100V	E24 ±5% E24/E96 ±1% Jumper	$1\Omega \leq R \leq 10M\Omega$ $1\Omega \leq R \leq 10M\Omega$ $< 0.05\Omega$	$10\Omega < R \leq 10M\Omega$ $1\Omega \leq R \leq 10\Omega$	±100 ±200	Rated current	1.0				
													Max. current	2.0	
AR0603	1/10W	-55°C to +155°C	50V	100V	100V									Rated current	1.0
														Max. current	2.0
AR0805	1/8W	-55°C to +155°C	150V	300V	300V					Rated current	2.0				
										Max. current	5.0				
AR1206	1/4W	-55°C to +155°C	200V	500V	500V					Rated current	2.0				
										Max. current	10.0				

Environmental characteristics				
Performance test		Test method	Procedure	Requirements
Life		MIL-STD-202G-method 108A	1 000 hours at 70 ±5°C applied RCWV 1.5 hours on, 0.5 hours off, still air required	±(2% +0.05Ω) < 100mΩ for jumper
High temperature exposure		MIL-STD-202G-method 108A	1 000 hours at maximum operating temperature depending on specification, unpowered	±(1% +0.05Ω) < 50mΩ for jumper
Moisture resistance		MIL-STD-202G-method 106F	Each temperature / humidity cycle is defined as 8 hours (method 106F), 3 cycles / 24 hours for 10d with 25°C / 65°C 95% R.H	±(2% +0.05Ω) < 100mΩ for jumper
Thermal shock		MIL-STD-202G-method 107G	LCT / UCT, number of cycles required is 300 Maximum transfer time is 20 seconds	±(0.5% +0.05Ω) for 10K to 10M ±(1% +0.05Ω) for others < 50mΩ for jumper
Solderability	Wetting	J-STD-002B testB	Electrical test not required. Magnification 50X Lead-free solder bath at 245 ±3°C Dipping time: 3 ±0.5 seconds	Well tinned (≥95% covered) No visible damage
	Resistance to soldering heat	MIL-STD-202G- method 210F	Lead-free solder, 260°C, 10 seconds immersion time	±(1% +0.05Ω) < 50mΩ for jumper No visible damage
Short time overload		MIL-R-55342D- para 4.7.5	2.5 times RCWV or maximum overload voltage which- ever is less for 5 seconds at room temperature	±(2% +0.05Ω) < 50mΩ for jumper No visible damage



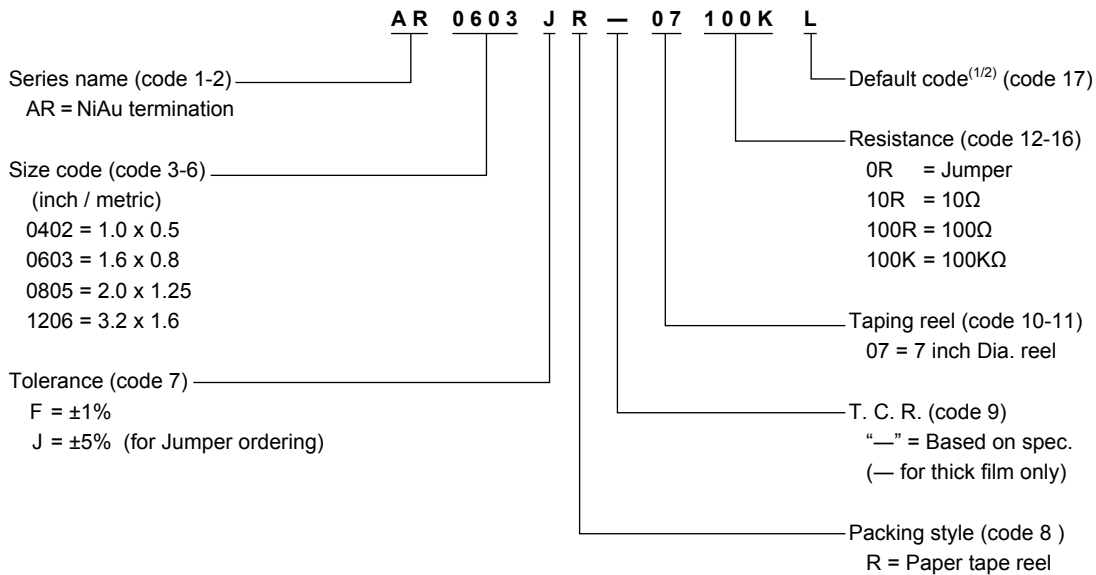


Chip Resistors Selection Charts

NiAu termination chip resistors, 0402 to 1206

Global part number - Preferred type for ordering Yageo / Phycomp branded products

Ordering example: AR0603JR-07100KL



Note: 1. All of our RSMD products are RoHS compliant. "LFP" of the internal 2D reel label mentions "Lead Free Process"
 2. Letter L is system default code for ordering only

Phycomp worldwide - Traditional type

Chip resistors with Ni/Au terminations

Size: inch (mm)	0402 (1005)		0603 (1608)		0805 (2012)		1206 (3216)	
Power	1/16 W		1/10 W		1/8 W		1/4 W	
Tolerance	+5%	+1%	+5%	+1%	+5%	+1%	+5%	+1%
Resistance	E24	E24 / E96	E24	E24 / E96	E24	E24 / E96	E24	E24 / E96
Packing	paper tape		paper tape		paper tape		paper tape	
Quantity 5 000	---	---	2322 702 11...L	2322 704 1...L	2322 730 11...	2322 734 1...L	2322 711 11...L	2322 729 1...L
10 000	2322 705 12...L	2322 706 2....	---	---	---	---	---	---
Jumper 5 000	---	---	2322 702 19001L	---	2322 730 19001L	---	2322 711 19001L	---
10 000	2322 705 19001 L	---	---	---	---	---	---	---

For ordering rules: See page 14 for E24 / E96 values and the last 4 or 3 digits of the 12NC catalogue number

Phycomp CTC ordering code - Traditional type - North America

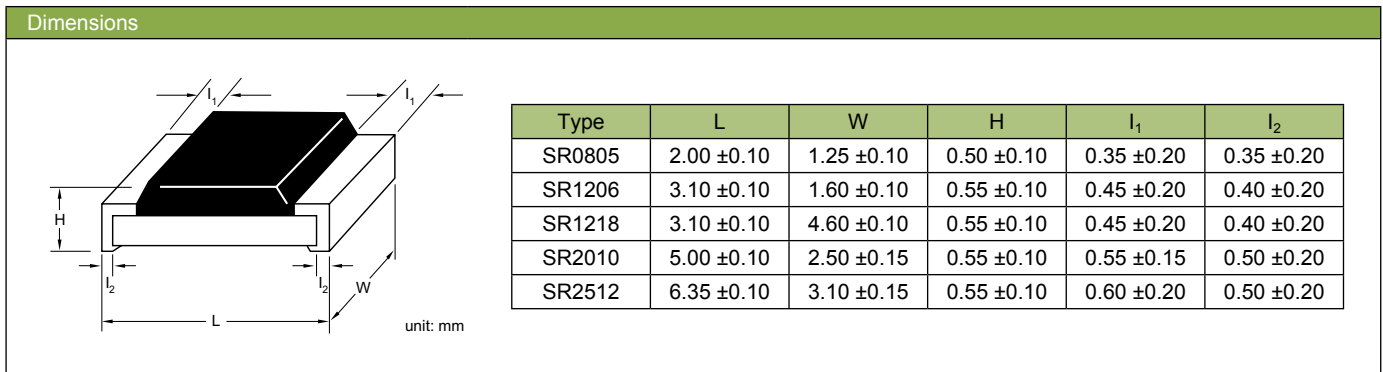
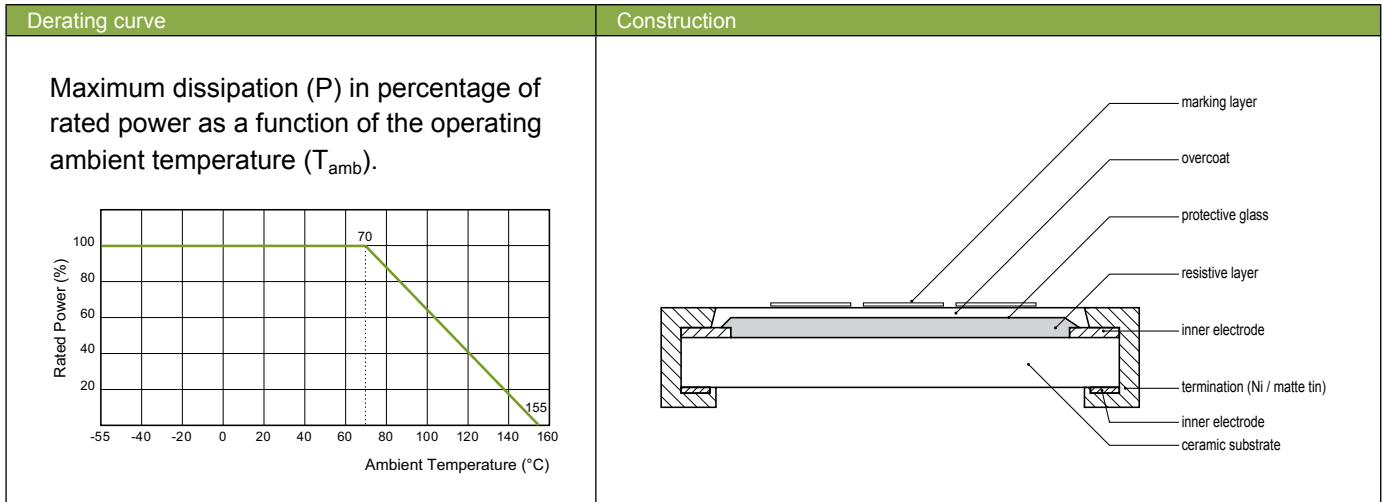
Regional code for ordering Phycomp branded products. Please see page 13 for details.

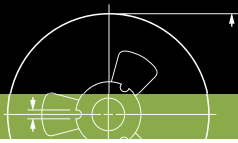




Features

- Reduced size of final equipment
- Low assembly costs
- Higher component and equipment reliability
- Excellent performance at pulse loading



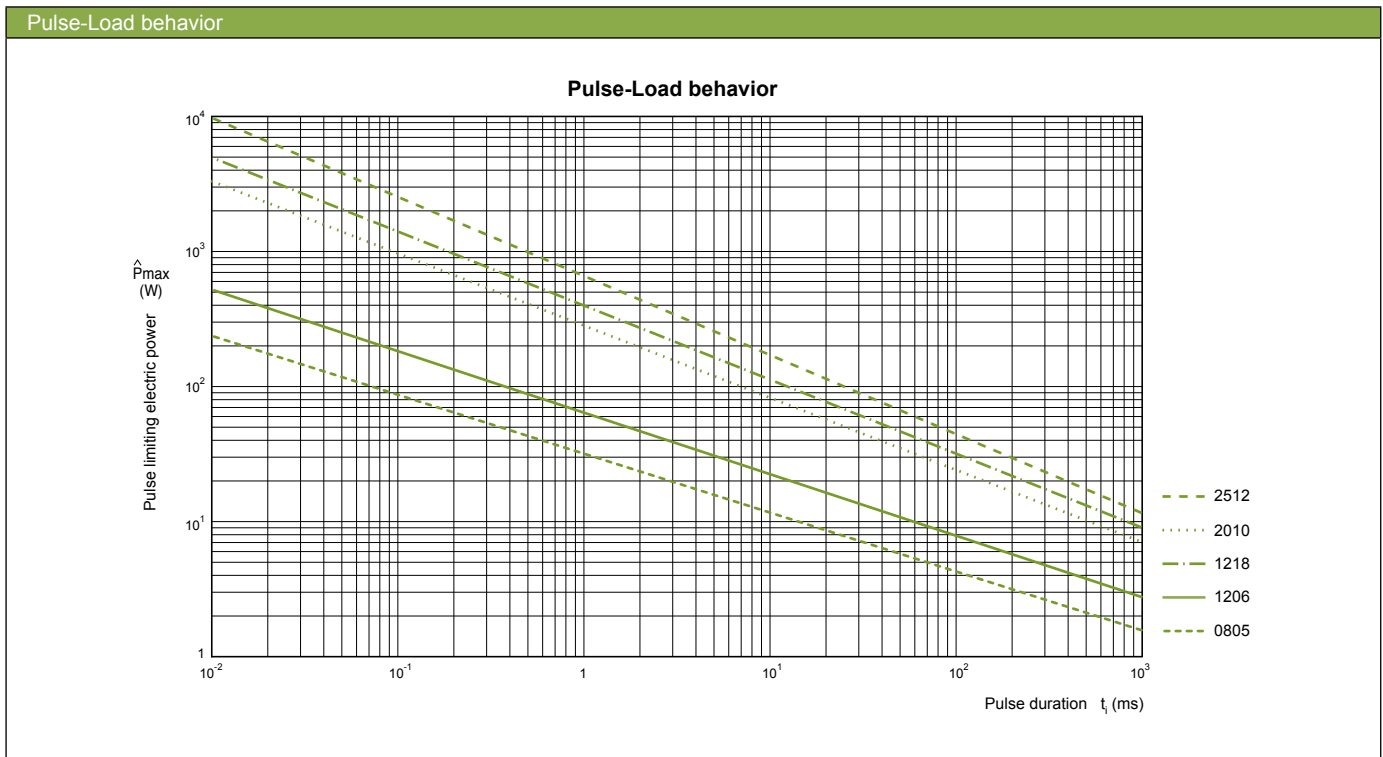


Chip Resistors Selection Charts

Surge chip resistors, 0805 to 2512

Electrical characteristics								
Type	Power P_{70}	Operating Temp. range	MWV	RCOV	DWV	Resistance range & tolerance		T. C. R.
SR0805	1/8W	-55°C to +155°C	150V	300V	300V	E24 ±5%, ±10%, ±20%	$1\Omega \leq R \leq 100K\Omega$	±200 ppm/°C
SR1206	1/4W	-55°C to +155°C	150V	400V	500V			
SR1218	1W	-55°C to +155°C	200V	400V	500V			
SR2010	3/4W	-55°C to +155°C	200V	400V	500V			
SR2512	1W	-55°C to +155°C	200V	400V	500V			

Environmental characteristics				
Performance test		Test method	Procedure	Requirements
Life		MIL-STD-202G-method 108A	1 000 hours at 70 ±5°C applied RCWV 1.5 hours on, 0.5 hours off, still air required	±(3% +0.05Ω)
High temperature exposure		MIL-STD-202G-method 108A	1 000 hours at maximum operating temperature depending on specification, unpowered	±(3% +0.05Ω)
Solderability	Wetting	J-STD-002B testB	Electrical test not required. Magnification 50X Lead-free solder bath at 245 ±3°C Dipping time: 3 ±0.5 seconds	Well tinned (≥95% covered) No visible damage
	Resistance to soldering heat	MIL-STD-202G-method 210F	Lead-free solder, 260°C, 10 seconds immersion time	±(1% +0.05Ω) No visible damage
Short time overload		MIL-R-55342D-para 4.7.5	2.5 times RCWV or maximum overload voltage which-ever is less for 5 seconds at room temperature	±(2% +0.05Ω) No visible damage



Chip Resistors Selection Charts

Surge chip resistors, 0805 to 2512

Global part number - Preferred type for ordering Yageo / Phycomp branded products

Ordering example: SR0805MR-07100KL

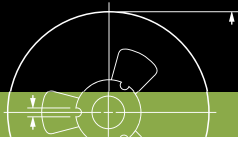
<p>SR 0805 MR — 07 100K L</p> <p>Series name (code 1-2) SR = Surge</p> <p>Size code (code 3-6) (inch / metric) 0805 = 2.0 x 1.25 1206 = 3.2 x 1.6 1218 = 3.2 x 4.5 2010 = 5.0 x 2.5 2512 = 6.35 x 3.2</p> <p>Tolerance (code 7) J = ±5% K = ±10% M = ±20%</p>	<p>Default code^(1/2) (code 17)</p> <p>Resistance (code 12-16) 10R = 10Ω 100K = 100KΩ</p> <p>Taping reel (code 10-11) 07 = 7 inch Dia. reel 10 = 10 inch Dia. reel 13 = 13 inch Dia. reel</p> <p>T. C. R. (code 9) "—" = Based on spec. (— for thick film only)</p> <p>Packing style (code 8) R = Paper tape reel K = Embossed plastic tape reel</p>
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Note: 1. All of our RSMD products are RoHS compliant. "LFP" of the internal 2D reel label mentions "Lead Free Process"
2. Letter L is system default code for ordering only

Phycomp worldwide - Traditional type						
Surge chip resistors						
Size: inch (mm)	0805 (2012)	1206 (3216)	1218 (3248)	2512 (6432)		
Power	1/8 W	1/4 W	1 W	1 W		
Tolerance	+10%	+5%	+10%	+5%	+10%	+20%
Resistance	E24	E24	E24	E24	E24	E24
Packing	paper tape	paper tape	paper tape	paper tape	paper tape	paper tape
Quantity	4 000	---	2350 557 10...L	2350 556 11...L	2350 556 10...L	2350 556 13...L
	5 000	2350 554 12...L	2350 550 10...L	---	---	---

For ordering rules: See page 14 for E24 / E96 values and the last 4 or 3 digits of the 12NC catalogue number

Phycomp CTC ordering code - Traditional type - North America
Regional code for ordering Phycomp branded products. Please see page 13 for details.



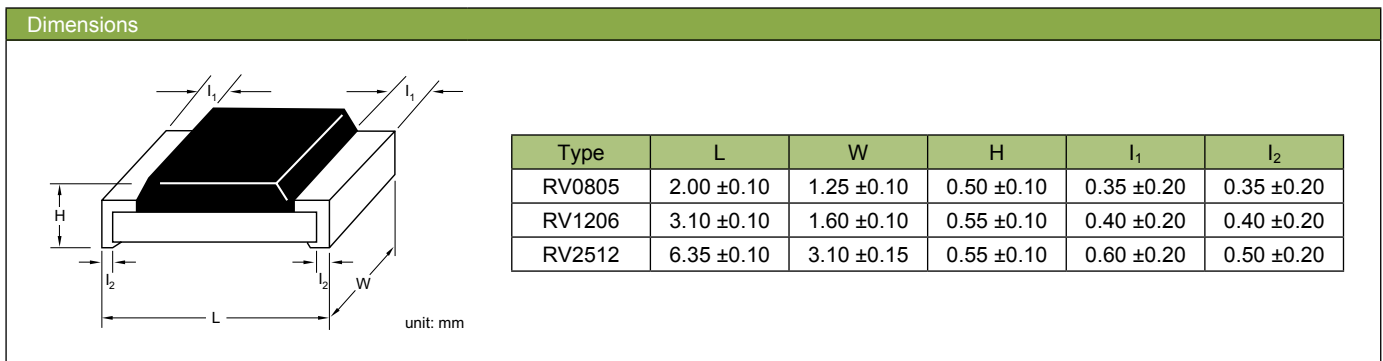
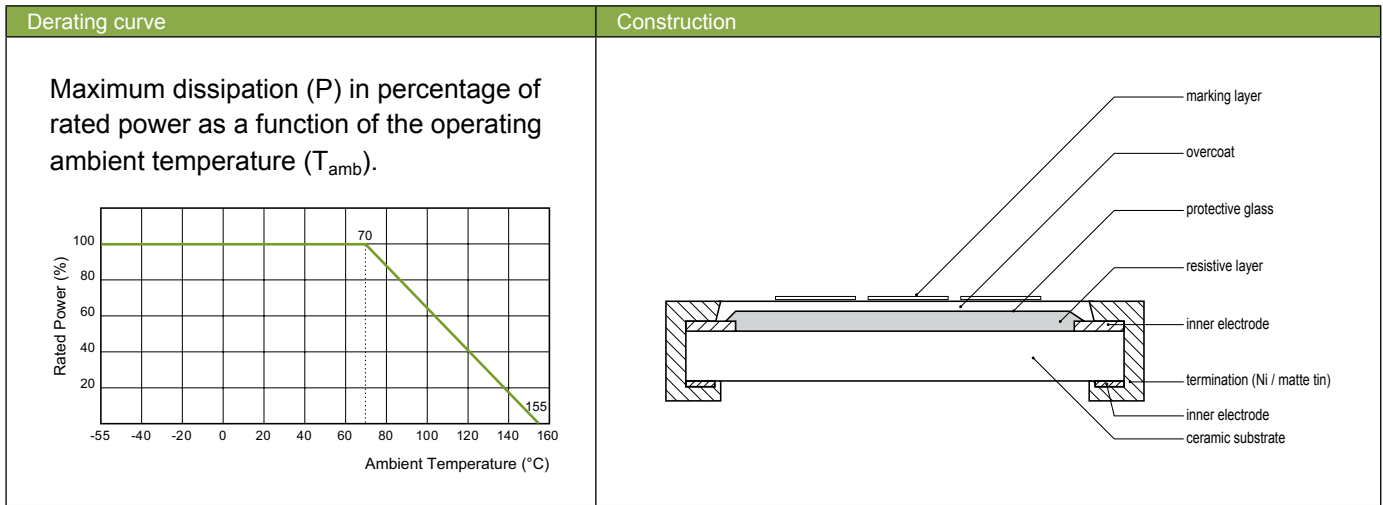
Chip Resistors Selection Charts

High voltage chip resistors, 0805 to 2512



Features

- Higher maximum working voltage compared to RC series
- Extremely thin and light
- Reliable electrode construction
- Compatible with lead containing and lead-free soldering processes
- Highly stable in auto-placement surface mounting

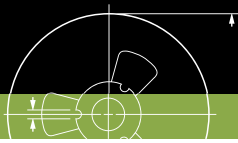


Chip Resistors Selection Charts

High voltage chip resistors, 0805 to 2512

Electrical characteristics								
Type	Power P ₇₀	Operating Temp. range	MWV	RCOV	DWV	Resistance range & tolerance		T. C. R.
RV0805	1/8W	-55°C to +155°C	400V	800V	800V	E24 ±5% E24/E96 ±1%	100KΩ ≤ R ≤ 10MΩ	±200 ppm/°C
RV1206	1/4W	-55°C to +155°C	500V	1000V	1000V	E24 ±5% E24/E96 ±1%	100KΩ ≤ R ≤ 27MΩ 100KΩ ≤ R ≤ 10MΩ	
RV2512	1W	-55°C to +155°C	500V	1000V	1000V	E24 ±5%	4.7MΩ ≤ R ≤ 16MΩ	

Environmental characteristics				
Performance test		Test method	Procedure	Requirements
Life		MIL-STD-202G-method 108A	1 000 hours at 70 ±5°C applied RCWV 1.5 hours on, 0.5 hours off, still air required	±(2% +0.05Ω)
High temperature exposure		MIL-STD-202G-method 108A	1 000 hours at maximum operating temperature depending on specification, unpowered	±(1% +0.05Ω)
Moisture resistance		MIL-STD-202G-method 106F	Each temperature / humidity cycle is defined as 8 hours (method 106F), 3 cycles / 24 hours for 10d with 25°C / 65°C 95% R.H	±(2% +0.05Ω)
Thermal shock		MIL-STD-202G-method 107G	LCT / UCT, number of cycles required is 300 Maximum transfer time is 20 seconds	±(0.5% +0.05Ω) for 10K to 10M ±(1% +0.05Ω) for others
Solderability	Wetting	J-STD-002B testB	Electrical test not required. Magnification 50X Lead-free solder bath at 245 ±3°C Dipping time: 3 ±0.5 seconds	Well tinned (≥95% covered) No visible damage
	Resistance to soldering heat	MIL-STD-202G-method 210F	Lead-free solder, 260°C, 10 seconds immersion time	±(1% +0.05Ω) No visible damage
Short time overload		MIL-R-55342D-para 4.7.5	2.5 times RCWV or maximum overload voltage whichever is less for 5 seconds at room temperature	±(2% +0.05Ω) No visible damage

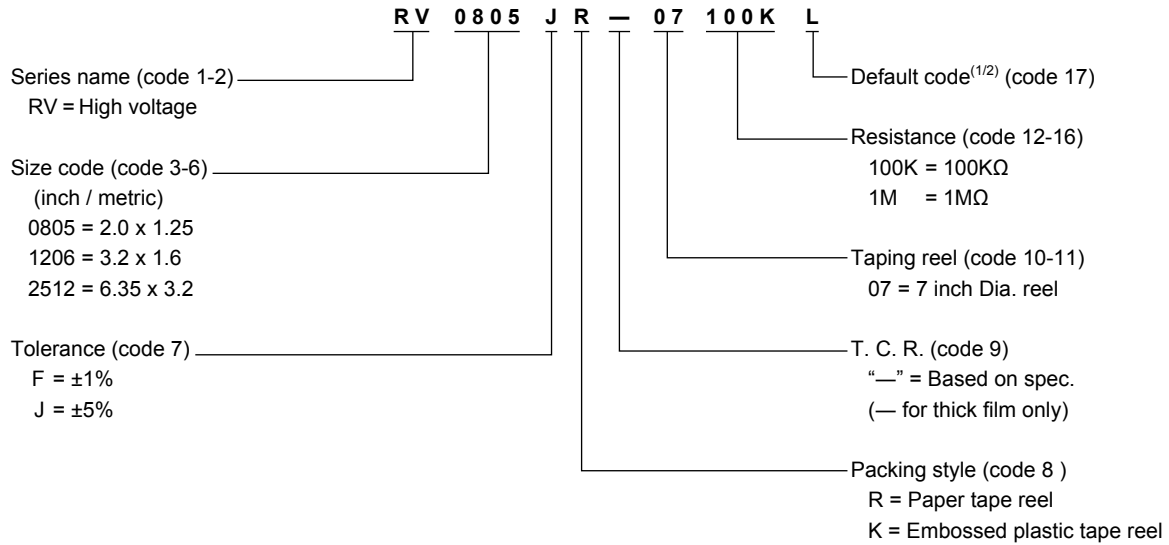


Chip Resistors Selection Charts

High voltage chip resistors, 0805 to 2512

Global part number - Preferred type for ordering Yageo / Phycomp branded products

Ordering example: RV0805JR-07100KL



Note: 1. All of our RSMD products are RoHS compliant. "LFP" of the internal 2D reel label mentions "Lead Free Process"
2. Letter L is system default code for ordering only

Phycomp worldwide - Traditional type

High voltage chip resistors

Size: inch (mm)	0805 (2012)		1206 (3216)		2512 (6432)
Power	1/8 W		1/4 W		1 W
Tolerance	+5%	+1%	+5%	+1%	+5%
Resistance	E24	E24 / E96	E24	E24 / E96	E24
Packing	paper tape		paper tape		blister tape
Quantity	4 000	---	---	---	2322 762 98...L
	5 000	2322 792 61...L	2322 793 6...L	2322 790 61...L	2322 791 6...L

For ordering rules: See page 14 for E24 / E96 values and the last 4 or 3 digits of the 12NC catalogue number

Phycomp CTC ordering code - Traditional type - North America

Regional code for ordering Phycomp branded products. Please see page 13 for details.



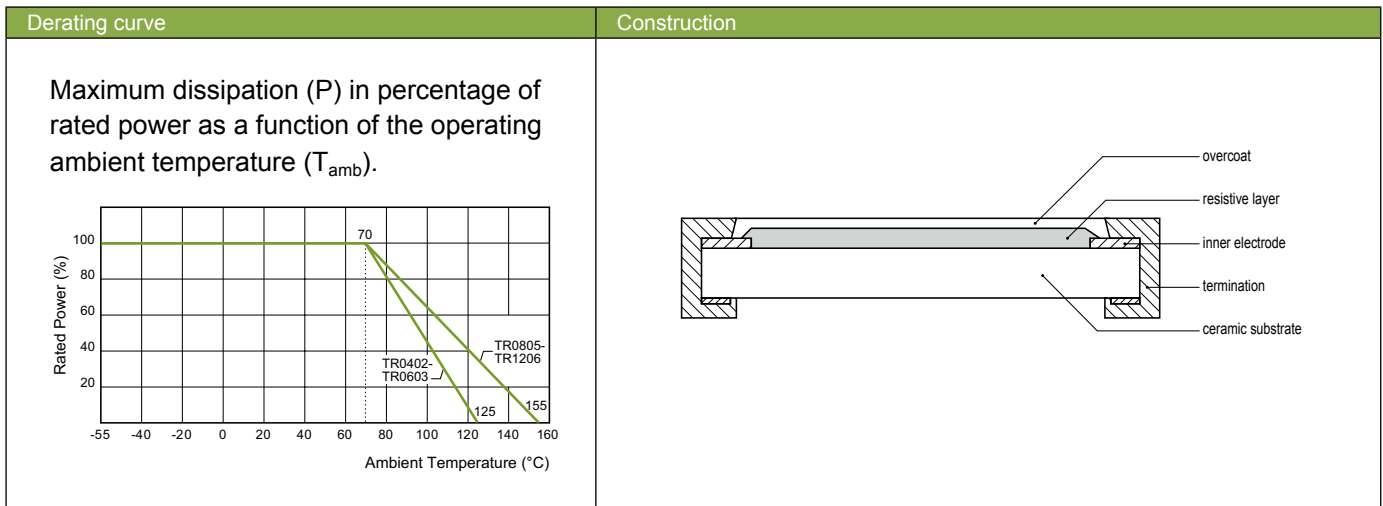
Chip Resistors Selection Charts

Trimmable chip resistors, 0402 to 1206

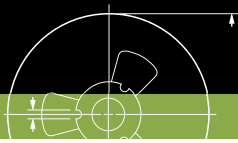


Features

- Reduced size of final equipment
- Low assembly costs
- Higher component and equipment reliability
- Improved performance at high frequency
- Low noise, when not trimmed



Dimensions																															
<p>unit: mm</p>	<table border="1"> <thead> <tr> <th>Type</th> <th>L</th> <th>W</th> <th>H</th> <th>l_1</th> <th>l_2</th> </tr> </thead> <tbody> <tr> <td>TR0402</td> <td>1.00 ±0.10</td> <td>0.50 ±0.05</td> <td>0.35 ±0.05</td> <td>0.20 ±0.10</td> <td>0.25 ±0.10</td> </tr> <tr> <td>TR0603</td> <td>1.60 ±0.10</td> <td>0.80 ±0.10</td> <td>0.45 ±0.10</td> <td>0.25 ±0.15</td> <td>0.25 ±0.15</td> </tr> <tr> <td>TR0805</td> <td>2.00 ±0.10</td> <td>1.25 ±0.10</td> <td>0.50 ±0.10</td> <td>0.35 ±0.20</td> <td>0.35 ±0.20</td> </tr> <tr> <td>TR1206</td> <td>3.10 ±0.10</td> <td>1.60 ±0.10</td> <td>0.55 ±0.10</td> <td>0.45 ±0.20</td> <td>0.40 ±0.20</td> </tr> </tbody> </table>	Type	L	W	H	l_1	l_2	TR0402	1.00 ±0.10	0.50 ±0.05	0.35 ±0.05	0.20 ±0.10	0.25 ±0.10	TR0603	1.60 ±0.10	0.80 ±0.10	0.45 ±0.10	0.25 ±0.15	0.25 ±0.15	TR0805	2.00 ±0.10	1.25 ±0.10	0.50 ±0.10	0.35 ±0.20	0.35 ±0.20	TR1206	3.10 ±0.10	1.60 ±0.10	0.55 ±0.10	0.45 ±0.20	0.40 ±0.20
Type	L	W	H	l_1	l_2																										
TR0402	1.00 ±0.10	0.50 ±0.05	0.35 ±0.05	0.20 ±0.10	0.25 ±0.10																										
TR0603	1.60 ±0.10	0.80 ±0.10	0.45 ±0.10	0.25 ±0.15	0.25 ±0.15																										
TR0805	2.00 ±0.10	1.25 ±0.10	0.50 ±0.10	0.35 ±0.20	0.35 ±0.20																										
TR1206	3.10 ±0.10	1.60 ±0.10	0.55 ±0.10	0.45 ±0.20	0.40 ±0.20																										



Chip Resistors Selection Charts

Trimmable chip resistors, 0402 to 1206

Electrical characteristics									
Type	Power P ₇₀	Operating Temp. range	MWV	RCOV	DWV	Resistance range & tolerance		T. C. R. (ppm/°C)	
TR0402	1/16W	-55°C to +125°C	50V	100V	100V	E24 +0/-10%, +0/-20%, +0/-30%	1Ω ≤ R ≤ 10MΩ	1Ω ≤ R ≤ 10Ω	±200
TR0603	1/16W	-55°C to +125°C	50V	100V	100V			10Ω < R ≤ 1MΩ	±100
TR0805	1/8W	-55°C to +155°C	150V	300V	500V			1MΩ < R ≤ 10MΩ	±200
TR1206	1/4W	-55°C to +155°C	200V	500V	500V				

Environmental characteristics			
Performance test	Test method	Procedure	Requirements
Life	MIL-STD-202G-method 108A	1 000 hours at 70 ±5°C applied RCWV 1.5 hours on, 0.5 hours off, still air required	±(1% +0.05Ω)
High temperature exposure	MIL-STD-202G-method 108A	1 000 hours at maximum operating temperature depending on specification, unpowered	±(1% +0.05Ω)
Moisture resistance	MIL-STD-202G-method 106F	Each temperature / humidity cycle is defined as 8 hours (method 106F), 3 cycles / 24 hours for 10d with 25°C / 65°C 95% R.H	±(2% +0.05Ω)
Thermal shock	MIL-STD-202G-method 107G	LCT / UCT, number of cycles required is 300 Maximum transfer time is 20 seconds	±(1% +0.05Ω)
Solderability	Wetting	J-STD-002B testB Electrical test not required. Magnification 50X Lead-free solder bath at 245 ±3°C Dipping time: 3 ±0.5 seconds	Well tinned (≥95% covered) No visible damage
	Resistance to soldering heat	MIL-STD-202G-method 210F Lead-free solder, 260°C, 10 seconds immersion time	±(1% +0.05Ω) No visible damage
Short time overload	MIL-R-55342D-para 4.7.5	2.5 times RCWV or maximum overload voltage whichever is less for 5 seconds at room temperature	±(1% +0.05Ω) No visible damage

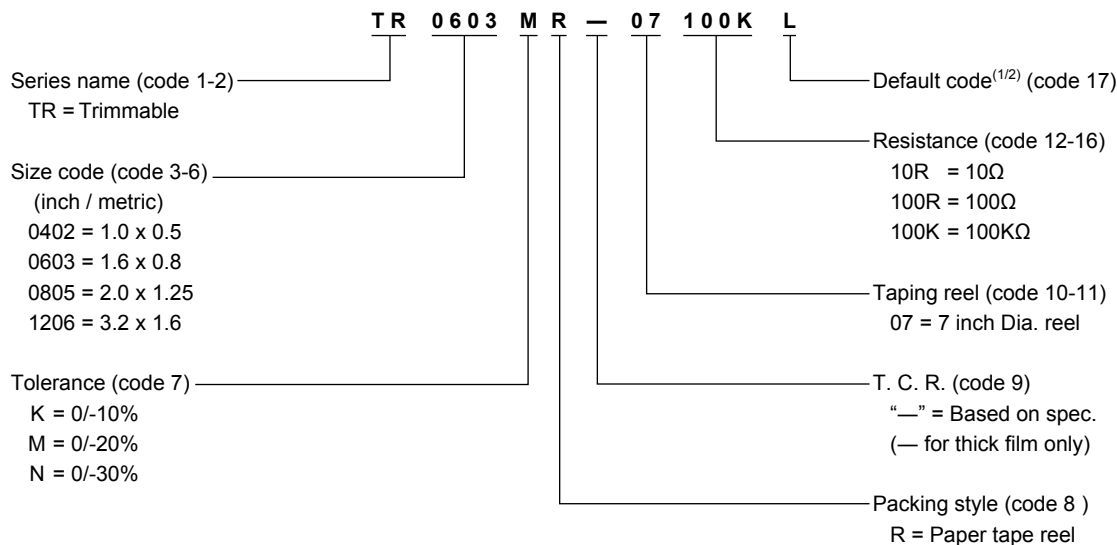


Chip Resistors Selection Charts

Trimmable chip resistors, 0402 to 1206

Global part number - Preferred type for ordering Yageo / Phycomp branded products

Ordering example: TR0603MR-07100KL



Note: 1. All of our RSMD products are RoHS compliant. "LFP" of the internal 2D reel label mentions "Lead Free Process"
 2. Letter L is system default code for ordering only

Phycomp worldwide - Traditional type

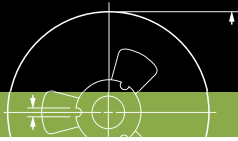
Trimmable chip resistors				
Size: inch (mm)	0402 (1005)	0603 (1608)	0805 (2012)	1206 (3216)
Power	1/16 W	1/10 W	1/8 W	1/4 W
Tolerance	E24	E24	E24	E24
Resistance	paper tape	paper tape	paper tape	paper tape
Packing	2350 503 21...L	2350 502 11...L	2350 501 11...L	2350 500 11...L
Quantity 5 000 0/-20%	2350 503 20...L	2350 502 10...L	2350 511 10...L	2350 500 10...L
5 000 0/-30%	on request	on request	on request	2322 724 94...L
Europe 5 000	2322 792 61...L	2322 793 6...L	2322 791 6...L	---

For ordering rules: See page 14 for E24 / E96 values and the last 4 or 3 digits of the 12NC catalogue number

Phycomp CTC ordering code - Traditional type - North America

Regional code for ordering Phycomp branded products. Please see page 13 for details.





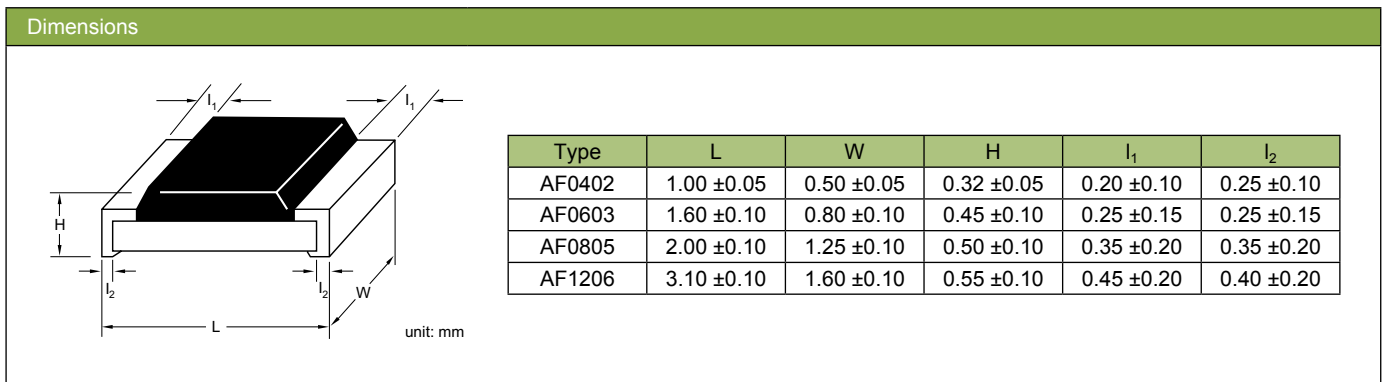
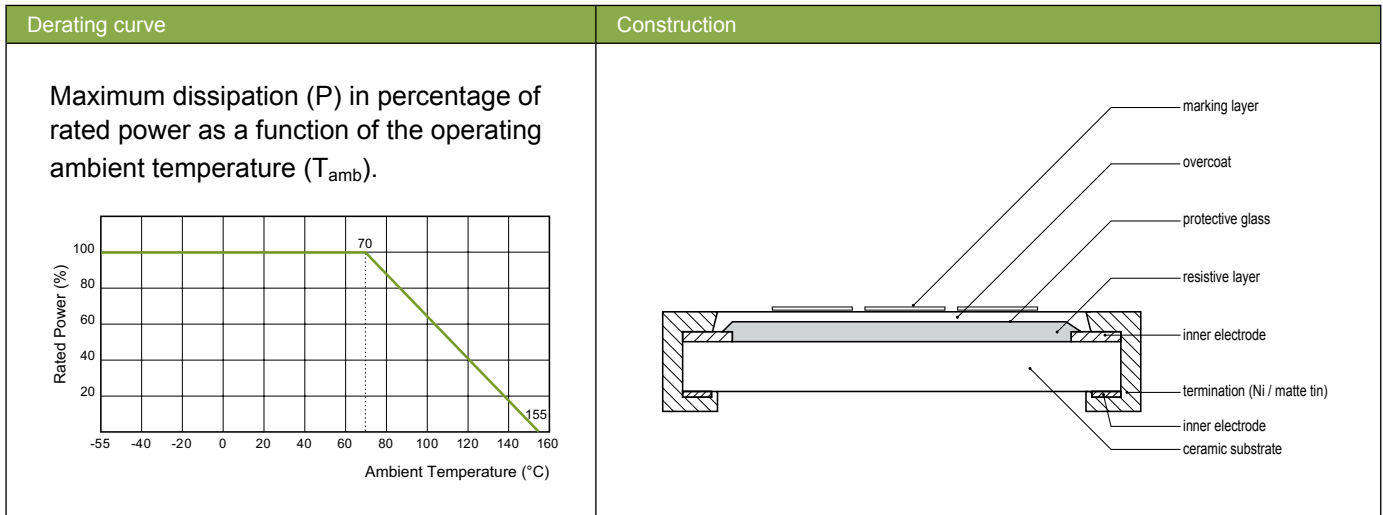
Chip Resistors Selection Charts

Anti-sulfurated chip resistors, 0402 to 1206



Features

- Superior resistance against sulfur containing atmosphere
- Highly reliable multilayer electrode construction
- Compatible with all soldering processes
- Highly stable in auto-placement surface mounting applications
- Barrier layer end termination
- Halogen free product and production

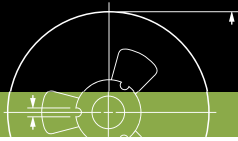


Chip Resistors Selection Charts

Anti-sulfurated chip resistors, 0402 to 1206

Electrical characteristics											
Type	Power P ₇₀	Operating Temp. range	MWV	RCOV	DWV	Resistance range & tolerance		T. C. R. (ppm/°C)		Jumper criteria (unit: A)	
AF0402	1/16W	-55°C to +155°C	50V	100V	100V	E24 ±5% E24/E96 ±1% Jumper	1Ω ≤ R ≤ 22MΩ 1Ω ≤ R ≤ 10MΩ < 0.05Ω	1Ω ≤ R ≤ 10Ω 10Ω < R ≤ 10MΩ 10MΩ < R ≤ 22MΩ	±200 ±100 ±200	Rated current	1.0
AF0603	1/10W	-55°C to +155°C	50V	100V	100V					Max. current	2.0
AF0805	1/8W	-55°C to +155°C	150V	300V	300V					Rated current	2.0
AF1206	1/4W	-55°C to +155°C	200V	400V	500V					Max. current	5.0
										Rated current	2.0
										Max. current	10.0

Environmental characteristics				
Performance test		Test method	Procedure	Requirements
Life		MIL-STD-202G-method 108A	1 000 hours at 70 ±5°C applied RCWV 1.5 hours on, 0.5 hours off, still air required	±(1% +0.05Ω) < 100mΩ for jumper
High temperature exposure		MIL-STD-202G-method 108A	1 000 hours at maximum operating temperature depending on specification, unpowered	±(1% +0.05Ω) < 100mΩ for jumper
Moisture resistance		MIL-STD-202G-method 106F	Each temperature / humidity cycle is defined as 8 hours (method 106F), 3 cycles / 24 hours for 10d with 25°C / 65°C 95% R.H	±(0.5% +0.05Ω) for 1% tol. ±(1% +0.05Ω) for 5% tol. < 100mΩ for jumper
Thermal shock		MIL-STD-202G-method 107G	LCT / UCT, number of cycles required is 300 Maximum transfer time is 20 seconds	±(0.5% +0.05Ω) for 1% tol. ±(1% +0.05Ω) for 5% tol. < 100mΩ for jumper
Solderability	Wetting	J-STD-002B testB	Electrical test not required. Magnification 50X Lead-free solder bath at 245 ±3°C Dipping time: 3 ±0.5 seconds	Well tinned (≥95% covered) No visible damage
	Resistance to soldering heat	MIL-STD-202G-method 210F	Lead-free solder, 260°C, 10 seconds immersion time	±(1% +0.05Ω) No visible damage
Short time overload		MIL-R-55342D-para 4.7.5	2.5 times RCWV or maximum overload voltage whichever is less for 5 seconds at room temperature	±(1% +0.05Ω) No visible damage
Anti-FOS		ASTM-B-809-95	Sulfur (saturated vapor) 1000 hours, 60±2°C, 91~93 %RH, Rating with no power	±(1% +0.05Ω)

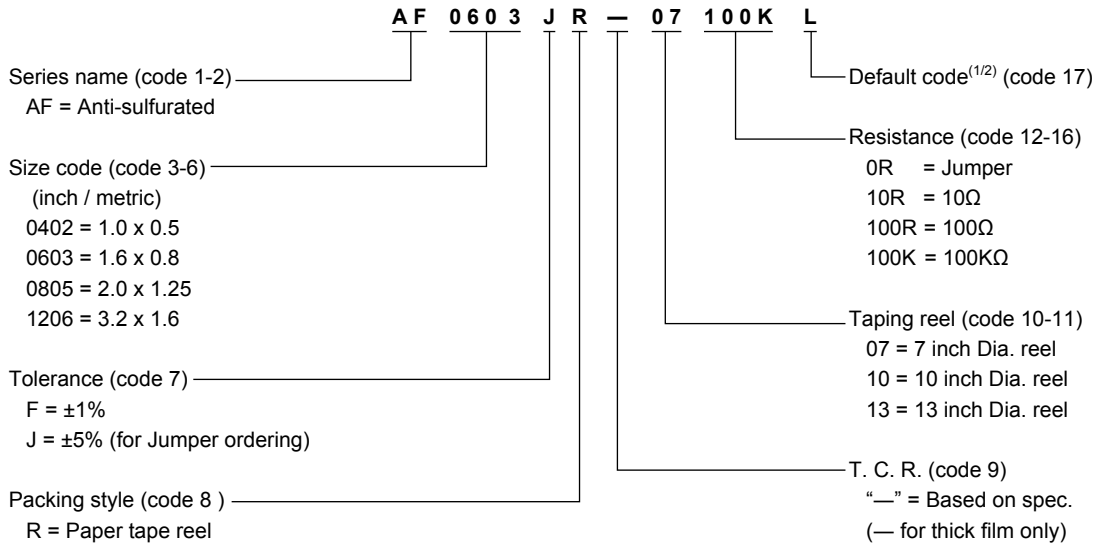


Chip Resistors Selection Charts

Anti-sulfurated chip resistors, 0402 to 1206

Global part number - Preferred type

Ordering example: AF0603JR-07100KL



- Note:** 1. All our RSMD products meet RoHS Compliant. "LFP" of the internal 2D reel label mentions "Lead Free Process"
 2. Letter L is system default code for order only
 3. AF series products are available by "Global part number" only



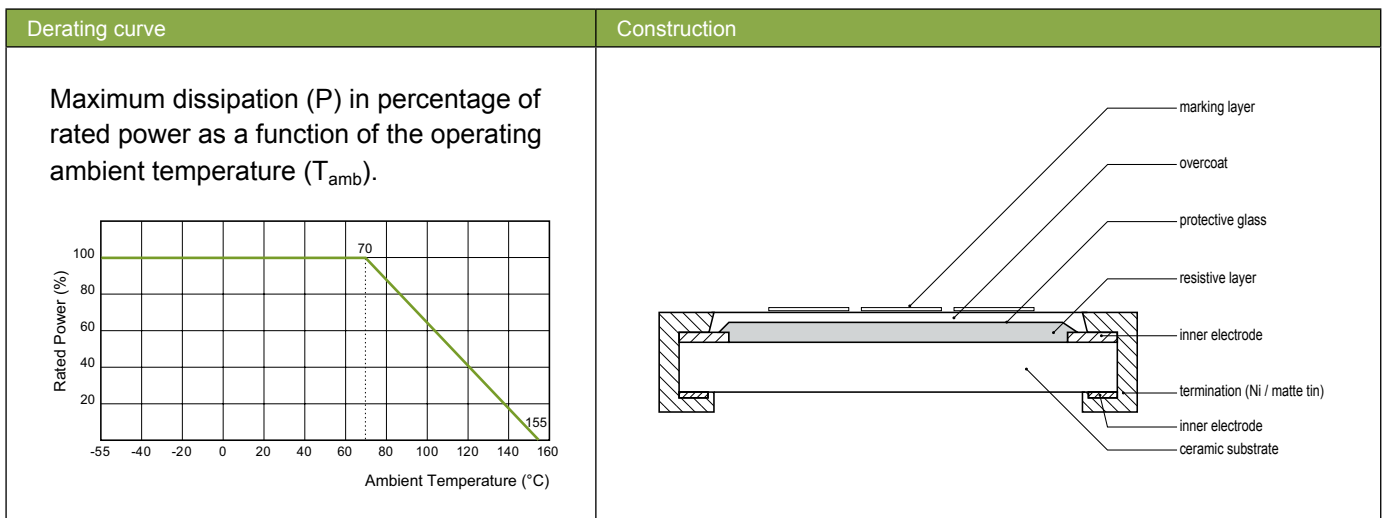
Chip Resistors Selection Charts

Automotive grade chip resistors, 0402 to 2512

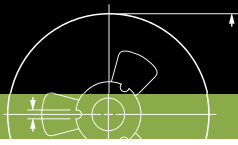


Features

- AEC-Q200 compliant
- Production part approval process (PPAP) support
- High reliability
- High quality level
- Superior resistance against sulfur containing atmosphere



Dimensions						
<p>unit: mm</p>	Type	L	W	H	l_1	l_2
	AC0402	1.00 ±0.05	0.50 ±0.05	0.32 ±0.05	0.20 ±0.10	0.25 ±0.10
	AC0603	1.60 ±0.10	0.80 ±0.10	0.45 ±0.10	0.25 ±0.15	0.25 ±0.15
	AC0805	2.00 ±0.10	1.25 ±0.10	0.50 ±0.10	0.35 ±0.20	0.35 ±0.20
	AC1206	3.10 ±0.10	1.60 ±0.10	0.55 ±0.10	0.45 ±0.20	0.40 ±0.20
	AC1210	3.10 ±0.10	2.60 ±0.15	0.50 ±0.10	0.45 ±0.15	0.50 ±0.20
	AC1218	3.10 ±0.10	4.60 ±0.10	0.55 ±0.10	0.45 ±0.20	0.40 ±0.20
	AC2010	5.00 ±0.10	2.50 ±0.15	0.55 ±0.10	0.55 ±0.15	0.50 ±0.20
AC2512	6.35 ±0.10	3.10 ±0.15	0.55 ±0.10	0.60 ±0.20	0.50 ±0.20	



Chip Resistors Selection Charts

Automotive grade chip resistors, 0402 to 2512

Electrical characteristics											
Type	Power P ₇₀	Operating Temp. range	MWV	RCOV	DWV	Resistance range & tolerance		T. C. R. (ppm/°C)		Jumper criteria (unit: A)	
AC0402	1/16W	-55°C to +155°C	50V	100V	100V	E24 ±5% E24/E96 ±1% Jumper	1Ω ≤ R ≤ 10MΩ 1Ω ≤ R ≤ 10MΩ < 0.05Ω	10Ω ≤ R ≤ 10Ω 10Ω < R ≤ 10 MΩ	±200 ±100	Rated current	1.0
					Max. current					2.0	
AC0603	1/10W	-55°C to +155°C	50V	100V	100V					Rated current	1.0
					Max. current					2.0	
AC0805	1/8W	-55°C to +155°C	150V	300V	300V					Rated current	2.0
					Max. current					5.0	
AC1206	1/4W	-55°C to +155°C	200V	400V	500V					Rated current	2.0
					Max. current					10.0	
AC1210	1/2W	-55°C to +155°C	200V	500V	500V					Rated current	2.0
					Max. current	10.0					
AC1218	1W	-55°C to +155°C	200V	500V	500V	Rated current	6.0				
					Max. current	10.0					
AC2010	3/4W	-55°C to +155°C	200V	500V	500V	Rated current	2.0				
					Max. current	10.0					
AC2512	1W	-55°C to +155°C	200V	500V	500V	Rated current	2.0				
					Max. current	10.0					

Environmental characteristics				
Performance test		Test method	Procedure	Requirements
Life		AEC-Q200-REV C-Test 8 MIL-STD-202 Method 108	1 000 hours at 125°C applied RCWV 1.5 hours on, 0.5 hours off	±(1% +0.05Ω) < 100mΩ for jumper
High temperature exposure		AEC-Q200-REV C-Test 3 MIL-STD-202 Method 108	1 000 hours at maximum operating temperature depending on specification	±(1% +0.05Ω) < 50mΩ for jumper
Moisture resistance		AEC-Q200-REV C-Test 6 MIL-STD-202 Method 106	Each temperature / humidity cycle is defined as 8 hours (method 106F), 3 cycles / 24 hours for 10d with 25°C / 65°C 95% R.H.	±(0.5% +0.05Ω) for 1% tol. ±(2% +0.05Ω) for 5% tol. < 100mΩ for jumper
Biased humidity		AEC-Q200-REV C-Test 7 MIL-STD-202 Method 103	1 000 hours; + 85°C 85% R.H.; 10% of operating power Measured at 24 ±2 hours after test	±(1% +0.05Ω) < 100mΩ for jumper
Thermal shock		AEC-Q200-REV C-Test 16 MIL-STD-202 Method 107	LCT / UCT, number of cycles required is 300 Maximum transfer time is 20 seconds	±(1% +0.05Ω) < 50mΩ for jumper
Solderability	Wetting	AEC-Q200-REV C-Test 18 J-STD-002B testB	Electrical test not required. Magnification 50X Lead-free solder bath at 245 ±3°C Dipping time: 3 ±0.5 seconds	Well tinned (≥95% covered) No visible damage
	Resistance to soldering heat	AEC-Q200-REV C-Test 15 MIL-STD-202 Method 215	Lead-free solder, 260°C, 10 seconds immersion time	±(1% +0.05Ω) < 50mΩ for jumper No visible damage
Short time overload		MIL-R-55342D- para 4.7.5	2.5 times RCWV or maximum overload voltage whichever is less for 5 seconds at room temperature	±(1% +0.05Ω) < 100mΩ for jumper No visible damage

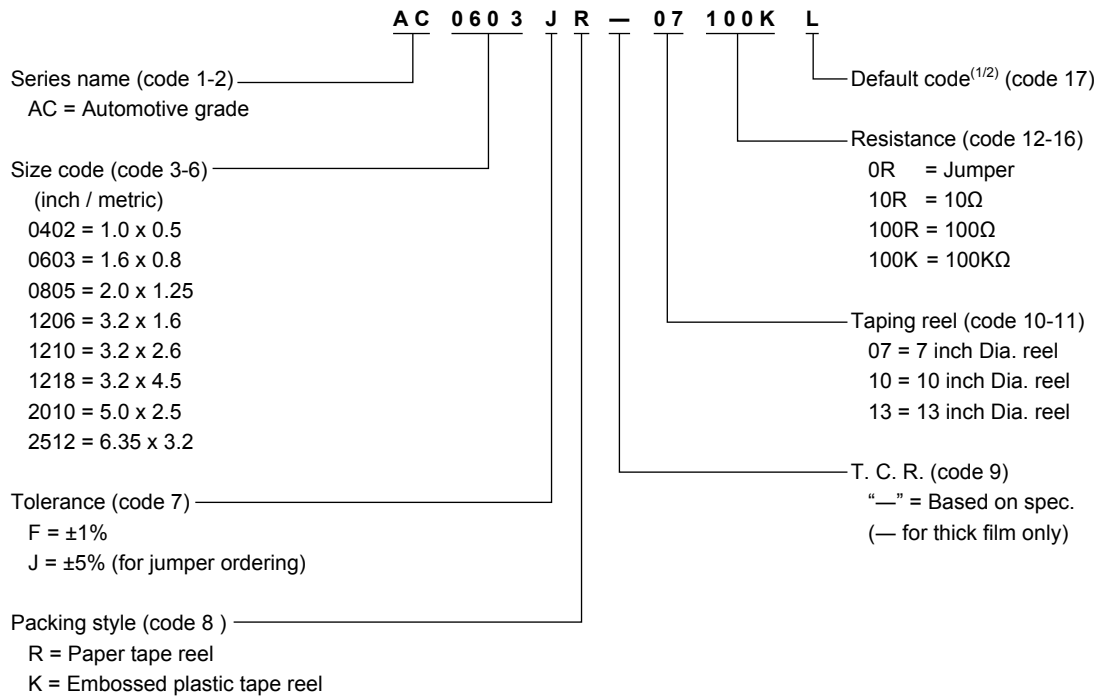


Chip Resistors Selection Charts

Automotive grade chip resistors, 0402 to 2512

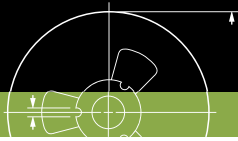
Global part number - Preferred type

Ordering example: AC0603JR-07100KL



- Note:** 1. All of our RSMD products are RoHS compliant. "LFP" of the internal 2D reel label mentions "Lead Free Process"
 2. Letter L is system default code for ordering only
 3. AC series products are available by "Global part number" only





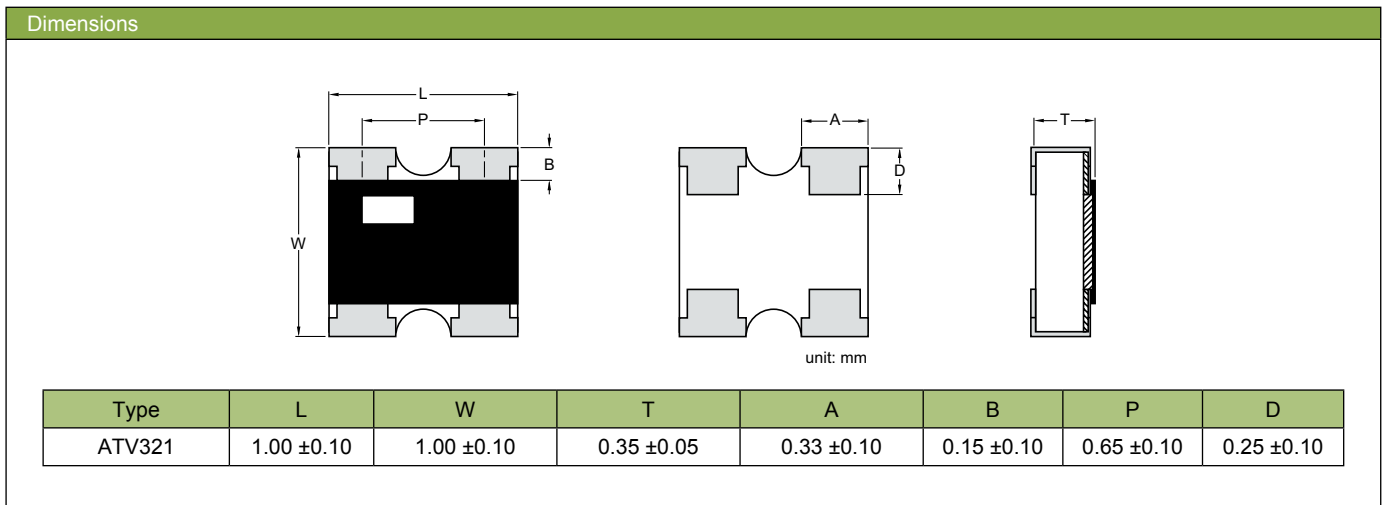
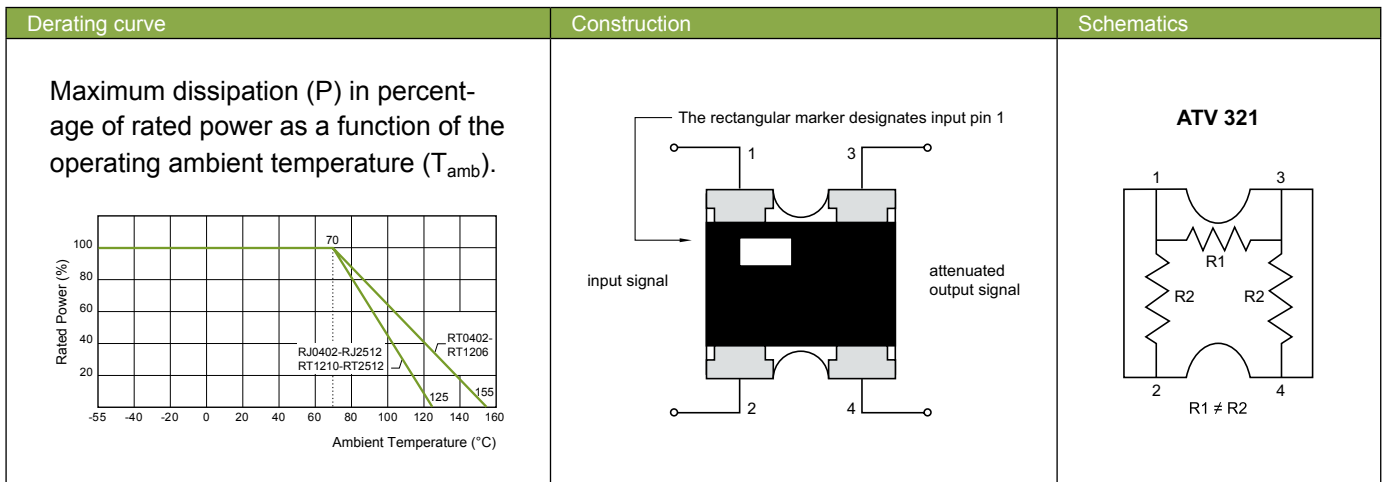
Chip Resistors Selection Charts

RF attenuator chip resistors, 0404



Features

- Reduce system size
- Low assembly cost
- Higher component and system reliability
- Suitable for applications of mobile phones, receivers, battery chargers, palmtop computers and tablets



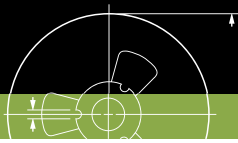
Chip Resistors Selection Charts

RF attenuator chip resistors, 0404

Electrical characteristics								
Type	Power P ₇₀	Operating Temp. range	MPV	VSWR (Max.)	Impedance	Attenuation range & tolerance		Frequency range
ATV321	40mW	-55°C to +125°C	50V	1.3	50Ω	-1dB to -5dB	±0.3 dB	-1dB to -10dB DC to 2.5 GHz
						-6dB to -10dB	±0.5 dB	
						-15dB	±1.0 dB	-15dB to -20dB DC to 2.0 GHz
						-20dB	±2.0 dB	

Environmental characteristics				
Performance test		Test method	Procedure	Requirements
Life		MIL-STD-202G-method 108A	1 000 hours at 70 ±5°C applied RCWV 1.5 hours on, 0.5 hours off, still air required	Max.: ±0.3 dB
Humidity (steady state)		JIS C 5202 7.5	1 000 hours, 40 ±2°C, 93(+2/-3)% RH RCWV applied for 1.5 hours on and 0.5 hour off	Max.: ±0.3 dB
Moisture resistance		MIL-STD-202G-method 106F	Each temperature / humidity cycle is defined as 8 hours (method 106F), 3 cycles / 24 hours for 10d with 25°C / 65°C 95% R.H	Max.: ±0.3 dB
Thermal shock		MIL-STD-202G-method 107G	LCT / UCT, number of cycles required is 300 Maximum transfer time is 20 seconds	Max.: ±0.3 dB
Solderability	Wetting	J-STD-002B testB	Electrical test not required. Magnification 50X Lead-free solder bath at 245 ±3°C Dipping time: 3 ±0.5 seconds	Well tinned (≥95% covered)
	Resistance to soldering heat	MIL-STD-202G-method 210F	Lead-free solder, 260°C, 10 seconds immersion time	Max.: ±0.1 dB
Short time overload		MIL-R-55342D-para 4.7.5	2.5 times RCWV or maximum overload voltage whichever is less for 5 seconds at room temperature	Max.: ±0.3 dB



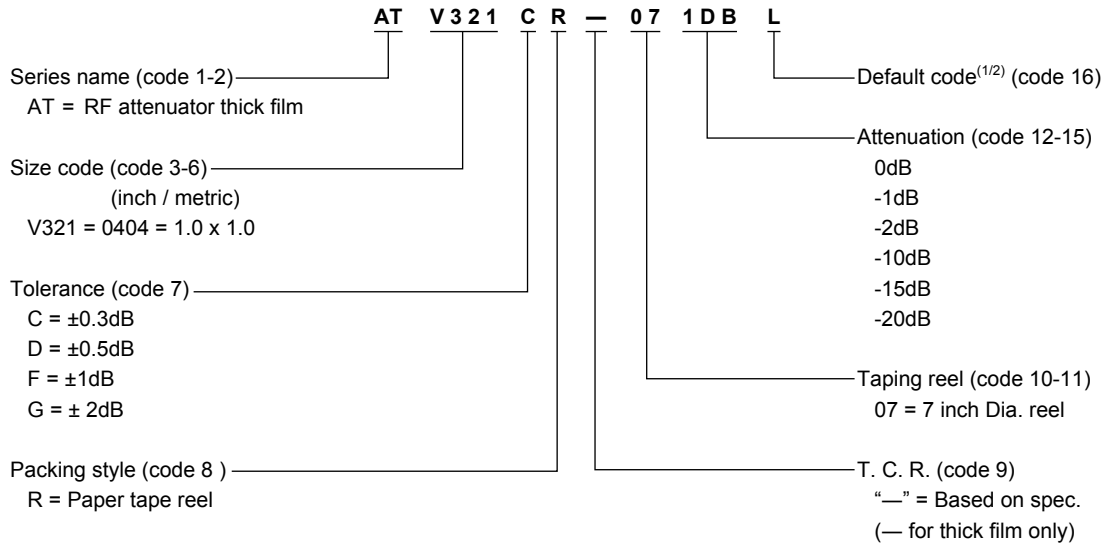


Chip Resistors Selection Charts

RF attenuator chip resistors, 0404

Global part number - Preferred type for ordering Yageo / Phycomp branded products

Ordering example: ATV321CR-071DBL



Note: 1. All of our RSMD products are RoHS compliant. "LFP" of the internal 2D reel label mentions "Lead Free Process"
2. Letter L is system default code for ordering only

Phycomp worldwide - Traditional type

Packing	paper tape
Quantity 10 000	2350 703 11...L
Remark	For last three digits, see following table "Attenuation codes"

Note: L = Default code

Phycomp CTC ordering code - Traditional type - North America

Packing	paper tape
Quantity 10 000	9CV3218AXXXXX-PF3
Remark	For last 9th to 13th digits, see following table "Attenuation codes"

Attenuation codes

Value (dB)	Tolerance (dB)	Standard	
		Phycomp worldwide code (12NC)	Phycomp North America code (NA code)
1	±0.3	012	01DBC
2	±0.3	022	02DBC
3	±0.3	032	03DBC
4	±0.3	042	04DBC
5	±0.3	052	05DBC
6	±0.5	063	06DBD
7	±0.5	073	07DBD
8	±0.5	083	08DBD
9	±0.5	093	09DBD
10	±0.5	103	10DBD
15	±1.0	154	15DBF
20	±2.0	205	20DBG



Thick film chip resistors							
Global CTC (Preferred)	Description	Size	Tolerance	Max. power	Resistance range	Resistor pieces	Min. items
RC0100-R-SKE24L	RC0100, $\pm 1\%$ & $\pm 5\%$, RoHS compliant, + Jumper	01005	F / J	1/32W	10 - 1M	100	100
RC0201-R-SKE24L	RC0201, $\pm 1\%$ & $\pm 5\%$, RoHS compliant, + Jumper	0201	F / J	1/20 W	10 - 1M	100	120
RC0402JR-SKE24L	RC0402, $\pm 5\%$, RoHS compliant, + Jumper	0402	J	1/16 W	10 - 1M	100	110
RC0402FR-SKE96L	RC0402, $\pm 1\%$, RoHS compliant, + Jumper	0402	F	1/16 W	10 - 1M	100	450
RC0603JR-SKE24L	RC0603, $\pm 5\%$, RoHS compliant, + Jumper	0603	J	1/10 W	10 - 1M	50	110
RC0603FR-SKE96L	RC0603, $\pm 1\%$, RoHS compliant, + Jumper	0603	F	1/10 W	10 - 1M	50	450
RC0805JR-SKE24L	RC0805, $\pm 5\%$, RoHS compliant, + Jumper	0805	J	1/8 W	10 - 1M	50	110
RC0805FR-SKE96L	RC0805, $\pm 1\%$, RoHS compliant, + Jumper	0805	F	1/8 W	10 - 1M	50	280
RC1206JR-SKE24L	RC1206, $\pm 5\%$, RoHS compliant, + Jumper	1206	J	1/4 W	10 - 1M	50	110
RC1206FR-SKE96L	RC1206, $\pm 1\%$, RoHS compliant, + Jumper	1206	F	1/4 W	10 - 1M	50	350

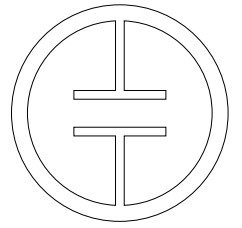
Thick film array chip resistors (convex)							
Global CTC (Preferred)	Description	Size	Tolerance	Max. power	Resistance range	Resistor pieces	Min. items
YC12X-JR-SK001L	YC124 / YC122, $\pm 5\%$, +Jumper, RoHS compliant,	0402 X 2 0402 X 4	J	1/16 W	10 - 1M	100	75

Engineering design kit for current sensing application							
Global CTC (Preferred)	Description	Size	Tolerance	Max. power	Resistance range	Resistor pieces	Min. items
CS0402-R-SK001L	RL0402 - RL2512, $\pm 1\%$ & $\pm 5\%$, RoHS compliant	0402 - 2512	F / J	---	100m - 910m	30	160

Engineering design kit for mobile application							
Global CTC (Preferred)	Description	Size	Tolerance	Max. power	Resistance range	Resistor pieces	Min. items
MD0402-R-SK001L	Chip resistors / MLCC / Attenuators	---	---	---	---	50 - 100	44

Note: Before ordering, please contact our sales force for detail of resistance

Engineering design kit for automotive application							
Global CTC (Preferred)	Description	Size	Tolerance	Max. power	Resistance range	Resistor pieces	Min. items
AC0402-R-SK001L	AC0402 - AC1206, $\pm 1\%$ & $\pm 5\%$, RoHS compliant, + Jumper	0402 - 1206	F/J	---	1 - 10M	50-100	200



SMD CERAMIC MULTILAYER CAPACITORS



MLCC General Information

Specification overview

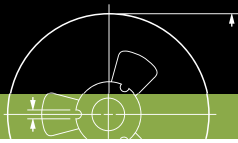
Specification overview					
Description	TC code	Series	Capacitance range	Voltage range	Size
Discrete	NP0	General purpose	10 pF to 10 nF	16 V to 25 V	0201, 0402, 0603, 0805, 1206, 1210
		General purpose	0.47 pF to 22 nF	50 V	0201, 0402, 0603, 0805, 1206, 1210, 1812
		Medium voltage	10 pF to 10 nF	100 V to 630 V	0402, 0603, 0805, 1206, 1210
		High voltage	10 pF to 1 nF	1 kV to 3 kV	0805, 1206, 1808, 1812
		High frequency	0.22 pF to 8.2 pF	50 V	0402, 0603, 0805
	X7R	General purpose & High capacitance	100 pF to 47 μ F	6.3 V to 50 V	0201, 0402, 0603, 0805, 1206, 1210, 1812
		Medium voltage	100 pF to 2.2 μ F	100 V to 630 V	0603, 0805, 1206, 1210, 1812
		High voltage	100 pF to 33 nF	1 kV to 3 kV	1206, 1210, 1808, 1812
		Low inductance	10 nF to 220 nF	10 V to 50 V	0306, 0508, 0612
		Soft termination	100 pF to 1 μ F	16 V to 630 V	0603, 0805, 1206
	X5R	General purpose & High capacitance	100 pF to 100 μ F	6.3 V to 50 V	0201, 0402, 0603, 0805, 1206, 1210, 1812
		Low profile	10 nF to 10 μ F	6.3 V to 25 V	0402, 0603, 0805
	Y5V	General purpose & High capacitance	10 nF to 47 μ F	6.3 V to 50 V	0201, 0402, 0603, 0805, 1206, 1210
	Automotive grade products	NP0	Automotive grade	10 pF to 10 nF	50 V to 630 V
X7R		Automotive grade	100 pF to 2.2 μ F	16 V to 630 V	0402, 0603, 0805, 1206, 1210
Safety certification products	NP0	High voltage SC type	2.0 pF to 470 pF	X1/Y2, X2/Y3	1808, 1812
	X7R	High voltage SC type	150 pF to 1.5 nF	X1/Y2, X2/Y3	1808, 1812
C-Arrays	NP0	4C arrays	10 pF to 470 pF	50 V	0508, 0612
	X7R	4C arrays	180 pF to 100 nF	16 V to 50 V	0508, 0612
	Y5V	4C arrays	10 nF to 100 nF	25 V	0612



Global part number

Ordering example: CC0201KRX7R8BB102

<p>CC 0201 K R X7R 8 B B 102</p> <p>Series name (code 1-2) ———</p> <p>CA = 4 x Capacitors array CC = Multilayer chip capacitors CL = Low inductance capacitors CH = High frequency SC = Safety certification capacitors AC = Automotive grade capacitors CS = Soft termination capacitors</p> <p>Size code (code 3-6) ———</p> <p>0201 0402 0603 0805 1206 1210 1808 1812 0306 0508 0612</p> <p>Capacitance tolerance (code 7) ———</p> <p>B = ±0.1 pF C = ±0.25 pF D = ±0.5 pF F = ±1% G = ±2% J = ±5% K = ±10% M = ±20% Z = -20% to +80%</p> <p>Packing style (code 8) ———</p> <p>R = Paper / PE tape reel Ø7 inch P = Paper / PE tape reel Ø13 inch K = Embossed plastic tape reel Ø7 inch F = Embossed plastic tape reel Ø13 inch C = Bulk case</p> <p>TC material (code 9-11) ———</p> <p>NP0 X5R X7R Y5V</p>	<p>Capacitance value (code 15-17) 102 = 1 000 pF (2 significant digits+number of zeros; the 3rd digit signifies the multiplying factor, and letter R is decimal point) 0 = x 1 1 = x 10¹ 2 = x 10² 3 = x 10³ 4 = x 10⁴ 5 = x 10⁵ 6 = x 10⁶ 7 = x 10⁷ X X R = Special capacitance (X X: capacitance before decimal point)</p> <p>Process code (code 14) N = NP0 B = Class 2 product</p> <p>Termination (code 13) B = Ni-Barrier</p> <p>Rated voltage (code 12) 5 = 6.3 V 6 = 10 V 7 = 16 V 8 = 25 V 9 = 50 V 0 = 100 V A = 200 V B = 500 V C = 1 kV D = 2 kV E = 3 kV G = 35 V S = 2.5 kV T = X2 / Y3 for TUV / UL (3 kV) W = X1 / Y2 for TUV / UL (4 kV) U = X1 / Y2 for TUV / UL (5 kV) Y = 250 V Z = 630 V</p>
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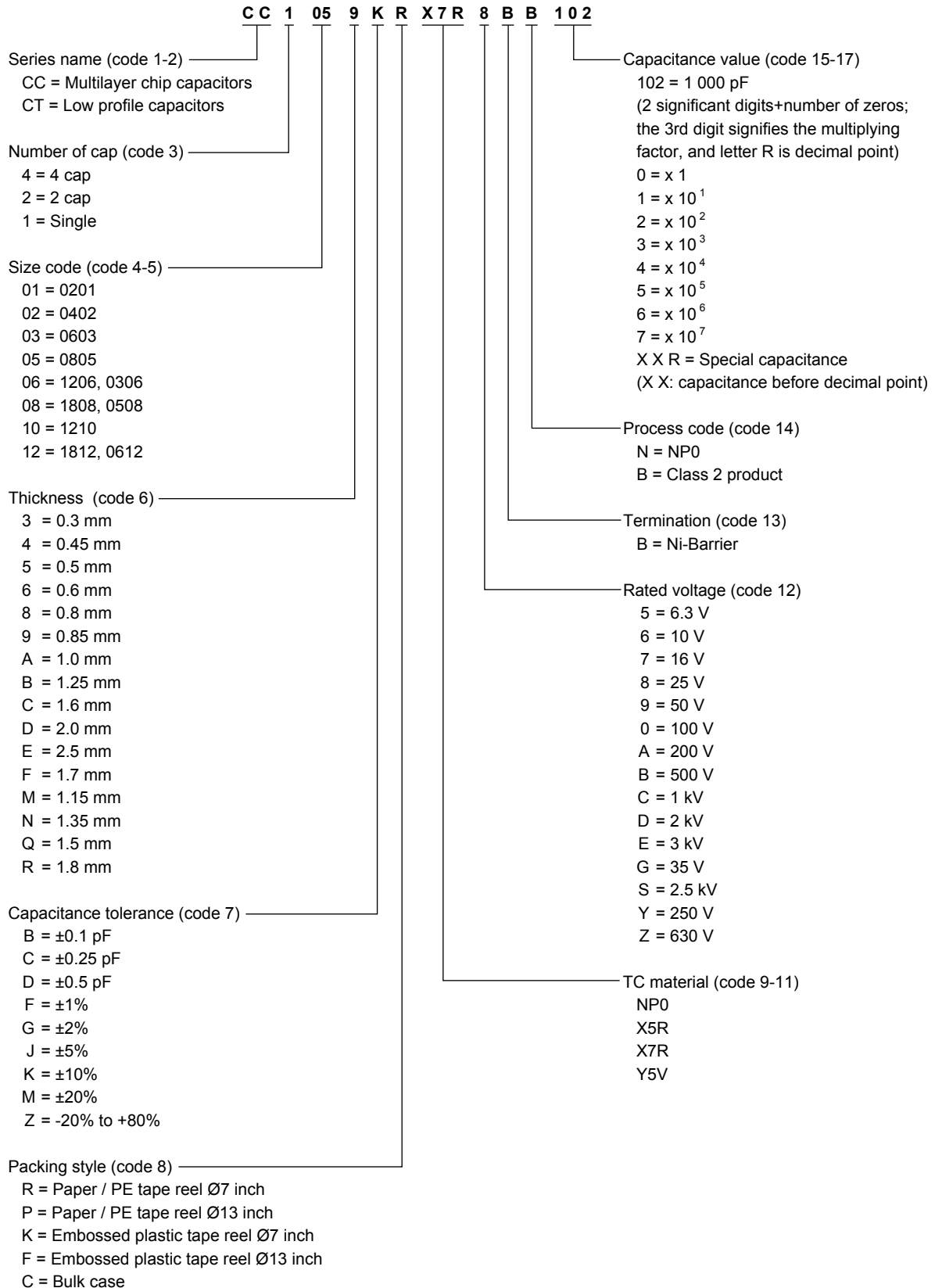


MLCC Selection Charts

Ordering information - Global part number

Global part number

Ordering example: CCxxxxKRX5RxBBxxx (for Low profile)

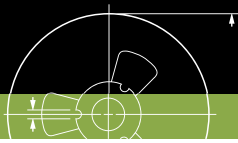


MLCC General Information

Ordering information - North America

Phycomp CTC ordering code - North America								
Ordering example: 02012R102K8B20								
0201	2R	102	K	8	B	2	0	0
Size code	Temperature characteristic	Capacitance (pF)	Tolerance	Voltage	Termination	Packing	Marking	Range identifier
0201	CG = NP0	102 = 1 000 pF	B = ± 0.1 pF	5 = 6.3 V	B = NiSn	2 = 180mm / 7" paper / PE	0 = No marking	0 = Conventional ceramic
0402	2B = X5R	The third digit	C = ± 0.25 pF	6 = 10 V		3 = 330 mm / 13" paper / PE		D = Class 2 MLCC
0603	2R = X7R	signifies the	D = ± 0.5 pF	7 = 16 V		B = 180mm / 7" blister		L = Low inductance
0805	2F = Y5V	multiplying factor:	F = $\pm 1\%$	8 = 25 V		F = 330 mm / 13" blister		S = Safety certification capacitor
1206		8 = x 0.01	G = $\pm 2\%$	9 = 50 V		P = Bulk case		H = High frequency
1210		9 = x 0.1	J = $\pm 5\%$	0 = 100 V				
1808		0 = x 1	K = $\pm 10\%$	B = 200 V				
1812		1 = x 10	M = $\pm 20\%$	C = 250 V				
0306		2 = x 100	Z = -20% to	D = 500 V				
0508		3 = x 1 000	+80%	E = 1 kV				
0612		4 = x 10 000		F = 2 kV				
		5 = x 100 000		G = 3 kV				
		6 = x 1 000 000		Z = 630 V				
		7 = x 10 000 000		S = 2.5 kV				
				T = X2/Y3				
				W = X1				
				U = Y2				





MLCC General Information

Thickness classes and packing quantities for all series

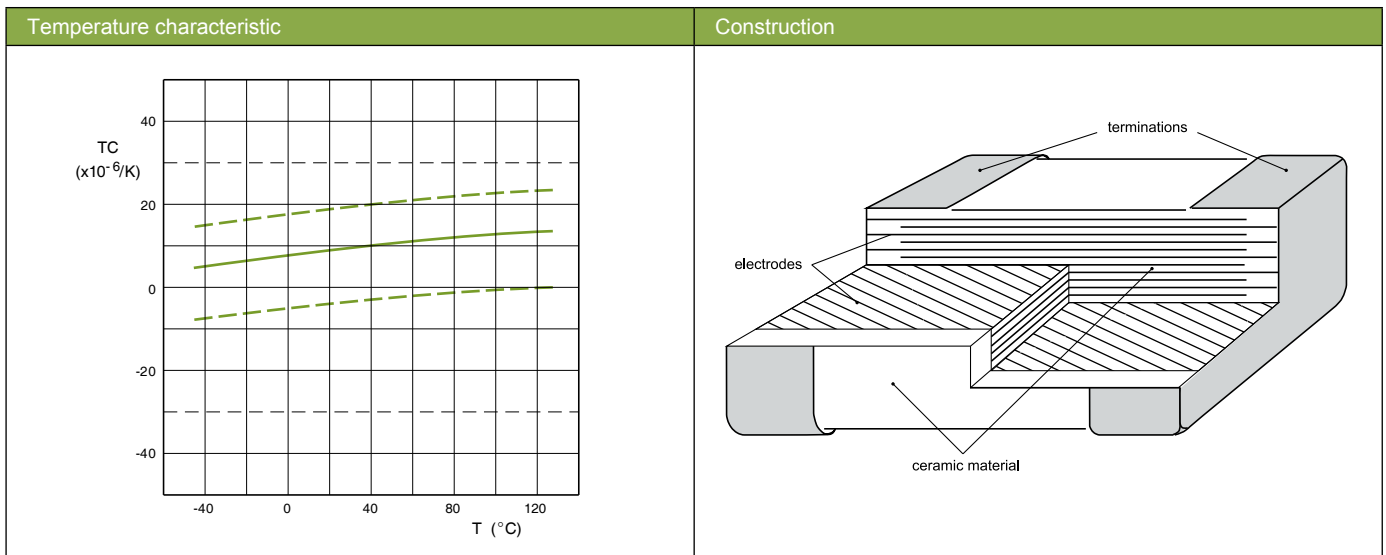
Thickness classes and packing quantities									
Description	Size code	Thickness classification (mm)	Quantity per reel				Quantity per bulk case		
			Tape width	180 mm / 7"		330 mm / 13"			
				Paper	Blister	Paper		Blister	
Discrete capacitors	0201	0.3 ±0.03 / ±0.05	8 mm	15 000	---	50 000	---	---	
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





Features

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



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

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



MLCC Selection Charts

NPO - General purpose 16 to 25V, 0201 to 0603

NPO						
General purpose						
Capacitance	Last 2-digit of 12NC	0201	0402		0603	
		25 V	16 V	25 V	16 V	25 V
10 pF	23	0.3 ±0.03	0.5 ±0.05	0.5 ±0.05	0.8 ±0.1	0.8 ±0.1
12 pF	24					
15 pF	25					
18 pF	26					
22 pF	27					
27 pF	28					
33 pF	29					
39 pF	31					
47 pF	32					
56 pF	33					
68 pF	34					
82 pF	35					
100 pF	36					
120 pF	37					
150 pF	38					
180 pF	39					
220 pF	41					
270 pF	42					
330 pF	43					
390 pF	44					
470 pF	45					
560 pF	46					
680 pF	47					
820 pF	48					
1 000 pF	49					
1.2 nF	51					
1.5 nF	52					
1.8 nF	53					
2.2 nF	54					
2.7 nF	55					
3.3 nF	56					
3.9 nF	57					
4.7 nF	58					
Tape width		8 mm				

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



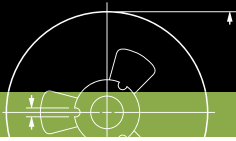
MLCC Selection Charts

NPO - General purpose 16 to 25V, 0805 to 1210

NPO						
General purpose						
Capacitance	Last 2-digit of 12NC	0805		1206		1210
		16 V	25 V	16 V	25 V	25 V
10 pF	23	0.6 ±0.1	0.6 ±0.1	0.6 ±0.1	0.6 ±0.1	
12 pF	24					
15 pF	25					
18 pF	26					
22 pF	27					
27 pF	28					
33 pF	29					
39 pF	31					
47 pF	32					
56 pF	33					
68 pF	34					
82 pF	35					
100 pF	36					
120 pF	37					
150 pF	38					
180 pF	39					
220 pF	41	1.25 ±0.2				
270 pF	42					
330 pF	43					
390 pF	44					
470 pF	45					
560 pF	46					
680 pF	47					
820 pF	48					
1 000 pF	49					
1.2 nF	51		0.85 ±0.1	0.85 ±0.1	0.85 ±0.1	0.85 ±0.1
1.5 nF	52					
1.8 nF	53					
2.2 nF	54	1.25 ±0.2	1.25 ±0.2	0.85 ±0.1	0.85 ±0.1	
2.7 nF	55					
3.3 nF	56					
3.9 nF	57					
4.7 nF	58					
5.6 nF	59					
6.8 nF	61					
8.2 nF	62					
10 nF	63	1.25 ±0.2	1.25 ±0.2	1.25 ±0.2	1.25 ±0.2	
12 nF	64					
15 nF	65					
18 nF	66					
22 nF	67	1.6 ±0.2	1.6 ±0.2	1.6 ±0.2	1.6 ±0.2	
33 nF	69					
Tape width		8 mm				

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





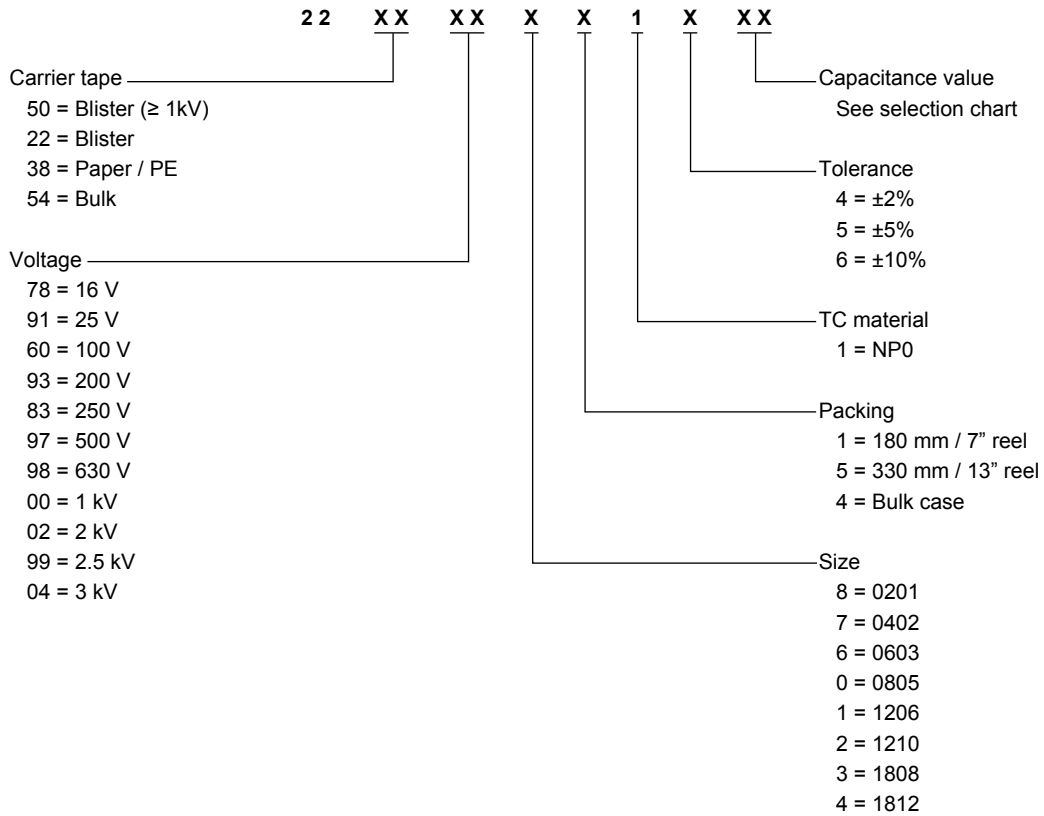
MLCC Selection Charts

NPO - General purpose 16 to 25V, 0201 to 1210

Global part number - Preferred type

Global Part Number is the preferred clear text code for ordering Yageo and Phycomp branded products. For details, please see page 77.

12NC ordering code - Phycomp branded products only



Phycomp CTC ordering code - North America

Regional code for ordering Phycomp branded products. For details, please see page 79.

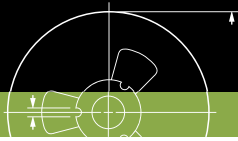


MLCC Selection Charts

NPO - General purpose 50V, 0201 to 1812

NPO															
General purpose															
Capacitance	Last 3-digit of 12NC	0201	0402	0603	0805	1206	1210	1812							
		50 V	50 V	50 V	50 V	50 V	50 V	50 V							
0.47 pF	477	0.3 ±0.03													
0.56 pF	567														
0.68 pF	687														
0.82 pF	827														
1 pF	108														
1.2 pF	128														
1.5 pF	158														
1.8 pF	188														
2.2 pF	228														
2.7 pF	278														
3.3 pF	338														
3.9 pF	398														
4.7 pF	478														
5.6 pF	568														
6.8 pF	688														
8.2 pF	828														
10 pF	109														
12 pF	129														
15 pF	159														
18 pF	189														
22 pF	229	0.5 ±0.05			0.6 ±0.1										
27 pF	279														
33 pF	339														
39 pF	399														
47 pF	479								0.8 ±0.1			0.6 ±0.1			
56 pF	569														
68 pF	689														
82 pF	829														
100 pF	101														
120 pF	121														
150 pF	151														
180 pF	181														
220 pF	221														
270 pF	271														
330 pF	331					1.25 ±0.2									
390 pF	391														
470 pF	471														
560 pF	561														
680 pF	681														
820 pF	821														
1 000 pF	102														
1.2 nF	122														
1.5 nF	152														
1.8 nF	182														
2.2 nF	222														
2.7 nF	272														
3.3 nF	332														
3.9 nF	392														





MLCC Selection Charts

NPO - General purpose 50V, 0201 to 1812

NPO									
General purpose									
Capacitance	Last 3-digit of 12NC	0201	0402	0603	0805	1206	1210	1812	
		50 V	50 V	50 V	50 V	50 V	50 V	50 V	
4.7 nF	472			0.80 ±0.1	1.25 ±0.2	0.85 ±0.1	1.0 ±0.15	1.25 ±0.2	
5.6 nF	562								
6.8 nF	682					1.25 ±0.2			
8.2 nF	822								
10 nF	103								
12 nF	123						1.25 ±0.2		
15 nF	153								
18 nF	183								
22 nF	223						2.0 ±0.2		
Tape width		8 mm						12 mm	

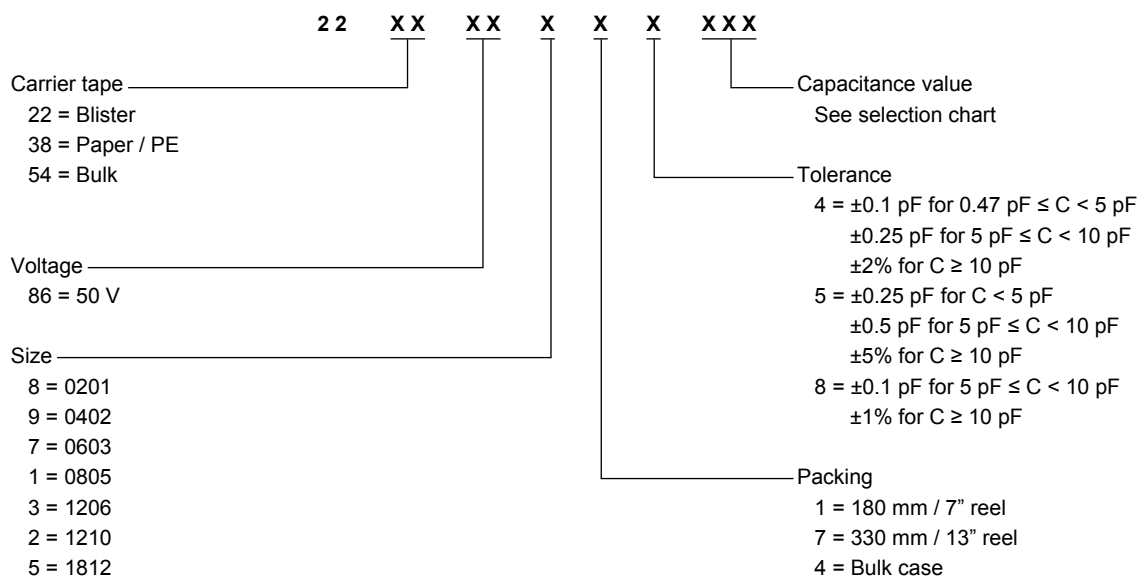
Note: Values in shaded cells indicate thickness class (unit: mm)



Global part number - Preferred type

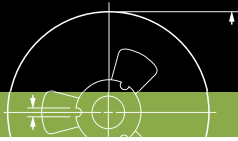
Global Part Number is the preferred clear text code for ordering Yageo and Phycomp branded products. For details, please see page 77.

12NC ordering code - Phycomp branded products only



Phycomp CTC ordering code - North America

Regional code for ordering Phycomp branded products. For details, please see page 79.



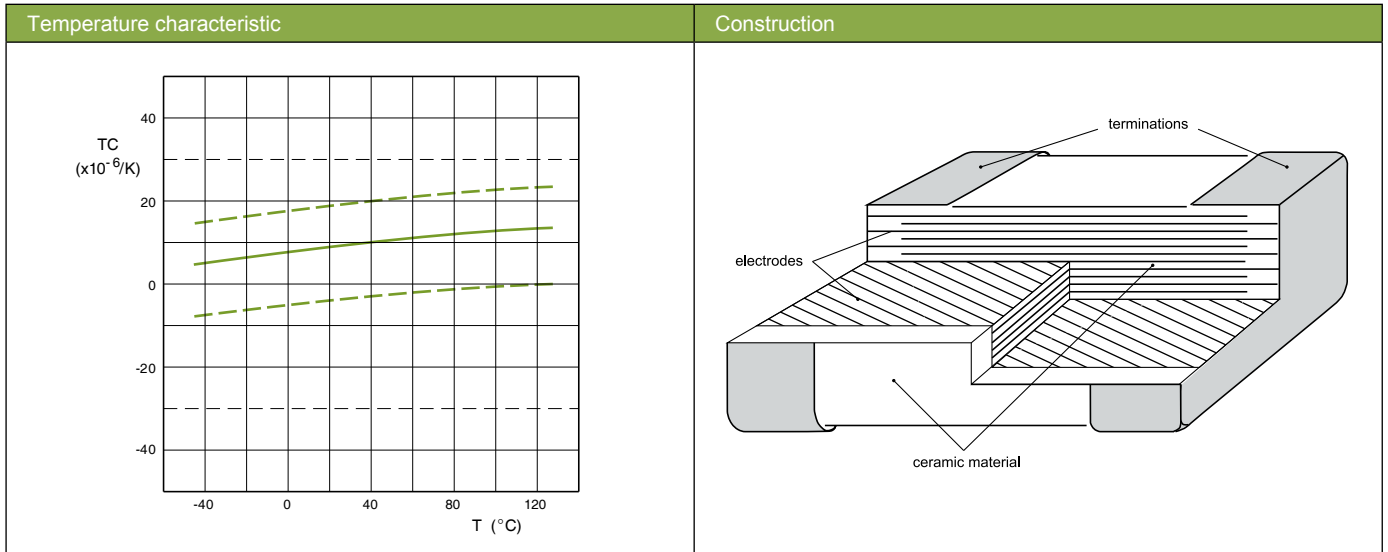
MLCC Selection Charts

NPO - Medium & High voltage, 0402 to 1812



Features

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



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

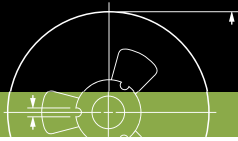


MLCC Selection Charts

NPO - Medium voltage, 0402 to 0805

NPO										
Medium voltage										
Capacitance	Last 2-digit of 12NC	0402	0603			0805				
		100V	100 V	200 V	250 V	100 V	200 V	250 V	500 V	630 V
10 pF	23	0.5 ±0.05								
12 pF	24									
15 pF	25									
18 pF	26									
22 pF	27									
27 pF	28									
33 pF	29									
39 pF	31									
47 pF	32									
56 pF	33									
68 pF	34									
82 pF	35									
100 pF	36									
120 pF	37	0.8 ±0.1				0.6 ±0.1				
150 pF	38									
180 pF	39									
220 pF	41									
270 pF	42									
330 pF	43									
390 pF	44									
470 pF	45									
560 pF	46									
680 pF	47									
820 pF	48									
1 000 pF	49									
1.2 nF	51									
1.5 nF	52									
1.8 nF	53									
2.2 nF	54									
2.7 nF	55									
3.3 nF	56									
3.9 nF	57									
4.7 nF	58									
5.6 nF	59									
6.8 nF	61									
8.2 nF	62									
10 nF	63									
Tape width		8 mm								

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



MLCC Selection Charts

NPO - Medium voltage, 1206 / 1210

NPO											
Medium voltage											
Capacitance	Last 2-digit of 12NC	1206					1210				
		100 V	200 V	250 V	500 V	630 V	100 V	200 V	250 V	500 V	630 V
10 pF	23										
12 pF	24										
15 pF	25										
18 pF	26										
22 pF	27										
27 pF	28										
33 pF	29										
39 pF	31										
47 pF	32										
56 pF	33										
68 pF	34										
82 pF	35		0.6 ±0.1	0.6 ±0.1	0.6 ±0.1						
100 pF	36					1.25 ±0.2					1.25 ±0.2
120 pF	37										
150 pF	38										
180 pF	39	0.6 ±0.1									
220 pF	41										
270 pF	42										
330 pF	43										
390 pF	44										
470 pF	45										
560 pF	46										
680 pF	47										
820 pF	48										
1 000 pF	49		0.85 ±0.1	0.85 ±0.1	0.85 ±0.1						
1.2 nF	51										
1.5 nF	52										
1.8 nF	53										
2.2 nF	54		1.25 ±0.2	1.25 ±0.2	1.25 ±0.2						
2.7 nF	55										
3.3 nF	56										
3.9 nF	57										
4.7 nF	58	0.85 ±0.1									
5.6 nF	59										
6.8 nF	61										
8.2 nF	62	1.25 ±0.2									
10 nF	63										
12 nF	64										
15 nF	65										
Tape width		8 mm									

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

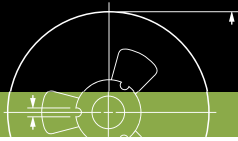


MLCC Selection Charts

NPO - Medium voltage, 1808 / 1812

NPO											
Medium voltage											
Capacitance	Last 2-digit of 12NC	1808					1812				
		100 V	200 V	250 V	500 V	630 V	100 V	200 V	250 V	500 V	630 V
10 pF	23										
12 pF	24										
15 pF	25										
18 pF	26										
22 pF	27										
27 pF	28										
33 pF	29										
39 pF	31										
47 pF	32										
56 pF	33										
68 pF	34										
82 pF	35										
100 pF	36										1.25 ±0.2
120 pF	37										
150 pF	38										1.25 ±0.2
180 pF	39					1.25 ±0.2					
220 pF	41						1.25 ±0.2	1.25 ±0.2	1.25 ±0.2		
270 pF	42				1.25 ±0.2						
330 pF	43										
390 pF	44	1.25 ±0.2	1.25 ±0.2	1.25 ±0.2							
470 pF	45										
560 pF	46										
680 pF	47										
820 pF	48										
1 000 pF	49										
1.2 nF	51										
1.5 nF	52										
1.8 nF	53										
2.2 nF	54										
2.7 nF	55										
3.3 nF	56										
3.9 nF	57										
4.7 nF	58										
5.6 nF	59										
6.8 nF	61										
8.2 nF	62										
10 nF	63										
12 nF	64										
15 nF	65										
18 nF	66										
22 nF	67										
Tape width		12 mm									

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



MLCC Selection Charts

NPO - High voltage, 0805 to 1812

NPO											
High voltage											
Capacitance	Last 2-digit of 12NC	0805	1206	1210		1808			1812		
		1KV	1 kV	1 kV	2 kV	1 kV	2 kV	3 kV	1 kV	2 kV	3 kV
10 pF	23	0.85 ±0.1	1.25 ±0.2					1.6 ±0.2	1.25 ±0.2	1.25 ±0.2	1.25 ±0.2
12 pF	24										
15 pF	25										
18 pF	26										
22 pF	27										
27 pF	28										
33 pF	29										
39 pF	31										
47 pF	32										
56 pF	33										
68 pF	34										
82 pF	35		1.25 ±0.2	1.25 ±0.2		1.25 ±0.2					
100 pF	36		1.25 ±0.2						1.25 ±0.2		
120 pF	37										
150 pF	38										
180 pF	39					1.25 ±0.2					
220 pF	41							2.0 ±0.2			
270 pF	42										
330 pF	43										
390 pF	44										
470 pF	45										
560 pF	46										
680 pF	47										
820 pF	48										
1 000 pF	49										
1.2 nF	51										
1.5 nF	52										
1.8 nF	53										
2.2 nF	54										
2.7 nF	55										
Tape width		12 mm									

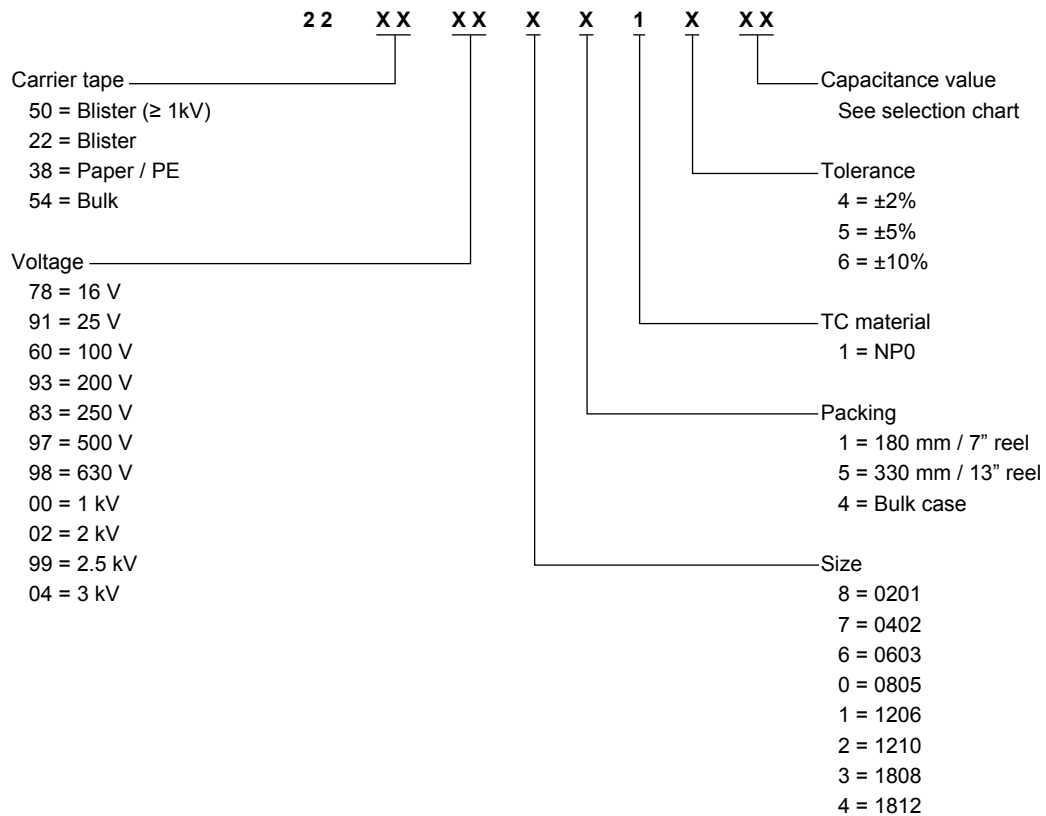
Note: Values in shaded cells indicate thickness class (unit: mm)



Global part number - Preferred type

Global Part Number is the preferred clear text code for ordering Yageo and Phycomp branded products. For details, please see page 77.

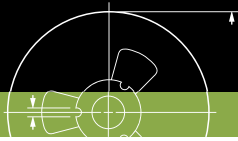
12NC ordering code - Phycomp branded products only



Phycomp CTC ordering code - North America

Regional code for ordering Phycomp branded products. For details, please see page 79.





MLCC Selection Charts

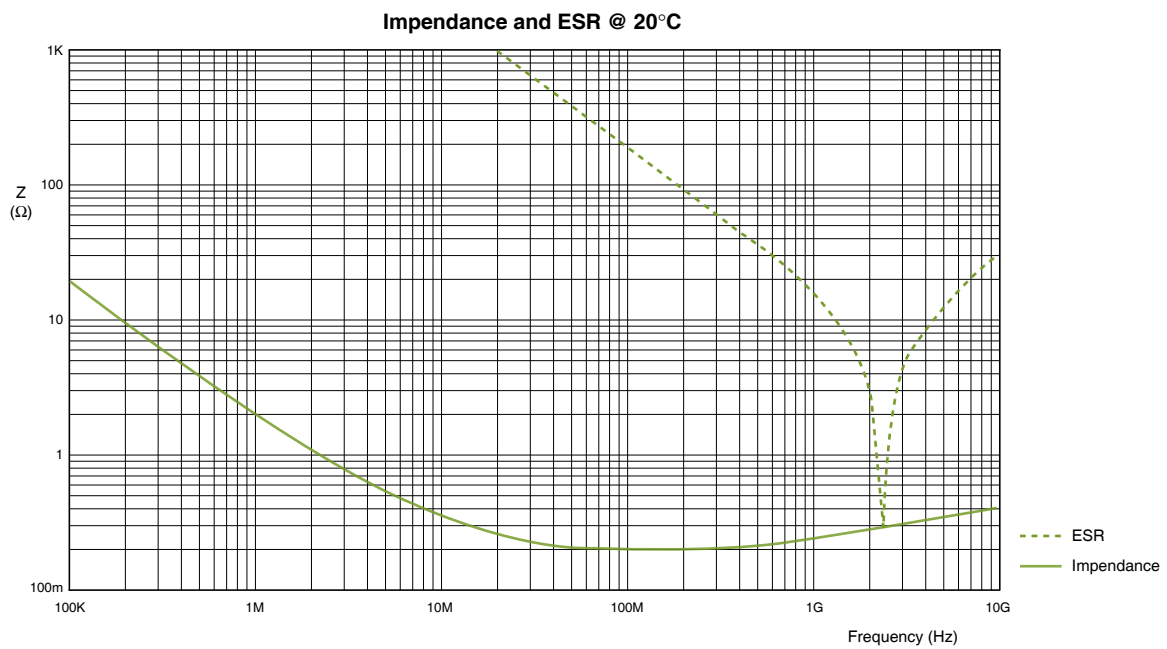
NPO - High frequency, 0402 to 0805



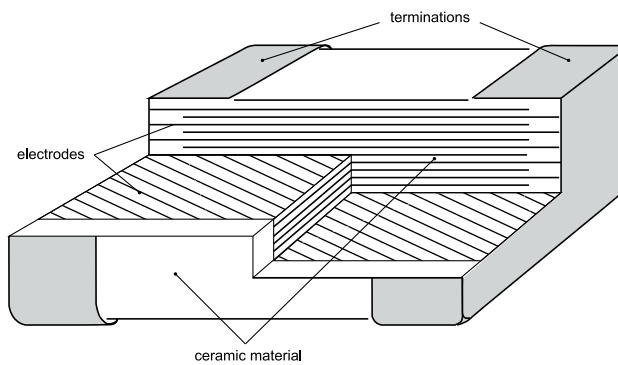
Features

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

ESR characteristic



Construction



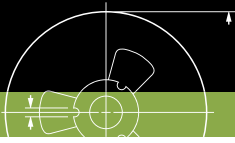
MLCC Selection Charts

NPO - High frequency, 0402 to 0805

Case dimensions							
Discrete capacitors - High Frequency							
	Case size designation		Dimensions in mm				
	Inch-based	Metric	L ₁	W	L ₂ / L ₃ min	L ₂ / L ₃ max	L ₄ min
	0402	1005M	1.0 ±0.05	0.5 ±0.05	0.15	0.30	0.40
	0603	1608M	1.6 ±0.10	0.8 ±0.10	0.20	0.60	0.40
0805	2012M	2.0 ±0.10	1.25 ±0.10	0.25	0.75	0.55	

NPO				
High frequency				
Capacitance	Last 3-digit of 12NC	0402	0603	0805
		50 V	50 V	50 V
0.22 pF	227	0.5 ±0.05	0.8 ±0.1	0.6 ±0.1
0.47 pF	477			
0.56 pF	567			
0.68 pF	687			
0.82 pF	827			
1 pF	108			
1.2 pF	128			
1.5 pF	158			
1.8 pF	188			
2.2 pF	228			
2.7 pF	278			
3.3 pF	338			
3.9 pF	398			
4.7 pF	478			
5.6 pF	568			
6.8 pF	688			
8.2 pF	828			
10 pF	109			
12 pF	129			
15 pF	159			
18 pF	189			
22 pF	229			
27 pF	279			
33 pF	339			
39 pF	399			
47 pF	479			
56 pF	569			
68 pF	689			
82 pF	829			
100 pF	101			
Tape width		8 mm		

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



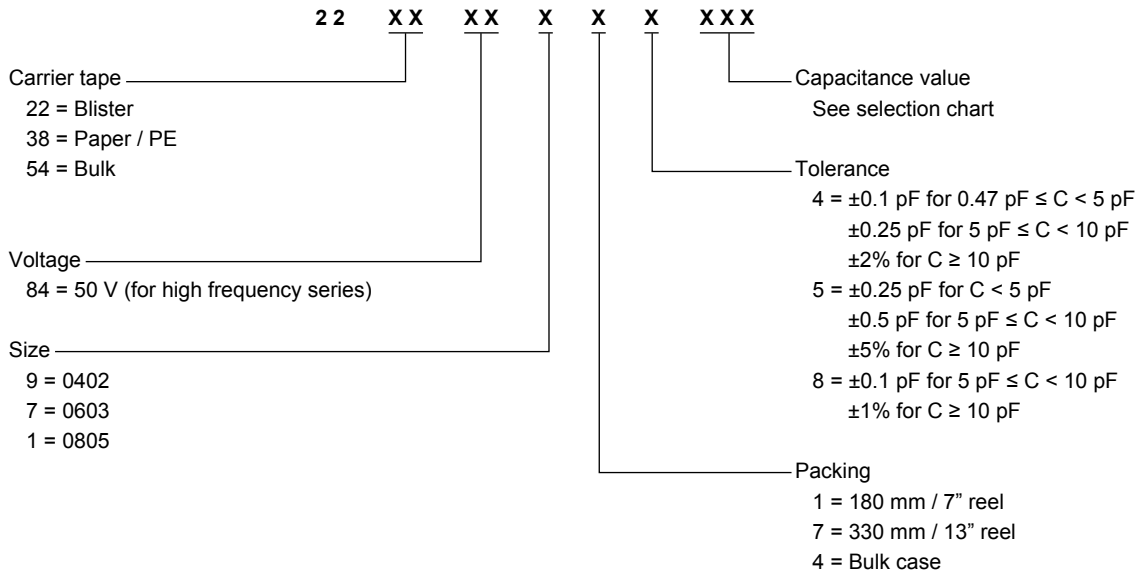
MLCC Selection Charts

NPO - High frequency, 0402 to 0805

Global part number - Preferred type

Global Part Number is the preferred clear text code for ordering Yageo and Phycomp branded products. For details, please see page 77.

12NC ordering code - Phycomp branded products only



Phycomp CTC ordering code - North America

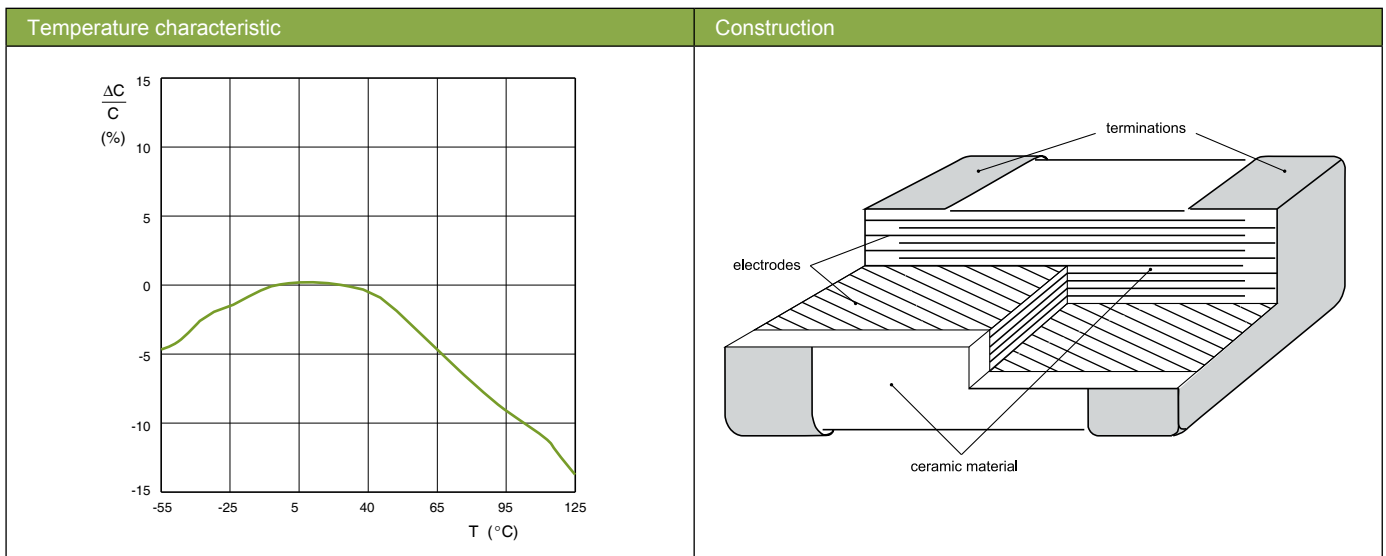
Regional code for ordering Phycomp branded products. For details, please see page 79.





Features

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



Case dimensions							
Discrete capacitors - General purpose & High capacitance							
	Case size designation		Dimensions in mm				
	Inch-based	Metric	L ₁	W	L ₂ / L ₃ min	L ₂ / L ₃ max	L ₄ min
	0201	0603M	0.6 ±0.03 0.6 ±0.05	0.3 ±0.03 0.3 ±0.05	0.10 0.10	0.20 0.20	0.20 0.20
0402	1005M	1.0 ±0.05 ⁽¹⁾ 1.0 ±0.20 ⁽²⁾	0.5 ±0.05 ⁽¹⁾ 0.5 ±0.20 ⁽²⁾	0.15 0.15	0.30 0.30	0.40 0.40	
		0603	1608M	1.6 ±0.10 ⁽¹⁾ 1.6 ±0.15 ⁽²⁾	0.8 ±0.10 ⁽¹⁾ 0.8 ±0.15 ⁽²⁾	0.20 0.20	0.60 0.60
0805	2012M			2.0 ±0.10 ⁽¹⁾ 2.0 ±0.20 ⁽²⁾	1.25 ±0.10 ⁽¹⁾ 1.25 ±0.20 ⁽²⁾	0.25 0.25	0.75 0.75
		1206	3216M	3.2 ±0.15 ⁽¹⁾ 3.2 ±0.30 ⁽²⁾	1.6 ±0.15 ⁽¹⁾ 1.6 ±0.20 ⁽²⁾	0.25 0.25	0.75 0.75
1210	3225M			3.2 ±0.20 ⁽¹⁾ 3.2 ±0.40 ⁽²⁾	2.5 ±0.20 ⁽¹⁾ 2.5 ±0.30 ⁽²⁾	0.25 0.25	0.75 0.75
		1808	4520M	4.5 ±0.40	2.0 ±0.30	0.25	0.75
1812	4532M			4.5 ±0.20 ⁽¹⁾ 4.5 ±0.40 ⁽²⁾	3.2 ±0.20 ⁽¹⁾ 3.2 ±0.40 ⁽²⁾	0.25 0.25	0.75 0.75

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



MLCC Selection Charts

X7R - General purpose, 0201 / 0402

X7R											
General purpose											
Capacitance	Last 2-digit of 12NC	0201					0402				
		6.3 V	10 V	16 V	25 V	50 V	6.3 V	10 V	16 V	25 V	50 V
100 pF	09										
150 pF	12										
220 pF	14					0.3 ±0.03					
330 pF	16				0.3 ±0.03						
470 pF	18										
680 pF	21										
1 000 pF	23	0.3 ±0.03	0.3 ±0.03	0.3 ±0.03							
1.5 nF	25										0.5 ±0.05
2.2 nF	27										
3.3 nF	29						0.5 ±0.05	0.5 ±0.05	0.5 ±0.05	0.5 ±0.05	
4.7 nF	32										
6.8 nF	34										
10 nF	36										
15 nF	38										
22 nF	41										
33 nF	43										
47 nF	45										
68 nF	47										
100 nF	49										
150 nF	52										
220 nF	54						0.5 ±0.05	0.5 ±0.05	0.5 ±0.05		
330 nF	56										
470 nF	58						0.5 ±0.05				
680 nF	61										
1 000 nF	63						0.5 ±0.05 (X6S)				
Tape width		8 mm									

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



MLCC Selection Charts

X7R - General purpose & High capacitance, 0603 / 0805

X7R											
General purpose & High capacitance											
Capacitance	Last 2-digit of 12NC	0603					0805				
		6.3 V	10 V	16 V	25 V	50 V	6.3 V	10 V	16 V	25 V	50 V
100 pF	09										
150 pF	12										
220 pF	14										
330 pF	16										
470 pF	18										
680 pF	21										
1 000 pF	23										
1.5 nF	25										
2.2 nF	27						0.6 ±0.1	0.6 ±0.1	0.6 ±0.1	0.6 ±0.1	0.6 ±0.1
3.3 nF	29										
4.7 nF	32										
6.8 nF	34										
10 nF	36										
15 nF	38	0.8 ±0.1	0.8 ±0.1	0.8 ±0.1	0.8 ±0.1	0.8 ±0.1					
22 nF	41										
33 nF	43										
47 nF	45										
68 nF	47										
100 nF	49						0.85 ±0.1	0.85 ±0.1	0.85 ±0.1	0.85 ±0.1	0.85 ±0.1
150 nF	52										
220 nF	54										
330 nF	56										
470 nF	58										1.25 ±0.2
680 nF	61										
1 000 nF	63						1.25 ±0.2	1.25 ±0.2	1.25 ±0.2	1.25 ±0.2	
2.2 µF	67										
4.7 µF	72										
10 µF	76										
Tape width		8 mm									

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





MLCC Selection Charts

X7R - General purpose & High capacitance, 1206 to 1812

X7R											
General purpose & High capacitance											
Capacitance	Last 2-digit of 2NC	1206					1210				1812
		6.3 V	10 V	16 V	25 V	50 V	10 V	16 V	25 V	50 V	50 V
220 pF	14										
330 pF	16										
470 pF	18										
680 pF	21										
1 000 pF	23										
1.5 nF	25										
2.2 nF	27										
3.3 nF	29										
4.7 nF	32					0.85 ±0.1					
6.8 nF	34										
10 nF	36	0.85 ±0.1	0.85 ±0.1	0.85 ±0.1	0.85 ±0.1					0.85 ±0.1	
15 nF	38										
22 nF	41										
33 nF	43						0.85 ±0.1	0.85 ±0.1	0.85 ±0.1		
47 nF	45										
68 nF	47										
100 nF	49										
150 nF	52					1.15 ±0.1				1.15 ±0.1	1.25 ±0.2
220 nF	54										
330 nF	56					1.0 ±0.1					
470 nF	58										
680 nF	61						1.15 ±0.1	1.15 ±0.1	1.15 ±0.1	1.25 ±0.2	1.6 ±0.2
1 000 nF	63	1.15 ±0.1	1.15 ±0.1	1.15 ±0.1	1.15 ±0.1	1.6 ±0.2	1.25 ±0.2	1.25 ±0.2	1.25 ±0.2		
2.2 µF	67						1.9 ±0.2	1.9 ±0.2	1.9 ±0.2	1.9 ±0.2	
4.7 µF	72			1.6 ±0.2	1.6 ±0.2						
10 µF	76	1.6 ±0.2	1.6 ±0.2							2.5 ±0.2	
22 µF	81						2.5 ±0.2	2.5 ±0.2	2.5 ±0.2		
47 µF	85										
Tape width		8 mm									12mm

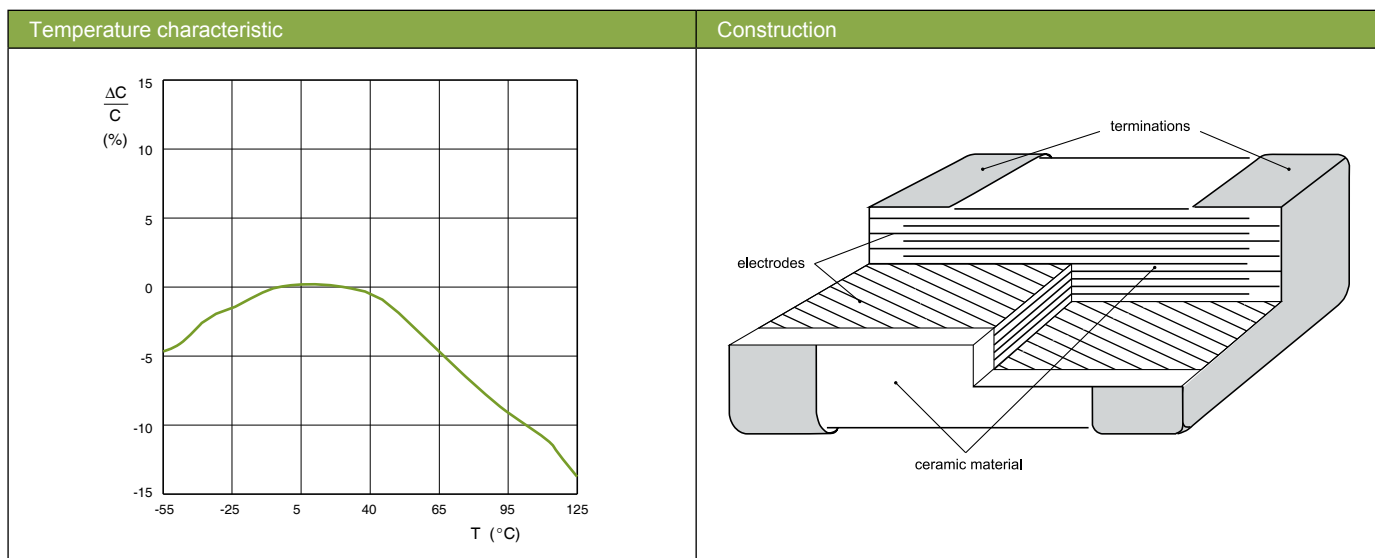
Note: Values in shaded cells indicate thickness class (unit: mm)





Features

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



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



MLCC Selection Charts

X7R - Medium voltage, 0603 / 0805

X7R												
Medium voltage												
Capacitance	Last 2-digit of 12NC	0402	0603			0805						
		100V	100V	250V	100 V	200 V	250 V	500 V	630 V			
100 pF	9	0.5 ±0.05	0.8 ±0.1	0.8 ±0.1								
150 pF	12											
220 pF	14											
330 pF	16											
470 pF	18											
680 pF	21											
1 000 pF	23											
1.5 nF	25							0.6 ±0.1	0.85 ±0.1	0.85 ±0.1	0.85 ±0.1	0.85 ±0.1
2.2 nF	27											
2.7 nF	28											
3.3 nF	29											
4.7 nF	32											
6.8 nF	34											
10 nF	36											
15 nF	38											
22 nF	41				0.85 ±0.1	1.25 ±0.2	1.25 ±0.2					
33 nF	43											
47 nF	45											
68 nF	47											
100 nF	49				1.25 ±0.2							
220 nF	54											
Tape width		8 mm										

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

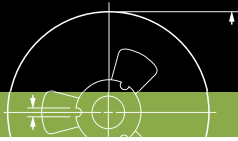


MLCC Selection Charts

X7R - Medium voltage, 1206 / 1210

X7R											
Medium voltage											
Capacitance	Last 2-digit of 12NC	1206					1210				
		100V	200V	250V	500V	630V	100 V	200 V	250 V	500 V	630 V
220 pF	14										
330 pF	16										
470 pF	18										
680 pF	21										
1 000 pF	23										
1.5 nF	25										
2.2 nF	27										
3.3 nF	29	0.85 ±0.1	0.85 ±0.1	0.85 ±0.1	1.25 ±0.2	1.25 ±0.2					
4.7 nF	32										
6.8 nF	34										
10 nF	36										
15 nF	38										
22 nF	41						0.85 ±0.1				
33 nF	43		1.25 ±0.2	1.25 ±0.2		1.6 ±0.2		0.85 ±0.1	0.85 ±0.1	1.25 ±0.2	1.25 ±0.2
47 nF	45										
68 nF	47										
100 nF	49		1.25 ±0.2	1.25 ±0.2				1.25 ±0.2	1.25 ±0.2		
150 nF	52	1.25 ±0.2									
220 nF	54										
330 nF	56						1.25 ±0.2				
470 nF	58	1.6 ±0.2									
680 nF	61										
1 000 nF	63										
2.2 µF	67						2.0 ±0.2				
Tape width		8 mm									

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



MLCC Selection Charts

X7R - Medium voltage, 1812

X7R						
Medium voltage						
Capacitance	Last 2-digit of 12NC	1812				
		100 V	200 V	250 V	500 V	630 V
1 000 pF	23	0.85 ±0.1	0.85 ±0.1	0.85 ±0.1	1.25 ±0.2	1.25 ±0.2
1.5 nF	26					
2.2 nF	28					
3.3 nF	29					
4.7 nF	32					
6.8 nF	34					
10 nF	36					
15 nF	38					
22 nF	41					
33 nF	43					
47 nF	45					
68 nF	47	1.25 ±0.2	1.6 ±0.2	1.6 ±0.2	1.6 ±0.2	
100 nF	49					
150 nF	52					
220 nF	54					
330 nF	56					
470 nF	58	1.6 ±0.2				
560 nF	59					
680 nF	61					
820 nF	62					
1 000 nF	63					
Tape width		12 mm				

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



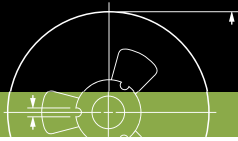
MLCC Selection Charts

X7R - High voltage, 1206 / 1210

X7R						
High voltage						
Capacitance	Last 2-digit of 12NC	0805	1206		1210	
		1kV	1 kV	2 kV	1 kV	2 kV
100 pF	09					
150 pF	12					
220 pF	14	0.85 ±0.1	1.25 ±0.2	1.25 ±0.2		
330 pF	16					
470 pF	18					
680 pF	21					
1 000 pF	23					1.25 ±0.2
1.5 nF	25		1.25 ±0.2		1.25 ±0.2	
2.2 nF	27					
3.3 nF	29					
4.7 nF	32					
6.8 nF	34					
10 nF	36				1.25 ±0.2	
15 nF	38					
22 nF	41					1.6 ±0.2
33 nF	43					
Tape width		8 mm				

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





MLCC Selection Charts

X7R - High voltage, 1808 / 1812

X7R								
High voltage								
Capacitance	Last 2-digit of 12NC	1808			1812			
		1 kV	2 kV	3 kV	1 kV	2 kV	3 kV	
150 pF	12			1.6 ±0.2				
220 pF	14							
330 pF	16	1.35 ±0.2	1.35 ±0.2					
470 pF	18							
680 pF	21							
1 000 pF	23				2.0 ±0.2	1.35 ±0.2	1.35 ±0.2	1.6 ±0.2
1.5 nF	25							
2.2 nF	27		1.6 ±0.2					
3.3 nF	29							
4.7 nF	32							
6.8 nF	34	1.6 ±0.2						1.6 ±0.2
10 nF	36							2.0 ±0.2
15 nF	38							
22 nF	41							
33 nF	43				1.6 ±0.2			
Tape width		12 mm						

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

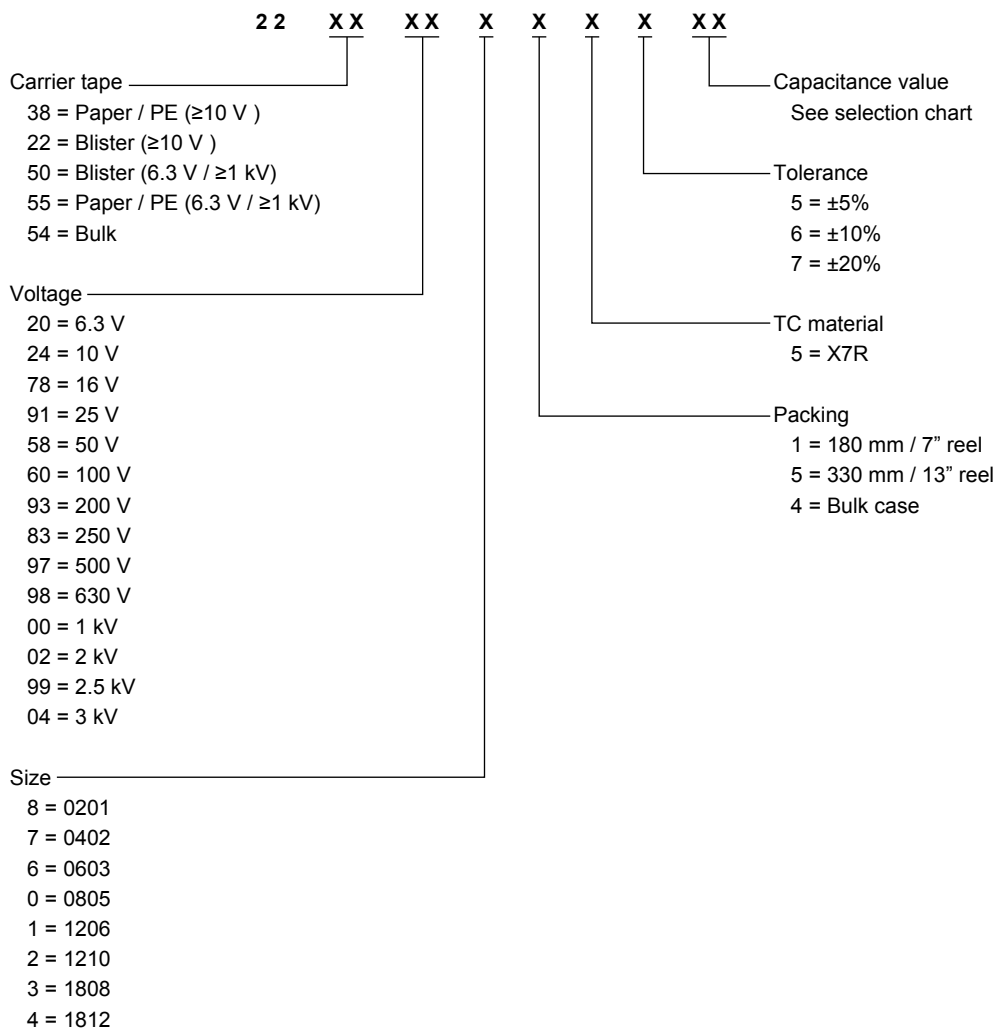


X7R - General purpose, High Capacitance, Medium & High voltage

Global part number - Preferred type

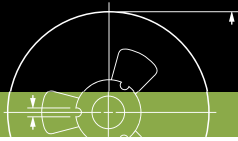
Global Part Number is the preferred clear text code for ordering Yageo and Phycomp branded products. For details, please see page 77.

12NC ordering code - Phycomp branded products only



Phycomp CTC ordering code - North America

Regional code for ordering Phycomp branded products. For details, please see page 79.



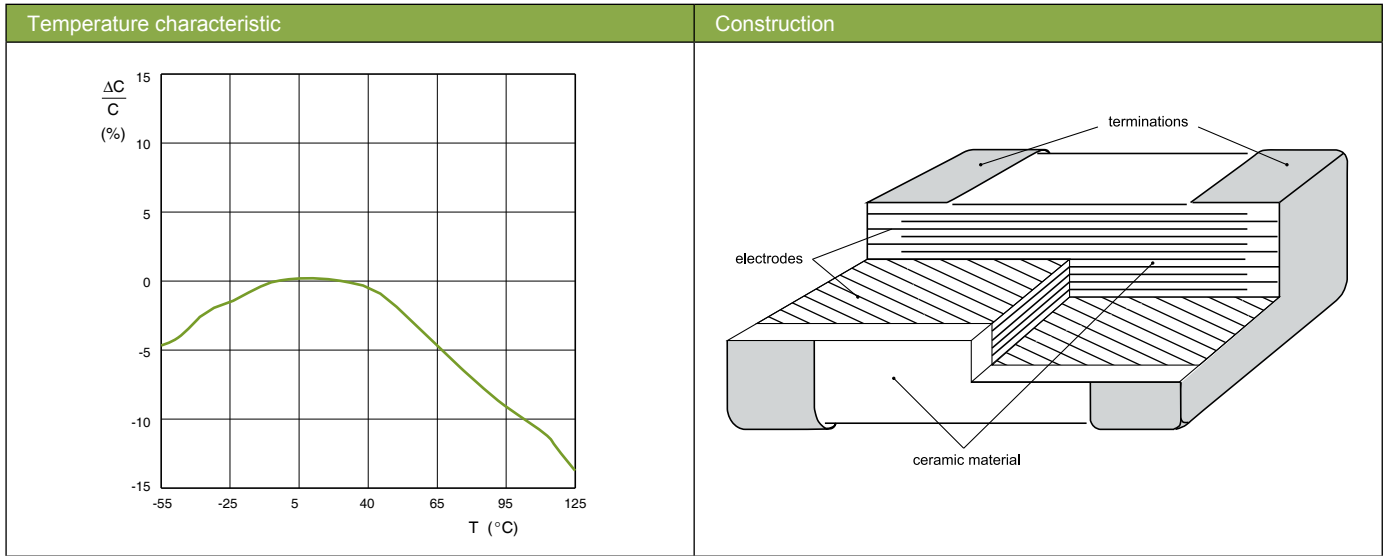
MLCC Selection Charts

X7R - Low inductance, 0306 to 0612



Features

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



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



X7R					
Low inductance					
Capacitance	Last 2-digit of 12NC	0306	0508	0508	0612
		10 V	16 V	25 V	50 V
10 nF	36			0.85 ±0.1	0.85 ±0.1
22 nF	41				
47 nF	45				
100 nF	49	0.5 ±0.1	0.85 ±0.1		
220 nF	54				
Tape width		8 mm			

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



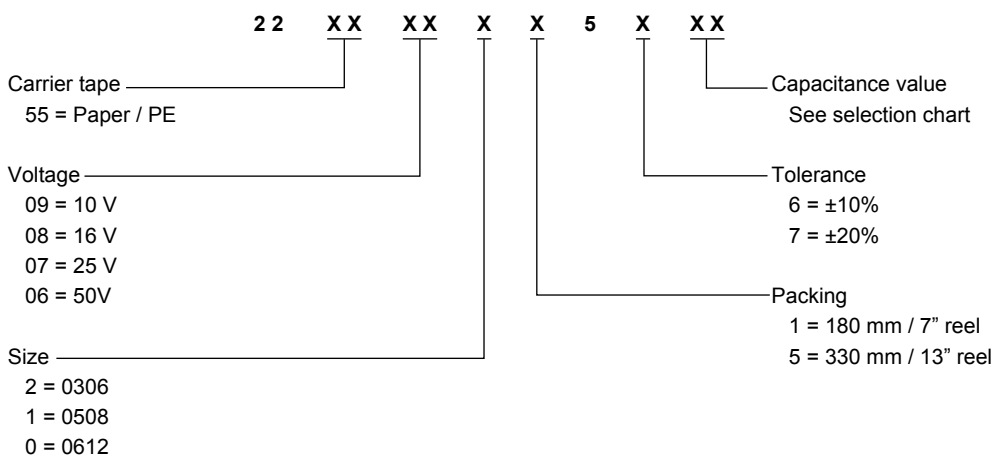
MLCC Selection Charts

X7R - Low inductance, 0306 to 0612

Global part number - Preferred type

Global Part Number is the preferred clear text code for ordering Yageo and Phycomp branded products. For details, please see page 77.

12NC ordering code - Phycomp branded products only



Phycomp CTC ordering code - North America

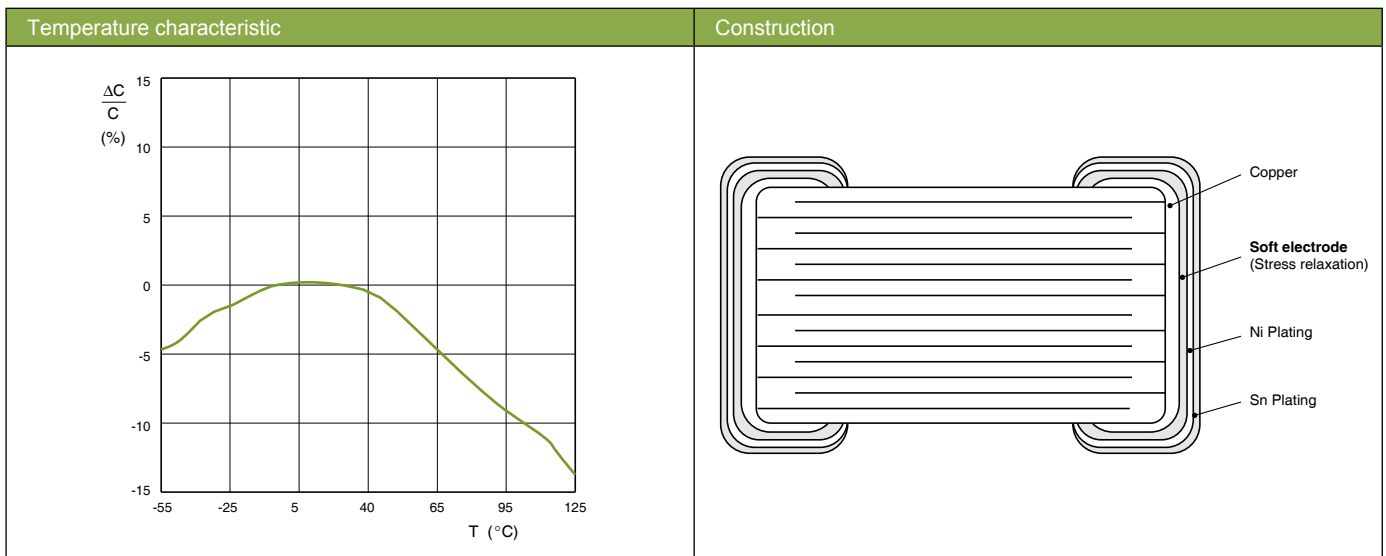
Regional code for ordering Phycomp branded products. For details, please see page 79.



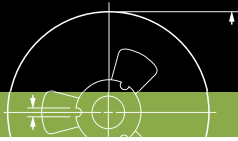


Features

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



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



MLCC Selection Charts

X7R - Soft termination, 0603 / 0805

X7R											
Soft termination											
Capacitance	Last 2-digit of 12NC	0603				0805					
		16 V	25 V	50 V	100 V	16 V	25 V	50 V	100 V	200 V	250 V
100 pF	09										
150 pF	12										
180 pF	13										
220 pF	14										
330 pF	16										
390 pF	17										
470 pF	18										
680 pF	21				0.8 ±0.1					0.85 ±0.1	0.85 ±0.1
1 000 pF	23			0.8 ±0.1					0.6 ±0.1		
1.5 nF	25		0.8 ±0.1			0.6 ±0.1	0.6 ±0.1	0.6 ±0.1			
2.2 nF	27										
3.3 nF	29	0.8 ±0.1									
4.7 nF	32										
6.8 nF	34										
10 nF	36									1.25 ±0.2	1.25 ±0.2
15 nF	38										
18 nF	39								0.85 ±0.1		
22 nF	41										
27 nF	42										
33 nF	43										
47 nF	45					0.85 ±0.1	0.85 ±0.1	0.85 ±0.1			
68 nF	47										
100 nF	49										
150 nF	52										
220 nF	54										
270 nF	55										
330 nF	56										
390 nF	57										
470 nF	58										
680 nF	61										
1 000 nF	63										
Tape width		8mm									

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



MLCC Selection Charts

X7R - Soft termination, 1206

X7R								
Soft termination								
Capacitance	Last 2-digit of 12NC	1206						
		16V	25V	50V	100V	200V	250V	630V
100 pF	09							
150 pF	12							
180 pF	13							
220 pF	14							
330 pF	16							
390 pF	17							
470 pF	18							
680 pF	21							
1 000 pF	23							1.25 ±0.2
1.5 nF	25					0.85 ±0.1	0.85 ±0.1	
2.2 nF	27							
3.3 nF	29							
4.7 nF	32							
6.8 nF	34							
10 nF	36							
15 nF	38	0.85 ±0.1						
18 nF	39		0.85 ±0.1					
22 nF	41			0.85 ±0.1				
27 nF	42				0.85 ±0.1			
33 nF	43							
47 nF	45							
68 nF	47							
100 nF	49					1.25 ±0.2		
150 nF	52							
220 nF	54				1.15 ±0.2			
270 nF	55		1.15 ±0.2					
330 nF	56							
390 nF	57							
470 nF	58							
680 nF	61	1.15 ±0.2						
1 000 nF	63							
Tape width		8mm						

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





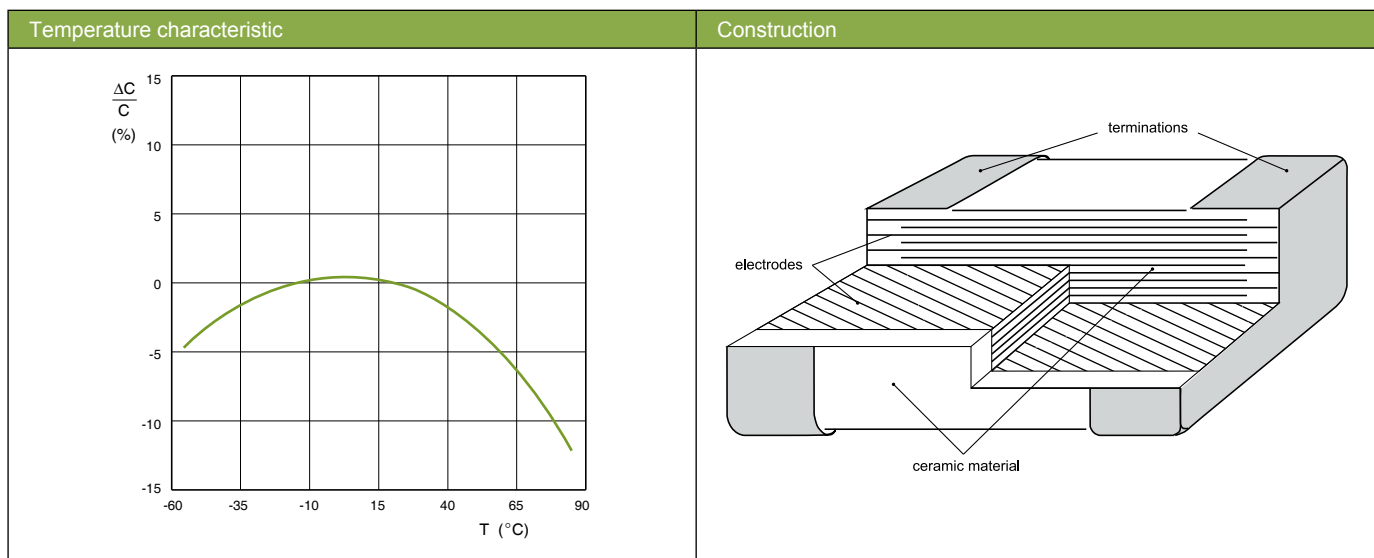
MLCC Selection Charts

X5R - General purpose & High capacitance, 0201 to 1812



Features

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



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

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



MLCC Selection Charts

X5R - General purpose & High capacitance, 0201 / 0402

X5R											
General purpose & High capacitance											
Capacitance	Last 2-digit of 12NC	0201					0402				
		6.3 V	10 V	16 V	25 V	50 V	6.3 V	10 V	16 V	25 V	50 V
100 pF	09										
150 pF	12										
220 pF	14					0.3 ±0.03					
330 pF	16										
470 pF	18										
680 pF	21										
1.0 nF	23				0.3 ±0.03						
1.5 nF	25										
2.2 nF	27										
3.3 nF	29	0.3 ±0.03	0.3 ±0.03	0.3 ±0.03					0.5 ±0.05	0.5 ±0.05	0.5 ±0.05
4.7 nF	32										
6.8 nF	34										
10 nF	36										
15 nF	39						0.5 ±0.05	0.5 ±0.05			
22 nF	41										
33 nF	43										
47 nF	45										
68 nF	47										
100 nF	49										
150 nF	52										
220 nF	54	0.3 ±0.03	0.3 ±0.03							0.5 ±0.05	0.5 ±0.05
330 nF	56										
470 nF	58	0.3 ±0.03							0.5 ±0.05	0.5 ±0.05	0.5 ±0.05
680 nF	61										
1 000 nF	63	0.3 ±0.05							0.5 ±0.05	0.5 ±0.05	
2.2 µF	65										
4.7 µF	67						0.5 ±0.15				
10 µF	76						0.5 ±0.2				
Tape width		8 mm									

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





MLCC Selection Charts

X5R - General purpose & High capacitance, 0603 / 0805

X5R											
General purpose & High capacitance											
Capacitance	Last 2-digit of 12NC	0603					0805				
		6.3 V	10 V	16 V	25 V	50 V	6.3 V	10 V	16 V	25 V	50 V
100 pF	09										
150 pF	12										
220 pF	14										
330 pF	16										
470 pF	18										
680 pF	21										
1.0 nF	23										
1.5 nF	25										
2.2 nF	27										
3.3 nF	29						0.6 ±0.1	0.6 ±0.1	0.6 ±0.1	0.6 ±0.1	0.6 ±0.1
4.7 nF	32										
6.8 nF	34										
10 nF	36										
15 nF	39	0.8 ±0.1	0.8 ±0.1	0.8 ±0.1	0.8 ±0.1	0.8 ±0.1					
22 nF	41										
33 nF	43										
47 nF	45										
68 nF	47										
100 nF	49						0.85 ±0.1	0.85 ±0.1	0.85 ±0.1	0.85 ±0.1	0.85 ±0.1
150 nF	52										
220 nF	54										
330 nF	56										
470 nF	58										1.25 ±0.2
680 nF	61										
1 000 nF	63										
2.2 µF	65						1.25 ±0.2	1.25 ±0.2	1.25 ±0.2	1.25 ±0.2	
4.7 µF	67										
10 µF	76		0.8 ±0.2								
22 µF	81	0.8 ±0.2									
47 µF	85										
100 µF	89										
Tape width		8 mm									

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



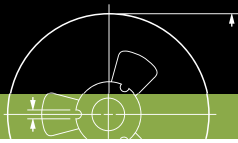
MLCC Selection Charts

X5R - High capacitance, 1206

X5R						
General purpose & High capacitance						
Capacitance	Last 2-digit of 12NC	1206				
		6.3 V	10 V	16 V	25 V	50 V
100 pF	09					
150 pF	12					
220 pF	14	0.85 ±0.1	0.85 ±0.1	0.85 ±0.1	0.85 ±0.1	0.85 ±0.1
330 pF	16					
470 pF	18					
680 pF	21					
1.0 nF	23					
1.5 nF	25					
2.2 nF	27					
3.3 nF	29					
4.7 nF	32					
6.8 nF	34					
10 nF	36					
15 nF	39					
22 nF	41					
33 nF	43					
47 nF	45					
68 nF	47					
100 nF	49					
150 nF	52					1.15 ±0.1
220 nF	54					1.0 ±0.1
330 nF	56					
470 nF	58					
680 nF	61	1.15 ±0.1	1.15 ±0.1	1.15 ±0.1	1.15 ±0.1	1.6 ±0.2
1 000 nF	63					
2.2 µF	65					
4.7 µF	67			1.6 ±0.2	1.6 ±0.2	
10 µF	76	1.6 ±0.2	1.6 ±0.2			
22 µF	81					
47 µF	85					
100 µF	89					
Tape width		8 mm				

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





MLCC Selection Charts

X5R - High capacitance, 1210 / 1812

X5R							
General purpose & High capacitance							
Capacitance	Last 2-digit of 12NC	1210					1812
		6.3 V	10 V	16 V	25 V	50 V	50 V
100 pF	09						
150 pF	12						
220 pF	14						
330 pF	16						
470 pF	18						
680 pF	21						
1.0 nF	23						
1.5 nF	25						
2.2 nF	27	0.85 ±0.1	0.85 ±0.1	0.85 ±0.1	0.85 ±0.1	0.85 ±0.1	0.85 ±0.1
3.3 nF	29						
4.7 nF	32						
6.8 nF	34						
10 nF	36						
15 nF	39						
22 nF	41						
33 nF	43						
47 nF	45						
68 nF	47						
100 nF	49	1.15 ±0.1	1.15 ±0.1	1.15 ±0.1	1.15 ±0.1	1.25 ±0.2	1.6 ±0.2
150 nF	52						
220 nF	54						
330 nF	56	1.9 ±0.2	1.9 ±0.2	1.9 ±0.2	1.9 ±0.2	1.9 ±0.2	
470 nF	58						
680 nF	61						
1 000 nF	63						
2.2 µF	65						
4.7 µF	67						
10 µF	76	2.5 ±0.2	2.5 ±0.2	2.5 ±0.2			
22 µF	81						
47 µF	85						
100 µF	89	2.5 ±0.3	2.5 ±0.3				
Tape width		8 mm					

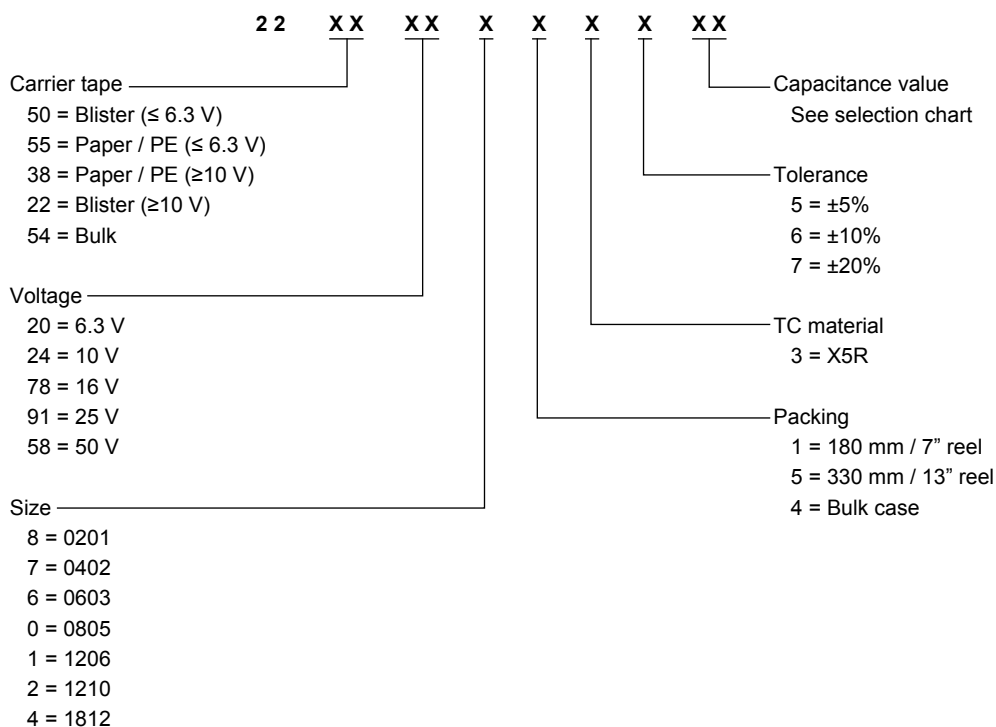
Note: Values in shaded cells indicate thickness class (unit: mm)



Global part number - Preferred type

Global Part Number is the preferred clear text code for ordering Yageo and Phycomp branded products. For details, please see page 77.

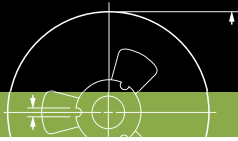
12NC ordering code - Phycomp branded products only



Phycomp CTC ordering code - North America

Regional code for ordering Phycomp branded products. For details, please see page 79.





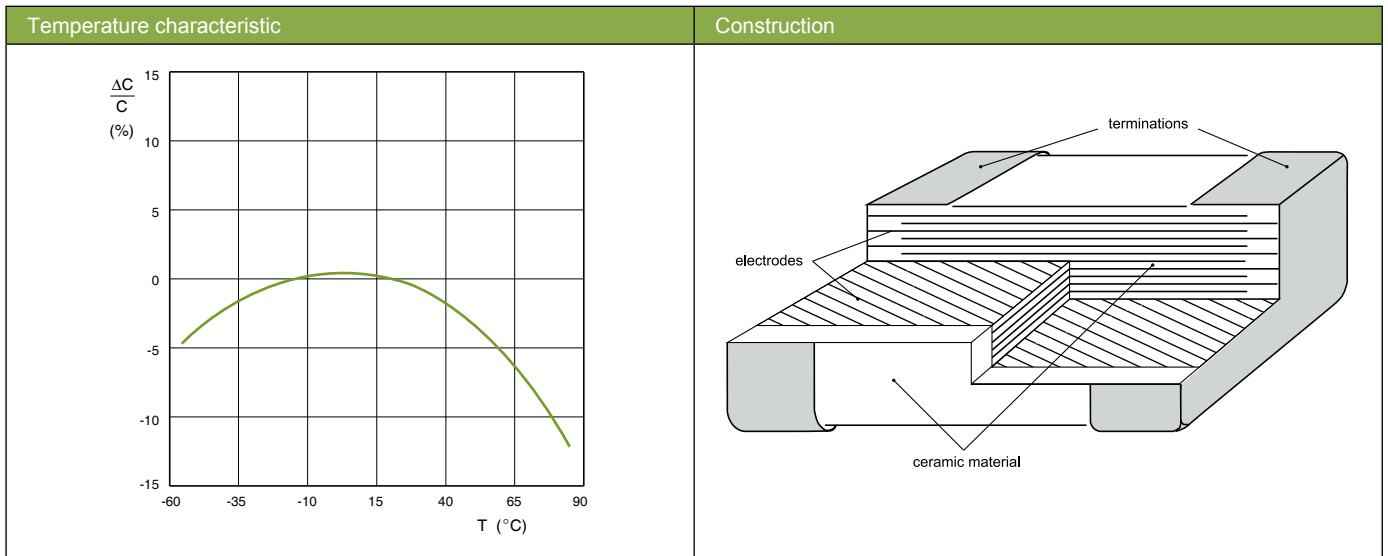
MLCC Selection Charts

X5R - Low profile, 0402 to 0805



Features

- Low ESR
- Increased allowable ripple current
- Excellent reliability with high insulation resistance



Dimensions							
Discrete capacitors - Low profile							
	Case size designation		Dimensions in mm				
	Inch-based	Metric	L_1	W	L_2 / L_3 min	L_2 / L_3 max	L_4 min
	0402	1005M	1.0 ± 0.05	0.5 ± 0.05	0.15	0.30	0.40
	0603	1608M	1.6 ± 0.10	0.8 ± 0.10	0.20	0.60	0.40
0805	2012M	2.0 ± 0.20	1.25 ± 0.20	0.25	0.75	0.55	



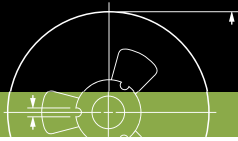
MLCC Selection Charts

X5R - Low profile, 0402 to 0805

X5R											
Low Profile											
Capacitance	0402				0603				0805		
	6.3 V	10 V	16 V	25 V	6.3 V	10 V	16 V	25 V	6.3 V	10 V	
10 nF	0.3 ±0.03	0.3 ±0.03	0.3 ±0.03	0.3 ±0.03							
22 nF											
47 nF											
100 nF	0.3 ±0.03	0.3 ±0.03									
220 nF											
470 nF		0.3 ±0.03	0.3 ±0.03								
1 000 nF	0.3 ±0.03				0.45 ±0.05	0.45 ±0.05	0.45 ±0.05	0.45 ±0.05			
2.2 µF											
4.7 µF											
10 µF										0.45 ±0.05	0.45 ±0.05
Tape width	8 mm										

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





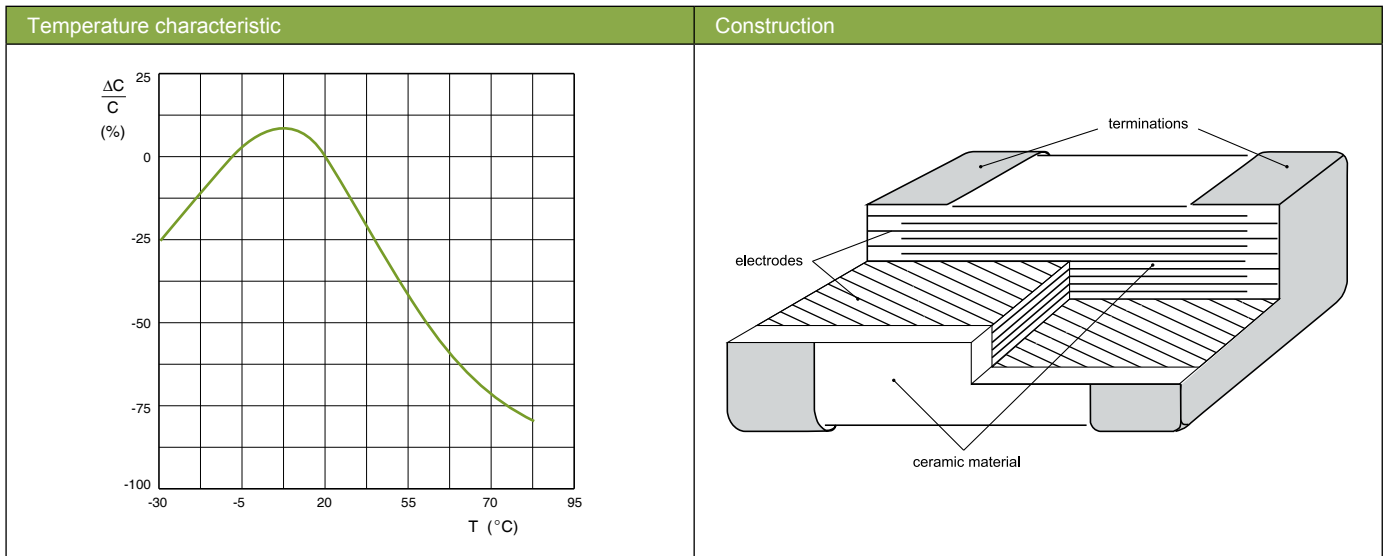
MLCC Selection Charts

Y5V - General purpose & High capacitance, 0201 to 1210



Features

- High volumetric efficiency
- Non-polar construction



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

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



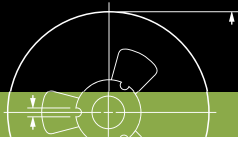
MLCC Selection Charts

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

Y5V						
General purpose & High capacitance						
Capacitance	Last 2-digit of 12NC	0201	0402			
		6.3 V	6.3 V	10 V	16 V	25 V
10 nF	36	0.3 ±0.03	0.5 ±0.05	0.5 ±0.05	0.5 ±0.05	0.5 ±0.05
22 nF	41					
47 nF	45					
100 nF	49					
220 nF	54					
470 nF	58					
1 000 nF	63					
Tape width		8 mm				

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





MLCC Selection Charts

Y5V - General purpose & High capacitance 6.3 to 25V, 0603 / 0805

Y5V												
General purpose & High capacitance												
Capacitance	Last 2-digit of 12NC	0603				0805						
		6.3 V	10 V	16 V	25 V	6.3 V	10 V	16 V	25 V			
10 nF	36	0.8 ±0.1	0.8 ±0.1	0.8 ±0.1	0.8 ±0.1	0.6 ±0.1	0.6 ±0.1	0.6 ±0.1	0.6 ±0.1			
22 nF	41											
47 nF	45											
100 nF	49											
220 nF	54					0.85 ±0.1	0.85 ±0.1	0.85 ±0.1	0.85 ±0.1	0.85 ±0.1	0.85 ±0.1	0.85 ±0.1
470 nF	58											
1 000 nF	63											
2.2 µF	67					1.25 ±0.2	1.25 ±0.2	1.25 ±0.2	1.25 ±0.2	1.25 ±0.2	1.25 ±0.2	1.25 ±0.2
4.7 µF	72											
10 µF	76											
22 µF	81											
Tape width		8 mm										

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



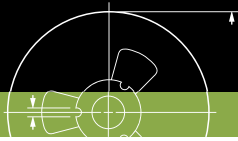
MLCC Selection Charts

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

Y5V										
General purpose & High capacitance										
Capacitance	Last 2-digit of 12NC	1206				1210				
		6.3 V	10 V	16 V	25 V	6.3 V	10 V	16 V	25 V	
10 nF	36	0.6 ±0.1	0.6 ±0.1	0.6 ±0.1	0.6 ±0.1					
22 nF	41									
47 nF	45									
100 nF	49									
220 nF	54									
470 nF	58	0.85 ±0.1	0.85 ±0.1	0.85 ±0.1	0.85 ±0.1					
1 000 nF	63									
2.2 µF	67					1.15 ±0.1	1.6 ±0.2			
4.7 µF	72									
10 µF	76					1.5 ±0.1	1.5 ±0.1	1.5 ±0.1	1.5 ±0.1	
22 µF	81	1.6 ±0.2	1.6 ±0.2	1.6 ±0.2		1.6 ±0.2	1.6 ±0.2	1.6 ±0.2		
47 µF	85					2.0 ±0.2				
Tape width		8 mm								

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





MLCC Selection Charts

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

Y5V					
General purpose & High capacitance					
Capacitance	Last 2-digit of 12NC	0402	0603	0805	1206
		50 V	50 V	50 V	50 V
10 nF	05	0.5 ±0.05	0.8 ±0.1	0.6 ±0.1	0.6 ±0.1
22 nF	07				
47 nF	09				
100 nF	12			0.85 ±0.1	
220 nF	14				
470 nF	16			0.85 ±0.1	
1 000 nF	18		1.25 ±0.2		
2.2 µF	23				1.15 ±0.1
Tape width		8 mm			

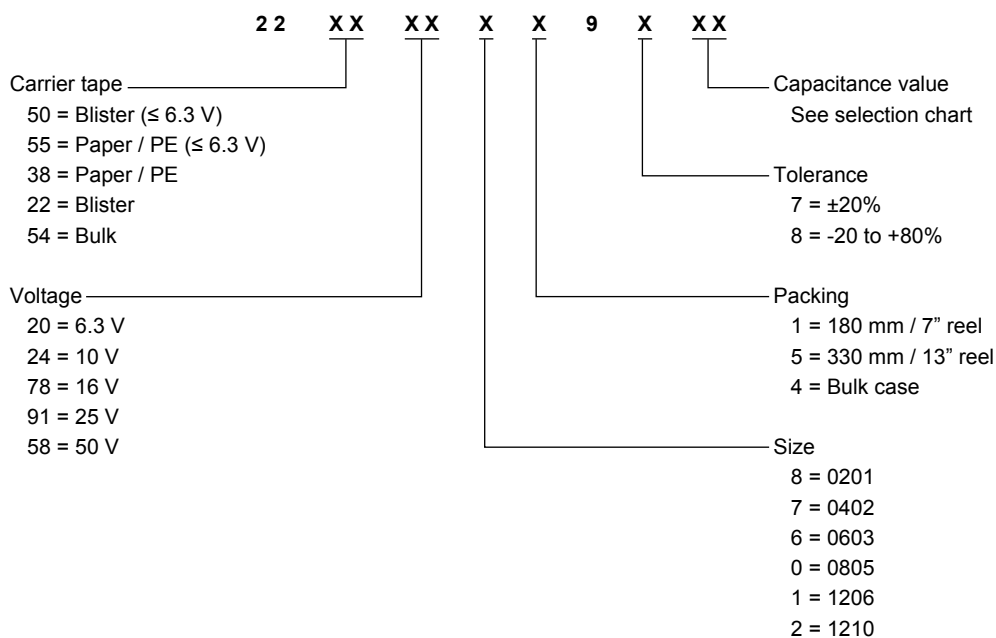
Note: Values in shaded cells indicate thickness class (unit: mm)



Global part number - Preferred type

Global Part Number is the preferred clear text code for ordering Yageo and Phycomp branded products. For details, please see page 77.

12NC ordering code - Phycomp branded products only



Phycomp CTC ordering code - North America

Regional code for ordering Phycomp branded products. For details, please see page 79.





MLCC Selection Charts

NPO / X7R - Automotive grade, 0402 to 1210



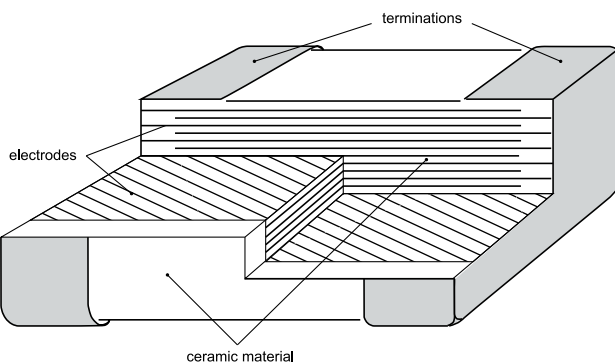
Features

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

Application

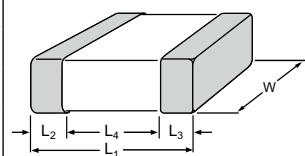
- All general purpose applications
- Entertainment applications
- Comfort / security applications
- Information applications

Construction



Dimensions

Discrete capacitors - Automotive grade



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



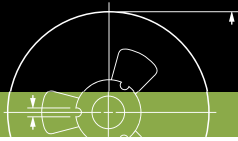
MLCC Selection Charts

NPO - Automotive grade, 0402 to 0805

NPO									
Automotive Grade									
Capacitance	0402	0603			0805				
	50 V	50 V	100V	250V	50 V	100 V	250 V	500 V	630 V
10 pF	0.5 ±0.05	0.8 ±0.1	0.8 ±0.1	0.8 ±0.1	0.6 ±0.1	0.6 ±0.1	0.6 ±0.1	0.6 ±0.1	0.6 ±0.1
12 pF									
15 pF									
18 pF									
22 pF									
27 pF									
33 pF									
39 pF									
47 pF									
56 pF									
68 pF									
82 pF									
100 pF									
120 pF									
150 pF									
180 pF									
220 pF									
270 pF									
330 pF									
390 pF									
470 pF									
560 pF									
680 pF									
820 pF								1.25 ±0.2	
1 000 pF									
1.2 nF									
1.5 nF					0.85 ±0.1	0.85 ±0.1			
1.8 nF									
2.2 nF									
2.7 nF									
3.3 nF					1.25 ±0.2	1.25 ±0.2			
3.9 nF									
4.7 nF									
5.6 nF									
6.8 nF									
8.2 nF									
10 nF									
Tape width	8mm								

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





MLCC Selection Charts

NPO - Automotive grade, 1206 / 1210

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

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



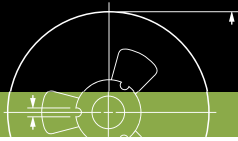
MLCC Selection Charts

X7R - Automotive grade, 0402 / 0603

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

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





MLCC Selection Charts

X7R - Automotive grade, 0805

X7R							
Automotive grade							
Capacitance	0805						
	10 V	16 V	25 V	50 V	100 V	250 V	500 V
100 pF							
150 pF							
180 pF							
220 pF							
330 pF							
390 pF							
470 pF							
680 pF							
1 000 pF							
1.5 nF							
2.2 nF							
3.3 nF	0.6 ±0.1	0.6 ±0.1	0.6 ±0.1	0.6 ±0.1		0.6 ±0.1	0.85 ±0.1
4.7 nF							
6.8 nF							
10 nF							
15 nF							
18 nF							
22 nF							
27 nF							
33 nF							
47 nF							
68 nF							
100 nF	0.85 ±0.1	0.85 ±0.1	0.85 ±0.1	0.85 ±0.1			
150 nF							
220 nF				1.25 ±0.2			
270 nF							
330 nF							
390 nF							
470 nF	1.25 ±0.2	1.25 ±0.2	1.25 ±0.2				
680 nF							
1000 nF							
2.2 μF							
4.7 μF							
10 μF							
Tape width	8mm						

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

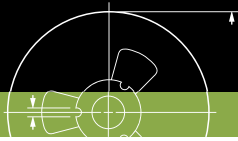


MLCC Selection Charts

X7R - Automotive grade, 1206

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

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



MLCC Selection Charts

X7R - Automotive grade, 1210

X7R								
Automotive grade								
Capacitance	1210							
	6.3 V	10 V	16 V	25V	50V	100V	250 V	500 V
100 pF								
150 pF								
180 pF								
220 pF								
330 pF								
390 pF								
470 pF								
680 pF								
1 000 pF								
1.5 nF								
2.2 nF								
3.3 nF								
4.7 nF							0.85 ±0.1	
6.8 nF								
10 nF								1.25 ±0.2
15 nF	0.85 ±0.1	0.85 ±0.1	0.85 ±0.1	0.85 ±0.1	0.85 ±0.1	0.85 ±0.1		
18 nF								
22 nF							1.25 ±0.2	
27 nF								
33 nF								
47 nF								
68 nF								
100 nF							1.6 ±0.2	
150 nF						1.25 ±0.2		
220 nF								
270 nF								
330 nF	1.25 ±0.2	1.25 ±0.2	1.25 ±0.2	1.25 ±0.2	1.25 ±0.2			
390 nF								
470 nF								
680 nF								
1000 nF								
2.2 μF								
4.7 μF								
10 μF								
Tape width	8mm							

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



MLCC Selection Charts

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

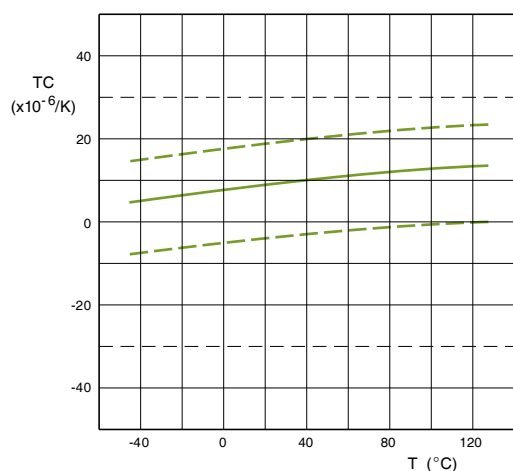


Features

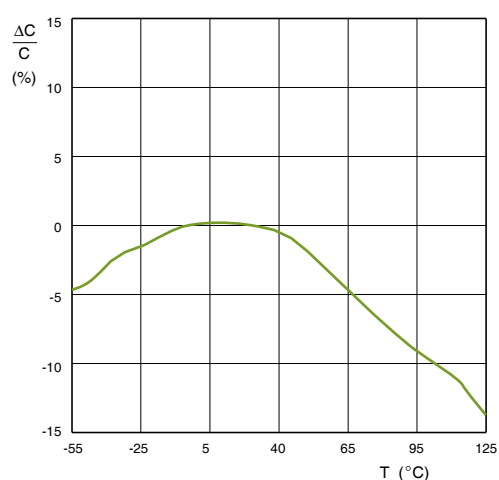
- Capable of operating at high voltage levels
- For high frequency snubber
- Decoupling/ Smoothing function
- TUV certificate No.: 50031668
- UL certificate No.: E238900

Temperature characteristic

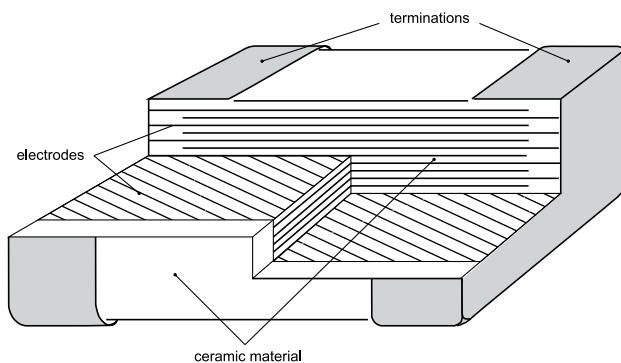
NPO



X7R

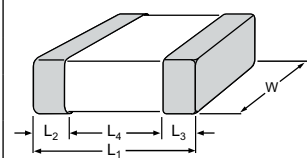


Construction



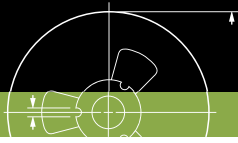
Dimensions

Discrete capacitors - High voltage SC type



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





MLCC Selection Charts

NPO - High voltage SC type, 1808 / 1812

NPO							
High voltage SC type							
Capacitance	Last 2-digit of 12NC	1808		1812		1808	
		X1/Y2 for TUV	X1/Y2 for UL	X1/Y2 for TUV	X1/Y2 for UL	X2/Y3 for TUV	X2/Y3 for UL
10 pF	23	1.6 ±0.2	1.6 ±0.2			1.6 ±0.2	1.6 ±0.2
12 pF	24						
15 pF	25						
18 pF	26						
22 pF	27						
27 pF	28						
33 pF	29						
39 pF	31			1.6 ±0.2	1.6 ±0.2		
47 pF	32						
56 pF	33						
68 pF	34						
82 pF	35						
100 pF	36	2.0 ±0.2	2.0 ±0.2			2.0 ±0.2	2.0 ±0.2
120 pF	37						
150 pF	38						
180 pF	39						
220 pF	41			2.0 ±0.2	2.0 ±0.2		
270 pF	42						
330 pF	43						
390 pF	44						
470 pF	45						
560 pF	46						
680 pF	47						
820 pF	48						
1 000 pF	49						
Tape width		12 mm					

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



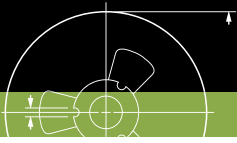
MLCC Selection Charts

X7R - High voltage SC type, 1808 / 1812

X7R							
High voltage SC type							
Capacitance	Last 2-digit of 12NC	1808		1812		1808	
		X1/Y2 for TUV	X1/Y2 for UL	X1/Y2 for TUV	X1/Y2 for UL	X2/Y3 for TUV	X2/Y3 for UL
150 pF	12	1.6 ±0.2	1.6 ±0.2			1.6 ±0.2	1.6 ±0.2
180 pF	13						
220 pF	14						
270 pF	15	2.0 ±0.2	2.0 ±0.2	1.6 ±0.2	1.6 ±0.2	1.6 ±0.2	1.6 ±0.2
330 pF	16						
390 pF	17						
470 pF	18						
560 pF	19						
680 pF	21						
820 pF	22	2.0 ±0.2	2.0 ±0.2	2.0 ±0.2	2.0 ±0.2	2.0 ±0.2	2.0 ±0.2
1 000 pF	23						
1.2 nF	24						
1.5 nF	25						
Tape width		12 mm					

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





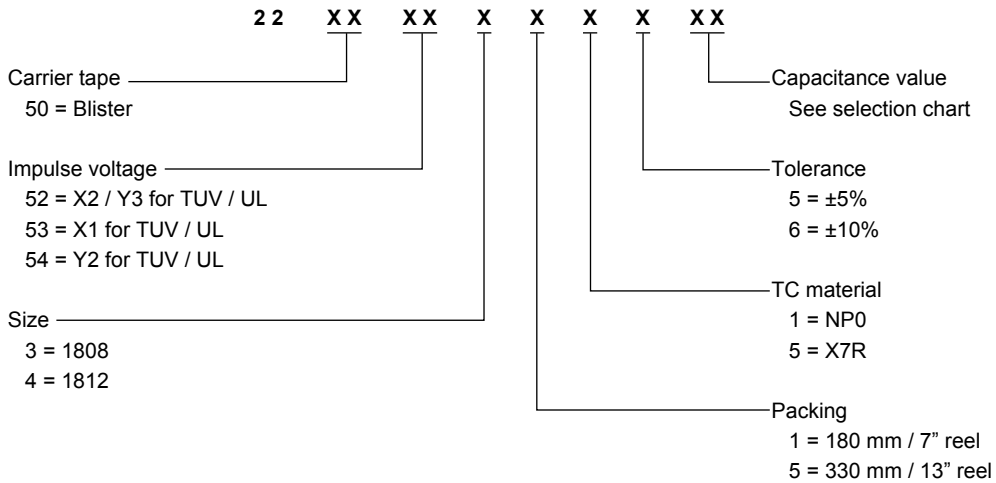
MLCC Selection Charts

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

Global part number - Preferred type

Global Part Number is the preferred clear text code for ordering Yageo and Phycomp branded products. For details, please see page 77.

12NC ordering code - Phycomp branded products only



Phycomp CTC ordering code - North America

Regional code for ordering Phycomp branded products. For details, please see page 79.



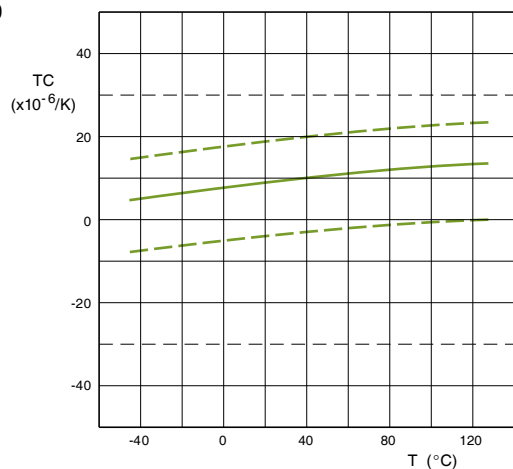


Features

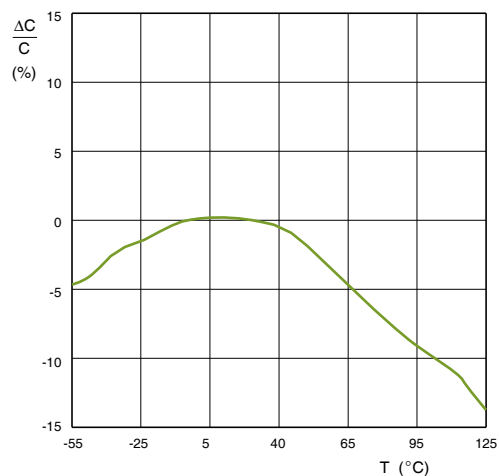
- Less than 50% board space of an equivalent discrete component
- High volumetric efficiency
- Increased throughput, by time saved in mounting

Temperature characteristic

NPO

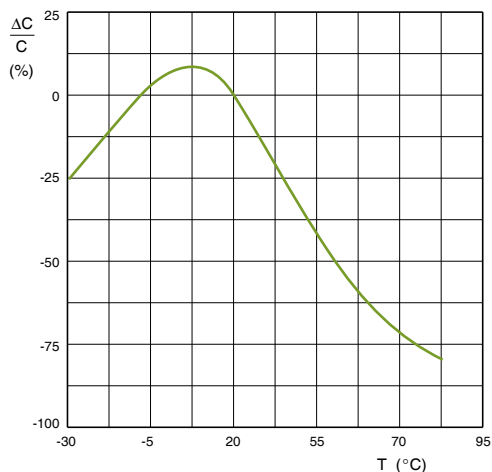


X7R

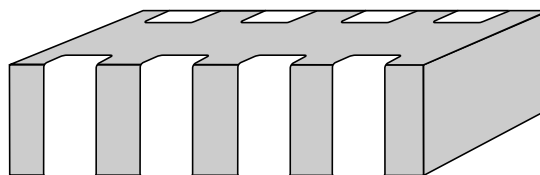


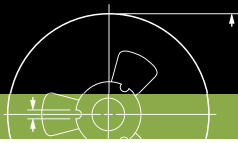
Temperature characteristic

Y5V



Construction





MLCC Selection Charts

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

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

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



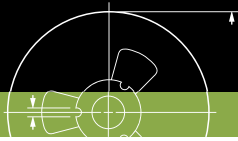
MLCC Selection Charts

NPO - 4C Arrays, 0508 / 0612

NPO			
4C arrays			
Capacitance	Last 2-digit of 12NC	0508	0612
		50 V	50 V
10 pF	23	0.6 ±0.1	0.8 ±0.1
15 pF	25		
18 pF	26		
22 pF	27		
27 pF	28		
47 pF	32		
100 pF	36		
150 pF	38		
180 pF	39		
220 pF	41		
270 pF	42		
330 pF	43		
390 pF	44		
470 pF	45		
560 pF	46		
680 pF	47		
820 pF	48		
1 000 pF	49		
Tape width		8 mm	

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





MLCC Selection Charts

X7R - 4C Arrays, 0508 / 0612

X7R									
4C arrays									
Capacitance	Last 2-digit of 12NC	0508			0612				
		16 V	25 V	50 V	16 V	25 V	50 V		
180 pF	13								
220 pF	14			0.6 ±0.1		0.8 ±0.1	0.8 ±0.1		
270 pF	15								
330 pF	16								
390 pF	17								
470 pF	18								
560 pF	19								
680 pF	21								
820 pF	22								
1 000 pF	23	0.6 ±0.1	0.6 ±0.1					0.8 ±0.1	0.8 ±0.1
1.2 nF	24								
1.5 nF	25								
1.8 nF	26								
2.2 nF	27								
2.7 nF	28								
3.3 nF	29								
3.9 nF	31								
4.7 nF	32								
5.6 nF	33								
6.8 nF	34								
8.2 nF	35								
10 nF	36								
12 nF	37			0.8 ±0.1					
15 nF	38								
18 nF	39								
22 nF	41								
27 nF	42								
33 nF	43								
47 nF	45								
56 nF	46								
68 nF	47								
82 nF	48								
100 nF	49								
Tape width		8 mm							

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



Y5V		
4C arrays		
Capacitance	Last 2-digit of 12NC	0612 25 V
10 nF	36	0.6 ±0.1
22 nF	41	
47 nF	45	
100 nF	49	
Tape width		8 mm

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





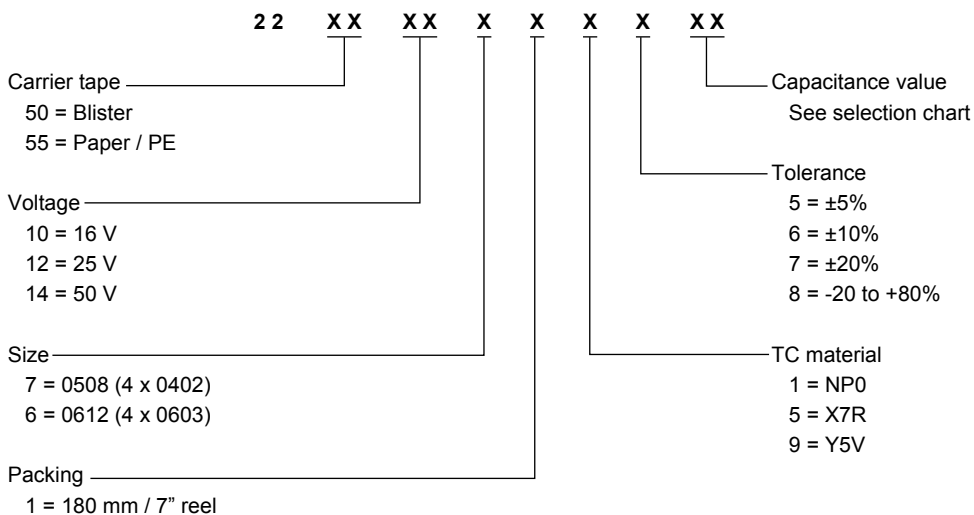
MLCC Selection Charts

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

Global part number - Preferred type

Global Part Number is the preferred clear text code for ordering Yageo and Phycomp branded products. For details, please see page 77.

12NC ordering code - Phycomp branded products only



Phycomp CTC ordering code - North America

Regional code for ordering Phycomp branded products. For details, please see page 79.

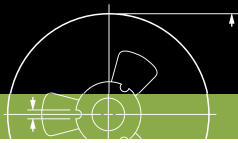


0201 sample kits					
NP0 50 V		NP0 25 V		X7R 50 V	
Capacitance (pF)	Tolerance	Capacitance (pF)	Tolerance	Capacitance (pF)	Tolerance
1	±0.25 pF	27	±5%	47	±10%
1.2	±0.25 pF	33	±5%	68	±10%
1.5	±0.25 pF	39	±5%	100	±10%
1.8	±0.25 pF	47	±5%	150	±10%
2.2	±0.25 pF	56	±5%	220	±10%
2.7	±0.25 pF	68	±5%	330	±10%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

Note: 100 pieces per value. Ordering code 432204407111 for Phycomp brand product, CC02010000000000 for Yageo brand product

0402 sample kits					
NP0 50 V		Y5V 16 V		X7R 50 V	
Capacitance (pF)	Tolerance	Capacitance (pF)	Tolerance	Capacitance (pF)	Tolerance
0.47	±0.25 pF	10 000	±20%	100	±10%
0.68	±0.25 pF	22 000	±20%	150	±10%
1	±0.25 pF	47 000	±20%	220	±10%
1.5	±0.25 pF	100 000	±20%	330	±10%
2.2	±0.25 pF	X5R 25V		470	±10%
3.3	±0.25 pF	Capacitance (pF)	Tolerance	680	±10%
4.7	±0.25 pF	100 000	±10%	1 000	±10%
6.8	±0.50 pF			1 500	±10%
10	±5%			2 200	±10%
15	±5%			3 300	±10%
22	±5%			X7R 25 V	
33	±5%	Capacitance (pF)	Tolerance	4 700	±10%
47	±5%			100 000	±10%
68	±5%	X7R 16 V		Capacitance (pF) Tolerance	
100	±5%			6 800	±10%
150	±5%			10 000	±10%
220	±5%			15 000	±10%
				22 000	±10%

Note: 95 pieces per value. Ordering code 432204409911 for Phycomp brand product, CC04020000000000 for Yageo brand product



MLCC Engineering Design Kits

Sample kits for 0603 / 0805

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

Note: 48 pieces per value. Ordering code 432204407121 for Phycomp brand product, CC06030000000000 for Yageo brand product

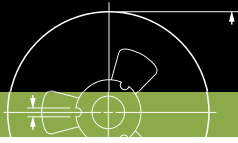
0805 sample kits					
NP0 50 V		NP0 25 V		X7R 50 V	
Capacitance (pF)	Tolerance	Capacitance (pF)	Tolerance	Capacitance (pF)	Tolerance
0.47	±0.25 pF	3 300	±5%	220	±10%
0.68	±0.25 pF	4 700	±5%	330	±10%
1	±0.25 pF	Y5V 50 V		470	±10%
1.5	±0.25 pF	Capacitance (pF)	Tolerance	680	±10%
2.2	±0.25 pF	10 000	±20%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

Note: 48 pieces per value. Ordering code 432204407131 for Phycomp brand product, CC08050000000000 for Yageo brand product



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

Note: 48 pieces per value. Ordering code 432204407141 for Phycomp brand product, CC12060000000000 for Yageo brand product



MLCC Engineering Design Kits

Sample kits for high capacitance series

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

Note: 50 pieces per value. Ordering code 432204510001 for Phycomp brand product, CC88880000000000 for Yageo brand product

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

Note: 50 pieces per value. Ordering code SP88880000000000 for Yageo brand product



MLCC Engineering Design Kits

High voltage sample kits for general applications

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

Note: 50 pieces per value. Ordering code 432204510013 for Phycomp brand product, HV77770000000000 for Yageo brand product



MLCC Engineering Design Kits

High voltage sample kits for safety certification MLCCs

High voltage sample kits for safety certification MLCCs					
NP0 1808 TUV / UL			X7R 1808 TUV / UL		
Capacitance	Safety certification	Tolerance	Capacitance	Safety certification	Tolerance
10 pF	X1 / Y2	±5%	150 pF	X1 / Y2	±10%
22 pF	X1 / Y2	±5%	220 pF	X1 / Y2	±10%
47 pF	X1 / Y2	±5%	330 pF	X1 / Y2	±10%
100 pF	X1 / Y2	±5%	470 pF	X1 / Y2	±10%
150 pF	X1 / Y2	±5%	680 pF	X1 / Y2	±10%
220 pF	X1 / Y2	±5%	1 nF	X1 / Y2	±10%
330 pF	X1 / Y2	±5%	X7R 1812 TUV / UL		
NP0 1812 TUV / UL			Capacitance	Safety certification	Tolerance
Capacitance	Safety certification	Tolerance	220 pF	X1 / Y2	±10%
10 pF	X1 / Y2	±5%	330 pF	X1 / Y2	±10%
22 pF	X1 / Y2	±5%	470 pF	X1 / Y2	±10%
47 pF	X1 / Y2	±5%	680 pF	X1 / Y2	±10%
100 pF	X1 / Y2	±5%	1 nF	X1 / Y2	±10%
150 pF	X1 / Y2	±5%	1.5 nF	X1 / Y2	±10%
220 pF	X1 / Y2	±5%	X7R 1808 TUV / UL		
NP0 1808 TUV / UL			Capacitance	Safety certification	Tolerance
Capacitance	Safety certification	Tolerance	470 pF	X2 / Y3	±10%
10 pF	X2 / Y3	±5%	680 pF	X2 / Y3	±10%
22 pF	X2 / Y3	±5%	1 nF	X2 / Y3	±10%
47 pF	X2 / Y3	±5%	1.5 nF	X2 / Y3	±10%
100 pF	X2 / Y3	±5%			
150 pF	X2 / Y3	±5%			
220 pF	X2 / Y3	±5%			

Note: 50 pieces per value. Ordering code 432204510014 for Phycomp brand product, SC99990000000000 for Yageo brand product



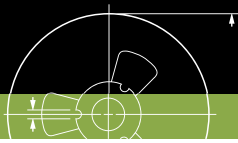
0402 high frequency sample kits		
NPO		
Capacitance	Rated voltage	Tolerance
0.22 pF	50 V	±0.1 pF
0.47 pF	50 V	±0.1 pF
0.68 pF	50 V	±0.1 pF
0.82 pF	50 V	±0.1 pF
1 pF	50 V	±0.25 pF
1.2 pF	50 V	±0.25 pF
1.5 pF	50 V	±0.25 pF
1.8 pF	50 V	±0.25 pF
2.2 pF	50 V	±0.25 pF
2.7 pF	50 V	±0.25 pF
3.3 pF	50 V	±0.25 pF
3.9 pF	50 V	±0.25 pF
4.7 pF	50 V	±0.25 pF
5.6 pF	50 V	±0.5 pF
6.8 pF	50 V	±0.5 pF
8.2 pF	50 V	±0.5 pF

Note: 50 pieces per value. Ordering code 432204409912 for Phycomp brand product, CH040200000000000 for Yageo brand product

0603 high frequency sample kits		
NPO		
Capacitance	Rated voltage	Tolerance
0.22 pF	50 V	±0.1 pF
0.47 pF	50 V	±0.1 pF
0.68 pF	50 V	±0.1 pF
0.82 pF	50 V	±0.1 pF
1 pF	50 V	±0.25 pF
1.2 pF	50 V	±0.25 pF
1.5 pF	50 V	±0.25 pF
1.8 pF	50 V	±0.25 pF
2.2 pF	50 V	±0.25 pF
2.7 pF	50 V	±0.25 pF
3.3 pF	50 V	±0.25 pF
3.9 pF	50 V	±0.25 pF
4.7 pF	50 V	±0.25 pF
5.6 pF	50 V	±0.5 pF
6.8 pF	50 V	±0.5 pF
8.2 pF	50 V	±0.5 pF

Note: 50 pieces per value. Ordering code 432204407122 for Phycomp brand product, CH060300000000000 for Yageo brand product





MLCC Engineering Design Kits

Sample kits for all sizes, all types, E1 series only

All sizes, all types, E1 series only								
General purpose & High capacitance								
0402	NP0 50 V		X7R 50 V		X7R 16 V		Y5V 16 V	
	Capacitance (pF)	Tolerance	Capacitance (pF)	Tolerance	Capacitance (pF)	Tolerance	Capacitance (pF)	Tolerance
	1	±0.25 pF	100	±10%	10 000	±10%	100 000	±20%
	10	±5%	1 000	±10%				
	100	±5%						
0603	NP0 50 V		X7R 50 V		X7R 16 V		Y5V 10 V	
	Capacitance (pF)	Tolerance	Capacitance (pF)	Tolerance	Capacitance (pF)	Tolerance	Capacitance (pF)	Tolerance
	1	±0.25 pF	100	±10%	100 000	±10%	1 000 000	-20% to +80%
	10	±5%	1 000	±10%				
	100	±5%	10 000	±10%				
0805	NP0 50 V		X7R 50 V		X7R 10 V		Y5V 10 V	
	Capacitance (pF)	Tolerance	Capacitance (pF)	Tolerance	Capacitance (pF)	Tolerance	Capacitance (pF)	Tolerance
	1	±0.25 pF	1 000	±10%	1 000 000	±10%	4 700 000	-20% to +80%
	10	±5%	10 000	±10%				
	100	±5%	100 000	±10%				
	1 000	±5%						
1206	NP0 50 V		X7R 50 V		X7R 16 V		Y5V 10 V	
	Capacitance (pF)	Tolerance	Capacitance (pF)	Tolerance	Capacitance (pF)	Tolerance	Capacitance (pF)	Tolerance
	1	±0.25 pF	1 000	±10%	1 000 000	±10%	10 000 000	-20% to +80%
	10	±5%	10 000	±10%				
	100	±5%	100 000	±10%				
	1 000	±5%						

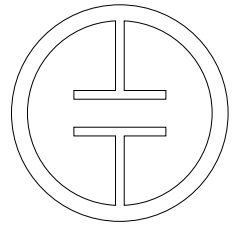
Microwave		
Size	NP0 50 V	
	Capacitance (pF)	Tolerance
0603	1	±0.25 pF
0805	3.3	±0.25 pF
1206	3.9	±0.25 pF

Array (4 x 0603)						
Size	NP0 50 V		X7R 25 V		X7R 16 V	
	Capacitance (pF)	Tolerance	Capacitance (pF)	Tolerance	Capacitance (pF)	Tolerance
0612	100	±5%	10 000	±10%	100 000	±10%
	1 000	±5%				

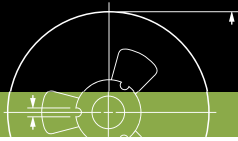
High voltage				
Size	NP0 3 kV		X7R 1 kV	
	Capacitance (pF)	Tolerance	Capacitance (pF)	Tolerance
1808	10	±5%		
1812	100	±5%	10 000	±10%

Note: 48 pieces per value (95 pieces for 0402 and 25 pieces for 1812). Ordering code 432204500581 for Phycomp brand product, CC99990000000000 for Yageo brand product





SMD CERAMIC EMI FILTER CAPACITORS
X2Y[®] PRODUCTS



X2Y[®] Product Selection Charts

SMD ceramic EMI filter capacitors X2Y[®] series

NPO						
Size	Y-Capacitor		X-Capacitor		Thickness (mm)	Global part number
	Capacitance (nF)	Voltage rating (V)	Capacitance (nF)	Voltage rating (V)		
0805	0.01	50	0.005	100	0.85	CX 0805 MR NPO 9BB 100
	0.022	50	0.011	100	0.85	CX 0805 MR NPO 9BB 220
	0.047	50	0.023	100	0.85	CX 0805 MR NPO 9BB 470

X7R						
Size	Y-Capacitor		X-Capacitor		Thickness (mm)	Global part number
	Capacitance (nF)	Voltage rating (V)	Capacitance (nF)	Voltage rating (V)		
0603	1	100	0.5	200	0.65	CX 0603 MR X7R 0BB 102
	1.5	100	0.75	200		CX 0603 MR X7R 0BB 152
	2.2	100	1.1	200		CX 0603 MR X7R 0BB 222
	4.7	100	2.4	200		CX 0603 MR X7R 0BB 472
	5.6	50 / 63	2.8	100		CX 0603 MR X7R 9BB 562
				200		CX 0603 MR X7R 0BB 562
	10	50 / 63	5	100		CX 0603 MR X7R 9BB 103
	22	25	11	50		CX 0603 MR X7R 8BB 223
	47	16	24	25		CX 0603 MR X7R 7BB 473
	56	16	28	25		CX 0603 MR X7R 7BB 563
	100	10	50	16		CX 0603 MR X7R 6BB 104
0805	1	100	0.5	200	0.85	CX 0805 MR X7R 0BB 102
	4.7	100	2.4	200		CX 0805 MR X7R 0BB 472
	10	100	5	200		CX 0805 MR X7R 0BB 103
	15	50 / 63	8	100		CX 0805 MR X7R 9BB 153
	18	50 / 63	9	100		CX 0805 MR X7R 9BB 183
	22	50 / 63	11	100		CX 0805 MR X7R 9BB 223
	39	25	20	50		CX 0805 MR X7R 8BB 393
	47	16	24	25		CX 0805 MR X7R 7BB 473
	100	16	50	25		CX 0805 MR X7R 7BB 104
	180	10	90	16		CX 0805 MR X7R 6BB 184
1206	47	50 / 63	24	100	1.20	CX 1206 MK X7R 9BB 473
	100	50 / 63	50	100		CX 1206 MK X7R 9BB 104
	220	16	110	25		CX 1206 MK X7R 7BB 224
	390	16	195	25		CX 1206 MK X7R 7BB 394
	470	10	235	25		CX 1206 MK X7R 7BB 474
1210	470	25	235	50	1.60	CX 1210 MK X7R 8BB 474
	560	25	280	50	1.60	CX 1210 MK X7R 8BB 564
	820	16	410	25	1.60	CX 1210 MK X7R 7BB 824
	1000	16	500	25	1.60	CX 1210 MK X7R 7BB 105

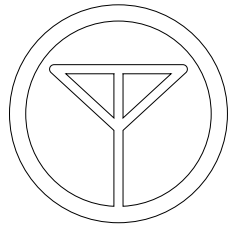
X5R						
Size	Y-Capacitor		X-Capacitor		Thickness (mm)	Global part number
	Capacitance (nF)	Voltage rating (V)	Capacitance (nF)	Voltage rating (V)		
0603	220	10	110	16	0.65	CX 0603 MR X5R 6BB 224
	330		165			CX 0603 MR X5R 6BB 334
	470		235			CX 0603 MR X5R 6BB 474

Note: 1. Special values are available on request
 2. Ordering codes for preferred versions (20% tolerance, 180 mm reel). For packing and tolerance information, see section "Thickness classes and packing quantities" on next page

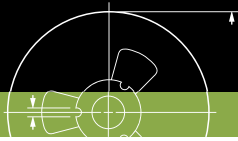


Global part number	
Ordering example: CX0603MKX7R6BB104	
<p>C X 0 6 0 3 M K X 7 R 6 B B 1 0 4</p>	
Series name (code 1-2) CX = X2Y®-series	Capacitance value (code 15-17) 104 = 100 000 pF (2 significant digits+number of zeros; the 3rd digit signifies the multiplying factor, and letter R is decimal point) 0 = x 1 1 = x 10 ¹ 2 = x 10 ² 3 = x 10 ³ 4 = x 10 ⁴ 5 = x 10 ⁵ 6 = x 10 ⁶
Size code (code 3-6) EIA mm 0603 (1608M) 0805 (2012M) 1206 (3216M) 1210 (3225M) 1410 (3625M) 1812 (4632M)	
Capacitance tolerance (code 7) M = ±20%	Process code (code 14) B = BME
Packing style (code 8) R = Paper tape reel Ø7" K = Embossed plastic tape reel Ø7"	Termination (code 13) B = Ni-barrier
TC material (code 9-11) NP0 X7R X5R	Rated voltage (code 12) 5 = 6.3 V 6 = 10 V 7 = 16 V 8 = 25 V 9 = 50 V 0 = 100 V

Thickness classes and packing quantities		
Thickness Classification (mm)	Quantity per reel	
	8 mm tape width	
	Ø180mm / 7"	
	Paper	Blister
0.65 ±0.10	4 000	---
0.85 ±0.10	4 000	---
1.20 ±0.15	---	2 500
1.60 ±0.15	---	2 500



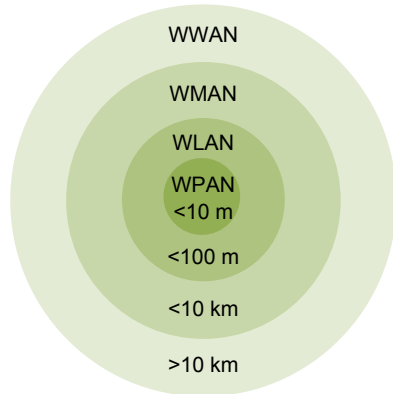
HIGH FREQUENCY PRODUCTS



HF Product Selection Charts

Specification overview - Antenna

Wireless communication - networks & applications



- Wireless Wide Area Network (WWAN)_IEEE 802.20
- Wireless Metropolitan Area Network (WMAN)_IEEE 802.16 (Mobile/Fixed)
▶ **WiMAX**
- Wireless Local Area Network (WLAN)_IEEE 802.11 a/b/g/n
▶ **WiFi, MIMO**
- Wireless Personal Area Network (WPAN)_IEEE 802.15
▶ **Bluetooth, ZigBee, UWB**

Function	Networking	Application	Operating Frequency	Polarization	Impedance	Temp. Range
Antenna	WPAN	Bluetooth	2400-2484 MHz	Linear	50 Ω	-40 °C to 90 °C
		UWB_BG1	3168-4752 MHz			
		UWB_BG3	6336-7920 MHz			
		RFID	13.56 MHz			
	WLAN	WiFi	2400-2484 MHz 5150-5850 MHz			
	WMAN	WiMAX	2300-2700 MHz			
			3300-3800 MHz			
			5150-5850 MHz			
	WWAN	GSM-850	824-894 MHz			
		GSM-900	880-960 MHz			
		GSM-1800	1710-1880 MHz			
		GSM-1900	1850-1990 MHz			
		UMTS	1920-2170 MHz			
		Active GPS	1575 MHz			
LTE-Band 17		704-746 MHz				
LTE-Band 13		746-787 MHz				
LTE-Band 40		2300-2400 MHz				
LTE-Band 07		2500-2690 MHz				



HF Product Selection Charts

Antenna for WWAN - GSM/LTE, Satellite Communication - GPS

WWAN - GSM/LTE antenna					
Function	Frequency Range	Type*	Dimensions** (mm)	Polarization	Radiation Pattern
Triple-band GSM_US ant	824-894 / 1850-2170 MHz	Planar	60x10	Linear	Near Omni-Directional
		3-D Structure	55x9x2.5		
Triple-band GSM_EU ant	880-960 / 1710-1990 MHz	Planar	55x10		
		3-D Structure	55x9x2		
Quad-band GSM_US ant	824-894 / 1710-2170 MHz	Planar	63x10		
		3-D Structure	55x10x2.5		
Quad-band GSM_EU ant	880-960 / 1710-2170 MHz	Planar	60x10		
		3-D Structure	55x10x2.5		
Penta-band GSM ant	824-960 / 1710-2170 MHz	Planar	65x10		
		3-D Structure	55x10x3		
Six-band GSM/LTE ant	704-960 / 1710-2170 MHz	Planar	75x13		
		3-D Structure	75x12x3		
Seven-band GSM/LTE ant	824-960 / 1710-2170 / 2300-2690 MHz	Planar	75x13		
		3-D Structure	70x12x3		
Eight-band GSM/LTE ant	704-960 / 1710-2170 / 2300-2690 MHz	Planar	85x14		
		3-D Structure	80x12x3		

Satellite Communication - GPS antenna					
Function	Frequency Range	Type*	Dimensions** (mm)	Polarization	Radiation Pattern
GPS antenna	1575 MHz	Planar	20x8.5	Linear	Near Omni-Directional
		3-D Structure	15x8x2		
Active GPS antenna	1575 MHz	Planar	n/a	Linear	Near Omni-Directional
		3-D Structure	35x8x3		

Note: * The antenna can be implemented by material of PCB/Metal/FPC/LDS as the planar or 3-D structure.

** Dimensions depend on the layout and environment of practical application. The shown dimensions are tested by demoboard.



HF Product Selection Charts

Antenna for WPAN / WLAN / WMAN

WPAN - Bluetooth / Ultra wideband / Radio frequency identification antenna					
Function	Frequency Range	Type*	Dimensions** (mm)	Polarization	Radiation Pattern
Bluetooth antenna	2400-2484 MHz	Planar	10x10	Linear	Near Omni-Directional
		3-D Structure	10x9x2		
UWB antenna_BG1	3168-4752 MHz	Planar	30x10		
		3-D Structure	30x8.5x2		
UWB antenna_BG1+BG3	3168-4752 / 6336-7920 MHz	Planar	30x10		
		3-D Structure	30x9x2		
RFID antenna	13.56 MHz	PCB	40x30	NFC	
		FPC	40x40		

WLAN - WiFi antenna					
Function	Frequency Range	Type*	Dimensions** (mm)	Polarization	Radiation Pattern
Single-band WiFi antenna	2400-2484 MHz	Planar	13x10	Linear	Near Omni-Directional
		3-D Structure	13x9x2		
Dual-band WiFi antenna	2400-2484 / 5150-5850 MHz	Planar	15x10		
		3-D Structure	15x9x2		

WMAN - WiMAX antenna					
Function	Frequency Range	Type*	Dimensions** (mm)	Polarization	Radiation Pattern
Dual-band WiMAX antenna	2300-2700 / 5150-5850 MHz	Planar	25x10	Linear	Near Omni-Directional
		3-D Structure	25x9x2		
Triple-band WiMAX antenna	2400-2484 / 3300-3800 / 5150-5850 MHz	Planar	30x10		
		3-D Structure	30x9x3		

Note: * The antenna can be implemented by material of PCB/Metal/FPC/LDS as the planar or 3-D structure.

** Dimensions depend on the layout and environment of practical application. The shown dimensions are tested by demoboard.



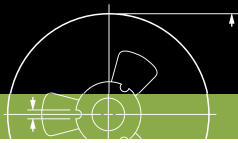
HF Product Selection Charts

Specification overview - Chip antenna

Function		Application	Frequency	Size* (metric-based)	Unit
Antenna	Chip antenna	Bluetooth	2.45 GHz	2012, 2516, 3012, 3216, 4018, 5010, 5320 6020, 6522, 7355, 7836, 8010, 9520	0.1 mm
				1004, 1204, 1903	mm
		WiFi	2.45 GHz, 5 GHz, 2.45 / 5 GHz	2012, 2516, 3012, 3216, 4018, 5010, 5320 6020, 6522, 7355, 7836, 8010, 9520	0.1 mm
				1004, 1204, 1903	mm
		UHF	433 MHz, 570 MHz, 870 MHz	1204, 1614, 3807	mm
		FM	88-108 MHz	1105, 2405	mm
		WiMAX	2.3-2.7 GHz, 3.3-3.9 GHz	3216, 8010	0.1 mm
		GPS	1.575 GHz	1266	mm
	3216, 5320, 6230			0.1 mm	
	DECT / WCDMA	1.8 / 2 GHz	8868	mm	
GSM	900 MHz / 1.8 GHz	2112	mm		
Patch antenna	GPS	1.575 GHz	1010, 1212, 1313, 1515, 1818, 2525	mm	
	Glonass	1.6 GHz			
	SDARS	2.3 GHz			
Filter	Band pass filter	Bluetooth	2.45 GHz	1608, 2012, 2520	0.1 mm
		WiFi	2.45 GHz, 5 GHz		0.1 mm
	Low pass filter	Bluetooth	2.45 GHz	1608, 2012	0.1 mm
		WiFi	2.45 GHz, 5 GHz		0.1 mm
		WiMAX	2.3-2.7 GHz, 3.3-3.9 GHz		0.1 mm
	Diplexer	WiFi	2.45 / 5 GHz	2012	0.1 mm
Balancer	Balun	Bluetooth	2.45 GHz	1608, 2012	0.1 mm
		WiFi	2.45 GHz, 5 GHz		
		WiMAX	2.3-2.7 GHz, 3.3-3.9 GHz		
	Balanced filter (combo)	Bluetooth	2.45 GHz	2012, 2520	0.1 mm

Note: Measurement of size code: 20 (length) 12 (width) equals to 20 (unit) 12 (unit)





HF Product Selection Charts

Patch antenna for GPS / SDARS / Glonass

GPS patch antenna (CP)								
Dimensions (mm)	Frequency range	Bandwidth* (MHz)	Gain* (dBic/Max.)	Polarization	Axial ratio	VSWR*	Temp. range (°C)	Packing (Bulk)
12x12x2	1575±2 MHz	6	-3.5	Circular	< 3	< 2.0	-25 to 85	CAN43134220C1581B
12x12x4		6	-1					CAN43134220D1581B
13x13x4		6	0					CAN43134229D1581B
15x15x2		6	-1					CAN43134230C1581B
15x15x4		7	1.5					CAN43134230D1581B
18x18x2		5	2					CAN43134240C1581B
18x18x4		10	4					CAN43134240D1581B
25x25x2		10	5					CAN43134250C1581B
25x25x4		20	5.5					CAN43134250D1581B

GPS patch antenna (LP)							
Dimensions (mm)	Frequency range	Bandwidth (MHz)	Gain* (dBi/Max.)	Polarization	VSWR*	Temp. range (°C)	Packing (Bulk)
10x4x4	1575±2 MHz	20	1.61	Linear	< 2.0	-25 to 85	CAN4311441001581K
15x10x4		6	0				CAN43134450D1581B
16x06x4		8	-0.5				CAN43134460D1581B

GPS active module							
Dimensions (mm)	Frequency range	Polarization	LNA Gain* (dB/Max.)	Noise Figure* (dB/Typical)	Current Consumption (mA/Max.)	Temp. range (°C)	Packing (Bulk)
13x13x5.5	1575±2 MHz	Circular	17	1.5	6	-25 to 85	CAN4313434881581B
13x13x7.5			17	1.5	6		CAN4313434861581B
15x15x7.5			15.1	2.5	3		CAN4313434621581B
15x15x7.5			15.1	2.5	3		CAN4313435621581B
16x16x7.5			16	1.5	5		CAN4313435921581B
19x19x5.5			30	1.5	6		CAN4313437951581B
19x19x7.5			30	1.5	6		CAN4313437931581B
20x06x6.4			Linear	15	1.5		8
		20		1	5		CAN4313466641581B
		25		1.5	15		CAN4313466661581B

Note: " * " marks that the value depends on the Yageo demoboard



HF Product Selection Charts

Chip antenna for FM / UHF / GPS / GSM / WIMAX

FM chip antenna									
Dimensions (mm)	Frequency range*	Bandwidth (MHz)	Gain* (dBi/Max.)	Polarization	Azimuth	VSWR*	Temp. range (°C)	Packing	
								Bulk	Tape
11x5x1.3	88-108 MHz	---	---	Linear	Omni-directional	---	-25 to 85	---	CAN4311629000882K
24x5x1.6									CAN4311050010882K

UHF chip antenna (433 MHz)									
Dimensions (mm)	Frequency range*	Bandwidth (MHz)	Gain* (dBi/Max.)	Polarization	Azimuth	VSWR*	Temp. range (°C)	Packing	
								Bulk	Tape
12x4x1.5	400-500 MHz	> 20	0.83	Linear	Omni-directional	< 3.0	-40 to 125	---	CAN4311129200431K
12x4x1.6			0.79				-25 to 85	----	CAN4311029020431K
37.5x6.8x0.9	433 MHz		0.5			< 3.0	-55 to 125	CAN4313121200431B	CAN4311121200431K

UHF chip antenna (870 MHz)												
Dimensions (mm)	Frequency range*	Bandwidth (MHz)	Gain* (dBi/Max.)	Polarization	Azimuth	VSWR*	Temp. range (°C)	Packing				
								Bulk	Tape			
12x4x1.0 (P)	800-900 MHz	> 15	1.05	Linear	Omni-directional	< 2.0	-40 to 125	---	< 2.8			
12x4x1.6	800-900 MHz	> 20	0.5						< 2.0	-25 to 85	---	CAN4311129100871K
									< 2.0	-40 to 125	---	CAN4311129040871K
				< 2.0	-40 to 125	---	CAN4311129050871K					
				< 2.0	-40 to 125	---	CAN4311129060871K					
16.5x14x0.9	790-880 MHz	> 80	-0.25			< 2.5	-55 to 125	CAN4313119000871B	---			

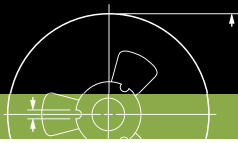
GPS chip antenna											
Dimensions (mm)	Frequency range*	Bandwidth (MHz)	Gain* (dBi/Max.)	Polarization	Azimuth	VSWR*	Temp. range (°C)	Packing			
								Bulk	Tape		
3.2x1.6x1.2 (P)	1.575 GHz	> 90	7.32	Linear	Omni-Directional	< 2.0	-25 to 85	---	< 2.5		
5.3x2.0x1.2 (P)			3.16						< 2.0	---	CAN4311712151583K
6.2x3.0x1.5			55						2.52	< 2.0	-55 to 125
									CAN4311113011582K		

DECT/WCDMA chip antenna									
Dimensions (mm)	Frequency range*	Bandwidth (MHz)	Gain* (dBi/Max.)	Polarization	Azimuth	VSWR*	Temp. range (°C)	Packing	
								Bulk	Tape
8.8x6.8x0.9	1.88-2.1 GHz	> 100	2.0	Linear	Omni-directional	< 2.0	-55 to 125	---	CAN4311112001881K

WiMAX chip antenna									
Dimensions (mm)	Frequency range*	Bandwidth (MHz)	Gain* (dBi/Max.)	Polarization	Azimuth	VSWR*	Temp. range (°C)	Packing	
								Bulk	Tape
3.2x1.6x1.3	3.3-3.9 GHz	> 100	2.8	Linear	Omni-directional	< 2.0	-25 to 85	---	CAN4311712063503K
10x0.6x1.2	2.3-2.7 GHz		2.0						< 3.0

Note: " * " marks that the value depends on the Yageo demoboard
 " (P) " represents PIFA mode antenna





HF Product Selection Charts

Chip antenna for Dual-band / Chip-on-Board / WWAN

Dual-band WiFi chip antenna									
Dimensions (mm)	Frequency range*	Bandwidth (MHz)	Gain* (dBi/Max.)	Polarization	Azimuth	VSWR*	Temp. range (°C)	Packing	
								Bulk	Tape
5.3x2.0x1.2	2.45 / 5.2 GHz	150 / 900	2.72 / 3.85	Linear	Omni-directional	< 2.8	-25 to 85	---	CAN4311153042522K
								---	CAN4311153062522K

Dual-band GPS / WiFi chip antenna									
Dimensions (mm)	Frequency range*	Bandwidth (MHz)	Gain* (dBi/Max.)	Polarization	Azimuth	VSWR*	Temp. range (°C)	Packing	
								Bulk	Tape
5.3x2.0x1.2 (P)	1.575 / 2.45 GHz	20 / 100	2.47 / 2.04	Linear	Omni-directional	< 2.0	-25 to 85	----	CAN4311853071522K

Dual-band chip antenna (900/1800 MHz)									
Dimensions (mm)	Frequency range*	Bandwidth (MHz)	Gain* (dBi/Max.)	Polarization	Azimuth	VSWR*	Temp. range (°C)	Packing	
								Bulk	Tape
12x4.4x1.2	880-960 MHz	> 20	0.5 -1	Linear	Omni-directional	< 3.0	-40 to 125	---	CAN4311116719181K
	1710-1880 MHz	> 170							
21x12x0.9	880-960 MHz	> 30	0.5 -1			< 2.7	-25 to 85	CAN4313118009181B	---
	1710-1880 MHz	> 170							

Chip-on-Board antenna (with Cable & Connector)									
Dimensions (mm)	Frequency range*	Bandwidth (MHz)	Gain* (dBi/Max.)	Polarization	Azimuth	VSWR*	Temp. range (°C)	Packing	
								Bulk	Tape
10x4x2.6	2450 MHz	100	1.22	Linear	Omni-directional	< 2.8	-25 to 85	CAN4313A81042451B	----
								CAN4313B81042451B	----
								CAN4313C81042451B	----
								CAN4313D81042451B	----
30x5x5.3	800-900 MHz	60	1.7			< 2.0	CAN4313A29A20871B	----	
	433 MHz	15	3.85				CAN4313A29A20431B	----	

WWAN chip antenna									
Dimensions (mm)	Frequency range*	Bandwidth (MHz)	Gain* (dBi/Max.)	Polarization	Azimuth	VSWR*	Temp. range (°C)	Packing	
								Bulk	Tape
35x5x6	824-960 MHz	> 140	2.91	Linear	Omni-directional	< 2.8	-40 to 85	CAN4313449009181B	---
	1710-2170 MHz	> 470				< 3.5			

Note: " * " marks that the value depends on the Yageo demoboard



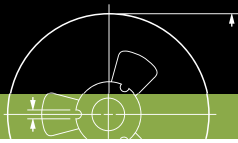
HF Product Selection Charts

Chip antenna for Bluetooth / WiFi

Bluetooth / WiFi antennna								
Dimensions (mm)	Frequency range	Bandwidth* (MHz)	Gain* (dBi/Max.)	Polarization	Azimuth	VSWR*	Temp. range (°C)	Packing (Tape)
2.0x1.2x1.1	2.45 GHz	< 200	3.12	Linear	Omni-Directional	< 2.8	-40 to 85	CAN4311714002454K
3.2x1.6x1.2			5.0					CAN4311712002453K
3.2x1.6x1.2 (P)			3.68					CAN4311712112453K
5.0x1.0x1.0			2.28					CAN4311851062453K
5.3x2.0x1.3			5.5					CAN4311153002451K
5.3x2.0x1.2 (P)			2.78					CAN4311153232452K
6.0x2.0x1.0		> 200	5.1					CAN4311860052452K
7.3x5.5x1.3			1.2					CAN4311111002451K
7.8x3.6x0.9			4.1					CAN4311115002451K
8.0x1.0x1.0			5.88					CAN4311881042453K
9.5x2.0x1.1	2.85		CAN4311895052452K					
12x4.0x2.0 (P)	6.66		CAN4311029012451K					
19x3.0x3.6 (P)	2.45 GHz	> 300	5.0			< 2.0		CAN4311093012451K

Note: " * " marks that value depends on the Yageo demoboard
 " (P) " represents PIFA mode antenna





HF Product Selection Charts

Band pass filter

Band pass filter													
Dimensions (mm)	Frequency range*	Pass band (MHz)	Impedance	Insertion loss	Ripple	VSWR*	Attenuation (Min.)	Packing (Tape)					
1.6x0.8x0.65	2.45 GHz	2400-2500	50 ohm	2.4 dB	0.5 dB	< 2.0	30 dB @ 880-960 MHz	CFL4111515012454K					
2.0x1.25x1.0							20 dB @ 1710-1990 MHz						
							8.5 dB @ 2170 MHz						
							30 dB @ 4800-5000 MHz						
							25 dB @ 7200-7500 MHz						
							40 dB @ 1000-1600 MHz						
				40 dB @ 4900 MHz									
2.0x1.25x0.85				20 dB @ 7500 MHz	CFL4111714032454K								
				30 dB @ 880-960 MHz									
				30 dB @ 1710-1990 MHz									
				25 dB @ 4800-5000 MHz									
				30 dB @ 7200-7500 MHz									
	40 dB @ 880-960 MHz												
2.0x1.25x0.85	2.45 GHz	2400-2500	50 ohm	2.6 dB	0.6 dB	< 2.0	40 dB @ 1710-1990 MHz	CFL4111514172454K					
							20 dB @ 2110-2170 MHz						
							30 dB @ 4800-5000 MHz						
							30 dB @ 7200-7500 MHz						
							40 dB @ 1600 MHz						
							38 dB @ 3200 MHz						
				2.0x1.25x0.8	5 GHz		5150-5850	50 ohm	1.8 dB	0.5 dB	< 2.0	20 dB @ 4800 MHz	CFL4111714192454K
												25 dB @ 7200 MHz	
												15 dB @ 1600 MHz	
												25 dB @ 3200 MHz	
												20 dB @ 4800-5000MHz	
												30 dB @ 2400-2500 MHz	
2.5x2.0x0.95	2.45 GHz	2400-2500	50 ohm	2.5 dB	0.6 dB	< 2.0	20 dB @ 4700 MHz	CFL4111714055004K					
							40 dB @ 880-960 MHz						
							30 dB @ 2100 MHz						
							30 dB @ 4800-5000 MHz						
							30 dB @ 7200-7500 MHz						
							40 dB @ 880-960 MHz						
				2.5x2.0x0.95	2.45 GHz		2400-2500	50 ohm	1.5 dB	0.6 dB	< 2.0	30 dB @ 1710-1785 MHz	CFL4111713032453K
												30 dB @ 1850-1910 MHz	
												20 dB @ 4800-5000 MHz	
												30 dB @ 7200-7500 MHz	
												30 dB @ 1600 MHz	
												35 dB @ 3200 MHz	
2.5x2.0x0.95	2.45 GHz	2400-2500	50 ohm	2.2 dB	0.6 dB	< 2.0	25 dB @ 4800-5000 MHz	CFL4111713182453K					
							30 dB @ 7200-7500 MHz						
							30 dB @ 1600 MHz						
							35 dB @ 3200 MHz						
							25 dB @ 4800-5000 MHz						
							30 dB @ 7200-7500 MHz						

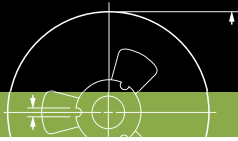
Note: " * " marks that the value depends on the Yageo demoboard



Low pass filter									
Dimensions (mm)	Frequency range*	Pass Band (MHz)	Impedance	Insertion loss	Ripple	VSWR*	Attenuation (Min.)	Packing (Tape)	
1.6x0.8x0.65	2.37 GHz	2300-2700	50 ohm	< 0.6 dB	0.6 dB	< 1.5	35 dB @ 4800 MHz	CFL4111715522374K	
							25 dB @ 7200 MHz		
	2.45 GHz	2400-2500		0.45 dB			25 dB @ 5000 MHz		CFL4111715502454K
							18 dB @ 7500 MHz		
2.0x1.25x0.85	2.45 GHz	2400-2500	50 ohm	0.5 dB	0.6 dB	< 1.8	27 dB @ 5000 MHz	CFL4111714502454K	
									25 dB @ 7500 MHz
	3.5 GHz	3000-4000				< 2.0	25 dB @ 10,000 MHz	CFL4111714503504K	
									35 dB @ 6800 MHz
					30 dB @ 11,000 MHz (Ref.)				

Note: " * " marks that the value depends on the Yageo demoboard





HF Product Selection Charts

Diplexer

Diplexer						
Dimensions (mm)	Frequency range	Pass band (MHz)	Insertion loss	VSWR	Attenuation (Min.)	Packing (Tape)
2.0x1.25x0.75	2.4 / 5 GHz	2400-2500	< 0.7 dB	< 2.0	17 dB @ 4800-6000 MHz	CFL4111714822504K
		4900-5900	< 1.6 dB		20 dB @ 7200-7500 MHz	
17 dB @ 1800-2500 MHz						
20 dB @ 10300-10700 MHz (Ref.)						
2.0x1.25x0.85		2400-2500	< 0.7 dB		20 dB @ 4900-5900 MHz	CFL4111714852504K
		4900-5900	< 0.9 dB		20 dB @ 2400-2500 MHz	CFL4111714862504K
		2400-2500	< 0.6 dB		20 dB @ 4900-5900 MHz	
		4900-5900	< 0.9 dB		25 dB @ 2400-2500 MHz	
2.0x1.25x0.9	2400-2500	< 0.5 dB	20 dB @ 4800-6000 MHz	CFL4111714882504K		
	4900-5900	< 0.9 dB	20 dB @ 7200-7500 MHz			
			25 dB @ 1800-2500 MHz			
	25 dB @ 9800-11800 MHz (Ref.)					



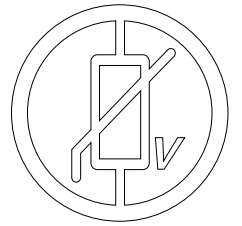
HF Product Selection Charts

Balun and Balanced filter

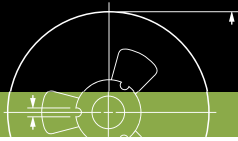
Balun									
Dimensions (mm)	Frequency range*	Pass band (MHz)	Impedance	Insertion loss	Ripple	VSWR*	Amplitude balance	Phase differential	Packing (Tape)
1.6x0.8x0.65	2.45 GHz	2400-2500	50/50 ohm	< 1.2 dB			< 1.0 dB		CBA4711715002454K
	5 GHz	4900-5950	50/100 ohm				< 1.2 dB		
2.0x1.25x0.80	2.45 GHz	2400-2500	50/50 ohm	< 1.0 dB	0.6 dB	< 2.0	2.0 dB	180°±10°	CBA4711714002454K
			50/100 ohm						CBA4711714012454K
			50/200 ohm						CBA4711714022454K
	5 GHz	4900-5900	50/100 ohm	< 1.2 dB	CBA4711714015004K				

Balanced filter (combo)									
Dimensions (mm)	Frequency range*	Pass band (MHz)	Unbalanced impedance	Balanced impedance	Insertion loss	Amplitude balance	Phase differential	Attenuation (MHz/Min.)	Packing (Tape)
2.0x1.2x0.9	2.45 GHz	2400-2500	50 ohm	Conjugate match to CSR BC03/04/05 series	< 3.5 dB	< 1.0 dB	180°±10°	40 dB @ 880-960	CBA4711714982454K
								25 dB @ 1300-1600	
								35 dB @ 4800-5000	
								30 dB @ 7200-7500	
2.0x1.2x0.8	2.45 GHz	2400-2500	50 ohm	Conjugate match to CSR BC03/04/05 series	< 3.5 dB	< 1.3 dB	180°±13°	40 dB @ 880-960	CBA4711714672454K
								25 dB @ 1300-1600	
								30 dB @ 4800-5000	
								25 dB @ 7200-7500	
2.0x1.2x0.8	2.45 GHz	2400-2500	50 ohm	Conjugate match to CSR BC03/04/05 series	< 3.3 dB	< 1.2 dB	180°±13°	40 dB @ 880-960	CBA4711814472454K
								25 dB @ 1300-1600	
								30 dB @ 4800-5000	
								25 dB @ 7200-7500	
2.0x1.2x0.8	2.45 GHz	2400-2500	50 ohm	Conjugate match to CSR BC04/05/06 series	< 2.8 dB	< 1.5 dB	180°±10°	35 dB @ 880-960	CBA4711514372454K
								30 dB @ 1710-1880	
								20 dB @ 1880-1990	
								30 dB @ 4800-5000	
2.0x1.2x0.8	2.45 GHz	2400-2500	50 ohm	Conjugate match to MTK MT 6616 series	< 3.1 dB	< 1.5 dB	180°±10°	35 dB @ 880-960	CBA4711514312454K
								30 dB @ 1710-1880	
								20 dB @ 1880-1990	
								30 dB @ 4800-5000	

Note: " * " marks that the value depends on the Yageo demoboard



MULTILAYER CHIP VARISTORS



MLV Product Selection Charts

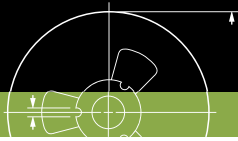
Case dimensions and specification for 0402

Case dimensions								
	Case size designation	Dimensions in mm						
	Inch-based	L ₁	W	T _{min}	T _{max}	L ₂ / L _{3 min}	L ₂ / L _{3 max}	L _{4 min}
	0402	1.0 ±0.10	0.5 ±0.10	0.45	0.55	0.15	0.30	0.40
0603	1.6 ±0.20	0.8 ±0.10	0.70	0.90	0.20	0.60	0.40	

MLV							
General purpose							
0402							
Working voltage	5.5 V	5.5 V	9 V	14 V	14 V	18 V	18 V
Varistor voltage	10 ~ 14 V	7.2 ~ 10.8V	10.2~13.8V	18~24 V	16.2~19.8V	24~32 V	21.6~26.4 V
1 pF	0.5 ±0.1	0.5 ±0.1	0.5 ±0.1	0.5 ±0.1	0.5 ±0.1	0.5 ±0.1	0.5 ±0.1
3 pF							
10 pF							
22 pF							
33 pF							
50 pF							
82 pF							
100 pF							
120 pF							
160 pF							
200 pF							
250 pF							
360 pF							
470 pF							
650 pF							
900 pF							
Tape width	8 mm						



MLV						
General purpose						
0603						
Working voltage	5.5 V	5.5 V	9 V	14 V	18 V	30 V
Varistor voltage	10 ~ 14 V	7.2 ~ 10.8V	9.6 ~ 14.4V	18 ~ 24V	24 ~ 32 V	38 ~ 46 V
1 pF						
3 pF						
10 pF	0.8 ±0.1	0.8 ±0.1	0.8 ±0.1	0.8 ±0.1	0.8 ±0.1	0.8 ±0.1
22 pF						
33 pF						
50 pF						
82 pF						
100 pF						
120 pF						
160 pF						
200 pF						
250 pF						
360 pF						
470 pF						
650 pF						
900 pF						
Tape width	8 mm					



MLV Product Selection Charts

Ordering information for 0402 / 0603

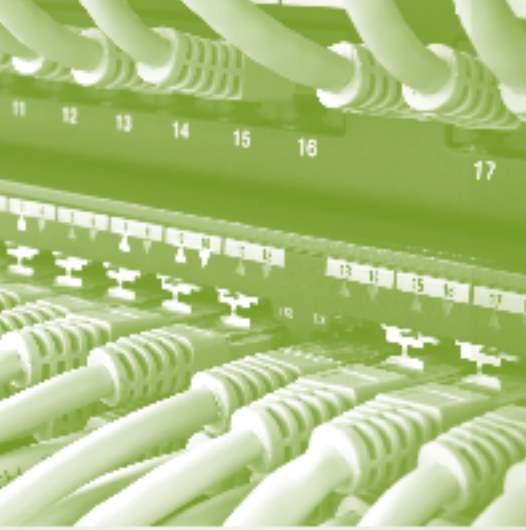
Global part number

Ordering example: VRS0402KR55R680N

<p>Series name (code 1-2) ————</p> <p>VR = Varistor</p> <p>Chip type (code 3) ————</p> <p>S = Single chip</p> <p>Size code (code 4-7) ————</p> <p>0402 0603</p> <p>Varistor voltage tolerance (code 8) ————</p> <p>K = ±10% L = ±15% M = ±20 % S = Special range</p> <p>Packing style (code 9) ————</p> <p>R = paper tape reel Ø7 inch</p>	<p>V R S 0 4 0 2 K R 5 5 R 6 8 0 N</p>	<p>Process code (code 16)</p> <p>N = Normal S = ESD up to 15 kV</p> <p>Capacitance value (code 13-15)</p> <p>680 = 68 pF (2 significant digits+number of zeros; the 3rd digit signifies the multiplying factor, and letter R is decimal point)</p> <p>0 = x 1 1 = x 10¹</p> <p>Working voltage (code 10-12)</p> <p>33R = 3.3 V 55R = 5.5 V 090 = 9 V 110 = 11 V 120 = 12 V 140 = 14 V 150 = 15 V 160 = 16 V 180 = 18 V 220 = 22 V 260 = 26 V 300 = 30 V 310 = 31 V 380 = 38 V</p>
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Thickness classification and packing quantities		
Type	Thickness classification (mm)	8 mm tape width per reel
		180 mm / 7"
		Paper
0402	0.50 ±0.05	10 000
0603	0.80 ±0.10	4 000





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