

PRODUCT SELECTION GUIDE

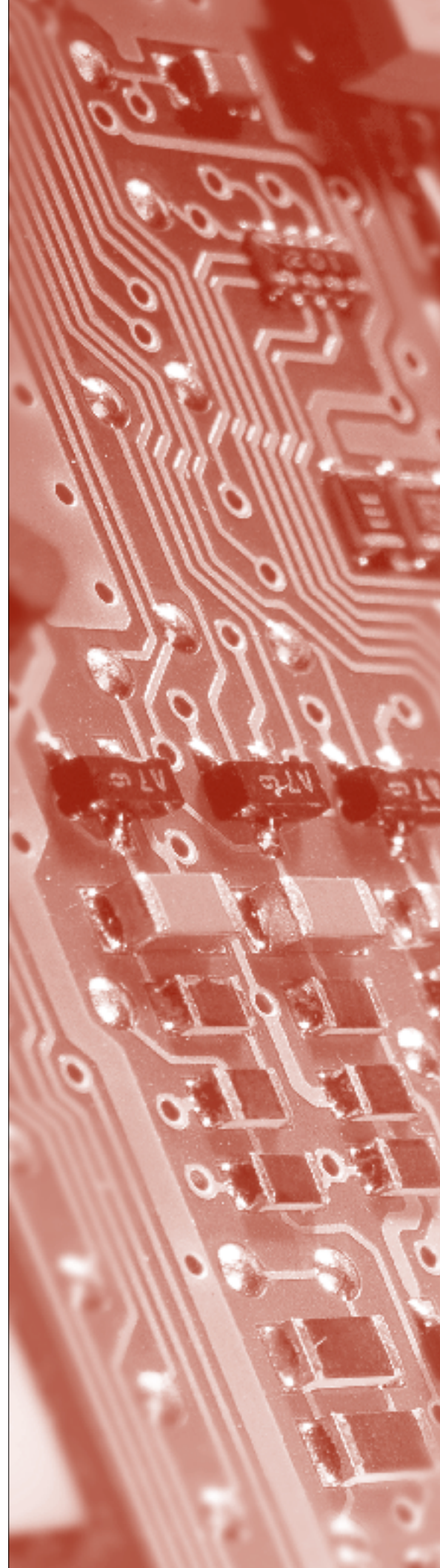
2014

SMD RESISTORS + MLCC

SMD CERAMIC EMI FILTER CAPACITORS - X2Y®

WIRELESS COMPONENTS

MULTILAYER CHIP VARISTORS



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
0050	0201M	0606	1616M	1224	3250M
0075	03015M	0612	1632M	1225	3264M
01005	0402M	0616	1640M	1812	4532M
0201	0603M	0805	2012M	2007	5320M
0202	0605M	0815	2037M	2010	5025M
0402	1005M	0830	2075M	2220	5750M
0404	1010M	1008	2520M	2512	6432M
0408	1020M	1206	3216M	3014	7836M
0508	1220M	1210	3225M	4527	11070M
0603	1608M	1218	3245M		

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

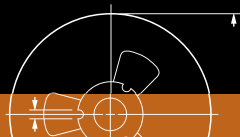


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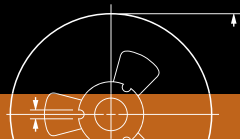
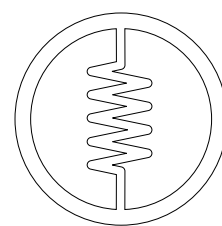


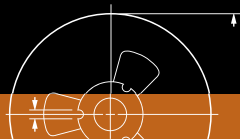
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SURFACE-MOUNT CHIP RESISTORS



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	1Ω ≤ R ≤ 1MΩ Jumper < 50mΩ	±1% ±5%	1Ω ≤ R ≤ 10Ω -200~600 ppm/°C 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		0402	1/16W	50V	-55°C to 155°C	1Ω ≤ R ≤ 22MΩ Jumper < 50mΩ	Max./Min.: 1MΩ/10Ω ±0.1% ±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	-55°C to 155°C	1Ω ≤ R ≤ 22MΩ Jumper < 50mΩ	±1% ±5%	±200 ppm/°C	
RC2512xK-07xxxxL		2512	1W	200V					
RC0603xR-7WxxxxL		0603	1/5W	50V		1Ω ≤ R ≤ 1MΩ			
RC0805xR-7WxxxxL		0805	1/4W	150V		1Ω ≤ R ≤ 1MΩ			
RC1206xR-7WxxxxL		1206	1/2W	200V		1Ω ≤ R ≤ 150Ω			
RC2512xK-7WxxxxL		2512	2W	200V		24MΩ ≤ R ≤ 100MΩ			
RC0805xR-07xxxxL		0805	1/8W	150V	-55°C to 155°C	24MΩ ≤ R ≤ 100MΩ	±5%, ±10%, ±20%	±300 ppm/°C	
RC1206xR-07xxxxL		1206	1/4W	200V					
RE0402xRE07xxxxL	RE	0402	1/16W	50V	-55°C to 155°C	10Ω ≤ R ≤ 1MΩ	±0.1% ±0.5% ±1%	±50 ppm/°C	
RE0603xRE07xxxxL		0603	1/10W	50V		10Ω ≤ R ≤ 1MΩ			
RE0805xRE07xxxxL		0805	1/8W	150V		10Ω ≤ R ≤ 1MΩ			
RE1206xRE07xxxxL		1206	1/4W	200V		10Ω ≤ R ≤ 1MΩ			
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			
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					
YC124-xR-07xxxxL		4*0402	1/16W	25V	-55°C to 155°C	1Ω ≤ R ≤ 1MΩ Jumper < 50mΩ	±1% ±5%	1Ω ≤ R < 10Ω ±250 ppm/°C 10Ω ≤ R ≤ 1MΩ ±200 ppm/°C	
YC162-xR-07xxxxL		2*0603	1/16W	50V	-55°C to 125°C	10Ω ≤ R ≤ 1MΩ Jumper < 50mΩ	±5%	±200 ppm/°C	
YC164-xR-07xxxxL		4*0603	1/16W	50V	-55°C to 155°C	1Ω ≤ R ≤ 1MΩ Jumper < 50mΩ	±1% ±5%		
YC248-xR-07xxxxL		8*0602	1/16W	50V		10Ω ≤ R ≤ 1MΩ Jumper < 50mΩ			
YC324-xK-07xxxxL		4*1206	1/8W	200V		10Ω ≤ R ≤ 1MΩ			
TC122-xR-07xxxxL	TC	2*0402	1/16W	50V	-55°C to 125°C	10Ω ≤ R ≤ 1MΩ Jumper < 50mΩ	±1% ±5%	±200 ppm/°C	
! TC122HxR-07xxxxL									
! TC122MxR-07xxxxL									
TC124-xR-07xxxxL		4*0402	1/16W	50V					
! TC124HxR-07xxxxL									
! TC124MxR-07xxxxL									
TC164-xR-07xxxxL	4*0603	1/16W	50V	1Ω ≤ R ≤ 1MΩ					

Note: " ! " is the symbol for new product

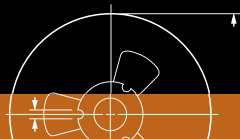
Chip Resistors General Information

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 Jumper < 20mΩ	±1% ±2% ±5%	See page 36, table "T. C. R. - RL series"
RL0603xR-07xxxxL		0603	1/10W			10mΩ ≤ R < 1Ω Jumper < 20mΩ		
RL0805xR-07xxxxL		0805	1/8W					
RL1206xR-07xxxxL		1206	1/4W			10mΩ ≤ R < 1Ω		
RL1210xR-07xxxxL		1210	1/2W					
RL1218xK-07xxxxL		1218	1W					
RL2010xK-07xxxxL		2010	3/4W			10mΩ ≤ R < 1Ω		
RL2512xK-07xxxxL		2512	1W					
RL0805xR-7WxxxxL		0805	1/4W					
RL1206xR-7WxxxxL		1206	1/2W					
PT0402xR-07xxxxL	PT	0402	1/16W	(PxR)^1/2	-55°C to 155°C	50mΩ ≤ R < 1Ω Jumper < 10mΩ	±1% ±2% ±5%	See page 41, table "T.C.R. - PT series"
PT0603xR-07xxxxL		0603	1/10W			50mΩ ≤ R < 1Ω Jumper < 8mΩ		
PT0805xR-07xxxxL		0805	1/8W			50mΩ ≤ R < 1Ω Jumper < 5mΩ		
PT1206xR-07xxxxL		1206	1/4W			100mΩ ≤ R < 1Ω		
PT2010xK-07xxxxL		2010	3/4W					
PT2512xK-07xxxxL		2512	1W			50mΩ ≤ R < 1Ω		
PT0402xR-7WxxxxL		0402	1/8W					
PT0603xR-7WxxxxL		0603	1/5W					
PT0805xR-7WxxxxL		0805	1/4W			100mΩ ≤ R < 1Ω		
PT1206xR-7WxxxxL		1206	1/2W					
PT2010xK-7WxxxxL		2010	1W			68mΩ		
PT2512xK-7WxxxxL		2512	2W					
PT0402xR-7TxxxxL		0402	1/6W			50mΩ ≤ R ≤ 68mΩ		
PT0603xR-7TxxxxL		0603	1/3W					
PT0815xK-07xxxxL	PT (Wide)	0815	1/2W	(PxR)^1/2	-55°C to 155°C	25mΩ ≤ R ≤ 50mΩ	±1% ±2% ±5%	±100 ppm/°C
PT0815xK-7WxxxxL			1W					

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.
PR1206xKx07xxxxxx	PR	1206	1/4W	(PxR) ^{1/2}	-55°C to 170°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	±1% ±2% ±5%	0.5mΩ ≤ R ≤ 2mΩ ±200 ppm/°C 3mΩ ≤ R ≤ 5mΩ ±100 ppm/°C
PR2512xKx7Wxxxxxx			2W			0.5mΩ ≤ R ≤ 10mΩ		
PR2512xKx7Txxxxxx			3W				±0.5%	±50 ppm/°C
PR2512DKx07xxxxxx			1W					
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					
! PF0402xRx07xxxxxx	PF	0402	1/16W	(PxR) ^{1/2}	-55°C to 155°C	10mΩ ≤ R ≤ 50mΩ	±1% ±2% ±5%	±100 ppm/°C
! PF0402xRx7Wxxxxxx			1/8W					
! PF0402xRx47xxxxxx			1/4W					
PF0603xRx07xxxxxx		0603	1/10W		-55°C to 170°C	5mΩ ≤ R ≤ 100mΩ		±50 ppm/°C ±75 ppm/°C ±100 ppm/°C
PF0603xRx7Wxxxxxx			1/5W					
PF0603xRx7Txxxxxx			1/3W					
PF0603xRx47xxxxxx			2/5W					
PF0603xRx57xxxxxx		1/2W						
PF0805xRx07xxxxxx		0805	1/8W			3mΩ ≤ R ≤ 100mΩ		
PF0805xRx7Wxxxxxx			1/4W					
PF0805xRx7Txxxxxx			1/3W					
PF0805xRx47xxxxxx			1/2W					
PF1206xxx07xxxxxx		1206	1/4W			3mΩ ≤ R ≤ 100mΩ		
PF1206xxx7Wxxxxxx			1/2W					
PF1206xxx47xxxxxx			1W					
PF2010xKx07xxxxxx		2010	1/2W		5mΩ ≤ R ≤ 100mΩ			
PF2010xKx7Wxxxxxx			1W					
PF2512xKx07xxxxxx		2512	1W		6mΩ ≤ R ≤ 100mΩ			
PF2512xKx7Wxxxxxx			2W					
PF2512xKx7Txxxxxx			3W					
PF4527xKx07xxxxxx		4527	2W		5mΩ ≤ R ≤ 1Ω			
PF4527xKx7Wxxxxxx			3W					
PF4527xKx7Txxxxxx			5W					
PF4527xKx7Wxxxxxx		4527	3W		5mΩ ≤ R ≤ 1Ω	±1% ±2% ±5%	±50 ppm/°C ±75 ppm/°C ±100 ppm/°C	
PF4527xKx7Txxxxxx			5W					
PF0612xKx07xxxxxx	PF (Wide)	0612	1W	(PxR) ^{1/2}	-55°C to 170°C	1mΩ ≤ R ≤ 300mΩ	±1% ±2% ±5%	±75 ppm/°C ±100 ppm/°C
PF0612xKx7Wxxxxxx			2W			1mΩ ≤ R ≤ 100mΩ		
PF0815xKx07xxxxxx		0815	1/2W					
PF0815xKx7Wxxxxxx			1W			1mΩ ≤ R ≤ 100mΩ		
PF0830xKx07xxxxxx		0830	2W					
PF0830xKx7Wxxxxxx			3W					

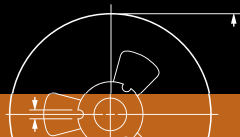
Chip Resistors General Information

Specification overview

Global part number	Series	Size	Power rating	Max. voltage	Operating Temp. range	Resistance range	Tolerance	T. C. R.
! PE0612xKx07xxxxxx	PE (Wide)	0612	1W	(PxR)^1/2	-55°C to 170°C	1mΩ ≤ R ≤ 300mΩ	±1% ±2% ±5%	±75 ppm/°C ±100 ppm/°C
! PE0612xKx7Wxxxxxx			2W					
! PE0815xKx07xxxxxx		0815	1/2W			1mΩ ≤ R ≤ 100mΩ		
! PE0815xKx7Wxxxxxx			1W					
! PE0830xKx07xxxxxx		0830	2W			1mΩ ≤ R ≤ 100mΩ		
! PE0830xKx7Wxxxxxx			3W					
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					
! PE0402xRx07xxxxxx	PE	0402	1/16W	(PxR)^1/2	-55°C to 155°C	10mΩ ≤ R ≤ 50mΩ	±1% ±2% ±5%	±100 ppm/°C
! PE0402xRx7Wxxxxxx			1/8W					
! PE0402xRx47xxxxxx			1/4W					
PE0603xRx07xxxxxx		0603	1/10W		5mΩ ≤ R ≤ 100mΩ			
PE0603xRx7Wxxxxxx			1/5W					
PE0603xRx7Txxxxxx			1/3W					
PE0603xRx47xxxxxx			2/5W					
PE0603xRx57xxxxxx			1/2W					
PE0805xRx07xxxxxx		0805	1/8W		3mΩ ≤ R ≤ 100mΩ			
PE0805xRx7Wxxxxxx			1/4W					
PE0805xRx7Txxxxxx			1/3W					
PE0805xRx47xxxxxx			1/2W					
PE1206xxx07xxxxxx		1206	1/4W		-55°C to 170°C	3mΩ ≤ R ≤ 100mΩ		
PE1206xxx7Wxxxxxx			1/2W					
PE1206xxx47xxxxxx			1W					
! PE2010xKx07xxxxxx		2010	1/2W			5mΩ ≤ R ≤ 100mΩ		
! PE2010xKx7Wxxxxxx			1W					
! PE2512xKx07xxxxxx		2512	1W			6mΩ ≤ R ≤ 100mΩ		
PE2512xKx7Wxxxxxx			2W					
! PE2512xKx7Txxxxxx			3W					
! PE4527xKx07xxxxxx		4527	2W			5mΩ ≤ R < 1Ω		
! PE4527xKx7Wxxxxxx			3W					
! PE4527xKx7Txxxxxx			5W					
! PS0306xRx07xxxxxx	PS (4 Terminal)	0306	1/8W	(PxR)^1/2	-55°C to 155°C	10mΩ ≤ R ≤ 50mΩ	±1% ±5%	±75 ppm/°C ±100 ppm/°C
! PS0306xRx7Wxxxxxx			1/4W					
! PS0508xRx07xxxxxx		0508	1/8W		-55°C to 170°C			
! PS0508xRx7Wxxxxxx			1/4W					
! PS0508xRx7Txxxxxx			1/2W					
! PS0612xKx07xxxxxx		0612	1W		0.5mΩ, 0.75mΩ 1mΩ ≤ R ≤ 5mΩ	0.5mΩ, 0.75mΩ ±700 ppm/°C 1mΩ ≤ R ≤ 2mΩ ±400 ppm/°C 3mΩ ≤ R ≤ 5mΩ ±150 ppm/°C		
! PS1225xKx07xxxxxx		1225	3W		4mΩ ≤ R ≤ 50mΩ	±75 ppm/°C ±100 ppm/°C		

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.			
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	50V							
AR0805xR-07xxxxL		0805	1/8W	150V							
AR1206xR-07xxxxL		1206	1/4W	200V							
! SR0402xR-07xxxxL	SR	0402	1/16W	50V	-55°C to 155°C	1Ω ≤ R ≤ 100KΩ	±5% ±10% ±20%	±200 ppm/°C			
! SR0402xR-7WxxxxL			1/8W								
! SR0603xR-07xxxxL		0603	1/10W	50V							
! SR0603xR-7WxxxxL			1/5W								
SR0805xR-07xxxxL		0805	1/8W	150V							
! SR0805xR-7WxxxxL			1/4W								
SR1206xR-07xxxxL		1206	1/4W	200V							
! SR1206xR-7WxxxxL			1/2W								
SR1218xK-07xxxxL		1218	1W	200V							
SR2010xK-07xxxxL		2010	3/4W	200V							
SR2512xK-07xxxxL		2512	1W	200V							
! RV0603xR-07xxxxL		RV	0603	1/10W					350V	-55°C to 155°C	10KΩ ≤ R ≤ 1MΩ
RV0805xR-07xxxxL	0805		1/8W	400V	100KΩ ≤ R ≤ 10MΩ	±5%					
RV1206xR-07xxxxL	1206		1/4W	500V	100KΩ ≤ R ≤ 27MΩ	Max.: 10MΩ ±1% Max.: 27MΩ ±5%					
RV2512JK-07xxxxL	2512		1W		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	150V							
TR1206xR-07xxxxL		1206	1/4W	200V							
! AF0201xR-07xxxxL		0201	1/20W	25V	-55°C to 125°C	1Ω ≤ R ≤ 10MΩ Jumper<50mΩ	±1% ±5%	1Ω ≤ R ≤ 10Ω -100/+350 ppm/°C 10Ω < R ≤ 10MΩ ±200 ppm/°C			
AF0402xRx-07xxxxL		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			
AF0603xRx-07xxxxL		0603	1/10W	50V							
AF0805xRx-07xxxxL		0805	1/8W	150V							
AF1206xRx-07xxxxL		1206	1/4W	200V		1Ω ≤ R ≤ 10MΩ Jumper<50mΩ	±1% ±5%	1Ω ≤ R ≤ 10Ω ±200 ppm/°C 10Ω < R ≤ 10MΩ ±100 ppm/°C			
! AF1210xRx-07xxxxL		1210	1/2W	200V							
! AF1218xKx-07xxxxL		1218	1W	200V							
! AF2010xKx-07xxxxL		2010	3/4W	200V	-55°C to 125°C	1Ω ≤ R ≤ 1MΩ Jumper < 50mΩ	±1% ±5%	1Ω ≤ R ≤ 10Ω ±250 ppm/°C 10Ω < R ≤ 1MΩ ±200 ppm/°C			
! AF2512xKx-07xxxxL		2512	1W	200V							
! AF122-xR-07xxxxL		2*0402	1/16W	50V							
! AF124-xR-07xxxxL		4*0402	1/16W	25V	-55°C to 155°C						
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	50V							
AC0805xR-07xxxxL		0805	1/8W	150V							
AC1206xR-07xxxxL		1206	1/4W	200V		1Ω ≤ R ≤ 1MΩ Jumper < 50mΩ					
AC1210xR-07xxxxL		1210	1/2W	200V							
AC1218xK-07xxxxL		1218	1W	200V							
AC2010xK-07xxxxL		2010	3/4W	200V		1Ω ≤ R ≤ 10MΩ Jumper < 50mΩ					
AC2512xK-07xxxxL		2512	1W	200V							
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

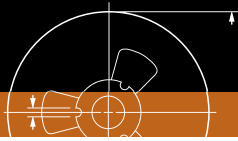
Global part number - Single resistor ⁽³⁾

	R C	0 4 0 2	J R	—	7 D	1 0 R	L	
Series name (code 1-2)								Default code ^(1/2) (code 17)
RC = Thick film general purpose								
RE = Thick film precision grade								Resistance (code 12-16)
RT = Thin film high precision high stability								0R = Jumper
RL = Thick film low ohmic								0U5 = 0.0005Ω
PT = Thick film low ohmic low T. C. R.								0R1 = 0.1Ω
PR/PA/PF/PH/PE = Current sensor - low T. C. R.								1R = 1Ω
PS = Current sensor - low T.C.R, 4 termination								10R = 10Ω
TR = Trimmable								100R = 100Ω
SR = Surge								1K = 1 000Ω
AR = NiAu termination								1M = 1 000 000Ω
RV = High voltage								100M = 100 000 000Ω
AF = Sulfur resistant								
AC = Automotive grade								Taping reel (code 10-11)
								07 = 7 inch Dia. reel
								10 = 10 inch Dia. reel
								13 = 13 inch Dia. reel
								7D = 7 inch Dia. reel
								2 x standard quantity
Size code (code 3-6)								T. C. R. (code 9)
(inch / metric)								B = ±10 ppm/°C (on request)
0100 = 0.4 x 0.2								C = ±15 ppm/°C (on request)
0201 = 0.6 x 0.3								D = ±25 ppm/°C
0402 = 1.0 x 0.5								E = ±50 ppm/°C
0603 = 1.6 x 0.8								M = ±75 ppm/°C
0612 = 1.6 x 3.2								F = ±100 ppm/°C
0805 = 2.0 x 1.25								L = ± 150 ppm/°C
0815 = 2.15 x 3.75								G = ±200 ppm/°C
0830 = 2.0 x 7.5								P = ± 400 ppm/°C
1206 = 3.2 x 1.6								Q = ± 700 ppm/°C
1210 = 3.2 x 2.6								“—” = Based on spec.
1218 = 3.2 x 4.5								(— for thick film only)
2010 = 5.0 x 2.5								
2512 = 6.35 x 3.2								Packing style (code 8)
4527 = 11.0 x 7.0								R = Paper tape reel
								K = Embossed plastic tape reel
								C = Bulk cassette
								S = ESD safe reel
Tolerance (code 7)								
W = ±0.05%								
B = ±0.1%								
C = ±0.25%								
D = ±0.5%								
F = ±1%								
G = ±2%								
J = ±5% (for RC/AR/AF/AC Jumper ordering)								
K = ±10% (for TR = 0/-10%)								
M = ±20% (for TR = 0/-20%)								
N = ±30% (for TR = 0/-30%)								
“—” for RL/PT Jumper ordering								

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

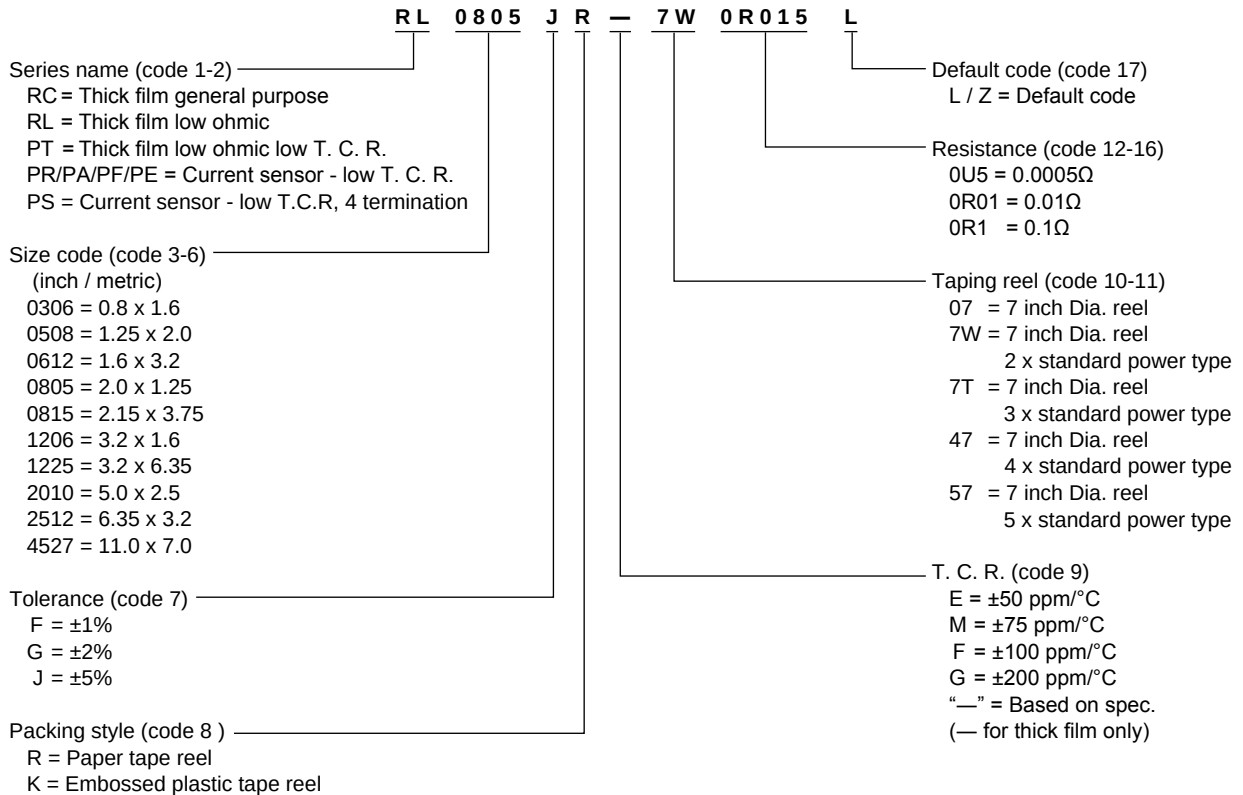
3. Global Part Number is the preferred clear text code for ordering Yageo and Phycomp branded products.



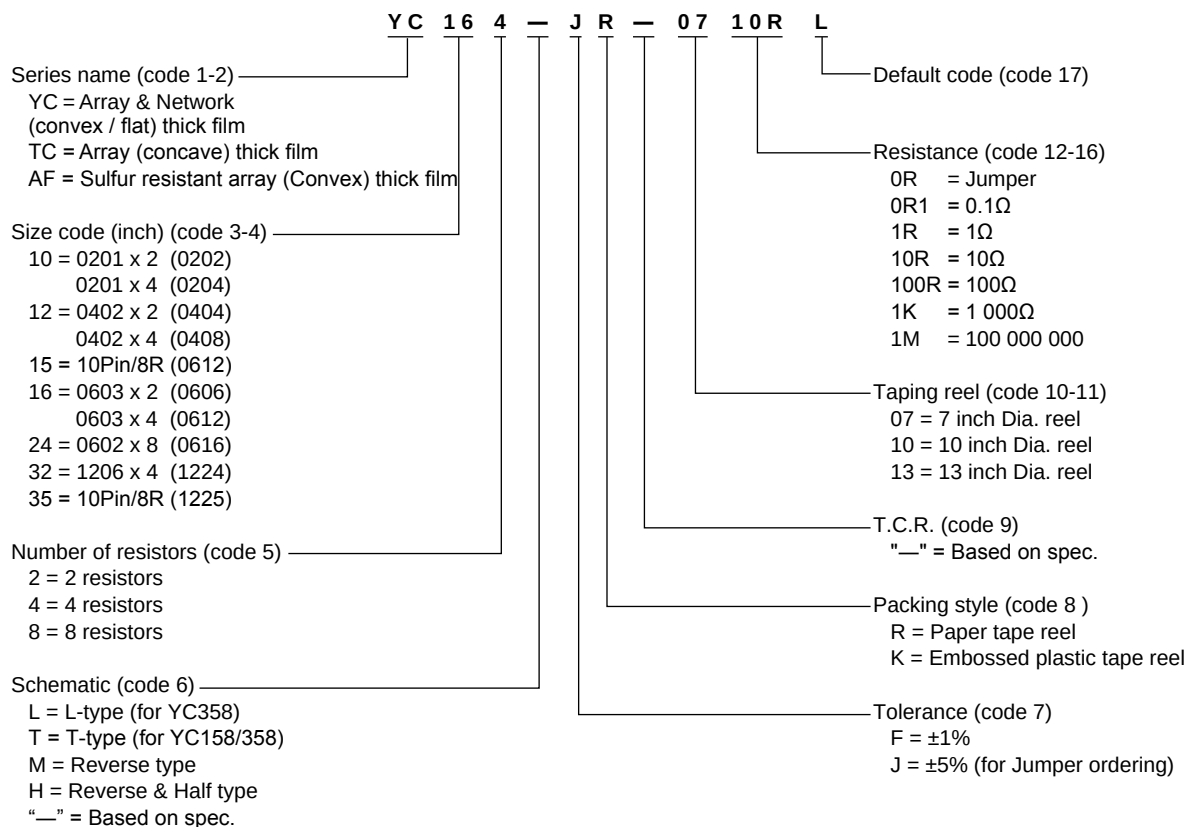
Chip Resistors General Information

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

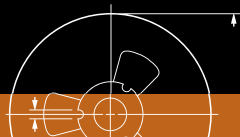
Ordering example: 9C06031A10R0FKHFT = R-Chip 0603, 10R0, 1%, 5K reel

1-2	3-6	7-8	9-12	13	14	15-16	17
XX	XXXX	XX	XXXX	X	X	XX	X
Series name (code 1-2)	Size code (standard resistors, code 3-6)	Power rating (code 7-8)	Resistance value (code 9-12)	Tolerance (code 13)	T. C. R. (code 14)	Special coding (code 15-16)	Packing style (code 17)
9C = Phycomp thick film chip resistors 9T = Phycomp thin film chip resistors	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) 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	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	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	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%	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	HF = SnPb PF = Lead-free AF = NiAu	T = 5K paper 3 = 10K paper 4 = 20K paper 5 = 4K blister 6 = 5K blister 7 = 50K paper P = 25K bulk case

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	Volume
		Paper	Embossed	Paper	Paper	Embossed	g /100pcs	mm³
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	---	---	---	3.704	10.827
4527	24mm	---	1 000	---	---	---	16.225	48.3
YC102	8mm	10 000	---	---	---	---	0.052	---
YC104	8mm	10 000	---	---	---	---	0.099	---
AF/YC122	8mm	10 000	---	---	50 000	---	0.100	---
TC122	8mm	10 000	---	---	50 000	---	0.112	---
ATV321	8mm	10 000	--	---	---	---	0.100	---
AF/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

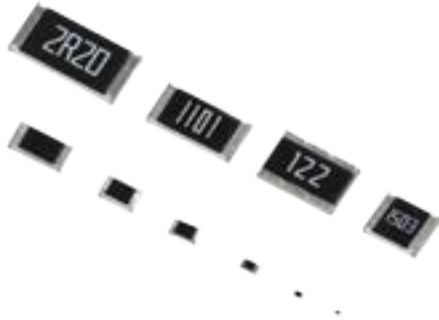
10 MΩ = 1006 or 106

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



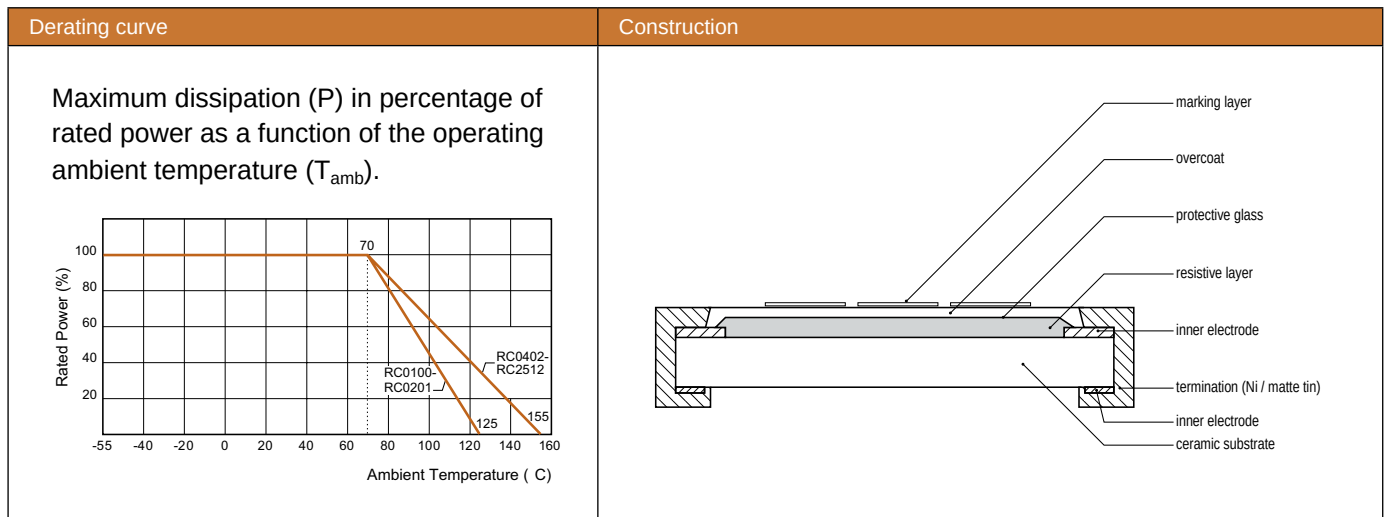
Chip Resistors Selection Charts

RC - Thick film general purpose chip resistors, 01005 to 2512



Features

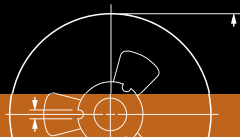
- Extremely thin and light
- Highly reliable multilayer electrode construction
- Compatible with all soldering processes
- Highly stable in auto-placement surface mounting applications
- Barrier layer end termination
- Jumper is available
- Available in 8mm tape & reel per IEC 60286-3 (EIA -RS 481)



Dimensions

unit: mm

Type	L	W	H	l_1	l_2
RC01005	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 (1W)	6.35 ±0.10	3.10 ±0.15	0.55 ±0.10	0.60 ±0.20	0.50 ±0.20
RC2512 (2W)	6.35 ±0.10	3.10 ±0.15	0.55 ±0.10	0.60 ±0.20	1.15 ±0.20



Chip Resistors Selection Charts

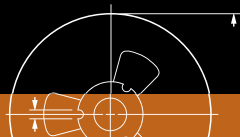
RC - Thick film general purpose chip resistors, 01005 to 2512

Electrical characteristics									
Type	Power P ₇₀	Operating Temp. range	MWV	RCOV	DWV	Resistance range & tolerance		T. C. R. (ppm/°C)	Jumper criteria (unit: A)
RC01005	1/32W	-55°C to +125°C	15V	30V	30V	E24 ±1%, 5% Jumper	1Ω≤R≤1MΩ <50mΩ	1Ω≤R≤10Ω -200~600 10Ω≤R≤1MΩ ±250	Rated current 0.5 Max. current 1.0
RC0201	1/20W	-55°C to +125°C	25V	50V	50V	E24 ±5% E24/E96 ±1% E24/E96 ±0.1%, ±0.5% Jumper	1Ω≤R≤10MΩ 1Ω≤R≤10MΩ 10Ω≤R≤1MΩ <50mΩ	10Ω<R≤10MΩ ±200 1Ω≤R≤10Ω -100/+350	Rated current 0.5 Max. current 1.0
RC0402	1/16W	-55°C to +125°C	50V	100V	100V	E24 ±5% E24/E96 ±1% E24/E96 ±0.1%, ±0.5% Jumper	1Ω≤R≤22MΩ 1Ω≤R≤10MΩ 10Ω≤R≤1MΩ <50mΩ	1Ω≤R≤10Ω ±200 10Ω<R≤10MΩ ±100 10MΩ<R≤22MΩ ±200	Rated current 1.0 Max. current 2.0
RC0603	1/10W	-55°C to +125°C	50V	100V	100V	E24 ±5% E24/E96 ±1% E24/E96 ±0.1%, ±0.5% Jumper	1Ω≤R≤22MΩ 1Ω≤R≤10MΩ 10Ω≤R≤1MΩ <50mΩ	1Ω≤R≤10Ω ±200 10Ω<R≤10MΩ ±100 10MΩ<R≤22MΩ ±200	Rated current 1.0 Max. current 2.0
	1/5W	-55°C to +125°C	50V	100V	100V	E24 ±5% E24/E96 ±1%	1Ω≤R≤1MΩ 1Ω≤R≤1MΩ	1Ω≤R≤1MΩ ±200	-- --
RC0805	1/8W	-55°C to +155°C	150V	300V	300V	E24 ±5% E24/E96 ±1% E24/E96 ±0.1%, ±0.5% Jumper	1Ω≤R≤22MΩ 1Ω≤R≤10MΩ 10Ω≤R≤1MΩ <50mΩ	1Ω≤R≤10Ω ±200 10Ω<R≤10MΩ ±100 10MΩ<R≤22MΩ ±200	Rated current 2.0 Max. current 5.0
	1/4W	-55°C to +155°C	150V	300V	300V	E24 ±5% E24/E96 ±1%	1Ω≤R≤1MΩ 1Ω≤R≤1MΩ	1Ω≤R≤1MΩ ±200	-- --
RC1206	1/4W	-55°C to +155°C	200V	400V	500V	E24 ±5% E24/E96 ±1% E24/E96 ±0.1%, ±0.5% Jumper	10Ω≤R≤22MΩ 1Ω≤R≤10MΩ 10Ω≤R≤1MΩ <50mΩ	1Ω≤R≤10Ω ±200 10Ω<R≤10MΩ ±100 10MΩ<R≤22MΩ ±200	Rated current 2.0 Max. current 10.0
	1/2W	-55°C to +155°C	200V	400V	500V	E24 ±5% E24/E96 ±1%	1Ω≤R≤1MΩ 1Ω≤R≤1MΩ	1Ω≤R≤1MΩ ±200	-- --
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 ±200 10Ω<R≤10MΩ ±100 10MΩ<R≤22MΩ ±200	Rated current 2.0 Max. current 10.0
RC1218	1W	-55°C to +155°C	200V	500V	500V	E24 ±5% E24/E96 ±1% E24/E96 ±0.1%, ±0.5% Jumper	1Ω≤R≤1MΩ 1Ω≤R≤1MΩ 10Ω≤R≤1MΩ <20mΩ		Rated current 6.0 Max. current 10.0
RC2010	3/4W	-55°C to +155°C	200V	500V	500V	E24 ±5% E24/E96 ±1% E24/E96 ±0.1%, ±0.5% Jumper	1Ω≤R≤22MΩ 1Ω≤R≤10MΩ 10Ω≤R≤1MΩ <50mΩ		Rated current 2.0 Max. current 10.0
RC2512	1W	-55°C to +155°C	200V	500V	500V	E24 ±5% E24/E96 ±1% E24/E96 ±0.1%, ±0.5% Jumper	1Ω≤R≤1MΩ 1Ω≤R≤1MΩ 10Ω≤R≤1MΩ <50mΩ		Rated current 2.0 Max. current 10.0
	2W	-55°C to +155°C	200V	400V	500V	E24 ±5% E24/E96 ±1%	1Ω≤R≤150Ω 1Ω≤R≤150Ω	1Ω≤R≤150Ω ±200	-- --

Chip Resistors Selection Charts

RC - 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

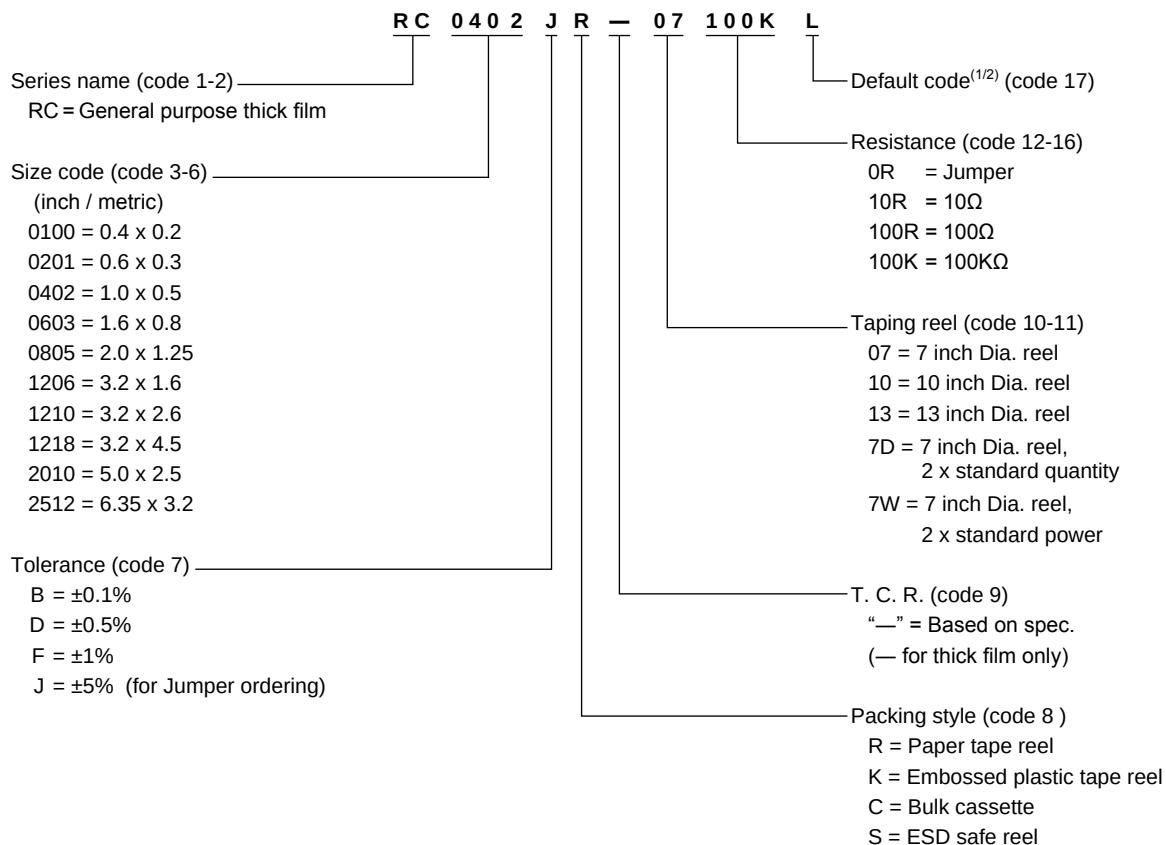


Chip Resistors Selection Charts

RC - 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

RC - Thick film general purpose chip resistors, 01005 to 2512

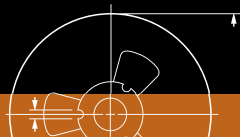
Phycomp worldwide - Traditional type								
General purpose thick film / RC series								
Size: inch (mm)	0201 (0603)		0402 (1005)		0603 (1608)		0805 (2012)	
Power	1/20 W		1/16 W		1/10 W		1/8 W	
Tolerance	+5%	+1%	+5%	+1%	+5%	+1%	+5%	+1%
Resistance	E24	E24 / E96	E24	E24 / E96	E24	E24 / E96	E24	E24 / E96
Packing	paper tape		paper tape		paper tape		paper tape	
Quantity	5 000	---	---	---	2322 702 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
	20 000	2322 806 80...L	2322 806 8...L	---	---	2322 702 81...L	2322 704 8...L	2322 730 81...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%
Resistance	E24	E24 / E96	E24	E24 / E96	E24	E24 / E96	E24	E24 / E96	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
	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 15 for details.	



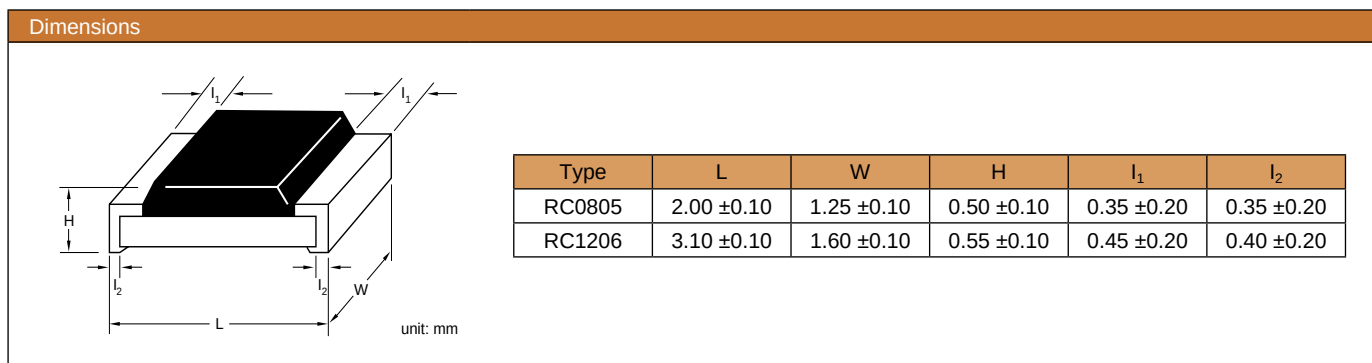
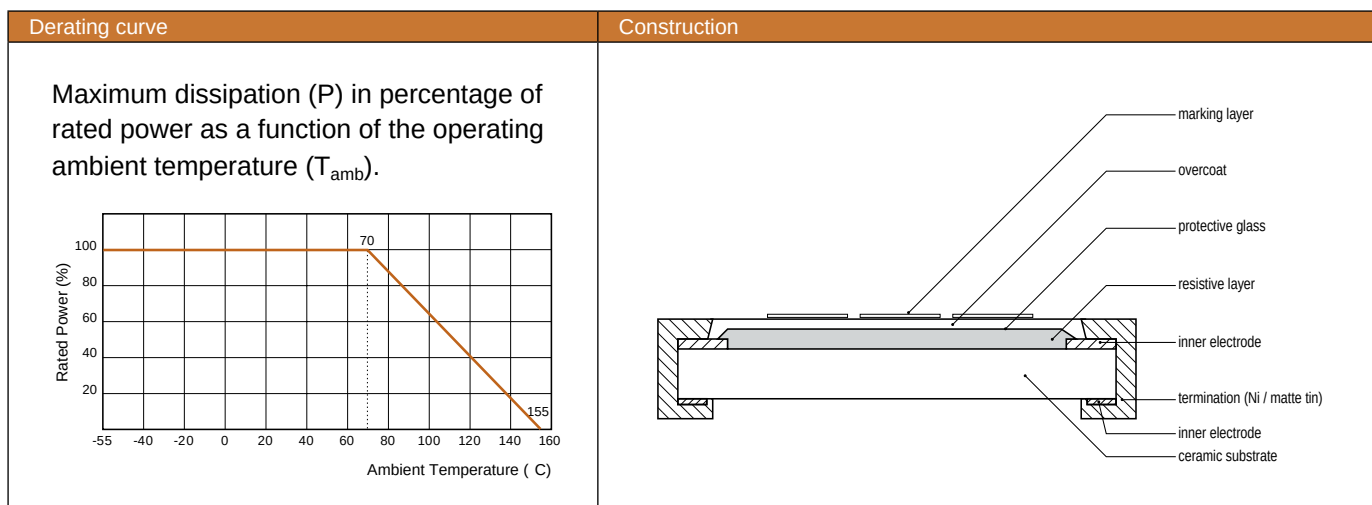
Chip Resistors Selection Charts

RC - 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



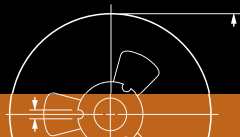
Chip Resistors Selection Charts

RC - 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 $\pm 5\%$, $\pm 10\%$, $\pm 20\%$ $24M\Omega \leq R \leq 100M\Omega$	± 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 $\pm 5^\circ\text{C}$ applied RCWV 1.5 hours on, 0.5 hours off, still air required	$\pm(2\% + 0.05\Omega)$
High temperature exposure		MIL-STD-202G-method 108A	1 000 hours at maximum operating temperature depending on specification, unpowered	$\pm(1\% + 0.05\Omega)$
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°C / 65°C 95% R.H	$\pm(2\% + 0.05\Omega)$
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	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	$\pm(1\% + 0.05\Omega)$ 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	$\pm(2\% + 0.05\Omega)$ No visible damage



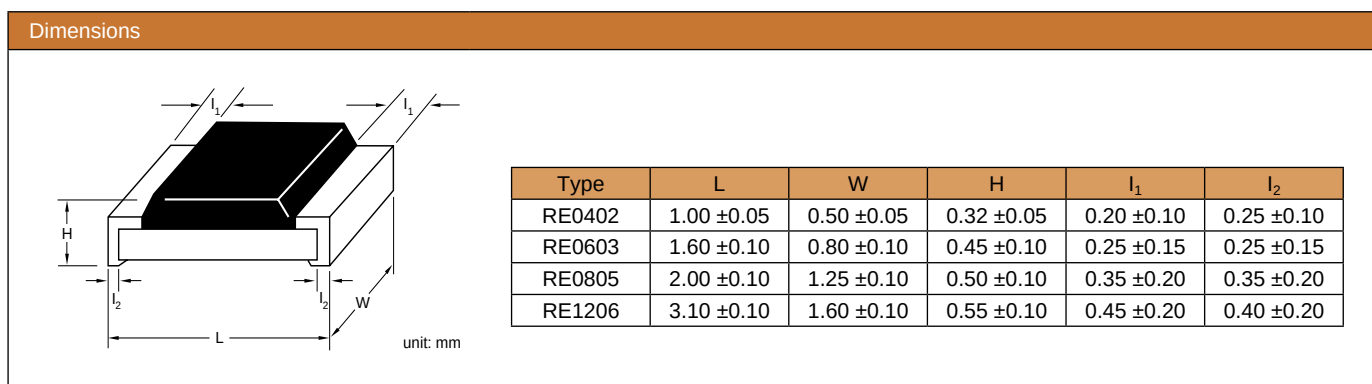
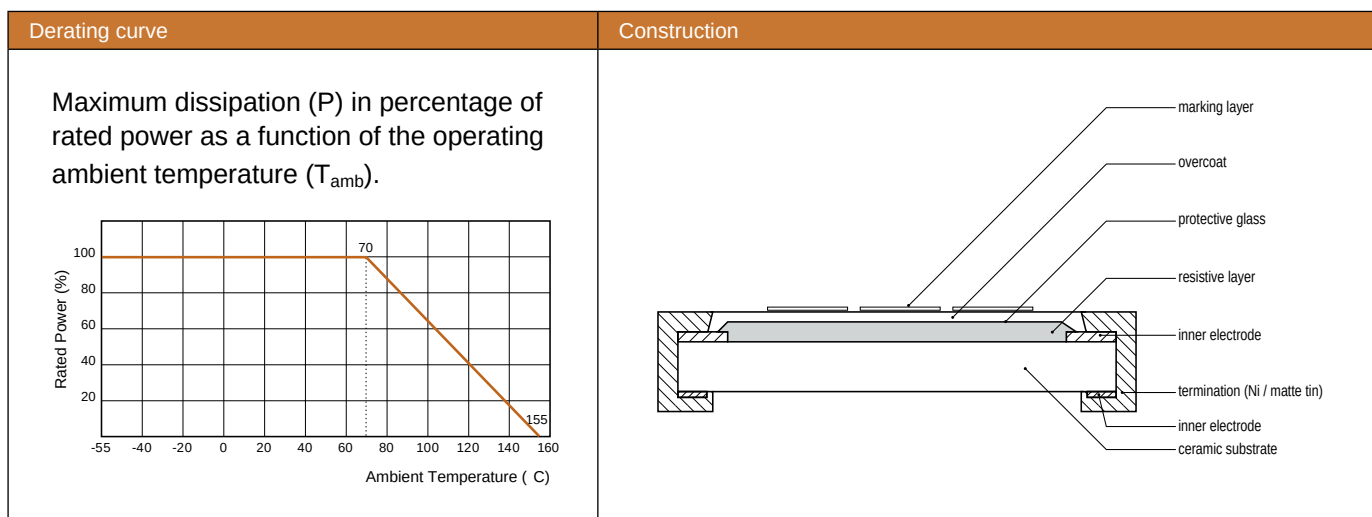
Chip Resistors Selection Charts

RE - 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

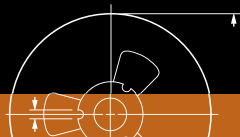


Chip Resistors Selection Charts

RE - 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 $\pm 0.1\%$, $\pm 0.5\%$, $\pm 1\%$ $10\Omega \leq R \leq 1M\Omega$	± 50 ppm/°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°C / 65°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

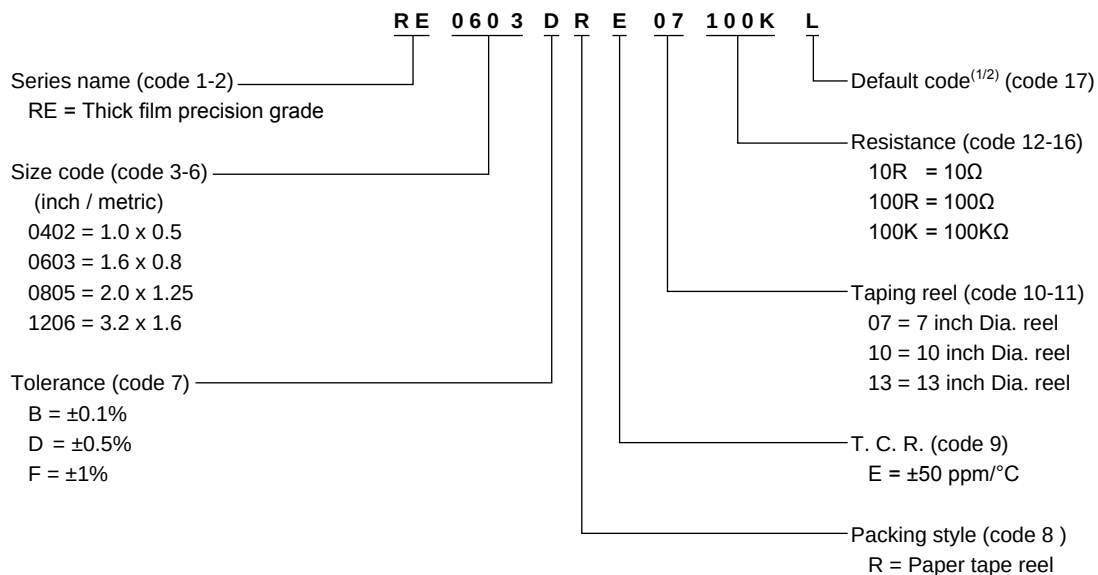


Chip Resistors Selection Charts

RE - 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 15 for details.



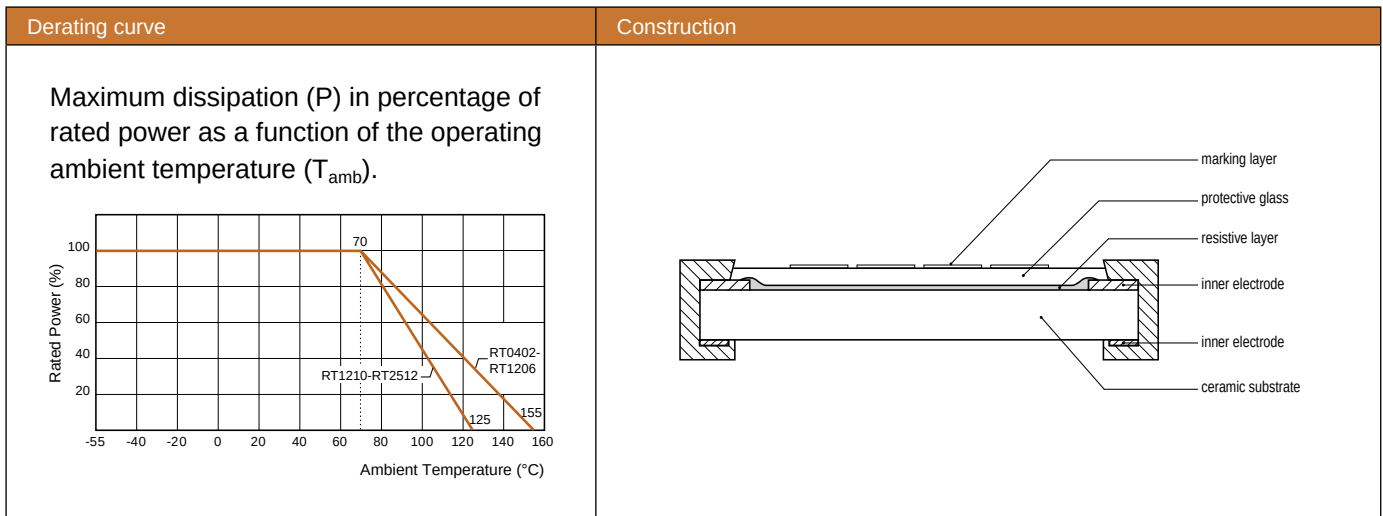
Chip Resistors Selection Charts

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

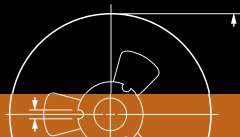


Features

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



Dimensions					
unit: mm					
Type	L	W	H	l_1	l_2
RT0402	1.00 $\pm$ 0.10	0.50 $\pm$ 0.05	0.30 $\pm$ 0.05	0.20 $\pm$ 0.10	0.25 $\pm$ 0.10
RT0603	1.60 $\pm$ 0.10	0.80 $\pm$ 0.10	0.45 $\pm$ 0.10	0.25 $\pm$ 0.15	0.25 $\pm$ 0.15
RT0805	2.00 $\pm$ 0.10	1.25 $\pm$ 0.10	0.50 $\pm$ 0.10	0.35 $\pm$ 0.20	0.35 $\pm$ 0.20
RT1206	3.10 $\pm$ 0.10	1.60 $\pm$ 0.10	0.55 $\pm$ 0.10	0.45 $\pm$ 0.20	0.40 $\pm$ 0.20
RT1210	3.10 $\pm$ 0.10	2.60 $\pm$ 0.15	0.55 $\pm$ 0.10	0.50 $\pm$ 0.20	0.50 $\pm$ 0.20
RT2010	5.00 $\pm$ 0.10	2.50 $\pm$ 0.15	0.55 $\pm$ 0.10	0.60 $\pm$ 0.20	0.50 $\pm$ 0.20
RT2512	6.35 $\pm$ 0.10	3.20 $\pm$ 0.15	0.55 $\pm$ 0.10	0.60 $\pm$ 0.20	0.50 $\pm$ 0.20



Chip Resistors Selection Charts

RT - 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 $\pm 0.05\%$, $\pm 0.1\%$, $\pm 0.25\%$, $\pm 0.5\%$, $\pm 1\%$	$10\Omega \leq R \leq 121K\Omega$	± 50 ppm/°C ± 25 ppm/°C ± 15 ppm/°C ± 10 ppm/°C
RT0603	1/10W		75V	150V	100V		$5.1\Omega \leq R \leq 681K\Omega$	
RT0805	1/8W		150V	300V	200V		$5.1\Omega \leq R \leq 1.5M\Omega$	
RT1206	1/4W		200V	400V	300V		$5.1\Omega \leq R \leq 1M\Omega$	
RT1210	1/4W	-55°C to +125°C	200V	400V	400V		$5.1\Omega \leq R \leq 1M\Omega$	
RT2010	1/2W		200V	400V	400V		$10\Omega \leq R \leq 1M\Omega$	
RT2512	3/4W		200V	400V	400V		$10\Omega \leq R \leq 1M\Omega$	

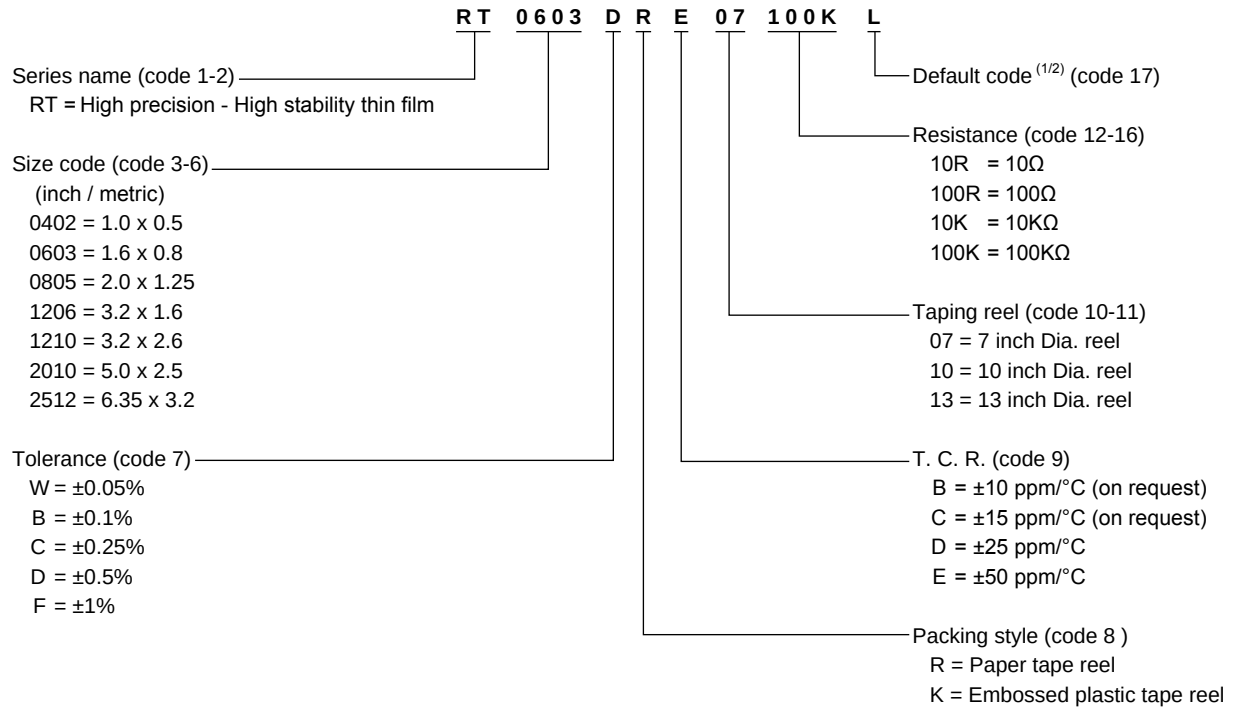
Environmental characteristics				
Performance test		Test method	Procedure	Requirements
Life		MIL-STD-202G-method 108A	1 000 hours at 70 $\pm 5^\circ\text{C}$ applied RCWV 1.5 hours on, 0.5 hours off, still air required	$\pm(0.5\% + 0.05\Omega)$ for RT
High temperature exposure		MIL-STD-202G-method 108A	1 000 hours at maximum operating temperature depending on specification, unpowered	$\pm(0.5\% + 0.05\Omega)$
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°C / 65°C 95% R.H	$\pm(0.5\% + 0.05\Omega)$
Thermal shock		MIL-STD-202G-method 107G	LCT / UCT, number of cycles required is 300 Maximum transfer time is 20 seconds	$\pm(0.5\% + 0.05\Omega)$
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	$\pm(0.5\% + 0.05\Omega)$ for RT No visible damage
Solderability	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
	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

Chip Resistors Selection Charts

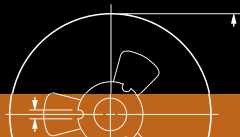
RT - Thin film high precision high stability chip resistors, 0402 to 2512

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

RT - 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.	

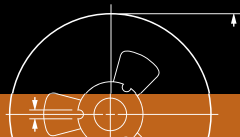
Thin film product range against tolerance / T. C. R. (ordering code)														
Tolerance	±0.05% (W)			±0.1% (B)				±0.25% (C)				±0.5% (D)		±1% (F)
T. C. R. (ppm/°C)	±10 (B)	±15 (C)	±25 (D)	±10 (B)	±15 (C)	±25 (D)	±50 (E)	±10 (B)	±15 (C)	±25 (D)	±50 (E)	±25 (D)	±50 (E)	±50 (E)
RT0402	--	--	--	10R - 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



YC/TC - Thick film array / network chip resistors

- 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

$$R1 = R2 = R3 = R4 = R5 = R6 = R7 = R8$$



Chip Resistors Selection Charts

YC/TC - 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		Rated current	0.5
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
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 ≤ 10Ω ±250 ppm/°C 10Ω ≤ R ≤ 1MΩ ±200 ppm/°C	Rated current	1.0
YC162	1/16W	-55°C to +125°C	50V	100V	100V	E24 ±5% Jumper	10Ω ≤ R ≤ 1MΩ < 0.05Ω	±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	±200 ppm/°C	Rated current	1.0
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
YC324	1/8W	-55°C to +155°C	200V	500V	500V	E24 ±5% E24/E96 ±1%	10Ω ≤ R ≤ 1MΩ 10Ω ≤ R ≤ 1MΩ		--	--
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		Rated current	1.0
TC122H									Max. current	1.5
TC122M										
TC124						E24 ±5% E24/E96 ±1% Jumper	10Ω ≤ R ≤ 1MΩ 10Ω ≤ R ≤ 1MΩ < 0.05Ω		Rated current	1.0
TC124H									Max. current	1.5
TC124M										
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		Rated current	1.0
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

YC/TC - Arrays, convex / concave / flat

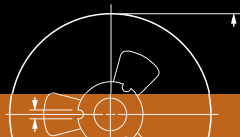
Global part number - Arrays											
Ordering example: YC122-JR-07100KL											
Series name (code 1-2) YC = Array & Network (convex / flat) thick film TC = Array (concave) thick film Size code (inch) (code 3-4) 10 = 0201 x 2 (0202) 0201 x 4 (0204) 12 = 0402 x 2 (0404) 0402 x 4 (0408) 16 = 0603 x 2 (0606) 0603 x 4 (0612) 24 = 0602 x 8 (0616) 32 = 1206 x 4 (1224) Number of resistors (code 5) 2 = 2 resistors 4 = 4 resistors 8 = 8 resistors Schematic (code 6) H = Reverse & Half type M = Reverse type "-" = Based on spec. Resistance (code 12-16) 0R = Jumper 10R = 10Ω 100R = 100Ω 100K = 100KΩ Taping reel (code 10-11) 07 = 7 inch Dia. reel 10 = 10 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% (for Jumper ordering) Default code (code 17) L											

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 X1206 / 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 (concave)	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 15 for details.											



Chip Resistors Selection Charts

YC/TC - Networks, T-type / L-type

Global part number - Networks	
Ordering example: YC158TJR-07100KL	
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 L = L-type (for YC358) T = T-type (for YC158/358)	Default code (code 17) 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	E24
Packing	paper tape	blister tape	
Quantity	4 000	2350 201 10...L	2350 200 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 15 for details.



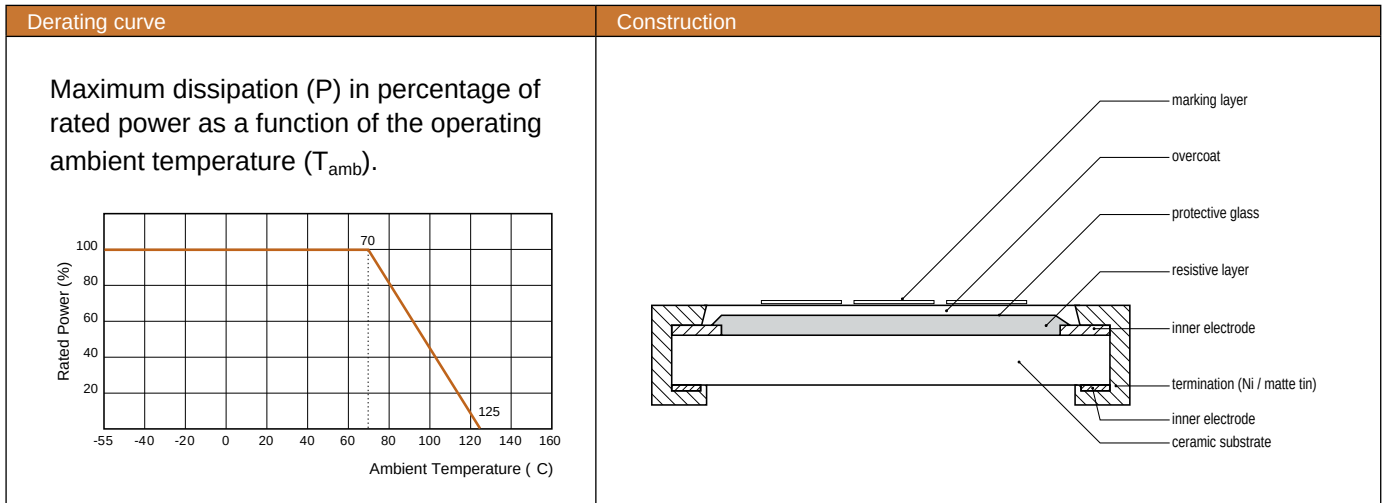
Chip Resistors Selection Charts

RL - Thick film low ohmic chip resistors, 0402 to 2512



Features

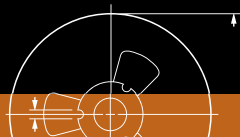
- Current sensing of desktop & notebook PC
- Resistance values down to 0.01Ω
- Highly reliable multilayer electrode construction
- Low inductance
- High speed logic circuits



Dimensions

A 3D perspective diagram of a chip resistor. The dimensions are labeled as follows: L is the overall length, W is the overall width, H is the overall height, l₁ is the length of the top surface, and l₂ is the length of the bottom surface. The unit is mm.

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

RL - 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)	Jumper criteria
RL0402	1/16W	-55°C to +125°C	E24 ±1%, ±2%, ±5%	50mΩ ≤ R < 1Ω	See following table “T.C.R.- RL series”	Max. resistance 20mΩ Rated current 1.5A
RL0603	1/10W			10mΩ ≤ R < 1Ω		Max. resistance 20mΩ Rated current 2A
RL0805	1/8W			10mΩ ≤ R < 1Ω		Max. resistance 20mΩ Rated current 2.5A
	1/4W			10mΩ ≤ R < 1Ω		-- --
RL1206	1/4W			10mΩ ≤ R < 1Ω		Max. resistance 20mΩ Rated current 3.5A
	1/2W			10mΩ ≤ R < 1Ω		-- --
RL1210	1/2W			10mΩ ≤ R < 1Ω		-- --
RL1218	1W			10mΩ ≤ R < 1Ω		-- --
RL2010	3/4W			10mΩ ≤ R < 1Ω		-- --
RL2512	1W			10mΩ ≤ R < 1Ω		-- --

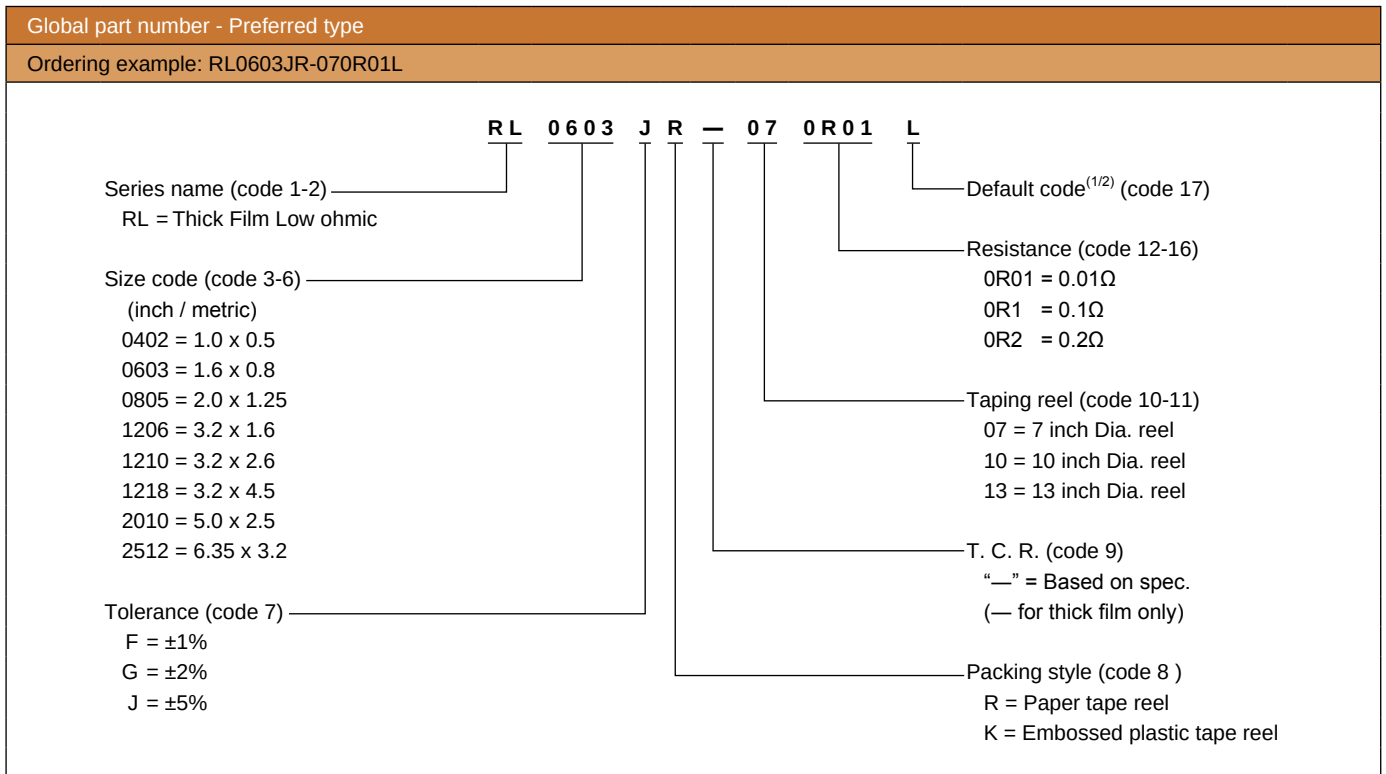
Note: The partial values of 25 / 40 / 50 / 60 / 250 / 400 / 500 mΩ are also available

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		±300 ppm/°C				
			10mΩ≤R≤18mΩ		18mΩ<R≤47mΩ		47mΩ<R≤91mΩ		91mΩ<R≤360mΩ	360mΩ<R≤500mΩ	500mΩ<R<1Ω		
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	±200 ppm/°C	
RL1206			±1 500 ppm/°C		±1 200 ppm/°C		±1 000 ppm/°C		±800 ppm/°C		±600 ppm/°C	±300 ppm/°C	±200 ppm/°C
RL1210			±1 500 ppm/°C		±1 000 ppm/°C		±800 ppm/°C		±600 ppm/°C		±300 ppm/°C	±200 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		±250 ppm/°C				
			10mΩ≤R≤18mΩ		18mΩ<R≤47mΩ		47mΩ<R≤91mΩ		91mΩ<R≤360mΩ		360mΩ<R≤500mΩ	500mΩ<R<1Ω	
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	±200 ppm/°C	
RL2512			±1 500 ppm/°C		±1 200 ppm/°C		±800 ppm/°C		±600 ppm/°C		±300 ppm/°C	±200 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	±1% No visible damage
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

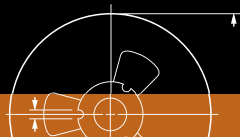
Chip Resistors Selection Charts

RL - Thick film low ohmic chip resistors, 0402 to 2512



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

RL - 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 15 for details.								

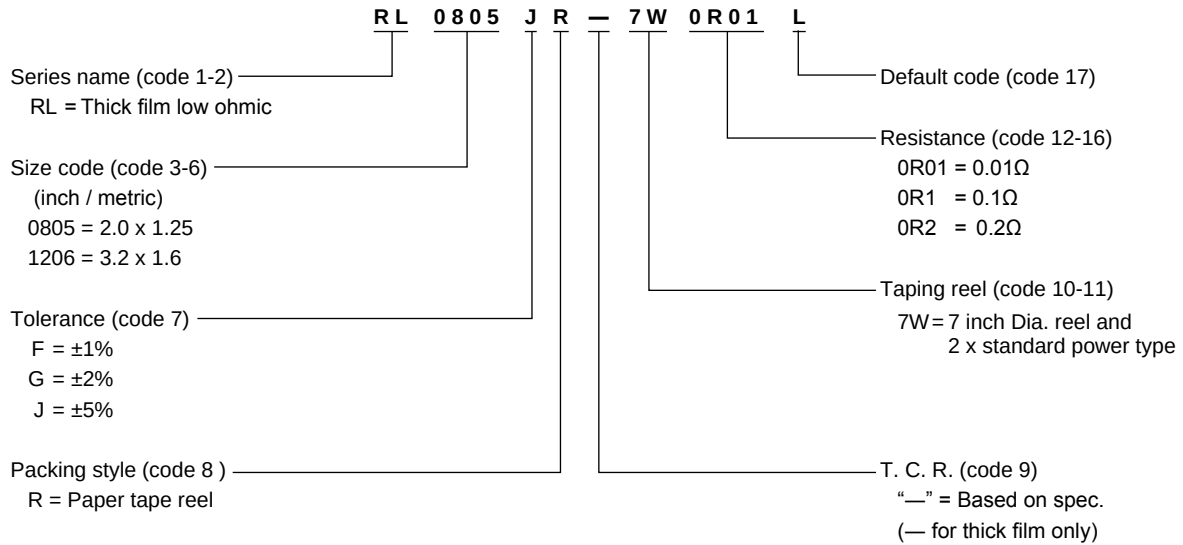


Chip Resistors Selection Charts

RL - Thick film low ohmic, high power chip resistors, 0402 / 1206

Global part number - Preferred type

Ordering example: RL0805JR-7W0R01L



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

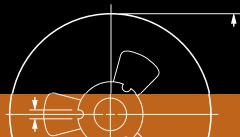
Phycomp worldwide - Traditional type

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

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 15 for details.



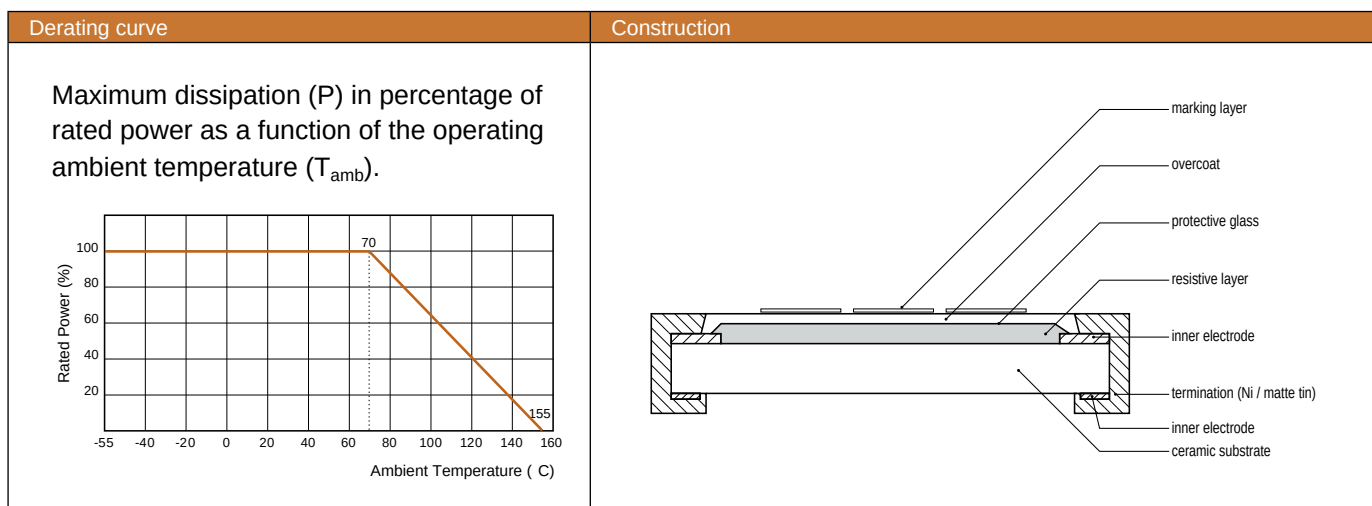
Chip Resistors Selection Charts

PT - 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



Dimensions

unit: mm

Type	L	W	H	l_1	l_2
PT0402	1.00 ±0.10	0.50 ±0.05	0.35 ±0.05	0.20 ±0.10	0.25 ±0.10
PT0603	1.60 ±0.10	0.80 ±0.10	0.45 ±0.10	0.25 ±0.15	0.25 ±0.15
PT0805	2.00 ±0.10	1.25 ±0.10	0.55 ±0.10	0.35 ±0.20	0.35 ±0.20
PT1206 (50mΩ ≤ R < 75mΩ & 91mΩ ≤ R < 1Ω)	3.10 ±0.10	1.60 ±0.10	0.55 ±0.10	0.45 ±0.20	0.45 ±0.20
PT1206 (75mΩ ≤ R < 91mΩ)	3.10±0.10	1.60±0.10	0.55±0.10	0.75±0.20	0.45±0.20
PT2010	5.00 ±0.10	2.50 ±0.15	0.55 ±0.10	0.60 ±0.20	0.50 ±0.20
PT2512	6.35 ±0.10	3.20 ±0.15	0.55 ±0.10	0.60 ±0.20	0.50 ±0.20

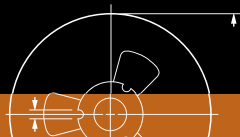
Note: For relevant physical dimensions, please refer to above construction outlines
Please contact our sales offices, distributors and representatives in your region before ordering

Chip Resistors Selection Charts

PT - 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 68mΩ ≤ R < 100mΩ ±300 ppm/°C 100mΩ ≤ R < 1Ω ±200 ppm/°C	Max. resistance 5mΩ Rated current 3A
	1/8W				68mΩ ±300 ppm/°C	
	1/6W				68mΩ ±300 ppm/°C	
PT0603	1/10W				50mΩ 0/+400 ppm/°C 50mΩ < R < 68mΩ 0/+350 ppm/°C 68mΩ ≤ R < 100mΩ 0/+300 ppm/°C 100mΩ ≤ R < 1Ω ±200 ppm/°C	Max. resistance 8mΩ Rated current 5A
	1/5W				50mΩ 0/+400 ppm/°C 50mΩ < R < 68mΩ 0/+350 ppm/°C 68mΩ 0/+300 ppm/°C	
	1/3W				50mΩ 0/+400 ppm/°C 50mΩ < R < 68mΩ 0/+350 ppm/°C 68mΩ 0/+300 ppm/°C	
PT0805	1/8W				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	Max. resistance 5mΩ Rated current 6A
	1/4W				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	
PT1206	1/4W				50mΩ ≤ R < 75mΩ ±350ppm 75mΩ ≤ R ≤ 100mΩ ±100ppm 100mΩ < R < 1Ω ±75ppm	Max. resistance 5mΩ Rated current 10A
	1/2W				50mΩ ≤ R < 75mΩ ±350ppm 75mΩ ≤ R ≤ 100mΩ ±100ppm 100mΩ < R < 1Ω ±75ppm	
PT2010	3/4W				100mΩ ±100 ppm/°C 100mΩ < R < 1Ω ±75 ppm/°C	Max. resistance --- Rated current ---
	1W					
PT2512	1W					Max. resistance --- Rated current ---
	2W					

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

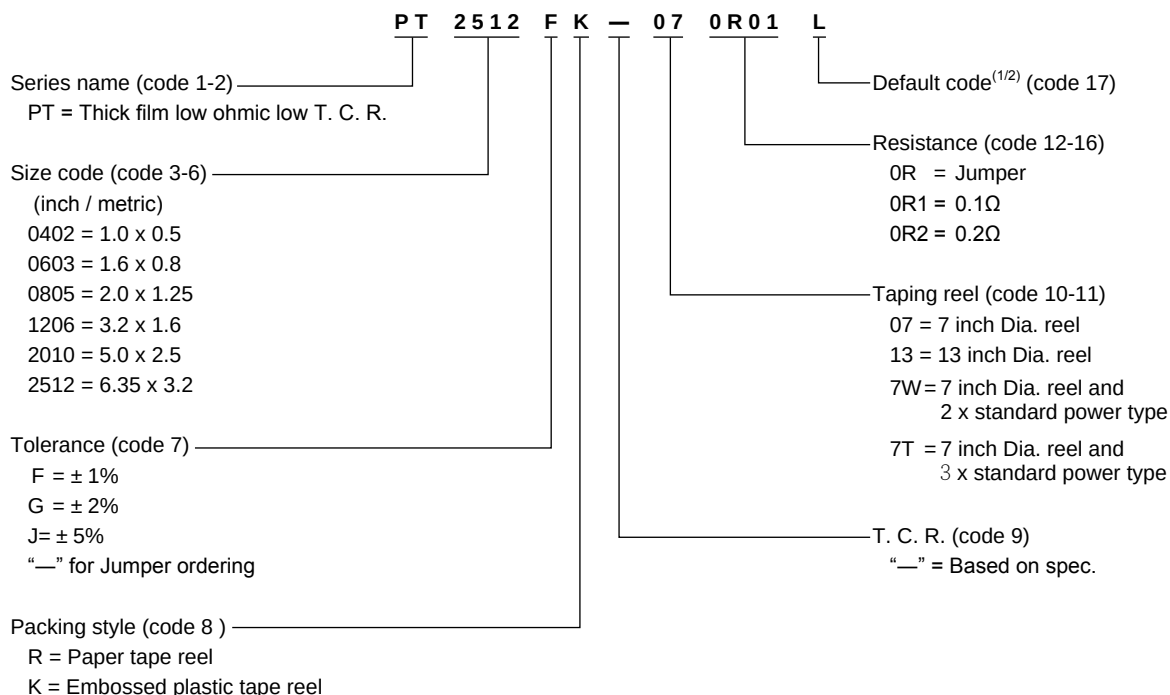


Chip Resistors Selection Charts

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

Global part number - Preferred type

Ordering example: PT2512FK-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

Phycomp CTC ordering code - Traditional type - North America

Regional code for ordering Phycomp branded products. Please see page 15 for details.



Chip Resistors Selection Charts

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

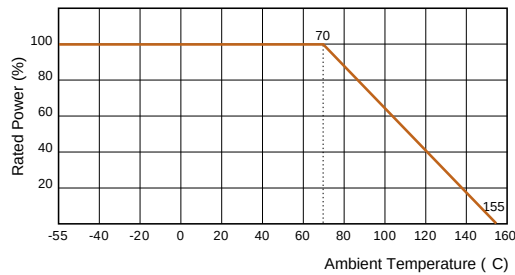


Features

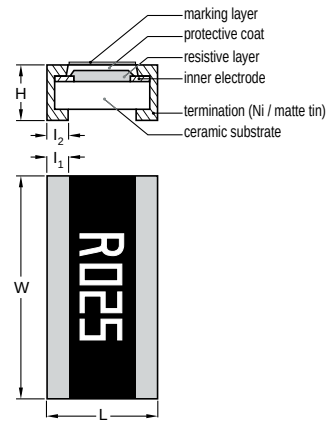
- Excellent T. C. R.
- Precision current sensing control
- Excellent performance for current sensing applications
- Low ohmic and high power

Derating curve

Maximum dissipation (P) in percentage of rated power as a function of the operating ambient temperature (T_{amb}).

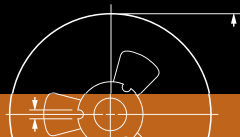


Construction



Dimensions

Type	L	W	H	L_1	L_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

PT - 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 $\pm 1\%$	$25\text{m}\Omega \leq R \leq 50\text{m}\Omega$ $\pm 100 \text{ ppm}/^\circ\text{C}$
	1W				

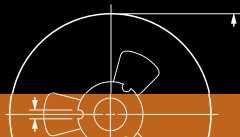
Environmental characteristics				
Performance test		Test method	Procedure	Requirements
Life		MIL-STD-202G-method 108A	1 000 hours at $70 \pm 5^\circ\text{C}$ applied RCWV 1.5 hours on, 0.5 hours off, still air required	$\pm(1\% + 0.0005\Omega)$
High temperature exposure		MIL-STD-202G-method 108A	1 000 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

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

Global part number - Preferred type	
Ordering example: PT0815FK-070R01L	
Series name (code 1-2) ———— P T PT = Thick film low ohmic low T. C. R. Size code (code 3-6) ———— 0 8 1 5 (inch / metric) 0815 = 2.00 x 3.70 Tolerance (code 7) ———— F K F = $\pm 1\%$ G = $\pm 2\%$ J = $\pm 5\%$ Packing style (code 8) ———— — K = Embossed plastic tape reel	Resistance (code 12-16) ———— 0 7 0 R 0 1 0R025 = 0.025Ω 0R05 = 0.05Ω Taping reel (code 10-11) ———— L 07 = 7 inch Dia. reel 7W = 7 inch Dia. reel and 2 x standard power type T. C. R. (code 9) ———— L "—" = base on spec

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



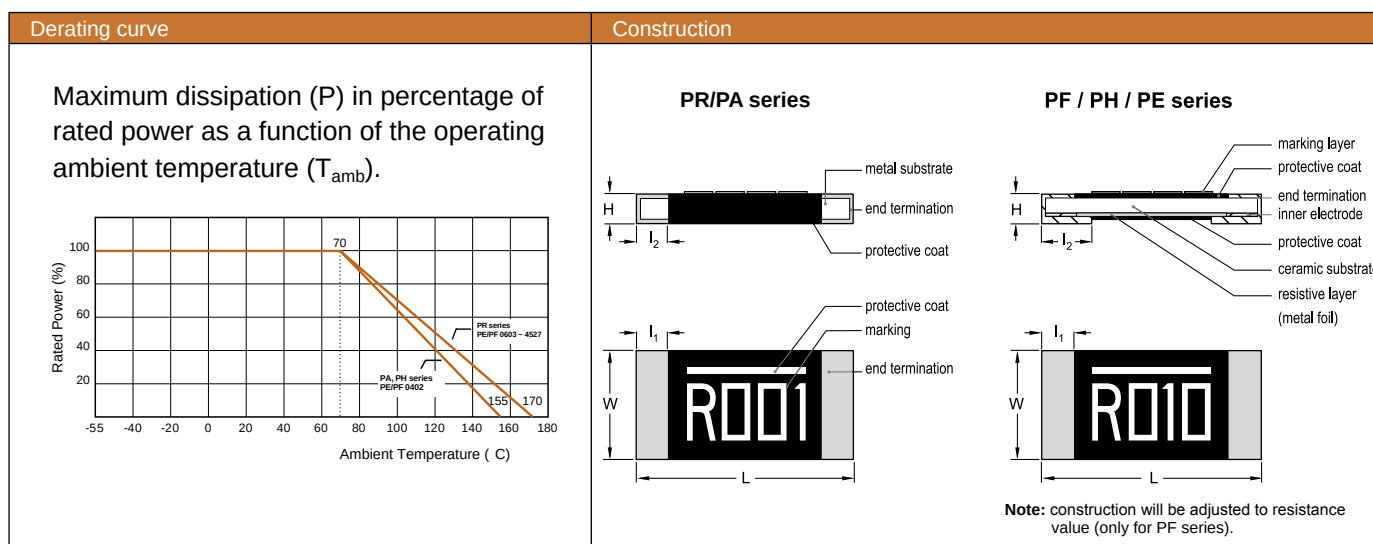
Chip Resistors Selection Charts

PR/PA/PF/PH/PE - Current sensors - low T. C. R. chip resistors, 0402 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	$1\text{m}\Omega \leq R \leq 6\text{m}\Omega$	3.20 ± 0.25	1.60 ± 0.25	0.64 ± 0.25	0.50 ± 0.25	0.50 ± 0.25
PR2010	$1\text{m}\Omega \leq R \leq 3\text{m}\Omega$	5.10 ± 0.25	2.54 ± 0.25	0.80 ± 0.25	1.30 ± 0.25	1.30 ± 0.25
	$4\text{m}\Omega \leq R \leq 100\text{m}\Omega$	5.10 ± 0.25	2.54 ± 0.25	0.64 ± 0.25	0.80 ± 0.25	0.80 ± 0.25
PR2512 ⁽¹⁾	$1\text{m}\Omega \leq R \leq 2\text{m}\Omega$	6.40 ± 0.20	3.20 ± 0.20	0.75 ± 0.15	1.20 ± 0.20	1.20 ± 0.20
	$3\text{m}\Omega \leq R \leq 5\text{m}\Omega$			0.55 ± 0.10	0.60 ± 0.20	0.60 ± 0.20
PR2512 ⁽²⁾	$0.5\text{m}\Omega \leq R \leq 4\text{m}\Omega$	6.25 ± 0.25	3.30 ± 0.25	0.78 ± 0.25	1.88 ± 0.25	1.88 ± 0.25
	$5\text{m}\Omega \leq R \leq 75\text{m}\Omega$			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	$1\text{m}\Omega \leq R \leq 10\text{m}\Omega$	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

PR/PA/PF/PH/PE - Current sensors - low T. C. R. chip resistors, 0402 to 4527

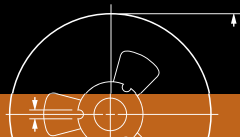
Dimensions

PF / PH / PE series

unit: mm

Type	Resistance range	L	W	H	l_1	l_2
PF / PE0402	$10\text{m}\Omega \leq R \leq 50\text{m}\Omega$	1.00 ± 0.30	0.50 ± 0.20	0.45 ± 0.20	0.25 ± 0.10	---
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	$3\text{m}\Omega$	2.10 ± 0.20	1.35 ± 0.20	0.65 ± 0.20	0.75 ± 0.15	---
PF / PH / PE0805 ⁽²⁾	$4\text{m}\Omega$	2.00 ± 0.20	1.25 ± 0.20	0.60 ± 0.15	---	0.70 ± 0.15
	$5\text{m}\Omega$					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⁾	$3\text{m}\Omega$	3.20 ± 0.20	1.60 ± 0.20	0.60 ± 0.15	---	1.30 ± 0.20
	$4\text{m}\Omega$					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
PF / PE2010	$5\text{m}\Omega \leq R \leq 9\text{m}\Omega$	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⁾	$6\text{m}\Omega$	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)				1.30 ± 0.25	0.75 ± 0.25
	$20\text{m}\Omega \leq R \leq 50\text{m}\Omega$ (2W)				0.75 ± 0.25	1.30 ± 0.25
PF / PE2512 ⁽²⁾	$1\text{m}\Omega$	6.30 ± 0.20	3.10 ± 0.20	0.60 ± 0.15	---	2.93 ± 0.20
	$2\text{m}\Omega$					2.70 ± 0.20
	$3\text{m}\Omega$					2.50 ± 0.20
	$4\text{m}\Omega$					2.15 ± 0.20
	$5\text{m}\Omega$					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
PF / PE4527	$5\text{m}\Omega$	11.50 ± 0.20	7.00 ± 0.20	0.60 ± 0.15	2.90 ± 0.20	---
	$6\text{m}\Omega \leq R < 1\Omega$	11.50 ± 0.20	7.00 ± 0.20	0.60 ± 0.15	---	2.60 ± 0.20

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

PR/PA/PF/PH/PE - Current sensors - low T. C. R. chip resistors, 0402 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	0402	1/16W	-55°C to 155°C	(PxR)^1/2	±1% ±2% ±5%	10mΩ ≤ R ≤ 50mΩ	±100 ppm/°C
			1/8W					
			1/4W					
		0603	1/10W					
			1/5W					
			1/3W					
			2/5W					
		0805	1/2W					
			1/8W					
			1/4W					
			1/3W					
		1206	1/2W					
			1/4W					
			1W					
		2010	1/2W					
			1W					
		2512	1W					
			2W					
			3W					
		4527	2W					
			3W					
			5W					
PF	Metal Foil	0402	1/16W	-55°C to 155°C	(PxR)^1/2	±1% ±2% ±5%	10mΩ ≤ R ≤ 50mΩ	±100 ppm/°C
			1/8W					
			1/4W					
		0603	1/10W					
			1/5W					
			1/3W					
			2/5W					
		0805	1/2W					
			1/8W					
			1/4W					
			1/3W					
		1206	1/2W					
			1/4W					
			1W					
		2010	1/2W					
			1W					
		2512	1W					
			2W					
			3W					
		4527	2W					
			3W					
			5W					
PH	Metal Foil	0805	4/5W	-55°C to 155°C	(PxR)^1/2	±1%, ±2%, ±5%	4mΩ ≤ R ≤ 50mΩ	
		1206	1W					

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



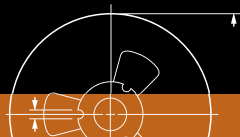
Chip Resistors Selection Charts

PR/PA/PF/PH/PE - Current sensors - low T. C. R. chip resistors, 0402 to 4527

Electrical characteristics										
Type	Technology	Size	Power P70	Operating Temp. range	Max. working voltage	Tolerance	Resistance range	Min. T. C. R.		
PR	Metal Plate	1206	1/4W	-55°C to 170°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							
			1W							
		2512	1W			±0.5%	7mΩ ≤ R ≤ 75mΩ	±200 ppm/°C		
						±1%, ±2%, ±5%	0.5mΩ ≤ R ≤ 2mΩ			
							3mΩ ≤ R ≤ 5mΩ		±100 ppm/°C	
			2W			±0.5%	7mΩ ≤ R ≤ 75mΩ	±50 ppm/°C		
						±1%, ±2%, ±5%	0.5mΩ ≤ R ≤ 2mΩ	±200 ppm/°C		
							3mΩ ≤ R ≤ 5mΩ	±100 ppm/°C		
						±1%, ±2%, ±5%	0.5mΩ ≤ R ≤ 10mΩ	±50 ppm/°C		
3W										
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)
Solder-ability	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

PR/PA/PF/PH/PE - Current sensors - low T. C. R. chip resistors, 0402 to 2512

Global part number - Preferred type	
Ordering example: PF2512FKF070R01L	
Series name (code 1-2) PR/PA/PF/PH/PE = Current sensors - low T. C. R.	P F
Size code (code 3-6) (inch / metric) 0402 = 1.0 x 0.5 0603 = 1.6 x 0.8 0805 = 2.0 x 1.25 1206 = 3.2 x 1.6 2010 = 5.0 x 2.5 2512 = 6.35 x 3.2 4527 = 11.0 x 7.0	2 5 1 2
Tolerance (code 7) F = $\pm 1\%$ G = $\pm 2\%$ J = $\pm 5\%$	F K F
Packing style (code 8) R = Paper tape reel K = Embossed plastic tape reel	0 7
	0 R 0 1
	L
	Default code ^(1/2) (code 17) L / Z = Default code
	Resistance (code 12-16) 0U5=0.0005 Ω 0R01 = 0.01 Ω 0R1 = 0.1 Ω 0R2 = 0.2 Ω
	Taping reel (code 10-11) 07 = 7 inch Dia. reel 7W = 7 inch Dia. reel 2 x standard power type 7T = 7 inch Dia. reel 3 x standard power type 47 = 7 inch Dia. reel 4 x standard power type 57 = 7 inch Dia. reel 5 x standard power type
	T. C. R. (code 9) E = ± 50 ppm/ $^{\circ}$ C M = ± 75 ppm/ $^{\circ}$ C F = ± 100 ppm/ $^{\circ}$ C G = ± 200 ppm/ $^{\circ}$ C

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

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

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 15 for details.



Chip Resistors Selection Charts

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

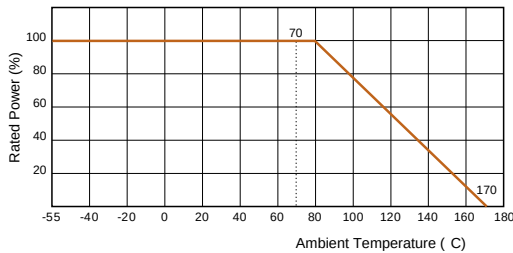


Features

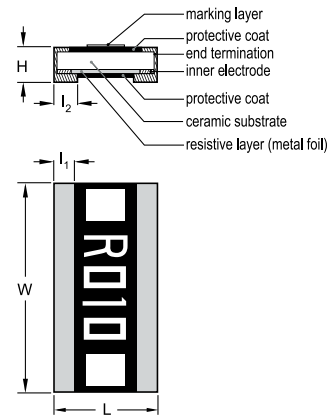
- Excellent T. C. R. compared to thick film low ohmic
- Precision current sensing control
- Excellent performance for current sensing applications
- Low ohmic and high power

Derating curve

Maximum dissipation (P) in percentage of rated power as a function of the operating ambient temperature (T_{amb}).



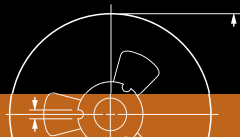
Construction



Dimensions

Type	Resistance range	L	W	H	I_1	I_2
PE / PF0612 ⁽²⁾	1mΩ	1.60 ±0.20	0.32 ±0.20	0.60 ±0.15	---	0.55±0.20
	2mΩ ≤ R ≤ 4mΩ	1.60 ±0.20	0.32 ±0.20	0.60 ±0.15	---	0.40±0.20
	5mΩ ≤ R ≤ 300mΩ	1.60 ±0.20	0.32 ±0.20	0.60 ±0.15	---	0.30±0.15
PE / PF0815 ⁽²⁾	1mΩ	2.50±0.20	3.70±0.20	0.60±0.15	---	0.95±0.20
	2mΩ	2.50±0.20	3.70±0.20	0.60±0.15	---	0.75±0.20
	3mΩ ≤ R ≤ 100mΩ	2.50±0.20	3.70±0.20	0.60±0.15	---	0.60±0.20
PE / 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
PE / PF0830 ⁽²⁾	6 / 8 / 10mΩ	2.00 ±0.20	7.50 ±0.30	0.60 ±0.15	---	0.60 ±0.15
	1mΩ ≤ R ≤ 100mΩ (except 6/8/10mΩ)	2.50 ±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

PE/PF - 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 170°C	(PxR) ^{1/2}	±1%, ±2%, ±5%	$1\text{m}\Omega \leq R \leq 300\text{m}\Omega$ ±75 ppm/°C $1\text{m}\Omega \leq R \leq 100\text{m}\Omega$ ±100 ppm/°C $1\text{m}\Omega \leq R \leq 100\text{m}\Omega$
			2W				
		0815	1/2W				
			1W				
		0830	2W				
			3W				
PE	Metal Foil wide termination	0612	1W	-55°C to 170°C	(PxR) ^{1/2}	±1%, ±2%, ±5%	$1\text{m}\Omega \leq R \leq 300\text{m}\Omega$ ±75 ppm/°C $1\text{m}\Omega \leq R \leq 100\text{m}\Omega$ ±100 ppm/°C $1\text{m}\Omega \leq R \leq 100\text{m}\Omega$
			2W				
		0815	1/2W				
			1W				
		0830	2W				
			3W				

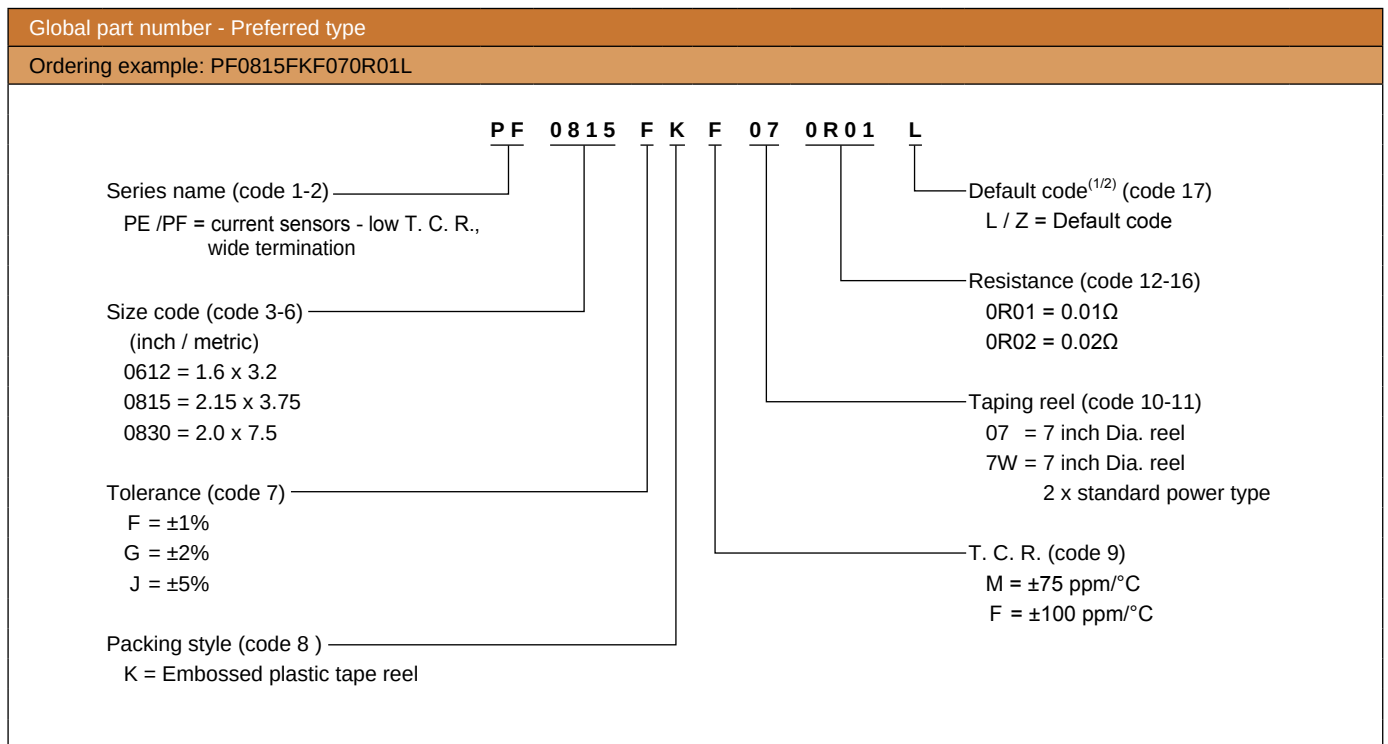
Note: Please contact with sales offices, distributors and representatives in your region before ordering

Environmental characteristics			
Performance test		Test method	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
High temperature exposure		MIL-STD-202G-method 108A	1 000 hours at maximum operating temperature depending on specification, unpowered
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
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
	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	5 times of rated power for 5 seconds at room temperature



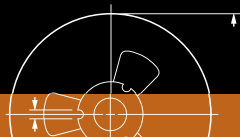
Chip Resistors Selection Charts

PE/PF - 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

PS - Current sensors - low T.C.R. chip resistors, 4 termination, 0306 to 1225

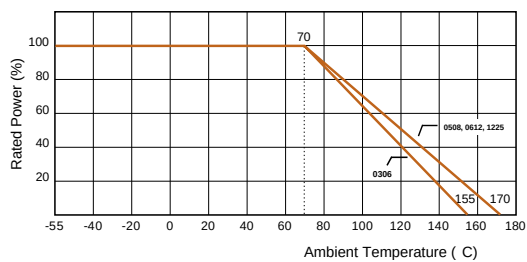


Features

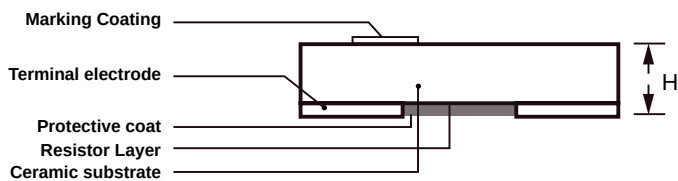
- Excellent T. C. R. compared to thick film low ohmic
- Precision current sensing control
- Excellent performance for current sensing applications
- Ultra-low resistance and narrow tolerance are suitable for current detection

Derating curve

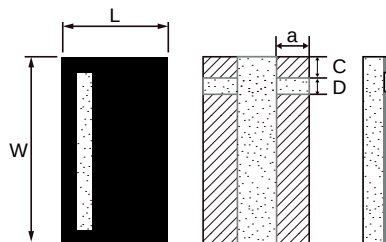
Maximum dissipation (P) in percentage of rated power as a function of the operating ambient temperature (T_{amb}).



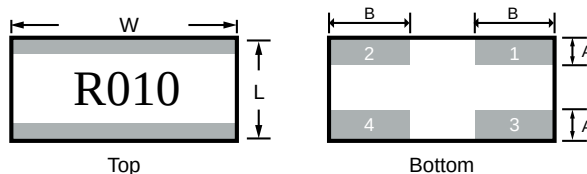
Construction



PS0306 / PS0508 / PS0612



PS1225



Dimensions

Type	L	W	a	D	c	H
PS0306	0.80±0.20	1.60±0.20	0.25±0.20	0.30±0.15	0.30±0.15	0.55±0.20
PS0508	1.25±0.20	2.00±0.20	0.25±0.20	0.20±0.15	0.30±0.20	0.55±0.20
PS0612	1.50±0.25	3.15±0.25	0.35±0.20	0.38±0.20	0.66±0.20	0.75±0.25

Type	L	W	A	B	H
PS1225	3.10±0.20	6.30±0.20	0.80±0.20	2.20±0.20	0.60±0.15

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

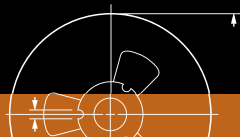
Chip Resistors Selection Charts

PS - Current sensors - low T.C.R. chip resistors, 4 termination, 0306 to 1225

Electrical characteristics							
Type	Technology	Size	Power P ₇₀	Operating Temp. range	Max. working voltage	Tolerance	Resistance range & T. C. R.
PS	Metal Foil 4 termination	0306	1/8W	-55°C to 155°C	(PxR)^1/2	±1%, ±5%	10mΩ ≤ R ≤ 50mΩ ±75 ppm/°C ±100 ppm/°C
			1/4W				
		0508	1/8W	-55°C to 170°C			
			1/4W				
			1/2W				
		0612	1W	-55°C to 170°C			0.5mΩ, 0.75mΩ ±700 ppm/°C 1mΩ ≤ R ≤ 2mΩ ±400 ppm/°C 3mΩ ≤ R ≤ 5mΩ ±150 ppm/°C
		1225	3W	-55°C to 170°C			4mΩ ≤ R ≤ 50mΩ ±75 ppm/°C ±100 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

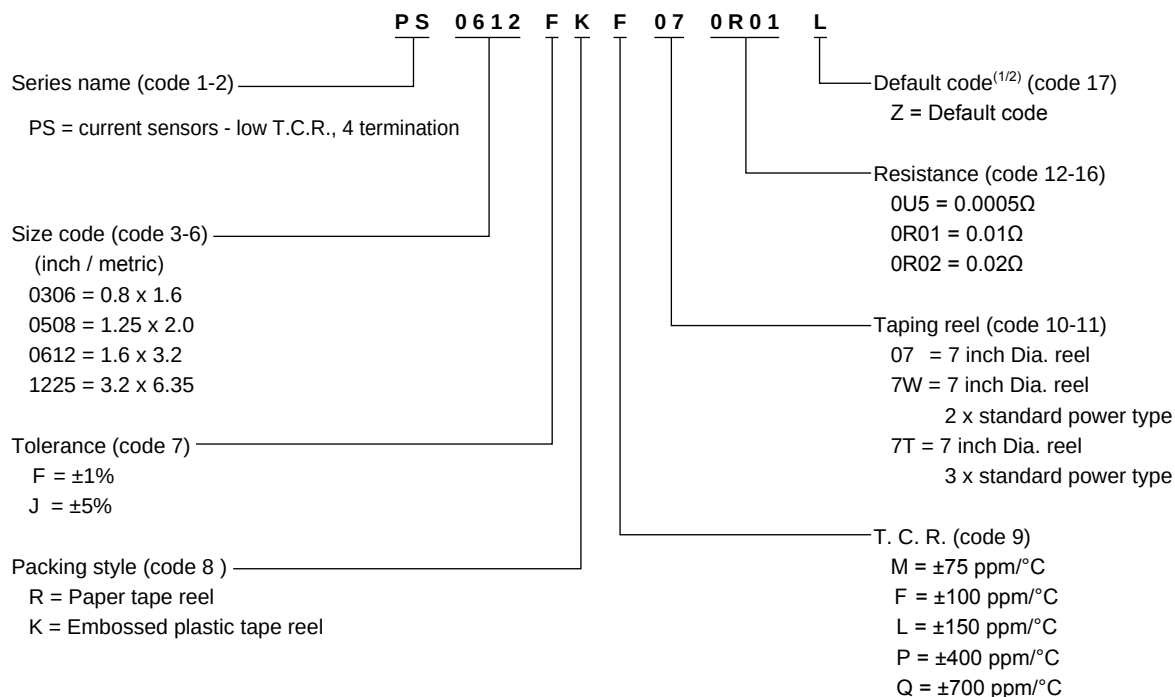


Chip Resistors Selection Charts

PS - Current sensors - low T.C.R. chip resistors, 4 termination, 0306 to 1225

Global part number - Preferred type

Ordering example: PS0612FKF070R01L



Note: 1. All of our RSMD products are RoHS compliant. "LFP" of the internal 2D reel label mentions "Lead Free Process"
2. PS series 4 termination type products are available by "Global part number" only



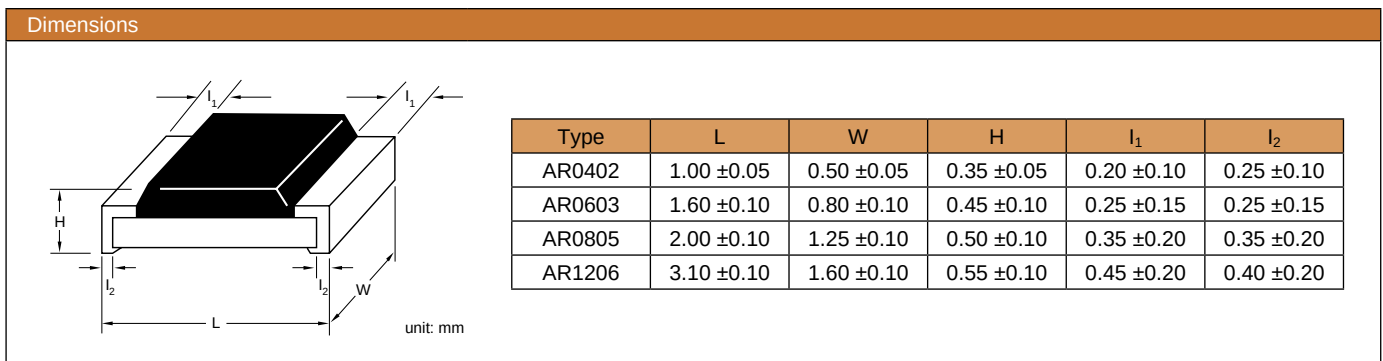
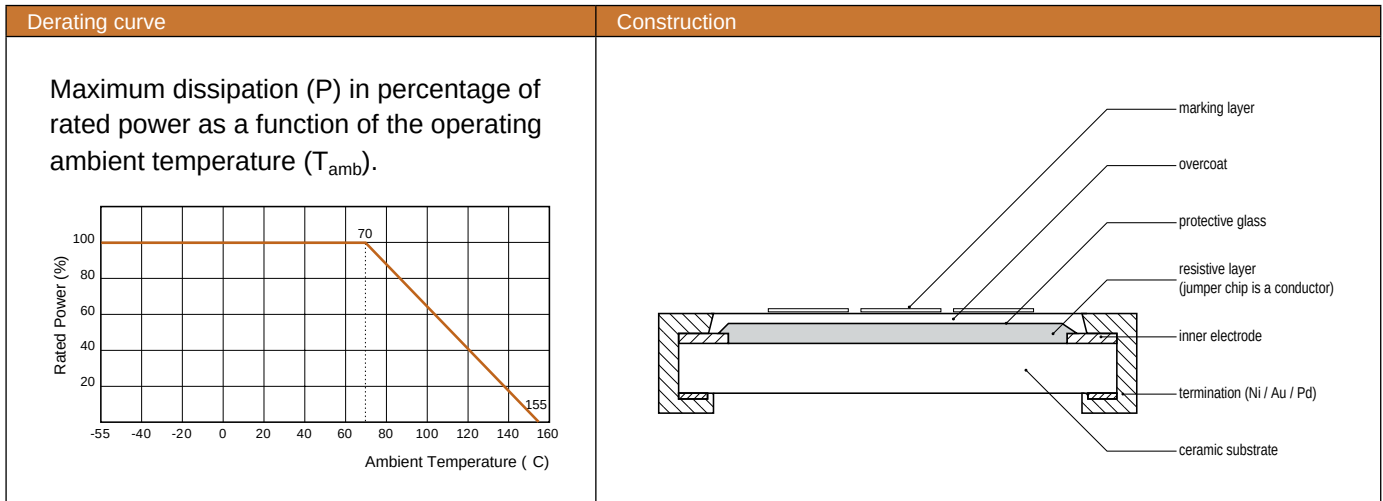
Chip Resistors Selection Charts

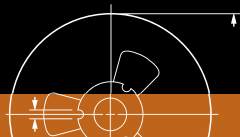
AR - NiAu termination chip resistors, 0402 to 1206



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

AR - 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 $\pm 5\%$ $1\Omega \leq R \leq 10M\Omega$ E24/E96 $\pm 1\%$ $1\Omega \leq R \leq 10M\Omega$ Jumper $< 50M\Omega$	$10\Omega < R \leq 10M\Omega$ ± 100 $1\Omega \leq R \leq 10\Omega$ ± 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

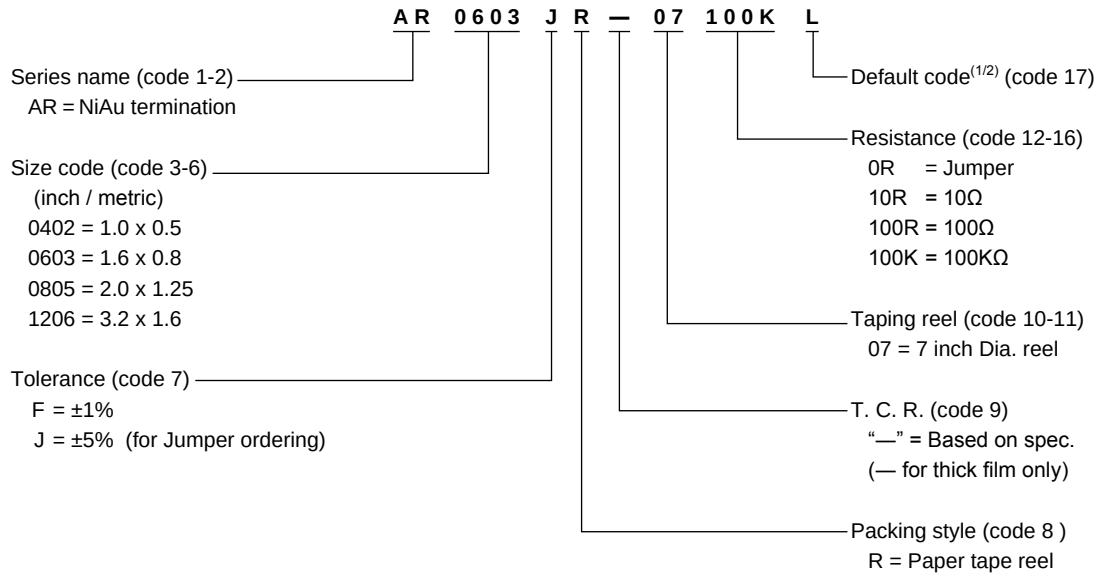
Environmental characteristics				
Performance test		Test method	Procedure	Requirements
Life		MIL-STD-202G-method 108A	1 000 hours at 70 $\pm 5^\circ\text{C}$ applied RCWV 1.5 hours on, 0.5 hours off, still air required	$\pm(2\% + 0.05\Omega)$ $< 100m\Omega$ for jumper
High temperature exposure		MIL-STD-202G-method 108A	1 000 hours at maximum operating temperature depending on specification, unpowered	$\pm(1\% + 0.05\Omega)$ $< 50m\Omega$ 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	$\pm(2\% + 0.05\Omega)$ $< 100m\Omega$ for jumper
Thermal shock		MIL-STD-202G-method 107G	LCT / UCT, number of cycles required is 300 Maximum transfer time is 20 seconds	$\pm(0.5\% + 0.05\Omega)$ for 10K to 10M $\pm(1\% + 0.05\Omega)$ for others $< 50m\Omega$ for jumper
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	$\pm(1\% + 0.05\Omega)$ $< 50m\Omega$ 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	$\pm(2\% + 0.05\Omega)$ $< 50m\Omega$ for jumper No visible damage

Chip Resistors Selection Charts

AR - 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

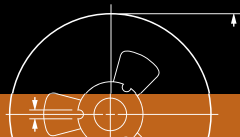
Phycomp worldwide - Traditional type

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.



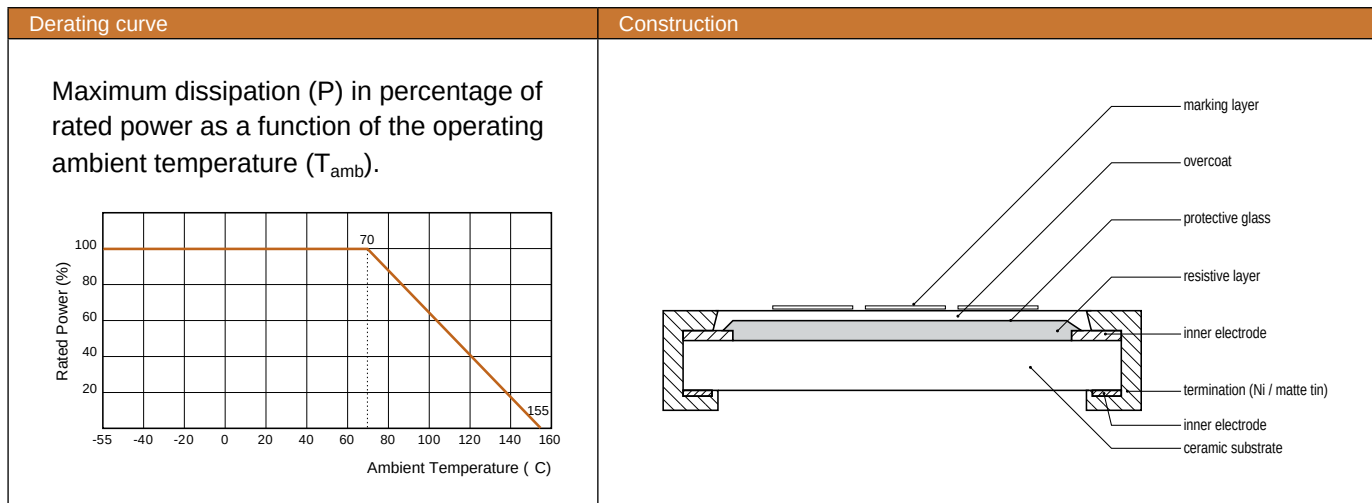
Chip Resistors Selection Charts

SR - Surge chip resistors, 0402 to 2512



Features

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



Dimensions

unit: mm

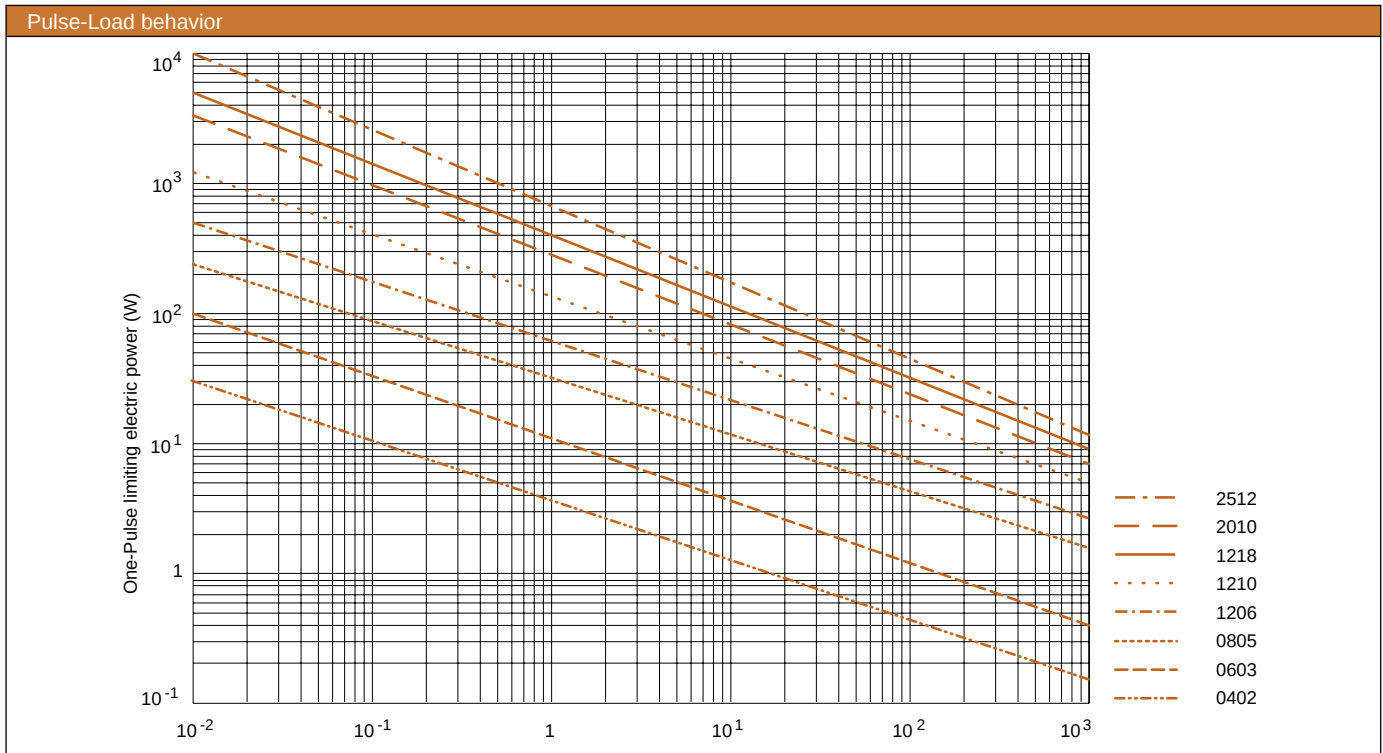
Type	L	W	H	l_1	l_2
SR0402	1.00±0.05	0.50±0.05	0.35±0.05	0.20±0.10	0.25±0.10
SR0603	1.60±0.10	0.80±0.10	0.45±0.10	0.25±0.15	0.25±0.15
SR0805	2.00 ±0.10	1.25 ±0.10	0.50 ±0.10	0.35 ±0.20	0.35 ±0.20
SR1206	3.10 ±0.10	1.60 ±0.10	0.55 ±0.10	0.45 ±0.20	0.40 ±0.20
SR1218	3.10 ±0.10	4.60 ±0.10	0.55 ±0.10	0.45 ±0.20	0.40 ±0.20
SR2010	5.00 ±0.10	2.50 ±0.15	0.55 ±0.10	0.55 ±0.15	0.50 ±0.20
SR2512	6.35 ±0.10	3.10 ±0.15	0.55 ±0.10	0.60 ±0.20	0.50 ±0.20

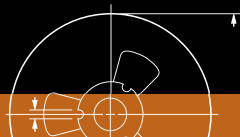
Chip Resistors Selection Charts

SR - Surge chip resistors, 0402 to 2512

Electrical characteristics								
Type	Power P ₇₀	Operating Temp. range	MWV	RCOV	DWV	Resistance range & tolerance		T. C. R.
SR0402	1/16W	-55°C to +155°C	50V	100V	100V	E24 ±5%, ±10%, ±20%	1Ω ≤ R ≤ 100KΩ	±200 ppm/°C
	1/8W	-55°C to +155°C	50V	100V	100V			
SR0603	1/10W	-55°C to +155°C	50V	100V	100V			
	1/5W	-55°C to +155°C	50V	100V	100V			
SR0805	1/8W	-55°C to +155°C	150V	300V	300V			
	1/4W	-55°C to +155°C	150V	300V	300V			
SR1206	1/4W	-55°C to +155°C	200V	400V	500V			
	1/2W	-55°C to +155°C	200V	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)
Solder-ability	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



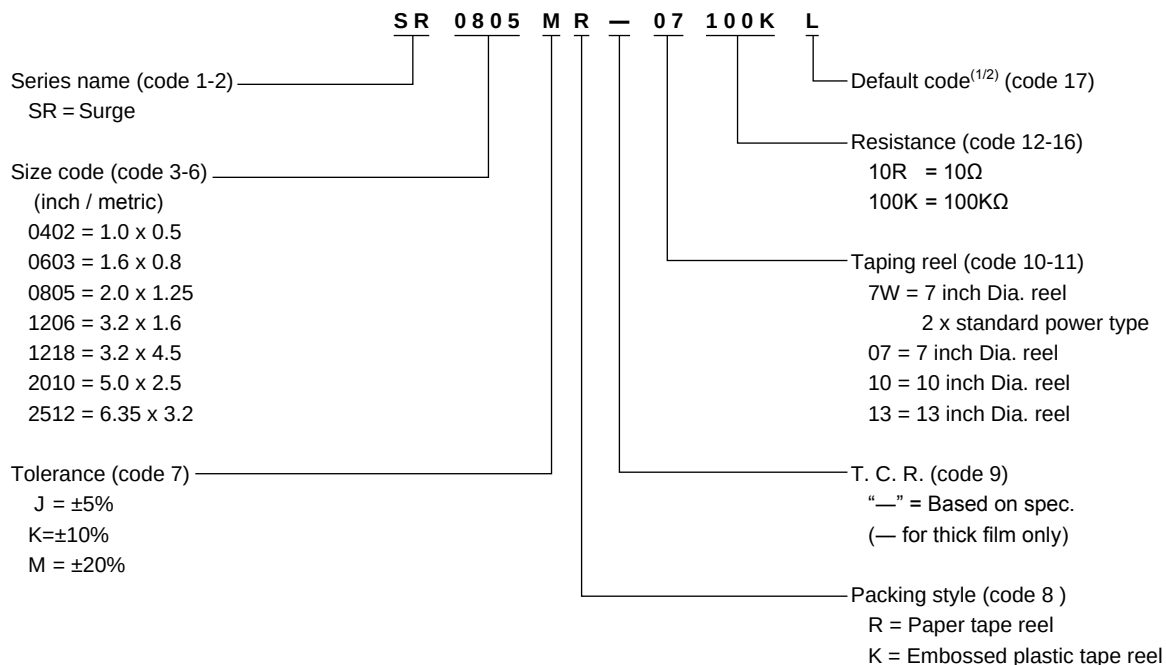


Chip Resistors Selection Charts

SR - Surge chip resistors, 0402 to 2512

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

Ordering example: SR0805MR-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

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 15 for details.



Chip Resistors Selection Charts

RV - High voltage chip resistors, 0603 to 2512

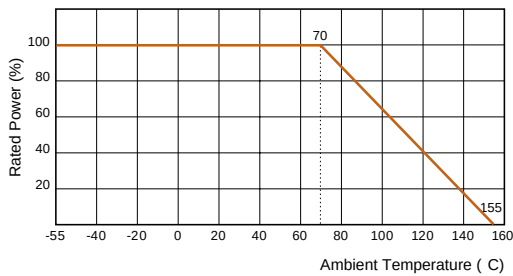


Features

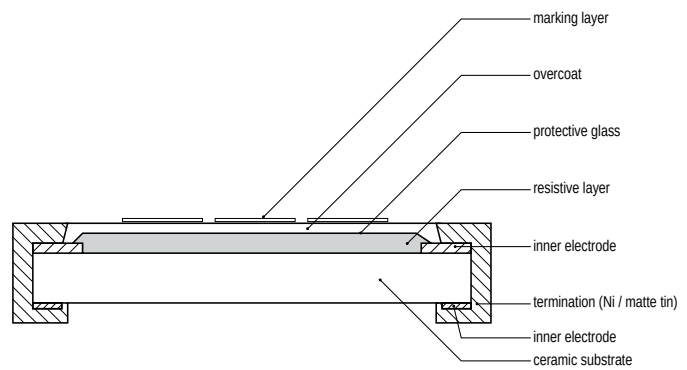
- Higher maximum working voltage compared to RC series
- Extremely thin and light
- Reliable electrode construction
- Compatible with lead containing and lead-free soldering processes
- Highly stable in auto-placement surface mounting

Derating curve

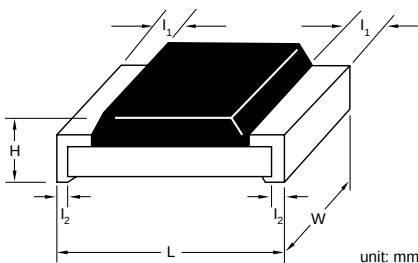
Maximum dissipation (P) in percentage of rated power as a function of the operating ambient temperature (T_{amb}).



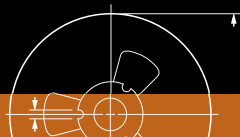
Construction



Dimensions



Type	L	W	H	l_1	l_2
RV0603	1.60 ±0.10	0.80 ±0.10	0.45 ±0.10	0.25 ±0.15	0.25 ±0.15
RV0805	2.00 ±0.10	1.25 ±0.10	0.50 ±0.10	0.35 ±0.20	0.35 ±0.20
RV1206	3.10 ±0.10	1.60 ±0.10	0.55 ±0.10	0.40 ±0.20	0.45 ±0.20
RV2512	6.35 ±0.10	3.10 ±0.15	0.55 ±0.10	0.60 ±0.20	0.50 ±0.20



Chip Resistors Selection Charts

RV - High voltage chip resistors, 0603 to 2512

Electrical characteristics							
Type	Power P_{70}	Operating Temp. range	MWV	RCOV	DWV	Resistance range & tolerance	T. C. R.
RV0603	1/10W	-55°C to +155°C	350V	500V	500V	E24 $\pm 5\%$ E24/E96 $\pm 1\%$ $10K\Omega \leq R \leq 1M\Omega$	± 200 ppm/°C
RV0805	1/8W	-55°C to +155°C	400V	800V	800V	E24 $\pm 5\%$ E24/E96 $\pm 1\%$ $100K\Omega \leq R \leq 10M\Omega$	
RV1206	1/4W	-55°C to +155°C	500V	1000V	1000V	E24 $\pm 5\%$ $100K\Omega \leq R \leq 27M\Omega$ E24/E96 $\pm 1\%$ $100K\Omega \leq R \leq 10M\Omega$	
RV2512	1W	-55°C to +155°C	500V	1000V	1000V	E24 $\pm 5\%$ $4.7M\Omega \leq R \leq 16M\Omega$	

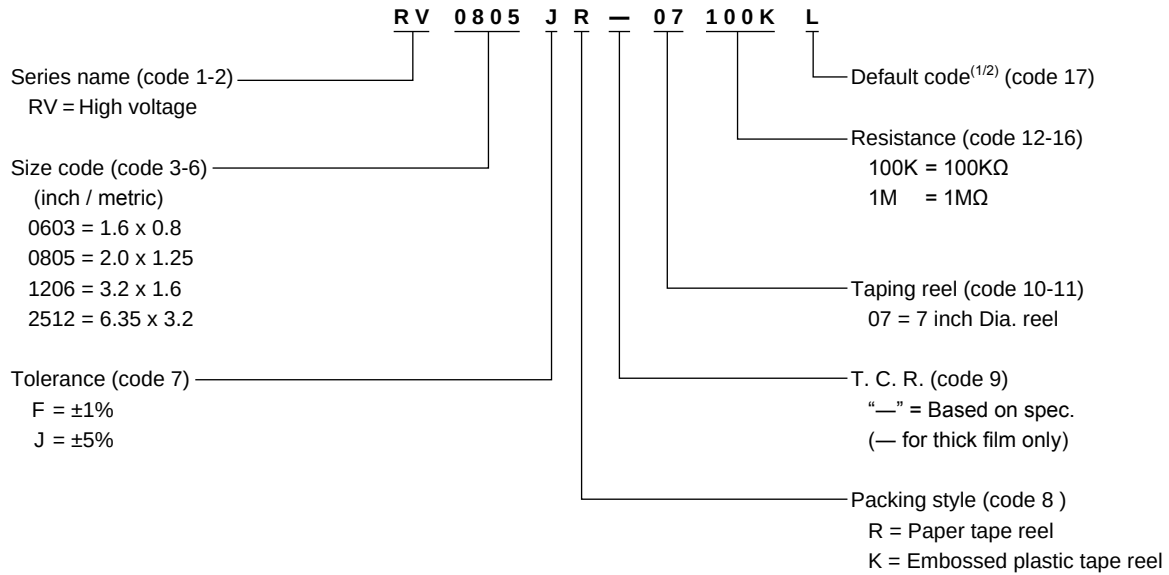
Environmental characteristics			
Performance test		Test method	Requirements
Life		MIL-STD-202G-method 108A	1 000 hours at 70 $\pm 5^\circ\text{C}$ applied RCWV 1.5 hours on, 0.5 hours off, still air required
High temperature exposure		MIL-STD-202G-method 108A	1 000 hours at maximum operating temperature depending on specification, unpowered
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
Thermal shock		MIL-STD-202G-method 107G	LCT / UCT, number of cycles required is 300 Maximum transfer time is 20 seconds
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
	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	2.5 times RCWV or maximum overload voltage which- ever is less for 5 seconds at room temperature

Chip Resistors Selection Charts

RV - High voltage chip resistors, 0603 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

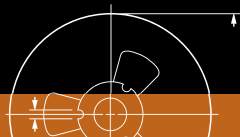
Phycomp worldwide - Traditional type

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 15 for details.



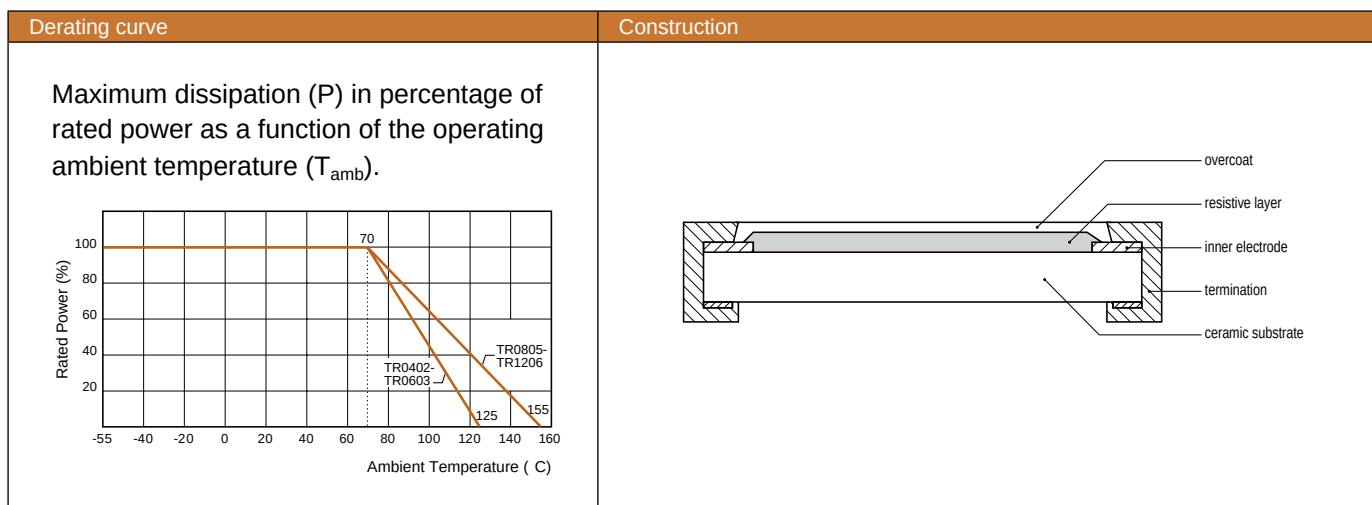
Chip Resistors Selection Charts

TR - 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

unit: mm

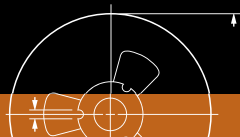
Type	L	W	H	l_1	l_2
TR0402	1.00 ± 0.10	0.50 ± 0.05	0.35 ± 0.05	0.20 ± 0.10	0.25 ± 0.10
TR0603	1.60 ± 0.10	0.80 ± 0.10	0.45 ± 0.10	0.25 ± 0.15	0.25 ± 0.15
TR0805	2.00 ± 0.10	1.25 ± 0.10	0.50 ± 0.10	0.35 ± 0.20	0.35 ± 0.20
TR1206	3.10 ± 0.10	1.60 ± 0.10	0.55 ± 0.10	0.45 ± 0.20	0.40 ± 0.20

Chip Resistors Selection Charts

TR - 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% $1\Omega \leq R \leq 10M\Omega$	$1\Omega \leq R \leq 10\Omega$ ± 200 $10\Omega < R \leq 1M\Omega$ ± 100 $1M\Omega < R \leq 10M\Omega$ ± 200
TR0603	1/16W	-55°C to +125°C	50V	100V	100V		
TR0805	1/8W	-55°C to +155°C	150V	300V	500V		
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 $\pm 5^\circ\text{C}$ applied RCWV 1.5 hours on, 0.5 hours off, still air required	$\pm(1\% + 0.05\Omega)$
High temperature exposure		MIL-STD-202G-method 108A	1 000 hours at maximum operating temperature depending on specification, unpowered	$\pm(1\% + 0.05\Omega)$
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°C / 65°C 95% R.H	$\pm(2\% + 0.05\Omega)$
Thermal shock		MIL-STD-202G-method 107G	LCT / UCT, number of cycles required is 300 Maximum transfer time is 20 seconds	$\pm(1\% + 0.05\Omega)$
Solder-ability	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	$\pm(1\% + 0.05\Omega)$ 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	$\pm(1\% + 0.05\Omega)$ No visible damage

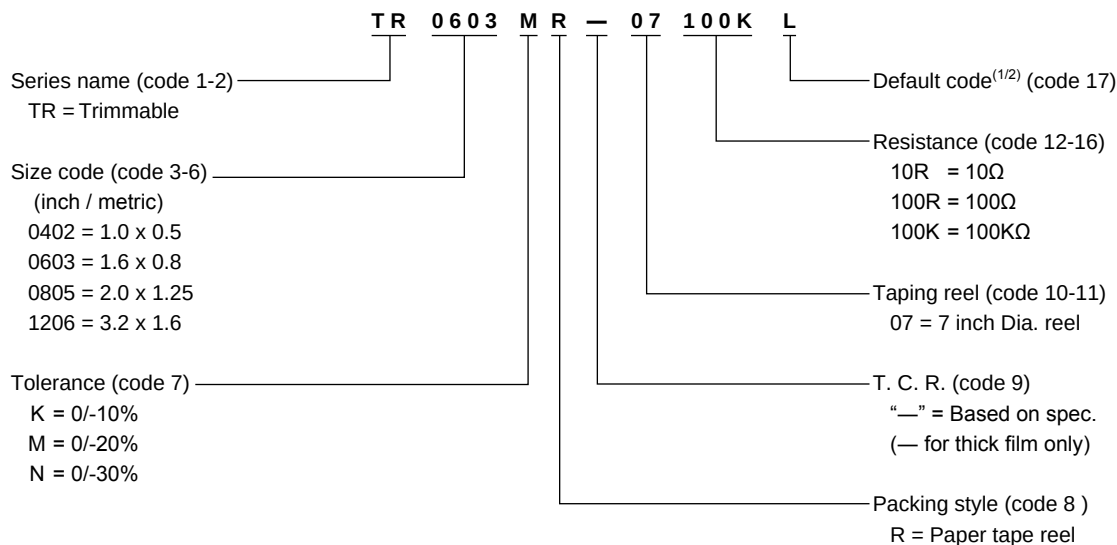


Chip Resistors Selection Charts

TR - 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 15 for details.



Chip Resistors Selection Charts

AF - Sulfur resistant chip resistors, 0201 to 2512

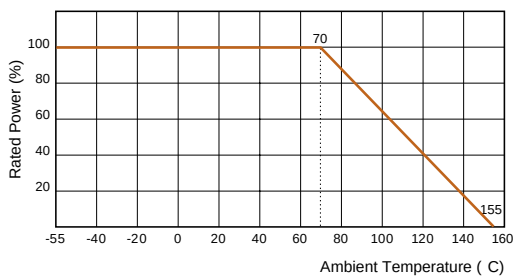


Features

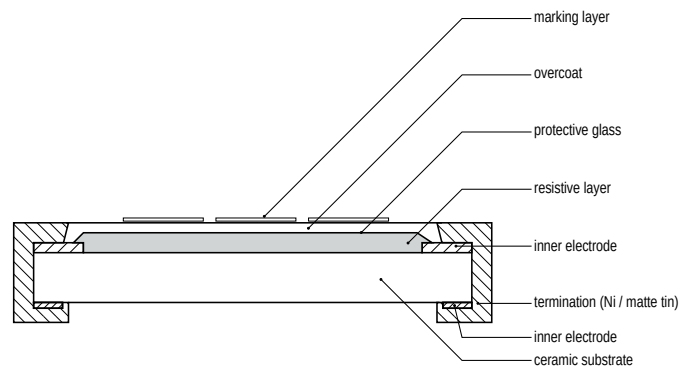
- Superior resistance against sulfur containing atmosphere
- Highly reliable multilayer electrode construction
- Compatible with all soldering processes
- Highly stable in auto-placement surface mounting applications
- Barrier layer end termination
- Halogen free product and production

Derating curve

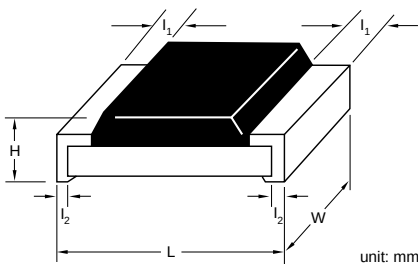
Maximum dissipation (P) in percentage of rated power as a function of the operating ambient temperature (T_{amb}).



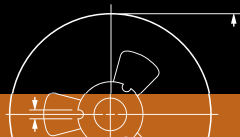
Construction



Dimensions



Type	L	W	H	l_1	l_2
AF0201	0.60±0.03	0.30±0.03	0.23 ±0.03	0.10±0.05	0.15±0.05
AF0402	1.00 ±0.05	0.50 ±0.05	0.32 ±0.05	0.20 ±0.10	0.25 ±0.10
AF0603	1.60 ±0.10	0.80 ±0.10	0.45 ±0.10	0.25 ±0.15	0.25 ±0.15
AF0805	2.00 ±0.10	1.25 ±0.10	0.50 ±0.10	0.35 ±0.20	0.35 ±0.20
AF1206	3.10 ±0.10	1.60 ±0.10	0.55 ±0.10	0.45 ±0.20	0.40 ±0.20
AF1210	3.10±0.10	2.60±0.15	0.50 ±0.10	0.45±0.15	0.50±0.20
AF1218	3.10±0.10	4.60±0.10	0.55 ±0.10	0.45±0.20	0.40±0.20
AF2010	5.00±0.10	2.50±0.15	0.55±0.10	0.55±0.15	0.50±0.20
AF2512	6.35±0.10	3.10±0.15	0.55±0.10	0.60±0.20	0.50±0.20



Chip Resistors Selection Charts

AF - Sulfur resistant chip resistors, 0201 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)
AF0201	1/20W	-55°C to +125°C	25V	50V	50V	E24 $\pm 5\%$ $1\Omega \leq R \leq 10M\Omega$ E24/E96 $\pm 1\%$ $1\Omega \leq R \leq 10M\Omega$ Jumper $< 50m\Omega$	$1\Omega \leq R \leq 10\Omega$ -100/+350 $10\Omega < R \leq 10M\Omega$ ± 200	Rated current 0.5 Max. current 1.0
AF0402	1/16W	-55°C to +155°C	50V	100V	100V	E24 $\pm 5\%$ $1\Omega \leq R \leq 22M\Omega$ E24/E96 $\pm 1\%$ $1\Omega \leq R \leq 10M\Omega$ Jumper $< 50m\Omega$	$1\Omega \leq R \leq 10\Omega$ ± 200 $10\Omega < R \leq 10M\Omega$ ± 100 $10M\Omega < R \leq 22M\Omega$ ± 200	Rated current 1.0 Max. current 2.0
AF0603	1/10W	-55°C to +155°C	50V	100V	100V			Rated current 1.0 Max. current 2.0
AF0805	1/8W	-55°C to +155°C	150V	300V	300V			Rated current 2.0 Max. current 5.0
AF1206	1/4W	-55°C to +155°C	200V	400V	500V			Rated current 2.0 Max. current 10.0
AF1210	1/2W	-55°C to +155°C	200V	500V	500V	E24 $\pm 5\%$ $1\Omega \leq R \leq 10M\Omega$ E24/E96 $\pm 1\%$ $1\Omega \leq R \leq 10M\Omega$ Jumper $< 50m\Omega$	$1\Omega \leq R \leq 10\Omega$ ± 200 $10\Omega < R \leq 10M\Omega$ ± 100	Rated current 2.0 Max. current 10.0
AF1218	1W	-55°C to +155°C	200V	500V	500V			Rated current 2.0 Max. current 10.0
AF2010	3/4W	-55°C to +155°C	200V	500V	500V			Rated current 2.0 Max. current 10.0
AF2512	1W	-55°C to +155°C	200V	500V	500V			Rated current 2.0 Max. current 10.0

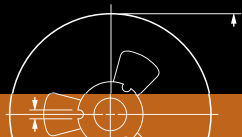
Environmental characteristics				
Performance test		Test method	Procedure	Requirements
Life		MIL-STD-202G-method 108A	1 000 hours at 70 $\pm 5^\circ\text{C}$ applied RCWV 1.5 hours on, 0.5 hours off, still air required	$\pm(1\% + 0.05\Omega)$ $< 100m\Omega$ for jumper
High temperature exposure		MIL-STD-202G-method 108A	1 000 hours at maximum operating temperature depending on specification, unpowered	$\pm(1\% + 0.05\Omega)$ $< 100m\Omega$ 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	$\pm(0.5\% + 0.05\Omega)$ for 1% tol. $\pm(1\% + 0.05\Omega)$ for 5% tol. $< 100m\Omega$ for jumper
Thermal shock		MIL-STD-202G-method 107G	LCT / UCT, number of cycles required is 300 Maximum transfer time is 20 seconds	$\pm(0.5\% + 0.05\Omega)$ for 1% tol. $\pm(1\% + 0.05\Omega)$ for 5% tol. $< 100m\Omega$ for jumper
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	$\pm(1\% + 0.05\Omega)$ 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
Anti-FOS		ASTM-B-809-95	Sulfur (saturated vapor) 1000 hours, 60 $\pm 2^\circ\text{C}$, 91~93 %RH, Rating with no power	$\pm(1\% + 0.05\Omega)$

Chip Resistors Selection Charts

AF - Sulfur resistant chip resistors, 0201 to 2512

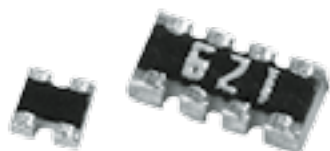
Global part number - Preferred type	
Ordering example: AF0603JR-07100KL	
Series name (code 1-2) ———— A F AF = Anti-sulfurated Size code (code 3-6) ———— 0 6 0 3 (inch / metric) 0201 = 0.6 x 0.3 0402 = 1.0 x 0.5 0603 = 1.6 x 0.8 0805 = 2.0 x 1.25 1206 = 3.2 x 1.6 1210 = 3.2 x 1.6 1218 = 3.2 x 2.6 2010 = 5.0 x 2.5 2512 = 6.35 x 3.2 Tolerance (code 7) ———— J F = $\pm 1\%$ J = $\pm 5\%$ (for Jumper ordering) Packing style (code 8) ———— R R = Paper tape reel K = Embossed plastic tape reel	——— — ———— 0 7 ———— 1 0 0 K ———— L Default code^(1/2) (code 17) Resistance (code 12-16) 0R = Jumper 10R = 10Ω 100R = 100Ω 100K = 100KΩ Taping reel (code 10-11) 07 = 7 inch Dia. reel 10 = 10 inch Dia. reel 13 = 13 inch Dia. reel T. C. R. (code 9) “—” = Based on spec. (— for thick film only)

- 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

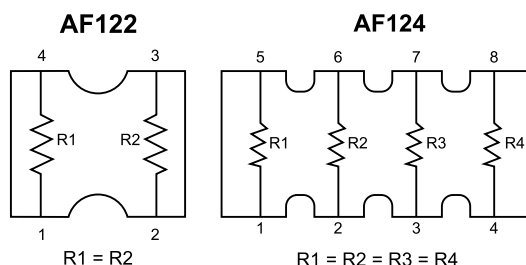
AF - Sulfur resistant chip resistors, Arrays



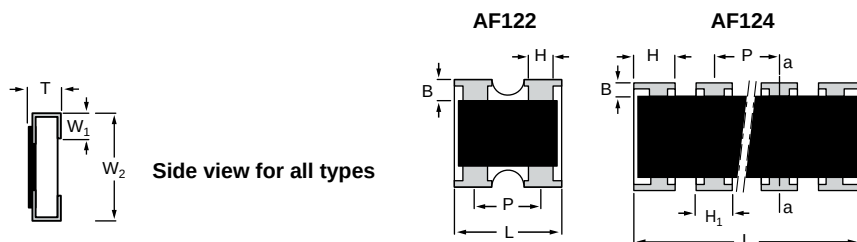
Features

- 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

Schematics



Dimensions



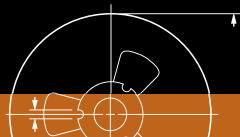
Type	H / H1	B	P	L	T	W1	W2
AF122	0.30 +0.10/-0.05	0.24 ± 0.10	0.67 ± 0.05	1.00 ± 0.10	0.30 ± 0.10	0.25 ± 0.10	1.00 ± 0.10
AF124	H : 0.45 ± 0.05 H1 : 0.30 ± 0.05	0.20 ± 0.15	0.50 ± 0.05	2.00 ± 0.10	0.45 ± 0.10	0.30 ± 0.15	1.00 ± 0.10

Chip Resistors Selection Charts

AF - Sulfur resistant chip resistors, Arrays

Electrical characteristics								
Type	Power rating	Operating Temp. range	MWV	RCOV	DWV	Resistance range & tolerance	T. C. R.	Jumper criteria (unit: A)
AF122	1/16W	-55°C to +125°C	50V	100V	100V	E24 $\pm 5\%$ $1\Omega \leq R \leq 1M\Omega$ E24/E96 $\pm 1\%$ $1\Omega \leq R \leq 1M\Omega$ Jumper $< 50m\Omega$	$1\Omega \leq R < 10\Omega$ $\pm 250ppm/^{\circ}C$ $10\Omega < R < 1M\Omega$ $\pm 200ppm/^{\circ}C$	Rated current 0.5A Max. current 1.0A
AF124	1/16W	-55°C to +155°C	25V	50V	100V			Rated current 1.0A Max. current 2.0A

Environmental characteristics				
Performance test		Test method	Procedure	Requirements
Life		MIL-STD-202G-method 108A	1 000 hours at 70 $\pm 5^{\circ}C$ applied RCWV 1.5 hours on, 0.5 hours off, still air required	$\pm(2\% + 0.05\Omega)$ $< 100m\Omega$ for jumper
High temperature exposure		MIL-STD-202G-method 108A	1 000 hours at maximum operating temperature depending on specification, unpowered	$\pm(1\% + 0.05\Omega)$ $< 50m\Omega$ 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	$\pm(2\% + 0.05\Omega)$ $< 50m\Omega$ for jumper
Thermal shock		MIL-STD-202G-method 107G	LCT / UCT, number of cycles required is 300 Maximum transfer time is 20 seconds	$\pm(0.5\% + 0.05\Omega)$ for 10K to 10M $\pm(1\% + 0.05\Omega)$ for others $< 50m\Omega$ for jumper
Solderability	Wetting	J-STD-002B testB	Electrical test not required. Magnification 50X Lead-free solder bath at 245 $\pm 3^{\circ}C$ Dipping time: 3 ± 0.5 seconds	Well tinned ($\geq 95\%$ covered)
	Resistance to soldering heat	MIL-STD-202G-method 210F	Lead-free solder, 260°C, 10 seconds immersion time	$\pm(1\% + 0.05\Omega)$ $< 50m\Omega$ 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	$\pm(2\% + 0.05\Omega)$ $< 50m\Omega$ for jumper No visible damage
Anti-FOS		ASTM-B-809-95	Sulfur (saturated vapor) 1000 hours, 60 $\pm 2^{\circ}C$, 91~93 %RH, Rating with no power	$\pm(1\% + 0.05\Omega)$

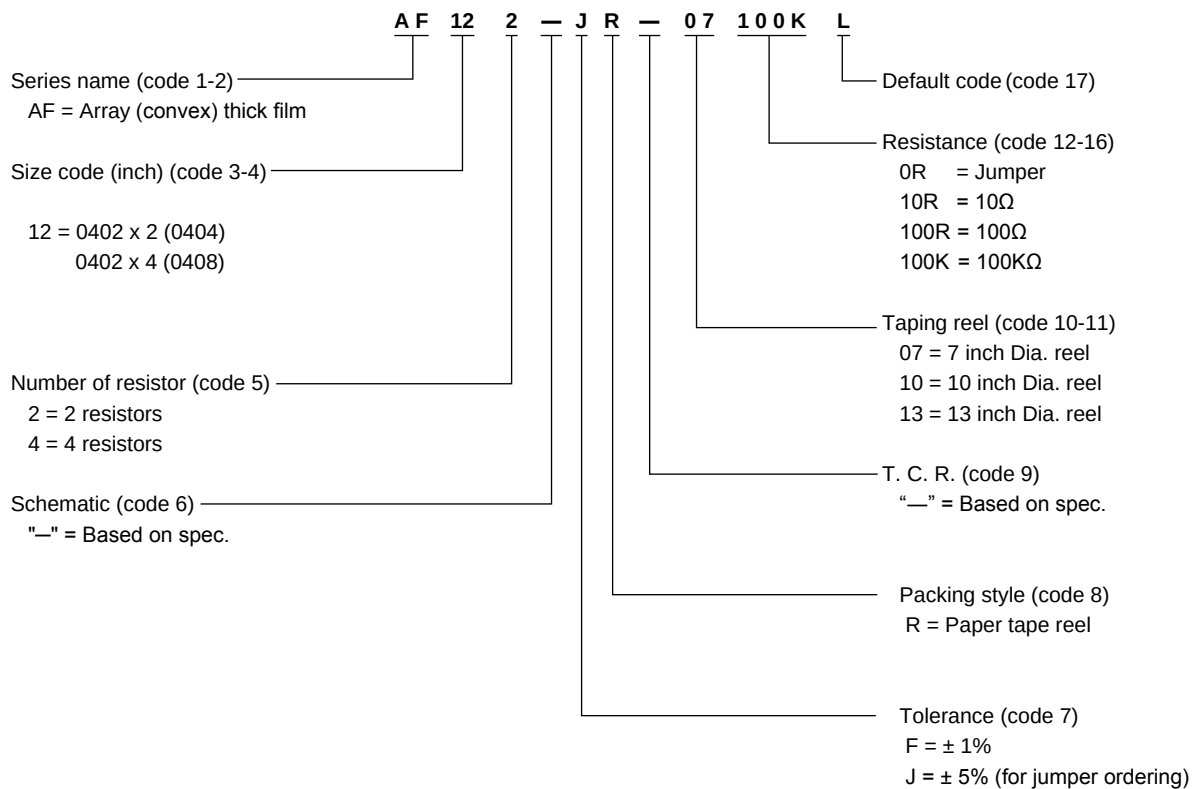


Chip Resistors Selection Charts

AF - Sulfur resistant chip resistors, Arrays

Global part number - Array

Ordering example: AF122-JR-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

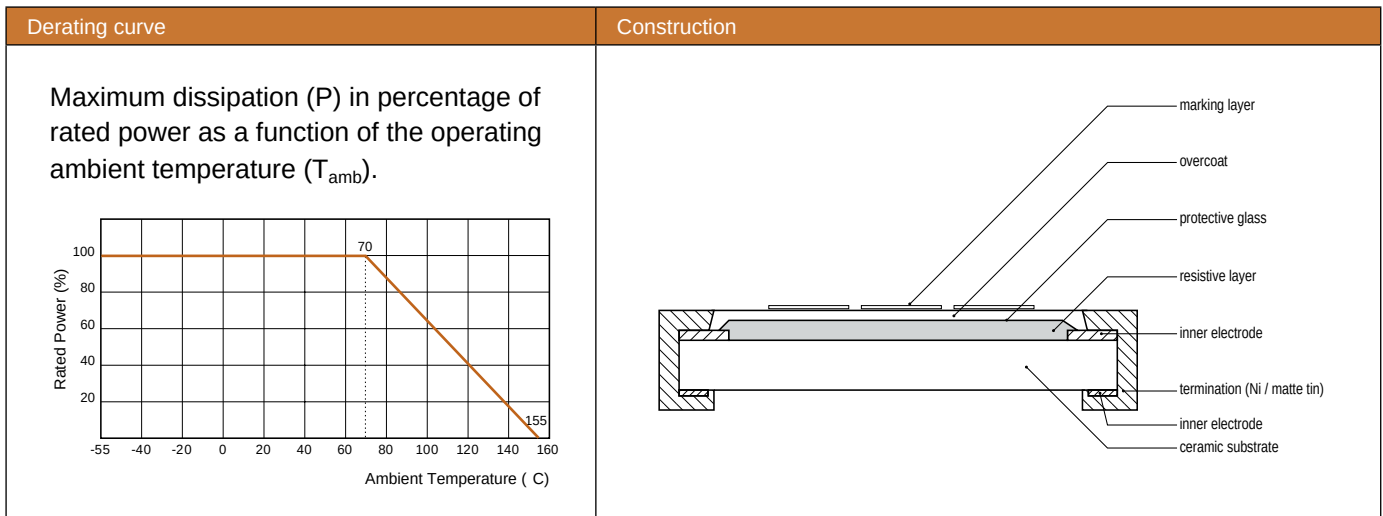
Chip Resistors Selection Charts

AC - Automotive grade chip resistors, 0402 to 2512



Features

- AEC-Q200 qualified
- Production part approval process (PPAP) support
- High reliability
- High quality level

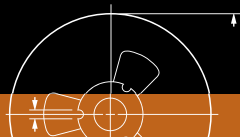


Dimensions

A 3D perspective diagram of a chip resistor. The component is a rectangular block with a black top surface. Dimensions are labeled with arrows: L is the length, W is the width, H is the height, l1 is the length of the top surface, and l2 is the length of the bottom surface. The unit is mm.

unit: mm

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

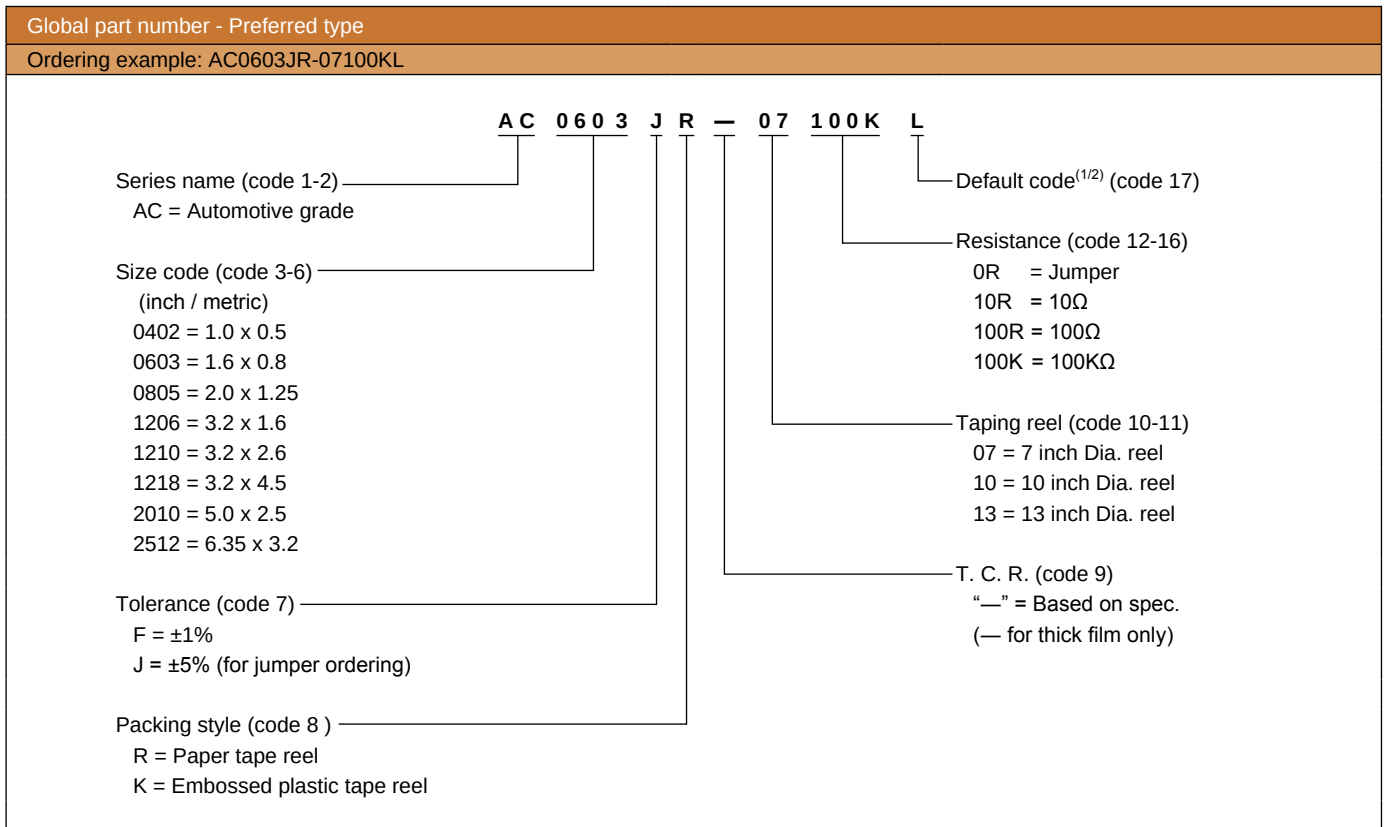
AC - Automotive grade chip resistors, 0402 to 2512

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	$E24 \pm 5\%$ $1\Omega \leq R \leq 10M\Omega$ $E24/E96 \pm 0.5\%, \pm 1\%$ $1\Omega \leq R \leq 10M\Omega$ Jumper $< 0.05\Omega$	$1\Omega \leq R \leq 10\Omega \pm 200$ $10\Omega < R \leq 10M\Omega \pm 100$	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

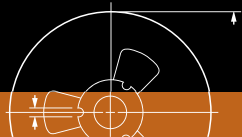
Environmental characteristics				
Performance test		Test method	Procedure	Requirements
Life		AEC-Q200-REV C-Test 8 MIL-STD-202 Method 108	1 000 hours at 125°C applied RCWV 1.5 hours on, 0.5 hours off	$\pm(1\% + 0.05\Omega)$ $< 100m\Omega$ for jumper
High temperature exposure		AEC-Q200-REV C-Test 3 MIL-STD-202 Method 108	1 000 hours at maximum operating temperature depending on specification	$\pm(1\% + 0.05\Omega)$ $< 50m\Omega$ 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.	$\pm(0.5\% + 0.05\Omega)$ for 1% tol. $\pm(2\% + 0.05\Omega)$ for 5% tol. $< 100m\Omega$ 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 $\pm$ 2 hours after test	$\pm(1\% + 0.05\Omega)$ $< 100m\Omega$ 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	$\pm(1\% + 0.05\Omega)$ $< 50m\Omega$ 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 $\pm$ 3°C Dipping time: 3 $\pm$ 0.5 seconds	Well tinned ($\geq 95\%$ 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	$\pm(1\% + 0.05\Omega)$ $< 50m\Omega$ 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	$\pm(1\% + 0.05\Omega)$ $< 100m\Omega$ for jumper No visible damage

Chip Resistors Selection Charts

AC - Automotive grade chip resistors, 0402 to 2512

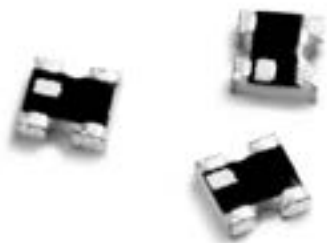


Note: 1. All of our RSMD products are RoHS compliant. "LFP" of the internal 2D reel label mentions "Lead Free Process"
 2. Letter L is system default code for ordering only
 3. AC series products are available by "Global part number" only



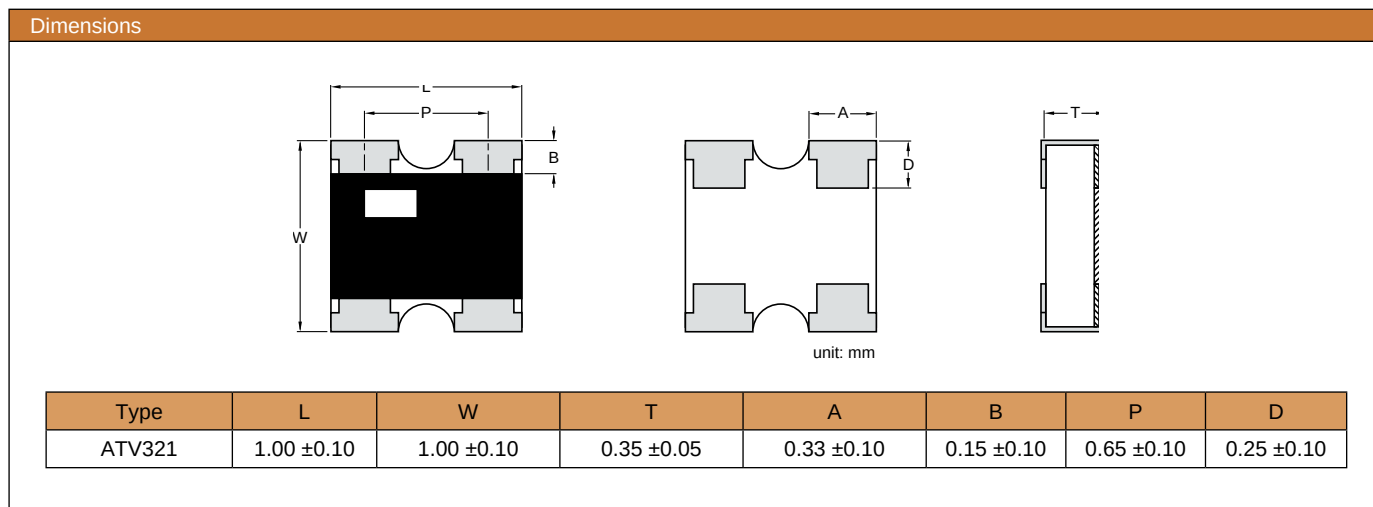
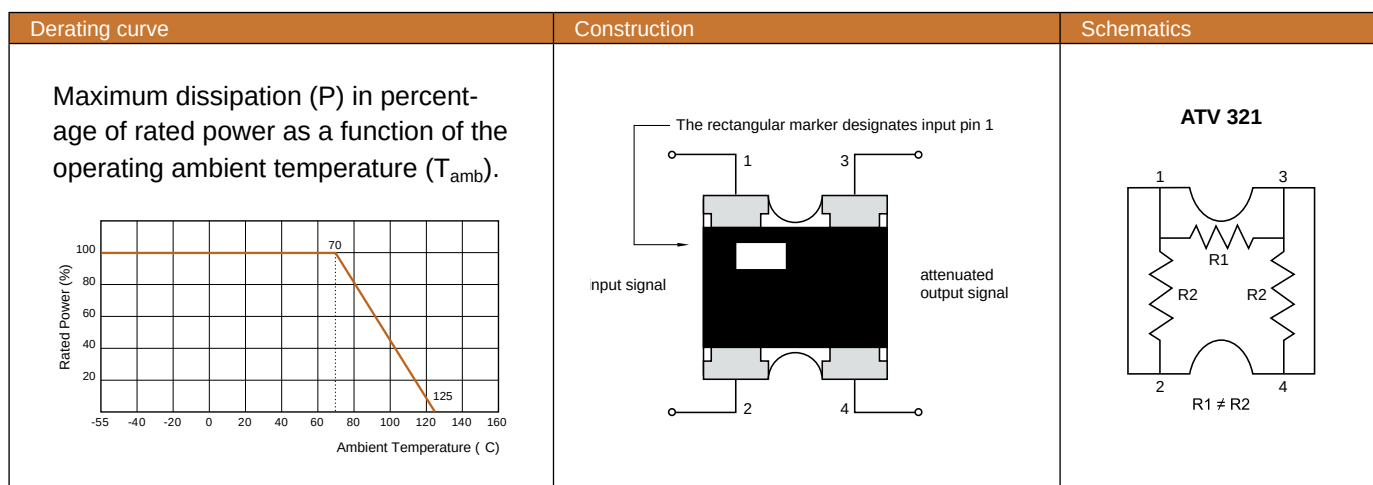
Chip Resistors Selection Charts

AT - 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

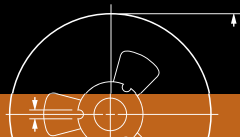


Chip Resistors Selection Charts

AT - 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
Solder- ability	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

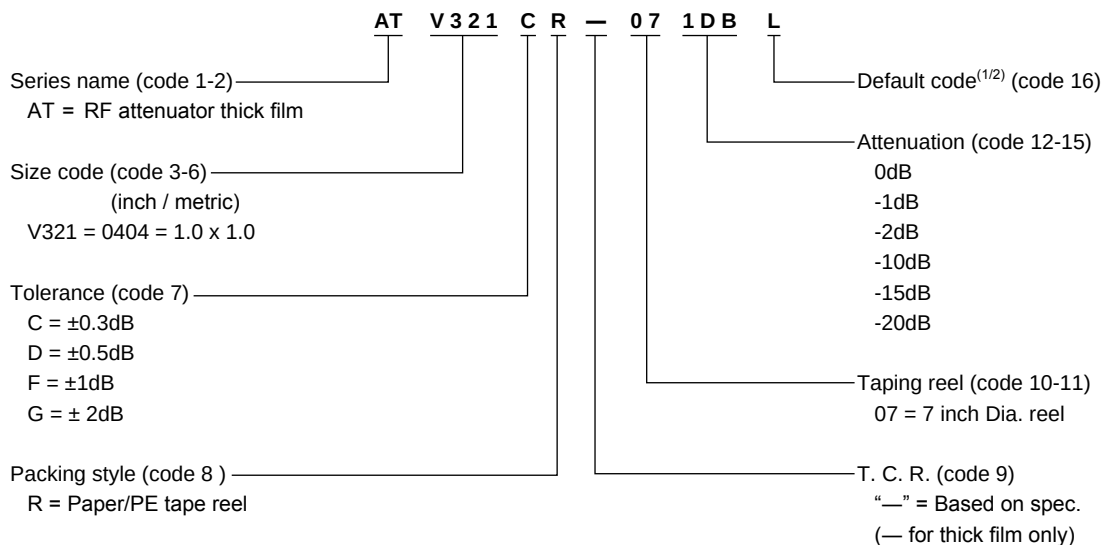


Chip Resistors Selection Charts

AT - 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
Remark	2350 703 11...L 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
Remark	9CV3218AXXXX-PF3 For last 9th to 13th digits, see following table "Attenuation codes"

Attenuation codes

Standard			
Value (dB)	Tolerance (dB)	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



Chip Resistors Engineering Design Kits

Engineering design kits/ Engineering design books

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

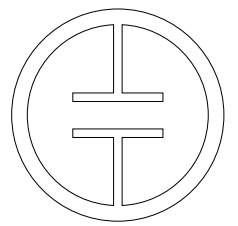
Engineering design kit for automotive application							
Global CTC (Preferred)	Description	Size	Tolerance	Max. power	Resistance range	Resistor pieces	Min. items
AC0402-R-SK001L	AC0402 - AC1206, $\pm 1\%$ & $\pm 5\%$, RoHS compliant, + Jumper	0402 - 1206	F/J	---	1 - 10M	50-100	200

Engineering design kit for general purpose							
Global CTC	Description	Size	Tolerance	Max. power	Resistance range	Resistor pieces	Items
RC0402-R-SK001L	Chip resistors / MLCC	0402 - 1206	---	---	---	50-100	472

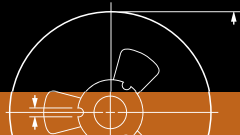
Engineering design book for thin film chip resistor							
Global CTC	Description	Size	Tolerance	Max. power	Resistance range	Resistor pieces	Items
RT0402-R-SB001L	RT0402 - RT1206, E96 series, $\pm 0.1\%$, RoHS compliant	0402 - 1206	B	---	10 ~ 1M	10	60

Engineering design book for automotive application							
Global CTC	Description	Size	Tolerance	Max. power	Resistance range	Resistor pieces	Items
AC0402-R-SB001L	AC0402 - AC1206, E96 series, $\pm 1\%$, RoHS compliant	0402 - 1206	F	---	10 ~ 1M	10	60

Engineering design book for current sensing application							
Global CTC	Description	Size	Tolerance	Max. power	Resistance range	Resistor pieces	Items
PE0603-R-SB001L	PA/PE/PR, $\pm 1\%$, RoHS compliant, low T.C.R.	0603 - 2512	F	---	0.5m ~ 50m	10	60



SMD CERAMIC MULTILAYER CAPACITORS

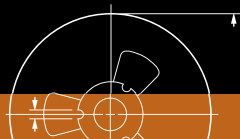


MLCC General Information

Specification overview

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

Global part number	
Ordering example: CC0201KRX7R8BB102	
Series name (code 1-2) ——— CC CA = 4 x Capacitors array CC = Multilayer chip capacitors CL = Low inductance capacitors CQ = High frequency capacitors SC = Safety certification capacitors AC = Automotive grade capacitors CS = Soft termination capacitors Size code (code 3-6) ——— 0201 0100 0201 0402 0603 0805 1206 1210 1808 1812 2220 0306 0508 0612 Capacitance tolerance (code 7) ——— K A = ±0.05 pF (CQ series only) 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% Packing style (code 8) ——— R 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 TC material (code 9-11) ——— X7R NPO X5R X7R Y5V	Capacitance value (code 15-17) ——— 102 102 = 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) Process code (code 14) ——— B N = NP0 B = Class 2 product Termination (code 13) ——— B B = Ni-Barrier Rated voltage (code 12) ——— 8 5 = 6.3 V 6 = 10 V 7 = 16 V 8 = 25 V G = 35 V 9 = 50 V 0 = 100 V A = 200 V Y = 250 V B = 500 V Z = 630 V C = 1 kV D = 2 kV E = 3 kV T = X2 / Y3 for TUV / UL W = X1 / Y2 for TUV / UL U = X1 for UL (X7R, 1812)



MLCC Selection Charts

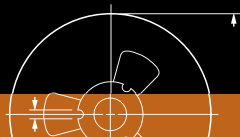
Ordering information - Global part number

Global part number														
Ordering example: CCxxxxKRX5RxBBxxx (for Low profile)														
	CC	1	05	9	K	R	X	7	R	8	B	B	1	02
Series name (code 1-2)	CC = Multilayer chip capacitors												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 10 ¹ 2 = x 10 ² 3 = x 10 ³ 4 = x 10 ⁴ 5 = x 10 ⁵ 6 = x 10 ⁶ 7 = x 10 ⁷ X X R = Special capacitance (X X: capacitance before decimal point)	
Number of cap (code 3)	4 = 4 cap 2 = 2 cap 1 = Single												Process code (code 14) N = NP0 B = Class 2 product	
Size code (code 4-5)	01 = 0201 02 = 0402 03 = 0603 05 = 0805 06 = 1206, 0306 08 = 1808, 0508 10 = 1210 12 = 1812, 0612												Termination (code 13) B = Ni-Barrier	
Thickness (code 6)	3 = 0.3 mm 4 = 0.45 mm 5 = 0.5 mm 6 = 0.6 mm 8 = 0.8 mm 9 = 0.85 mm A = 1.0 mm B = 1.25 mm C = 1.6 mm D = 2.0 mm E = 2.5 mm F = 1.7 mm M = 1.15 mm N = 1.35 mm Q = 1.5 mm R = 1.8 mm												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 Y = 250 V Z = 630 V	
Capacitance tolerance (code 7)	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%												TC material (code 9-11) X5R X7R	
Packing style (code 8)	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													

MLCC General Information

Thickness classes and packing quantities for all series

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



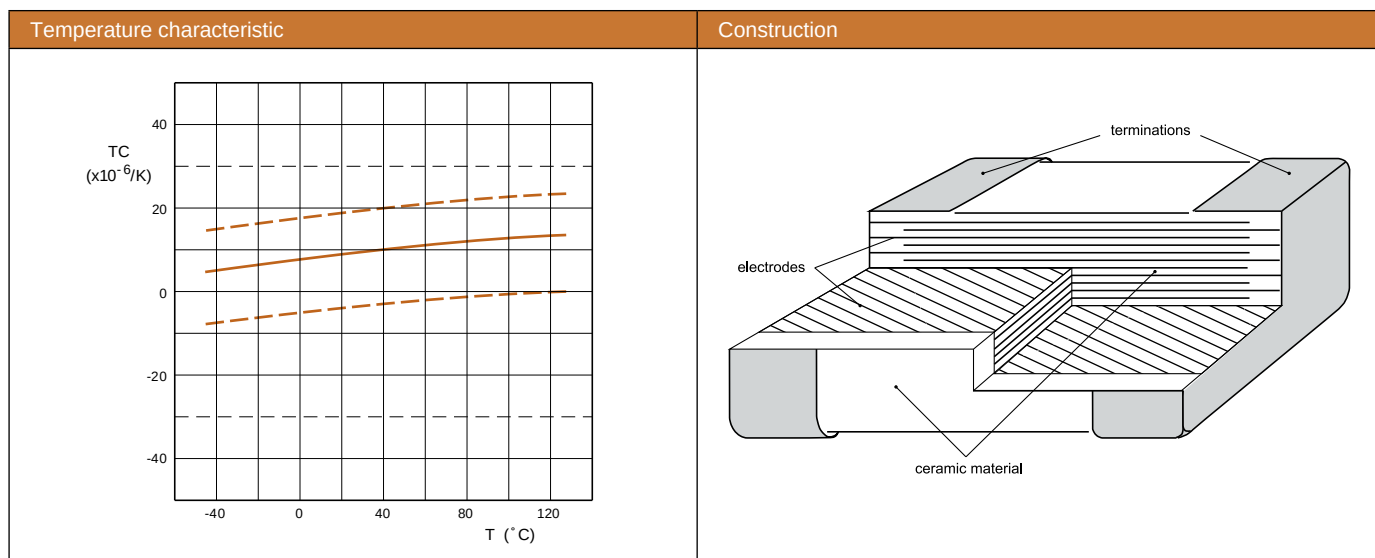
MLCC Selection Charts

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



Features

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



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

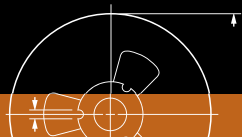
MLCC Selection Charts

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

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

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





MLCC Selection Charts

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

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

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



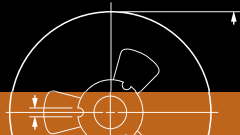
MLCC Selection Charts

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

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

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





MLCC Selection Charts

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

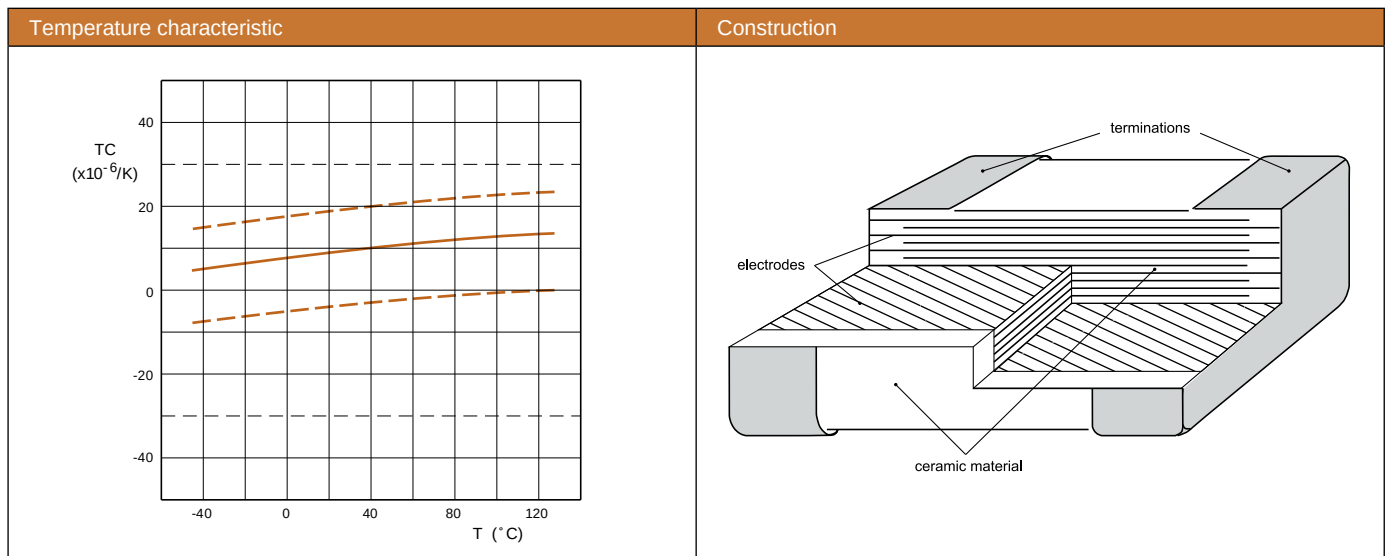
NP0									
General purpose									
Capacitance	0805			1206			1210	1210	1812
	16 V	25 V	50 V	16 V	25 V	50 V	25 V	50 V	50 V
1.2 nF	0.85 ±0.1	0.85 ±0.1	0.85 ±0.1	0.6 ±0.1	0.6 ±0.1	0.6 ±0.1	1.25 ±0.2	1.25 ±0.2	1.25 ±0.2
1.5 nF									
1.8 nF									
2.2 nF									
2.7 nF	1.25 ±0.2	1.25 ±0.2	1.25 ±0.2	0.85 ±0.1	0.85 ±0.1	0.85 ±0.1			
3.3 nF									
3.9 nF									
4.7 nF									
5.6 nF									
6.8 nF									
8.2 nF				1.25 ±0.2	1.25 ±0.2	1.25 ±0.2			
10 nF	1.25 ±0.2	1.25 ±0.2	1.25 ±0.2						
12 nF									
15 nF									
18 nF									
22 nF									
33 nF				0.85 ±0.1	0.85 ±0.1	0.85 ±0.1			
39 nF									
47 nF				1.15 ±0.1	1.15 ±0.1	1.15 ±0.1			
56 nF				1.6 ±0.2	1.6 ±0.2	1.6 ±0.2			
68 nF				1.6 ±0.2	1.6 ±0.2	1.6 ±0.2			
82 nF									
100 nF									
Tape width	8 mm								

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

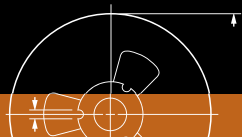


Features

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



Dimensions							
Discrete capacitors - Medium and High voltage							
	Case size designation		Dimensions in mm				
	Inch-based	Metric	L 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	0402	0603		0805			
	100 V	100 V	250 V	100 V	250 V	500 V	630 V
1 pF	0.5 ±0.05	0.8 ±0.1	0.8 ±0.1	0.6 ±0.1	0.6 ±0.1	0.6 ±0.1	0.6 ±0.1
1.2 pF							
1.5 pF							
1.8 pF							
2.2 pF							
2.7 pF							
3.3 pF							
3.9 pF							
4.7 pF							
5.6 pF							
6.8 pF							
8.2 pF							
10 pF							
12 pF							
15 pF							
18 pF							
22 pF							
27 pF							
33 pF							
39 pF							
47 pF							
56 pF							
68 pF							
82 pF							
100 pF							
120 pF							
150 pF							
180 pF							
220 pF							
270 pF							
330 pF							
390 pF							
470 pF							
560 pF							
680 pF							
820 pF							
1000 pF							
1.2 nF				0.85 ±0.1	1.25 ±0.2		
1.5 nF							
1.8 nF							
2.2 nF				1.25 ±0.2			
2.7 nF							
3.3 nF							
3.9 nF							
4.7 nF							
Tape width	8 mm						

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



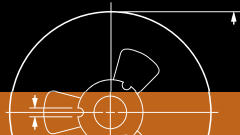
MLCC Selection Charts

NPO - Medium voltage, 1206 / 1210

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

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





MLCC Selection Charts

NPO - High voltage, 0805 to 1210

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

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



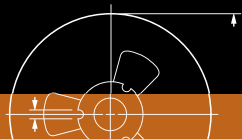
MLCC Selection Charts

NPO - High voltage, 1808 / 1812

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

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





MLCC Selection Charts

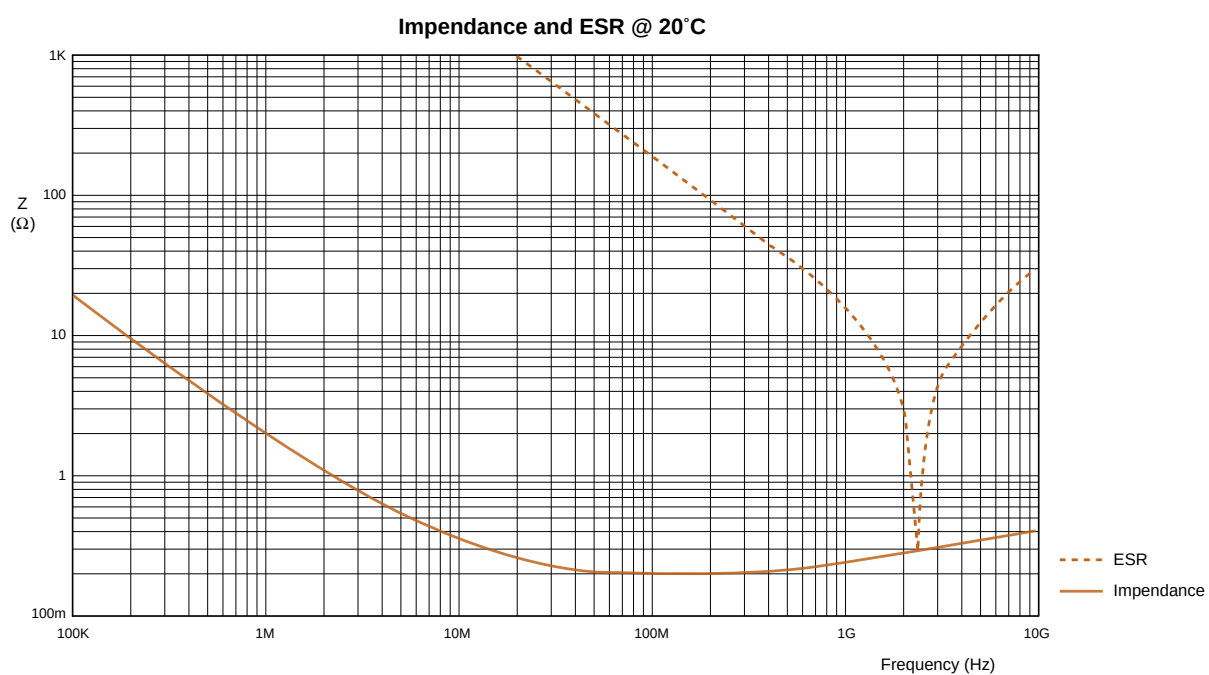
NP0 - High frequency, 01005 to 0805



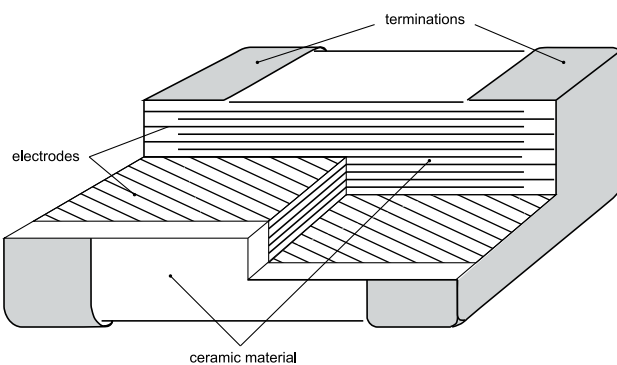
Features

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

ESR characteristic

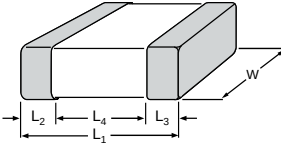


Construction



MLCC Selection Charts

NP0 - High frequency, 01005 to 0805

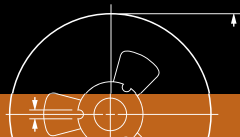
Case dimensions							
Discrete capacitors - High Frequency							
	Case size designation		Dimensions in mm				
	Inch-based	Metric	L ₁	W	L ₂ / L ₃ min	L ₂ / L ₃ max	L ₄ min
	01005	0402M	0.4 ±0.02	0.2 ±0.02	0.07	0.14	0.13
	0201	0603M	0.6 ±0.03	0.3 ±0.03	0.10	0.20	0.20
	0402	1005M	1.0 ±0.05	0.5 ±0.05	0.15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

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

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

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

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



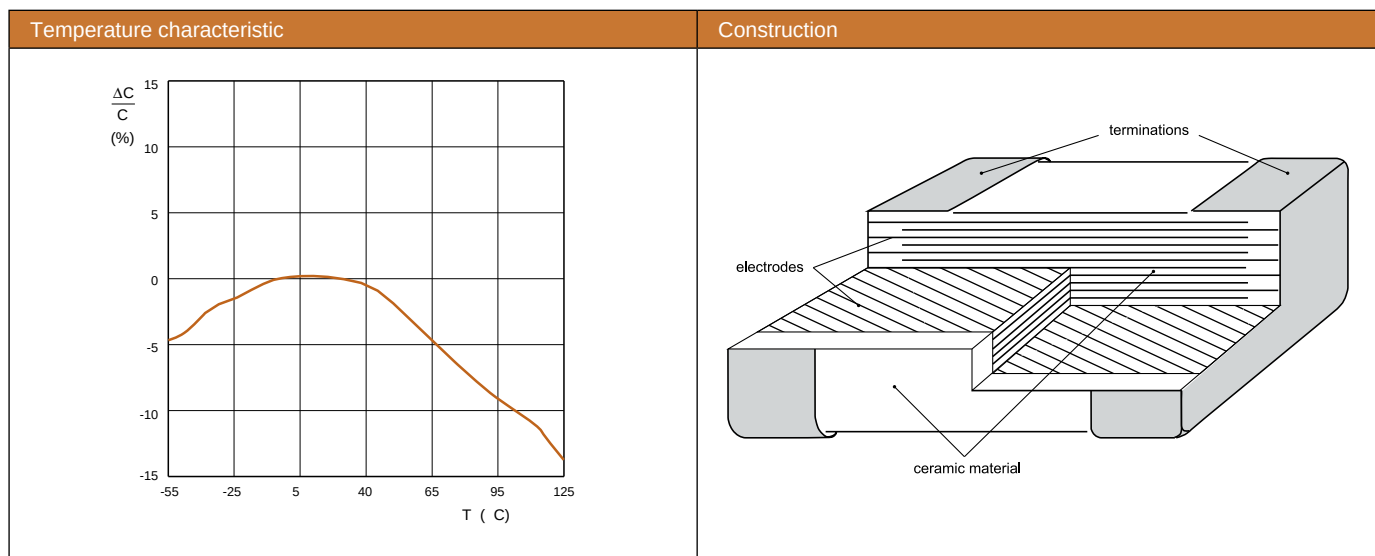
MLCC Selection Charts

X7R - General purpose & High capacitance, 01005 to 2220



Features

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



Case dimensions							
Discrete capacitors - General purpose & High capacitance							
	Case size designation		Dimensions in mm				
	Inch-based	Metric	L ₁	W	L ₂ / L ₃ min	L ₂ / L ₃ max	L ₄ min
	01005	0402M	0.4±0.02	0.2±0.02	0.07	0.14	0.14
	0201	0603M	0.6 ±0.03	0.3 ±0.03	0.10	0.20	0.20
			0.6 ±0.05	0.3 ±0.05	0.10	0.20	0.20
	0402	1005M	1.0 ±0.05 ⁽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
	1808	4520M	4.5 ±0.40	2.0 ±0.30	0.25	0.75	2.20
	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
	2220	5750M	5.7 ±0.40	5.0 ±0.30	0.25	0.75	3.40

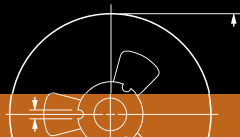
Note: 1. Dimension for size 0402, C < 4.7 μF; 0603, C < 10 μF; 0805 to 1812, C ≤ 100 nF
 2. Dimension for size 0402, C ≥ 4.7 μF; 0603, C ≥ 10 μF; 0805 to 1812, C > 100 nF

MLCC Selection Charts

X7R - General purpose & High Capacitance , 01005 to 0402

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

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



MLCC Selection Charts

X7R - General purpose & High capacitance, 0603 / 0805

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

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

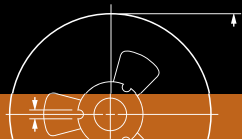


MLCC Selection Charts

X7R - General purpose & High capacitance, 1206 to 2220

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

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



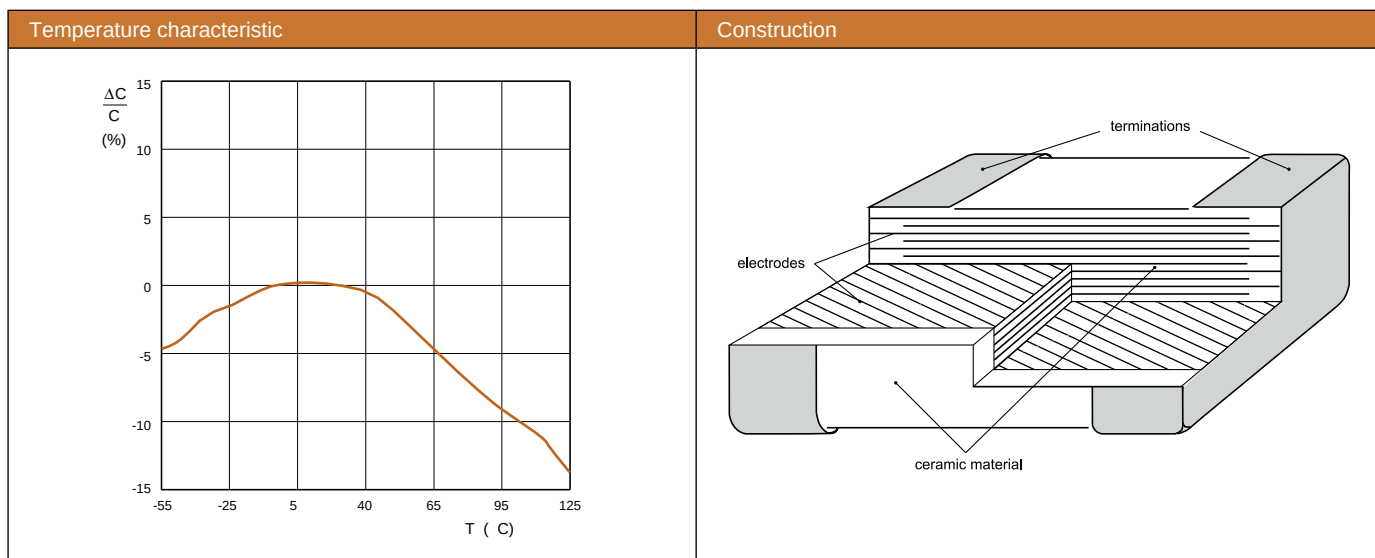
MLCC Selection Charts

X7R - Medium & High voltage, 0402 to 1812



Features

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



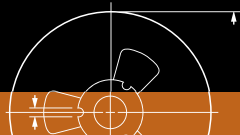
Dimensions							
Discrete capacitors - Medium and High voltage							
	Case size designation		Dimensions in mm				
	Inch-based	Metric	L ₁	W	L ₂ / L ₃ min	L ₂ / L ₃ max	L ₄ min
	0402	1005M	1.0 ±0.05	0.5 ±0.05	0.15	0.30	0.40
	0603	1608M	1.6 ±0.10	0.8 ±0.10	0.20	0.60	0.40
	0805	2012M	2.0 ±0.20	1.25 ±0.20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

X7R - Medium and High voltage, 0402 to 0805

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

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



MLCC Selection Charts

X7R - Medium and High voltage, 1206 / 1210

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

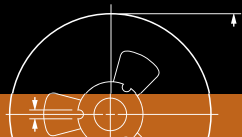
Note: Values in shaded cells indicate thickness class (unit: mm)

MLCC Selection Charts

X7R - Medium and High voltage, 1808 / 1812

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

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



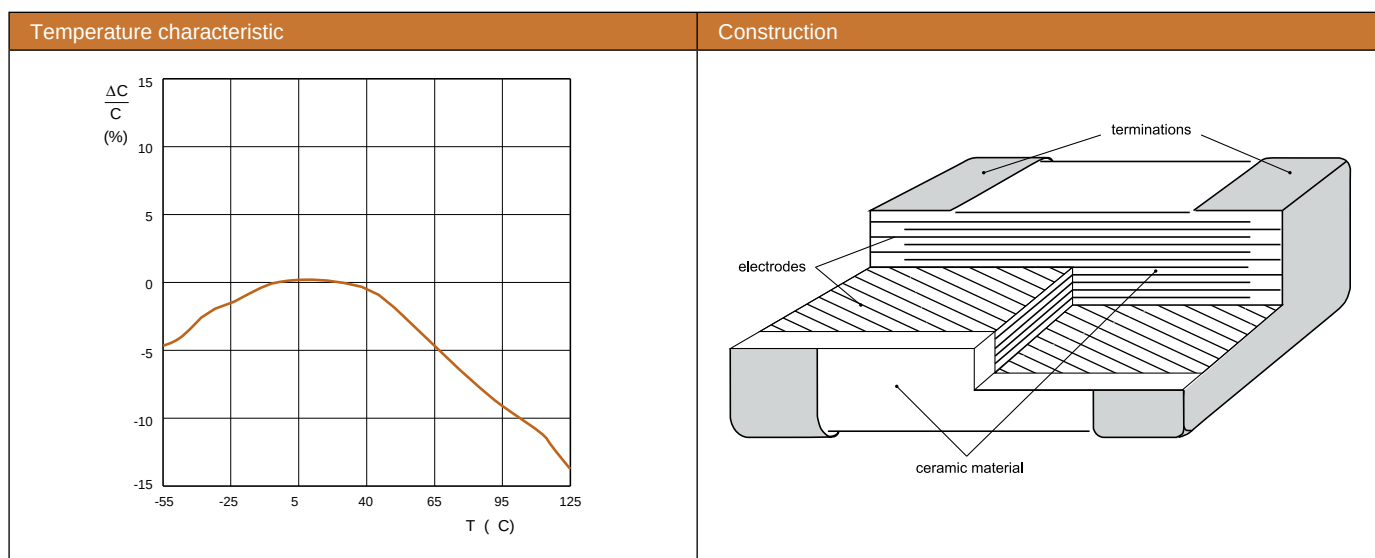
MLCC Selection Charts

X7R / X5R - Low inductance, 0306 to 0612



Features

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



Dimensions								
Discrete capacitors - Low inductance types only								
	Case size designation		Dimensions in mm					
	Inch-based	Metric	L 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

MLCC Selection Charts

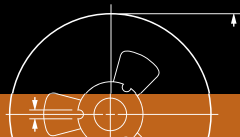
X7R / X5R - Low inductance, 0306 to 0612

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

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

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

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



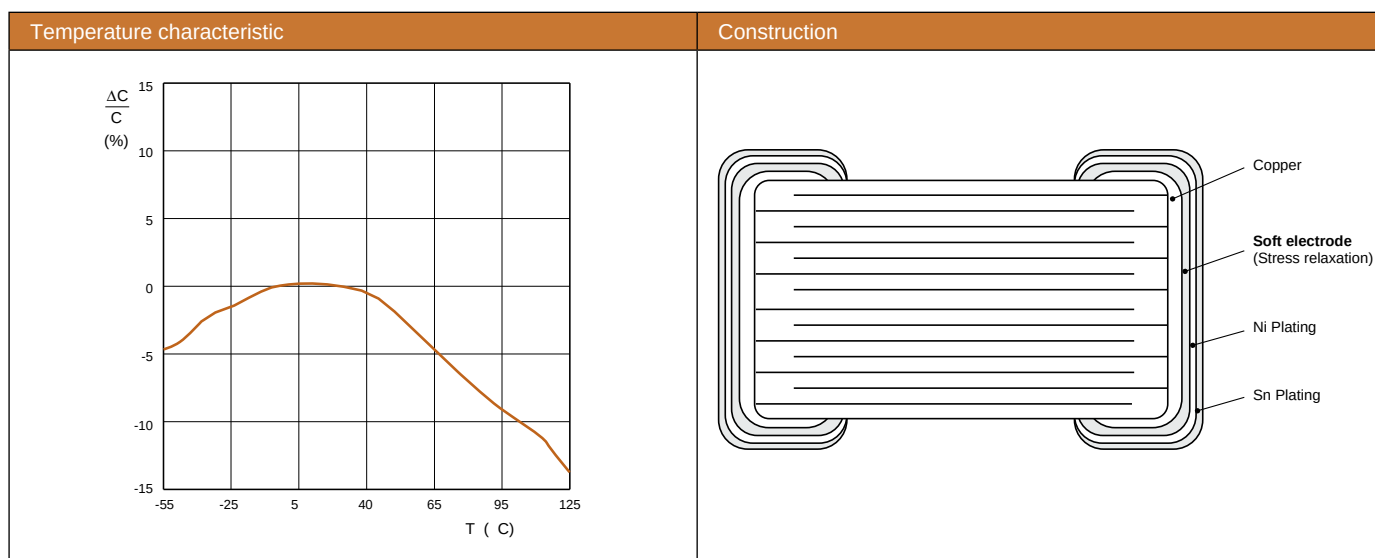
MLCC Selection Charts

X7R - Soft termination, 0603 to 1812



Features

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



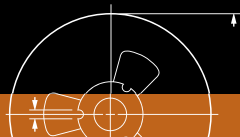
Dimensions							
Discrete capacitors - Soft termination							
	Case size designation		Dimensions in mm				
	Inch-based	Metric	L1	W	L2 / L3 min	L2 / L3 max	L4 min
	0603	1608M	1.6 ±0.20	0.8 ±0.15	0.20	0.50	0.40
	0805	2012M	2.0 ±0.30	1.25 ±0.20	0.25	0.75	0.55
	1206	3216M	3.2 ±0.40	1.6 ±0.20	0.25	0.85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

MLCC Selection Charts

X7R - Soft termination, 0603 / 0805

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

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



MLCC Selection Charts

X7R - Soft termination, 1206

X7R									
Soft termination									
Capacitance	1206								
	16 V	25 V	50 V	100 V	250 V	500 V	630 V	1000 V	2000 V
100 pF									
150 pF									
180 pF									
220 pF	0.85 ±0.15	0.85 ±0.15	0.85 ±0.15	0.85 ±0.15	0.85 ±0.15	1.25 ±0.2	1.25 ±0.2	1.25 ±0.2	1.25 ±0.2
330 pF									
390 pF									
470 pF									
680 pF									
1.0 nF									
1.5 nF									
2.2 nF									
3.3 nF									
4.7 nF									
6.8 nF									
10 nF									
15 nF									
18 nF									
22 nF									
27 nF									
33 nF									
47 nF									
68 nF									
100 nF									
150 nF									
220 nF									
330 nF									
470 nF	1.15 ±0.2	1.15 ±0.2	1.6 ±0.2						
680 nF									
1000 nF									
2.2 μF									
4.7 μF									
10 μF									
22 μF									
47 μF									
100 μF									
Tape width	12 mm								

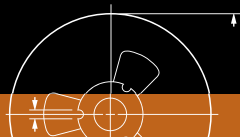
Note: Values in shaded cells indicate thickness class (unit: mm)

MLCC Selection Charts

X7R - Soft termination, 1210/ 1812

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

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



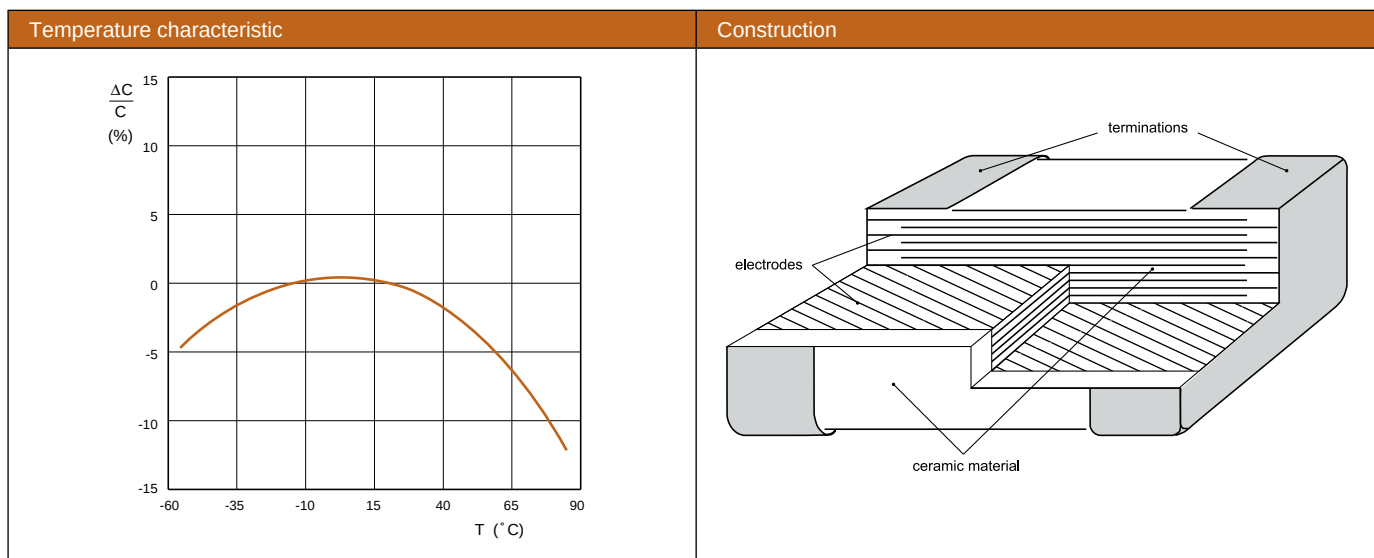
MLCC Selection Charts

X5R - General purpose & High capacitance, 01005 to 1812



Features

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



Case dimensions							
Discrete capacitors - General purpose & High capacitance							
	Case size designation		Dimensions in mm				
	Inch-based	Metric	L ₁	W	L ₂ / L ₃ min	L ₂ / L ₃ max	L ₄ min
		01005	0.4±0.02	0.2±0.02	0.07	0.14	0.14
		0201	0.6 ±0.03 ⁽¹⁾	0.3 ±0.03 ⁽¹⁾	0.10	0.20	0.20
			0.6 ±0.05 ⁽²⁾	0.3 ±0.05 ⁽²⁾	0.10	0.20	0.20
		0402	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	1.6 ±0.10 ⁽¹⁾	0.8 ±0.10 ⁽¹⁾	0.20	0.60	0.40
			1.6 ±0.20 ⁽²⁾	0.8 ±0.20 ⁽²⁾	0.20	0.60	0.40
		0805	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	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	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
		1808	4.5 ±0.40	2.0 ±0.30	0.25	0.75	2.20
		1812	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 0201, C < 1 µF; 0402, C < 4.7 µF; 0603, C < 10 µF; 0805 to 1812, C ≤ 100 nF
2. Dimension for size 0201, C ≥ 1 µF; 0402, C ≥ 4.7 µF; 0603, C ≥ 10 µF; 0805 to 1812, C > 100 nF

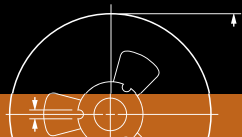
MLCC Selection Charts

X5R - General purpose & High capacitance, 01005 to 0402

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

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





MLCC Selection Charts

X5R - General purpose & High capacitance, 0603 / 0805

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

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

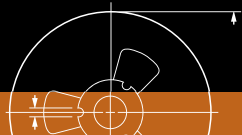


MLCC Selection Charts

X5R - General purpose & High capacitance, 1206

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

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



MLCC Selection Charts

X5R - High capacitance, 1210 / 1812

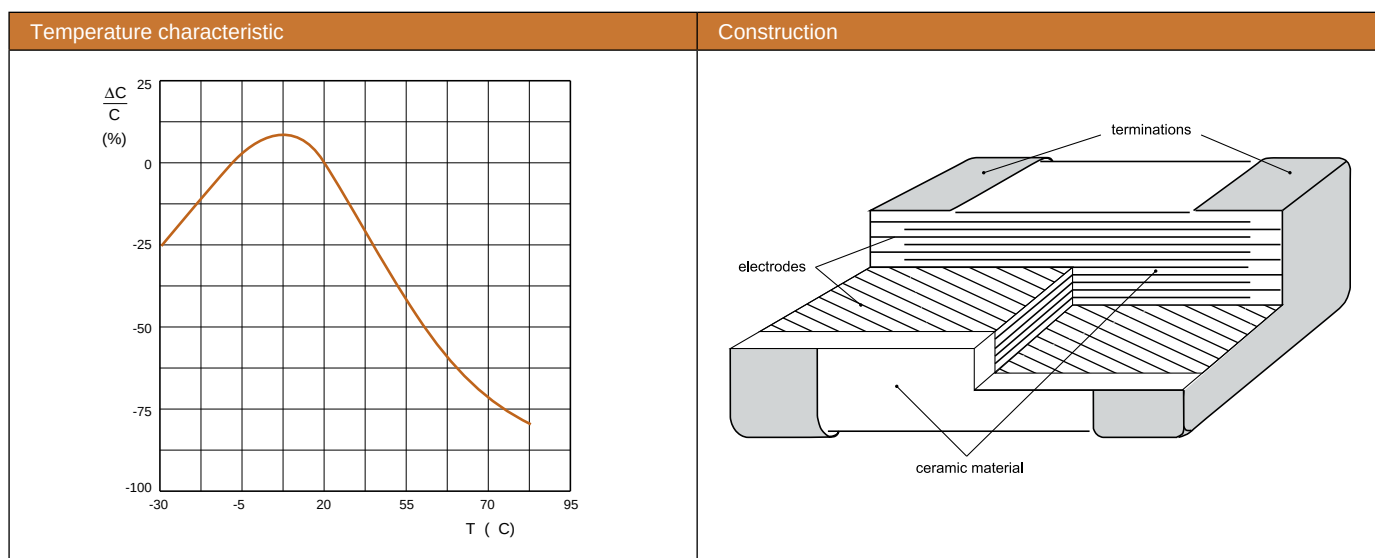
X5R						
General purpose & High capacitance						
Capacitance	1210					1812
	6.3 V	10 V	16 V	25 V	50 V	6.3 V
100 pF						
150 pF						
220 pF						
330 pF						
470 pF						
680 pF						
1.0 nF						
1.5 nF						
2.2 nF	0.85 ±0.1	0.85 ±0.1	0.85 ±0.1	0.85 ±0.1	0.85 ±0.1	
3.3 nF						
4.7 nF						
6.8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

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



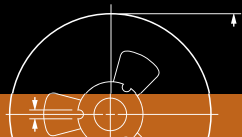
Features

- High volumetric efficiency
- Non-polar construction



Case dimensions							
Discrete capacitors - General purpose & High capacitance							
	Case size designation		Dimensions in mm				
	Inch-based	Metric	L 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	0201	0402			
	6.3 V	6.3 V	10 V	16 V	25 V
10 nF	0.3 ±0.03	0.5 ±0.05	0.5 ±0.05	0.5 ±0.05	0.5 ±0.05
22 nF					
47 nF					
100 nF					
220 nF					
470 nF					
1 000 nF					
Tape width	8 mm				

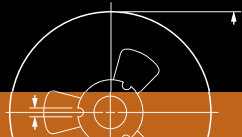
Note: Values in shaded cells indicate thickness class (unit: mm)



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

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

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



MLCC Selection Charts

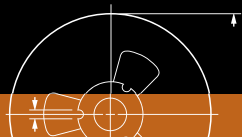
Y5V - General purpose & High capacitance 6.3 to 25V, 1206 / 1210

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

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

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

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



MLCC Selection Charts

NP0 / X7R - Automotive grade, 0402 to 1210



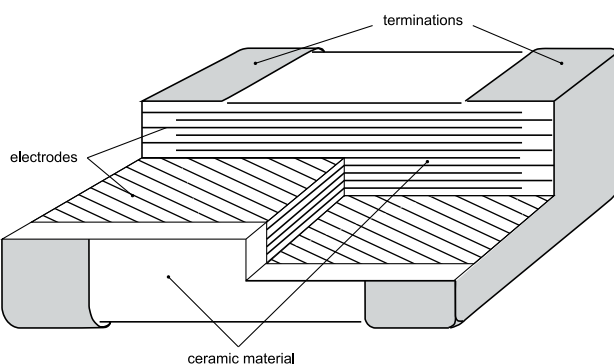
Features

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

Applications

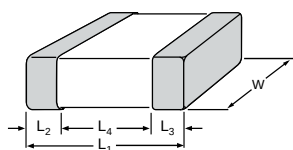
- All general purpose applications
- Entertainment applications
- Comfort / security applications
- Information applications

Construction



Dimensions

Discrete capacitors - Automotive grade



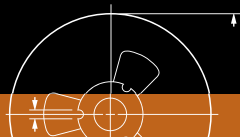
Case size designation		Dimensions in mm				
Inch-based	Metric	L1	W	L2 / L3 min	L2 / L3 max	L4 min
0402	1005M	1.0 ±0.05	0.5 ±0.05	0.15	0.30	0.40
0603	1608M	1.6 ±0.20	0.8 ±0.10	0.20	0.60	0.40
0805	2012M	2.0 ±0.20	1.25 ±0.20	0.25	0.75	0.55
1206	3216M	3.2 ±0.30	1.6 ±0.20	0.25	0.75	1.40
1210	3225M	3.2 ±0.30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

MLCC Selection Charts

NPO - Automotive grade, 0402 to 0805

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

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



MLCC Selection Charts

NP0 - Automotive grade, 1206 / 1210

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

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



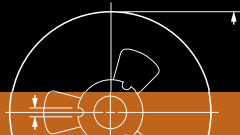
MLCC Selection Charts

X7R - Automotive grade, 0402 / 0603

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

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





MLCC Selection Charts

X7R - Automotive grade, 0805

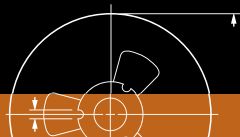
X7R							
Automotive grade							
Capacitance	0805						
	10 V	16 V	25 V	50 V	100 V	250 V	500 V
100 pF							
150 pF							
180 pF							
220 pF	0.85 ±0.1	0.85 ±0.1	0.85 ±0.1	0.85 ±0.1	0.85 ±0.1	0.85 ±0.1	0.85 ±0.1
330 pF							
390 pF							
470 pF							
680 pF							
1 000 pF							
1.5 nF						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

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



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

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



MLCC Selection Charts

X7R - Automotive grade, 1210

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

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



MLCC Selection Charts

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

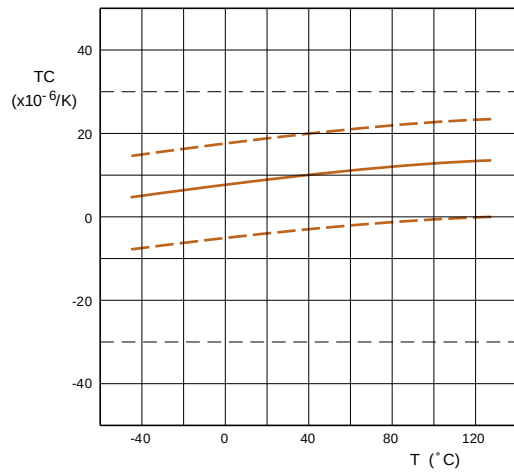


Features

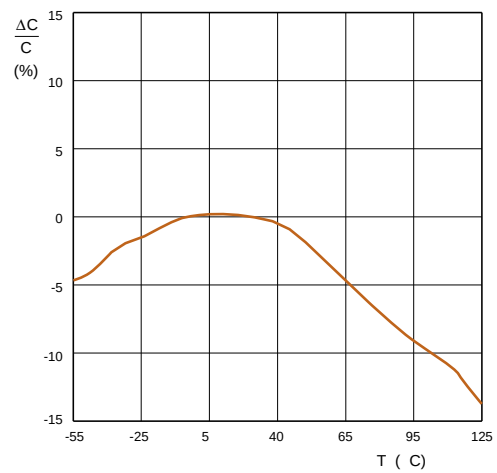
- Capable of operating at high voltage levels
- For high frequency snubber
- Decoupling/ Smoothing function
- TUV certificate No.: 50031668
- UL certificate No.: E238900

Temperature characteristic

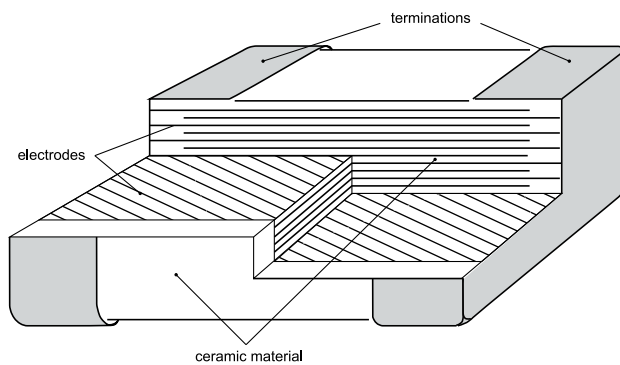
NP0



X7R

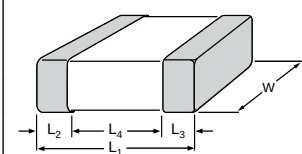


Construction

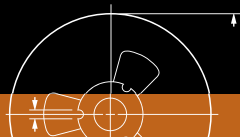


Dimensions

Discrete capacitors - High voltage SC type



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

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

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

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

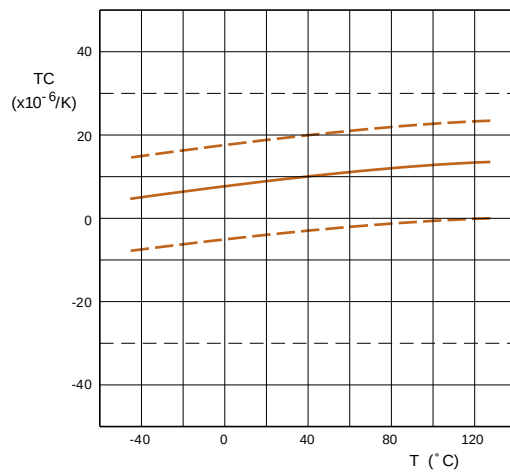


Features

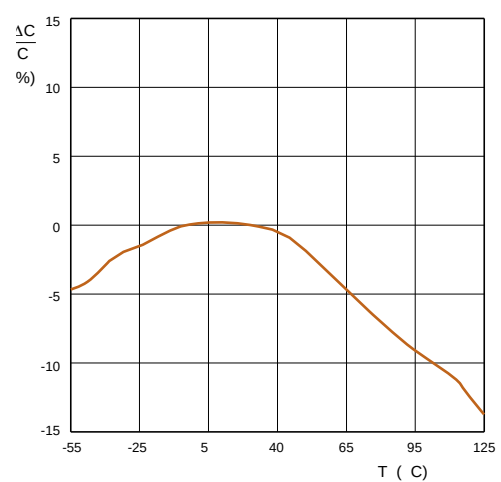
- Less than 50% board space of an equivalent discrete component
- High volumetric efficiency
- Increased throughput, by time saved in mounting

Temperature characteristic

NP0

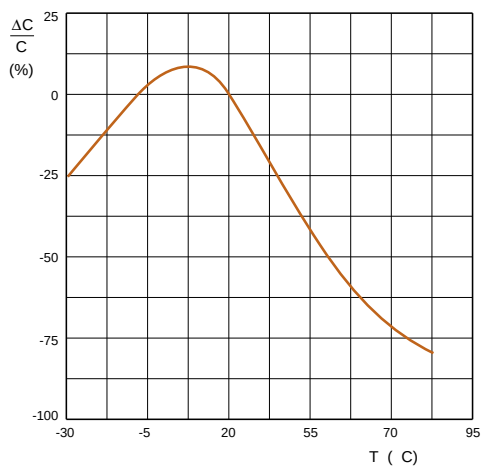


X7R

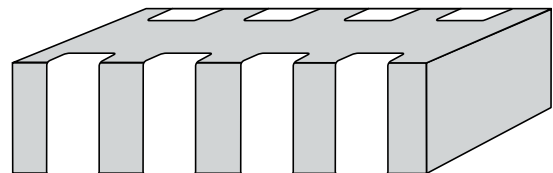


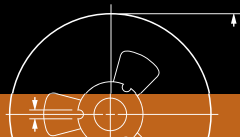
Temperature characteristic

Y5V



Construction





MLCC Selection Charts

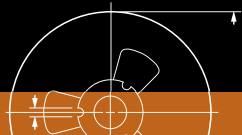
NP0 / X7R / Y5V - 4C Arrays, 0508 / 0612

Dimensions									
4C arrays									
	Case size designation		Dimensions in mm						
	Inch-based	Metric	L	W	T _{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⁾ 0.50 ⁽²⁾	0.90 ⁽¹⁾ 0.70 ⁽²⁾	0.4 ±0.10	0.3 ±0.20	0.8 ±0.10

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

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

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



MLCC Selection Charts

X7R - 4C Arrays, 0508 / 0612

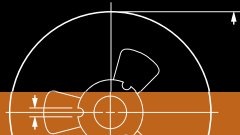
X7R						
4C arrays						
Capacitance	0508			0612		
	16 V	25 V	50 V	16 V	25 V	50 V
180 pF					0.8 ±0.1	0.8 ±0.1
220 pF						
270 pF						
330 pF						
390 pF						
470 pF						
560 pF						
680 pF						
820 pF						
1 000 pF	0.6 ±0.1	0.6 ±0.1	0.6 ±0.1			
1.2 nF						
1.5 nF						
1.8 nF						
2.2 nF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

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



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

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



MLCC Engineering Design Kits

Sample kits for 0201 / 0402

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

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

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

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

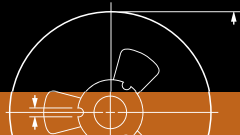


0603 sample kits					
NP0 50 V		NP0 25 V		X7R 50 V	
Capacitance (pF)	Tolerance	Capacitance (pF)	Tolerance	Capacitance (pF)	Tolerance
1	±0.25 pF	1 000	±5%	100	±10%
1.5	±0.25 pF	1 500	±5%	150	±10%
2.2	±0.25 pF	Y5V 50 V		220	±10%
3.3	±0.25 pF	Capacitance (pF)	Tolerance	330	±10%
4.7	±0.25 pF	10 000	±20%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

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

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

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



MLCC Engineering Design Kits

Sample kits for 1206

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

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

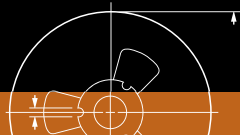


High capacitance sample kits								
X5R 0402			X7R 0603			Y5V 0402		
Capacitance	Rated voltage	Tolerance	Capacitance	Rated voltage	Tolerance	Capacitance	Rated voltage	Tolerance
1 μF	6.3 V	±10%	1 μF	16 V	±10%	1 μF	6.3 V	-20% to +80%
1 μF	10 V	±10%	X7R 0805			1 μF	10 V	-20% to +80%
2.2 μF	6.3 V	±20%	Capacitance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

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

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

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



MLCC Engineering Design Kits

High voltage sample kits for general applications

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

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

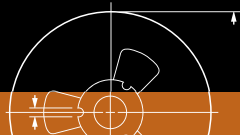


High frequency sample kits								
NP0 0201								
Capacitance	Rated voltage	Tolerance	Capacitance	Rated voltage	Tolerance	Capacitance	Rated voltage	Tolerance
0.2pF	25 V	±0.1pF	1.6pF	25 V	±0.1pF	5.0pF	25 V	±0.25pF
0.3pF	25 V	±0.1pF	1.8pF	25 V	±0.1pF	5.6pF	25 V	±0.25pF
0.4pF	25 V	±0.1pF	2.0pF	25 V	±0.1pF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

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

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

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



MLCC Engineering Design Kits

Sample kits for high frequency series

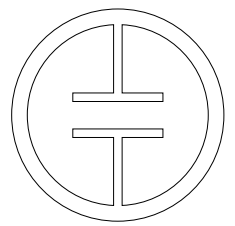
High frequency sample kits								
NP0 0603								
Capacitance	Rated voltage	Tolerance	Capacitance	Rated voltage	Tolerance	Capacitance	Rated voltage	Tolerance
0.2pF	250 V	±0.1pF	2.0pF	250 V	±0.1pF	6.8pF	250 V	±0.25pF
0.3pF	250 V	±0.1pF	2.2pF	250 V	±0.1pF	7.0pF	250 V	±0.25pF
0.4pF	250 V	±0.1pF	2.4pF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

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

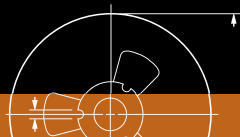
High frequency sample kits								
NP0 0805								
Capacitance	Rated voltage	Tolerance	Capacitance	Rated voltage	Tolerance	Capacitance	Rated voltage	Tolerance
0.2pF	250 V	±0.1pF	2.4pF	250 V	±0.1pF	8.2pF	250 V	±0.25pF
0.3pF	250 V	±0.1pF	2.7pF	250 V	±0.1pF	9.0pF	250 V	±0.25pF
0.4pF	250 V	±0.1pF	3.0pF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

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





SMD CERAMIC EMI FILTER CAPACITORS
X2Y[®] PRODUCTS



X2Y® Product Selection Charts

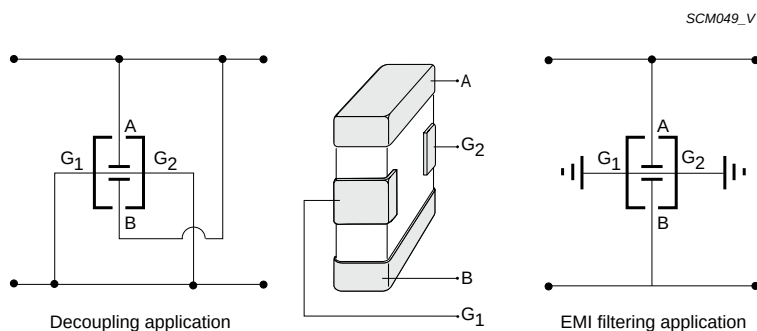
SMD ceramic EMI filter capacitors X2Y® series



Features

- Broadband Filtering and Decoupling: X2Y® is effective up to 10 GHz and frequencies beyond
- Ultra Low ESL: Noise cancellation within X2Y® makes ESL reducing from nanohenry to picohenry levels
- Bypass: Unlike feedthrough capacitors, X2Y® is in bypass, so no DC current limitations
- Matched Y-caps: Two tightly matched line to ground capacitors in one device
- Superior Balance: Temperature and voltage variations balanced of two Y-caps
- Aging Reliability: Aging effects are equal on two Y-caps

Circuit of typical applications

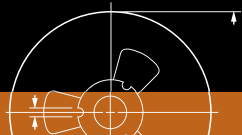


Benefits	Applications
• Fewer Components in Filtering: One X2Y® can replace multiple inductors and/or capacitors • Superior Performance in Filtering: One X2Y® can eliminate both differential and common mode noises • Fewer Components in Decoupling: Up to 1:7 replacement of MLCC in power delivering system bypass networks • Superior Performance in Decoupling: Large or small, X2Y® components exhibit ultra low ESL • Total Cost Savings: Assembly cost savings through reduced component count and placement costs • Board Level Design Advantages: Dramatically reduces via drills, which blocks routing	• EMI filtering on DC motors • Filtered connectors (airbag connectors, RJ-45 connectors) • High speed data-line filtering • Decoupling of supply-lines in high speed digital circuits • Broadband filtering • Amplifier decoupling and EMI suppression • IC Decoupling, on-package, on-PCB • DC power line filtering • Data line filtering • EMI suppression for DC motors • Sensors • Audio

X7R					
Size	Y-Capacitor		Voltage rating (V)	Thickness (mm)	Global part number
	Capacitance (nF)	TOLERANCE (%)			
0603	1	20%	100	0.65	CX 0603 MR X7R 0BB 102
	1	20%	16		CX 0603 MR X7R 7BB 102
	1.5	20%	100		CX 0603 MR X7R 0BB 152
	1.5	20%	50		CX 0603 MR X7R 9BB 152
	2.2	20%	100		CX 0603 MR X7R 0BB 222
	4.7	20%	100		CX 0603 MR X7R 0BB 472
	5.6	20%	100		CX 0603 MR X7R 0BB 562
	5.6	20%	50 / 63		CX 0603 MR X7R 9BB 562
	10	20%	50 / 63		CX 0603 MR X7R 9BB 103
	22	20%	25		CX 0603 MR X7R 8BB 223
	47	20%	16		CX 0603 MR X7R 7BB 473
	56	20%	16		CX 0603 MR X7R 7BB 563
	100	20%	10		CX 0603 MR X7R 6BB 104
	220	20%	10		CX 0603 MR X7R 6BB 224
0805	1	20%	100	0.85	CX 0805 MR X7R 0BB 102
	4.7	20%	100		CX 0805 MR X7R 0BB 472
	10	20%	100		CX 0805 MR X7R 0BB 103
	15	20%	50 / 63		CX 0805 MR X7R 9BB 153
	18	20%	50 / 63		CX 0805 MR X7R 9BB 183
	22	20%	50 / 63		CX 0805 MR X7R 9BB 223
	22	20%	25		CX 0805 MR X7R 8BB 223
	39	20%	25		CX 0805 MR X7R 8BB 393
	47	20%	16		CX 0805 MR X7R 7BB 473
	100	20%	16		CX 0805 MR X7R 7BB 104
	180	20%	10		CX 0805 MR X7R 6BB 184
1206	15	20%	100	1.20	CX 1206 MK X7R 0BB 153
	22	20%	100		CX 1206 MK X7R 0BB 223
	47	20%	50 / 63		CX 1206 MK X7R 9BB 473
	100	20%	50 / 63		CX 1206 MK X7R 9BB 104
	220	20%	16		CX 1206 MK X7R 7BB 224
	390	20%	16		CX 1206 MK X7R 7BB 394
	470	20%	10		CX 1206 MK X7R 6BB 474
1210	100	20%	50	1.60	CX 1210 MK X7R 9BB 104
	220	20%	50		CX 1210 MK X7R 9BB 224
	390	20%	50		CX 1210 MK X7R 9BB 394
	470	20%	25		CX 1210 MK X7R 8BB 474
	560	20%	25		CX 1210 MK X7R 8BB 564
	820	20%	16		CX 1210 MK X7R 7BB 824
	1000	20%	16		CX 1210 MK X7R 7BB 105
1410	390	20%	50	1.30	CX 1410 MK X7R 9BB 394

X5R					
Size	Y-Capacitor		Voltage rating (V)	Thickness (mm)	Global part number
	Capacitance (nF)	TOLERANCE (%)			
0603	220	20%	10	0.65	CX 0603 MR X5R 6BB 224
	330	20%	10		CX 0603 MR X5R 6BB 334
	470	20%	10		CX 0603 MR X5R 6BB 474
	470	20%	6.3		CX 0603 MR X5R 5BB 474

Note: 1. Special values are available on request



X2Y® Product Selection Charts

Ordering information

NPO					
Size	Y-Capacitor		Voltage rating (V)	Thickness (mm)	Global part number
	Capacitance (nF)	TOLERANCE (%)			
0603	0.01	20%	100	0.85	CX 0603 MR NPO 0BB 100
	0.022		100		CX 0603 MR NPO 0BB 220
	0.033		100		CX 0603 MR NPO 0BB 330
	0.047		100		CX 0603 MR NPO 0BB 470
	0.1		50		CX 0603 MR NPO 9BB 101
	0.22		50		CX 0603 MR NPO 9BB 221
	0.47		50		CX 0603 MR NPO 9BB 471
0805	0.01	20%	50	0.85	CX 0805 MR NPO 9BB 100
	0.022		50		CX 0805 MR NPO 9BB 220
	0.047		50		CX 0805 MR NPO 9BB 470

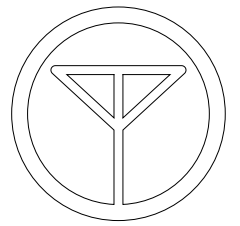
Note: 1. Special values are available on request

Thickness classes and packing quantities		
Thickness Classification (mm)	Quantity per reel	
	8 mm tape width	
	Ø180mm / 7"	
	0603 - 1410	
	Paper	Blister
0.60 ±0.10	4 000	---
0.85 ±0.10	4 000	---
1.20 ±0.15	---	3 000
1.60 ±0.15	---	2 000
1.90 ±0.20	---	2 000

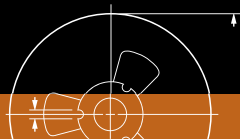
Note: 1. Special values are available on request



Global part number	
Ordering example: CX0603MKX7R6BB104	
	C X 0 6 0 3 M K X 7 R 6 B B 1 0 4
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)	Process code (code 14) B = BME
Capacitance tolerance (code 7) M = ±20%	Termination (code 13) B = Ni-barrier
Packing style (code 8) R = Paper tape reel Ø7" K = Embossed plastic tape reel Ø7"	Rated voltage (code 12) 5 = 6.3 V 6 = 10 V 7 = 16 V 8 = 25 V 9 = 50 V 0 = 100 V
TC material (code 9-11) NP0 X7R X5R	



WIRELESS COMPONENTS



Wireless Components Product Selection Charts

Introduction

Introduction

Yageo produces a comprehensive range of wireless components, including metal/PCB/FPCB antenna, patch antenna (ceramic bulk), active antenna (LNA circuit), chip antenna, and RF components (filter/balancer).

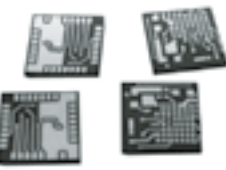
Our products cover a wide variety of wireless communication protocols, including Bluetooth & IEEE 802.11b/g, WPAN (Wireless Personal Area Network), WLAN (Wireless Local Area Network), WMAN (Wireless Metropolitan Area Network), WWAN (Wireless Wide Area Network) and LTE (Long Term Evolution).

Wireless Components

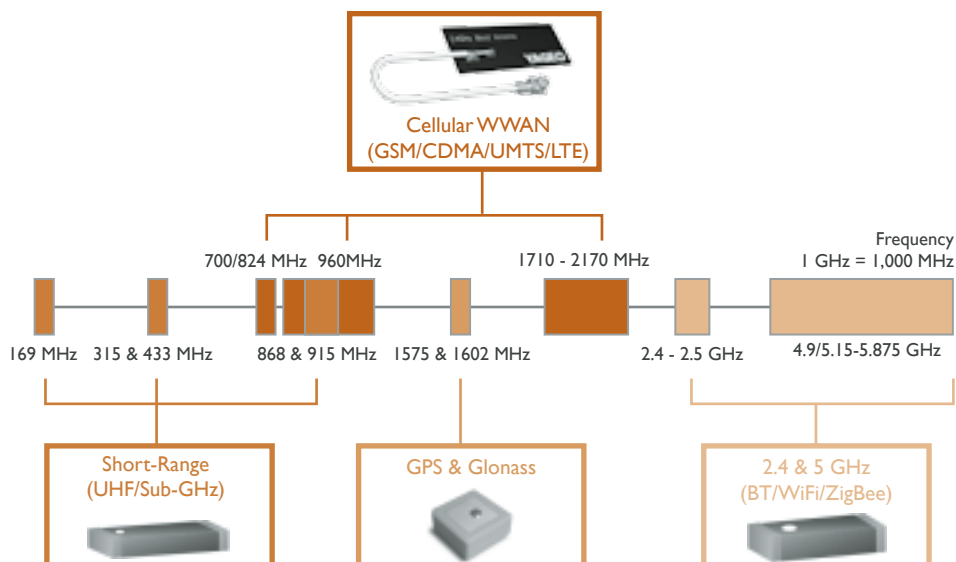
Antenna

				
Metal	PCB	FPCB	LTCC / Ceramic	Patch / Ceramic

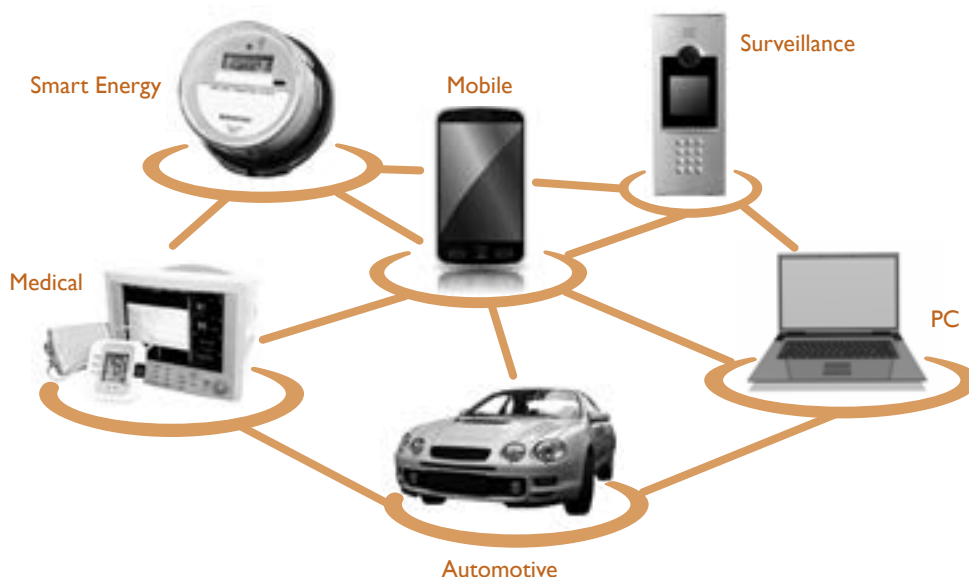
LTCC Balun/ Filter/ Balun + Filter (Combo) / X2Y

				
Balun	Filter	Balun + Filter	X2Y Filter	FEM Substrate

Yageo Antenna Portfolio



Portable devices, home appliances, industrial/medical equipment will be equipped with wireless connectivity for Peer-to-Peer data exchange. More wireless components are needed.



Key features of wireless components

Compact

- Maximize performance with the smallest size required
- The smallest 2.4/5 GHz antenna: PCB 18.4x7.5 mm / LTCC 2x1.25 mm

Multi-Band & High Efficiency

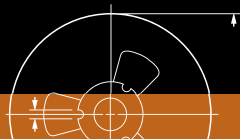
- WWAN: Quad-band (850/900/1800/1900 MHz) to Penta-band (850/900/1800/1900/2100 MHz)
- Support 4G cellular network LTE 700 MHz (Band 12,13,17), 2300/2600 MHz
- Multi-band 2.3/2.4/2.7 & 5 GHz supporting WLAN/WiMAX/LTE
- Operating in dual navigational systems GPS & Glonass: 1575 – 1602 MHz

High Reliability

- Operating temperature range: -40°C ~ 105°C
- Operating humidity 95% RH at 40°C
- Vibration verification

Easy Installation

- Reliable adhesive tape, surface mount, and flexible cable/connector selection



Wireless Components Selection Charts

Antenna - 2.4 GHz

2.4 GHz			
Model	Part No./ Description	Electrical Data	Mechanical Data
	ANT1204F001R2400A / CAN4311059012451K 1204 2.4GHz PIFA Chip Antenna	Freq. Range: 2400~2500 MHz VSWR *: 2.0 (Max) Polarization: Linear Peak Gain : 6.66 dBi(Typ.)	Size (mm) : 12*4*2.0 Operating Temp.: -40 ~ 105°C RoHS Compliance
	ANT1004F002R2400A / CAN4311041022451K 1004 2.4GHz PIFA Chip Antenna	Freq. Range: 2400~2500 MHz VSWR *: 2.0 (Max) Polarization: Linear Peak Gain : 1.55 dBi(Typ.)	Size (mm) : 10*4*2.0 Operating Temp.: -40 ~ 105°C RoHS Compliance
	ANT9520LL06R2400A / CAN4311795062452K 9520 2.4GHz Chip Antenna	Freq. Range: 2400~2500 MHz VSWR *: 2.5 (Max) Polarization: Linear Peak Gain : 2.85 dBi(Typ.)	Size (mm) : 9.5*2.0*1.2 Operating Temp.: -40 ~ 105°C RoHS Compliance
	ANT8010LL04R2400A / CAN4311781042453K 8010 2.4GHz Chip Antenna	Freq. Range: 2400~2500 MHz VSWR *: 2.0 (Max) Polarization: Linear Peak Gain : 5.88 dBi(Typ.)	Size (mm) : 8.0*1.0*1.0 Operating Temp.: -40 ~ 105°C RoHS Compliance
	ANT7836A003R2400A / CAN4311278032451K 7836 2.4GHz Chip Antenna	Freq. Range: 2400~2500 MHz VSWR *: 2.0 (Max) Polarization: Linear Peak Gain : 3.93 dBi dBi(Typ.)	Size (mm) : 7.8*3.6*0.5 Operating Temp.: -40 ~ 105°C RoHS Compliance
	ANT7020LL05R2400A / CAN4311772052452K 7020 2.4GHz Chip Antenna	Freq. Range: 2400~2500 MHz VSWR *: 2.8 (Max) Polarization: Linear Peak Gain : 2.62 dBi dBi(Typ.)	Size (mm) : 7.0*2.0*0.8 Operating Temp.: -40 ~ 105°C RoHS Compliance
	ANT5320LL45R2400A / CAN4311753452451K 5320 2.4GHz Chip Antenna	Freq. Range: 2400~2500 MHz VSWR *: 2.0 (Max) Polarization: Linear Peak Gain : 5.5 dBi dBi(Typ.)	Size (mm) : 5.3*2.0*1.2 Operating Temp.: -40 ~ 105°C RoHS Compliance
	ANT5320LL24R2400A / CAN4311753242452K 5320 2.4GHz PIFA Chip Antenna	Freq. Range: 2400~2500 MHz VSWR *: 2.0 (Max) Polarization: Linear Peak Gain : 2.78 dBi(Typ.)	Size (mm) : 5.3*2.0*1.25 Operating Temp.: -40 ~ 105°C RoHS Compliance
	ANT5010LL04R2400A / CAN4311751042453K 5010 2.4GHz Chip Antenna	Freq. Range: 2400~2500 MHz VSWR *: 2.8 (Max) Polarization: Linear Peak Gain : 2.28 dBi(Typ.)	Size (mm) : 5.0*1.0*1.0 Operating Temp.: -40 ~ 105°C RoHS Compliance
	ANT3216LL00R2400A / CAN4311712002453K 3216 2.4Ghz Chip Antenna	Freq. Range: 2400~2500 MHz VSWR *: 2.5 (Max) Polarization: Linear Peak Gain : 5 dBi(Typ.)	Size (mm) : 3.2*1.6*1.3 Operating Temp.: -40 ~ 105°C RoHS Compliance
	ANT3216A063R2400A / CAN4311212632453K 3216 2.4GHz PIFA Chip Antenna	Freq. Range: 2400~2500 MHz VSWR *: 2.0 (Max) Polarization: Linear Peak Gain : 1.69 dBi(Typ.)	Size (mm) : 3.2*1.6*0.5 Operating Temp.: -40 ~ 105°C RoHS Compliance
	ANT3012LL04R2400A / CAN4311792042453K 3012 2.4GHz Chip Antenna	Freq. Range: 2400~2500 MHz VSWR *: 2.0 (Max) Polarization: Linear Peak Gain : 1.84 dBi(Typ.)	Size (mm) : 3.0*1.2*1.2 Operating Temp.: -40 ~ 105°C RoHS Compliance

* VSWR depends on the environment

Wireless Components Selection Charts

Antenna - 2.4/ 5 GHz

2.4 GHz

Model	Part No./ Description	Electrical Data	Mechanical Data
	ANT2012LL13R2400A / CAN4311714132454K 2012 2.4GHz PIFA Chip Antenna	Freq. Range : 2400~2500 MHz VSWR * : 2.0 (Max) Polarization : Linear Peak Gain : 2.72 dBi(Typ.)	Size (mm) : 2.0*1.2*1.0 Operating Temp. : -40 ~ 105°C RoHS Compliance
	ANTX200P001B24003 2.4GHz PCB Antenna - mini	Freq. Range : 2400 MHz VSWR * : 2.5 (Max) Polarization : Linear Peak Gain : 4.8 dBi(Typ.)	Size (mm) : 18.4*7.5*0.55 Operating Temp. : -40 ~ 80°C RoHS Compliance

2.4 GHz / GPS

Model	Part No./ Description	Electrical Data	Mechanical Data
	ANT1003LL15R1524A / CAN4311756151521K 1003 2.4GHz+GPS PIFA Chip Antenna	Freq. Range : 1575 / 2400 MHz VSWR * : 2.8 (Max) Polarization : Linear Peak Gain : 1.15 dBi / 2.90 dBi(Typ.)	Size (mm) : 10*3*1.5 Operating Temp. : -40 ~ 105°C RoHS Compliance
	ANT5320LL07R1524A / CAN4311753071522K 5320 2.4GHz+GPS PIFA Chip Antenna	Freq. Range : 1575 / 2400 MHz VSWR * : 2.0 (Max) Polarization : Linear Peak Gain : 2.47 dBi / 2.04 dBi(Typ.)	Size (mm) : 5.3*2.0*1.2 Operating Temp. : -40 ~ 105°C RoHS Compliance

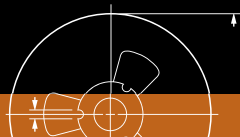
2.4 / 5 GHz

Model	Part No./ Description	Electrical Data	Mechanical Data
	ANT1003LL05R2455A / CAN4311756052521K 1003 2.4+5GHz Chip Antenna	Freq. Range : 2400~2500/ 5150~5875 MHz VSWR * : 2.8 (Max) Polarization : Linear Peak Gain : 2.5 dBi / 2.48dBi(Typ.)	Size (mm) : 10*3*1.6 Operating Temp. : -40 ~ 105°C RoHS Compliance
	ANT5320LL04R2455A / CAN4311753042522K 5320 2.4+5GHz Chip Antenna	Freq. Range : 2400~2500/ 5150~5875 MHz VSWR * : 2.8 (Max) Polarization : Linear Peak Gain : 2.72 dBi / 3.85dBi(Typ.)	Size (mm) : 5.3*2.0*1.4 Operating Temp. : -40 ~ 105°C RoHS Compliance
	ANT5320LL24R2455A / CAN4311753242522K 5320 2.4+5GHz PIFA Chip Antenna	Freq. Range : 2400~2500/ 5150~5875 MHz VSWR * : 2.8 (Max) Polarization : Linear Peak Gain : 2.17 dBi / 3.51dBi(Typ.)	Size (mm) : 5.3*2.0*1.2 Operating Temp. : -40 ~ 105°C RoHS Compliance
	ANTX100P001B24553 2.4+5GHz PCB Antenna	Freq. Range : 2400~2500/ 5150~5875 MHz VSWR * : 2.5 (Max) Polarization : Linear Peak Gain : 5.1dBi(Typ.)	Size (mm) : 50*10*0.9 Operating Temp. : -40 ~ 80°C RoHS Compliance

5 GHz

Model	Part No./ Description	Electrical Data	Mechanical Data
	ANT3216LL05R5000A / CAN4311712055003K 3216 5GHz Chip Antenna	Freq. Range : 5150~5875 MHz VSWR * : 2.0 (Max) Polarization : Linear Peak Gain : 5.71 dBi(Typ.)	Size (mm) : 3.2*1.6*1.3 Operating Temp. : -40 ~ 105°C RoHS Compliance

* VSWR depends on the environment



Wireless Components Product Selection Charts

Antenna - Cellular WWAN / Short Range

Cellular WWAN			
Model	Part No./ Description	Electrical Data	Mechanical Data
	ANT2112A010B0918A /	Freq. Range : 824~960 / 1710~1990 MHz	Size (mm) : 21*12*0.5
	CAN4313284109181B	VSWR* : 2.0 (Max)	Operating Temp.: -40 ~ 105°C
	2112 Cellular-Band Chip Antenna	Polarization: Linear Peak Gain : 0.5 ~ 1 dBi(Typ.)	RoHS Compliance
	ANT3505B000TWPEA /	Freq. Range : 824~960 / 1710~2170 MHz	Size (mm) : 35*5*6
	CAN4313449009181B	VSWR* : 2.8 / 3.5 (Max)	Operating Temp.: -40 ~ 105°C
	3505 Penta-band Antenna	Polarization: Linear Peak Gain : 2.9 dBi(Typ.)	RoHS Compliance
	ANT1204LL00R0918A /	Freq. Range : 900/1800 MHz	Size (mm) : 12*4*1.2
	CAN4311759009181K	VSWR* : 3.0 (Max)	Operating Temp.: -40 ~ 105°C
	1204 Cellular-Band Chip Antenna	Polarization: Linear Peak Gain : N/A	RoHS Compliance
	ANTX100P001BWPEA3	Freq. Range : 824~960 / 1710~2170 MHz	Size (mm) : 50*20*0.55
	Penta-band PCB Antenna	VSWR* : 2.5 Max (Low Band) 3.5 Max (High Band)	Operating Temp.: -40 ~ 80°C
		Polarization: Linear Peak Gain : 4.2 dBi(Typ.)	Cable* : Φ1.13 / 100mm Connector: I-PEX Mounting: Adhesive Tape RoHS Compliance
Short-Range			
Model	Part No./ Description	Electrical Data	Mechanical Data
	ANT1204LL05R0915A /	Freq. Range : 915 MHz	Size (mm) : 12*4*1.6
	CAN4311759050911K	VSWR* : 2.0 (Max)	Operating Temp.: -40 ~ 105°C
	1204 915MHz Chip Antenna	Polarization: Linear Peak Gain : 3.32 dBi(Typ.)	RoHS Compliance
	ANT1204LL08R0870A /	Freq. Range : 870 MHz	Size (mm) : 12*4*1.6
	CAN4311759080871K	VSWR* : 2.0 (Max)	Operating Temp.: -40 ~ 105°C
	1204 870MHz Chip Antenna	Polarization: Linear Peak Gain : 0.5 dBi(Typ.)	RoHS Compliance
	ANT1204LL17R0870A /	Freq. Range : 870 MHz	Size (mm) : 12*4*1.0
	CAN4311759170871K	VSWR* : 2.8 (Max)	Operating Temp.: -40 ~ 105°C
	1204 870MHz PIFA Chip Antenna	Polarization: Linear Peak Gain : 1.05 dBi(Typ.)	RoHS Compliance
	ANT7020LL05R0870A /	Freq. Range : 870 MHz	Size (mm) : 7.0*2.0*0.7
	CAN4311772050872K	VSWR* : 2.0 (Max)	Operating Temp.: -40 ~ 105°C
	7020 870MHz Chip Antenna	Polarization: Linear Peak Gain : N/A	RoHS Compliance
	ANT1204F002R0433A /	Freq. Range : 315/ 433 MHz	Size (mm) : 12*4*1.6
	CAN4311059020431K	VSWR* : 2.0 (Max)	Operating Temp.: -40 ~ 105°C
	1204 433MHz Chip Antenna	Polarization: Linear Peak Gain : 0.79 dBi(Typ.)	RoHS Compliance
	ANT1204LL20R0433A /	Freq. Range : 315/ 433 MHz	Size (mm) : 12*4*1.2
	CAN4311759200431K	VSWR* : 3.0 (Max)	Operating Temp.: -40 ~ 105°C
	1204 433MHz Chip Antenna	Polarization: Linear Peak Gain : 0.83 dBi(Typ.)	RoHS Compliance
	ANT2405F001R0169A /	Freq. Range : 169 MHz	Size (mm) : 24*5*1.6
	CAN4311050010162K	VSWR* : 2.0 (Max)	Operating Temp.: -40 ~ 105°C
	2405 169MHz Chip Antenna	Polarization: Linear Peak Gain : N/A	RoHS Compliance

* VSWR depends on the environment

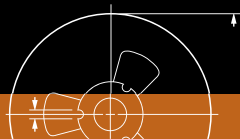
* Cable/Connector is customizable

Wireless Components Selection Charts

Antenna - GPS

GPS			
Model	Part No./ Description	Electrical Data	Mechanical Data
	ANT8010LL05R1575A / CAN4311781051583K 8010 GPS Chip Antenna	Freq. Range : 1575 MHz VSWR *: 2.0 (Max) Polarization : Linear Peak Gain : 0.67 dBi(Typ.)	Size (mm) : 8.0*1.0*1.0 Operating Temp. : -40 ~ 105°C RoHS Compliance
	ANT6230LL01R1575A / CAN4311763011582K 6230 GPS Chip Antenna	Freq. Range : 1575 MHz VSWR *: 2.0 (Max) Polarization : Linear Peak Gain : 2.52 dBi(Typ.)	Size (mm) : 6.2*3.0*1.25 Operating Temp. : -40 ~ 105°C RoHS Compliance
	ANT5320LL14R1575A / CAN4311753141582K 5320 GPS PIFA Chip Antenna	Freq. Range : 1575 MHz VSWR *: 2.0 (Max) Polarization : Linear Peak Gain : 3.16 dBi(Typ.)	Size (mm) : 5.3*2.0*1.2 Operating Temp. : -40 ~ 105°C RoHS Compliance
	ANT3216LL15R1575A / CAN4311712151583K 3216 GPS PIFA Chip Antenna	Freq. Range : 1575 MHz VSWR *: 2.0 (Max) Polarization : Linear Peak Gain : 7.32 dBi(Typ.)	Size (mm) : 3.2*1.6*1.2 Operating Temp. : -40 ~ 105°C RoHS Compliance
	ANT1010B00FT1575A / CAN43134200F1581B 10104 GPS Patch Antenna	Freq. Range : 1575 MHz VSWR *: 2.0 (Max) Polarization : RHCP Peak Gain : -3 dBic(Typ.)	Size (mm) : 10*10*4 Operating Temp. : -40 ~ 105°C Mounting : PIN RoHS Compliance
	ANT1212B00BT1575A / CAN43134220B1581B 12124 GPS Patch Antenna	Freq. Range : 1575 MHz VSWR *: 2.0 (Max) Polarization : RHCP Peak Gain : -1 dBic(Typ.)	Size (mm) : 12*12*4 Operating Temp. : -40 ~ 105°C Mounting : SMD RoHS Compliance
	ANT1212B00DT1575A / CAN43134220D1581B 12124 GPS Patch Antenna	Freq. Range : 1575 MHz VSWR *: 2.0 (Max) Polarization : RHCP Peak Gain : -1 dBic(Typ.)	Size (mm) : 12*12*4 Operating Temp. : -40 ~ 105°C Mounting : PIN RoHS Compliance
	ANT1515B00BT1575A / CAN43134230B1581B 15154 GPS Patch Antenna	Freq. Range : 1575 MHz VSWR *: 2.0 (Max) Polarization : RHCP Peak Gain : 1.5 dBic(Typ.)	Size (mm) : 15*15*4 Operating Temp. : -40 ~ 105°C Mounting : SMD RoHS Compliance
	ANT1515B00DT1575A / CAN43134230D1581B 15154 GPS Patch Antenna	Freq. Range : 1575 MHz VSWR *: 2.0 (Max) Polarization : RHCP Peak Gain : 1.5 dBic(Typ.)	Size (mm) : 15*15*4 Operating Temp. : -40 ~ 105°C Mounting : PIN RoHS Compliance
	ANT1515B00FT1575A / CAN43134230F1581B 15154 GPS Patch Antenna	Freq. Range : 1575 MHz VSWR *: 2.0 (Max) Polarization : RHCP Peak Gain : 1.5 dBic(Typ.)	Size (mm) : 15*15*4 Operating Temp. : -40 ~ 105°C Mounting : PIN RoHS Compliance
	ANT1818B00AT1575A / CAN43134240A1581B 18182 GPS Patch Antenna	Freq. Range : 1575 MHz VSWR *: 2.0 (Max) Polarization : RHCP Peak Gain : 2 dBic(Typ.)	Size (mm) : 18*18*2 Operating Temp. : -40 ~ 105°C Mounting : SMD RoHS Compliance
	ANT1818B00BT1575A / CAN43134240B1581B 18184 GPS Patch Antenna	Freq. Range : 1575 MHz VSWR *: 2.0 (Max) Polarization : RHCP Peak Gain : 4 dBic(Typ.)	Size (mm) : 18*18*4 Operating Temp. : -40 ~ 105°C Mounting : SMD RoHS Compliance

* VSWR depends on the environment



Wireless Components Selection Charts

Antenna - GPS

GPS			
Model	Part No./ Description	Electrical Data	Mechanical Data
	ANT1818B00CT1575A / CAN43134240C1581B 18182 GPS Patch Antenna	Freq. Range: 1575 MHz VSWR *: 2.0 (Max) Polarization: RHCP Peak Gain: 2 dBic(Typ.)	Size (mm): 18*18*2 Operating Temp.: -40 ~ 105°C Mounting: PIN RoHS Compliance
	ANT1818B00DT1575A / CAN43134240D1581B 18184 GPS Patch Antenna	Freq. Range: 1575 MHz VSWR *: 2.0 (Max) Polarization: RHCP Peak Gain: 4 dBic(Typ.)	Size (mm): 18*18*4 Operating Temp.: -40 ~ 105°C Mounting: PIN RoHS Compliance
	ANT1818B00ET1575A / CAN43134240E1581B 18182 GPS Patch Antenna	Freq. Range: 1575 MHz VSWR *: 2.0 (Max) Polarization: RHCP Peak Gain: 2 dBic(Typ.)	Size (mm): 18*18*2 Operating Temp.: -40 ~ 105°C Mounting: PIN RoHS Compliance
	ANT2525B00AT1575A / CAN43134250A1581B 25252 GPS Patch Antenna	Freq. Range: 1575 MHz VSWR *: 2.0 (Max) Polarization: RHCP Peak Gain: 5 dBic(Typ.)	Size (mm): 25*25*2 Operating Temp.: -40 ~ 105°C Mounting: SMD RoHS Compliance
	ANT2525B00BT1575A / CAN43134250B1581B 25254 GPS Patch Antenna	Freq. Range: 1575 MHz VSWR *: 2.0 (Max) Polarization: RHCP Peak Gain: 5.5 dBic(Typ.)	Size (mm): 25*25*4 Operating Temp.: -40 ~ 105°C Mounting: SMD RoHS Compliance
	ANT2525B00CT1575A / CAN43134250C1581B 25252 GPS Patch Antenna	Freq. Range: 1575 MHz VSWR *: 2.0 (Max) Polarization: RHCP Peak Gain: 5 dBic(Typ.)	Size (mm): 25*25*2 Operating Temp.: -40 ~ 105°C Mounting: PIN RoHS Compliance
	ANT2525B00DT1575A / CAN43134250D1581B 25254 GPS Patch Antenna	Freq. Range: 1575 MHz VSWR *: 2.0 (Max) Polarization: RHCP Peak Gain: 5.5 dBic(Typ.)	Size (mm): 25*25*4 Operating Temp.: -40 ~ 105°C Mounting: PIN RoHS Compliance
	ANT2525B00ET1575A / CAN43134250E1581B 25252 GPS Patch Antenna	Freq. Range: 1575 MHz VSWR *: 2.0 (Max) Polarization: RHCP Peak Gain: 5 dBic(Typ.)	Size (mm): 25*25*2 Operating Temp.: -40 ~ 105°C Mounting: PIN RoHS Compliance
	ANT2525B00FT1575A / CAN43134250F1581B 25254 GPS Patch Antenna	Freq. Range: 1575 MHz VSWR *: 2.0 (Max) Polarization: RHCP Peak Gain: 5.5 dBic(Typ.)	Size (mm): 25*25*4 Operating Temp.: -40 ~ 105°C Mounting: PIN RoHS Compliance
	ANT1606B00DT1575A / CAN43134460D1581B 16064 GPS Patch Antenna	Freq. Range: 1575 MHz VSWR *: 2.0 (Max) Polarization: Linear Peak Gain: -0.5 dBic(Typ.)	Size (mm): 16*6*4 Operating Temp.: -40 ~ 105°C Mounting: PIN RoHS Compliance
	ANT1004B000R1575A / CAN4311441001581K 10044 GPS Patch Antenna	Freq. Range: 1575 MHz VSWR *: 2.0 (Max) Polarization: Linear Peak Gain: 1.61 dBic(Typ.)	Size (mm): 10*4*4 Operating Temp.: -40 ~ 105°C Mounting: SMD RoHS Compliance

* VSWR depends on the environment

Wireless Components Selection Charts

Antenna - GPS / Glonass / Active Antenna

GPS+Glonass

Model	Part No./ Description	Electrical Data	Mechanical Data
	ANT1818B00BT1516A / CAN43134240B1561B 18184 Gps+Glonass Patch Antenna	Freq. Range: 1575 / 1602 MHz VSWR *: 2.0 (Max) Polarization: Linear Peak Gain: 1.89 / 2.59 dBi(Typ.)	Size (mm): 18*18*4 Operating Temp.: -40 ~ 105°C Mounting: SMD RoHS Compliance
	ANT1818B00DT1516A / CAN43134240D1561B 18184 Gps+Glonass Patch Antenna	Freq. Range: 1575 / 1602 MHz VSWR *: 2.0 (Max) Polarization: Linear Peak Gain: 2.65 / 2.79 dBi (Typ.)	Size (mm): 18*18*4 Operating Temp.: -40 ~ 105°C Mounting: PIN RoHS Compliance
	ANT2525B00BT1516A / CAN43134250B1561B 25254 Gps+Glonass Patch Antenna	Freq. Range: 1575 / 1602 MHz VSWR *: 2.0 (Max) Polarization: Linear Peak Gain: 3.44 / 4.10 dBi (Typ.)	Size (mm): 25*25*4 Operating Temp.: -40 ~ 105°C Mounting: SMD RoHS Compliance
	ANT2525B00DT1516A / CAN43134250D1561B 25254 Gps+Glonass Patch Antenna	Freq. Range: 1575 / 1602 MHz VSWR *: 2.0 (Max) Polarization: Linear Peak Gain: 3.5 / 3.8 dBi (Typ.)	Size (mm): 25*25*4 Operating Temp.: -40 ~ 105°C Mounting: PIN RoHS Compliance

Active GPS

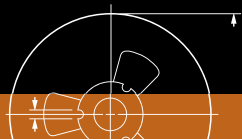
Model	Part No./ Description	Electrical Data	Mechanical Data
	ANT2525JB08B1575A / CAN4313325081581B 25256.9 GPS Active Antenna	Freq. Range: 1575 MHz VSWR *: 2.0 (Max) Polarization: RHCP LNA Gain: 16 dB (Typ.) Antenna Gain: 5.5 dBic(Typ.)	Size (mm): 25*25*6.9 Cable * (mm): 1.13*75 Operating Temp.: -30 ~ 85°C RoHS Compliance
	ANT1818JB30B1575A / CAN4313324301581B 18187.1 GPS Active Antenna	Freq. Range: 1575 MHz VSWR *: 2.0 (Max) Polarization: RHCP LNA Gain: 25 dB (Typ.) Antenna Gain: 1.54 dBic(Typ.)	Size (mm): 18*18*7.1 Cable * (mm): 1.37*100 Operating Temp.: -30 ~ 85°C RoHS Compliance
	ANT1515JB27B1575A / CAN4313323271581B 15156.5 GPS Active Antenna	Freq. Range: 1575 MHz VSWR *: 2.0 (Max) Polarization: RHCP LNA Gain: 20.5 dB (Typ.) Antenna Gain: 1.0 dBic(Typ.)	Size (mm): 15*15*6.5 Cable * (mm): 1.13*100 Operating Temp.: -30 ~ 85°C RoHS Compliance
	ANT1212JB27B1575A / CAN4313322271581B 12126.5 GPS Active Antenna	Freq. Range: 1575 MHz VSWR *: 1.5 (Max) Polarization: RHCP LNA Gain: 25 dB (Typ.) Antenna Gain: -0.16 dBic(Typ.)	Size (mm): 12*12*6.5 Cable * (mm): 1.13*60 Operating Temp.: -30 ~ 85°C RoHS Compliance
	ANT1606JB12B1575A / CAN4313346121581B 20066.4 GPS Active Antenna	Freq. Range: 1575 MHz VSWR *: 2.0 (Max) Polarization: Linear LNA Gain: 20 dB (Typ.) Antenna Gain: 0.35 dBi (Typ.)	Size (mm): 20*6*6.4 Cable * (mm): 1.37*93 Operating Temp.: -30 ~ 85°C RoHS Compliance

Active GPS+Glonass

Model	Part No./ Description	Electrical Data	Mechanical Data
	ANT8010JLC1B1516A / CAN4313981C11561B 22061.9 GPS+Glonass Active Antenna	Freq. Range: 1575/1602 MHz VSWR *: 2.0 (Max) Polarization: Linear LNA Gain: 20 / 20 dB (Typ.) Antenna Gain: 5.88 dBi(Typ.)	Size (mm): 22*6*1.9 Cable * (mm): 1.13*100 Operating Temp.: -30 ~ 85°C RoHS Compliance

* VSWR depends on the environment

* Cable/Connector is customizable



Wireless Components Selection Charts

Antenna - Others

FM			
Model	Part No./ Description	Electrical Data	Mechanical Data
	ANT2405F001R0098A / CAN4311050010882K	Freq. Range : 88 MHz VSWR * : 2.0 (Max)	Size (mm) : 24*5*1.6 Operating Temp. : -40 ~ 105°C
	2405 FM Chip Antenna	Polarization : Linear Peak Gain : N/A	RoHS Compliance
	ANT1105LF00R0098A / CAN4311858000882K	Freq. Range : 88 MHz VSWR * : 2.0 (Max)	Size (mm) : 11*5*1.3 Operating Temp. : -40 ~ 105°C
	1105 FM (Ferrite) Chip Antenna	Polarization : Linear Peak Gain : N/A	RoHS Compliance
SDARS			
Model	Part No./ Description	Electrical Data	Mechanical Data
	ANT2525B00DT2300A / CAN43134250D2301B	Freq. Range : 2320~2345 MHz VSWR * : 2.0 (Max)	Size (mm) : 25*25*4 Operating Temp. : -40 ~ 105°C
	25254 SDARS Patch Antenna	Polarization : LHCP Peak Gain : 6 dBic(Typ.)	Mounting : PIN RoHS Compliance
1.88~2.1 GHz			
Model	Part No./ Description	Electrical Data	Mechanical Data
	ANT8868LL00R1880A / CAN4311788001881K	Freq. Range : 1880~2000 MHz VSWR * : 2.0 (Max)	Size (mm) : 8.8*6.8*0.9 Operating Temp. : -40 ~ 105°C
	8868 DECT Chip Antenna	Polarization : Linear Peak Gain : 6.13 dBi(Typ.)	RoHS Compliance

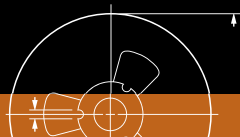
* VSWR depends on the environment

Wireless Components Selection Charts

Filters

Filter (BPF)				
Model	Part No./ Description	Electrical Data		Mechanical Data
	BPF2012LL05R2400A / CFL4111714052454K	Freq. Range: 2400-2500MHz	Attenuation: 24dB Min @ 3200MHz	Size(mm): 2.0*1.2*0.9
	2012 2.4G BPF Type05, H.R.3.2G	Insertion Loss: 2.0dB (Max) VSWR *: 2.0 (Max)	30dB Min @ 4800~5000MHz 20dB Min @ 7200~7500MHz	Operating Temp.: -40~85°C RoHS Compliance
	BPF2012LL22R2400A / CFL4111714222454K	Freq. Range: 2400-2500 MHz	Attenuation: 30dB Min @ 824~915 MHz	Size(mm): 2.0*1.2*0.5
	2012 2.4G BPF Type22, H.R.2.1G	Insertion Loss: 2.5 dB (Max.) VSWR *: 2.0 (Max)	32dB Min @ 1920~1980 MHz 16dB Min @ 2110~2170 MHz 35dB Min @ 4800~5000 MHz 23dB Min @ 7200~7500 MHz	Operating Temp.: -40~85°C RoHS Compliance
	BPF2012LM17R2400A / CFL411151472454K	Freq. Range: 2400-2500 MHz	Attenuation: 40dB Min @ 880~960 MHz	Size(mm): 2.0*1.2*0.9
	2012 2.4G BPF Type17, H.R.2.1G	Insertion Loss: 2.6dB (Max.) VSWR *: 2.0 (Max)	40dB Min @ 1710~1990 MHz 20dB Min @ 2110~2170 MHz 30dB Min @ 4800~5000 MHz 30dB Min @ 7200~7500 MHz	Operating Temp.: -25~85°C RoHS Compliance
	BPF2012LM47R2400A / CFL4111514472454K	Freq. Range: 2400-2500MHz	Attenuation: 30dB Min @ 824~915 MHz	Size(mm): 2.0*1.2*0.8
	2012 2.4G BPF Type47, H.R.2.1G	Insertion Loss: 1.8dB (Max) VSWR *: 2.0 (Max)	30dB Min @ 1545~1605 MHz 35dB Min @ 1710~1990 MHz 30dB Min @ 2170 MHz 30dB Min @ 4800~5000 MHz 25dB Min @ 7200~7500 MHz	Operating Temp.: -40~85°C RoHS Compliance
	BPF2012LM09R2400A / CFL4111514092454K	Freq. Range: 2400-2500MHz	Attenuation: 15dB Min @ 1600MHz	Size(mm): 2.0*1.2*0.9
	2012 2.4G BPF Type09	Insertion Loss: 1.2dB (Max) VSWR *: 2.0 (Max)	25dB Min @ 3200MHz 20dB Min @ 4800~5000MHz	Operating Temp.: -40~85°C RoHS Compliance
	BPF2012LL01R5000A / CFL4111714015004K	Freq. Range: 4900-5950 MHz	Attenuation: 30dB Min @ 1280~3000MHz	Size(mm): 2.0*1.2*1
	2012 5G BPF Type01	Insertion Loss: 1.5dB (Max) VSWR *: 2.0 (Max)	25dB Min @ 3300~4000MHz 25dB Min @ 9800~11900MHz	Operating Temp.: -40~85°C RoHS Compliance
	BPF2012LL05R5000A / CFL4111714055004K	Freq. Range: 5150-5850 MHz	Attenuation: 30dB Min @ 2400~2500MHz	Size(mm): 2.0*1.2*0.8
	2012 5G BPF Type05	Insertion Loss: 1.8dB (Max) VSWR *: 2.0 (Max)	20dB Min @ 4700MHz	Operating Temp.: -40~85°C RoHS Compliance
	BPF1608LM02R2400A / CFL4111515022454K	Freq. Range: 2400-2500 MHz	Attenuation: 30dB Min @ 880~960 MHz	Size(mm): 1.6*0.8*0.6
	1608 2.4G BPF Type02	Insertion Loss: 1.7 dB (Max) VSWR *: 2.0 (Max)	20dB Min @ 1710~1990 MHz 8.5dB Min @ 2170 MHz 20dB Min @ 4800~5000 MHz 25dB Min @ 7200~7500 MHz	Operating Temp.: -40~85°C RoHS Compliance
	BPF1608LM07R2400A / CFL4111515072454K	Freq. Range: 2400-2500 MHz	Attenuation: 40dB Min @ 880~915 MHz	Size(mm): 1.6*0.8*0.6
	1608 2.4G BPF Type07	Insertion Loss: 3.2 dB (Max.) VSWR *: 2.0 (Max)	38dB Min @ 1710~1850 MHz 40dB Min @ 1850~1910 MHz 40dB Min @ 1920~1990 MHz 35dB Min @ 2110~2170 MHz 30dB Min @ 4800~5000 MHz 30dB Min @ 7200~7500 MHz	Operating Temp.: -40~85°C RoHS Compliance

* VSWR depends on the environment



Wireless Components Selection Charts

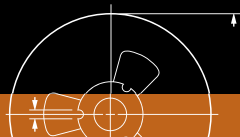
Filter

Filter (BPF)				
Model	Part No./ Description	Electrical Data		Mechanical Data
	BPF1608LM17R2400A / CFL4111515172454K	Freq. Range: 2400-2500 MHz	Attenuation:	Size(mm): 1.6*0.8*0.6
	1608 2.4G BPF Type17	Insertion Loss: 2.7 dB (Max.)	38dB Min @ 880~915 MHz	Operating Temp.: -40~85°C
		VSWR *: 2.0 (Max)	35dB Min @ 1710~1850 MHz	RoHS Compliance
	BPF1608LM11R2400A / CFL4111515112454K	Freq. Range: 2400-2500 MHz	Attenuation:	Size(mm): 1.6*0.8*0.6
	1608 2.4G BPF Type11	Insertion Loss: 1.8 dB (Max.)	20dB Min @ 1710~1990 MHz	Operating Temp.: -40~85°C
		VSWR *: 2.0 (Max)	6.5dB Min @ 2110~2170 MHz	RoHS Compliance
	BPF1608LM37R2400A / CFL4111515372454K	Freq. Range: 2400-2500 MHz	Attenuation:	Size(mm): 1.6*0.8*0.6
	1608 2.4G BPF Type37	Insertion Loss: 2.8 dB (Max.)	38dB Min @ 880~915 MHz	Operating Temp.: -40~85°C
		VSWR *: 2.0 (Max)	35dB Min @ 1710~1850 MHz	RoHS Compliance
			35dB Min @ 1850~1910 MHz	
			35dB Min @ 1920~1990 MHz	
			30dB Min @ 2110~2170 MHz	
			30dB Min @ 4800~5000 MHz	
			35dB Min @ 4800~5000 MHz	
			25dB Min @ 7200~7500 MHz	
Filter (LPF)				
Model	Part No./ Description	Electrical Data		Mechanical Data
	LPF1608LL53R2400A / CFL4111715532454K	Freq. Range: 2400-2500 MHz	Attenuation:	Size(mm): 1.6*0.8*0.65
	1608 2.4G LPF Type53	Insertion Loss: 0.48dB (Max)	35dB Min @ 4800~5000 MHz	Operating Temp.: -40~85°C
		VSWR *: 1.5 (Max)	27dB Min @ 7200~7500 MHz	RoHS Compliance
Filter (Diplexer)				
Model	Part No./ Description	Electrical Data		Mechanical Data
	DPX2012LL85R2455A / CFL4111714852524K	Freq. Range: 2400-2500MHz/ 4900-5900MHz	Attenuation:	Size(mm): 2.0*1.2*0.85
	2012 2.4/5GHz Diplexer Type85	Insertion Loss: Low : 0.7dB/ High: 0.9dB	20dB Min @ 4900~5900 MHz	Operating Temp.: -40~85°C
		VSWR *: 2.0 (Max)	20dB Min @ 2400~2500 MHz	RoHS Compliance
	DPX2012LL89R2455A / CFL4111714892524K	Freq. Range: 2400-2500MHz/ 4900-5950MHz	Attenuation:	Size(mm): 2.0*1.2*0.5
	2012 2.4/5GHz Diplexer Type89	Insertion Loss: Low : 0.5dB/ High: 0.65dB	20dB Min.,2f0@4800~5000 MHz	Operating Temp.: -40~85°C
		VSWR *: 2.0 (Max)	20dB Min.,3f0@7200~7500 MHz	RoHS Compliance
			20dB Min. @ 824~915 MHz	
			20dB Min. @1800~2500 MHz	
			10dB Ref.,2f0@9800~11900 MHz	

* VSWR depends on the environment

Balun				
Model	Part No./ Description	Electrical Data		Mechanical Data
	BLN1608LL01R5000A/ CBA4711715015004K	Freq. Range: 4900-5950MHz	Unbalanced Impedance: 50Ω	Size(mm): 1.6*0.8*0.65
	1608 5G Balun Type01, 50100	Insertion Loss: 1.2 dB (Max) VSWR *: 2.0 (Max)	Balanced Impedance: 100Ω Phase Difference: 180 ±10 degree Amplitude Difference: 1.5 dB (Max)	Operating Temp.: -40~85°C RoHS Compliance
	BLN1608LL00R2400A/ CBA4711715002454K	Freq. Range: 2400-2500MHz	Unbalanced Impedance: 50Ω	Size(mm): 1.6*0.8*0.65
	1608 2.4G Balun Type00, 5050	Insertion Loss: 1.2 dB (Max) VSWR *: 2.0 (Max)	Balanced Impedance: 50Ω Phase Difference: 180 ±10 degree Amplitude Difference: 1 dB (Max)	Operating Temp.: -40~85°C RoHS Compliance
	BLN1608LL01R2400A/ CBA4711715012454K	Freq. Range: 2400-2500MHz	Unbalanced Impedance: 50Ω	Size(mm): 1.6*0.8*0.65
	1608 2.4G Balun Type01, 50100	Insertion Loss: 1.1 dB (Max) VSWR *: 2.0 (Max)	Balanced Impedance: 100Ω Phase Difference: 180 ±10 degree Amplitude Difference: 2 dB (Max)	Operating Temp.: -40~85°C RoHS Compliance
Balance Filter (Combo)				
Model	Part No./ Description	Electrical Data		Mechanical Data
	BLF2012LL98R2400A/ CBA4711714982454K	Freq. Range: 2400-2500MHz	Attenuation: 40dB Min@880~960MHz	Size(mm): 2.0*1.2*0.9
	2012 2.4G Combo Type98	Insertion Loss: 3.5dB (Max) VSWR *: 2.0 (Max) Unbalanced Impedance: 50Ω Balanced Impedance: Conjugate match to CSR BC03/04 series Phase Difference: 180 ±5 degree @25°C Amplitude Balance: 1.0 dB (Max)	25dB Min@1300~1600MHz 35dB Min@4800~5000MHz 30dB Min@7200~7500MHz	Operating Temp.: -40~85°C RoHS Compliance
	BLF2012LM37R2400A/ CBA4711514372454K	Freq. Range: 2400-2500MHz	Attenuation: 35dB Min@880~960MHz	Size(mm): 2.0*1.2*0.8
	2012 2.4G Combo Type37	Insertion Loss: 2.8 dB (Max) VSWR *: 2.0 (Max) Unbalanced Impedance: 50Ω Balanced Impedance: Conjugate match to CSR BC04/05/06 series Phase Difference: 180 ±10 degree @25°C Amplitude Balance: 1.5 dB (Max)	30dB Min@1710~1880MHz 20dB Min@1880~1990MHz 30dB Min@4800~5000MHz	Operating Temp.: -40~85°C RoHS Compliance
	BLF2012LM31R2400A/ CBA4711514312454K	Freq. Range: 2400-2500MHz	Attenuation: 35dB Min@880~960MHz	Size(mm): 2.0*1.2*0.8
	2012 2.4G Combo Type31	Insertion Loss: 3.1dB (Max) VSWR *: Unbalanced Impedance: 50Ω Balanced Impedance: Conjugate match to MTK MT6616 series Phase Difference: 180 ±10 degree @25°C Amplitude Balance: 1.5 dB (Max)	30dB Min@1710~1880MHz 20dB Min@1880~1990MHz 30dB Min@4800~5000MHz	Operating Temp.: -40~85°C RoHS Compliance

* VSWR depends on the environment

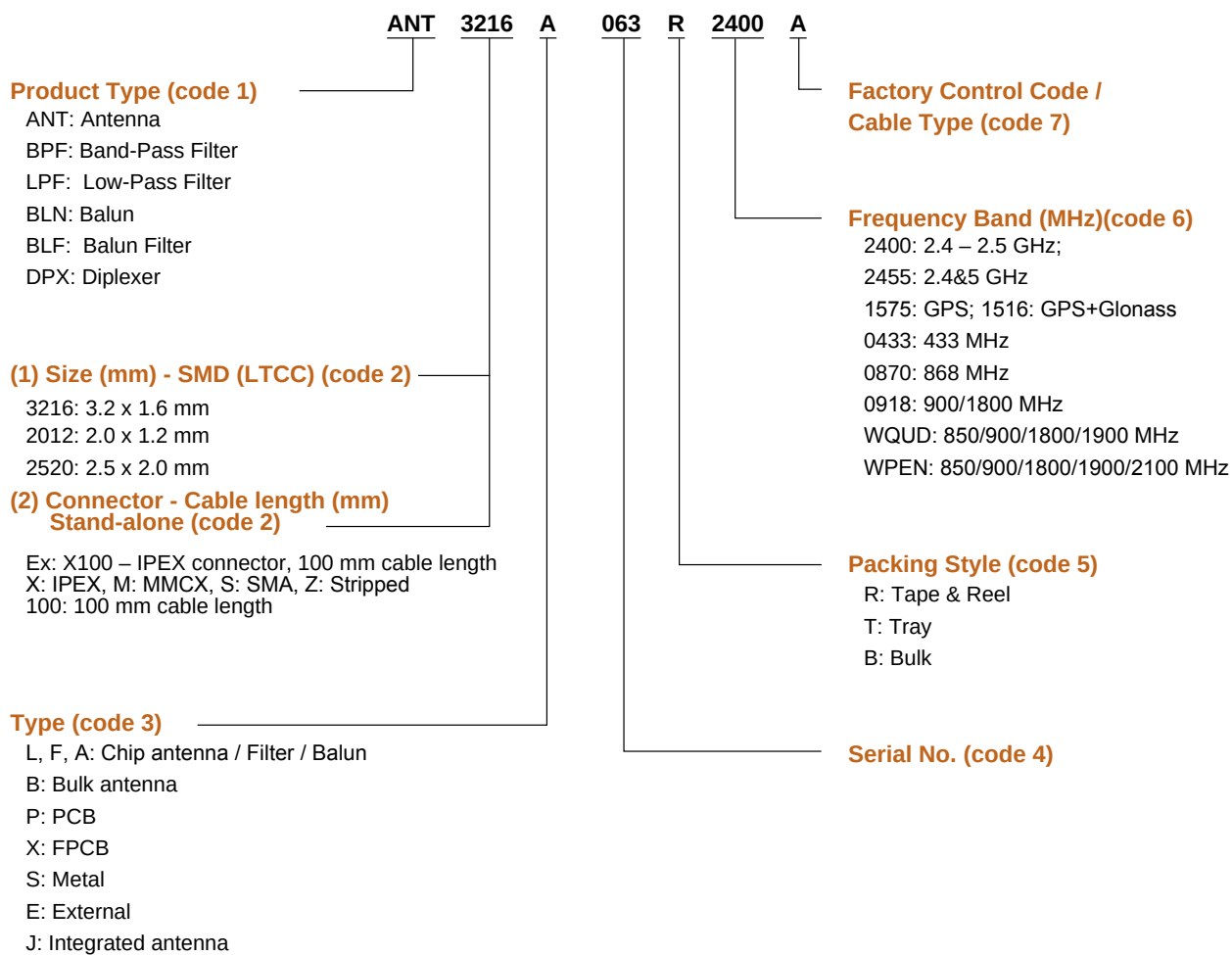


Wireless Components Selection Charts

Product information - Ordering Information

Explanation of ordering code - New

Ordering example : ANT3216A063R2400A

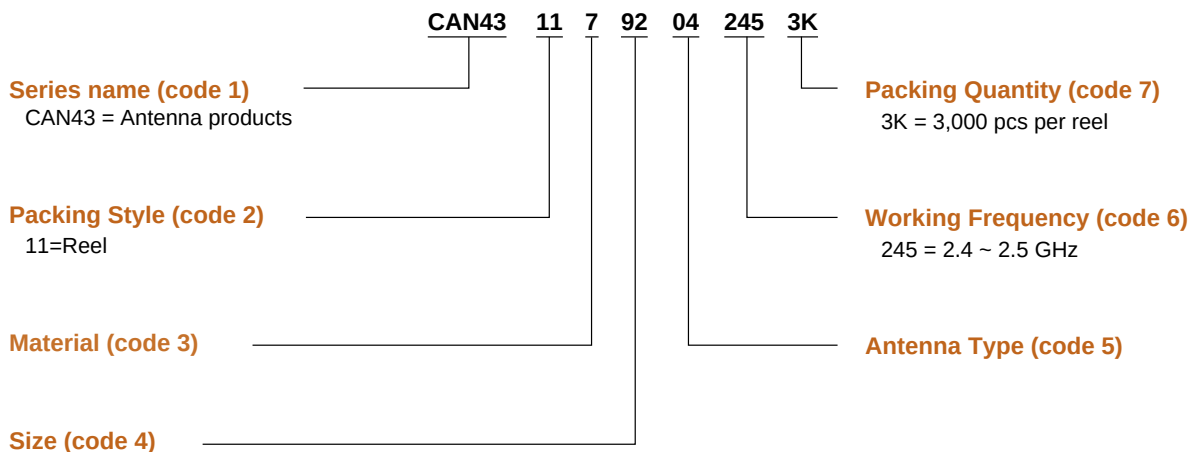


Wireless Components Selection Charts

Product Information - Ordering Information

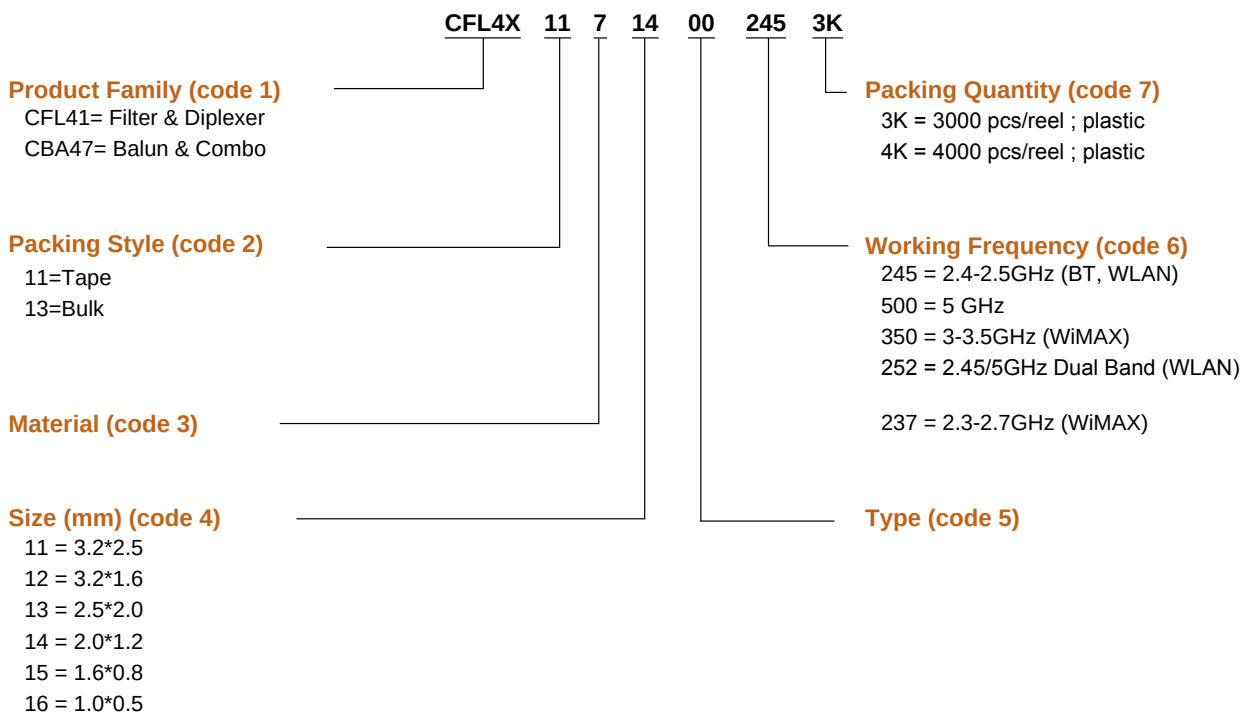
Explanation of ordering code - Antenna (old)

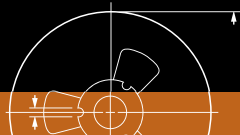
Ordering example : CAN4311792042453K



Explanation of ordering code - Filter / Diplexer / Balun / Combo (old)

Ordering example : CFL4X11714002453K

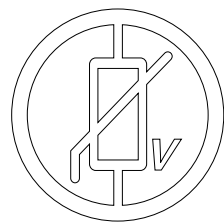




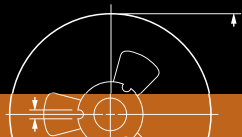
Wireless components Engineering Design Kits

Sample Kits

M2M Application : Antenna Ordering code ANT5B000000020140		
Product Series	PART NUMBER	Frequency Range (MHz)
2.4GHz	ANT1204F001R2400A	2400 - 2500
	ANT8010LL04R2400A	2400 - 2500
	ANT5320LL24R2400A	2400 - 2500
	ANT3216A063R2400A	2400 - 2500
	ANT3216LL00R2400A	2400 - 2500
	ANT2012LL13R2400A	2400 - 2500
	ANTX200P001B24003	2400 - 2500
2.4/5 GHz	ANT5320LL04R2455A	2400 - 2500 5150 - 5875
	ANT5320LL24R2455A	2400 - 2500 5150 - 5875
	ANTX100P001B24553	2400 - 2500 5150 - 5875
	ANTX200P002B24553	2400 - 2500 5150 - 5875
GPS	ANT6230LL01R1575A	1575
	ANT5320LL14R1575A	1575
	ANT3216LL15R1575A	1575
	ANT1212B00DT1575A	1575
	ANT1515B00FT1575A	1575
	ANT1818B00AT1575A	1575
	ANT2525B00BT1575A	1575
	ANT2525B00FT1575A	1575
GPS& GLONASS	ANT1818B00BT1516A	1575 / 1602
	ANT1818B00DT1516A	1575 / 1602
	ANT2525B00BT1516A	1575 / 1602
	ANT2525B00DT1516A	1575 / 1602
Active GPS	ANT1818JB30B1575A	1575
2.4GHz + GPS	ANT5320LL17R1524A	1575 / 2400
Cellular WWAN	ANT2112A010B0918A	824 - 960 1710 - 1990
	ANT1204LL00R0918A	900 / 1800
	ANT3505B000TWPENA	824 - 960 1710 - 2170
	ANTX100P001BWPEN3	824 - 960 1710 - 2170
Short-Range	ANT2405F001R0169A	169
	ANT1204F002R0433A	315 / 433
	ANT1204LL08R0870A	870
	ANT1204LL05R0915A	915
FM	ANT1105LF00R0098A	88
SDARS	ANT2525B00DT2300A	2320 - 2345



MULTILAYER CHIP VARISTORS



MLV Product Selection Charts

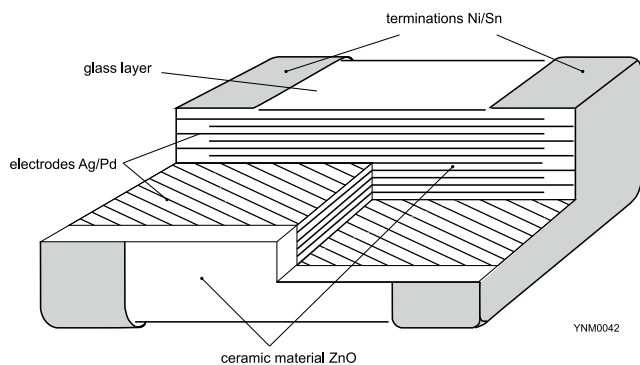
Multilayer Chip Varistors, 0402 to 1206



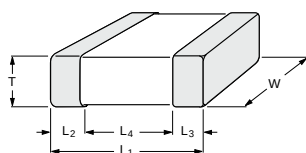
Features

- Excellent clamping voltage
- Excellent energy dissipation capability
- Quick response time ($<1\text{ n sec}$)
- Adjustable capacitance values
- High reliability
- High transient current capability
- Symmetrical voltage-current characteristics

Construction



Case dimensions



Case size designation	Dimensions in mm						
	Inch-based	L_1	W	T	$L_2 / L_{2 \min}$	$L_2 / L_{3 \max}$	$L_4 \min$
0402		1.0 ± 0.10	0.5 ± 0.10	0.5 ± 0.10	0.15	0.30	0.40
0603		1.6 ± 0.15	0.8 ± 0.10	0.8 ± 0.10	0.20	0.60	0.40
0805		2.0 ± 0.20	1.25 ± 0.10	0.85 ± 0.10	0.25	0.75	0.55
1206		3.2 ± 0.15	1.6 ± 0.15		0.25	0.75	1.40

Thickness classification and packing quantities

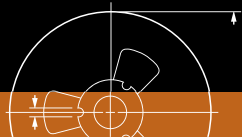
Type	Thickness classification (mm)	8 mm tape width per reel
		180 mm / 7"
0402	0.50 ± 0.10	Paper
0603	0.80 ± 0.10	10 000
0805	0.85 ± 0.10	4 000
1206	0.85 ± 0.10	4 000

MLV Product Selection Charts

Specification for 0402

MLV									
General purpose									
0402									
Maximum working voltage	5.5 V	5.5 V	9 V	14 V	14 V	18 V	18 V	18 V	30 V
Varistor voltage tolerance (code 8)	10 ~ 14 V (S)	7.2 ~ 10.8V (M)	10.2~13.8V (L)	18~24 V (S)	16.2~19.8V (K)	24~34 V (S)	50~80 V (S)	21.6~26.4 V (K)	50~80 V (S)
1 pF									
3 pF							0.5 ±0.10		0.5 ±0.10
5 pF									
10 pF						0.5 ±0.10			
15 pF	0.5 ±0.10								
22 pF			0.5 ±0.10						
27 pF									
33 pF									
40 pF									
50 pF			0.5 ±0.10	0.5 ±0.10					
82 pF							0.5 ±0.10		
100 pF		0.5 ±0.10			0.5 ±0.10		0.5 ±0.10		
120 pF									
160 pF									
200 pF									
250 pF	0.5 ±0.10								
300 pF									
360 pF									
470 pF									
480 pF									
650 pF									
900 pF									
Tape width	8 mm								

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



MLV Product Selection Charts

Specification for 0603

MLV								
General purpose								
0603								
Maximum working voltage	5.5 V	5.5 V	9 V	9 V	14 V	14 V	18 V	30 V
Varistor voltage tolerance (code 8)	10 ~ 14 V (S)	7.2 ~ 10.8 V (M)	14 ~ 18 V (S)	9.6 ~ 14.4 V (M)	18 ~ 24 V (S)	16.2 ~ 19.8 V (K)	24 ~ 32 V (S)	50 ~ 80 V (S)
1 pF								
3 pF								0.80 ±0.10
5 pF								
9 pF								
10 pF								
15 pF								
22 pF								
33 pF								
50 pF								
82 pF								
100 pF			0.80 ±0.10				0.80 ±0.10	
120 pF								
160 pF				0.80 ±0.10	0.80 ±0.10			
180 pF								
200 pF						0.80 ±0.10		
250 pF	0.80 ±0.10							
300 pF		0.80 ±0.10						
350 pF								
360 pF								
470 pF								
650 pF								
680 pF								
800 pF								
900 pF								
Tape width	8 mm							

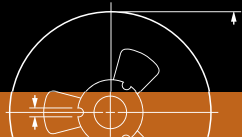
Note: Values in shaded cells indicate thickness class (unit: mm)

MLV Product Selection Charts

Specification for 0805

MLV										
General purpose										
0805										
Maximum working voltage	5.5 V	9 V	14 V	16 V	18 V	26 V	30 V	38 V		
Varistor voltage tolerance (code 8)	7.2 ~ 10.8 V (M)	10.8 ~ 14.6 V (L)	16.3 ~ 20.7 V (K)	20 ~ 27 V (S)	19.27 ~ 28.8 V (M)	29.7 ~ 36.3 V (K)	36.9 ~ 45.1 V (K)	45 ~ 58 V (S)		
100 pF	0.85 ±0.10	0.85 ±0.10	0.85 ±0.10	0.85 ±0.10	0.85 ±0.10	0.85 ±0.10	0.85 ±0.10	0.85 ±0.10		
160 pF										
250 pF										
400 pF										
500 pF										
600 pF										
900 pF										
1.1 nF										
3.3 nF										
Tape width	8 mm									

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



MLV Product Selection Charts

Specification for 1206

MLV						
General purpose						
1206						
Maximum working voltage	5.5 V	14 V	18 V	26 V	30 V	38 V
working voltage	7.2 ~ 10.8 V (M)	16.3 ~ 20.7 V (K)	19.27 ~ 28.8 V (M)	29.7 ~ 36.3 V (K)	36.9 ~ 45.1 V (K)	45 ~ 58 V (S)
100 pF		0.85 ±0.10	0.85 ±0.10	0.85 ±0.10	0.85 ±0.10	0.85 ±0.10
160 pF						
250 pF						
400 pF						
500 pF	0.85 ±0.10					
600 pF						
800 pF						
900 pF						
1.1 nF						
3.3 nF						
Tape width	8 mm					

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

MLV Product Selection Charts

Ordering information for 0402 to 1206

The diagram illustrates the structure of the global part number **VRS0402KR55R680N**, breaking it down into its constituent codes and their meanings:

- Series name (code 1-2):** VR = Varistor
- Chip type (code 3):** S = Single chip
- Size code (code 4-7):** 0402
 - 0402
 - 0603
 - 0805
 - 1206
- Varistor voltage tolerance (code 8):** K = $\pm 10\%$, L = $\pm 15\%$, M = $\pm 20\%$, S = Special range
- Packing style (code 9):** R = paper tape reel $\varnothing 7$ inch
- Maximum working voltage (code 10-12):** 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, 190 = 19 V, 220 = 22 V, 260 = 26 V, 300 = 30 V, 310 = 31 V, 380 = 38 V
- Capacitance value (code 13-15):** 680 = 68 pF (2 significant digits+number of zeros; the 3rd digit signifies the multiplying factor, and letter R is decimal point)
 - 0 = $\times 1$
 - 1 = $\times 10^1$
- Capacitance tolerance (code 16):** K = $\pm 10\%$, L = $\pm 15\%$, M = $\pm 20\%$, N = $\pm 30\%$

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