

PRODUCT SELECTION GUIDE

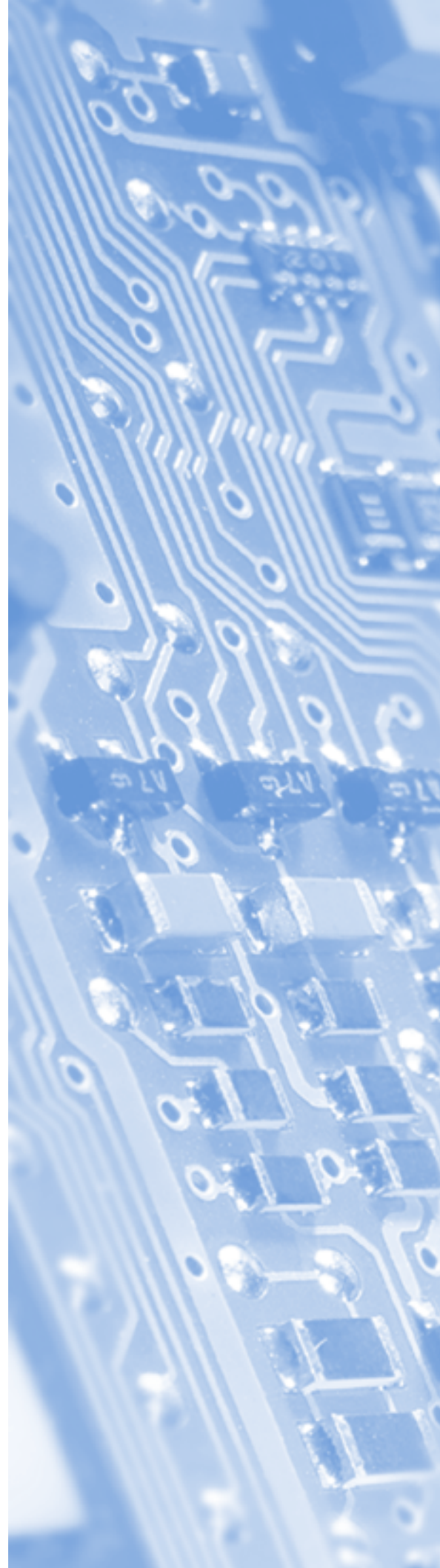
2016

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

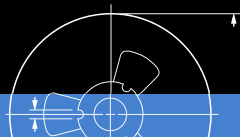


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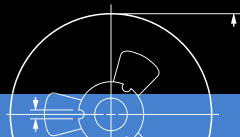
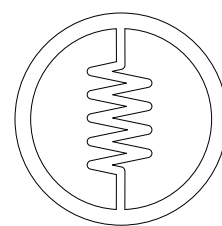
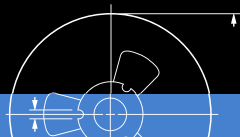


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SURFACE-MOUNT CHIP RESISTORS



Chip Resistors General Information

Specification overview

Global part number	Series	Size	Power rating	Max. voltage	Operating Temp. range	Resistance range	Tolerance	T. C. R.
RC0075xR-07xxxxL	RC	0075	1/50W	10V	-55°C to 125°C	10Ω ≤ R ≤ 1MΩ Jumper < 50mΩ	±1% ±5%	10Ω ≤ R < 100Ω -200/+600ppm/°C 100Ω ≤ R ≤ 1MΩ ±200ppm/°C
RC0100xR-07xxxxL		01005	1/32W	15V		1Ω ≤ R ≤ 22MΩ Jumper < 50mΩ	Max./Min.: 10MΩ/1Ω ±1% Max.: 22MΩ ±5% Max./Min.: 470KΩ/33Ω ±0.5%	1Ω ≤ R < 10Ω -200/+600ppm/°C 10Ω ≤ R < 100Ω +300ppm/°C 100Ω ≤ R ≤ 10MΩ +200ppm/°C 10MΩ < R ≤ 22MΩ +250ppm/°C
RC0201xR-07xxxxL		0201	1/20W	25V		1Ω ≤ R ≤ 10MΩ Jumper < 50mΩ	Max./Min.: 1MΩ/10Ω ±0.1, ±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	75V				
RC0805xR-07xxxxL		0805	1/8W	150V		1Ω ≤ R ≤ 100MΩ Jumper < 50mΩ	Max./Min.: 1MΩ/10Ω ±0.1%, ±0.5% Max.: 10MΩ ±1% Max.: 22MΩ ±5% Max./Min.: 100MΩ/24MΩ ±10%, ±20%	1Ω ≤ R ≤ 10Ω ±200ppm/°C 10Ω < R ≤ 10MΩ ±100ppm/°C 10MΩ < R ≤ 22MΩ ±200ppm/°C 24MΩ ≤ R ≤ 100MΩ ±300ppm/°C
RC1206xR-07xxxxL		1206	1/4W	200V		1Ω ≤ R ≤ 100MΩ Jumper < 50mΩ	Max./Min.: 1MΩ/10Ω ±0.1%, ±0.5% Max.: 10MΩ ±1% Max.: 22MΩ ±5% Max./Min.: 100MΩ/24MΩ ±10%, ±20%	1Ω ≤ R ≤ 10Ω ±200ppm/°C 10Ω < R ≤ 10MΩ ±100ppm/°C 10MΩ < R ≤ 22MΩ ±200ppm/°C 24MΩ ≤ R ≤ 100MΩ ±300ppm/°C
RC1210xR-07xxxxL		1210	1/2W	200V		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
RC1218xK-07xxxxL		1218	1W	200V		1Ω ≤ R ≤ 1MΩ Jumper < 50mΩ	Max./Min.: 1MΩ/10Ω ±0.1%, ±0.5% Max.: 1MΩ ±1%, ±5%	1Ω ≤ R ≤ 10Ω ±200ppm/°C 10Ω < R ≤ 1MΩ ±100ppm/°C
RC2010xK-07xxxxL		2010	3/4W	200V		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
RC2512xK-07xxxxL		2512	1W	200V				
RC0402xR-7WxxxxL		0402	1/8W	50V	-55°C to 155°C	1Ω ≤ R ≤ 1MΩ	±1% ±5%	±200 ppm/°C
RC0603xR-7WxxxxL		0603	1/5W	75V				
RC0805xR-7WxxxxL		0805	1/4W	150V				
RC1206xR-7WxxxxL		1206	1/2W	200V				
RC2512xK-7WxxxxL		2512	2W	200V				
RC0100xR-07xxxxP	RC_P	01005	1/32W	15V	-55°C to 125°C	1Ω ≤ R ≤ 1MΩ Jumper < 50mΩ	Max./Min.: 1MΩ/10Ω ±0.5% Max.: 1MΩ ±1%, ±5%	1Ω ≤ R ≤ 10Ω -200/+600ppm/°C 10Ω ≤ R ≤ 100Ω ±370ppm/°C 100Ω ≤ R ≤ 1MΩ ±250ppm/°C
RC0201xR-07xxxxP		0201	1/20W	25V	-55°C to 125°C	1Ω ≤ R ≤ 10MΩ Jumper < 50mΩ	Max./Min.: 1MΩ/10Ω ±0.5% Max.: 10MΩ ±1%, ±5%	1Ω ≤ R ≤ 10Ω -100/+500ppm/°C 10Ω ≤ R ≤ 100Ω ±300ppm/°C 100Ω ≤ R ≤ 10MΩ ±200ppm/°C
RC0402xR-07xxxxP		0402	1/16W	50V	-55°C to 155°C	1Ω ≤ R ≤ 22MΩ Jumper < 50mΩ	Max./Min.: 1MΩ/10Ω ±0.5% Max.: 22MΩ ±5% Max.: 10MΩ ±1%	1Ω ≤ R ≤ 10Ω ±350ppm/°C 10Ω ≤ R ≤ 100Ω ±200ppm/°C 100Ω ≤ R ≤ 10MΩ ±150ppm/°C 10MΩ ≤ R ≤ 22MΩ ±200ppm/°C
RC0603xR-07xxxxP		0603	1/10W	75V	-55°C to 155°C			1Ω ≤ R ≤ 10Ω ±300ppm/°C 10Ω ≤ R ≤ 100Ω ±200ppm/°C 100Ω ≤ R ≤ 10MΩ ±150ppm/°C 10MΩ ≤ R ≤ 22MΩ ±200ppm/°C
RC0805xR-07xxxxP		0805	1/8W	150V	-55°C to 155°C			1Ω ≤ R ≤ 10Ω ±300ppm/°C 10Ω ≤ R ≤ 100Ω ±150ppm/°C 100Ω ≤ R ≤ 10MΩ ±100ppm/°C 10MΩ ≤ R ≤ 22MΩ ±200ppm/°C
RC1206xR-07xxxxP		1206	1/4W	200V	-55°C to 155°C			1Ω ≤ R ≤ 10Ω ±300ppm/°C 10Ω ≤ R ≤ 100Ω ±100ppm/°C 100Ω ≤ R ≤ 10MΩ ±100ppm/°C 10MΩ ≤ R ≤ 22MΩ ±200ppm/°C
RC1210xR-07xxxxP		1210	1/2W	200V	-55°C to 155°C			
RC1218xK-07xxxxP		1218	1W	200V	-55°C to 155°C	1Ω ≤ R ≤ 1MΩ Jumper < 50mΩ	Max./Min.: 1MΩ/10Ω ±0.5% Max.: 1MΩ ±1%, ±5%	
RC2010xK-07xxxxP		2010	3/4W	200V	-55°C to 155°C	1Ω ≤ R ≤ 22MΩ Jumper < 50mΩ	Max./Min.: 1MΩ/10Ω ±0.5% Max.: 22MΩ ±5% Max.: 10MΩ ±1%	
RC2512xK-07xxxxP		2512	1W	200V	-55°C to 155°C			

Note: "I" is the symbol for new product

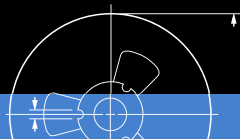


Chip Resistors General Information

Specification overview

Global part number	Series	Size	Power rating	Max. voltage	Operating Temp range	Resistance range	Tolerance	T. C. R.
RE0201xRE07xxxxL	RE	0201	1/20W	25V	-55°C to 155°C	10Ω ≤ R ≤ 1MΩ	±0.1% ±0.5% ±1%	±50 ppm/°C
RE0402xRE07xxxxL		0402	1/16W	50V		10Ω ≤ R ≤ 1MΩ		
RE0603xRE07xxxxL		0603	1/10W	75V		10Ω ≤ R ≤ 1MΩ		
RE0805xRE07xxxxL		0805	1/8W	150V		10Ω ≤ R ≤ 1MΩ		
RE1206xRE07xxxxL		1206	1/4W	200V		10Ω ≤ R ≤ 1MΩ		
RT0201xRx07xxxxL	RT	0201	1/20W	25V	-55°C to 155°C	22Ω ≤ R ≤ 75KΩ	±0.1%,±0.25%,±0.5%,±1% ±0.05% ±0.1% ±0.25% ±0.5% ±1%	±5 ppm/°C ±10 ppm/°C ±15 ppm/°C ±25 ppm/°C ±50 ppm/°C
RT0402xRx07xxxxL		0402	1/16W	50V		4.7Ω ≤ R ≤ 240KΩ		
RT0603xRx07xxxxL		0603	1/10W	75V		1Ω ≤ R ≤ 1MΩ		
RT0805xRx07xxxxL		0805	1/8W	150V		1Ω ≤ R ≤ 1.5MΩ		
RT1206xRx07xxxxL		1206	1/4W	200V	-55°C to 125°C	1Ω ≤ R ≤ 1.5MΩ		
RT1210xRx07xxxxL		1210	1/4W			4.7Ω ≤ R ≤ 1MΩ		
RT2010xKx07xxxxL		2010	1/2W			4.7Ω ≤ R ≤ 1MΩ		
RT2512xKx07xxxxL		2512	3/4W			4.7Ω ≤ 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				
YC122-xR-07xxxxL		2*0402	1/16W	50V	-55°C to 155°C	1Ω ≤ R ≤ 1MΩ Jumper < 50mΩ	±1% ±5%	1Ω ≤ R < 10Ω ±250 ppm/°C 10Ω ≤ R ≤ 1MΩ ±200 ppm/°C
YC124-xR-07xxxxL		4*0402	1/16W	25V		1Ω ≤ R ≤ 1MΩ Jumper < 50mΩ		
YC162-xR-07xxxxL		2*0603	1/16W	50V		1Ω ≤ R ≤ 1MΩ Jumper < 50mΩ	±1% ±5%	±200 ppm/°C
YC164-xR-07xxxxL		4*0603	1/16W	50V		1Ω ≤ R ≤ 1MΩ Jumper < 50mΩ		
YC248-xR-07xxxxL		8*0602	1/16W	50V		10Ω ≤ R ≤ 1MΩ Jumper < 50mΩ		
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
TC124-xR-07xxxxL		4*0402	1/16W	50V	-55°C to 125°C			
TC164-xR-07xxxxL		4*0603	1/16W	50V	-55°C to 155°C			
YC158TJR-07xxxxL	YC158	10P8R (0612)	1/16W	25V	-55°C to 155°C	10Ω ≤ R ≤ 100KΩ	±5%	±200 ppm/°C
YC358xJx-07xxxxL	YC358	10P8R (1225)	1/16W	50V		10Ω ≤ R ≤ 330KΩ		±200 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.		
RL0402xR-07xxxxL	RL	0402	1/16W	(PxR)^1/2	-55°C to 155°C	50mΩ ≤ R < 1Ω	±1% ±2% ±5%	See page 41, table “T. C. R. - RL series“		
RL0603xR-07xxxxL		0603	1/10W			10mΩ ≤ R < 1Ω				
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		-55°C to 125°C	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	±1% ±2% ±5%	See page 46, table "T.C.R. - PT series"		
PT0603xR-07xxxxL		0603	1/10W			50mΩ ≤ R < 1Ω				
PT0805xR-07xxxxL		0805	1/8W			50mΩ ≤ R < 1Ω				
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							
PT1206xR-7WxxxxL		1206	1/2W			100mΩ ≤ R < 1Ω				
PT2010xK-7WxxxxL		2010	1W							
PT2512xK-7WxxxxL		2512	2W			50mΩ ≤ R ≤ 68mΩ				
PT0603xR-7TxxxxL		0603	1/3W							

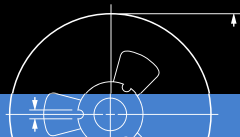
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Specification overview

Global part number	Series	Size	Power rating	Max. voltage	Operating Temp. range	Resistance range	Tolerance	T. C. R.		
!PA2512xKF07xxxxE	PA	2512	1W	(PxR)^1/2	-55°C to 170°C	1mΩ ≤ R ≤ 50mΩ	±1% ±5%	±100 ppm/°C		
!PA2512xKF7WxxxxE			2W							
!PA2512xKF7TxxxxE			3W							
!PA1206xRF07xxxxL		1206	1/4W	(PxR)^1/2	-55°C to 170°C	1mΩ ≤ R ≤ 5mΩ	±1% ±5%	±100ppm/°C		
!PA1206xRF7WxxxxL			1/2W							
!PA1206xRF47xxxxL			1W							
!PE0508xRx07xxxxL	PE (Wide)	0508	1.2W	(PxR)^1/2	-55°C to 155°C	5mΩ≤R≤100mΩ	±1% ±5%	±50 ppm/°C ±75 ppm/°C ±100 ppm/°C		
!PE0612xKx07xxxxL		0612	1W			1mΩ≤R≤100mΩ				
!PE0612xKx7WxxxxL			2W							
!PE0201xRx07xxxxL	PE	0201	1/20W	(PxR)^1/2	-55°C to 125°C	50mΩ ≤ R ≤ 200mΩ	Min.: 51mΩ ±0.5% ±1% ±5%	50mΩ ≤ R ≤ 70mΩ ±350 ppm/°C 70mΩ < R ≤ 200mΩ ±100 ppm/°C		
!PE0201xRx7WxxxxL			1/10W			10mΩ ≤ R ≤ 910mΩ		±100ppm/°C		
!PE0402xRx07xxxxL		0402	1/16W							
!PE0402xRx7WxxxxL			1/8W							
!PE0402xRx7TxxxxL			1/6W							
!PE0402xRx47xxxxL			1/4W							
!PE0603xRx07xxxxL		0603	1/10W		-55°C to 170°C				5m,10m, 20mΩ ≤ R ≤ 910mΩ	±75 ppm/°C ±100 ppm/°C
!PE0603xRx7WxxxxL			1/5W							
!PE0603xRx7TxxxxL			1/3W							
!PE0603xRx47xxxxL			2/5W							
!PE0603xRx57xxxxL			1/2W							
!PE0805xRx07xxxxL		0805	1/8W							
!PE0805xRx7WxxxxL			1/4W							
!PE0805xRx7TxxxxL			1/3W							
!PE0805xRx47xxxxL			1/2W							
!PE1206xRx07xxxxL		1206	1/4W			5mΩ ≤ R ≤ 910mΩ				
!PE1206xRx7WxxxxL			1/2W							
!PE1206xRx47xxxxL			1W							
!PE2010xKx07xxxxL		2010	1/2W			5mΩ ≤ R ≤ 100mΩ		±50 ppm/°C ±75 ppm/°C ±100 ppm/°C		
!PE2010xKx7WxxxxL			1W							
!PE2512xKx07xxxxL		2512	1W			6mΩ ≤ R ≤ 100mΩ				
!PE2512xKx7WxxxxL			2W							
!PS0306xRx07xxxxL	PS (4 Termination)	0306	1/8W	(PxR)^1/2	-55°C to 125°C	3mΩ ≤ R ≤ 100mΩ	±1% ±5%	5mΩ ≤ R ≤ 100mΩ ±75 ppm/°C ±100 ppm/°C 3mΩ ≤ R < 5mΩ ±150 ppm/°C		
!PS0306xRx7WxxxxL			1/4W							
!PS0306xRx7TxxxxL			1/2W							
!PS0612xKx07xxxxL		0612	1W		0.5mΩ ≤ R ≤10mΩ -55°C to 150°C 12mΩ ≤ R ≤ 100mΩ -55°C to 125°C	0.5mΩ, 0.75mΩ 1mΩ ≤ R ≤ 100mΩ		0.5mΩ ≤ R ≤ 1mΩ ±150ppm/°C 10mΩ ≤ R ≤ 13mΩ ±200ppm/°C 2mΩ ≤ R ≤ 9mΩ ±100ppm/°C 14mΩ ≤ R ≤ 100mΩ ±100ppm/°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.
!PU3921xKxxxxxxL	PU	3921	3W	(PxR)^1/2	-55°C to 170°C	0.2mR/ 0.3mR/ 0.5mR/ 1mR/ 2mR/3mR/4mR	±1% ±5%	0.2mR ±325ppm/°C 0.3mR/ 0.5mR ±175ppm/°C 1mR~4mR ±75ppm/°C
					-55°C to 275°C	0.5mR/1mR/ 2mR/ 3mR/4mR		
			5W			2mR/3mR/4mR		
			9W		-55°C to 170°C	0.2mR/ 0.3mR/ 0.5mR/1mR		
!PU5931xKxxxxxxL		5931	5W		-55°C to 170°C	0.2mR/ 0.3mR/ 0.5mR/ 1mR/ 2mR/3mR/4mR	±1% ±5%	0.2mR ±225ppm/°C 0.3mR/ 0.5mR ±175ppm/°C 1mR~4mR ±75ppm/°C
					-55°C to 275°C	0.3mR/ 0.5mR/1mR/ 2mR/3mR/4mR		
			7W		-55°C to 170°C	1mR/2mR/3mR/4mR		
			10W			0.2mR/ 0.3mR/ 0.5mR		
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	±0.5% ±1% ±5% ±10% ±20%	±200 ppm/°C
SR0402xR-7WxxxxL			1/8W					
SR0603xR-07xxxxL		0603	1/10W	75V				
SR0603xR-7WxxxxL			1/5W					
!SR0603xR-7TxxxxL			1/4W					
SR0805xR-07xxxxL		0805	1/8W	150V				
SR0805xR-7WxxxxL			1/4W					
!SR0805xR-7TxxxxL			1/3W					
SR1206xR-07xxxxL		1206	1/4W	200V				
SR1206xR-7WxxxxL			1/2W					
SR1210xR-07xxxxL		1210	1/2W	200V				
SR1210xR-7WxxxxL			3/4W					
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	47Ω ≤ R ≤ 10MΩ	±0.5%,±1%,±5%	±200 ppm/°C
RV0805xR-07xxxxL		0805	1/8W	400V		47Ω ≤ R ≤ 22MΩ	Max.: 22MΩ ±5%,±1% Max.: 10MΩ ±0.5%	
RV1206xR-07xxxxL		1206	1/4W	500V		47Ω ≤ R ≤ 27MΩ	Max.: 27MΩ ±5%,±1% Max.: 10MΩ ±0.5%	
RV2010xK-07xxxxL		2010	3/4W			47Ω ≤ R ≤ 22MΩ	Max.: 22MΩ ±5%,±1% Max.: 10MΩ ±0.5%	
RV2512xK-07xxxxL		2512	1W			47Ω ≤ R ≤ 16MΩ	Max.: 16MΩ ±5%,±1% Max.: 10MΩ ±0.5%	
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 125°C			
TR0805xR-07xxxxL		0805	1/8W	150V	-55°C to 155°C			
TR1206xR-07xxxxL		1206	1/4W	200V				

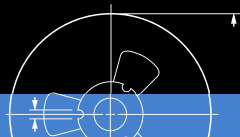
Note: "!" is the symbol for new product

Chip Resistors General Information

Specification overview

Global part number	Series	Size	Power rating	Max. voltage	Operating Temp. range	Resistance range	Tolerance	T. C. R.	
!AF0201xR-07xxxxL	AF	0201	1/20W	25V	-55°C to 125°C	1Ω ≤ R ≤ 10MΩ Jumper < 50mΩ	±1%, ±5%, ±0.5%	1Ω ≤ R ≤ 10Ω -100/+350 ppm/°C 10Ω < R ≤ 10MΩ ±200 ppm/°C	
AF0402xR-07xxxxL		0402	1/16W	50V	-55°C to 155°C	1Ω ≤ R ≤ 22MΩ Jumper < 50mΩ	Max:10MΩ ±0.5%, ±1% Max:22MΩ ±5%	1Ω ≤ R ≤ 10Ω ±200 ppm/°C 10Ω < R ≤ 10MΩ ±100 ppm/°C 10MΩ < R ≤ 22MΩ ±200 ppm/°C	
AF0603xR-07xxxxL		0603	1/10W	75V					
AF0805xR-07xxxxL		0805	1/8W	150V					
AF1206xR-07xxxxL		1206	1/4W	200V					
AF1210xR-07xxxxL		1210	1/2W	200V		1Ω ≤ R ≤ 10MΩ Jumper < 50mΩ	±1% , ±5% , ±0.5%	1Ω ≤ R ≤ 10Ω ±200 ppm/°C 10Ω < R ≤ 10MΩ ±100 ppm/°C	
AF1218xK-07xxxxL		1218	1W	200V		1Ω ≤ R ≤ 1MΩ Jumper < 50mΩ			
AF2010xK-07xxxxL		2010	3/4W	200V		1Ω ≤ R ≤ 10MΩ Jumper < 50mΩ			
AF2512xK-07xxxxL		2512	1W	200V					
AF122-xR-07xxxxL		2*0402	1/16W	50V		-55°C to 155°C	1Ω ≤ R ≤ 1MΩ Jumper < 50mΩ	Max.: 1MΩ ±5% Max./Min.: 1MΩ/10Ω ±1%	1Ω ≤ R ≤ 10Ω ±250 ppm/°C 10Ω < R ≤ 1MΩ ±200 ppm/°C
AF124-xR-07xxxxL			4*0402	1/16W	25V			±1%,±5%	
!AF162-xR-07xxxxL			2*0603	1/16W	50V			±1%,±5%	
!AF164-xR-07xxxxL			4*0603	1/16W	50V			±1%,±5%	±250 ppm/°C
AC0201xR-07xxxxL	AC	0201	1/20W	25V	-55°C to 155°C	1Ω ≤ R ≤ 10MΩ Jumper < 50mΩ	Max.: 10MΩ ±5%,±1% Max./Min.: 1MΩ/10Ω ±0.5%	1Ω ≤ R ≤ 10Ω -100/+350ppm/°C 10Ω < R ≤ 10MΩ ±200ppm/°C	
AC0402xR-07xxxxL		0402	1/16W	50V		1Ω ≤ R ≤ 22MΩ Jumper < 50mΩ	Max.: 10MΩ ±0.5%, ±1% Max.: 22MΩ ±5%	1Ω ≤ R ≤ 10Ω ±200 ppm/°C 10Ω < R ≤ 10MΩ ±100ppm/°C 10MΩ < R ≤ 22MΩ ±200 ppm/°C	
AC0603xR-07xxxxL		0603	1/10W	75V					
AC0805xR-07xxxxL		0805	1/8W	150V					
AC1206xR-07xxxxL		1206	1/4W	200V					
AC1210xR-07xxxxL		1210	1/2W	200V					
AC1218xK-07xxxxL		1218	1W	200V		1Ω ≤ R ≤ 1MΩ Jumper < 50mΩ	±0.5%, ±1%, ±5%	1Ω ≤ R ≤ 10Ω ±200 ppm/°C 10Ω < R ≤ 1MΩ ±100 ppm/°C	
AC2010xK-07xxxxL		2010	3/4W	200V		1Ω ≤ R ≤ 22MΩ Jumper < 50mΩ	Max.: 10MΩ ±0.5%, ±1% Max.: 22MΩ ±5%	1Ω ≤ R ≤ 10Ω ±200 ppm/°C 10Ω < R ≤ 10MΩ ±100ppm/°C 10MΩ < R ≤ 22MΩ ±200 ppm/°C	
AC2512xK-07xxxxL		2512	1W	200V		1Ω ≤ R ≤ 10MΩ	±0.5%, ±1%, ±5%	1Ω ≤ R ≤ 10Ω ±200 ppm/°C 10Ω < R ≤ 10MΩ ±100ppm/°C	
!AC0402xR-7WxxxxL		0402	1/8W	50V					
!AC0603xR-7WxxxxL		0603	1/5W	75V					
!AC0805xR-7WxxxxL		0805	1/4W	150V					
!AC1206xR-7WxxxxL		1206	1/2W	200V					
!AC1210xR-7WxxxxL		1210	1W	200V					
!AC1218xR-7WxxxxL		1218	1.5W	200V					
!AC2010xR-7WxxxxL		2010	1.25W	200V					
!AC2512xR-7WxxxxL		2512	2W	200V					
!AC0612xR-07xxxxL		AC wide	0612	3/4W		200V	1Ω ≤ R ≤ 1MΩ	±0.5%, ±1%, ±5%	1Ω ≤ R ≤ 10Ω ±200 ppm/°C 10Ω < R ≤ 1MΩ ±100ppm/°C
!AC1020xK-07xxxxL			1020	1W		200V			
!AC1225xK-07xxxxL	1225		2W	200V					

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.
!AA0201xR-07xxxxL	AA	0201	1/20W	25V	-55°C to 155°C	1Ω ≤ R ≤ 10MΩ Jumper < 50mΩ	±0.5%, ±1%, ±5%	1Ω ≤ R ≤ 10Ω -100/+400ppm/°C 10Ω < R ≤ 10MΩ ±300ppm/°C
!AA0402xR-07xxxxL		0402	1/16W	50V		1Ω ≤ R ≤ 22MΩ Jumper < 50mΩ	Max:22MΩ ±5% Max:10MΩ ±0.5%, ±1%	1Ω ≤ R ≤ 10Ω ±200 ppm/°C 10Ω < R ≤ 10MΩ ±150 ppm/°C 10MΩ ≤ R ≤ 22MΩ ±200 ppm/°C
!AA0603xR-07xxxxL		0603	1/10W	75V				
!AA0805xR-07xxxxL		0805	1/8W	150V				
!AA1206xR-07xxxxL		1206	1/4W	200V				
!AA1210xR-07xxxxL		1210	1/2W	200V		1Ω ≤ R ≤ 1MΩ Jumper< 50mΩ	±0.5%, ±1%, ±5%	
!AA1218xK-07xxxxL		1218	1W	200V				
!AA2010xK-07xxxxL		2010	3/4W	200V		1Ω ≤ R ≤ 22MΩ Jumper < 50mΩ	Max:22MΩ ±5% Max:10MΩ ±0.5%, ±1%	
!AA2512xK-07xxxxL		2512	1W	200V				
ATV321xR-07xxxxL	ATV	0404	40mW	50V	-55°C to 125°C	-1dB to -20dB	±0.3dB ±0.5dB ±1.0dB ±2.0dB	---
!AT0402xRx07xxxxL	AT	0402	1/16W	50V	-55°C to 155°C	10Ω ≤ R ≤ 100KΩ	±0.1% ±0.25% ±0.5% ±1%	±25 ppm/°C ±50 ppm/°C
!AT0603xRx07xxxxL		0603	1/10W	75V		10Ω ≤ R ≤ 330KΩ		
!AT0805xRx07xxxxL		0805	1/8W	150V		10Ω ≤ R ≤ 1MΩ		
!AT1206xRx07xxxxL		1206	1/4W	200V				

Note: "!" is the symbol for new product

Chip Resistors General Information

Ordering information - Global part number

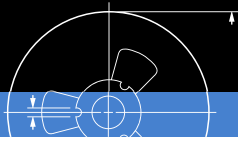
Global part number - Single resistor ⁽³⁾

	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									
RT = Thin film high precision high stability									
RL = Thick film low ohmic									
PT = Thick film low ohmic low T. C. R.									
PA/PE = Current sensor - low T. C. R.									
PS = Current sensor - low T.C.R, 4 termination									
TR = Trimmable									
SR = Surge									
AR = NiAu termination									
RV = High voltage									
AF = Sulfur resistant									
AC = Automotive grade									
AT = Thin film automotive grade									
AA = Sulfur resistant automotive grade									
PU = Shunt resistor									
Size code (code 3-6)									
(inch / metric)									
0075 = 0.3 x 0.1									
0100 = 0.4 x 0.2									
0201 = 0.6 x 0.3									
0402 = 1.0 x 0.5									
0603 = 1.6 x 0.8									
0612 = 1.6 x 3.2									
0805 = 2.0 x 1.25									
0830 = 2.0 x 7.5									
1206 = 3.2 x 1.6									
1210 = 3.2 x 2.6									
1218 = 3.2 x 4.5									
2010 = 5.0 x 2.5									
2512 = 6.35 x 3.2									
3921 =10.0 x 5.2									
5931 =15.0 x 7.75									
Tolerance (code 7)									
L = ±0.01%									
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									
									Resistance (code 12-16)
									0R = Jumper
									0U5 = 0.0005Ω
									0R1 = 0.1Ω
									1R = 1Ω
									10R = 10Ω
									100R = 100Ω
									1K = 1 000Ω
									1M = 1 000 000Ω
									100M = 100 000 000Ω
									Taping reel (code 10-11)
									07 = 7 inch Dia. reel
									13 = 13 inch Dia. reel
									7W = 7 inch Dia. reel
									2 x standard power
									7N = 7 inch Dia. reel, ESD safe reel
									T. C. R. (code 9)
									A = ±5 ppm/°C
									B = ±10 ppm/°C
									C = ±15 ppm/°C
									D = ±25 ppm/°C
									E = ±50 ppm/°C
									M = ±75 ppm/°C
									F = ±100 ppm/°C
									L = ±150 ppm/°C
									G = ±200 ppm/°C
									I = ±300 ppm/°C
									O = ±320 ppm/°C
									J = ±350 ppm/°C
									K = ±400 ppm/°C
									Q = ±700 ppm/°C
									“—” = Based on spec.
									(— for thick film only)
									Packing style (code 8)
									R = Paper tape reel
									K = Embossed plastic tape reel
									C = Bulk cassette
									S = ESD safe reel

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

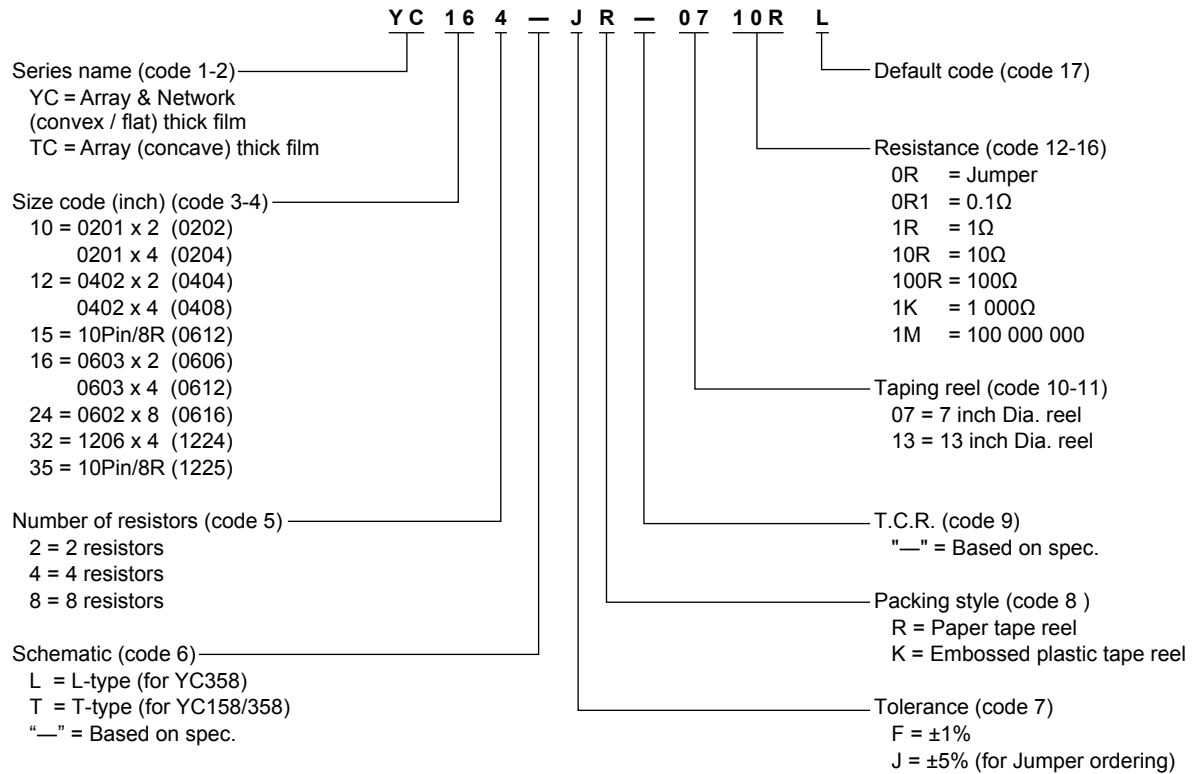
Global part number - Power enhancement

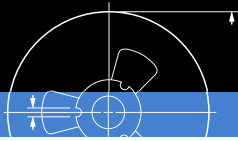
	R L	0 8 0 5	J R	—	7 W	0 R 0 1 5	L	
Series name (code 1-2)								Default code (code 17)
RC = Thick film general purpose								
AC = Automotive grade chip resistor								
RL = Thick film low ohmic								
PT = Thick film low ohmic low T. C. R.								
PA/PE = Current sensor - low T. C. R.								
PS = Current sensor - low T.C.R, 4 termination								
PU = Shunt resistor								
Size code (code 3-6)								Resistance (code 12-16)
(inch / metric)								0U5 = 0.0005Ω
0306 = 0.8 x 1.6								0R01 = 0.01Ω
0508 = 1.25 x 2.0								0R1 = 0.1Ω
0612 = 1.6 x 3.2								1R = 1Ω
0805 = 2.0 x 1.25								10R = 10Ω
1206 = 3.2 x 1.6								100R = 100Ω
2010 = 5.0 x 2.5								1K = 1000Ω
								1M = 1000000Ω
								100M = 100000000Ω
Tolerance (code 7)								Taping reel (code 10-11)
B = ±0.1%								07 = 7 inch Dia. reel
D = ±0.5%								7W = 7 inch Dia. reel
F = ±1%								2 x standard power type
G = ±2%								7T = 7 inch Dia. reel
J = ±5%								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
Packing style (code 8)								T. C. R. (code 9)
R = Paper tape reel								E = ±50 ppm/°C
K = Embossed plastic tape reel								M = ±75 ppm/°C
								F = ±100 ppm/°C
								G = ±200 ppm/°C
								"—" = Based on spec.
								(— for thick film only)

Chip Resistors General Information

Ordering information - Global part number

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		330mm / Ø13" reel		Weight g /100pcs	Volume mm ³
		Paper	Embossed	Paper	Embossed		
0100	8mm	20000	---	---	---	0.007	0.0104
0201	8mm	10000 / 20000	---	80000	---	0.016	0.041
0075	4mm	40000	---	---	---		
0306	4mm	5000	---	---	---		
0508	8mm	5000	---	---	---		
1020	12mm	---	4000	---	---		
1225	12mm	---	4000	---	---		
0402	8mm	10000 / 20000	---	50000	---	0.058	0.175
0603	8mm	5000	---	20000	---	0.192	0.576
0612	8mm	4000	4000	---	---	0.862	2.728
0805	8mm	4000 / 5000	---	20000	---	0.450	1.250
1206	8mm	4000 / 5000	---	20000	---	0.862	2.728
1210	8mm	5 000	---	20000	---	1.471	4.030
1218	12mm	---	4000	---	---	2.703	7.590
2010	12mm	---	4000	---	16000	2.273	6.875
2512	12mm	---	4000	---	---	3.704	10.827
YC102	8mm	10000	---	---	---	0.052	---
YC104	8mm	10000	---	---	---	0.099	---
AF/YC122	8mm	10000	---	50000	---	0.100	---
TC122	8mm	10000	---	50000	---	0.112	---
ATV321	8mm	10000	---	---	---	0.100	---
AF/YC124	8mm	10000	---	40000	---	0.281	---
TC124	8mm	10000	---	40000	---	0.311	---
AF/YC162	8mm	5000	---	---	---	0.376	---
AF/YC164	8mm	5000	---	20000	---	0.833	---
TC164	8mm	5000	---	20000	---	1.030	---
YC158	8mm	5000	---	20000	---	0.855	---
YC248	12mm	5000	4000	---	---	0.885	---
YC324	12mm	---	4000	---	---	2.703	---
YC358	12mm	---	4000	---	---	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.

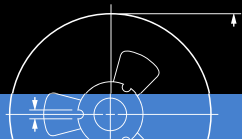
The remaining 4 or 3 digits represent the resistance value with the last digit indicating the multiplier as shown in table on the right.

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

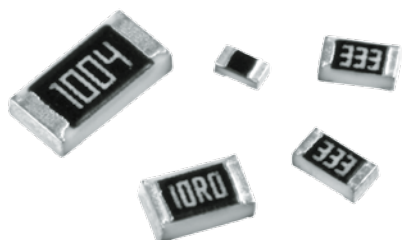
Last digit of 12NC	
Resistance	Last digit
0.001 to 0.0976 Ω	0
0.1 to 0.976 Ω	7
1 to 9.76 Ω	8
10 to 97.6 Ω	9
100 to 976 Ω	1
1 to 9.76 kΩ	2
10 to 97.6 kΩ	3
100 to 976 kΩ	4
1 to 9.76 MΩ	5
10 to 97.6 MΩ	6





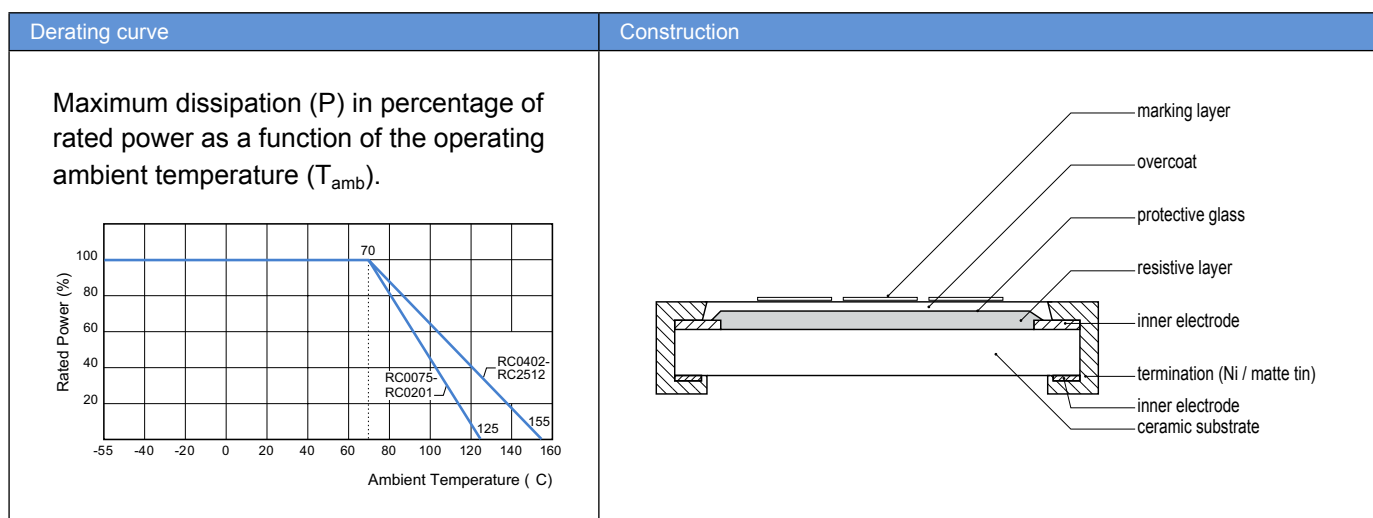
Chip Resistors Selection Charts

RC - Thick film general purpose chip resistors, 0075 to 2512



Features

- Extremely thin and light (0075 & 0100)
- Highly reliable construction
- Compatible with all soldering processes
- Highly stable in auto-placement surface mounting applications
- Jumper is available
- Available in 8mm tape & reel per IEC 60286-3 (EIA -RS 481)



Dimensions

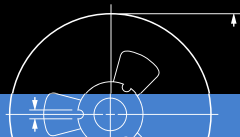
unit: mm

Type	L	W	H	l_1	l_2
RC0075	0.30 ±0.01	0.15 ±0.01	0.10 ±0.01	0.08 ±0.03	0.08 ±0.03
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, 0075 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)
RC0075	1/50W	-55°C to +125°C	10V	25V	25V	E24 ±5% 10Ω ≤ R ≤ 1MΩ E24/E96 ±1% 10Ω ≤ R ≤ 1MΩ	10Ω ≤ R < 100Ω -200/+600ppm°C 100Ω ≤ R ≤ 1MΩ ±200ppm°C	Rated current 0.5 Max. current 1.0
RC0100	1/32W	-55°C to +125°C	15V	30V	30V	E24 ±5% 1Ω ≤ R ≤ 22MΩ E24/E96 ±1% 1Ω ≤ R ≤ 10MΩ E24/E96 ±0.5% 33Ω ≤ R ≤ 470KΩ Jumper < 50mΩ	1Ω ≤ R < 10Ω -200/+600ppm°C 10Ω ≤ R < 100Ω +300ppm°C 100Ω ≤ R ≤ 10MΩ +200ppm°C 10MΩ < R ≤ 22MΩ +250ppm°C	Rated current 0.5 Max. current 1.0
RC0201	1/20W	-55°C to +125°C	25V	50V	50V	E24 ±5% 1Ω ≤ R ≤ 10MΩ E24/E96 ±1% 1Ω ≤ R ≤ 10MΩ E24/E96 ±0.1%,±0.5% 10Ω ≤ R ≤ 1MΩ Jumper < 50mΩ	10Ω < R ≤ 10MΩ ±200ppm°C 1Ω ≤ R ≤ 10Ω -100/+350ppm°C	Rated current 0.5 Max. current 1.0
RC0402	1/16W	-55°C to +155°C	50V	100V	100V	E24 ±5% 1Ω ≤ R ≤ 22MΩ E24/E96 ±1% 1Ω ≤ R ≤ 10MΩ E24/E96 ±0.1%,±0.5% 10Ω ≤ R ≤ 1MΩ Jumper < 50mΩ	1Ω ≤ R ≤ 10Ω ±200ppm°C 10Ω < R ≤ 10MΩ ±100ppm°C 10MΩ < R ≤ 22MΩ ±200ppm°C	Rated current 1.0 Max. current 2.0
	1/8W	-55°C to +155°C	50V	100V	100V	E24 ±5% 1Ω ≤ R ≤ 1MΩ E24/E96 ±1% 1Ω ≤ R ≤ 1MΩ	1Ω ≤ R < 1MΩ ±200ppm°C	-- --
RC0603	1/10W	-55°C to +155°C	75V	150V	150V	E24 ±5% 1Ω ≤ R ≤ 22MΩ E24/E96 ±1% 1Ω ≤ R ≤ 10MΩ E24/E96 ±0.1%,±0.5% 10Ω ≤ R ≤ 1MΩ Jumper < 50mΩ	1Ω ≤ R ≤ 10Ω ±200ppm°C 10Ω < R ≤ 10MΩ ±100ppm°C 10MΩ < R ≤ 22MΩ ±200ppm°C	Rated current 1.0 Max. current 2.0
	1/5W	-55°C to +155°C	75V	150V	150V	E24 ±5% 1Ω ≤ R ≤ 1MΩ E24/E96 ±1% 1Ω ≤ R ≤ 1MΩ	1Ω ≤ R ≤ 1MΩ ±200ppm°C	-- --
RC0805	1/8W	-55°C to +155°C	150V	300V	300V	E24 ±5% 1Ω ≤ R ≤ 22MΩ E24/E96 ±1% 1Ω ≤ R ≤ 10MΩ E24/E96 ±0.1%,±0.5% 10Ω ≤ R ≤ 1MΩ E24 ±10%,20% 24MΩ ≤ R ≤ 100MΩ Jumper < 50mΩ	1Ω ≤ R ≤ 10Ω ±200ppm°C 10Ω < R ≤ 10MΩ ±100ppm°C 10MΩ < R ≤ 22MΩ ±200ppm°C 24MΩ ≤ R ≤ 100MΩ ±300ppm°C	Rated current 2.0 Max. current 5.0
	1/4W	-55°C to +155°C	150V	300V	300V	E24 ±5% 1Ω ≤ R ≤ 1MΩ E24/E96 ±1% 1Ω ≤ R ≤ 1MΩ	1Ω ≤ R ≤ 1MΩ ±200ppm°C	-- --
RC1206	1/4W	-55°C to +155°C	200V	400V	500V	E24 ±5% 1Ω ≤ R ≤ 22MΩ E24/E96 ±1% 1Ω ≤ R ≤ 10MΩ E24/E96 ±0.1%,±0.5% 10Ω ≤ R ≤ 1MΩ E24 ±10%,20% 24MΩ ≤ R ≤ 100MΩ Jumper < 50mΩ	1Ω ≤ R ≤ 10Ω ±200ppm°C 10Ω < R ≤ 10MΩ ±100ppm°C 10MΩ < R ≤ 22MΩ ±200ppm°C 24MΩ ≤ R ≤ 100MΩ ±300ppm°C	Rated current 2.0 Max. current 10.0
	1/2W	-55°C to +155°C	200V	400V	500V	E24 ±5% 1Ω ≤ R ≤ 1MΩ E24/E96 ±1% 1Ω ≤ R ≤ 1MΩ	1Ω ≤ R ≤ 1MΩ ±200ppm°C	-- --
RC1210	1/2W	-55°C to +155°C	200V	500V	500V	E24 ±5% 1Ω ≤ R ≤ 22MΩ E24/E96 ±1% 1Ω ≤ R ≤ 10MΩ E24/E96 ±0.1%,±0.5% 10Ω ≤ R ≤ 1MΩ Jumper < 50mΩ	1Ω ≤ R ≤ 10Ω ±200ppm°C 10Ω < R ≤ 10MΩ ±100ppm°C 10MΩ < R ≤ 22MΩ ±200ppm°C	Rated current 2.0 Max. current 10.0
RC1218	1W	-55°C to +155°C	200V	500V	500V	E24 ±5% 1Ω ≤ R ≤ 1MΩ E24/E96 ±1% 1Ω ≤ R ≤ 1MΩ E24/E96 ±0.1%,±0.5% 10Ω ≤ R ≤ 1MΩ Jumper < 50mΩ	1Ω ≤ R ≤ 10Ω ±200ppm°C 11Ω ≤ R ≤ 1MΩ ±100ppm°C	Rated current 6.0 Max. current 10.0
RC2010	3/4W	-55°C to +155°C	200V	500V	500V	E24 ±5% 1Ω ≤ R ≤ 22MΩ E24/E96 ±1% 1Ω ≤ R ≤ 10MΩ E24/E96 ±0.1%,±0.5% 10Ω ≤ R ≤ 1MΩ Jumper < 50mΩ	1Ω ≤ R ≤ 10Ω ±200ppm°C 10Ω < R ≤ 10MΩ ±100ppm°C 10MΩ < R ≤ 22MΩ ±200ppm°C	Rated current 2.0 Max. current 10.0
RC2512	1W	-55°C to +155°C	200V	500V	500V	E24 ±5% 1Ω ≤ R ≤ 22MΩ E24/E96 ±1% 1Ω ≤ R ≤ 10MΩ E24/E96 ±0.1%,±0.5% 10Ω ≤ R ≤ 1MΩ Jumper < 50mΩ	1Ω ≤ R ≤ 10Ω ±200ppm°C 10Ω < R ≤ 10MΩ ±100ppm°C 10MΩ < R ≤ 22MΩ ±200ppm°C	Rated current 2.0 Max. current 10.0
	2W	-55°C to +155°C	200V	400V	500V	E24 ±5% 1Ω ≤ R ≤ 1MΩ E24/E96 ±1% 1Ω ≤ R ≤ 1MΩ	1Ω ≤ R ≤ 1MΩ ±200ppm°C	-- --



Chip Resistors Selection Charts

RC - Thick film general purpose chip resistors, 0075 to 2512

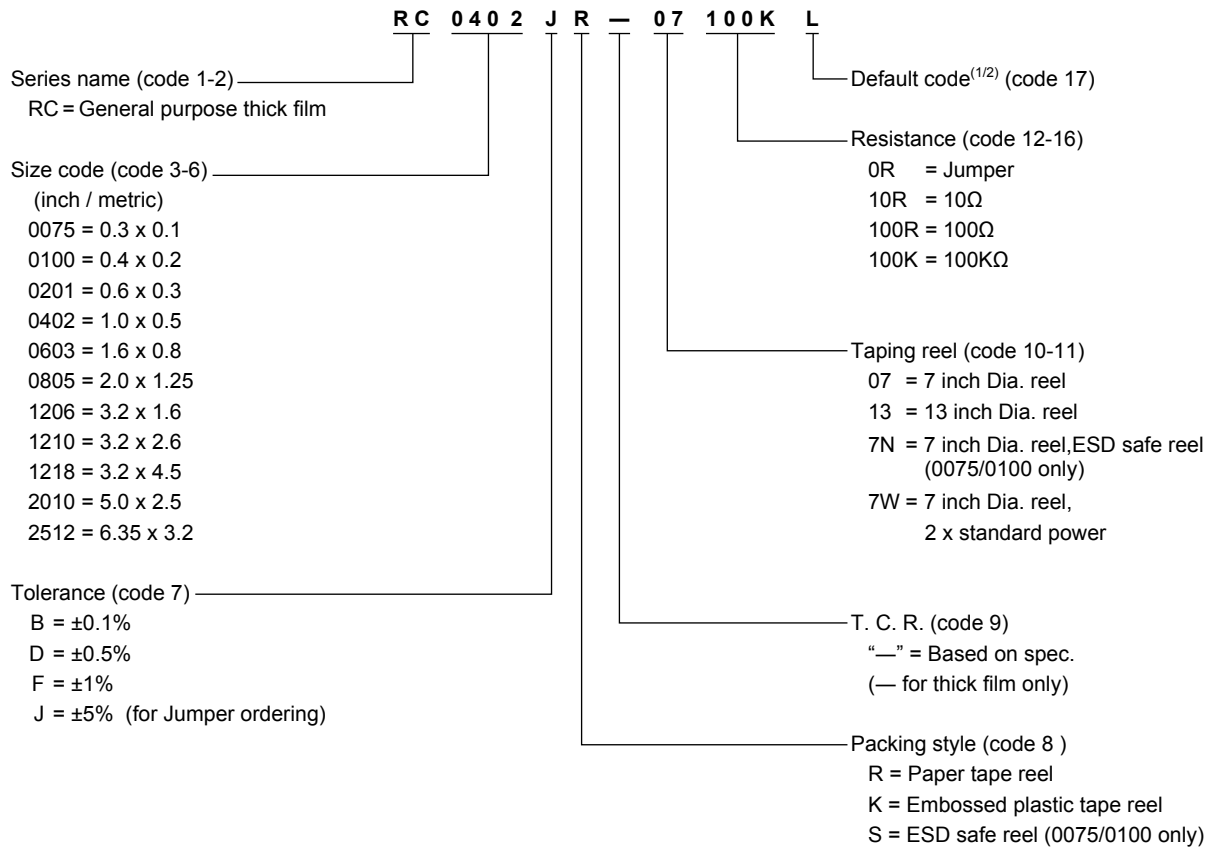
Environmental characteristics				
Performance test		Test method	Procedure	Requirements
Life		MIL-STD-202 -method 108A	1000 hours at 70 ±2°C applied RCWV 1.5 hours on, 0.5 hours off, still air required	0075/ 01005: ±(3% +50mΩ) < 100mΩ for jumper Others: ±(1% +50mΩ) for 0.1%/0.5%/1% tol. ±(3% +50mΩ) for 5% tol. < 100mΩ for jumper
High temperature exposure		MIL-STD-202 -method 108A	1000 hours at maximum operating temperature depending on specification, unpowered	0075/ 01005: ±(1% +50mΩ) < 50mΩ for jumper Others: ±(1% +50mΩ) for 0.1%/0.5%/1% tol. ±(2% +50mΩ) for 5% tol. < 50mΩ for jumper
Moisture resistance		MIL-STD-202 -method 106G	Each temperature / humidity cycle is defined as 8 hours (method 106G), 3 cycles / 24 hours for 10d with 25°C / 65°C 95% R.H	0075/ 01005: ±(2.0% +50mΩ) < 100mΩ for jumper Others: ±(0.5% +50mΩ) for 0.1%/0.5%/1% tol. ±(2% +50mΩ) for 5% tol. < 100mΩ for jumper
Thermal shock		MIL-STD-202 -method 107G	-55/+125 °C Note: Number of cycles required is 300. Devices mounted Maximum transfer time is 20 seconds. Dwell time is 15 minutes. Air – Air	0075/ 01005: ±(1% +50mΩ) < 50mΩ for jumper Others: ±(0.5% +50mΩ) for 0.1%/0.5%/1% tol. ±(1% +50mΩ) 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-202 -method 210F	Lead-free solder, 260°C, 10 seconds immersion time	0075/ 01005: ±(1% +50mΩ) < 50mΩ for jumper Others: ±(0.5% +50mΩ) for 0.1%/0.5%/1% tol. ±(1% +0.05 Ω) for 5% tol. < 50mΩ for jumper No visible damage
Short time overload		IEC 60115 -1 4.13	2.5 times RCWV or maximum overload voltage whichever is less for 5 seconds at room temperature	0075/ 01005: ±(2% +50mΩ) < 50mΩ for jumper Others: ±(1% +50mΩ) for 0.1%/0.5%/1% tol. ±(2% +50mΩ) for 5% tol. < 50mΩ for jumper No visible damage

Chip Resistors Selection Charts

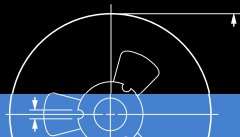
RC - Thick film general purpose chip resistors, 0075 to 2512

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, 0075 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%	+1%
Resistance	E24	E24 / E96	E24	E24 / E96	E24	E24 / E96	E24	E24 / E96	E24	E24 / E96
Packing	paper tape		paper tape		blister tape		blister tape		blister tape	
Quantity	4 000	---	---	---	2322 735 64...L	2322 735 7...L	2322 760 60...L	2322 761 6...L	2322 762 60...L	2322 763 6...L
	5 000	2322 711 61...L	2322 724 6...L	2390 735 70...L	2390 735 3...L	---	---	---	---	---
	10 000	2322 711 51...L	2322 724 7...L	---	---	---	---	---	---	---
	20 000	2322 711 81...L	2322 724 8...L	2390 735 71...L	2390 735 5...L	---	---	---	---	---
Jumper	4 000	---	---	---	2322 735 90007L	---	2322 760 90003L	---	2322 762 90000L	---
	5 000	2322 711 91032L	---	2390 735 90001L	---	---	---	---	---	---
	10 000	2322 711 91005L	---	---	---	---	---	---	---	---
	20 000	2322 711 92004L	---	---	---	---	---	---	---	---

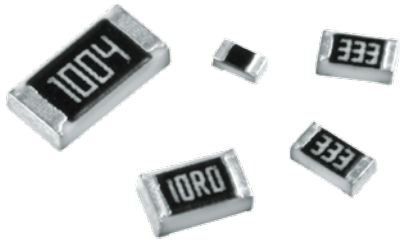
For ordering rules: See page 14 for E24 / E96 values and the last 4 or 3 digits of the 12NC catalogue number

Phycomp CTC ordering code - Traditional type - North America	
Regional code for ordering Phycomp branded products. Please see page 15 for details.	



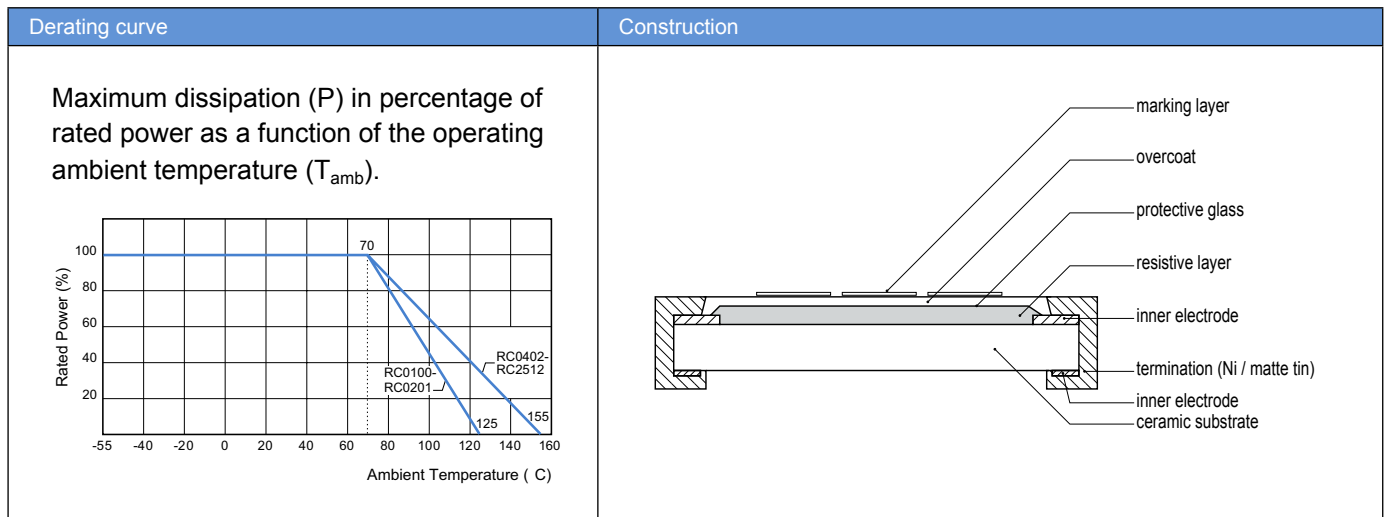
Chip Resistors Selection Charts

RC_P ,Total lead free thick film general purpose chip resistor,01005 to 2512



Features

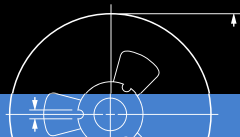
- Highly reliable electrode construction
- Compatible with all soldering processes
- Highly stable in auto-placement surface mounting applications
- Barrier layer end termination
- Lead free (Pb<1000ppm) without RoHS exemptions (7C-1)



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	6.35 ±0.10	3.10 ±0.15	0.55 ±0.10	0.60 ±0.20	0.50 ±0.20



Chip Resistors Selection Charts

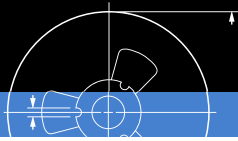
RC_P ,Total lead free thick film general purpose chip resistor,01005 to 2512

Electrical characteristics								
Type	Power P ₇₀	Operating Temp. range	MWV	RCOV	DWV	Resistance range & tolerance	T. C. R. (ppm/°C)	Jumper criteria (unit: A)
RC0100	1/32W	-55°C to +125°C	15V	30V	30V	E24 ±5% 1Ω ≤ R ≤ 1MΩ E24/E96 ±1% 1Ω ≤ R ≤ 1MΩ E24/E96 ±0.5% 10Ω ≤ R ≤ 1MΩ Jumper < 50mΩ	1Ω ≤ R < 10Ω -200/+600ppm°C 10Ω ≤ R < 100Ω +370ppm°C 100Ω ≤ R ≤ 1MΩ +250ppm°C	Rated current 0.5 Max. current 1.0
RC0201	1/20W	-55°C to +125°C	25V	50V	50V	E24 ±5% 1Ω ≤ R ≤ 10MΩ E24/E96 ±1% 1Ω ≤ R ≤ 10MΩ E24/E96 ±0.5% 10Ω ≤ R ≤ 1MΩ Jumper < 50mΩ	1Ω ≤ R ≤ 10Ω -100/+500ppm°C 10Ω ≤ R ≤ 100Ω ±300ppm°C 100Ω ≤ R ≤ 10MΩ ±200ppm°C	Rated current 0.5 Max. current 1.0
RC0402	1/16W	-55°C to +155°C	50V	100V	100V	E24 ±5% 1Ω ≤ R ≤ 22MΩ E24/E96 ±1% 1Ω ≤ R ≤ 10MΩ E24/E96 ±0.5% 10Ω ≤ R ≤ 1MΩ Jumper < 50mΩ	1Ω ≤ R ≤ 10Ω ±350ppm°C 10Ω ≤ R ≤ 100Ω ±200ppm°C 100Ω ≤ R ≤ 10MΩ ±150ppm°C 10MΩ ≤ R ≤ 22MΩ ±200ppm°C	Rated current 1.0 Max. current 2.0
RC0603	1/10W	-55°C to +155°C	75V	150V	150V	E24 ±5% 1Ω ≤ R ≤ 22MΩ E24/E96 ±1% 1Ω ≤ R ≤ 10MΩ E24/E96 ±0.5% 10Ω ≤ R ≤ 1MΩ Jumper < 50mΩ	1Ω ≤ R ≤ 10Ω ±300ppm°C 10Ω ≤ R ≤ 100Ω ±200ppm°C 100Ω ≤ R ≤ 10MΩ ±150ppm°C 10MΩ ≤ R ≤ 22MΩ ±200ppm°C	Rated current 1.0 Max. current 2.0
RC0805	1/8W	-55°C to +155°C	150V	300V	300V	E24 ±5% 1Ω ≤ R ≤ 22MΩ E24/E96 ±1% 1Ω ≤ R ≤ 10MΩ E24/E96 ±0.5% 10Ω ≤ R ≤ 1MΩ Jumper < 50mΩ	1Ω ≤ R ≤ 10Ω ±300ppm°C 10Ω ≤ R ≤ 100Ω ±150ppm°C 100Ω ≤ R ≤ 10MΩ ±100ppm°C 10MΩ ≤ R ≤ 22MΩ ±200ppm°C	Rated current 2.0 Max. current 5.0
RC1206	1/4W	-55°C to +155°C	200V	400V	500V	E24 ±5% 1Ω ≤ R ≤ 22MΩ E24/E96 ±1% 1Ω ≤ R ≤ 10MΩ E24/E96 ±0.5% 10Ω ≤ R ≤ 1MΩ Jumper < 50mΩ	1Ω ≤ R ≤ 10Ω ±300ppm°C 10Ω ≤ R ≤ 100Ω ±100ppm°C 100Ω ≤ R ≤ 10MΩ ±100ppm°C 10MΩ ≤ R ≤ 22MΩ ±200ppm°C	Rated current 2.0 Max. current 10.0
RC1210	1/2W	-55°C to +155°C	200V	500V	500V	E24 ±5% 1Ω ≤ R ≤ 22MΩ E24/E96 ±1% 1Ω ≤ R ≤ 10MΩ E24/E96 ±0.5% 10Ω ≤ R ≤ 1MΩ Jumper < 50mΩ	10Ω ±300ppm°C 10Ω ≤ R ≤ 100Ω ±100ppm°C 100Ω ≤ R ≤ 10MΩ ±100ppm°C 10MΩ ≤ R ≤ 22MΩ ±200ppm°C	Rated current 2.0 Max. current 10.0
RC1218	1W	-55°C to +155°C	200V	500V	500V	E24 ±5% 1Ω ≤ R ≤ 1MΩ E24/E96 ±1% 1Ω ≤ R ≤ 1MΩ E24/E96 ±0.5% 10Ω ≤ R ≤ 1MΩ Jumper < 50mΩ		Rated current 6.0 Max. current 10.0
RC2010	3/4W	-55°C to +155°C	200V	500V	500V	E24 ±5% 1Ω ≤ R ≤ 22MΩ E24/E96 ±1% 1Ω ≤ R ≤ 10MΩ E24/E96 ±0.5% 10Ω ≤ R ≤ 1MΩ		Rated current 2.0 Max. current 10.0
RC2512	1W	-55°C to +155°C	200V	500V	500V	E24 ±5% 1Ω ≤ R ≤ 22MΩ E24/E96 ±1% 1Ω ≤ R ≤ 10MΩ E24/E96 ±0.5% 10Ω ≤ R ≤ 1MΩ Jumper < 50mΩ		Rated current 2.0 Max. current 10.0

Chip Resistors Selection Charts

RC_P ,Total lead free thick film general purpose chip resistor,01005 to 2512

Environmental characteristics				
Performance test		Test method	Procedure	Requirements
Life		MIL-STD-202 -method 108A	1000 hours at 70 ±2°C applied RCWV 1.5 hours on, 0.5 hours off, still air required	01005: ±(3% +50mΩ) < 100mΩ for jumper Others: ±(1% +50mΩ) for 0.1%/0.5%/1% tol. ±(3% +50mΩ) for 5% tol. < 100mΩ for jumper
High temperature exposure		MIL-STD-202 -method 108A	1000 hours at maximum operating temperature depending on specification, unpowered	01005: ±(1% +50mΩ) < 50mΩ for jumper Others: ±(1% +50mΩ) for 0.1%/0.5%/1% tol. ±(2% +50mΩ) for 5% tol. < 50mΩ for jumper
Moisture resistance		MIL-STD-202 -method 106G	Each temperature / humidity cycle is defined as 8 hours (method 106G), 3 cycles / 24 hours for 10d with 25°C / 65°C 95% R.H	01005: ±(2.0% +50mΩ) < 100mΩ for jumper Others: ±(0.5% +50mΩ) for 0.1%/0.5%/1% tol. ±(2% +50mΩ) for 5% tol. < 100mΩ for jumper
Thermal shock		MIL-STD-202 -method 107G	-55/+125 °C Note: Number of cycles required is 300. Devices mounted Maximum transfer time is 20 seconds. Dwell time is 15 minutes. Air – Air	01005: ±(1% +50mΩ) < 50mΩ for jumper Others: ±(0.5% +50mΩ) for 0.1%/0.5%/1% tol. ±(1% +50mΩ) 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-202 -method 210F	Lead-free solder, 260°C, 10 seconds immersion time	01005: ±(1% +50mΩ) < 50mΩ for jumper Others: ±(0.5% +50mΩ) for 0.1%/0.5%/1% tol. ±(1% +0.05 Ω) for 5% tol. < 50mΩ for jumper No visible damage
Short time overload		IEC 60115 -1 4.13	2.5 times RCWV or maximum overload voltage whichever is less for 5 seconds at room temperature	01005: ±(2% +50mΩ) < 50mΩ for jumper Others: ±(1% +50mΩ) for 0.1%/0.5%/1% tol. ±(2% +50mΩ) for 5% tol. < 50mΩ for jumper No visible damage

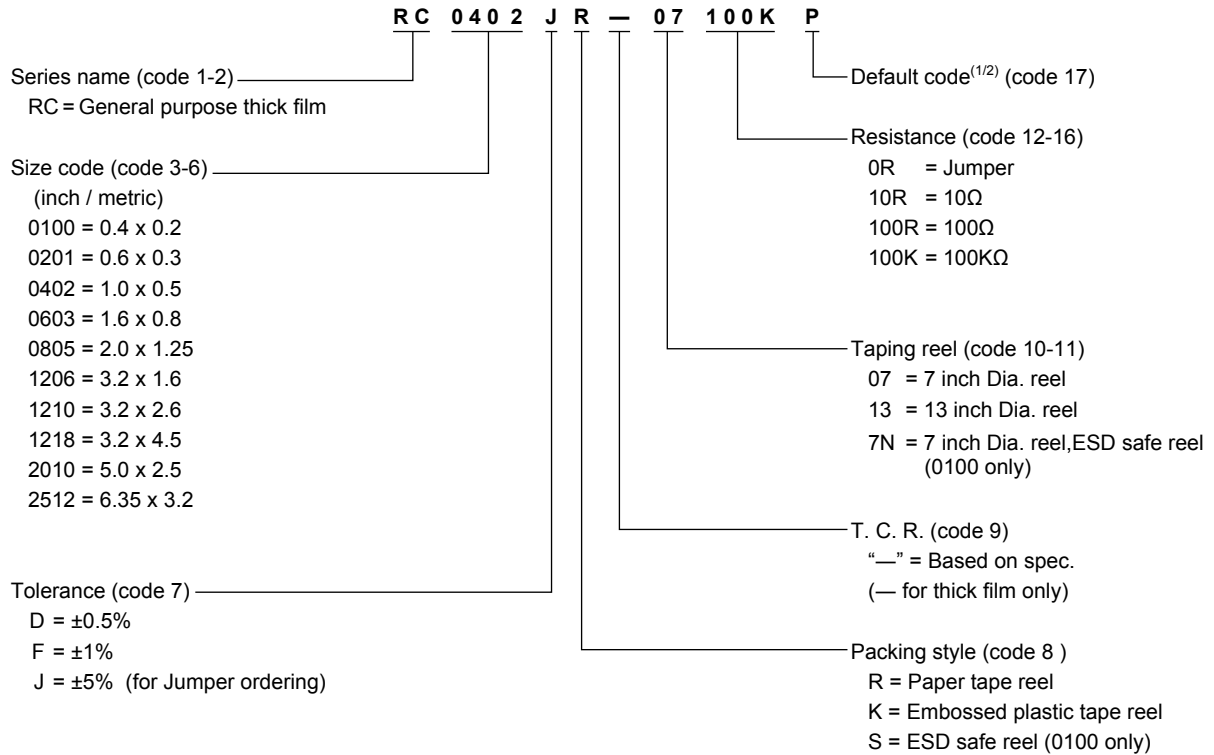


Chip Resistors Selection Charts

RC_P, Total lead free thick film general purpose chip resistor, 01005 to 2512

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

Ordering example: RC0402JR-07100KP



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

RE - Thick film precision grade chip resistors, 0201 to 1206

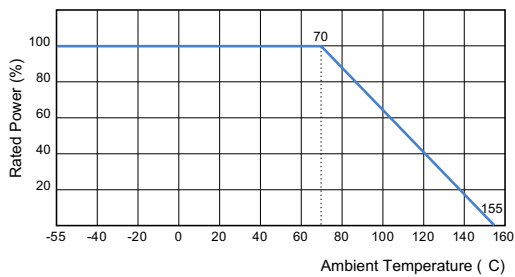


Features

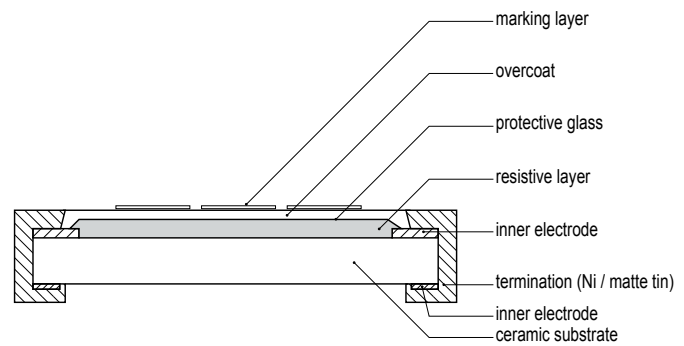
- Narrow tolerance
- Low T. C. R.
- Highly reliable construction
- Compatible with all soldering processes
- Suitable for auto-placement surface mounting applications
- Available in 8mm tape & reel per EIA RS481

Derating curve

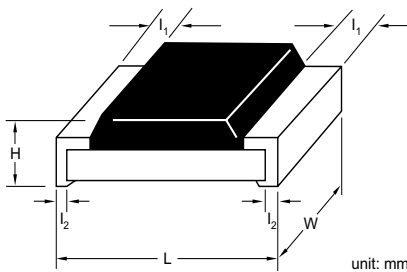
Maximum dissipation (P) in percentage of rated power as a function of the operating ambient temperature (T_{amb}).



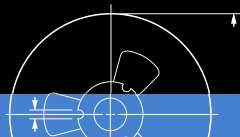
Construction



Dimensions



Type	L	W	H	I ₁	I ₂
RE0201	0.60 ±0.03	0.30 ±0.03	0.23 ±0.03	0.10 ±0.05	0.15 ±0.05
RE0402	1.00 ±0.05	0.50 ±0.05	0.32 ±0.05	0.20 ±0.10	0.25 ±0.10
RE0603	1.60 ±0.10	0.80 ±0.10	0.45 ±0.10	0.25 ±0.15	0.25 ±0.15
RE0805	2.00 ±0.10	1.25 ±0.10	0.50 ±0.10	0.35 ±0.20	0.35 ±0.20
RE1206	3.10 ±0.10	1.60 ±0.10	0.55 ±0.10	0.45 ±0.20	0.40 ±0.20



Chip Resistors Selection Charts

RE - Thick film precision grade chip resistors, 0201 to 1206

Electrical characteristics							
Type	Power P_{70}	Operating Temp. range	MWV	RCOV	DWV	Resistance range & tolerance	T. C. R.
RE0201	1/20W	-55°C to +155°C	25V	50V	50V	E24/E96 $\pm 0.1\%, \pm 0.5\%, \pm 1\%$ $10\Omega \leq R \leq 1M\Omega$	± 50 ppm/°C
RE0402	1/16W	-55°C to +155°C	50V	100V	100V		
RE0603	1/10W	-55°C to +155°C	75V	150V	150V		
RE0805	1/8W	-55°C to +155°C	150V	300V	300V		
RE1206	1/4W	-55°C to +155°C	200V	400V	500V		

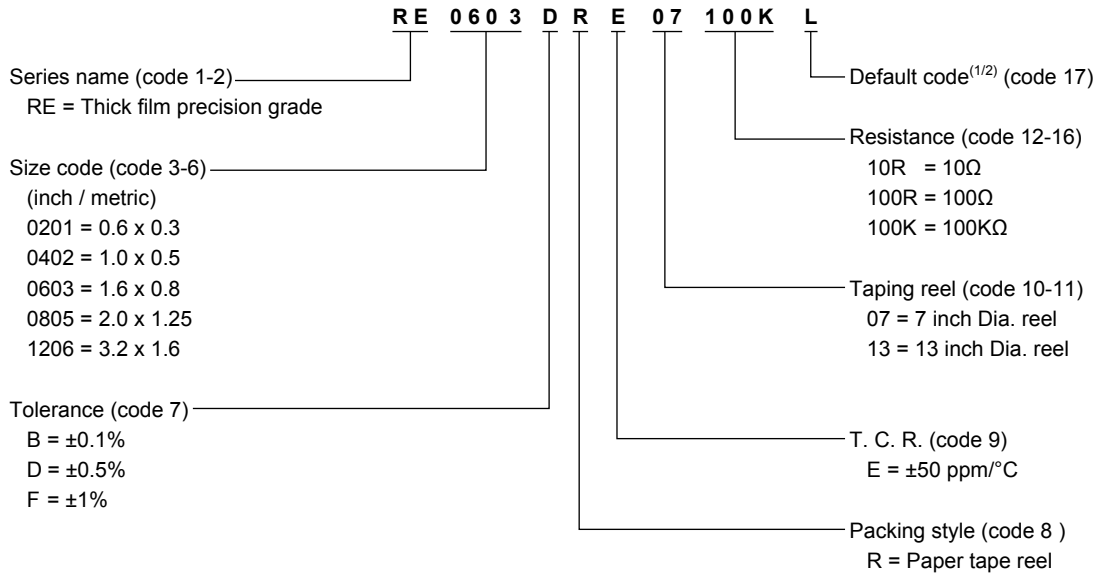
Environmental characteristics				
Performance test		Test method	Procedure	Requirements
Life		MIL-STD-202 -method 108A	1000 hours at 70 $\pm 2^\circ\text{C}$ applied RCWV 1.5 hours on, 0.5 hours off, still air required	$\pm(3\% + 50m\Omega)$
High temperature exposure		MIL-STD-202 -method 108A	1000 hours at maximum operating temperature depending on specification, unpowered	$\pm(3\% + 50m\Omega)$
Moisture resistance		MIL-STD-202 -method 106G	Each temperature / humidity cycle is defined as 8 hours (method 106G), 3 cycles / 24 hours for 10d with 25°C / 65°C 95% R.H	$\pm(3\% + 50m\Omega)$
Thermal shock		MIL-STD-202 -method 107G	-55/+125 °C Note: Number of cycles required is 300. Devices mounted Maximum transfer time is 20 seconds. Dwell time is 15 minutes. Air – Air	$\pm(1\% + 50m\Omega)$
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-202 -method 210F	Lead-free solder, 260°C, 10 seconds immersion time	$\pm(0.5\% + 50m\Omega)$ No visible damage
Short time overload		IEC 60115 -1 4.13	2.5 times RCWV or maximum overload voltage whichever is less for 5 seconds at room temperature	$\pm(1\% + 50m\Omega)$ No visible damage

Chip Resistors Selection Charts

RE - Thick film precision grade chip resistors, 0201 to 1206

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

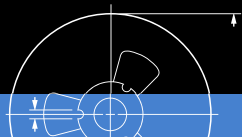
Ordering example: RE0603DRE07100KL



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.



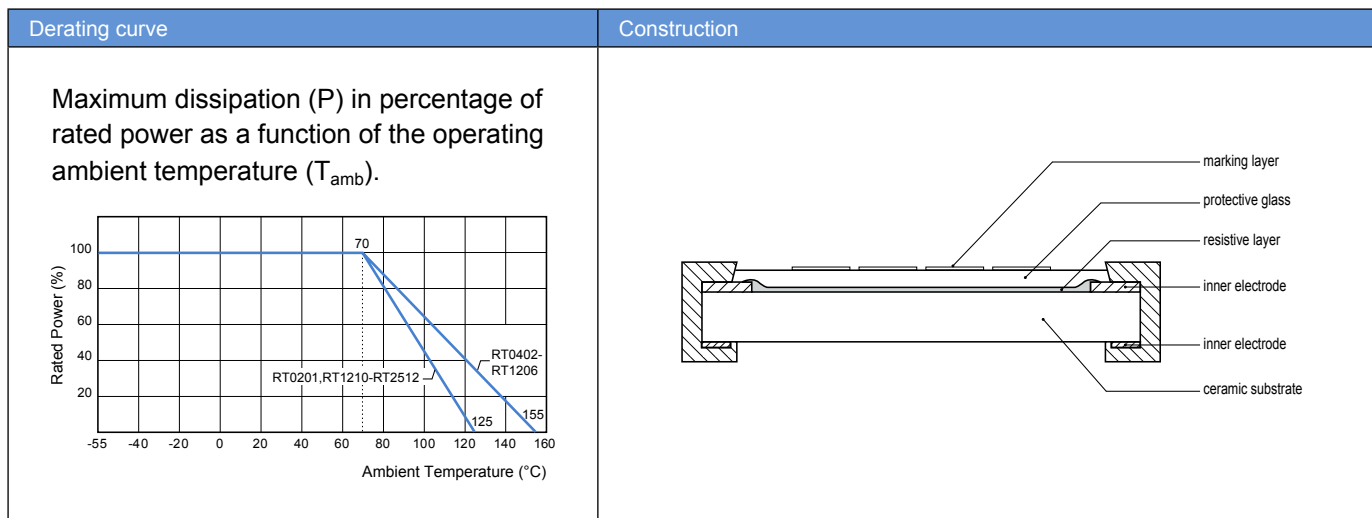
Chip Resistors Selection Charts

RT - Thin film high precision high stability chip resistors, 0201 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

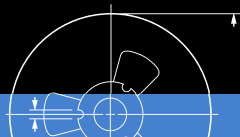
A 3D perspective diagram of a chip resistor. The dimensions are labeled as follows: L (length), W (width), H (height), l₁ (terminal length), and l₂ (terminal width). The unit is mm.

Type	L	W	H	l ₁	l ₂
RT0201	0.60 ±0.03	0.30 ±0.03	0.23 ±0.03	0.10 ±0.05	0.15 ±0.05
RT0402	1.00 ±0.10	0.50 ±0.05	0.30 ±0.05	0.20 ±0.10	0.25 ±0.10
RT0603	1.60 ±0.10	0.80 ±0.10	0.45 ±0.10	0.25 ±0.15	0.25 ±0.15
RT0805	2.00 ±0.10	1.25 ±0.10	0.50 ±0.10	0.35 ±0.20	0.35 ±0.20
RT1206	3.10 ±0.10	1.60 ±0.10	0.55 ±0.10	0.45 ±0.20	0.40 ±0.20
RT1210	3.10 ±0.10	2.60 ±0.15	0.55 ±0.10	0.50 ±0.20	0.50 ±0.20
RT2010	5.00 ±0.10	2.50 ±0.15	0.55 ±0.10	0.60 ±0.20	0.50 ±0.20
RT2512	6.35 ±0.10	3.20 ±0.15	0.55 ±0.10	0.60 ±0.20	0.50 ±0.20

Chip Resistors Selection Charts

RT - Thin film high precision high stability chip resistors, 0201 to 2512

Electrical characteristics											
Type	Power P ₇₀	Operating Temp. range	MWV	RCOV	DWV	T.C.R. (ppm/°C)	Resistance Range (E24/E96) & tolerance				
							±0.05%	±0.1%	±0.25%	±0.5%	±1.0%
RT0201	1/20W	−55 °C to +125 °C	25V	50V	50V	±50	--	22 ~75K	22 ~75K	22 ~75K	22 ~75K
						±25	--	22~75K	22~75K	22~75K	22~75K
						±15	--	--	--	--	--
						±10	--	--	--	--	--
						±5	--	--	--	--	--
RT0402	1/16W	−55 °C to +155 °C	50V	100V	75V	±50	20~12K	4.7~240K	4.7~240K	4.7~240K	4.7~240K
						±25	20~12K	4.7~240K	4.7~240K	4.7~240K	4.7~240K
						±15	20~12K	20~70K	20~70K	--	--
						±10	20~12K	20~70K	20~70K	--	--
						±5	20~10K	20~10K	20~10K	--	--
RT0603	1/10W		75V	150V	100V	±50	4.7~100K	1~1M	1~1M	1~1M	1~1M
						±25	4.7~100K	1~1M	1~1M	1~1M	1~1M
						±15	4.7~100K	4.7~332K	4.7~332K	--	--
						±10	4.7~100K	4.7~332K	4.7~332K	--	--
						±5	20~30K	20~30K	20~30K	--	--
RT0805	1/8W		150V	300V	200V	±50	4.7~200K	1~1.5M	1~1.5M	1~1.5M	1~1.5M
						±25	4.7~200K	1~1.5M	1~1.5M	1~1.5M	1~1.5M
						±15	4.7~200K	4.7~800K	4.7~800K	--	--
						±10	4.7~200K	4.7~800K	4.7~800K	--	--
						±5	20~50K	20~50K	20~50K	--	--
RT1206	1/4W		200V	400V	300V	±50	5.6~500K	1~1.5M	1~1.5M	1~1.5M	1~1.5M
						±25	5.6~500K	1~1.5M	1~1.5M	1~1.5M	1~1.5M
						±15	5.6~500K	5.6~1M	5.6~1M	--	--
						±10	5.6~500K	5.6~1M	5.6~1M	--	--
						±5	20~100K	20~100K	20~100K	--	--
RT1210	1/4W	−55 °C to +125 °C	200V	400V	400V	±50	4.7~1M	4.7~1M	4.7~1M	4.7~1M	4.7~1M
						±25	4.7~1M	4.7~1M	4.7~1M	4.7~1M	4.7~1M
						±15	100~100K	4.7~100K	4.7~100K	--	--
						±10	100~100K	4.7~100K	4.7~100K	--	--
						±5	--	--	--	--	--
RT2010	1/2W		200V	400V	400V	±50	4.7~1M	4.7~1M	4.7~1M	4.7~1M	4.7~1M
						±25	4.7~1M	4.7~1M	4.7~1M	4.7~1M	4.7~1M
						±15	100~100K	4.7~100K	4.7~100K	--	--
						±10	100~100K	4.7~100K	4.7~100K	--	--
						±5	--	--	--	--	--
RT2512	3/4W	200V	400V	400V	±50	4.7~1M	4.7~1M	4.7~1M	4.7~1M	4.7~1M	
					±25	4.7~1M	4.7~1M	4.7~1M	4.7~1M	4.7~1M	
					±15	100~100K	4.7~100K	4.7~100K	--	--	
					±10	100~100K	4.7~100K	4.7~100K	--	--	
					±5	--	--	--	--	--	



Chip Resistors Selection Charts

RT - Thin film high precision high stability chip resistors, 0201 to 2512

Environmental characteristics				
Performance test		Test method	Procedure	Requirements
Life		MIL-STD-202 Method 108A	1000 hours at 70 ±2°C applied RCWV 1.5 hours on, 0.5 hours off, still air required	±(0.5%+ 50mΩ)
High temperature exposure		MIL-STD-202 Method 108A	1000 hours at maximum operating temperature depending on specification, unpowered	±(0.5%+ 50mΩ)
Moisture resistance		MIL-STD-202 Method 106G	Each temperature / humidity cycle is defined as 8 hours (method 106G), 3 cycles / 24 hours for 10d with 25°C / 65°C 95% R.H	±(0.5%+ 50mΩ)
Thermal shock		MIL-STD-202 Method 107G	-55/+125 °C Note: Number of cycles required is 300. Devices mounted Maximum transfer time is 20 seconds. Dwell time is 15 minutes. Air – Air	±(0.5%+ 50mΩ)
Short time overload		IEC 60115-1 4.13	2.5 times RCWV or maximum overload voltage which-ever is less for 5 seconds at room temperature	±(0.5%+ 50mΩ) No visible damage
Solderability	Resistance to soldering heat	MIL-STD-202 method 210F	Lead-free solder, 260°C, 10 seconds immersion time	±(0.5%+50mΩ) No visible damage
	Wetting	J-STD-002B test B	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

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

Ordering example: RT0603DRE07100KL

RT 0603 DRE 07 100K L Series name (code 1-2) _____ RT = High precision - High stability thin film Size code (code 3-6) _____ (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 2.6 2010 = 5.0 x 2.5 2512 = 6.35 x 3.2 Tolerance (code 7) _____ W = ±0.05% B = ±0.1% C = ±0.25% D = ±0.5% F = ±1%		_____ Resistance (code 12-16) 10R = 10Ω 100R = 100Ω 10K = 10KΩ 100K = 100KΩ _____ Taping reel (code 10-11) 07 = 7 inch Dia. reel 13 = 13 inch Dia. reel _____ T. C. R. (code 9) A = ±5 ppm/°C B = ±10 ppm/°C C = ±15 ppm/°C D = ±25 ppm/°C E = ±50 ppm/°C _____ Packing style (code 8) R = Paper tape reel K = Embossed plastic tape reel		_____ Default code ^(1/2) (code 17)
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Note: 1. All of our RSMD products are RoHS compliant. "LFP" of the internal 2D reel label mentions "Lead Free Process"
2. Letter L is system default code for ordering only

Chip Resistors Selection Charts

RT - Thin film high precision high stability chip resistors, 0201 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

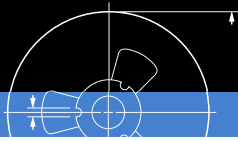
For ordering rules: See page 14 for E24 / E96 values and the last 4 or 3 digits of the 12NC catalogue number

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

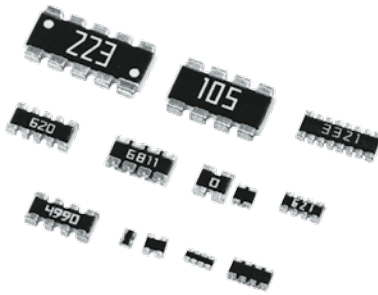
Phycomp CTC ordering code - Traditional type - North America	
Regional code for ordering Phycomp branded products. Please see page 13 for details.	

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)	±5 (A)	±10 (B)	±15 (C)	±25 (D)	±50 (E)	±5 (A)	±10 (B)	±15 (C)	±25 (D)	±50 (E)	±5 (A)	±10 (B)	±15 (C)	±25 (D)	±50 (E)	±25 (D)	±50 (E)	±25 (D)	±50 (E)
RT0201									22R - 75K	22R - 75K				22R - 75K	22R - 75K	22R - 75K	22R - 75K	22R - 75K	22R - 75K
RT0402	20R-10K	20R-12K	20R-12K	20R-12K	20R-12K	20R-10K	20R-70K	20R-70K	4.7R-240K	4.7R-240K	20R-10K	20R-70K	20R-70K	4.7R-240K	4.7R-240K	4.7R-240K	4.7R-240K	4.7R-240K	4.7R-240K
RT0603	20-30K	4.7R-100K	4.7R-100K	4.7R-100K	4.7R-100K	20-30K	4.7R-332K	4.7R-332K	1R-1M	1R-1M	20-30K	4.7R-332K	4.7R-332K	1R-1M	1R-1M	1R-1M	1R-1M	1R-1M	1R-1M
RT0805	20-50K	4.7R-200K	4.7R-200K	4.7R-200K	4.7R-200K	20-50K	4.7R-800K	4.7R-800K	1R-1.5M	1R-1.5M	20-50K	4.7R-800K	4.7R-800K	1R-1.5M	1R-1.5M	1R-1.5M	1R-1.5M	1R-1.5M	1R-1.5M
RT1206	20-100K	5.6R-500K	5.6R-500K	5.6R-500K	5.6R-500K	20-100K	5.6R-1M	5.6R-1M	1R-1.5M	1R-1.5M	20-100K	5.6R-1M	5.6R-1M	1R-1.5M	1R-1.5M	1R-1.5M	1R-1.5M	1R-1.5M	1R-1.5M
RT1210		100R-100K	100R-100K	4.7R-1M	4.7R-1M		4.7R-100K	4.7R-100K	4.7R-1M	4.7R-1M		4.7R-100K	4.7R-100K	4.7R-1M	4.7R-1M	4.7R-1M	4.7R-1M	4.7R-1M	4.7R-1M
RT2010		100R-100K	100R-100K	4.7R-1M	4.7R-1M		4.7R-100K	4.7R-100K	4.7R-1M	4.7R-1M		4.7R-100K	4.7R-100K	4.7R-1M	4.7R-1M	4.7R-1M	4.7R-1M	4.7R-1M	4.7R-1M
RT2512		100R-100K	100R-100K	4.7R-1M	4.7R-1M		4.7R-100K	4.7R-100K	4.7R-1M	4.7R-1M		4.7R-100K	4.7R-100K	4.7R-1M	4.7R-1M	4.7R-1M	4.7R-1M	4.7R-1M	4.7R-1M



Chip Resistors Selection Charts

YC/TC - Thick film array / network chip resistors

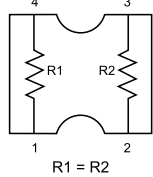


Features

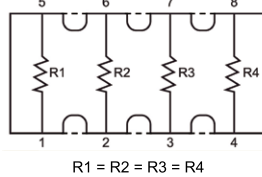
- Integrated discrete chip resistors from 2 to 8 pcs
- More efficient in pick & place application
- Low assembly costs
- Reduced size of final equipment
- Higher component and equipment reliability

Schematics

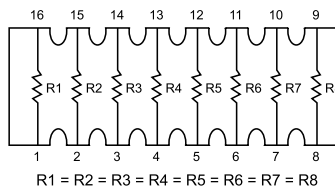
YC102/122/162



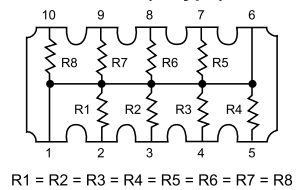
YC104/124/164/324⁽¹⁾



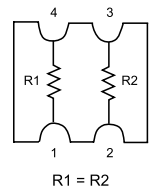
YC248



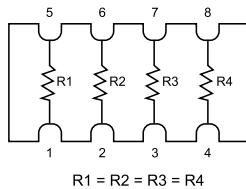
YC358 (L-Type)



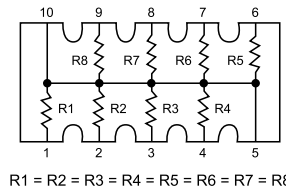
TC122



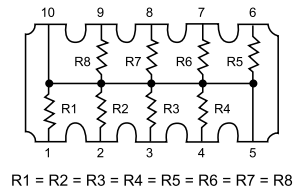
TC124/164



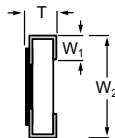
YC158



YC358 (T-Type)

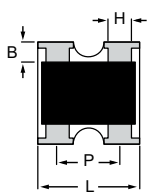


Dimensions

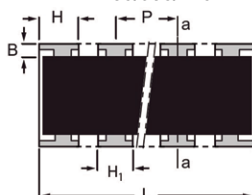


Side view for all types

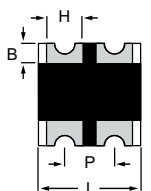
YC 102/122/162



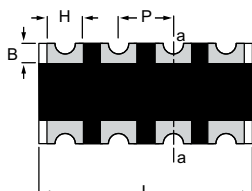
YC 104/124/164/324
158/358/248⁽¹⁾



TC 122



TC 124/164



unit: mm

Note: 1. YC104 is flat type

Type	H / H ₁	B	P	L	T	W ₁	W ₂
YC102	H: 0.30 ±0.10	0.15 ±0.10	0.50 ±0.05	0.80 ±0.10	0.35 ±0.10	0.15 ±0.10	0.60 ±0.10
YC104	H: 0.20 ±0.10	0.15 ±0.05	0.40 ±0.10	1.40 ±0.10	0.35 ±0.10	0.15 ±0.10	0.60 ±0.10
YC122	H: 0.21 ±0.10/-0.05	0.20 ±0.10	0.67 ±0.05	1.00 ±0.10	0.30 ±0.10	0.25 ±0.10	1.00 ±0.10
YC124	H: 0.45 ±0.05 H ₁ : 0.30 ±0.05	0.20 ±0.15	0.50 ±0.05	2.00 ±0.10	0.45 ±0.10	0.30 ±0.15	1.00 ±0.10
YC162	H: 0.30 ±0.10	0.30 ±0.10	0.80 ±0.05	1.60 ±0.10	0.40 ±0.10	0.30 ±0.10	1.60 ±0.10
YC164	H: 0.65 ±0.05 H ₁ : 0.50 ±0.15	0.30 ±0.15	0.80 ±0.05	3.20 ±0.15	0.60 ±0.10	0.30 ±0.15	1.60 ±0.15
YC248	H: 0.45 ±0.05 H ₁ : 0.30 ±0.05	0.30 ±0.15	0.50 ±0.05	4.00 ±0.20	0.45 ±0.10	0.40 ±0.15	1.60 ±0.15
YC324	H: 1.10 ±0.15 H ₁ : 0.90 ±0.15	0.50 ±0.20	1.27 ±0.05	5.08 ±0.20	0.60 ±0.10	0.50 ±0.15	3.20 ±0.20
TC122	H: 0.30 ±0.05	0.25 ±0.15	0.50 ±0.05	1.00 ±0.10	0.30 ±0.10	0.25 ±0.15	1.00 ±0.10
TC124	H: 0.30 ±0.10	0.20 ±0.10	0.50 ±0.05	2.00 ±0.10	0.40 ±0.10	0.25 ±0.10	1.00 ±0.10
TC164	H: 0.60 ±0.15	0.30 ±0.15	0.80 ±0.05	3.20 ±0.15	0.60 ±0.10	0.30 ±0.15	1.60 ±0.15
YC158	H: 0.45 ±0.05 H ₁ : 0.32 ±0.05	0.30 ±0.15	0.64 ±0.05	3.20 ±0.20	0.60 ±0.10	0.35 ±0.15	1.60 ±0.15
YC358	H: 1.10 ±0.15 H ₁ : 0.90 ±0.15	0.50 ±0.15	1.27 ±0.05	6.40 ±0.20	0.60 ±0.10	0.50 ±0.15	3.20 ±0.20

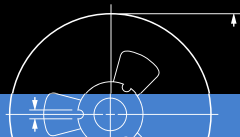


Chip Resistors Selection Charts

YC/TC - Thick film array / network chip resistors

Electrical characteristics								
Type	Power P ₇₀	Operating Temp. range	MWV	RCOV	DWV	Resistance range & tolerance		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 < 50mΩ	Rated current 0.5 Max. current 1.0
YC104	1/32W	-55°C to +125°C	12.5V	25V	25V	E24 ±5% E24/E96 ±1% Jumper	10Ω ≤ R ≤ 1MΩ 10Ω ≤ R ≤ 1MΩ < 50mΩ	Rated current 0.5 Max. current 1.0
YC122	1/16W	-55°C to +155°C	50V	100V	100V	E24 ±5% E24/E96 ±1% Jumper	1Ω ≤ R ≤ 1MΩ 1Ω ≤ R ≤ 1MΩ < 50mΩ	Rated current 0.5 Max. current 1.0
YC124	1/16W	-55°C to +155°C	25V	50V	100V	E24 ±5% E24/E96 ±1% Jumper	1Ω ≤ R ≤ 1MΩ 1Ω ≤ R ≤ 1MΩ < 50mΩ	Rated current 1.0 Max. current 2.0
YC162	1/16W	-55°C to +155°C	50V	100V	100V	E24 ±5% E24/E96 ±1% Jumper	1Ω ≤ R ≤ 1MΩ 1Ω ≤ R ≤ 1MΩ < 50mΩ	Rated current 1.0 Max. current 2.0
YC164	1/16W	-55°C to +155°C	50V	100V	100V	E24 ±5% E24/E96 ±1% Jumper	1Ω ≤ R ≤ 1MΩ 1Ω ≤ R ≤ 1MΩ < 50mΩ	Rated current 1.0 Max. current 2.0
YC248	1/16W	-55°C to +155°C	50V	100V	100V	E24 ±5% E24/E96 ±1% Jumper	10Ω ≤ R ≤ 1MΩ 10Ω ≤ R ≤ 1MΩ < 50mΩ	Rated current 2.0 Max. current 10.0
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 < 50mΩ	Rated current 1.0 Max. current 1.5
TC124	1/16W	-55°C to +125°C	50V	100V	100V	E24 ±5% E24/E96 ±1% Jumper	10Ω ≤ R ≤ 1MΩ 10Ω ≤ R ≤ 1MΩ < 50mΩ	Rated current 1.0 Max. current 1.5
TC164	1/16W	-55°C to +155°C	50V	100V	100V	E24 ±5% E24/E96 ±1% Jumper	10Ω ≤ R ≤ 1MΩ 10Ω ≤ R ≤ 1MΩ < 50mΩ	Rated current 1.0 Max. current 2.0
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-202 Method 108A	1000 hours at 70 ±2°C applied RCWV 1.5 hours on, 0.5 hours off, still air required	±(2% +50mΩ) < 100mΩ for jumper
High temperature exposure		MIL-STD-202 Method 108A	1000 hours at maximum operating temperature depending on specification, unpowered	±(1% +50mΩ) < 50mΩ for jumper
Moisture resistance		MIL-STD-202 Method 106G	Each temperature / humidity cycle is defined as 8 hours(method 106G), 3 cycles / 24 hours for 10d with 25°C / 65°C 95% R.H	±(2% +50mΩ) < 100mΩ for jumper
Thermal shock		MIL-STD-202 Method 107G	-55/+125 °C Note: Number of cycles required is 300. Devices mounted Maximum transfer time is 20 seconds. Dwell time is 15 minutes. Air – Air	±(1% +50mΩ) for others < 50mΩ for jumper
Solderability	Wetting	J-STD-002B test B	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-202 method 210F	Lead-free solder, 260°C, 10 seconds immersion time	±(1% +50mΩ) < 50mΩ for jumper No visible damage
Short time overload		IEC 60115 -1 4.13	2.5 times RCWV or maximum overload voltage whichever is less for 5 seconds at room temperature	±(2% +50mΩ) < 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											
YC122-JR-07100KL L/T 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 Default code (code 17) T = YC102 only 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% (for 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

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 - Network, T-type / L-type

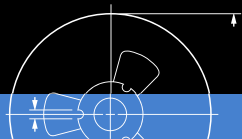
Global part number - Networks	
Ordering example: YC158TJR-07100KL	
Series name (code 1-2) ——— Y C YC = Array & Network (convex) thick film Size code (inch) (code 3-4) ——— 1 5 15 = 10Pin/8R (0612) 35 = 10Pin/8R (1225) Number of resistors (code 5) ——— 8 8 = 8 resistors Schematic (code 6) ——— T L = L-type (for YC358) T = T-type (for YC158/358)	——— J R — ——— 0 7 ——— 1 0 0 K ——— L 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) 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	---

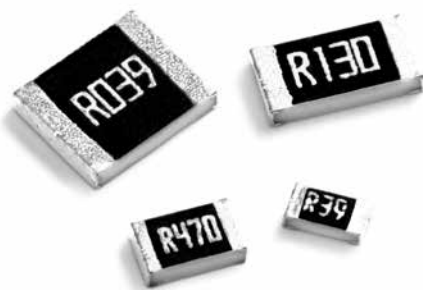
For ordering rules: See page 14 for E24 / E96 values and the last 4 or 3 digits of the 12NC catalogue number

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

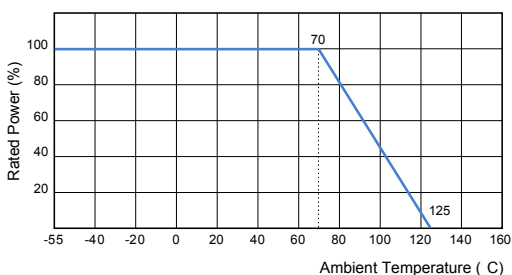
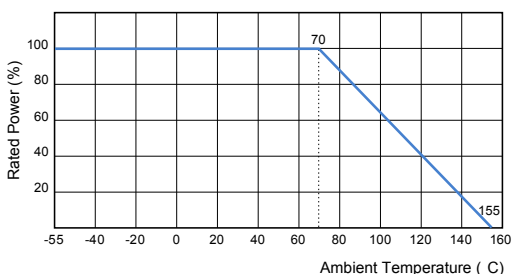
- Current sensing of desktop & notebook PC
- Resistance values down to 0.01Ω
- Highly reliable electrode construction

Derating curve

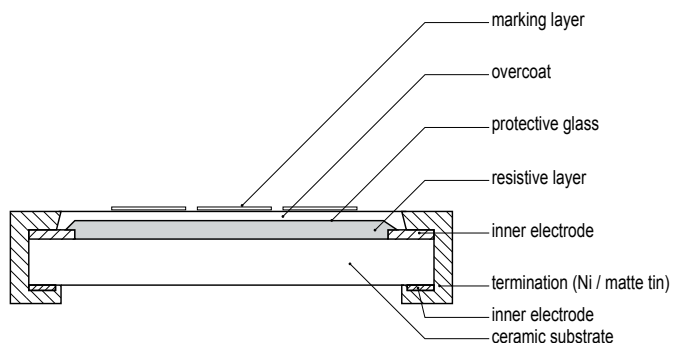
Maximum dissipation (P) in percentage of rated power as a function of the operating ambient temperature (T_{amb}).

Normal Power: Range: -55 °C to +155 °C

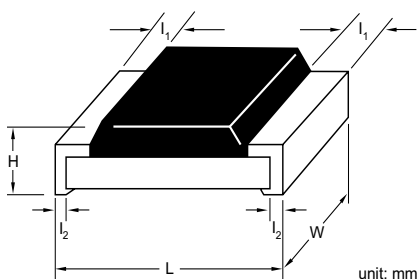
Double Power: Range: -55 °C to +125 °C



Construction



Dimensions



Type	L	W	H	I ₁	I 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

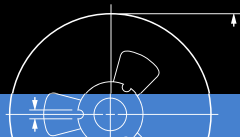
RL - Thick film low ohmic chip resistors, 0402 to 2512

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 +155°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	-55°C to +155°C		10mΩ ≤ R < 1Ω		Max. resistance 20mΩ Rated current 2A
RL0805	1/8W	-55°C to +155°C		10mΩ ≤ R < 1Ω		Max. resistance 20mΩ Rated current 2.5A
	1/4W	-55°C to +125°C		10mΩ ≤ R < 1Ω		-- --
RL1206	1/4W	-55°C to +155°C		10mΩ ≤ R < 1Ω		Max. resistance 20mΩ Rated current 3.5A
	1/2W	-55°C to +125°C		10mΩ ≤ R < 1Ω		-- --
RL1210	1/2W	-55°C to +155°C		10mΩ ≤ R < 1Ω		-- --
RL1218	1W	-55°C to +155°C		10mΩ ≤ R < 1Ω		-- --
RL2010	3/4W	-55°C to +155°C		10mΩ ≤ R < 1Ω		-- --
RL2512	1W	-55°C to +155°C		10mΩ ≤ R < 1Ω		-- --

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

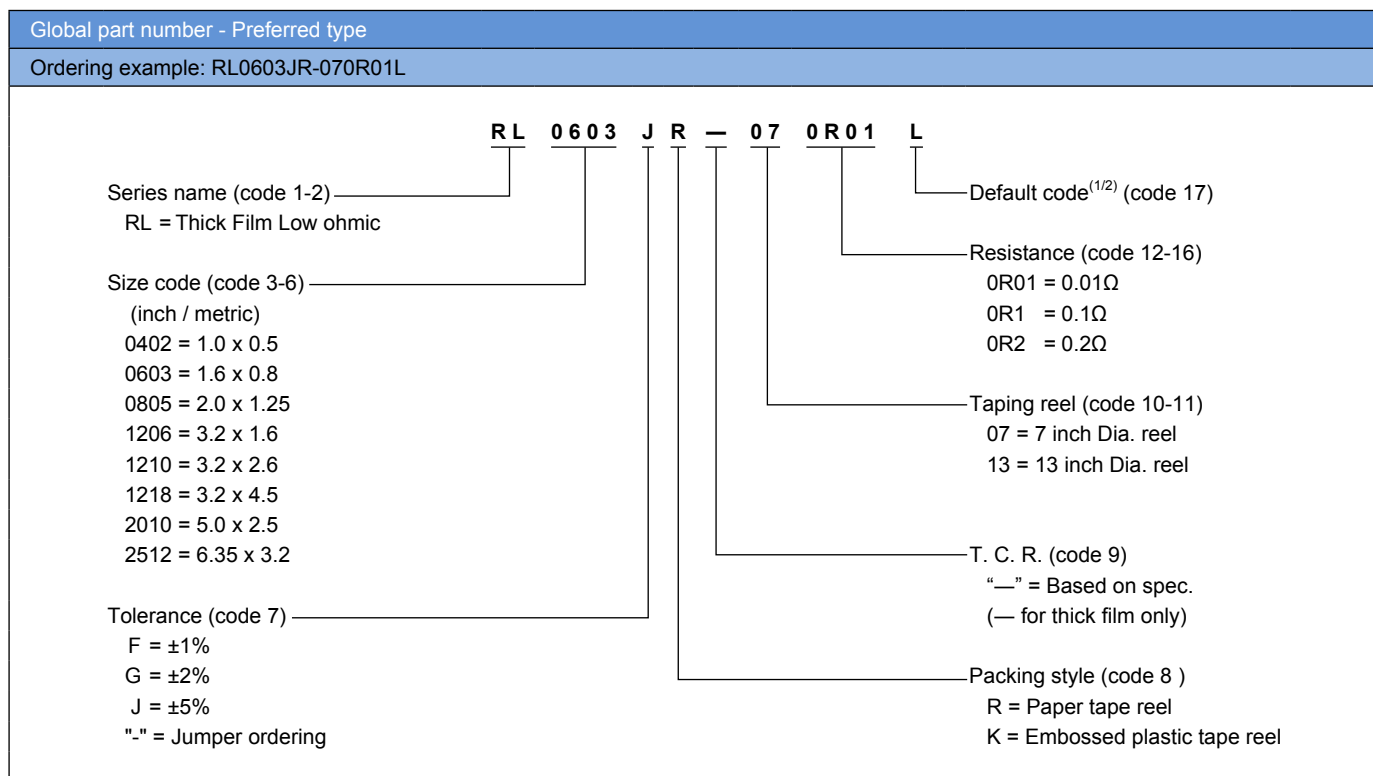
T. C. R. - RL series												
Type	Operating Temp. range	Resistancec range	T. C. R.									
			50mΩ≤R<100mΩ		100mΩ≤R<500mΩ		500mΩ≤R<1Ω					
RL0402	-55°C to +125°C	50mΩ≤R<1Ω	±1000 ppm/°C		±800 ppm/°C		±300 ppm/°C					
			10mΩ≤R≤36mΩ		36mΩ≤R≤91mΩ		91mΩ<R≤500mΩ		500mΩ<R<1Ω			
RL0603	-55°C to +125°C	10mΩ≤R<1Ω	±1500 ppm/°C		±1200 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	±1500 ppm/°C		±1200 ppm/°C		±1000 ppm/°C		±600 ppm/°C		±300 ppm/°C	±200 ppm/°C
RL1206												
RL1210												
			10mΩ≤R≤30mΩ		30mΩ<R≤56mΩ		56mΩ<R≤180mΩ		180mΩ<R<1Ω			
RL1218	-55°C to +125°C	10mΩ≤R<1Ω	±2000 ppm/°C		±1000 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	±1500 ppm/°C		±1200 ppm/°C		±1000 ppm/°C		±600 ppm/°C		±300 ppm/°C	±200 ppm/°C
RL2512												

Environmental characteristics			
Performance test		Test method	Requirements
Life		MIL-STD-202 Method 108A	1000 hours at 70°C ±2°C applied RCWV 1.5 hours on, 0.5 hours off, still air required
High temperature exposure		MIL-STD-202 Method 108A	1000 hours at maximum operating temperature depending on specification, unpowered
Moisture resistance		MIL-STD-202 Method 106G	Each temperature / humidity cycle is defined as 8 hours (method 106G), 3 cycles / 24 hours for 10d with 25°C / 65°C 95% R.H
Thermal shock		MIL-STD-202 Method 107G	-55/+125 °C Note: Number of cycles required is 300. Devices mounted Maximum transfer time is 20 seconds. Dwell time is 15 minutes. Air – Air
Solderability	Wetting	J-STD-002B test B	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-202 method 210F	Lead-free solder, 260°C, 10 seconds immersion time
Short time overload		IEC 60115 -1 4.13	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



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

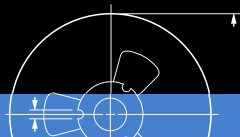
Phycomp worldwide - Traditional type								
Low ohmic chip resistors								
Size: inch (mm)	0402 (1005)		0603 (1608)		0805 (2012)		1206 (3216)	
Power	1/16 W		1/10 W		1/8 W		1/4 W	
Tolerance	+5%	+1%	+5%	+1%	+5%	+1%	+5%	+1%
Resistance	E24	E24	E24	E24	E24	E24	E24	E24
Packing	paper tape		paper tape		paper 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.								

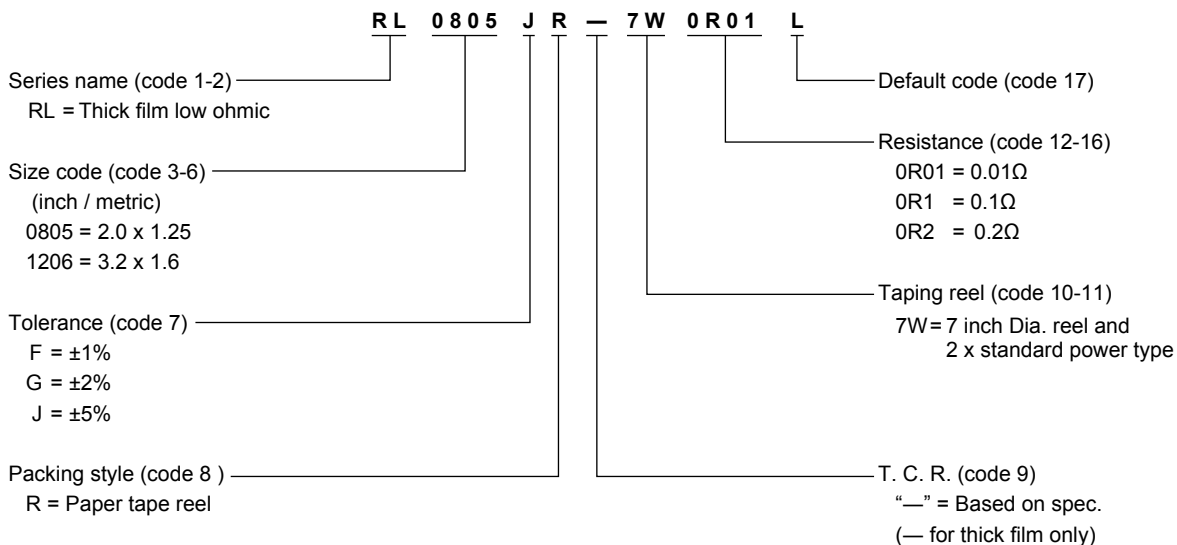


Chip Resistors Selection Charts

RL - Thick film low ohmic, high power chip resistors, 0805 / 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 519 01...L	2350 519 1...L

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

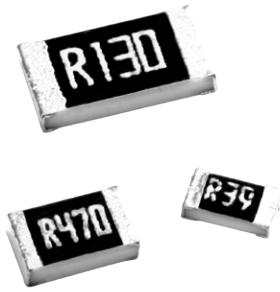
Phycomp CTC ordering code - Traditional type - North America

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



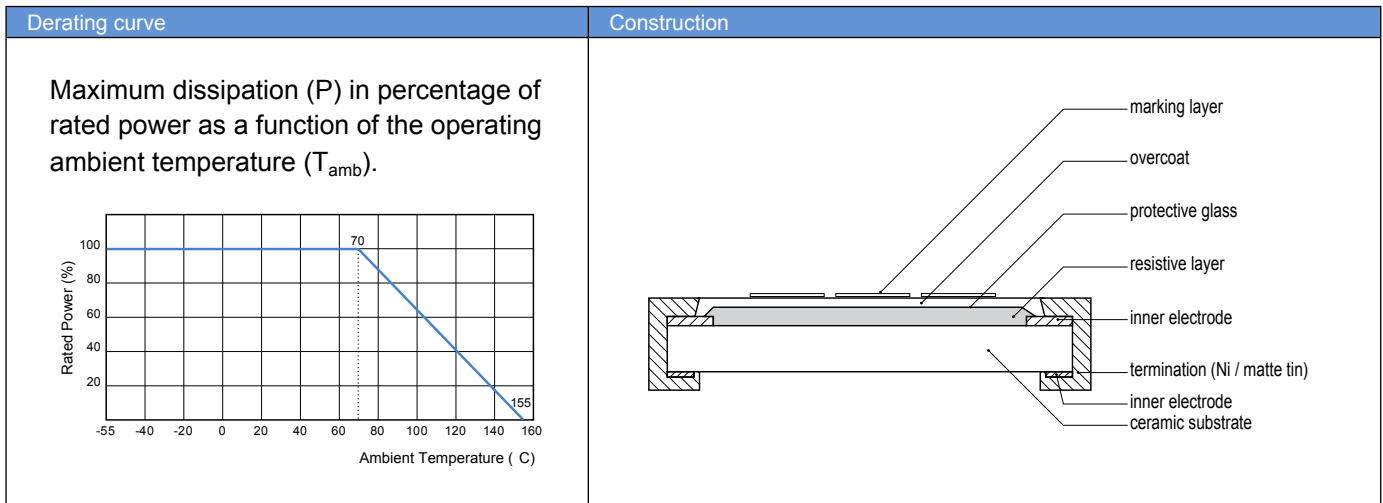
Chip Resistors Selection Charts

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

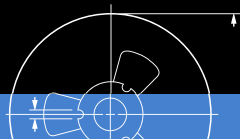


Dimensions

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 total length, W is the total width, H is the total 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
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 10mΩ Rated current 3A
	1/8W					
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					
	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					
PT1206	1/4W				50mΩ ≤ R < 75mΩ ±350ppm 75mΩ ≤ R ≤ 100mΩ ±100ppm 100mΩ < R < 1Ω ±75ppm	Max. resistance 5mΩ Rated current 10A
	1/2W					
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-202 Method 108A	1000 hours at 70 ±2°C applied RCWV 1.5 hours on, 0.5 hours off, still air required	±(1% +0.5mΩ) < 20mΩ for jumper
High temperature exposure		MIL-STD-202 Method 108A	1000 hours at maximum operating temperature depending on specification, unpowered	±(1% +0.5mΩ) < 20mΩ for jumper
Moisture resistance		MIL-STD-202 Method 106G	Each temperature / humidity cycle is defined as 8 hours (method 106G), 3 cycles / 24 hours for 10d with 25°C / 65°C 95% R.H	±(0.5% +0.5mΩ) < 20mΩ for jumper
Thermal shock		MIL-STD-202 Method 107G	-55/+125 °C Note: Number of cycles required is 300. Devices mounted Maximum transfer time is 20 seconds. Dwell time is 15 minutes. Air – Air	±(1% +0.5mΩ) < 10mΩ for jumper
Solderability	Wetting	J-STD-002B test B	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-202 method 210F	Lead-free solder, 260°C, 10 seconds immersion time	±(0.5% +0.5mΩ) No visible damage < 10mΩ for jumper
Short time overload		IEC 60115 -1 4.13	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% +0.5mΩ) No visible damage < 10mΩ for jumper

Chip Resistors Selection Charts

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

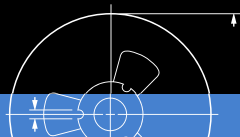
Global part number - Preferred type	
Ordering example: PT2512FK-070R01L	
Series name (code 1-2) ———— P T PT = Thick film low ohmic low T. C. R. Size code (code 3-6) ———— 2 5 1 2 (inch / metric) 0402 = 1.0 x 0.5 0603 = 1.6 x 0.8 0805 = 2.0 x 1.25 1206 = 3.2 x 1.6 2010 = 5.0 x 2.5 2512 = 6.35 x 3.2 Tolerance (code 7) ———— F K — F = $\pm 1\%$ G = $\pm 2\%$ J = $\pm 5\%$ “—” for Jumper ordering Packing style (code 8) ———— — R = Paper tape reel K = Embossed plastic tape reel	Resistance (code 12-16) 0 7 0 R 0 1 0R = Jumper 0R1 = 0.1Ω 0R2 = 0.2Ω Taping reel (code 10-11) L 07 = 7 inch Dia. reel 13 = 13 inch Dia. reel 7W = 7 inch Dia. reel and 2 x standard power type 7T = 7 inch Dia. reel and 3 x standard power type 3W = 13 inch Dia. reel and 2 x standard power type T. C. R. (code 9) “—” = Based 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

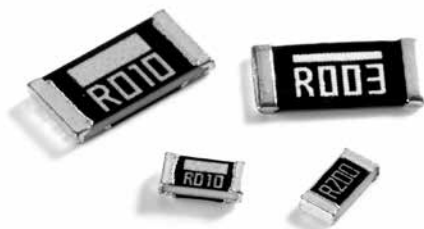
3. PT series products are available by "Global part number" only

Phycomp CTC ordering code - Traditional type - North America
Regional code for ordering Phycomp branded products. Please see page 15 for details.



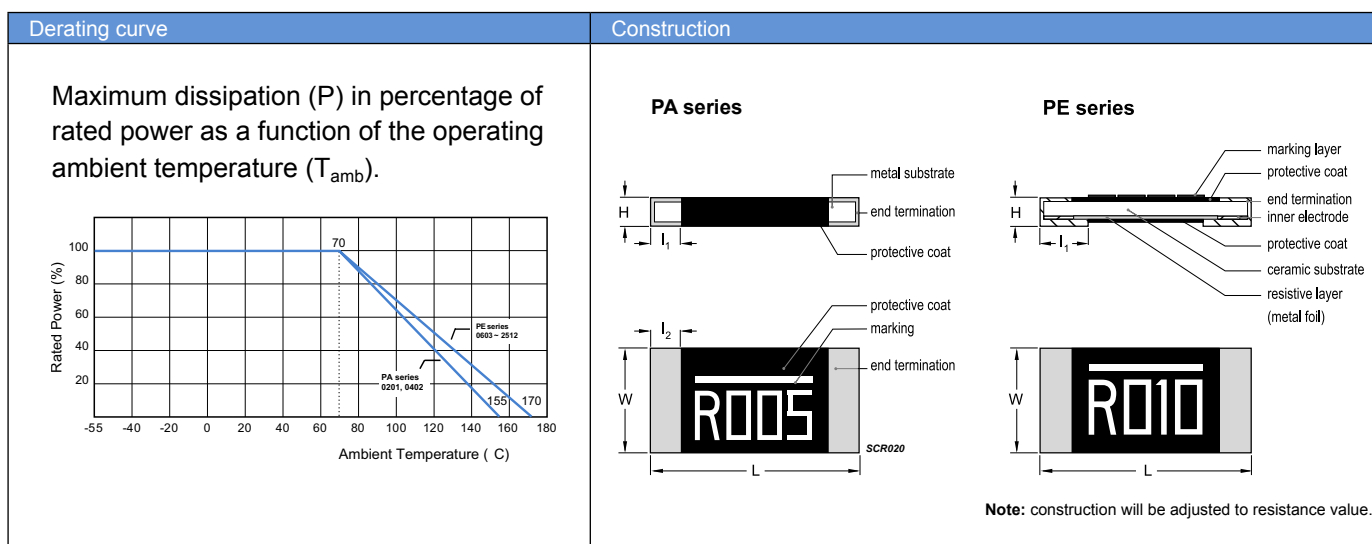
Chip Resistors Selection Charts

PA/PE - Current sensors - low T. C. R. chip resistors, 0201 to 2512



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						
PA series						
Type	Resistance range	L	W	H	I ₁	I ₂
PA1206	1mΩ	3.20 ± 0.25	1.60 ± 0.25	0.65 ± 0.25	1.04 ± 0.25	1.04 ± 0.25
	2mΩ ≤ R ≤ 5mΩ	3.20 ± 0.25	1.60 ± 0.25	0.65 ± 0.25	0.63 ± 0.25	0.63 ± 0.25
PA2512	1mΩ ≤ R ≤ 4mΩ	6.35 ± 0.25	3.18 ± 0.25	0.63 ± 0.25	2.21 ± 0.25	2.21 ± 0.25
	5mΩ ≤ R ≤ 6mΩ	6.35 ± 0.25	3.18 ± 0.25	0.63 ± 0.25	1.19 ± 0.25	1.19 ± 0.25
	7mΩ ≤ R ≤ 50mΩ	6.35 ± 0.25	3.18 ± 0.25	0.63 ± 0.25	0.76 ± 0.25	0.76 ± 0.25
PE series						
Type	Resistance range	L	W	H	I ₁	
PE0201	50mΩ ≤ R ≤ 200mΩ	0.60 ± 0.03	0.31 ± 0.04	0.27 ± 0.04	0.14 ± 0.06	
PE0402	10mΩ ≤ R ≤ 910mΩ	1.00+0.10/-0.15	0.50+0.10/-0.15	0.35 ± 0.15	0.25 ± 0.10	
PE0603	20mΩ ≤ R ≤ 50mΩ	1.60 ± 0.20	0.76 ± 0.25	0.35 ± 0.25	0.38 ± 0.25	
	51mΩ ≤ R ≤ 910mΩ	1.52 ± 0.25	0.76 ± 0.25	0.45 ± 0.10	0.38 ± 0.25	
PE0805	20 mΩ ≤ R ≤ 50mΩ	2.03 ± 0.25	1.27 ± 0.25	0.35 ± 0.25	0.38 ± 0.25	
	51mΩ ≤ R ≤ 910mΩ			0.55 ± 0.10	0.35 ± 0.20	
PE1206	5mΩ	3.20 ± 0.25	1.60 ± 0.25	0.64 ± 0.25	0.64 ± 0.25	
	6mΩ ≤ R ≤ 910mΩ				0.51 ± 0.25	
PE2010	5mΩ ≤ R ≤ 6mΩ	5.08 ± 0.25	2.54 ± 0.25	0.64 ± 0.25	1.47 ± 0.25	
	7mΩ ≤ R ≤ 100mΩ				0.51 ± 0.25	
PE2512	6mΩ ≤ R ≤ 100mΩ	6.35 ± 0.25	3.18 ± 0.25	0.64 ± 0.25	0.76 ± 0.25	

Chip Resistors Selection Charts

PA/PE - Current sensors - low T. C. R. chip resistors, 0201 to 2512

Electrical characteristics													
Type	Technology	Size	Power P70	Operating Temp. range	Max. working voltage	Tolerance	Resistance range	T. C. R.					
PE	Metal Foil	0201	1/20W	-55°C to 125°C	(PxR)^1/2	±0.5% R > 50mΩ ±1% ±5%	50mΩ ≤ R ≤ 200mΩ	50mΩ ≤ R ≤ 70mΩ ±350ppm/°C 70mΩ < R ≤ 200mΩ ±100ppm/°C					
			1/10W										
		0402	1/16W	-55°C to 125°C	(PxR)^1/2	±0.5% R > 50mΩ ±1% ±5%	10mΩ ≤ R ≤ 910mΩ	±100 ppm/°C					
			1/8W										
			1/6W										
			1/4W										
		0603	1/10W	-55°C to 170°C	(PxR)^1/2	±0.5% R > 50mΩ ±1% ±5%	5m,10m, 20mΩ ≤ R ≤ 910mΩ	±75 ppm/°C ±100 ppm/°C					
			1/5W										
			1/3W										
			2/5W										
			1/2W										
		0805	1/8W										
			1/4W										
			1/3W										
			1/2W										
		1206	1/4W				5mΩ ≤ R ≤ 910mΩ						
			1/2W										
			1W										
		2010	1/2W				-55°C to 170°C		(PxR)^1/2	±0.5% R > 50mΩ ±1% ±5%	5mΩ ≤ R<100mΩ	±50ppm/°C ±75ppm/°C ±100ppm/°C	
			1W										
		2512	1W								6mΩ ≤ R<100mΩ		
			2W										

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

Electrical characteristics								
Type	Technology	Size	Power P70	Operating Temp. range	Max. working voltage	Tolerance	Resistance range	Min. T. C. R.
PA	Metal Plate	1206	1/4W	-55°C to 170°C	(PxR) ^{1/2}	±1%, ±5%	1mΩ ≤ R ≤ 5mΩ	±100 ppm/°C
			1/2W					
			1W					
		2512	1W	-55°C to 170°C	(PxR) ^{1/2}	±1%, ±5%	1mΩ ≤ R ≤ 50mΩ	±100 ppm/°C
			2W					

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

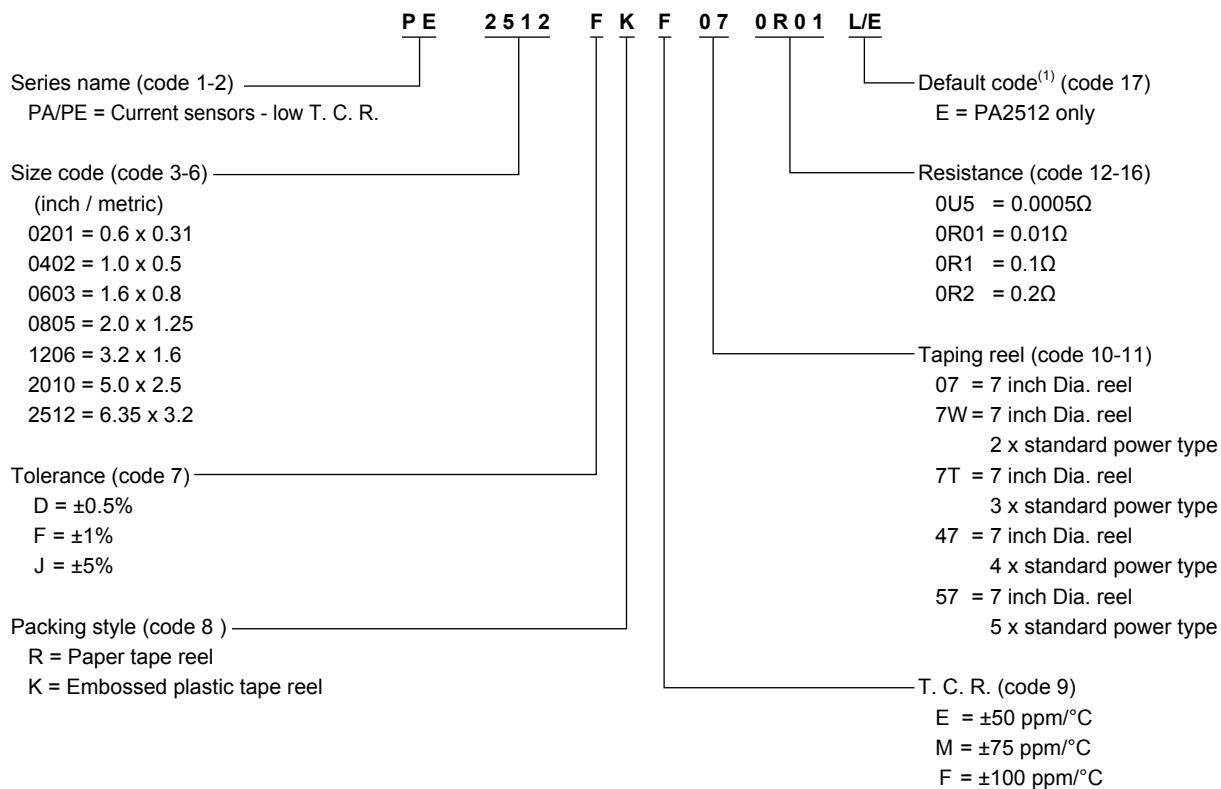
Environmental characteristics				
Performance test		Test method	Procedure	Requirements
Life		MIL-STD-202 Method 108A	1000 hours at 70 ±2°C applied RCWV 1.5 hours on, 0.5 hours off, still air required	±(1% +0.5mΩ)
High temperature exposure		MIL-STD-202 Method 108A	1000 hours at maximum operating temperature depending on specification, unpowered	±(1% +0.5mΩ)
Moisture resistance		MIL-STD-202 Method 106G	Each temperature / humidity cycle is defined as 8 hours (method 106G), 3 cycles / 24 hours for 10d with 25°C / 65°C 95% R.H	±(0.5% +0.5mΩ)
Thermal shock		MIL-STD-202 Method 107G	-55/+125 °C Note: Number of cycles required is 300. Devices mounted Maximum transfer time is 20 seconds. Dwell time is 15 minutes. Air – Air	±(0.5% +0.5mΩ)
Solderability	Wetting	J-STD-002B test B	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-202 method 210F	Lead-free solder, 260°C, 10 seconds immersion time	±(0.5% +0.5mΩ) No visible damage
Short time overload		IEC 60115 -1 4.13	5 times of rated power for 5 seconds at room temperature	±(0.5% +0.5mΩ) No visible damage





Global part number - Preferred type

Ordering example: PE2512FKF070R01L



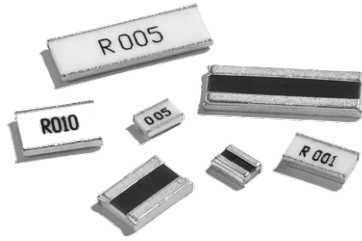
Note: 1. All of our RSMD products are RoHS compliant. "LFP" of the internal 2D reel label mentions "Lead Free Process"

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 - Current sensors - low T. C. R. chip resistors, wide termination, 0508 to 0612

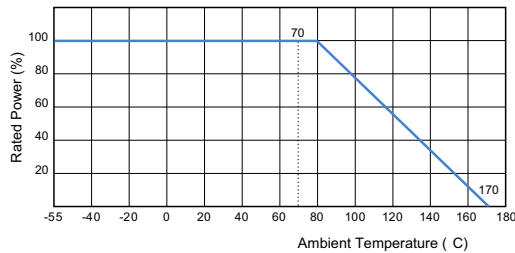


Features

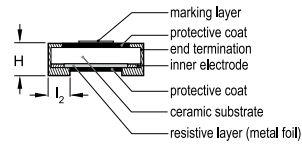
- Excellent T. C. R. compared to thick film low ohmic
- Precision current sensing control
- Excellent performance for current sensing applications
- Low ohmic and high power

Derating curve

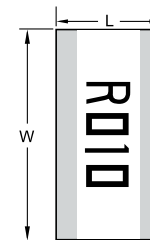
Maximum dissipation (P) in percentage of rated power as a function of the operating ambient temperature (T_{amb}).



Construction



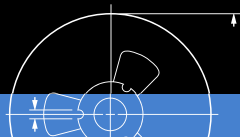
PE0508/ 0612



Dimensions

unit: mm

Type	Resistance range	L	W	H	l_1	l_2
PE0508	$3\text{ m}\Omega \leq R \leq 100\text{ m}\Omega$	1.35 ± 0.20	2.10 ± 0.20	0.65 ± 0.20	---	0.43 ± 0.15
PE0612	$1\text{ m}\Omega$	1.60 ± 0.20	0.32 ± 0.20	0.60 ± 0.15	---	0.55 ± 0.20
	$2\text{ m}\Omega \leq R \leq 4\text{ m}\Omega$	1.60 ± 0.20	0.32 ± 0.20	0.60 ± 0.15	---	0.40 ± 0.20
	$5\text{ m}\Omega \leq R \leq 100\text{ m}\Omega$	1.60 ± 0.20	0.32 ± 0.20	0.60 ± 0.15	---	0.30 ± 0.15



Chip Resistors Selection Charts

PE - Current sensors - low T. C. R. chip resistors, wide termination, 0508 to 0612

Electrical characteristics							
Type	Technology	Size	Power P ₇₀	Operating Temp. range	Max. working voltage	Tolerance	Resistance range & T. C. R.
PE	Foil	0508	1.2W	-55°C to +155°C	(PxR) ^{1/2}	±1% ±5%	5mΩ ≤ R ≤ 100mΩ ±50ppm/°C ±75ppm/°C ±100ppm/°C
		0612	1W	-55°C to +155°C	(PxR) ^{1/2}	±1% ±5%	1mΩ ≤ R ≤ 100mΩ ±50ppm/°C ±75 ppm/°C ±100 ppm/°C
			2W				

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

Environmental characteristics			
Performance test		Test method	Requirements
Life		MIL-STD-202 Method 108A	1000 hours at 70 ±2°C applied RCWV 1.5 hours on, 0.5 hours off, still air required
High temperature exposure		MIL-STD-202 Method 108A	1000 hours at maximum operating temperature depending on specification, unpowered
Moisture resistance		MIL-STD-202 Method 106G	Each temperature / humidity cycle is defined as 8 hours (method 106G), 3 cycles / 24 hours for 10d with 25°C / 65°C 95% R.H
Solderability	Wetting	J-STD-002B test B	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-202 method 210F	Lead-free solder, 260°C, 10 seconds immersion time
Short time overload		IEC 60115-1 4.13	5 times of rated power for 5 seconds at room temperature

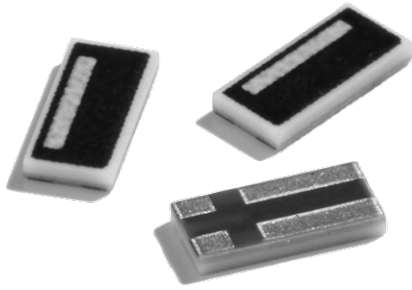
Global part number - Preferred type	
Ordering example: PE0612FKF070R01L	
Series name (code 1-2) ——— PE PE = current sensors - low T. C. R., wide termination Size code (code 3-6) ——— 0612 (inch / metric) 0508 = 1.35 x 2.1 0612 = 1.6 x 3.2 Tolerance (code 7) ——— F F = ±1% J = ±5% Packing style (code 8) ——— K K = Embossed plastic tape reel R = Paper tape reel	——— F ——— 07 ——— 0R01 ——— L Default code⁽¹⁾ (code 17) Resistance (code 12-16) 0R01 = 0.01Ω 0R02 = 0.02Ω Taping reel (code 10-11) 07 = 7 inch Dia. reel 7W = 7 inch Dia. reel 2 x standard power type T. C. R. (code 9) E = ±50 ppm/°C M = ±75 ppm/°C F = ±100 ppm/°C

Note: 1. All of our RSMD products are RoHS compliant. "LFP" of the internal 2D reel label mentions "Lead Free Process"



Chip Resistors Selection Charts

PS - Current sensors - low T.C.R. chip resistors, 4 termination, 0306 to 0612

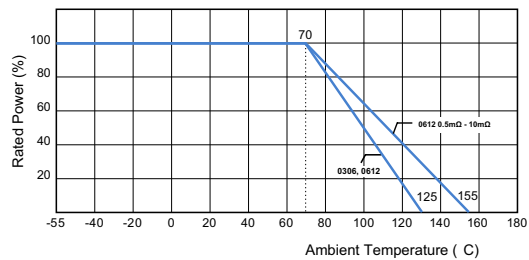


Features

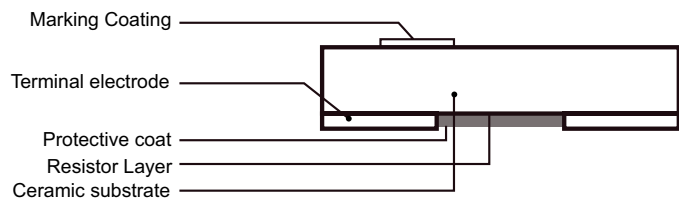
- Excellent T. C. R. compared to thick film low ohmic
- Precision current sensing control
- Excellent performance for current sensing applications
- Ultra-low resistance and narrow tolerance are suitable for current detection

Derating curve

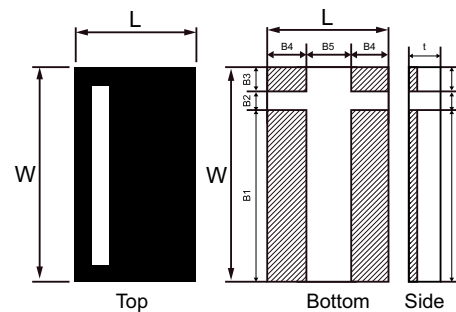
Maximum dissipation (P) in percentage of rated power as a function of the operating ambient temperature (T_{amb}).



Construction



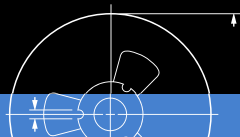
PS0306 / PS0612



Dimensions

unit: mm

Type	Resistance range	L	W	B1/S1	B2/S2	B3/S3	B4	B5	t
PS0306	$5\text{m}\Omega \leq R \leq 100\text{m}\Omega$	0.80 ± 0.15	1.60 ± 0.20	1.10 ± 0.20	0.25 ± 0.10	0.25 ± 0.10	0.20 ± 0.10	0.40 ± 0.20	0.50 ± 0.20
PS0612	$0.5\text{m}\Omega \leq R \leq 1\text{m}\Omega$	3.20 ± 0.20	$1.60^{+0.15}_{-0.20}$	2.20 ± 0.20	0.50 ± 0.20	0.50 ± 0.20	0.45 ± 0.20	0.70 ± 0.20	0.70 ± 0.20
	$2\text{m}\Omega \leq R \leq 10\text{m}\Omega$	3.20 ± 0.20							0.60 ± 0.20
	$12\text{m}\Omega \leq R \leq 100\text{m}\Omega$	3.20 ± 0.20							0.50 ± 0.20



Chip Resistors Selection Charts

PS - Current sensors - low T.C.R. chip resistors, 4 termination, 0306 to 0612

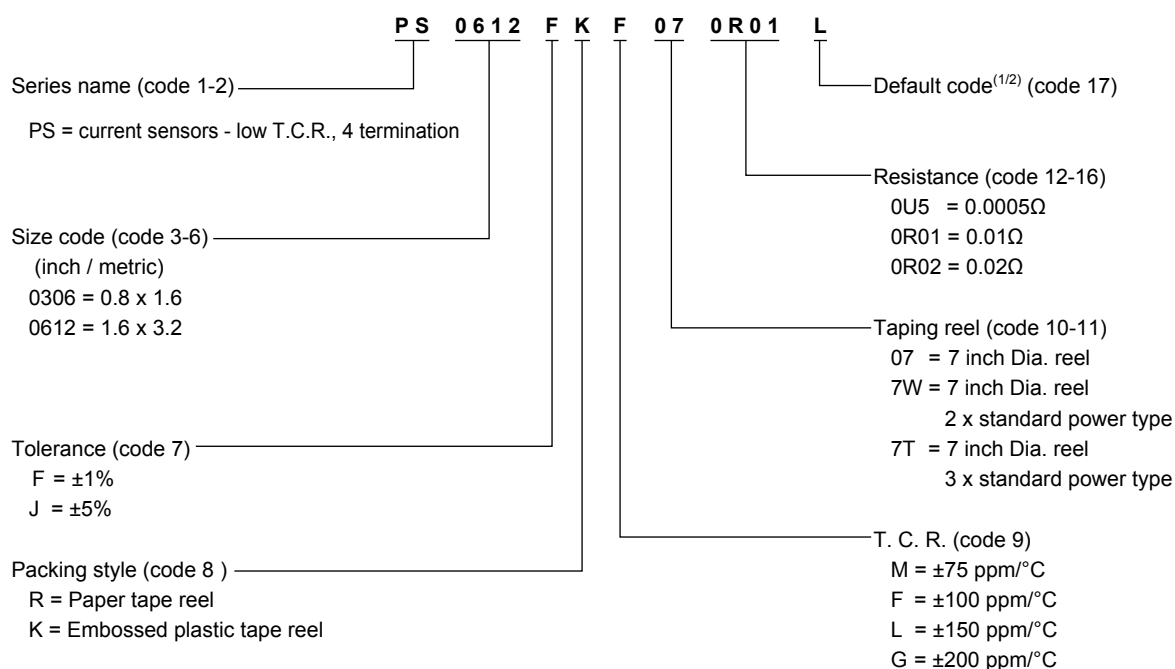
Electrical characteristics							
Type	Technology	Size	Power P ₇₀	Operating Temp. range	Max. working voltage	Tolerance	Resistance range & T. C. R.
PS	Metal Foil 4 termination	0306	1/4W	-55°C to 125°C	(PxR) ^{1/2}	±1%, ±5%	5mΩ ≤ R ≤ 100mΩ ±75 ppm/°C ±100 ppm/°C 3mΩ ≤ R < 5mΩ ±150 ppm/°C
			1/3W				
			1/2W				
		0612	1W	0.5mΩ ~ 10mΩ -55°C to +150°C 12mΩ ~ 100mΩ -55°C to +125°C			0.5mΩ ≤ R ≤ 1mΩ ±150ppm/°C 2mΩ ≤ R ≤ 9mΩ ±100ppm/°C 14mΩ ≤ R ≤ 100mΩ ±100ppm/°C 10mΩ ≤ R ≤ 13mΩ ±200ppm/°C

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

Environmental characteristics			
Performance test		Test method	Requirements
Life		MIL-STD-202 Method 108A	1000 hours at 70 ±2°C applied RCWV 1.5 hours on, 0.5 hours off, still air required
High temperature exposure		MIL-STD-202 Method 108A	1000 hours at maximum operating temperature depending on specification, unpowered
Moisture resistance		MIL-STD-202 Method 106G	Each temperature / humidity cycle is defined as 8 hours (method 106G), 3 cycles / 24 hours for 10d with 25°C / 65°C 95% R.H
Solderability	Wetting	J-STD-002B test B	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-202 method 210F	Lead-free solder, 260°C, 10 seconds immersion time
Short time overload		IEC 60115-1 4.13	5 times of rated power for 5 seconds at room temperature

Global part number - Preferred type

Ordering example: PS0612FKF070R01L

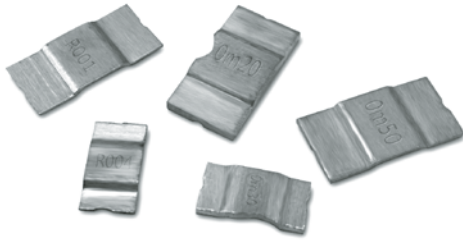


Note: 1. All of our RSMD products are RoHS compliant. "LFP" of the internal 2D reel label mentions "Lead Free Process"
2. PS series 4 termination type products are available by "Global part number" only



Chip Resistors Selection Charts

PU - Shunt chip resistors, 3921 / 5931



Features

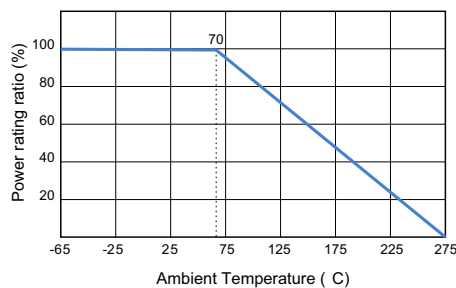
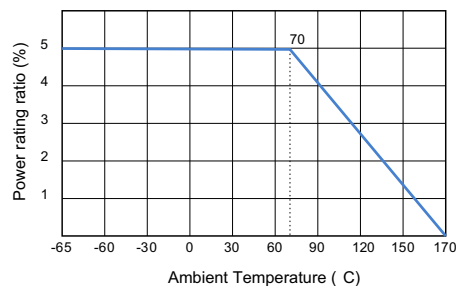
- Resistance value down to 0.0002Ω and high power to 10(W)
- 85°C/85% for high temperature & high humidity
- Welded metal plate construction

Derating curve

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

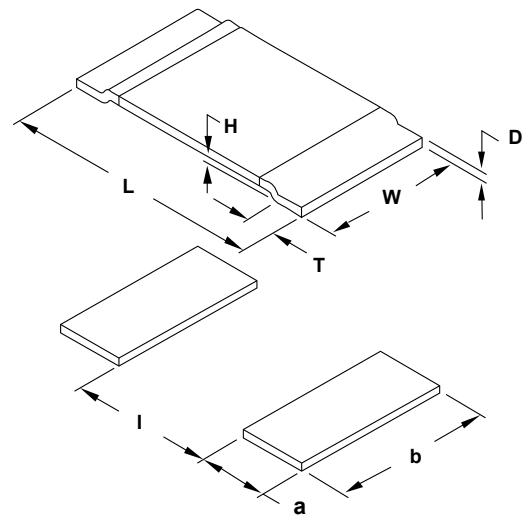
Normal Temperature Range: $-55\text{ }^{\circ}\text{C}$ to $+170\text{ }^{\circ}\text{C}$

High Temperature Range: $-55\text{ }^{\circ}\text{C}$ to $+275\text{ }^{\circ}\text{C}$



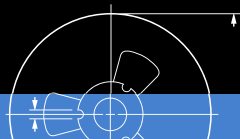
Construction

PU3921/PU5931



Dimensions

unit: mm							
Type	L	W	H	T	a	b	l
PU3921	10.0 ± 0.25	5.25 ± 0.25	0.5 ± 0.1	2.00 ± 0.25	2.75 ± 0.25	6.25 ± 0.25	5.5 ± 0.25
PU5931	15.0 ± 0.25	7.75 ± 0.25	0.5 ± 0.1	4.0 ± 0.25	5.25 ± 0.25	8.75 ± 0.25	5.5 ± 0.25



Chip Resistors Selection Charts

PU - Shunt chip resistors, 3921 / 5931

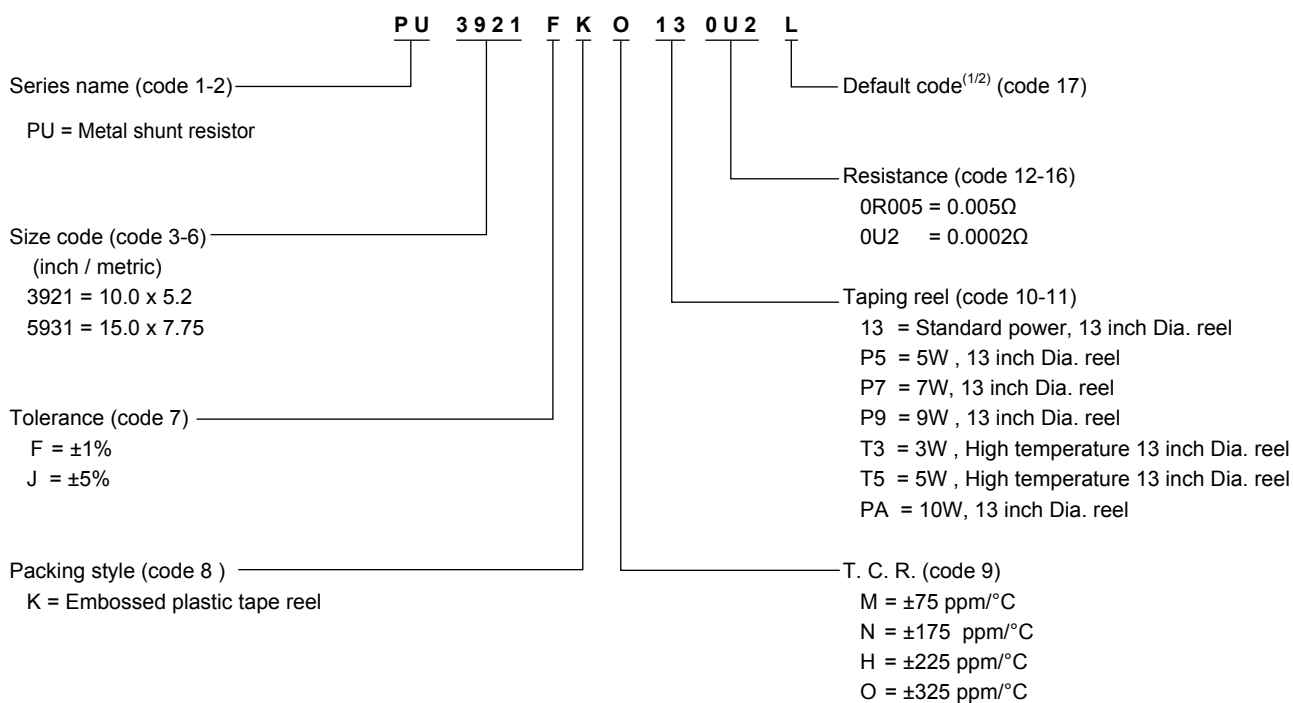
Electrical characteristics							
Type	Size	Power P ₇₀	Max voltage	Operating Temp. range	Resistance range	Tolerance	TCR
PU	3921	3W	(PxR)^1/2	-55℃ to 170℃	0.2mR/ 0.3mR/ 0.5mR/ 1mR/ 2mR/3mR/4mR	±1%,±5%	0.2mR ±325ppm/℃ 0.3mR/ 0.5mR ±175ppm/℃ 1mR~4mR ±75ppm/℃
				-55℃ to 275℃	0.5mR/1mR/ 2mR/3mR/4mR		
		5W		2mR/3mR/4mR			
		9W		0.2mR/ 0.3mR/ 0.5mR/1mR			
	5931	5W		-55℃ to 170℃	0.2mR/ 0.3mR/ 0.5mR/ 1mR/ 2mR/3mR/4mR	±1%,±5%	0.2mR ±225ppm/℃ 0.3mR/ 0.5mR ±175ppm/℃ 1mR~4mR ±75ppm/℃
				-55℃ to 275℃	0.3mR/0.5mR/1mR/2mR/3mR/4mR		
		7W		1mR/2mR/3mR/4mR			
		10W		0.2mR/ 0.3mR/ 0.5mR			

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-202 Method 108A	1000 hours at 70 ±2°C applied RCWV 1.5 hours on, 0.5 hours off, still air required	±(1% +0.5mΩ)
High temperature exposure		MIL-STD-202 Method 108A	1000 hours at maximum operating temperature depending on specification, unpowered	±(1% +0.5mΩ)
Moisture resistance		MIL-STD-202 Method 106G	Each temperature / humidity cycle is defined as 8 hours (method 106G), 3 cycles / 24 hours for 10d with 25°C / 65°C 95% R.H	±(0.5% +0.5mΩ)
Solderability	Resistance to soldering heat	MIL-STD-202 method 210F	Lead-free solder, 260°C, 10 seconds immersion time	±(0.5% +0.5mΩ) No visible damage
Short time overload		IEC 60115-1 4.13	5 times of rated power for 5 seconds at room temperature	±(0.5% +0.5mΩ) No visible damage

Global part number - Preferred type

Ordering example: PU3921FKO130U2L



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



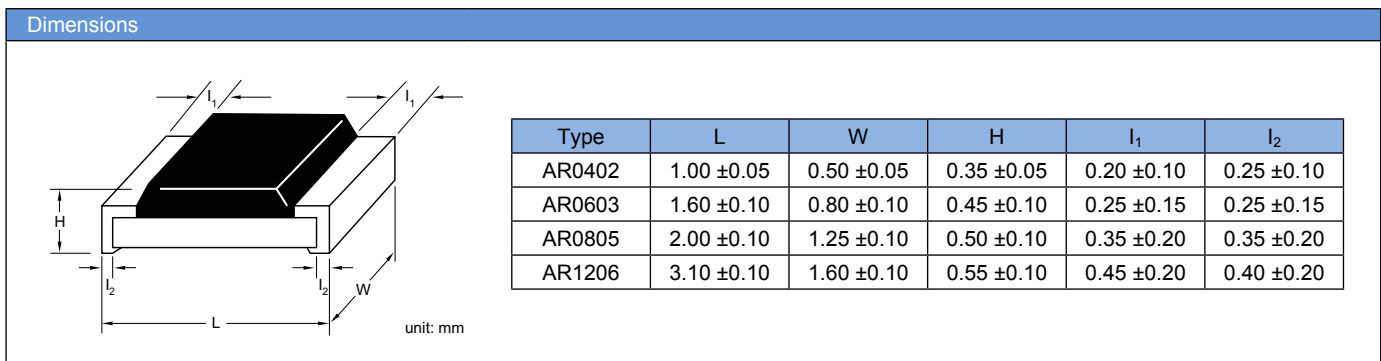
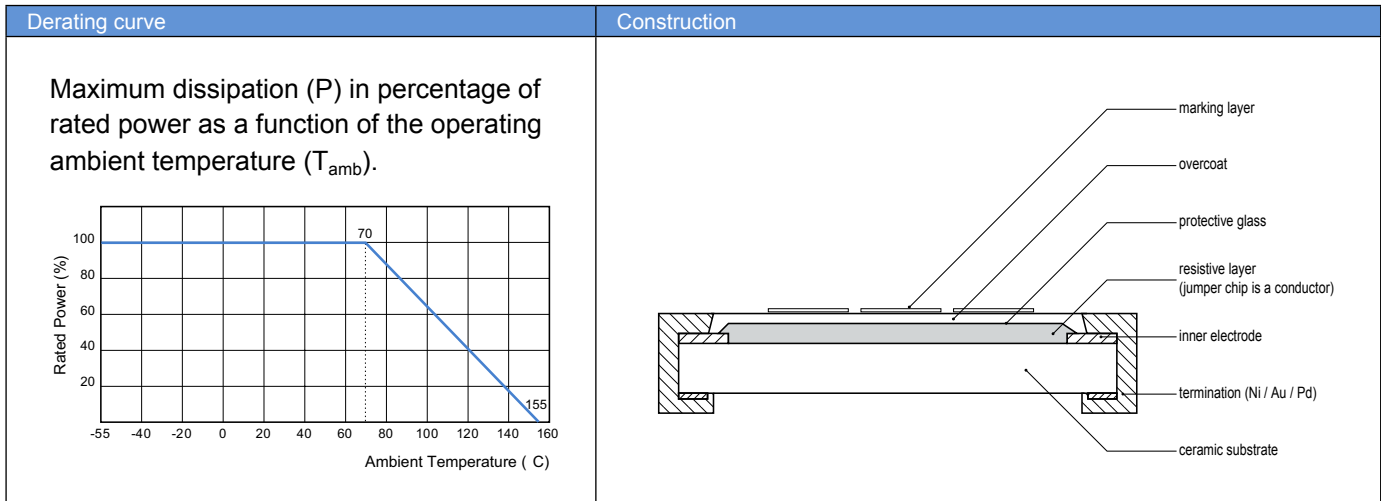
Chip Resistors Selection Charts

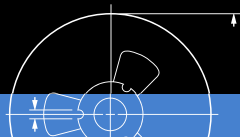
AR - NiAu termination chip resistors, 0402 to 1206



Features

- New NiAu terminations provide special application for hybrid board gluing
- Competitive with NiAu 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 ppm/°C $1\Omega \leq R \leq 10\Omega$ ± 200 ppm/°C	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

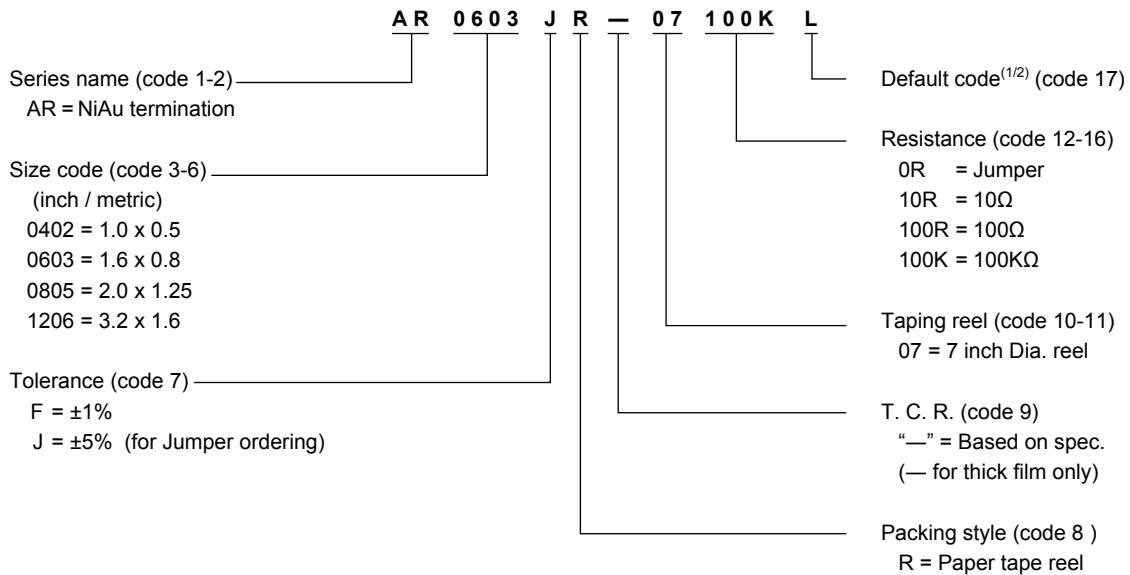
Environmental characteristics				
Performance test		Test method	Procedure	Requirements
Life		MIL-STD-202 -method 108A	1000 hours at 70 $\pm 2^\circ\text{C}$ applied RCWV 1.5 hours on, 0.5 hours off, still air required	$\pm(2\% + 50m\Omega)$ $< 100m\Omega$ for jumper
High temperature exposure		MIL-STD-202 -method 108A	1000 hours at maximum operating temperature depending on specification, unpowered	$\pm(1\% + 50m\Omega)$ $< 50m\Omega$ for jumper
Moisture resistance		MIL-STD-202 -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	$\pm(2\% + 50m\Omega)$ $< 100m\Omega$ for jumper
Thermal shock		MIL-STD-202 -method 107G	-55/+125 °C Note: Number of cycles required is 300. Devices mounted Maximum transfer time is 20 seconds. Dwell time is 15 minutes. Air – Air	$\pm(0.5\% + 50m\Omega)$ for 10K to 10M $\pm(1\% + 50m\Omega)$ 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-202 -method 107G	Lead-free solder, 260°C, 10 seconds immersion time	$\pm(1\% + 50m\Omega)$ $< 50m\Omega$ 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	$\pm(2\% + 50m\Omega)$ $< 50m\Omega$ 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

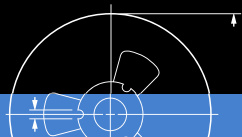
Phycomp worldwide - Traditional type

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

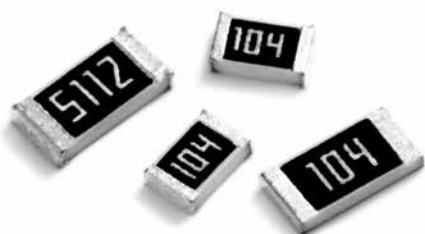
Phycomp CTC ordering code - Traditional type - North America

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



Chip Resistors Selection Charts

SR - Surge chip resistors, 0402 to 2512

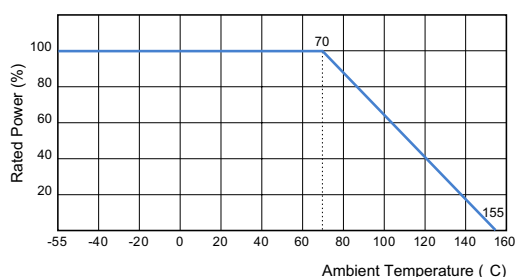


Features

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

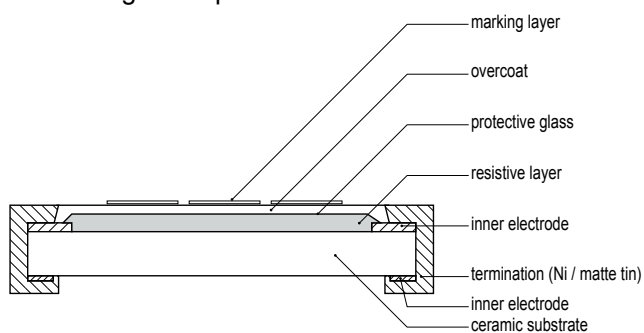
Derating curve

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

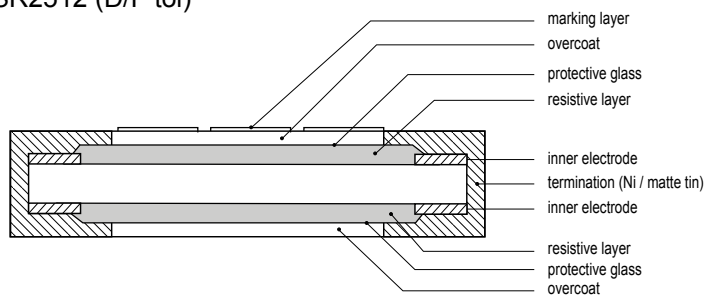


Construction

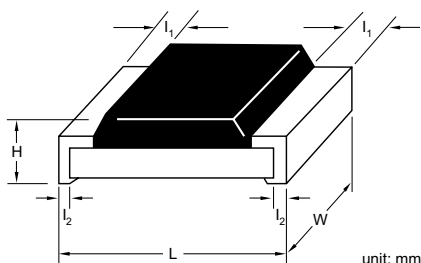
All size range except SR2512 with D/F tol



SR2512 (D/F tol)



Dimensions



unit: mm

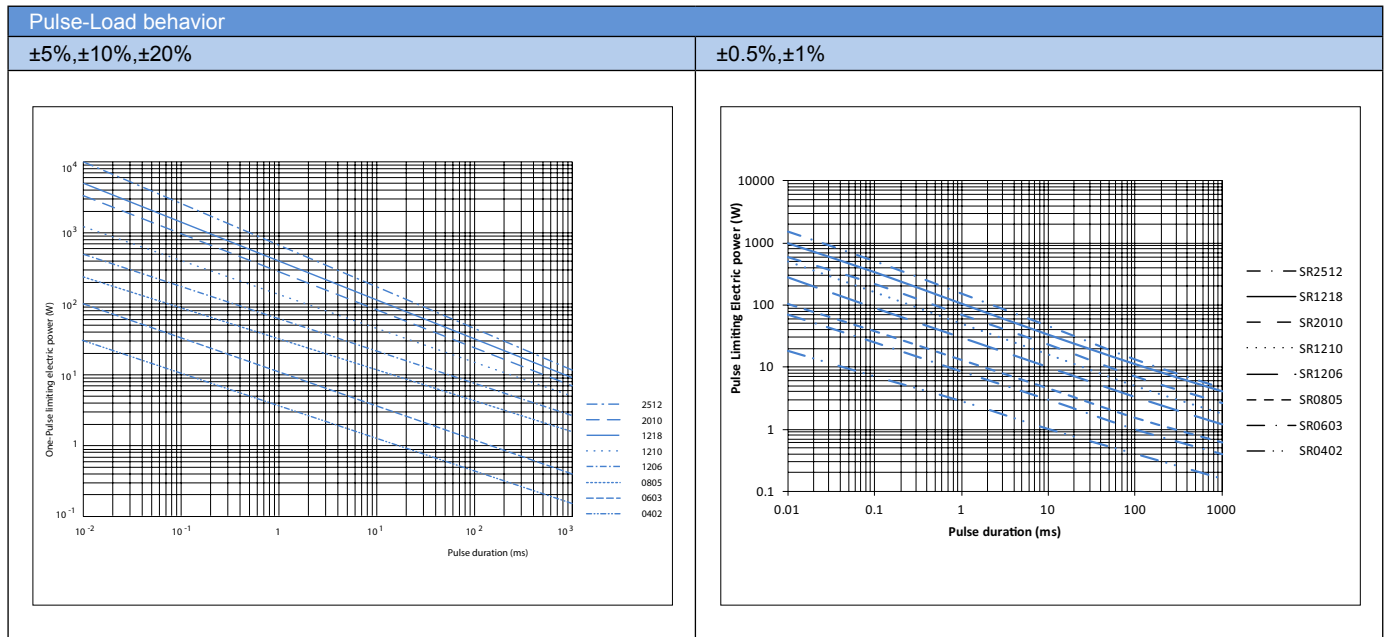
Type	L	W	H	l_1	l_2
SR0402	1.00 ±0.05	0.50 ±0.05	0.35 ±0.05	0.20 ±0.10	0.25 ±0.10
SR0603	1.60 ±0.10	0.80 ±0.10	0.45 ±0.10	0.25 ±0.15	0.25 ±0.15
SR0805	2.00 ±0.10	1.25 ±0.10	0.50 ±0.10	0.35 ±0.20	0.35 ±0.20
SR1206	3.10 ±0.10	1.60 ±0.10	0.55 ±0.10	0.45 ±0.20	0.40 ±0.20
SR1210	3.10 ±0.10	2.60 ±0.15	0.50 ±0.10	0.45 ±0.15	0.50 ±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

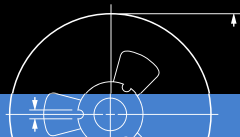
Chip Resistors Selection Charts

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 $\pm 0.5\%, \pm 1\%, \pm 5\%, \pm 10\%, \pm 20\%$ E96 $\pm 0.5\%, \pm 1\%$ $1\Omega \leq R \leq 100K\Omega$	$\pm 200 \text{ ppm}/^\circ\text{C}$
	1/8W	-55°C to +155°C	50V	100V	100V		
SR0603	1/10W	-55°C to +155°C	75V	150V	150V		
	1/5W	-55°C to +155°C	75V	150V	150V		
SR0805	1/4W	-55°C to +155°C	75V	150V	150V		
	1/8W	-55°C to +155°C	150V	300V	300V		
SR1206	1/4W	-55°C to +155°C	150V	300V	300V		
	1/3W	-55°C to +155°C	150V	300V	300V		
SR1210	1/4W	-55°C to +155°C	200V	400V	500V		
	1/2W	-55°C to +155°C	200V	400V	500V		
SR1218	1/2W	-55°C to +155°C	200V	400V	500V		
	3/4W	-55°C to +155°C	200V	400V	400V		
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-202 -method 108	1000 hours at 70 $\pm 2^\circ\text{C}$ applied RCWV 1.5 hours on, 0.5 hours off, still air required	$\pm(3\% + 50\text{m}\Omega)$
High temperature exposure	IEC 60068-2-2	1000 hours at maximum operating temperature depending on specification, unpowered	$\pm(3\% + 50\text{m}\Omega)$
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-202 -method 210F Lead-free solder, 260°C, 10 seconds immersion time	$\pm(1\% + 50\text{m}\Omega)$ No visible damage
Short time overload	IEC60115-1 4.13	2.5 times RCWV or maximum overload voltage whichever is less for 5 seconds at room temperature	$\pm(2\% + 50\text{m}\Omega)$ No visible damage



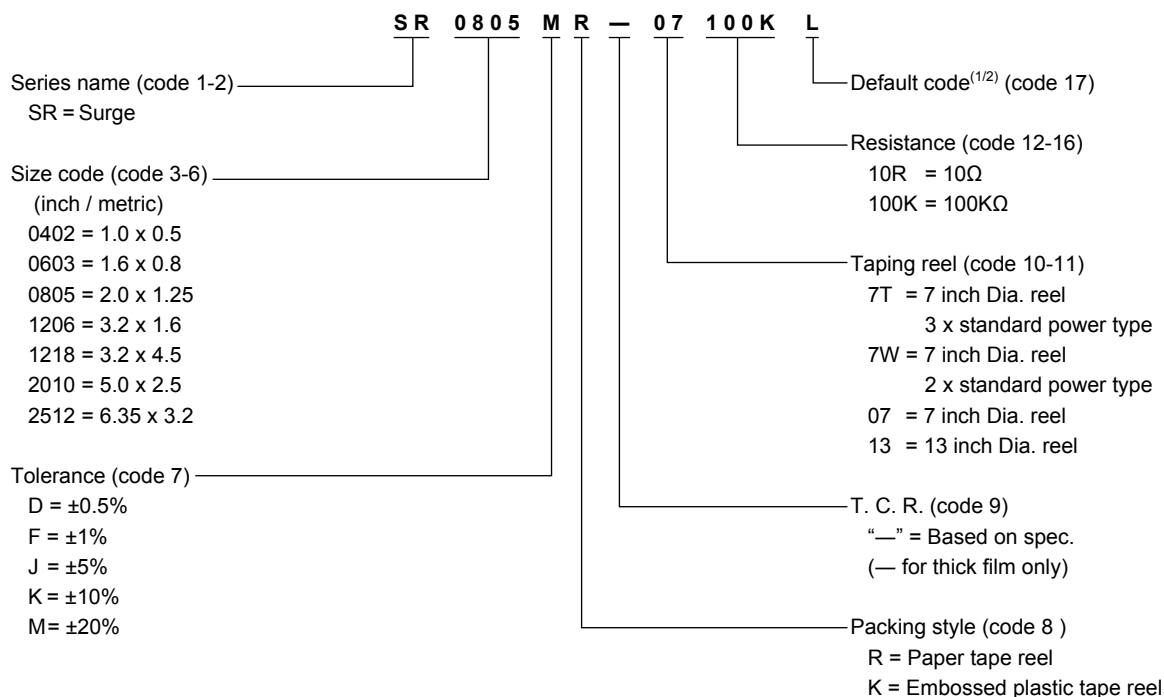


Chip Resistors Selection Charts

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.



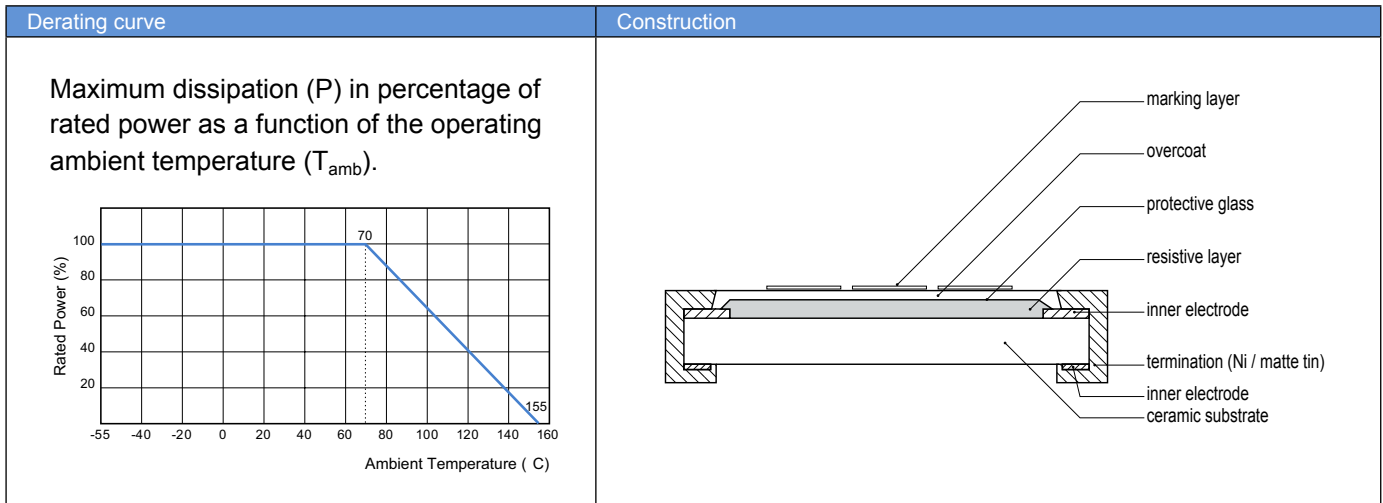
Chip Resistors Selection Charts

RV - High voltage chip resistors, 0603 to 2512



Features

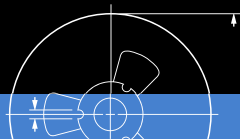
- Higher maximum working voltage compared to RC series
- Reliable electrode construction
- Compatible with lead containing and lead-free soldering processes
- Highly stable in auto-placement surface mounting



Dimensions

A 3D perspective diagram of a chip resistor. The component is a rectangular block with a black top surface. The dimensions are labeled as follows: L is the total length, W is the total width, H is the total height, l₁ is the length of the top surface, and l₂ is the length of the bottom surface. The bottom surface is shown as a white rectangular area within the black top surface. The unit is mm.

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
RV2010	5.00 ±0.10	2.50 ±0.15	0.55 ±0.10	0.45 ±0.15	0.50 ±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 $\pm 1\%$ $47\Omega \leq R \leq 10M\Omega$	$\pm 200 \text{ ppm}/^\circ\text{C}$
RV0805	1/8W	-55°C to +155°C	400V	800V	800V	E24 $\pm 5\%$ $47\Omega \leq R \leq 22M\Omega$ E24/E96 $\pm 1\%$ $47\Omega \leq R \leq 22M\Omega$ E24/E96 $\pm 0.5\%$ $47\Omega \leq R \leq 10M\Omega$	
RV1206	1/4W	-55°C to +155°C	500V	1000V	1000V	E24 $\pm 5\%$ $47\Omega \leq R \leq 27M\Omega$ E24/E96 $\pm 1\%$ $47\Omega \leq R \leq 27M\Omega$ E24/E96 $\pm 0.5\%$ $47\Omega \leq R \leq 10M\Omega$	
RV2010	3/4W	-55°C to +155°C	500V	1000V	1000V	E24 $\pm 5\%$ $47\Omega \leq R \leq 22M\Omega$ E24/E96 $\pm 1\%$ $47\Omega \leq R \leq 22M\Omega$ E24/E96 $\pm 0.5\%$ $47\Omega \leq R \leq 10M\Omega$	
RV2512	1W	-55°C to +155°C	500V	1000V	1000V	E24 $\pm 5\%$ $47\Omega \leq R \leq 16M\Omega$ E24/E96 $\pm 1\%$ $47\Omega \leq R \leq 16M\Omega$ E24/E96 $\pm 0.5\%$ $47\Omega \leq R \leq 10M\Omega$	

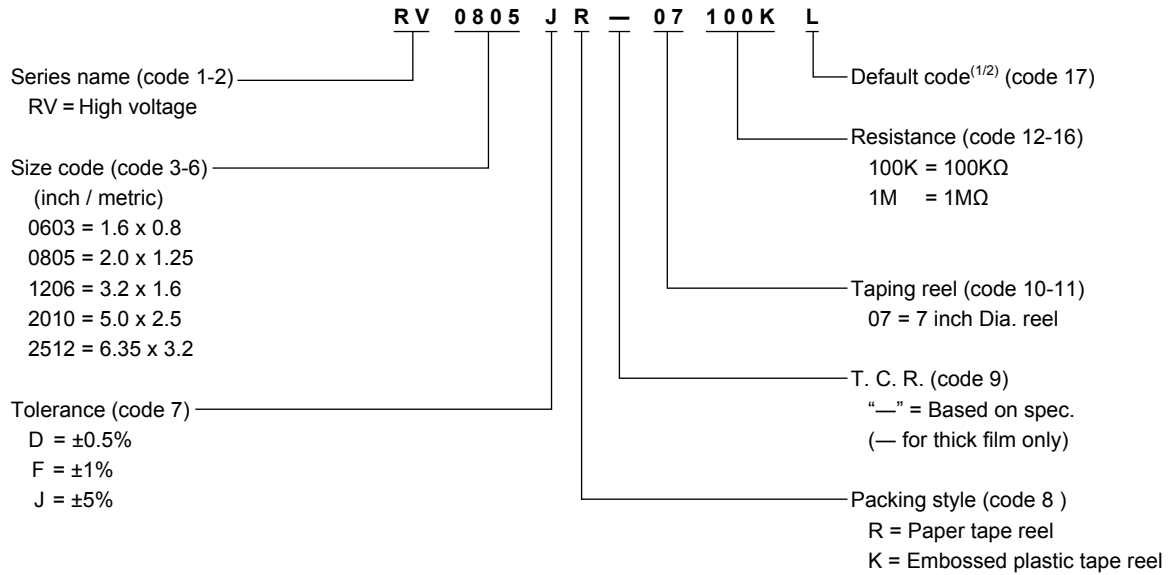
Environmental characteristics				
Performance test		Test method	Procedure	Requirements
Life		MIL-STD-202 Method 108A	1000 hours at $70 \pm 2^\circ\text{C}$ applied RCWV 1.5 hours on, 0.5 hours off, still air required	$\pm(2\% + 50m\Omega)$
High temperature exposure		MIL-STD-202 Method 108A	1000 hours at maximum operating temperature depending on specification, unpowered	$\pm(1\% + 50m\Omega)$
Moisture resistance		MIL-STD-202 Method 106G	Each temperature / humidity cycle is defined as 8 hours (method 106G), 3 cycles / 24 hours for 10d with 25°C / 65°C 95% R.H	$\pm(2\% + 50m\Omega)$
Thermal shock		MIL-STD-202 Method 107G	$-55/+125^\circ\text{C}$ Note: Number of cycles required is 300. Devices mounted Maximum transfer time is 20 seconds. Dwell time is 15 minutes. Air – Air	$\pm(0.5\% + 50m\Omega)$ for 10K to 10M $\pm(1\% + 50m\Omega)$ for others
Solderability	Wetting	IEC 60115 -1 4.13	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-202 method 210F	Lead-free solder, 260°C , 10 seconds immersion time	$\pm(1\% + 50m\Omega)$ No visible damage
Short time overload		J-STD-002B test B	2.5 times RCWV or maximum overload voltage whichever is less for 5 seconds at room temperature	$\pm(2\% + 50m\Omega)$ No visible damage

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

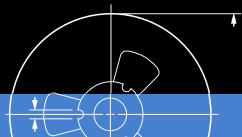
Phycomp worldwide - Traditional type

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

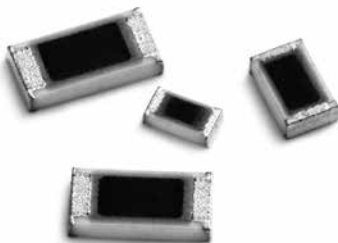
Phycomp CTC ordering code - Traditional type - North America

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



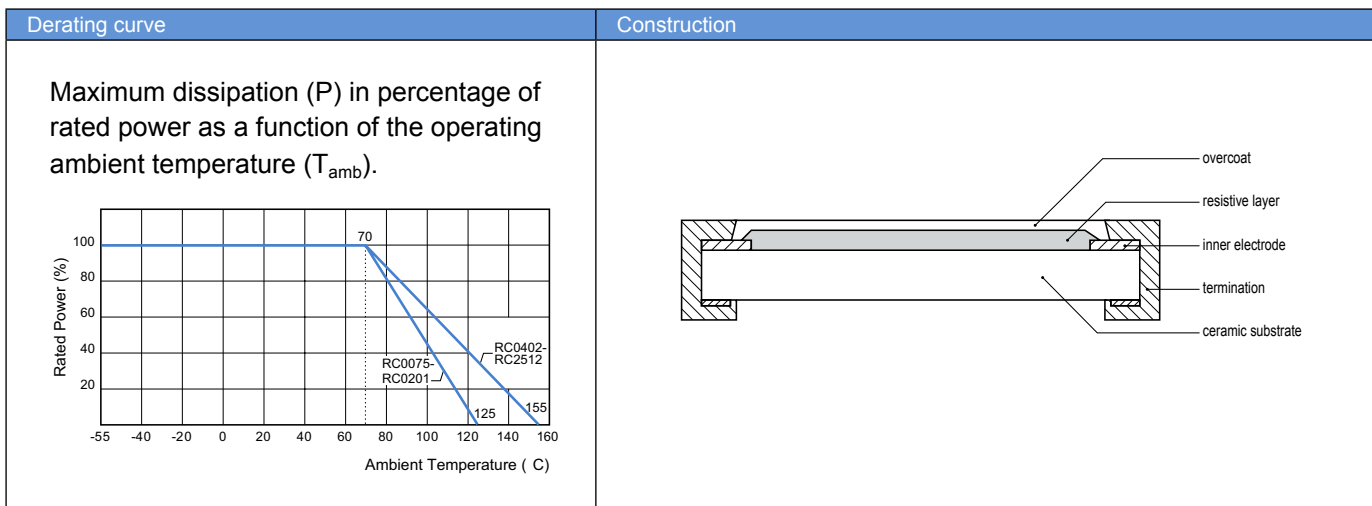
Chip Resistors Selection Charts

TR - Trimmable chip resistors, 0402 to 1206



Features

- Reduced size of final equipment
- Higher component and equipment reliability
- Low noise, when not trimmed
- Flexible for resistance trimming



Dimensions

A 3D perspective diagram of a chip resistor. The component is a rectangular block with a black top surface and a white bottom surface. The dimensions are labeled as follows: L is the length, W is the width, H is the height, l₁ is the distance from the end face to the start of the black surface, and l₂ is the distance from the end face to the end of the black surface. The unit is mm.

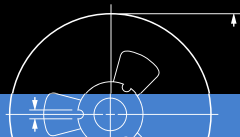
Type	L	W	H	l ₁	l ₂
TR0402	1.00 ±0.10	0.50 ±0.05	0.35 ±0.05	0.20 ±0.10	0.25 ±0.10
TR0603	1.60 ±0.10	0.80 ±0.10	0.45 ±0.10	0.25 ±0.15	0.25 ±0.15
TR0805	2.00 ±0.10	1.25 ±0.10	0.50 ±0.10	0.35 ±0.20	0.35 ±0.20
TR1206	3.10 ±0.10	1.60 ±0.10	0.55 ±0.10	0.45 ±0.20	0.40 ±0.20

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 ppm/°C $10\Omega < R \leq 1M\Omega$ ± 100 ppm/°C $1M\Omega < R \leq 10M\Omega$ ± 200 ppm/°C
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-202 Method 108A	1000 hours at 70 $\pm$ 2°C applied RCWV 1.5 hours on, 0.5 hours off, still air required	$\pm(1\% +50m\Omega)$
High temperature exposure		MIL-STD-202 Method 108A	1000 hours at maximum operating temperature depending on specification, unpowered	$\pm(1\% +50m\Omega)$
Moisture resistance		MIL-STD-202 Method 106G	Each temperature / humidity cycle is defined as 8 hours (method 106G), 3 cycles / 24 hours for 10d with 25°C / 65°C 95% R.H	$\pm(2\% +50m\Omega)$
Thermal shock		MIL-STD-202 Method 107G	-55/+125 °C Note: Number of cycles required is 300. Devices mounted Maximum transfer time is 20 seconds. Dwell time is 15 minutes. Air – Air	$\pm(1\% +50m\Omega)$
Solderability	Wetting	J-STD-002B test B	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	MIL-STD-202 method 210F	Lead-free solder, 260°C, 10 seconds immersion time	$\pm(1\% +50m\Omega)$ No visible damage
Short time overload		IEC 60115 -1 4.13	2.5 times RCWV or maximum overload voltage whichever is less for 5 seconds at room temperature	$\pm(1\% +50m\Omega)$ No visible damage

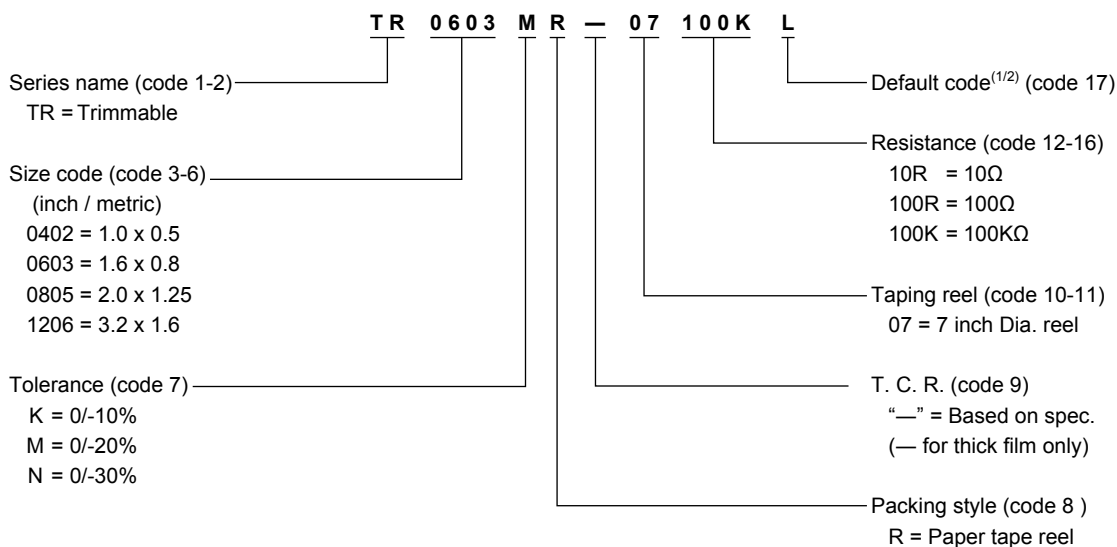


Chip Resistors Selection Charts

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

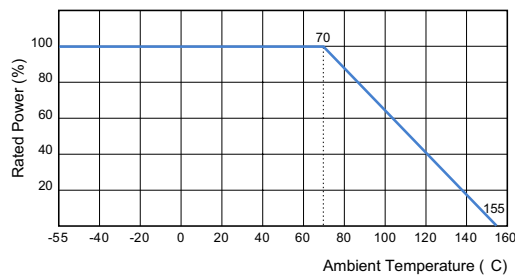
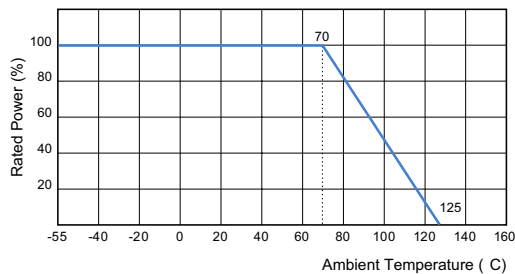
- Superior resistance against sulfur containing atmosphere
- Highly reliable electrode construction
- Compatible with all soldering processes
- Highly stable in auto-placement surface mounting applications
- Halogen free product and production

Derating curve

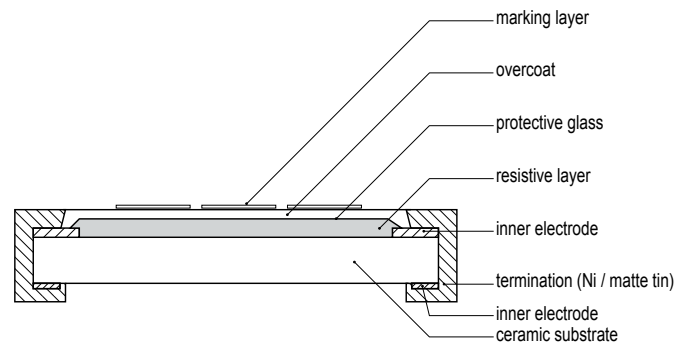
Maximum dissipation (P) in percentage of rated power as a function of the operating ambient temperature (T_{amb}).

AF0201 Range: -55 °C to + 125 °C

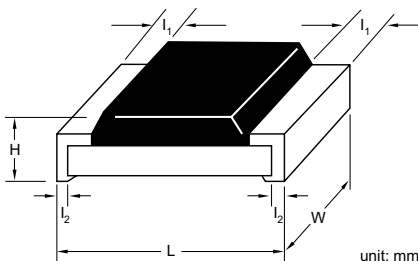
AF0402 - AF2512 Range: -55 °C to + 155 °C



Construction

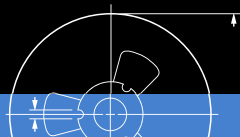


Dimensions



Type	L	W	H	l_1	l_2
AF0201	0.60 ±0.03	0.30 ±0.03	0.23 ±0.03	0.12 ±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

unit: mm



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 $\pm 0.5\%$, $\pm 1\%$ $1\Omega \leq R \leq 10M\Omega$ Jumper $< 50m\Omega$	$1\Omega \leq R \leq 10\Omega$ $-100/+350ppm/^{\circ}C$ $10\Omega < R \leq 10M\Omega$ $\pm 200ppm/^{\circ}C$	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 $\pm 0.5\%$, $\pm 1\%$ $1\Omega \leq R \leq 10M\Omega$ Jumper $< 50m\Omega$	$1\Omega \leq R \leq 10\Omega$ $\pm 200ppm/^{\circ}C$ $10\Omega < R \leq 10M\Omega$ $\pm 100ppm/^{\circ}C$ $10M\Omega < R \leq 22M\Omega$ $\pm 200ppm/^{\circ}C$	Rated current 1.0 Max. current 2.0
AF0603	1/10W	-55°C to +155°C	75V	150V	150V			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 $\pm 0.5\%$, $\pm 1\%$ $1\Omega \leq R \leq 10M\Omega$ Jumper $< 50m\Omega$	$1\Omega \leq R \leq 10\Omega$ $\pm 200ppm/^{\circ}C$ $10\Omega < R \leq 10M\Omega$ $\pm 100ppm/^{\circ}C$	Rated current 2.0 Max. current 10.0
AF1218	1W	-55°C to +155°C	200V	500V	500V	E24 $\pm 5\%$ $1\Omega \leq R \leq 1M\Omega$ E24/E96 $\pm 0.5\%$, $\pm 1\%$ $1\Omega \leq R \leq 1M\Omega$ Jumper $< 50m\Omega$		Rated current 2.0 Max. current 10.0
AF2010	3/4W	-55°C to +155°C	200V	500V	500V	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 $< 50m\Omega$		Rated current 2.0 Max. current 10.0
AF2512	1W	-55°C to +155°C	200V	500V	500V	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 $< 50m\Omega$		Rated current 2.0 Max. current 10.0

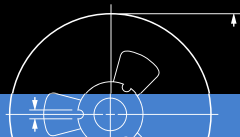
Environmental characteristics				
Performance test		Test method	Procedure	Requirements
Life		MIL-STD-202 Method 108	1000 hours at 70 $\pm 2^{\circ}C$ applied RCWV 1.5 hours on, 0.5 hours off, still air required	$\pm(1\% + 50m\Omega)$ $< 100m\Omega$ for jumper
High temperature exposure		MIL-STD-202 Method 108	1000 hours at maximum operating temperature depending on specification, unpowered	$\pm(1\% + 50m\Omega)$ $< 100m\Omega$ for jumper
Moisture resistance		MIL-STD-202 Method 106	Each temperature / humidity cycle is defined as 8 hours (method 106G), 3 cycles / 24 hours for 10d with 25°C / 65°C 95% R.H	$\pm(0.5\% + 50m\Omega)$ for 1% tol. $\pm(1\% + 50m\Omega)$ for 5% tol. $< 100m\Omega$ for jumper
Thermal shock		MIL-STD-202 Method 107	-55/+125 °C Note: Number of cycles required is 300. Devices mounted Maximum transfer time is 20 seconds. Dwell time is 15 minutes. Air – Air	$\pm(0.5\% + 50m\Omega)$ for 1% tol. $\pm(1\% + 50m\Omega)$ 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 $\pm 3^{\circ}C$ Dipping time: 3 ± 0.5 seconds	Well tinned ($\geq 95\%$ covered) No visible damage
	Resistance to soldering heat	MIL-STD-202 Method 215	Lead-free solder, 260°C, 10 seconds immersion time	$\pm(1\% + 50m\Omega)$ No visible damage
Short time overload		IEC60115-1 4.13	2.5 times RCWV or maximum overload voltage whichever is less for 5 seconds at room temperature	$\pm(1\% + 50m\Omega)$ No visible damage
Anti-FOS		ASTM-B-809-95	Sulfur (saturated vapor) 1000 hours, 90 $\pm 2^{\circ}C$, Rating with no power	$\pm(1\% + 50m\Omega)$
		ASTM-B-809-95* * Modified	Sulfur 750 hours, 105°C, Rating with no power	$\pm(4\% + 50m\Omega)$

Chip Resistors Selection Charts

AF - Sulfur resistant chip resistors, 0201 to 2512

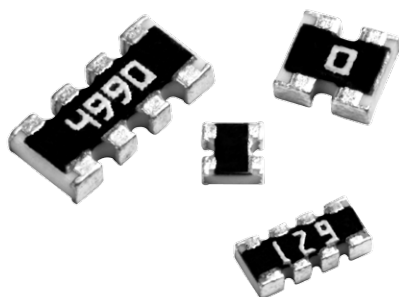
Global part number - Preferred type	
Ordering example: AF0603JR-07100KL	
Series name (code 1-2) ———— A F AF = Anti-sulfurated Size code (code 3-6) ———— 0 6 0 3 (inch / metric) 0201 = 0.6 x 0.3 0402 = 1.0 x 0.5 0603 = 1.6 x 0.8 0805 = 2.0 x 1.25 1206 = 3.2 x 1.6 1210 = 3.2 x 1.6 1218 = 3.2 x 2.6 2010 = 5.0 x 2.5 2512 = 6.35 x 3.2 Tolerance (code 7) ———— J D = $\pm 0.5\%$ 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 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

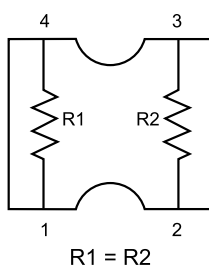


Features

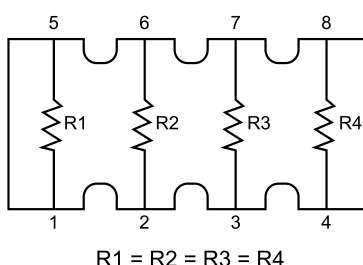
- Superior resistance against sulfur containing atmosphere
- Highly reliable electrode construction
- Compatible with all soldering processes
- Highly stable in auto-placement surface mounting applications
- Halogen free product and production

Schematics

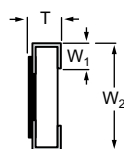
AF122 /AF162



AF124 /AF164

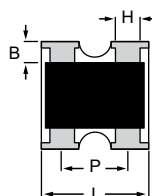


Dimensions

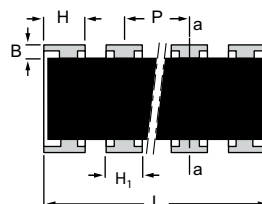


Side view for all types

AF122/ AF162



AF124/ AF164



unit: mm

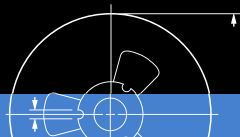
Type	H / H1	B	P	L	T	W1	W2
AF122	0.30 +0.10/-0.05	0.24 ±0.10	0.67 ±0.05	1.00 ±0.10	0.30 ±0.10	0.25 ±0.10	1.00 ±0.10
AF124	H : 0.45 ±0.05 H1 : 0.30 ±0.05	0.25 ±0.15	0.50 ±0.05	2.00 ±0.10	0.45 ±0.10	0.30 ±0.15	1.00 ±0.10
AF162	0.35 ±0.10	0.30 ±0.10	0.80 ±0.05	1.6 ±0.10	0.40 ±0.10	0.30 ±0.10	1.6 ±0.10
AF164	H: 0.65 ±0.05 H1: 0.50 ±0.15	0.30 ±0.15	0.80 ±0.05	3.2 ±0.15	0.60 ±0.10	0.30 ±0.15	1.6 ±0.15

Chip Resistors Selection Charts

AF - Sulfur resistant chip resistors, Arrays

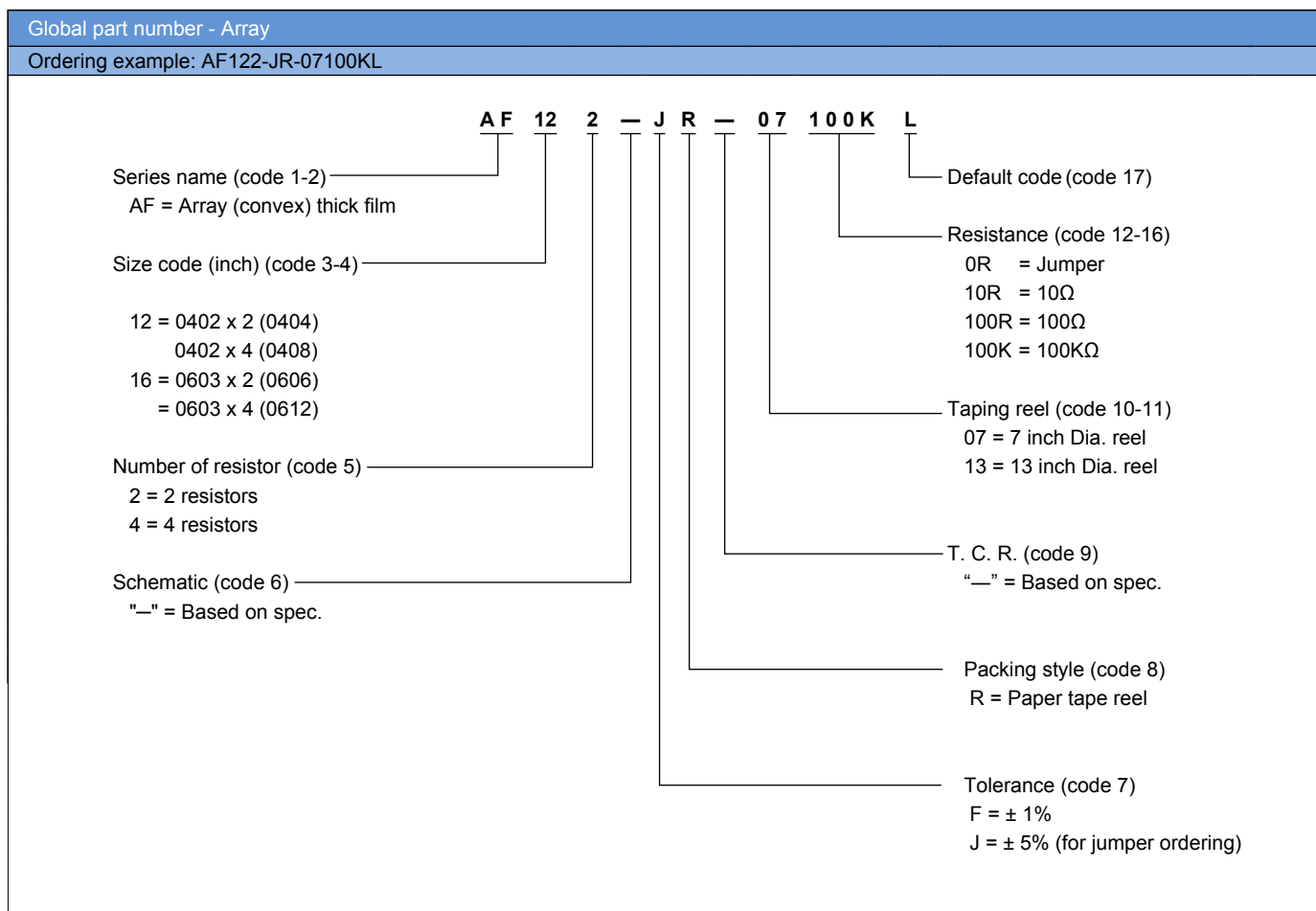
Electrical characteristics								
Type	Power rating	Operating Temp. range	MWV	RCOV	DWV	Resistance range & tolerance	T. C. R.	Jumper criteria (unit: A)
AF122	1/16W	-55°C to 155°C	50V	100V	100V	E24 $\pm 5\%$ $1\Omega \leq R \leq 1M\Omega$ E24/E96 $\pm 1\%$ $1\Omega \leq R \leq 1M\Omega$ Jumper $< 50m\Omega$	$1\Omega \leq R < 10\Omega$ $\pm 250ppm/^{\circ}C$ $10\Omega \leq R < 1M\Omega$ $\pm 200ppm/^{\circ}C$	Rated current 0.5A Max. current 1.0A
AF124	1/16W	-55°C to 155°C	25V	50V	100V	E24 $\pm 5\%$ $1\Omega \leq R \leq 1M\Omega$ E24/E96 $\pm 1\%$ $1\Omega \leq R \leq 1M\Omega$ Jumper $< 50m\Omega$	$1\Omega \leq R < 10\Omega$ $\pm 250ppm/^{\circ}C$ $10\Omega \leq R < 1M\Omega$ $\pm 200ppm/^{\circ}C$	Rated current 1.0A Max. current 2.0A
AF162	1/16W	-55°C to 155°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 $< 50m\Omega$	$1\Omega \leq R < 10\Omega$ $\pm 250ppm/^{\circ}C$ $10\Omega \leq R < 1M\Omega$ $\pm 200ppm/^{\circ}C$	Rated current 1.0A Max. current 2.0A
AF164	1/16W	-55°C to 155°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 $< 50m\Omega$	$\pm 250ppm/^{\circ}C$	Rated current 1.0A Max. current 2.0A

Environmental characteristics				
Performance test		Test method	Procedure	Requirements
Life		MIL-STD-202 -method 108	1000 hours at 70 $\pm 5^{\circ}C$ applied RCWV 1.5 hours on, 0.5 hours off, still air required	$\pm(2\% + 50m\Omega)$ $< 100m\Omega$ for jumper
High temperature exposure		MIL-STD-202 -method 108	1000 hours at maximum operating temperature depending on specification, unpowered No direct impingement of forced air to the parts Tolerances: 125 $\pm 3^{\circ}C$	$\pm(1\% + 50m\Omega)$ $< 50m\Omega$ for jumper
Moisture resistance		MIL-STD-202 -method 106	Each temperature / humidity cycle is defined as 8 hours (method 106F), 3 cycles / 24 hours for 10d with 25 $^{\circ}C$ / 65 $^{\circ}C$ 95% R.H	$\pm(2\% + 50m\Omega)$ $< 50m\Omega$ for jumper
Thermal shock		MIL-STD-202 -method 107	-55/+125 $^{\circ}C$ Note: Number of cycles required is 300. Devices mounted Maximum transfer time is 20 seconds. Dwell time is 15 minutes. Air – Air	$\pm(1\% + 50m\Omega)$ 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-202 Method 210	Lead-free solder, 260 $^{\circ}C$, 10 seconds immersion time	$\pm(1\% + 50m\Omega)$ $< 50m\Omega$ for jumper No visible damage
Short time overload		IEC60115-1 4.13	2.5 times RCWV or maximum overload voltage whichever is less for 5 seconds at room temperature	$\pm(2\% + 50m\Omega)$ $< 50m\Omega$ for jumper No visible damage
Anti-FOS		ASTM-B-809-95	Sulfur (saturated vapor) 1000 hours, 90 $\pm 2^{\circ}C$, Rating with no power	$\pm(1\% + 50m\Omega)$
		ASTM-B-809-95* *Modified	Sulfur 750 hours, 105 $^{\circ}C$, Rating with no power	$\pm(4\% + 50m\Omega)$



Chip Resistors Selection Charts

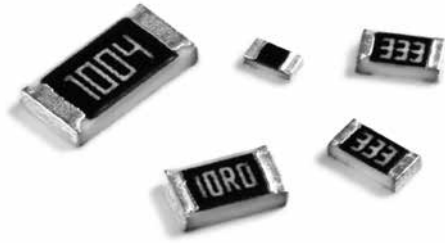
AF - Sulfur resistant chip resistors, Arrays



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

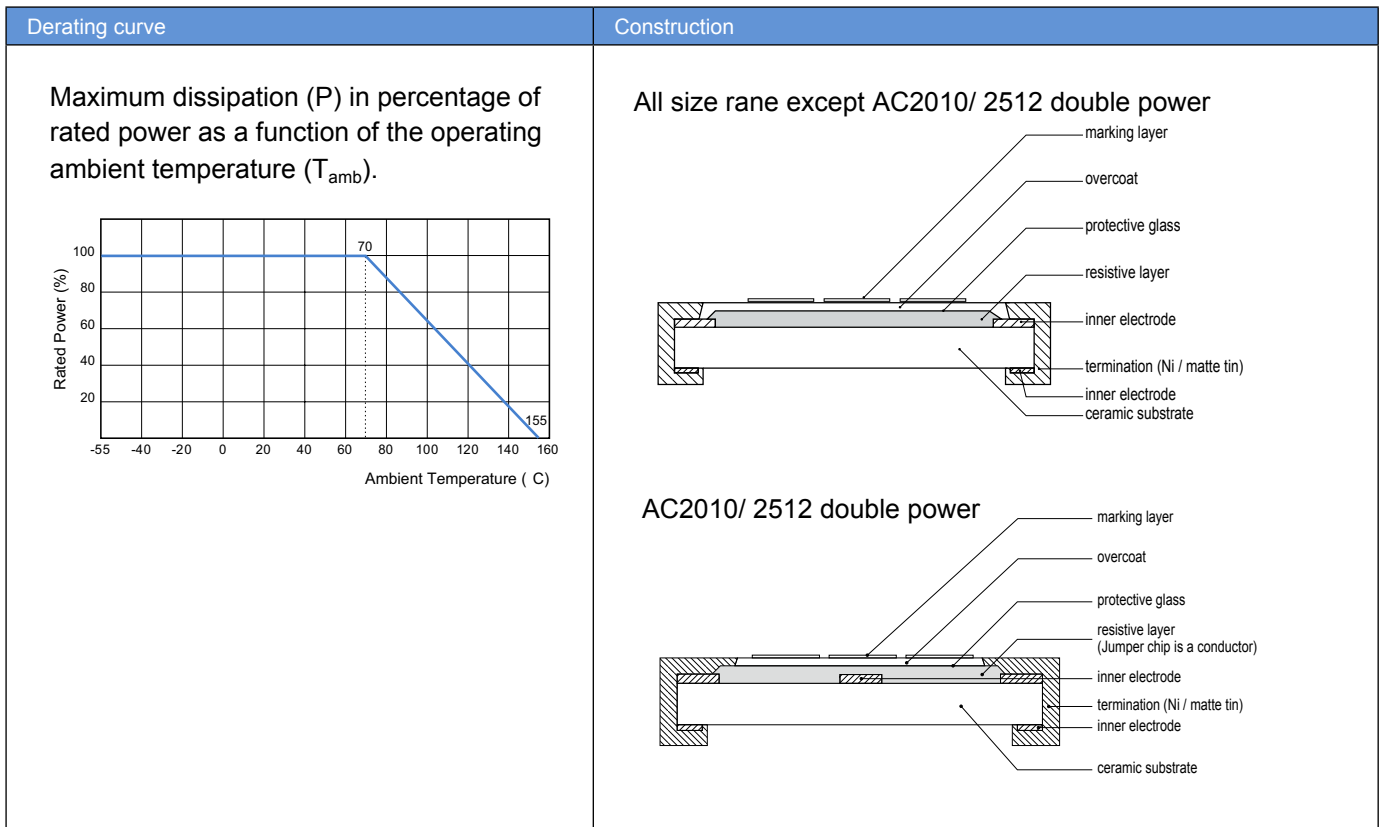
Chip Resistors Selection Charts

AC - Automotive grade chip resistors, 0201 to 2512

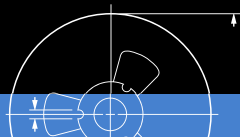


Features

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



Dimensions					
Type	L	W	H	l_1	l_2
AC0201	0.60 ±0.03	0.30 ±0.03	0.23 ±0.03	0.12 ±0.05	0.15 ±0.05
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
AC1210 7W	3.10 ±0.10	2.60 ±0.15	0.55 ±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, 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)
AC0201	1/20W	-55°C to 155°C	25V	50V	50V	E24 $\pm 1\%, \pm 5\%$ $1\Omega \leq R \leq 10M\Omega$ E24/E96 $\pm 0.5\%$ $10\Omega \leq R \leq 1M\Omega$ Jumper < 50m Ω	$1\Omega \leq R \leq 10\Omega$ -100/+350ppm/°C $10\Omega < R \leq 10M\Omega$ ± 200 ppm/°C	Rated Current 0.5A Max. Current 1.0A
AC0402	1/16W	-55°C to 155°C	50V	100V	100V	E24 $\pm 5\%$ $1\Omega \leq R \leq 22M\Omega$ E24/E96 $\pm 0.5\%, \pm 1\%$ $1\Omega \leq R \leq 10M\Omega$ Jumper < 50m Ω	$1\Omega \leq R \leq 10\Omega$ ± 200 ppm/°C $10\Omega < R \leq 10M\Omega$ ± 100 ppm/°C $10M\Omega < R \leq 22M\Omega$ ± 200 ppm/°C	Rated Current 1A Max. Current 2A
	1/8W	-55°C to 155°C	50V	100V	100V	E24 $\pm 5\%$ $1\Omega \leq R \leq 10M\Omega$ E24/E96 $\pm 1\%, 0.5\%$ $1\Omega \leq R \leq 10M\Omega$	$1\Omega \leq R \leq 10\Omega$ ± 200 ppm/°C $10\Omega < R \leq 10M\Omega$ ± 100 ppm/°C	--
AC0603	1/10W	-55°C to 155°C	75V	150V	150V	E24 $\pm 5\%$ $1\Omega \leq R \leq 22M\Omega$ E24/E96 $\pm 0.5\%, \pm 1\%$ $1\Omega \leq R \leq 10M\Omega$ Jumper < 50m Ω	$1\Omega \leq R \leq 10\Omega$ ± 200 ppm/°C $10\Omega < R \leq 10M\Omega$ ± 100 ppm/°C $10M\Omega < R \leq 22M\Omega$ ± 200 ppm/°C	Rated Current 1A Max. Current 2A
	1/5W	-55°C to 155°C	75V	150V	150V	E24 $\pm 5\%$ $1\Omega \leq R \leq 10M\Omega$ E24/E96 $\pm 1\%, 0.5\%$ $1\Omega \leq R \leq 10M\Omega$	$1\Omega \leq R \leq 10\Omega$ ± 200 ppm/°C $10\Omega < R \leq 10M\Omega$ ± 100 ppm/°C	--
AC0805	1/8W	-55°C to 155°C	150V	300V	300V	E24 $\pm 5\%$ $1\Omega \leq R \leq 22M\Omega$ E24/E96 $\pm 0.5\%, \pm 1\%$ $1\Omega \leq R \leq 10M\Omega$ Jumper < 50m Ω	$1\Omega \leq R \leq 10\Omega$ ± 200 ppm/°C $10\Omega < R \leq 10M\Omega$ ± 100 ppm/°C $10M\Omega < R \leq 22M\Omega$ ± 200 ppm/°C	Rated Current 2A Max. Current 5A
	1/4W	-55°C to 155°C	150V	300V	300V	E24 $\pm 5\%$ $1\Omega \leq R \leq 10M\Omega$ E24/E96 $\pm 1\%, 0.5\%$ $1\Omega \leq R \leq 10M\Omega$	$1\Omega \leq R \leq 10\Omega$ ± 200 ppm/°C $10\Omega < R \leq 10M\Omega$ ± 100 ppm/°C	--
AC1206	1/4W	-55°C to 155°C	200V	400V	500V	E24 $\pm 5\%$ $1\Omega \leq R \leq 22M\Omega$ E24/E96 $\pm 0.5\%, \pm 1\%$ $1\Omega \leq R \leq 10M\Omega$ Jumper < 50m Ω	$1\Omega \leq R \leq 10\Omega$ ± 200 ppm/°C $10\Omega < R \leq 10M\Omega$ ± 100 ppm/°C $10M\Omega < R \leq 22M\Omega$ ± 200 ppm/°C	Rated Current 2A Max. Current 10A
	1/2W	-55°C to 155°C	200V	400V	500V	E24 $\pm 5\%$ $1\Omega \leq R \leq 10M\Omega$ E24/E96 $\pm 1\%, 0.5\%$ $1\Omega \leq R \leq 10M\Omega$	$1\Omega \leq R \leq 10\Omega$ ± 200 ppm/°C $10\Omega < R \leq 10M\Omega$ ± 100 ppm/°C	--
AC1210	1/2W	-55°C to 155°C	200V	500V	500V	E24 $\pm 5\%$ $1\Omega \leq R \leq 22M\Omega$ E24/E96 $\pm 0.5\%, \pm 1\%$ $1\Omega \leq R \leq 10M\Omega$ Jumper < 50m Ω	$1\Omega \leq R \leq 10\Omega$ ± 200 ppm/°C $10\Omega < R \leq 10M\Omega$ ± 100 ppm/°C $10M\Omega < R \leq 22M\Omega$ ± 200 ppm/°C	Rated Current 2A Max. Current 10A
	1W	-55°C to 155°C	200V	500V	500V	E24 $\pm 5\%$ $1\Omega \leq R \leq 10M\Omega$ E24/E96 $\pm 1\%, 0.5\%$ $1\Omega \leq R \leq 10M\Omega$	$1\Omega \leq R \leq 10\Omega$ ± 200 ppm/°C $10\Omega < R \leq 10M\Omega$ ± 100 ppm/°C	--
AC1218	1W	-55°C to 155°C	200V	500V	500V	E24 $\pm 5\%$ $1\Omega \leq R \leq 1M\Omega$ E24/E96 $\pm 0.5\%, \pm 1\%$ $1\Omega \leq R \leq 1M\Omega$ Jumper < 50m Ω	$1\Omega \leq R \leq 10\Omega$ ± 200 ppm/°C $10\Omega < R \leq 1M\Omega$ ± 100 ppm/°C	Rated Current 6A Max. Current 10A
	1.5W	-55°C to 155°C	200V	500V	500V	E24 $\pm 5\%$ $1\Omega \leq R \leq 1M\Omega$ E24/E96 $\pm 1\%, 0.5\%$ $1\Omega \leq R \leq 1M\Omega$	$1\Omega \leq R \leq 10\Omega$ ± 200 ppm/°C $10\Omega < R \leq 1M\Omega$ ± 100 ppm/°C	--
AC2010	3/4W	-55°C to 155°C	200V	500V	500V	E24 $\pm 5\%$ $1\Omega \leq R \leq 22M\Omega$ E24/E96 $\pm 0.5\%, \pm 1\%$ $1\Omega \leq R \leq 10M\Omega$ Jumper < 50m Ω	$1\Omega \leq R \leq 10\Omega$ ± 200 ppm/°C $10\Omega < R \leq 10M\Omega$ ± 100 ppm/°C $10M\Omega < R \leq 22M\Omega$ ± 200 ppm/°C	Rated Current 2A Max. Current 10A
	1.5W	-55°C to 155°C	200V	500V	500V	E24 $\pm 5\%$ $1\Omega \leq R \leq 10M\Omega$ E24/E96 $\pm 1\%, 0.5\%$ $1\Omega \leq R \leq 10M\Omega$	$1\Omega \leq R \leq 10\Omega$ ± 200 ppm/°C $10\Omega < R \leq 10M\Omega$ ± 100 ppm/°C	--
AC2512	1W	-55°C to 155°C	200V	500V	500V	E24 $\pm 5\%$ $1\Omega \leq R \leq 22M\Omega$ E24/E96 $\pm 0.5\%, \pm 1\%$ $1\Omega \leq R \leq 10M\Omega$ Jumper < 50m Ω	$1\Omega \leq R \leq 10\Omega$ ± 200 ppm/°C $10\Omega < R \leq 10M\Omega$ ± 100 ppm/°C $10M\Omega < R \leq 22M\Omega$ ± 200 ppm/°C	Rated Current 2A Max. Current 10A
	2W	-55°C to 155°C	200V	500V	500V	E24 $\pm 5\%$ $1\Omega \leq R \leq 10M\Omega$ E24/E96 $\pm 1\%, 0.5\%$ $1\Omega \leq R \leq 10M\Omega$	$1\Omega \leq R \leq 10\Omega$ ± 200 ppm/°C $10\Omega < R \leq 10M\Omega$ ± 100 ppm/°C	--

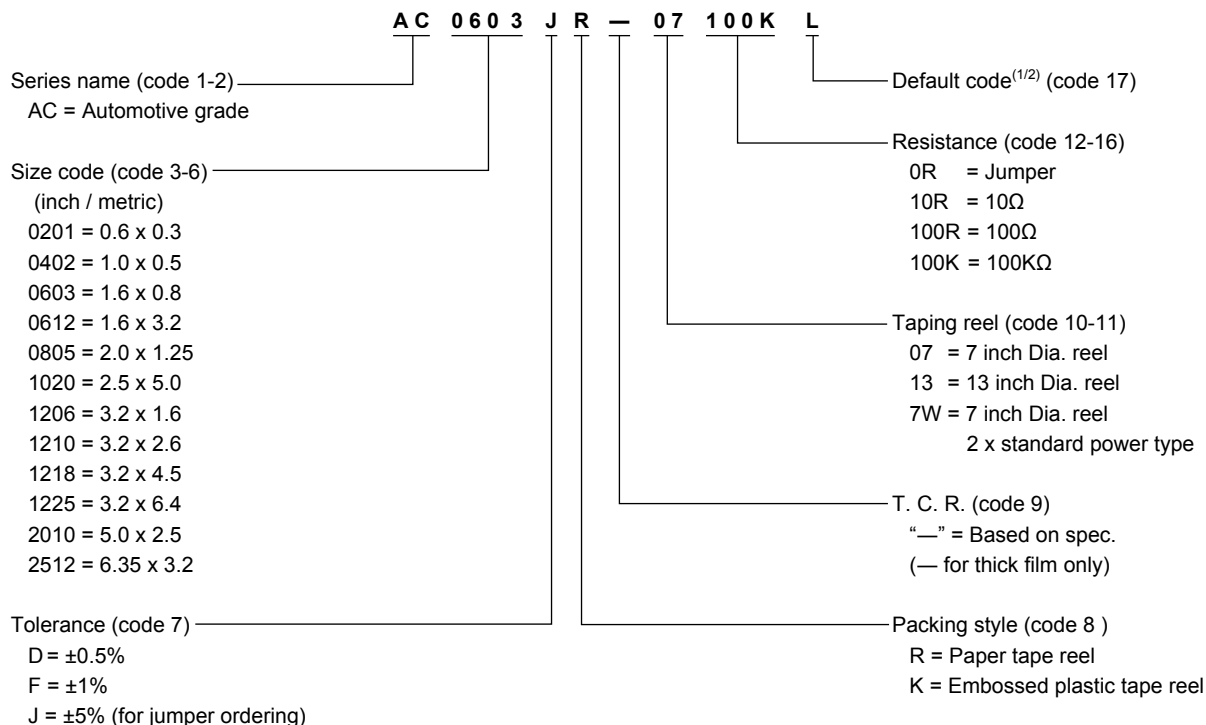
Chip Resistors Selection Charts

AC - Automotive grade chip resistors, 0201 to 2512

Environmental characteristics				
Performance test		Test method	Procedure	Requirements
Life		AEC-Q200-REV C-Test 8 MIL-STD-202 Method 108	1000 hours at 125°C applied RCWV 1.5 hours on, 0.5 hours off	± (1%+50mΩ) for D/F tol ± (3%+50mΩ) for J tol <100 mΩ for Jumper
High temperature exposure		AEC-Q200 Test 3 MIL-STD-202 Method 108	1000 hours at TA = 155 °C, unpowered	± (1%+50mΩ) for D/F tol ± (2%+50mΩ) for J tol <50 mΩ for Jumper
Moisture resistance		AEC-Q200 Test 6 MIL-STD-202 Method 106	Each temperature / humidity cycle is defined as 8 hours (method 106F), 3 cycles / 24 hours for 10d with 25°C / 65°C 95% R.H.	± (0.5%+50mΩ) for D/F tol ± (2%+50mΩ) for J tol <100 mΩ for Jumper
Biased humidity		AEC-Q200 Test 7 MIL-STD-202 Method 103	1000 hours; + 85°C 85% R.H.; 10% of operating power Measured at 24 ±2 hours after test	± (1%+50mΩ) for D/F tol ± (3%+50mΩ) for J tol <100 mΩ for Jumper
Thermal shock		AEC-Q200 Test 16 MIL-STD-202 Method 107	-55/+125 °C Number of cycles is 300. Devices mounted Maximum transfer time is 20 seconds. Dwell time is 15 minutes. Air – Air	± (0.5%+50mΩ) for D/F tol ± (1%+50mΩ) for J tol <50 mΩ for Jumper
Solderability	Wetting	AEC-Q200 Test 18 J-STD-002B testB	Electrical test not required. Magnification 50X Lead-free solder bath at 245 ±3°C Dipping time: 3 ±0.5 seconds	Well tinned (≥95% covered) No visible damage
	Resistance to soldering heat	AEC-Q200 Test 15 MIL-STD-202 Method 215	Lead-free solder, 260°C, 10 seconds immersion time	± (0.5%+50mΩ) for D/F tol ± (1%+50mΩ) for J tol <50 mΩ for Jumper No visible damage
Short time overload		IEC60115-1 4.13	2.5 times RCWV or maximum overload voltage whichever is less for 5 seconds at room temperature	± (1%+50mΩ) for D/F tol ± (2%+50mΩ) for J tol <50 mΩ for Jumper

Global part number - Preferred type

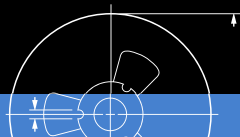
Ordering example: AC0603JR-07100KL



Note: 1. All of our RSMD products are RoHS compliant. "LFP" of the internal 2D reel label mentions "Lead Free Process"

2. Letter L is system default code for ordering only

3. AC series products are available by "Global part number" only



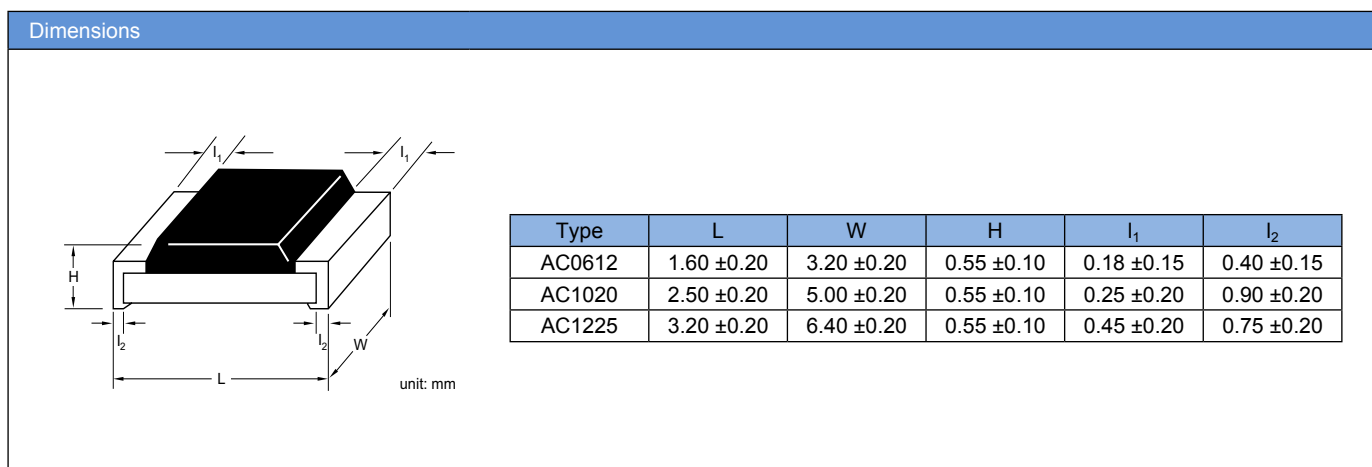
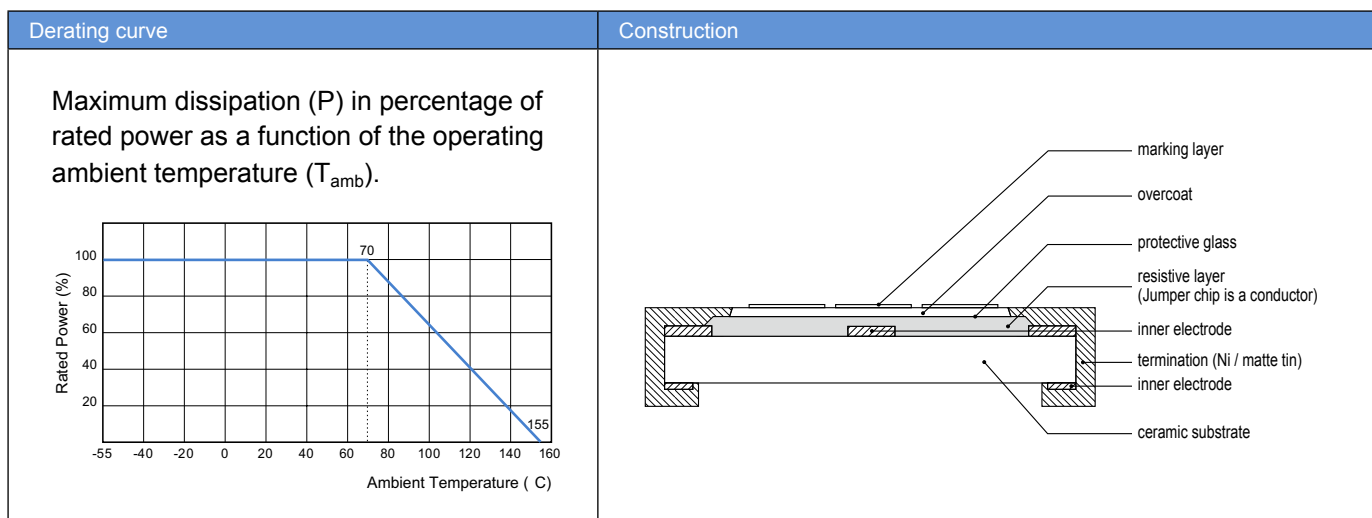
Chip Resistors Selection Charts

AC - Automotive grade chip resistors, wide termination , 0612 to 1225



Features

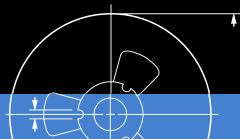
- AEC-Q200 qualified
- Production part approval process (PPAP) support
- High reliability
- High quality level



Chip Resistors Selection Charts

AC - Automotive grade chip resistors, wide termination , 0612 to 1225

Electrical characteristics								
Type	Power P_{70}	Operating Temp. range	MWV	RCOV	DWV	Resistance range & tolerance	T. C. R. (ppm/°C)	Jumper criteria (unit: A)
AC0612	3/4W	-55°C to 155°C	200V	400V	500V	E24 $\pm 5\%$ $1\Omega \leq R \leq 1M\Omega$ E24/E96 $\pm 0.5\%, \pm 1\%$ $1\Omega \leq R \leq 1M\Omega$ Jumper $< 50m\Omega$	$1\Omega \leq R \leq 10\Omega \pm 200 \text{ ppm/}^\circ\text{C}$ $10\Omega < R \leq 1M\Omega \pm 100 \text{ ppm/}^\circ\text{C}$	Rated Current 2A Max. Current 10A
AC1020	1W	-55°C to 155°C	200V	400V	500V			
AC1225	2W	-55°C to 155°C	200V	400V	500V			



Chip Resistors Selection Charts

AC - Automotive grade chip resistors, wide termination , 0612 to 1225

Environmental characteristics				
Performance test		Test method	Procedure	Requirements
Life		AEC-Q200-REV C-Test 8 MIL-STD-202 Method 108	1000 hours at 125°C applied RCWV 1.5 hours on, 0.5 hours off	± (1%+50mΩ) for D/F tol ± (3%+50mΩ) for J tol <100 mΩ for Jumper
High temperature exposure		AEC-Q200 Test 3 MIL-STD-202 Method 108	1000 hours at maximum operating temperature depending on specification	± (1%+50mΩ) for D/F tol ± (2%+50mΩ) for J tol <50 mΩ for Jumper
Moisture resistance		AEC-Q200 Test 6 MIL-STD-202 Method 106	Each temperature / humidity cycle is defined as 8 hours (method 106F), 3 cycles / 24 hours for 10d with 25°C / 65°C 95% R.H.	± (0.5%+50mΩ) for D/F tol ± (2%+50mΩ) for J tol <100 mΩ for Jumper
Biased humidity		AEC-Q200 Test 7 MIL-STD-202 Method 103	1000 hours; + 85°C 85% R.H.; 10% of operating power Measured at 24 ±2 hours after test	± (1%+50mΩ) for D/F tol ± (3%+50mΩ) for J tol <100 mΩ for Jumper
Thermal shock		AEC-Q200 Test 16 MIL-STD-202 Method 107	-55/+125 °C Number of cycles is 300. Devices mounted Maximum transfer time is 20 seconds. Dwell time is 15 minutes. Air – Air	± (0.5%+50mΩ) for D/F tol ± (1%+50mΩ) for J tol <50 mΩ for Jumper
Solderability	Wetting	AEC-Q200 Test 18 J-STD-002B testB	Electrical test not required. Magnification 50X Lead-free solder bath at 245 ±3°C Dipping time: 3 ±0.5 seconds	Well tinned (≥95% covered) No visible damage
	Resistance to soldering heat	AEC-Q200 Test 15 MIL-STD-202 Method 215	Lead-free solder, 260°C, 10 seconds immersion time	± (0.5%+50mΩ) for D/F tol ± (1%+50mΩ) for J tol <50 mΩ for Jumper No visible damage
Short time overload		IEC60115-1 4.13	2.5 times RCWV or maximum overload voltage whichever is less for 5 seconds at room temperature	± (1%+50mΩ) for D/F tol ± (2%+50mΩ) for J tol <50 mΩ for Jumper

Global part number - Preferred type	
Ordering example: AC0612FR-07100KL	
Series name (code 1-2) ————— AC = Automotive grade wide termination Size code (code 3-6) ————— (inch / metric) 0612 = 1.6 x 3.2 1020 = 2.5 x 5.0 1225 = 3.2 x 6.4 Tolerance (code 7) ————— D = ±0.5% F = ±1% J = ±5% (for jumper ordering) Packing style (code 8) ————— R = Paper tape reel K = Embossed plastic tape reel	AC 0612 J R — 07 100K 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 13 = 13 inch Dia. reel ————— T. C. R. (code 9) “—” = Based on spec. (— for thick film only)

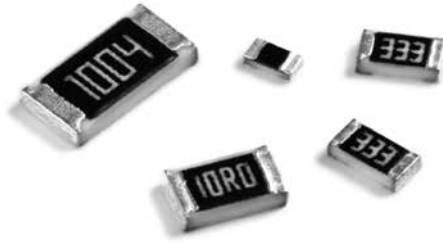
Note: 1. All of our RSMD products are RoHS compliant. "LFP" of the internal 2D reel label mentions "Lead Free Process"

2. Letter L is system default code for ordering only

3. AC wide series products are available by "Global part number" only

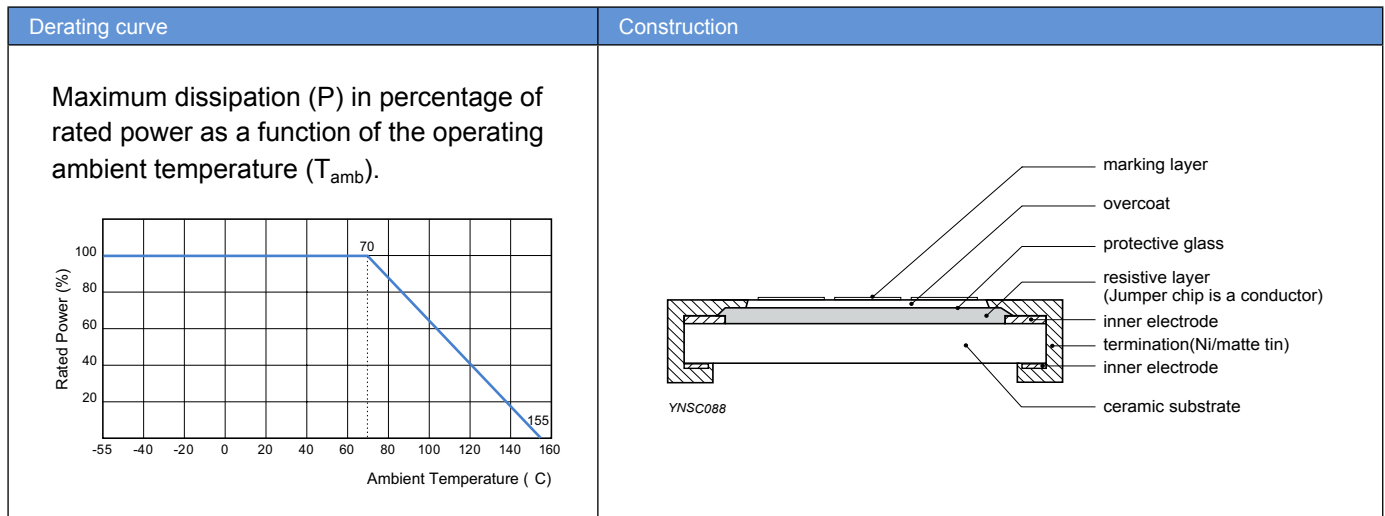
Chip Resistors Selection Charts

AA - Automotive grade sulfur-resistant chip resistors, 0201 to 2512



Features

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



Dimensions

AA0201 / 0402

Top view diagram of the AA0201 / 0402 resistor. It shows a rectangular component with a central black area. The overall length is labeled L, the width is labeled W, and the distance from the left edge to the start of the black area is labeled l₁.

AA0603/0805/1206
1210/2010/2512

Top view diagram of the AA0603/0805/1206/1210/2010/2512 resistor. It shows a rectangular component with a central black area containing the number '103'. The overall length is labeled L, the width is labeled W, and the distance from the left edge to the start of the black area is labeled l₁.

AA1218

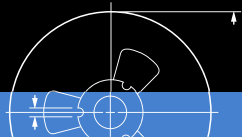
Top view diagram of the AA1218 resistor. It shows a rectangular component with a central black area containing the number '103'. The overall length is labeled L, the width is labeled W, and the distance from the left edge to the start of the black area is labeled l₁.

Side view for all type

Side view diagram of the resistor. It shows the profile of the component with a central black layer. The height of the component is labeled H, and the thickness of the black layer is labeled l₂.

unit: mm

Type	L	W	H	l ₁	l ₂
AA0201	0.60 ±0.03	0.30 ±0.03	0.23 ±0.03	0.12 ±0.05	0.15 ±0.05
AA0402	1.00 ±0.05	0.50 ±0.05	0.32 ±0.05	0.20 ±0.10	0.25 ±0.10
AA0603	1.60 ±0.10	0.80 ±0.10	0.45 ±0.10	0.25 ±0.15	0.25 ±0.15
AA0805	2.00 ±0.10	1.25 ±0.10	0.50 ±0.10	0.35 ±0.20	0.35 ±0.20
AA1206	3.10 ±0.10	1.60 ±0.10	0.55 ±0.10	0.45 ±0.20	0.40 ±0.20
AA1210	3.10 ±0.10	2.60 ±0.15	0.50 ±0.10	0.45 ±0.15	0.50 ±0.20
AA1218	3.10 ±0.10	4.60 ±0.10	0.55 ±0.10	0.45 ±0.20	0.40 ±0.20
AA2010	5.00 ±0.10	2.50 ±0.15	0.55 ±0.10	0.55 ±0.15	0.50 ±0.20
AA2512	6.35 ±0.10	3.10 ±0.15	0.55 ±0.10	0.60 ±0.20	0.50 ±0.20



Chip Resistors Selection Charts

AA - Automotive grade 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)
AA0201	1/20W	-55°C to 155°C	25V	50V	50V	E24 ±5% 1Ω ≤ R ≤ 10MΩ E24/E96 ±0.5%,±1% 1Ω ≤ R ≤ 10MΩ Jumper < 50mΩ	1Ω ≤ R ≤ 10Ω -100/+400ppm/°C 10Ω < R ≤ 10MΩ ±300ppm/°C	Rated Current 0.5A Max. Current 1.0A
AA0402	1/16W		50V	100V	100V	E24 ±5% 1Ω ≤ R ≤ 22MΩ E24/E96 ±0.5%,±1% 1Ω ≤ R ≤ 10MΩ Jumper < 50mΩ	1Ω ≤ R ≤ 10Ω ±200ppm/°C 10Ω < R ≤ 10MΩ +150ppm/°C 10MΩ < R ≤ 22MΩ ±200ppm/°C	Rated Current 1A Max. Current 2A
AA0603	1/10W		75V	150V	150V			Rated Current 1A Max. Current 2A
AA0805	1/8W		150V	300V	300V			Rated Current 2A Max. Current 5A
AA1206	1/4W		200V	400V	500V			Rated Current 2A Max. Current 10A
AA1210	1/2W		200V	500V	500V			Rated Current 2A Max. Current 10A
AA1218	1W		200V	500V	500V	E24 ±5% 1Ω ≤ R ≤ 1MΩ E24/E96 ±0.5%,±1% 1Ω ≤ R ≤ 1MΩ Jumper < 50mΩ	1Ω ≤ R ≤ 10Ω ±200ppm/°C 10Ω < R ≤ 10MΩ +150ppm/°C 10MΩ < R ≤ 22MΩ ±200ppm/°C	Rated Current 6A Max. Current 10A
AA2010	3/4W		200V	500V	500V	E24 ±5% 1Ω ≤ R ≤ 22MΩ E24/E96 ±0.5%,±1% 1Ω ≤ R ≤ 10MΩ Jumper < 50mΩ		Rated Current 2A Max. Current 10A
AA2512	1W		200V	500V	500V			Rated Current 2A Max. Current 10A

Chip Resistors Selection Charts

AA - Automotive grade sulfur-resistant chip resistors, 0201 to 2512

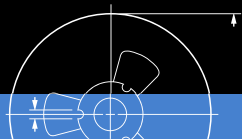
Environmental characteristics				
Performance test		Test method	Procedure	Requirements
Life		AEC-Q200 Test 8 MIL-STD-202 Method 108	1000 hours at 125°C applied RCWV 1.5 hours on, 0.5 hours off	±(1% +50mΩ) < 100mΩ for jumper
High temperature exposure		AEC-Q200 Test 3 MIL-STD-202 Method 108	1000 hours at maximum operating temperature depending on specification	±(1% +50mΩ) < 50mΩ for jumper
Moisture resistance		AEC-Q200 Test 6 MIL-STD-202 Method 106	Each temperature / humidity cycle is defined as 8 hours (method 106F), 3 cycles / 24 hours for 10d with 25°C / 65°C 95% R.H.	±(0.5% +50mΩ) for 1% tol. ±(2% +50mΩ) for 5% tol. < 100mΩ for jumper
Biased humidity		AEC-Q200 Test 7 MIL-STD-202 Method 103	1000 hours; + 85°C 85% R.H.; 10% of operating power Measured at 24 ±2 hours after test	±(3% +50mΩ) < 100mΩ for jumper
Thermal shock		AEC-Q200 Test 16 MIL-STD-202 Method 107	-55/+125 °C Number of cycles is 300. Devices mounted Maximum transfer time is 20 seconds. Dwell time is 15 minutes. Air – Air	±(1% +50mΩ) < 50mΩ for jumper
Solderability	Wetting	AEC-Q200 Test 18 J-STD-002B testB	Electrical test not required. Magnification 50X Lead-free solder bath at 245 ±3°C Dipping time: 3 ±0.5 seconds	Well tinned (≥95% covered) No visible damage
	Resistance to soldering heat	AEC-Q200 Test 15 MIL-STD-202 Method 210	Lead-free solder, 260°C, 10 seconds immersion time	±(0.5%+50mΩ) for 1% tol. ±(1%+50mΩ) for 5% tol. <50 mΩ for Jumper No visible damage
Short time overload		IEC60115-1 4.13	2.5 times RCWV or maximum overload voltage whichever is less for 5 seconds at room temperature	±(1%+50mΩ) <50 mΩ for Jumper
FOS		ASTM-B-809-5	Sulfur (saturated vapor) 1000 hours, 90±2°C, Rating with no power	±(1%+50mΩ)
		ASTM-B-809-5* * Modified	Sulfur 750 hours, 105°C, Rating with no power	±(4%+50mΩ)

Global part number - Preferred type	
Ordering example: AA0603JR-07100KL	
Series name (code 1-2) ———— AA AA = Automotive grade Size code (code 3-6) ———— 0603 (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 2.6 1218 = 3.2 x 4.5 2010 = 5.0 x 2.5 2512 = 6.35 x 3.2 Tolerance (code 7) ———— J D = ±0.5% F = ±1% J = ±5% (for jumper ordering)	Resistance (code 12-16) ———— 100K 0R = Jumper 10R = 10Ω 100R = 100Ω 100K = 100KΩ Taping reel (code 10-11) ———— 07 07 = 7 inch Dia. reel 13 = 13 inch Dia. reel T. C. R. (code 9) ———— — “—” = Based on spec. (— for thick film only) Packing style (code 8) ———— L R = Paper tape reel K = Embossed plastic tape reel Default code^(1/2) (code 17)

Note: 1. All of our RSMD products are RoHS compliant. "LFP" of the internal 2D reel label mentions "Lead Free Process"

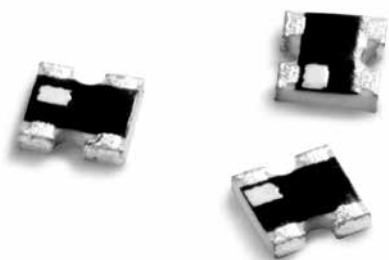
2. Letter L is system default code for ordering only

3. AA series products are available by "Global part number" only



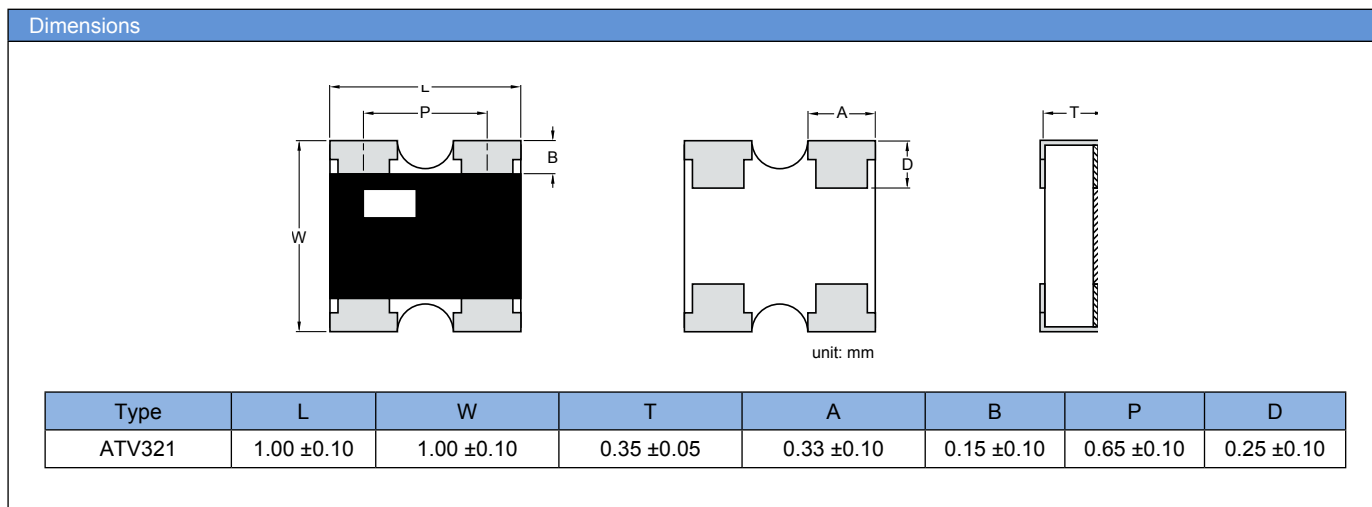
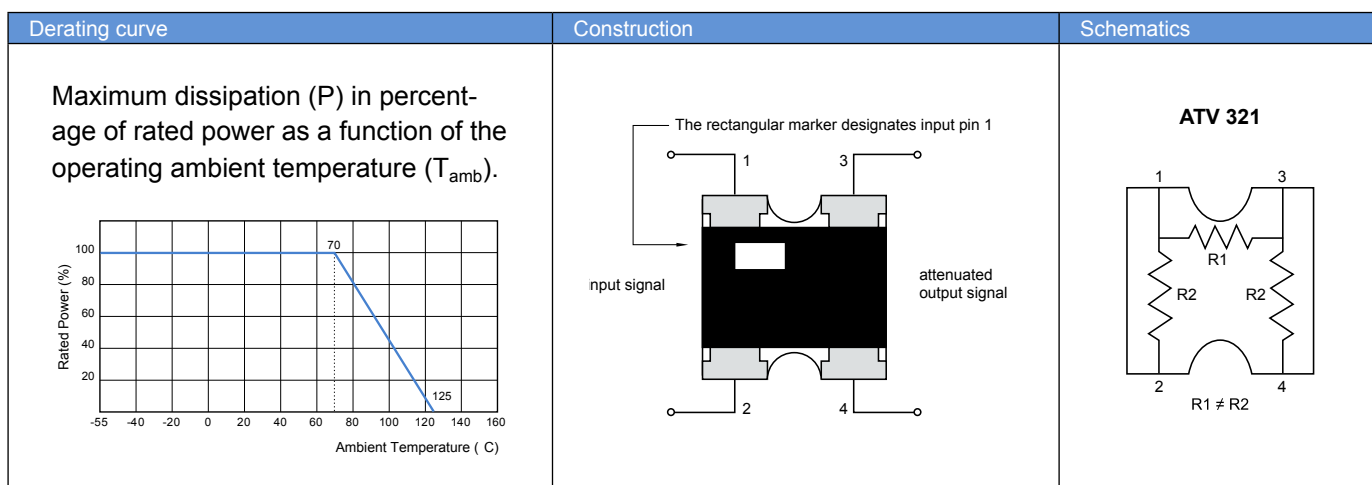
Chip Resistors Selection Charts

ATV - 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

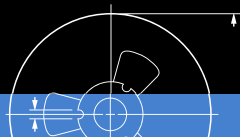


Chip Resistors Selection Charts

ATV - 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-202 -method 108A	1000 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	1000 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-202 -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-202 -method 107G	LCT / UCT, number of cycles required is 300 Maximum transfer time is 20 seconds	Max.: ±0.3 dB
Solderability	Wetting	J-STD-002B testB	Electrical test not required. Magnification 50X Lead-free solder bath at 245 ±3°C Dipping time: 3 ±0.5 seconds	Well tinned (≥95% covered)
	Resistance to soldering heat	MIL-STD-202 -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

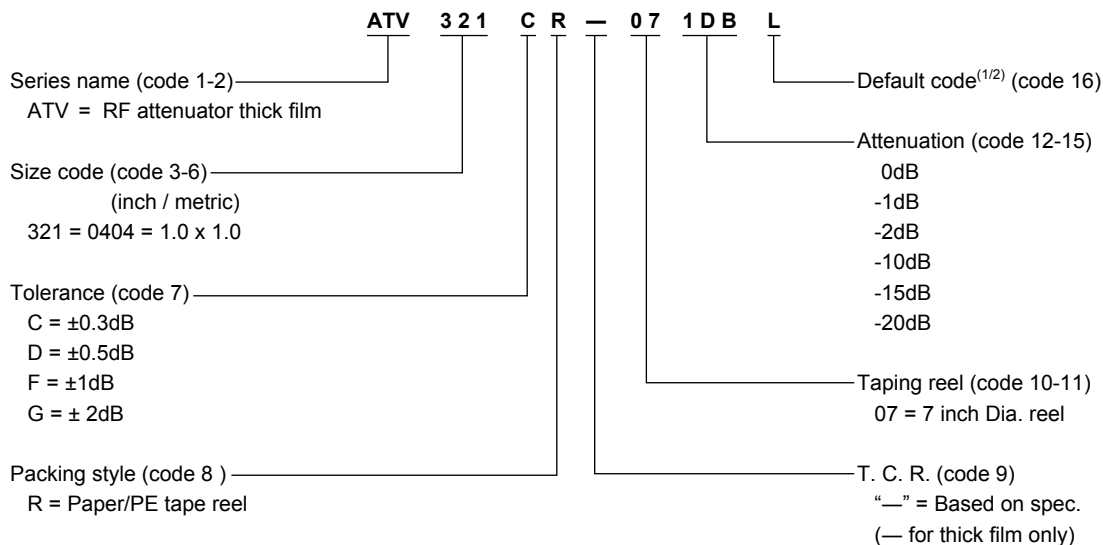


Chip Resistors Selection Charts

ATV - RF attenuator chip resistors, 0404

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

Ordering example: ATV321CR-071DBL



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

Phycomp worldwide - Traditional type

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

Note: L = Default code

Phycomp CTC ordering code - Traditional type - North America

Packing	paper tape
Quantity 10 000	9CV3218AXXXX-PF3
Remark	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



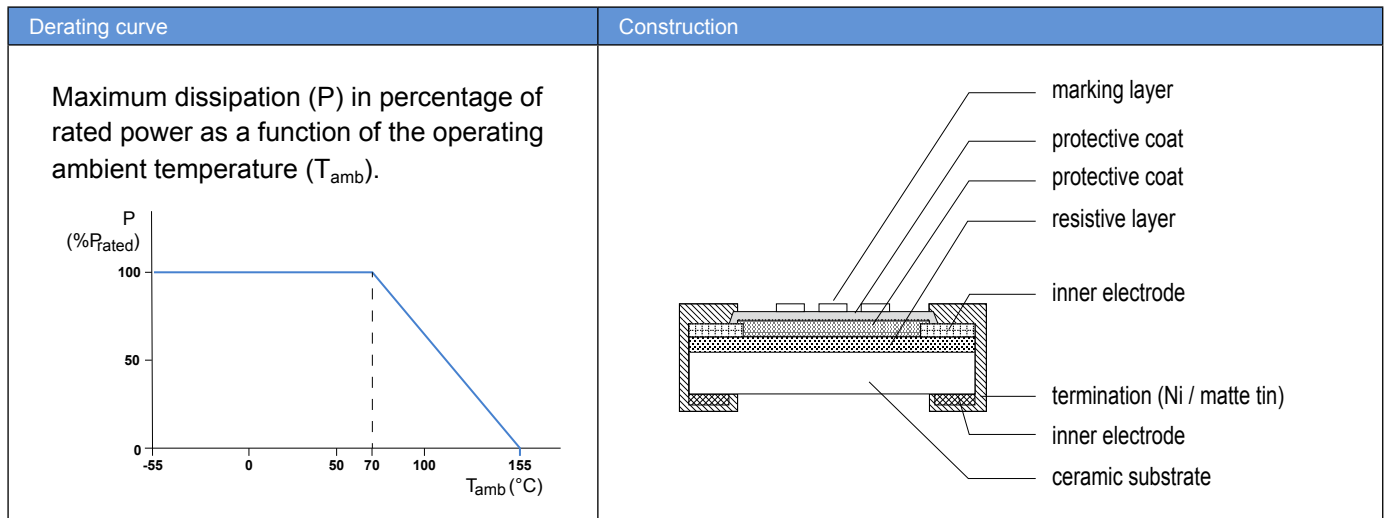
Chip Resistors Selection Charts

AT - Automotive grade thin film high precision high stability chip resistors, 0402 to 1206



Features

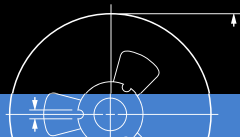
- High precision - High stability
- Low T. C. R. / low noise
- High accuracy ($\pm 0.1\%$, $\pm 0.25\%$, $\pm 0.5\%$, $\pm 1\%$)
- Superior resistance against sulfur containing atmosphere
- AEC-Q200 qualified



Dimensions

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

Type	L	W	H	l ₁	l ₂
AT0402	1.00 ±0.10	0.50 ±0.05	0.30 ±0.05	0.20 ±0.10	0.25 ±0.10
AT0603	1.60 ±0.10	0.80 ±0.10	0.45 ±0.10	0.25 ±0.15	0.25 ±0.15
AT0805	2.00 ±0.10	1.25 ±0.10	0.50 ±0.10	0.35 ±0.20	0.35 ±0.20
AT1206	3.10 ±0.10	1.60 ±0.10	0.55 ±0.10	0.45 ±0.20	0.40 ±0.20



Chip Resistors Selection Charts

AT - Automotive grade thin film high precision high stability chip resistors, 0402 to 1206

Electrical characteristics										
Type	Power rating	Operating Temp. range	MWV	RCOV	DWV	Resistance Range (E24/E96) & tolerance				T. C. R. (ppm/°C)
						±0.1%	±0.25%	±0.5%	±1.0%	
AT0402	1/16W	-55 °C to +155 °C	50V	100V	100V	10Ω~100KΩ				±25 ±50
AT0603	1/10W		75V	150V	100V	10Ω~330KΩ				
AT0805	1/8W		150V	300V	300V	10Ω~1MΩ				
AT1206	1/4W		200V	400V	500V					

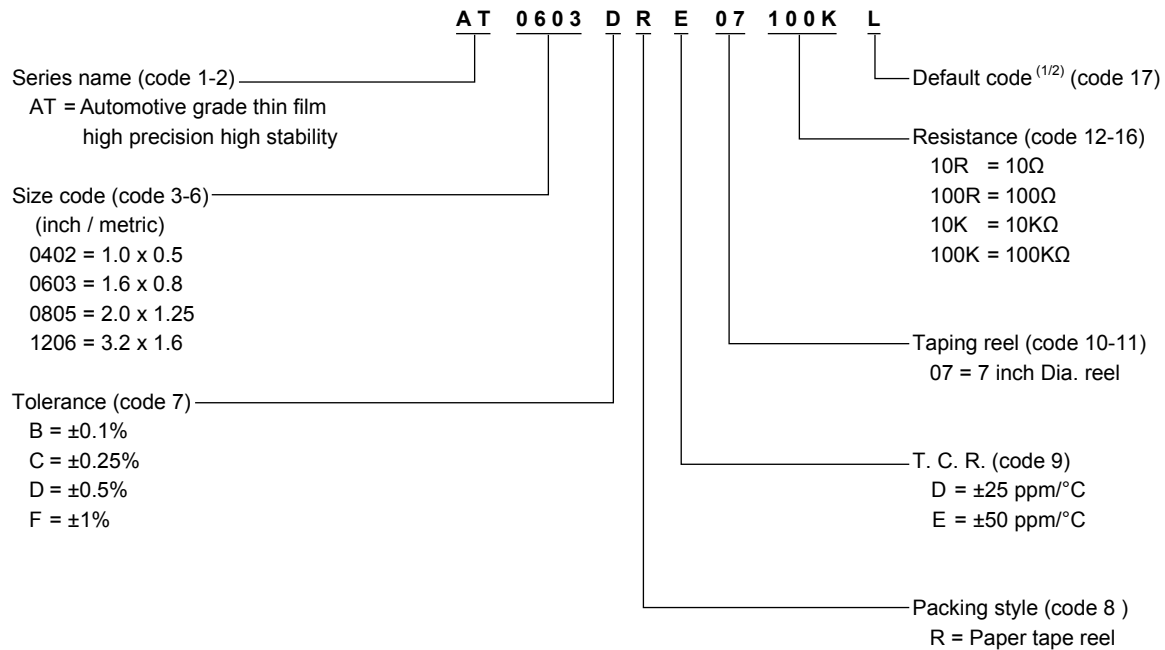
Environmental characteristics			
Performance test	Test method	Procedure	Requirements
Life/ Endurance	AEC-Q200 Test 8 MIL-STD-202 Method 108	1000 hours at 70± 5 °C, RCWV applied for 1.5 hours on, 0.5 hour off, still air required	± (0.1%+50mΩ)
		1000 hours at 125 °C, derated voltage applied for 1.5 hours on, 0.5 hour off, still air required	± (0.3%+50mΩ)
High Temperature Exposure temperature	AEC-Q200 Test 3 MIL-STD-202 Method 108	1000 hours at Tamb = 125 °C, unpowered	± (0.1%+50mΩ)
		1000 hours at Tamb = 155 °C, unpowered	± (0.3%+50mΩ)
Moisture Resistance	AEC-Q200 Test 6 MIL-STD-202 Method 106	Each temperature / humidity cycle is defined at 8 hours (method 106F), 3 cycles / 24 hours for 10d. with 25 °C / 65 °C 95% R.H, without steps 7a & 7b, unpowered Parts mounted on test-boards, without condensation on parts	± (0.1%+50mΩ)
Thermal Shock	AEC-Q200 Test 16 MIL-STD-202 Method 107	-55/+125 °C Number of cycles is 300. Devices mounted Maximum transfer time is 20 seconds. Dwell time is 15 minutes. Air -Air	± (0.1%+50mΩ) No visible damage
Short time overload	IEC60115-1 4.13	2.5 times of rated voltage or maximum overload voltage, the less of the above, for 5 sec at room temperature	± (0.05%+50mΩ)
Solderability	Wetting	AEC-Q200 Test 18 J-STD-002 Electrical Test not required Magnification 50X SMD conditions: (a) Method B, aging 4 hours at 155 °C dry heat, dipping at 235± 3 °C for 5± 0.5 seconds. (b) Method B, steam aging 8 hours, dipping at 215± 3 °C for 5± 0.5 seconds. (c) Method D, steam aging 8 hours, dipping at 260± 3 °C for 7± 0.5 seconds	Well tinned (>95% covered) No visible damage
	Resistance to soldering heat	AEC-Q200 Test 15 MIL-STD-202 Method 210 Condition B, no pre-heat of samples Lead-free solder, 260± 5 °C, 10± 1 seconds immersion time Procedure 2 for SMD: devices fluxed and cleaned with isopropanol	± (0.05%+50mΩ)
FOS	ASTM-B-809-5	Sulfur (saturated vapor) 1000 hours, 90±2°C, Rating with no power	± (1%+50mΩ)
	ASTM-B-809-5* * Modified	Sulfur 750 hours, 105°C, Rating with no power	± (4%+50mΩ)

Chip Resistors Selection Charts

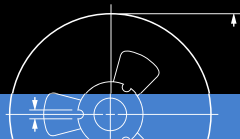
AT - Automotive grade thin film high precision high stability chip resistors, 0402 to 1206

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

Ordering example: AT0603DRE07100KL



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 Engineering Design Kits

Engineering design kits/ Engineering design books

Thick film chip resistors							
Yageo Part Number	Resistor pieces	Resistor values	Description	Size	Tolerance	Max. power	Resistance range
RC0100-R-SKE24L	100	80	RC0100, $\pm 1\%$ & $\pm 5\%$, E24 & E96, RoHS compliant, + Jumper	0100	F/J	1/32W	0R, 1R-3M32
RC0201-R-SKE24L	100	120	RC0201, $\pm 1\%$ & $\pm 5\%$, E24 & E96, RoHS compliant, + Jumper	0201	F/J	1/20W	0R, 1R-10M
RC0201FR-SKE96L	100	200	RC0201, $\pm 1\%$, E96, RoHS compliant	0201	F	1/20W	1R-10M
RC0402JR-SKE24L	100	120	RC0402, $\pm 5\%$, E24, RoHS compliant, + Jumper	0402	J	1/16W	0R, 1R-22M
RC0402FR-SKE96L	100	200	RC0402, $\pm 1\%$, E96, RoHS compliant	0402	F	1/16W	1R-10M
RC0603JR-SKE24L	50	120	RC0603, $\pm 5\%$, E24, RoHS compliant, + Jumper	0603	J	1/10W	0R, 1R-22M
RC0603FR-SKE96L	50	200	RC0603, $\pm 1\%$, E96, RoHS compliant	0603	F	1/10W	1R-10M
RC0805JR-SKE24L	50	120	RC0805, $\pm 5\%$, E24, RoHS compliant, + Jumper	0805	J	1/8W	0R, 1R-22M
RC0805FR-SKE96L	50	200	RC0805, $\pm 1\%$, E96, RoHS compliant	0805	F	1/8W	1R-10M
RC1206JR-SKE24L	50	120	RC1206, $\pm 5\%$, E24, RoHS compliant, + Jumper	1206	J	1/4W	0R, 1R-22M
RC1206FR-SKE96L	50	200	RC1206, $\pm 1\%$, E96, RoHS compliant	1206	F	1/4W	1R-10M
RC0000-R-SK001L	50 - 100	570	RC0201-RC1206, $\pm 1\%$ & $\pm 5\%$, RoHS compliant, + Jumper	0201 - 1206	F/J	---	0R, 10R-1M

Thick film array chip resistors (convex)							
Yageo Part Number	Resistor pieces	Resistor values	Description	Size	Tolerance	Max. power	Resistance range
YC12X-JR-SK001L	100	75	YC124/122, $\pm 5\%$, RoHS compliant, + Jumper	0402x2 0402x4	J	1/16W	0R, 1R-1M

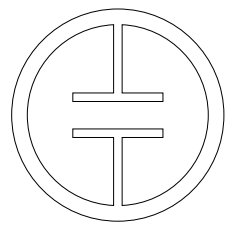
Engineering design kit for current sensing application							
Yageo Part Number	Resistor pieces	Resistor values	Description	Size	Tolerance	Max. power	Resistance range
CS0201-R-SB001L	10	60	PA/PE/RL/PT, $\pm 5\%$, $\pm 1\%$, E24 & E96, RoHS compliant	0201~2512	F/J	---	1m-820m
CS0402-R-SK001L	30	160	RL0402-RL2512, $\pm 1\%$ & $\pm 5\%$, RoHS compliant	0402 - 2512	F/J	---	100m - 910m

Engineering design kit for general purpose							
Yageo Part Number	Resistor pieces	Resistor values	Description	Size	Tolerance	Max. power	Resistance range
RC0402-R-SK001L	50 - 100	472	Chip resistor / MLCC	0402 - 1206	---	---	---

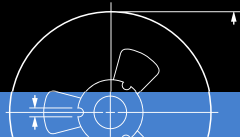
Engineering design book for thin film chip resistor							
Yageo Part Number	Resistor pieces	Resistor values	Description	Size	Tolerance	Max. power	Resistance range
RT0402-R-SB001L	10	60	RT0402-RT1206, $\pm 0.1\%$, RoHS compliant	0402 - 1206	B	---	10R-1M
RT0201-R-SB001L	10	60	RT0201-RT0402, $\pm 0.1\%$, RoHS compliant	0201 - 0402	B	---	10R-120K
AT0402-R-SB001L	10	60	AT0402~AT1206, $\pm 0.1\%$ ~ $\pm 1\%$, E24 & E96, RoHS compliant	0402~1206	B/D/F	1/4W	10R~1M

Engineering design book for automotive application							
Yageo Part Number	Resistor pieces	Resistor values	Description	Size	Tolerance	Max. power	Resistance range
AC0402-R-SB001L	10	60	AC0402-AC1206, $\pm 1\%$, RoHS compliant	0402 - 1206	F	---	10R-1M
AA0201-R-SB001L	10	60	Automotive Grade: AC/AA/AT/PE/PA/RL/PT, $\pm 0.1\%$ ~ $\pm 5\%$, E24 & E96, RoHS compliant, +Jumper	0201~2512	B/D/F/J	---	---

Engineering design book for Thick film chip resistors							
Yageo Part Number	Resistor pieces	Resistor values	Description	Size	Tolerance	Max. power	Resistance range
RC0805-R-SBE24L	10	60	RC0805, $\pm 1\%$ & $\pm 5\%$, RoHS compliant, High power	0805	F	1/4W	1R-1M
RC1206-R-SBE24L	10	60	RC1206, $\pm 1\%$ & $\pm 5\%$, RoHS compliant, High power	1206	F	1/2W	1R-1M
RC0201-R-SB001P	10	60	Total Lead Free: RC0201~1206, $\pm 1\%$, + Jumper	0201~1206	F	---	0R, 1R-10M



SMD CERAMIC MULTILAYER CAPACITORS

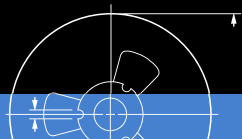


MLCC General Information

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	0201, 0402, 0603, 0805
	X7R	General purpose & High capacitance	100 pF to 47 μ F	6.3 V to 50 V	01005, 0201, 0402, 0603, 0805, 1206, 1210, 1812, 2220
		Medium and High voltage	100 pF to 2.2 μ F	100 V to 3000 V	0603, 0805, 1206, 1210, 1812
		Low inductance	10 nF to 220 nF	10 V to 50 V	0204, 0306, 0508, 0612
	X5R	General purpose & High capacitance	100 pF to 100 μ F	6.3 V to 50 V	01005, 0201, 0402, 0603, 0805, 1206, 1210, 1812
	Y5V	General purpose & High capacitance	10 nF to 47 μ F	6.3 V to 50 V	0201, 0402, 0603, 0805, 1206, 1210
Automotive grade products	NP0	Automotive grade	10 pF to 10 nF	50 V to 630 V	0402, 0603, 0805, 1206, 1210
	X7R	Automotive grade	100 pF to 2.2 μ F	16 V to 630 V	0402, 0603, 0805, 1206, 1210
Safety certification products	NP0	High voltage SC type	2.0 pF to 470 pF	X1/Y2, X2/Y3	1808, 1812
	X7R	High voltage SC type	150 pF to 1.5 nF	X1/Y2, X2/Y3	1808, 1812
Soft-termination Series	NP0	Soft-termination series	0.47pF to 22nF	100V to 3KV	0402, 0603, 0805, 1206, 1210, 1808, 1812
	X7R	Soft-termination series	100pF to 2.2uF	16V to 3KV	0402, 0603, 0805, 1206, 1210, 1808, 1812
C-Arrays	NP0	4C arrays	10 pF to 470 pF	50 V	0508, 0612
	X7R	4C arrays	180 pF to 100 nF	16 V to 50 V	0508, 0612
	Y5V	4C arrays	10 nF to 100 nF	25 V	0612
	X5R	4C arrays	100 nF to 2.2 uF	10 V	0508, 0612

Global part number	
Ordering example: CC0201KRX7R8BB102	
Series name (code 1-2) ——— 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) ——— 0100 0201 0402 0603 0805 1206 1210 1808 1812 2220 0204 0306 0508 0612 Capacitance tolerance (code 7) ——— 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 = 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) ——— NPO X5R X7R Y5V X6S	CC 0201 K R X7R 8 B B 102 Capacitance value (code 15-17) 102 = 1 000 pF (2 significant digits+number of zeros; the 3rd digit signifies the multiplying factor, and letter R is decimal point) 0 = x 1 1 = x 10¹ 2 = x 10² 3 = x 10³ 4 = x 10⁴ 5 = x 10⁵ 6 = x 10⁶ 7 = x 10⁷ X X R = Special capacitance (X X: capacitance before decimal point) Process code (code 14) N = NP0 B = Class 2 product Termination (code 13) B = Ni-Barrier Rated voltage (code 12) 4 = 4 V 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)

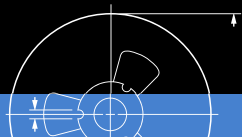
	CC	1	05	9	K	R	X7R	8	B	B	102
Series name (code 1-2) CC = Multilayer chip capacitors											Capacitance value (code 15-17) 102 = 1 000 pF (2 significant digits+number of zeros; the 3rd digit signifies the multiplying factor, and letter R is decimal point) 0 = x 1 1 = x 10 ¹ 2 = x 10 ² 3 = x 10 ³ 4 = 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											
Size code (code 4-5) 01 = 0201 02 = 0402 03 = 0603 05 = 0805 06 = 1206, 0306 08 = 1808, 0508 10 = 1210 12 = 1812, 0612											
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											
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%											
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											
											Process code (code 14) N = NP0 B = Class 2 product
											Termination (code 13) B = Ni-Barrier
											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
											TC material (code 9-11) X5R X7R

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	20000	---	---	---	---
	0201	0.3 ±0.03 / ±0.05		15000	---	50000	---	---
	0402	0.5 ±0.05 / ±0.15 / ±0.20		10000	---	50000	---	50000
	0603	0.8 ±0.1 / ±0.2		4000	---	15000	---	15000
	0805	0.6 ±0.1		4000	---	20000	---	10000
		0.85 / 1.0 ±0.1		4000	---	15000	---	8000
		1.25 ±0.2		---	3000	---	10000	5000
	1206	0.6 ±0.1		4000	---	20000	---	---
		0.85 ±0.1		4000	---	15000	---	---
		1.00 / 1.15 ±0.1		---	3000	---	10000	---
		1.25 ±0.2		---	3000	---	10000	---
		1.6 ±0.15		---	2500	---	8000	---
		1.6 ±0.2 / ±0.3		---	2000	---	8000	---
	1210	0.6 / 0.7 ±0.1		---	4000	---	15000	---
		0.85 ±0.1		---	4000	---	10000	---
		1.0 ±0.15		---	3000	---	10000	---
		1.15 ±0.1		---	3000	---	10000	---
		1.15 ±0.15		---	3000	---	10000	---
		1.25 ±0.2		---	3000	---	10000	---
		1.5 ±0.1		---	2000	---	8000	---
		1.6 / 1.9 ±0.2		---	2000	---	5000	---
		2.0 ±0.2		---	2000 / 1000	---	---	---
		2.5 ±0.2 / ±0.3		---	1000 / 500	---	---	---
	1808	1.15 ±0.15	12 mm	---	3000	---	---	---
		1.25 ±0.2		---	3000	---	---	---
		1.35 ±0.15		---	2000	---	---	---
		1.5 ±0.1		---	2000	---	---	---
		1.6 ±0.2		---	2000	---	8000	---
		2.0 ±0.2		---	2000	---	---	---
	1812	0.6 / 0.85 ±0.1		---	2000	---	---	---
		1.15 ±0.1		---	1000	---	---	---
		1.15 ±0.15		---	1000	---	---	---
		1.25 ±0.2		---	1000	---	8000	---
		1.35 ±0.15		---	1000	---	---	---
		1.5 ±0.1		---	1000	---	---	---
		1.6 ±0.2		---	1000	---	---	---
		2.0 ±0.2		---	1000	---	---	---
		2220		0.85 ±0.1	---	1500	---	---
	1.15 ±0.1			---	1500	---	---	---
Low inductance	0204	0.3 ±0.1	8 mm	10000	---	---	---	---
	0306	0.5 ±0.1		4000	---	15000	---	---
	0508	0.85 ±0.1		4000	---	15000	---	---
	0612	0.85 ±0.1		4000	---	15000	---	---
Arrays	0508	0.6 ±0.1		4000	---	20000	---	---
	0612	0.8 ±0.1		4000	---	15000	---	---





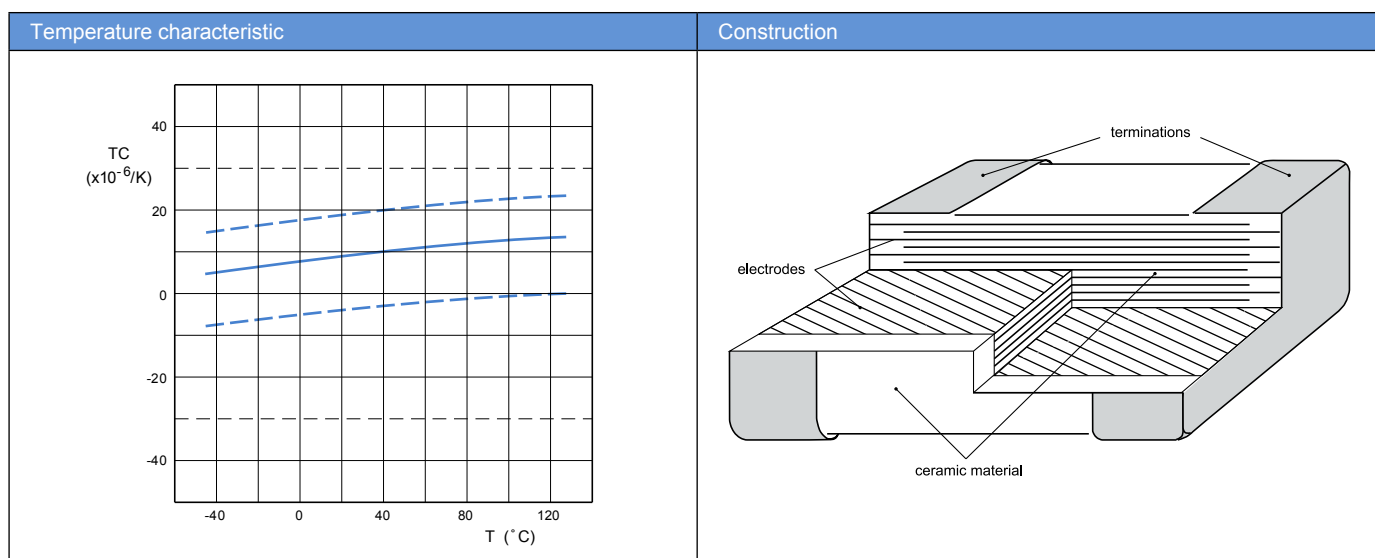
MLCC Selection Charts

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

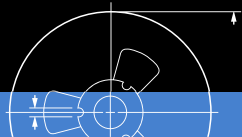
MLCC Selection Charts

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

NPO											
General purpose											
Capacitance	01005		0201			0402			0603		
	10 V	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			0.3 ±0.03	0.3 ±0.03	0.3 ±0.03	0.5 ±0.05	0.5 ±0.05	0.5 ±0.05	0.8 ±0.1	0.8 ±0.1	0.8 ±0.1
0.5 pF	0.2 ±0.02	0.2 ±0.02									
0.56 pF			0.3 ±0.03	0.3 ±0.03	0.3 ±0.03	0.5 ±0.05	0.5 ±0.05	0.5 ±0.05	0.8 ±0.1	0.8 ±0.1	0.8 ±0.1
0.6 pF	0.2 ±0.02	0.2 ±0.02									
0.68 pF			0.3 ±0.03	0.3 ±0.03	0.3 ±0.03	0.5 ±0.05	0.5 ±0.05	0.5 ±0.05	0.8 ±0.1	0.8 ±0.1	0.8 ±0.1
0.7 pF	0.2 ±0.02	0.2 ±0.02									
0.8 pF	0.2 ±0.02	0.2 ±0.02									
0.82 pF			0.3 ±0.03	0.3 ±0.03	0.3 ±0.03	0.5 ±0.05	0.5 ±0.05	0.5 ±0.05	0.8 ±0.1	0.8 ±0.1	0.8 ±0.1
0.9 pF	0.2 ±0.02	0.2 ±0.02									
1 pF	0.2 ±0.02	0.2 ±0.02	0.3 ±0.03	0.3 ±0.03	0.3 ±0.03	0.5 ±0.05	0.5 ±0.05	0.5 ±0.05	0.8 ±0.1	0.8 ±0.1	0.8 ±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						0.5 ±0.05	0.5 ±0.05	0.5 ±0.05	0.8 ±0.1	0.8 ±0.1	0.8 ±0.1
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								0.8 ±0.1	0.8 ±0.1	0.8 ±0.1
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)

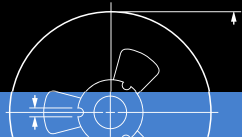
MLCC Selection Charts

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

NPO									
General purpose									
Capacitance	0805			1206			1210		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	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

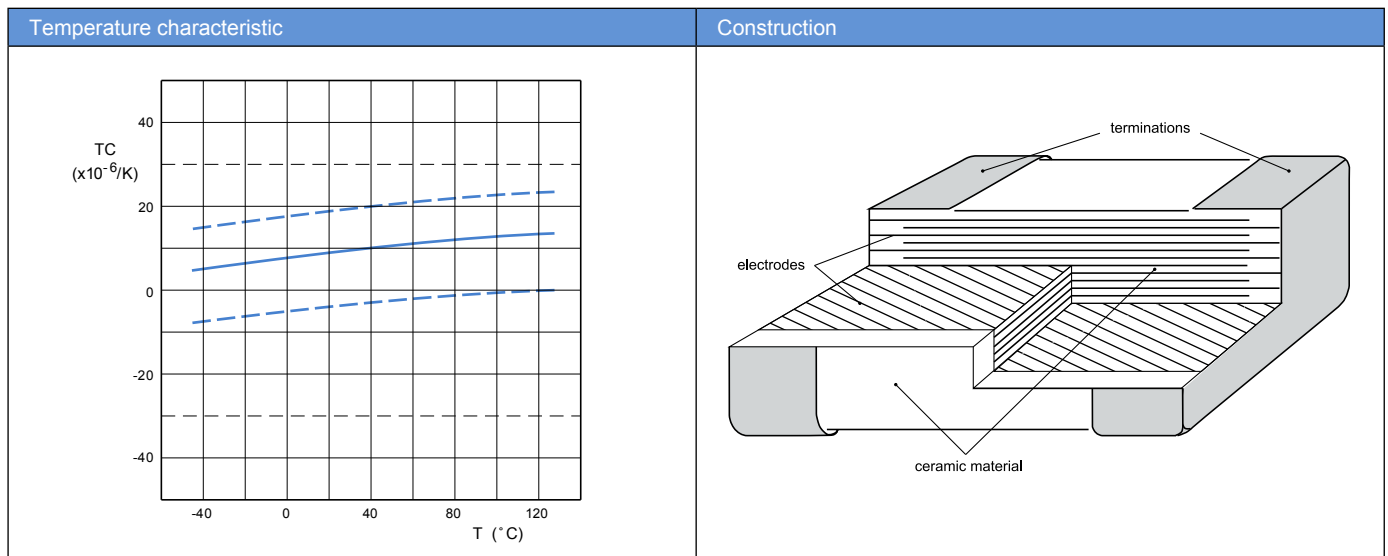
NP0									
General purpose									
Capacitance	0805			1206			1210		1812
	16 V	25 V	50 V	16 V	25 V	50 V	25 V	50 V	50 V
1.2 nF	0.85 ±0.1	0.85 ±0.1	0.85 ±0.1	0.6 ±0.1	0.6 ±0.1	0.6 ±0.1	1.25 ±0.2	1.25 ±0.2	1.25 ±0.2
1.5 nF									
1.8 nF									
2.2 nF	1.25 ±0.2	1.25 ±0.2	1.25 ±0.2	0.85 ±0.1	0.85 ±0.1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

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

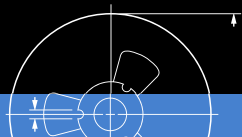


Features

- 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	1000 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								
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)



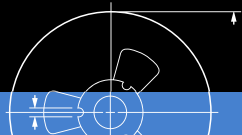
MLCC Selection Charts

NPO - Medium voltage, 1206 to 1812

NPO												
Medium voltage												
Capacitance	1206				1210				1812			
	100 V	250 V	500 V	630 V	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	0.6 ±0.1		0.6 ±0.1									
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		0.85 ±0.1	0.85 ±0.1									
1.2 nF												
1.5 nF												
1.8 nF												
2.2 nF												
2.7 nF		1.25 ±0.2	1.25 ±0.2									
3.3 nF												
3.9 nF												
4.7 nF	0.85 ±0.1											
5.6 nF												
6.8 nF												
8.2 nF												
10 nF	1.25 ±0.2											
22 nF												
Tape width	8 mm											

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





MLCC Selection Charts

NPO - High voltage, 0805 to 1210

NP0					
High voltage					
Capacitance	0805	1206		1210	
	1000 V	1000 V	2000 V	1000 V	2000 V
10 pF	0.85 ±0.1	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					
1.2 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)

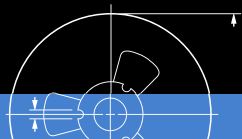


MLCC Selection Charts

NPO - High voltage, 1808 / 1812

NP0						
High voltage						
Capacitance	1808			1812		
	1000 V	2000 V	3000 V	1000 V	2000 V	3000 V
10 pF			1.6 ±0.2	1.25 ±0.2	1.25 ±0.2	1.25 ±0.2
12 pF						
15 pF						
18 pF						
22 pF						
27 pF						
33 pF	1.25 ±0.2	1.25 ±0.2				
39 pF						
47 pF						
56 pF						
68 pF						
82 pF						
100 pF						
120 pF						
150 pF						
180 pF			2.0 ±0.2			
220 pF						
270 pF						
330 pF						
390 pF						
470 pF						
560 pF						
680 pF						
820 pF						
1000 pF	1.25 ±0.2					
1.2 nF						
1.5 nF						
1.8 nF						
2.2 nF						
2.7 nF						
3.3 nF						
3.9 nF						
4.7 nF						
5.6 nF						
6.8 nF						
8.2 nF						
10 nF						
12 nF						
15 nF						
18 nF						
22 nF						
33 nF						
Tape width	12 mm					

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



MLCC Selection Charts

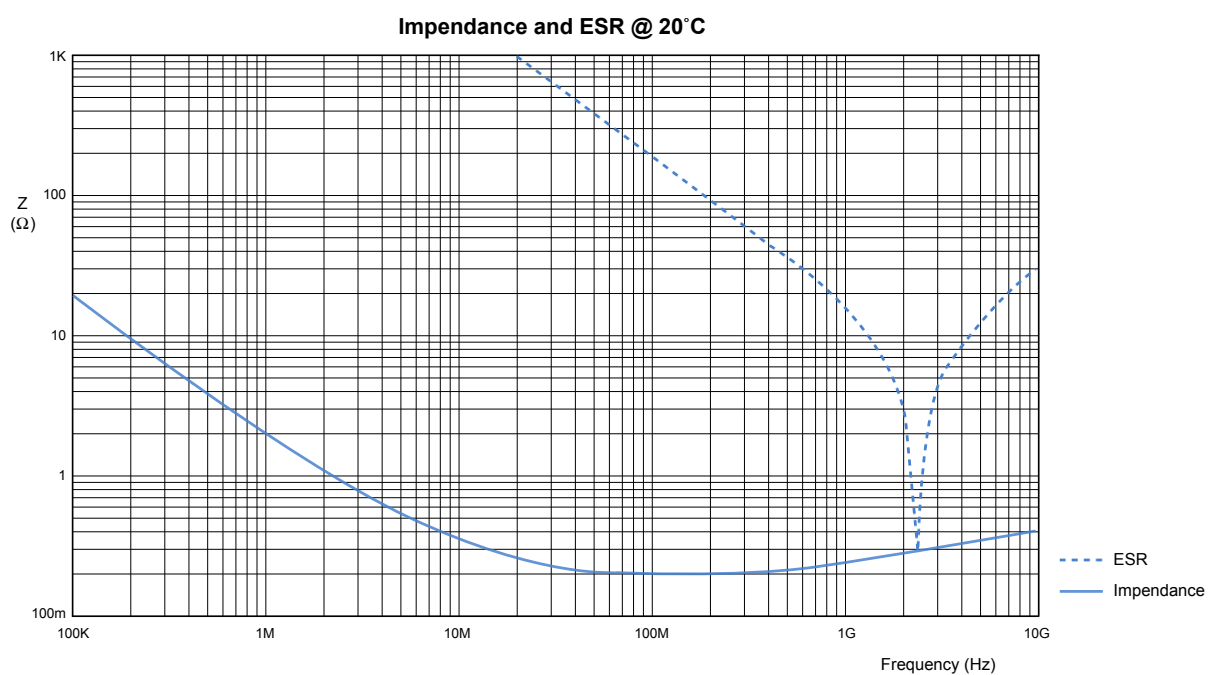
NPO - High frequency, 0201 to 0805



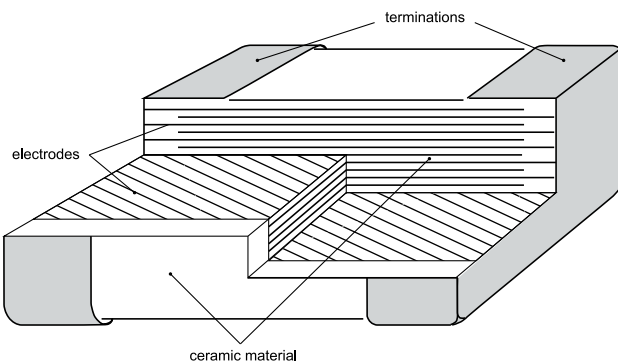
Features

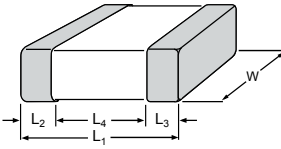
- Lowest ESR in high frequency
- Ultra small
- Noise filtering

ESR characteristic



Construction



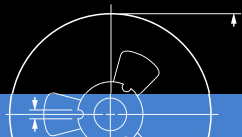
Case dimensions							
Discrete capacitors - High Frequency							
	Case size designation		Dimensions in mm				
	Inch-based	Metric	L ₁	W	L ₂ / L ₃ min	L ₂ / L ₃ max	L ₄ min
	0201	0603M	0.6 ±0.03	0.3 ±0.03	0.10	0.20	0.20
	0402	1005M	1.0 ±0.05	0.5 ±0.05	0.15	0.30	0.40
	0603	1608M	1.6 ±0.10	0.8 ±0.10	0.20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

NP0					
High frequency					
Capacitance	0201		0402		
	25 V	50 V	16 V	25 V	50 V
0.2 pF	0.3 ±0.03	0.3 ±0.03			
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			0.5 ±0.05	0.5 ±0.05	0.5 ±0.05
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					
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			
0.2 pF	0.8 ±0.1	0.8 ±0.1	0.8 ±0.1	0.6 ±0.1	0.6 ±0.1	0.6 ±0.1			
0.3 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									
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									
Tape width	8 mm								

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



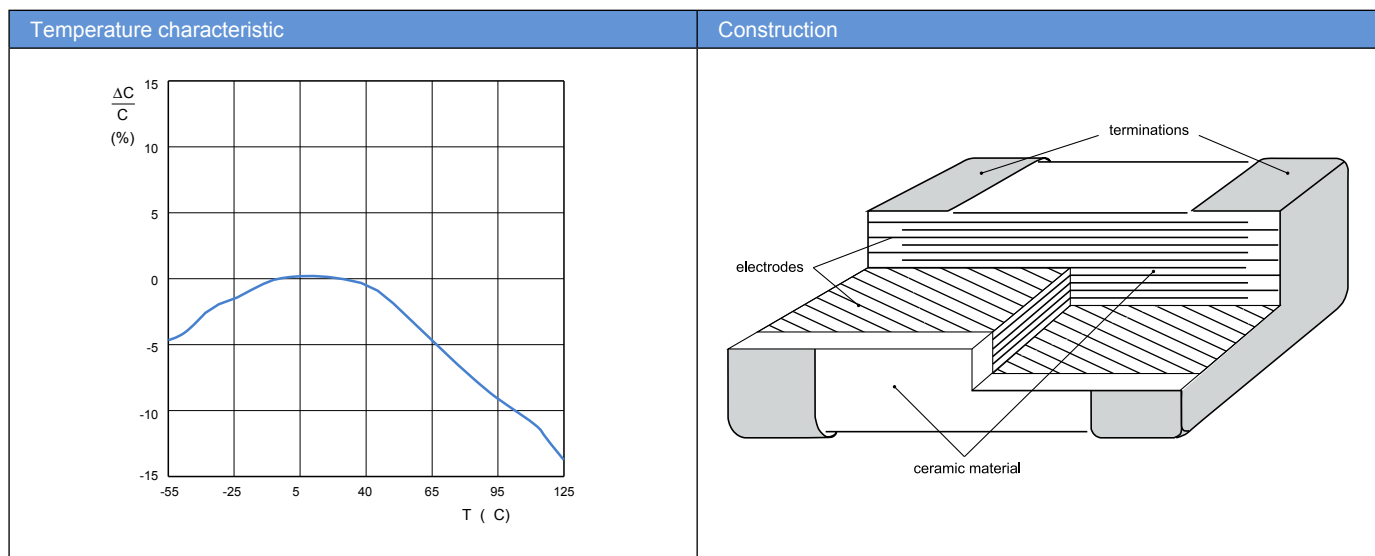
MLCC Selection Charts

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
	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

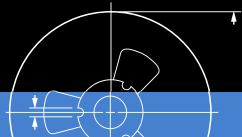
Note: 1. Dimension for size 0603, C < 10 µF; 0805 to 1812, C ≤ 100 nF
 2. Dimension for size 0402, C ≥ 4.7 µF; 0603, C = 1 µF, 50V; 0805 to 1812, C > 100 nF

MLCC Selection Charts

X7R - General purpose & High Capacitance , 01005 to 0402

X7R																				
General purpose & High Capacitance																				
Capacitance	01005		0201					0402												
	6.3 V/10V	16 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			0.3 ±0.03	0.3 ±0.03	0.3 ±0.03	0.3 ±0.03	0.3 ±0.03													
68 pF																				
100 pF	0.2 ±0.02	0.2 ±0.02						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																				
150 nF																				
220 nF								0.5 ±0.05	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 & 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
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						0.6 ±0.1	0.6 ±0.1	0.6 ±0.1	0.6 ±0.1	0.6 ±0.1
2.2 nF										
3.3 nF										
4.7 nF										
6.8 nF										
10 nF	0.8 ±0.1	0.8 ±0.1	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 ±0.15	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)

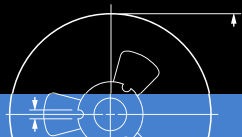


MLCC Selection Charts

X7R - General purpose & High capacitance, 1206 to 2220

X7R												
General purpose & High Capacitance												
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												
6.8 nF												
10 nF	0.85 ±0.1	0.85 ±0.1	0.85 ±0.1	0.85 ±0.1	0.85 ±0.1							
15 nF										0.85 ±0.1	0.85 ±0.1	
22 nF						0.85 ±0.1	0.85 ±0.1	0.85 ±0.1	0.85 ±0.1			
33 nF												
47 nF												
68 nF												
100 nF												
150 nF					1.15 ±0.1					1.15 ±0.1	1.15 ±0.1	
220 nF					0.85 ±0.1							
330 nF					1.0 ±0.1							
470 nF						1.15 ±0.1	1.15 ±0.1	1.15 ±0.1	1.15 ±0.1	1.25 ±0.2	1.6 ±0.2	0.85 ±0.1
680 nF	1.15 ±0.1	1.15 ±0.1	1.15 ±0.1	1.15 ±0.1	1.6 ±0.2	1.25 ±0.2	1.25 ±0.2	1.25 ±0.2	1.25 ±0.2			1.15 ±0.1
1000 nF										1.9 ±0.2		
2.2 µF										2.5 ±0.3		
4.7 µF	1.6 ±0.2	1.6 ±0.2	1.6 ±0.2	1.6 ±0.2		1.9 ±0.2	1.9 ±0.2	1.9 ±0.2	1.9 ±0.2			
10 µF												
22 µF						2.5 ±0.2	2.5 ±0.2	2.5 ±0.2	2.5 ±0.2			
47 µF												
100 µF												
Tape width	8 mm											

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



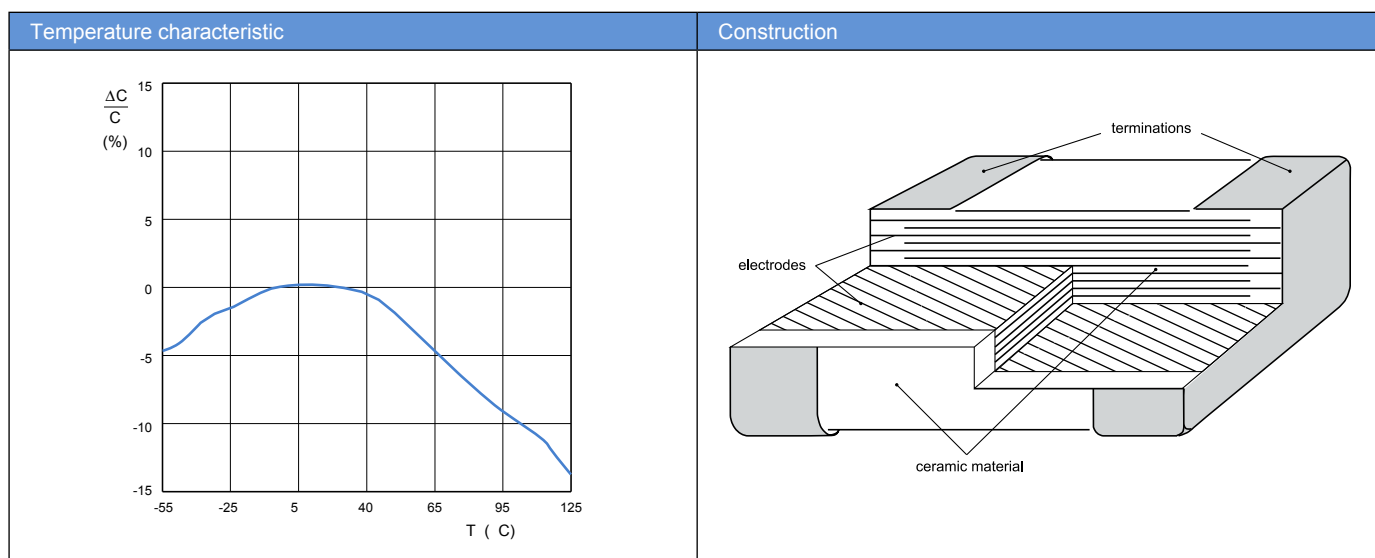
MLCC Selection Charts

X7R - Medium & High voltage, 0402 to 1812



Features

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



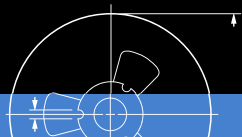
Dimensions							
Discrete capacitors - Medium and High voltage							
	Case size designation		Dimensions in mm				
	Inch-based	Metric	L ₁	W	L ₂ / L ₃ min	L ₂ / L ₃ max	L ₄ min
	0402	1005M	1.0 ±0.05	0.5 ±0.05	0.15	0.30	0.40
	0603	1608M	1.6 ±0.10	0.8 ±0.10	0.20	0.60	0.40
	0805	2012M	2.0 ±0.20	1.25 ±0.20	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				0.6 ±0.1	0.85 ±0.1	0.85 ±0.1	0.85 ±0.1	0.85 ±0.1
220 pF								
330 pF			0.8 ±0.1					
470 pF								
680 pF								
1.0 nF								
1.5 nF								
2.2 nF								
3.3 nF								
4.7 nF								
6.8 nF								
10 nF					1.25 ±0.2	1.25 ±0.2	1.25 ±0.2	
15 nF		0.85 ±0.1						
22 nF								
33 nF								
47 nF				1.25 ±0.2				
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

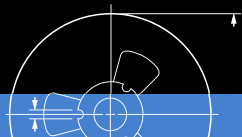
X7R - Medium & High voltage, 1206/ 1210

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	0.85 ±0.1	0.85 ±0.1	1.25 ±0.2	1.25 ±0.2	1.25 ±0.2	1.25 ±0.2					1.25 ±0.2	1.25 ±0.2												
330 pF																								
470 pF																								
680 pF																								
1.0 nF																								
1.5 nF																								
2.2 nF							0.85 ±0.1	0.85 ±0.1	1.25 ±0.2	1.25 ±0.2														
3.3 nF																								
4.7 nF																								
6.8 nF																								
10 nF																								
15 nF																								
22 nF		1.25 ±0.2								1.6 ±0.2	1.6 ±0.2													
33 nF		1.6 ±0.2	1.6 ±0.2																					
47 nF		1.25 ±0.2																						
68 nF		1.25 ±0.2																						
100 nF	1.25 ±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)

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							1.25 ±0.2	1.35 ±0.2		
4.7 nF										
6.8 nF	1.6 ±0.2			0.85 ±0.1	0.85 ±0.1	1.25 ±0.2			1.6 ±0.2	
10 nF									2.0 ±0.2	
15 nF										
22 nF							1.35 ±0.2			
33 nF							1.6 ±0.2	1.6 ±0.2		
47 nF										
68 nF										
100 nF					1.25 ±0.2	1.6 ±0.2				
150 nF				1.25 ±0.2						
220 nF					1.6 ±0.2					
330 nF										
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)



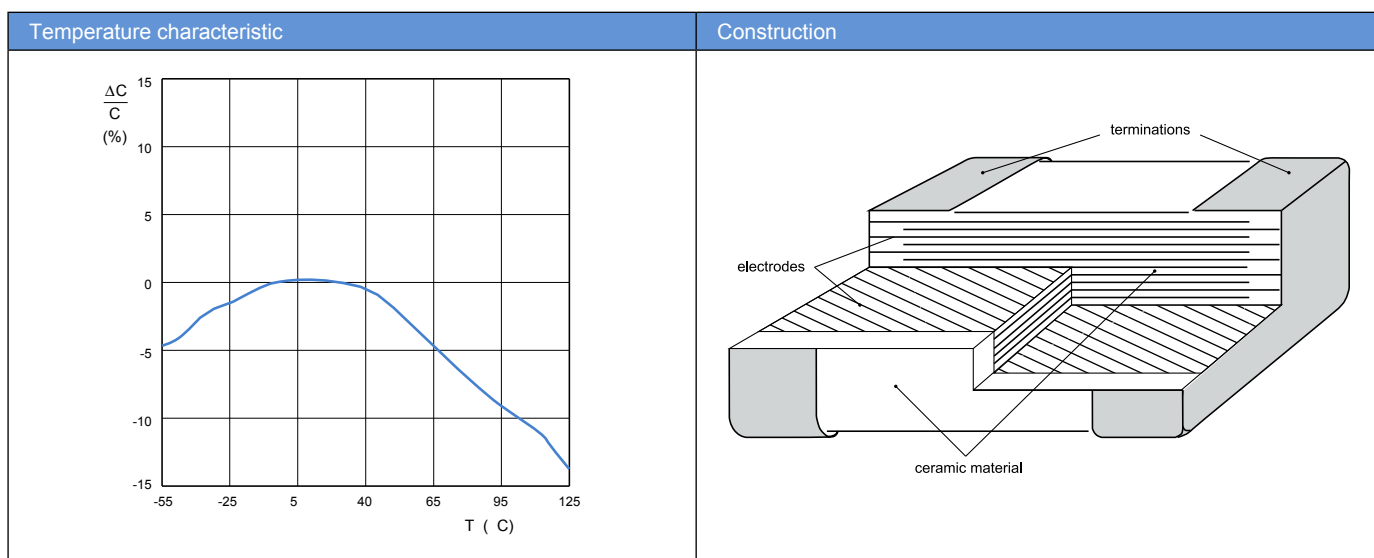
MLCC Selection Charts

X7R / X5R - Low inductance, 0204 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
	0204	0510M	0.5 ±0.10	1.0 ±0.10	0.30 ±0.10	0.10	0.30	0.10
	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

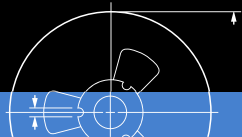
X7R / X5R - Low inductance, 0204 to 0612

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	0.85 ±0.1	0.85 ±0.1
22 nF							
47 nF							
100 nF	0.5 ±0.1					1.15 ±0.1	1.15 ±0.1
220 nF							
470 nF					1.15 ±0.1		
1000 nF							
Tape width	8 mm						

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

X5R	
Low Inductance series	
Capacitance	0204
	10 V
10 nF	0.3±0.1
22 nF	
47 nF	
100 nF	
Tape width	8 mm

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



MLCC Selection Charts

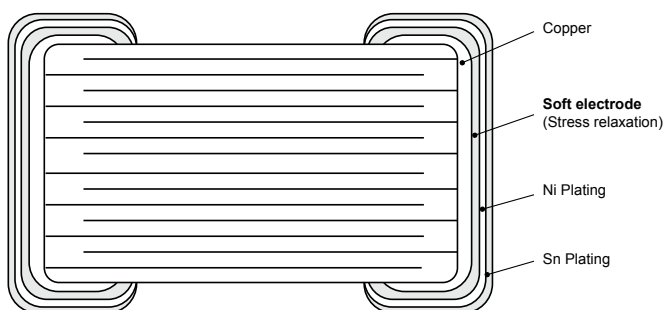
NP0 / X7R - Soft termination, 0402 to 1812



Features

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

Construction



Dimensions

Discrete capacitors - Soft termination

	Case size designation		Dimensions in mm				
	Inch-based	Metric	L1	W	L2 / L3 min	L2 / L3 max	L4 min
	0402	1005M	1.0 ±0.15	0.5 ±0.15	0.10	0.30	0.20
	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
	1808	4520M	4.5 ±0.40	2.0 ±0.30	0.25	0.85	2.20
	1812	4532M	4.5 ±0.40	3.2 ±0.20	0.25	0.85	2.20

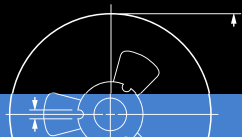
MLCC Selection Charts

NP0 - Soft termination, 0402 to 0805

NP0									
Soft termination									
Capacitance	0402	0603		0805					
	100 V	100 V	250 V	100 V	250 V	500 V	630 V	1000 V	
1 pF	0.5 ±0.15	0.8 ±0.15	0.8 ±0.15	0.6 ±0.15	0.6 ±0.15	0.6 ±0.15			
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 ±0.15	1.25 ±0.2				
1.5 nF									
1.8 nF				1.25 ±0.2					
2.2 nF									
2.7 nF									
3.3 nF									
3.9 nF									
4.7 nF									
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

NP0 - Soft termination, 1206 / 1210

NP0												
Soft termination												
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
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												
22 nF												
Tape width	8 mm											

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

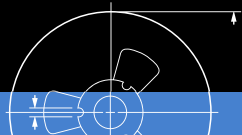


MLCC Selection Charts

NP0 - Soft termination, 1808 / 1812

NP0										
Soft termination										
Capacitance	1808			1812						
	1 K V	2 K V	3K V	100 V	250 V	500 V	630 V	1000 V	2000 V	3000 V
10 pF			1.6 ±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					1.25 ±0.2			1.25 ±0.2		
150 pF										
180 pF										
220 pF										
270 pF										
330 pF										
390 pF										
470 pF										
560 pF										
680 pF			1.25 ±0.2							1.25 ±0.2
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										
22 nF										
Tape width	12mm									

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



MLCC Selection Charts

X7R - Soft termination, 0402 / 0603

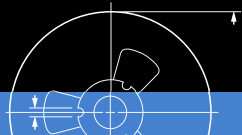
X7R									
Soft termination									
Capacitance	0402				0603				
	16 V	25 V	50 V	100 V	16 V	25 V	50 V	100 V	250 V
100 pF	0.5 ±0.15	0.5 ±0.15	0.5 ±0.15	0.5 ±0.15	0.8 ±0.15	0.8 ±0.15	0.8 ±0.15	0.8 ±0.15	0.8 ±0.15
150 pF									
220 pF									
330 pF									
470 pF									
680 pF									
1.0 nF									
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									
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	8 mm								

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



X7R								
Soft termination								
Capacitance	0805							
	16 V	25 V	50 V	100 V	250 V	500 V	630 V	1000 V
100 pF								
150 pF	0.6 ±0.15	0.6 ±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								
470 pF								
680 pF								
1.0 nF								
1.5 nF								
2.2 nF								
3.3 nF								
4.7 nF								
6.8 nF					1.25 ±0.2	1.25 ±0.2	1.25 ±0.2	
10 nF								
15 nF				0.85 ±0.15	1.25 ±0.2	1.25 ±0.2		
22 nF								
33 nF	0.85 ±0.15	0.85 ±0.15	0.85 ±0.15	1.25 ±0.2				
47 nF								
68 nF								
100 nF								
150 nF	1.25 ±0.2	1.25 ±0.2	1.25 ±0.2					
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	8 mm							

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



MLCC Selection Charts

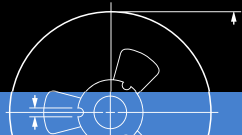
X7R - Soft termination, 1206

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									
220 pF									
330 pF									
470 pF									1.25 ±0.2
680 pF									
1.0 nF									
1.5 nF					0.85 ±0.15	1.25 ±0.2	1.25 ±0.2	1.25 ±0.2	
2.2 nF				0.85 ±0.15					
3.3 nF			0.85 ±0.15						
4.7 nF									
6.8 nF	0.85 ±0.15	0.85 ±0.15							
10 nF									
15 nF									
22 nF									
33 nF					1.25 ±0.2	1.6 ±0.2	1.6 ±0.2		
47 nF									
68 nF									
100 nF				1.25 ±0.2	1.6 ±0.2				
150 nF			1.15 ±0.2						
220 nF									
330 nF	1.6 ±0.2	1.6 ±0.2							
470 nF			1.6 ±0.2						
680 nF	1.15 ±0.2	1.15 ±0.2							
1000 nF									
2.2 µF	1.6 ±0.2	1.6 ±0.2							
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)

X7R									
Soft termination									
Capacitance	1210								
	16 V	25 V	50 V	100 V	250 V	500 V	630 V	1000 V	2000 V
100 pF									
150 pF									
220 pF									
330 pF									
470 pF									
680 pF									
1.0 nF									1.25 ±0.2
1.5 nF									
2.2 nF								1.25 ±0.2	1.6 ±0.2
3.3 nF									
4.7 nF									
6.8 nF					0.85 ±0.15		1.25 ±0.2		
10 nF									
15 nF			0.85 ±0.15	0.85 ±0.15		1.25 ±0.2			
22 nF	0.85 ±0.15	0.85 ±0.15					1.6 ±0.2	1.6 ±0.2	
33 nF									
47 nF									
68 nF					1.25 ±0.2				
100 nF									
150 nF									
220 nF			1.15 ±0.2	1.25 ±0.2					
330 nF									
470 nF	1.15 ±0.2	1.15 ±0.2							
680 nF			1.25 ±0.2	2.0 ±0.2					
1000 nF	1.25 ±0.2	1.25 ±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

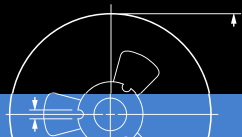
X7R - Soft termination, 1808

X7R			
Soft termination			
Capacitance	1808		
	1000 V	2000 V	3000 V
100 pF			
150 pF			
220 pF			
330 pF	1.35 ±0.2	1.35 ±0.2	1.6 ±0.2
470 pF			
680 pF			2.0 ±0.2
1.0 nF			
1.5 nF			
2.2 nF		1.6 ±0.2	
3.3 nF			
4.7 nF			
6.8 nF	1.6 ±0.2		
10 nF			
15 nF			
22 nF			
33 nF			
47 nF			
68 nF			
100 nF			
150 nF			
220 nF			
330 nF			
470 nF			
680 nF			
1000 nF			
2.2 µF			
4.7 µF			
10 µF			
22 µF			
47 µF			
100 µF			
Tape width	12 mm		

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

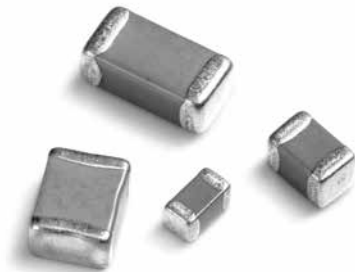
X7R							
Soft termination							
Capacitance	1812						
	50 V	100 V	250 V	500 V	630 V	1000 V	2000 V
100 pF							
150 pF							
220 pF							
330 pF							
470 pF							
680 pF							
1.0 nF							
1.5 nF							
2.2 nF	0.85 ±0.15	0.85 ±0.15	0.85 ±0.15	1.25 ±0.2	1.35 ±0.2	1.35 ±0.2	1.35 ±0.2
3.3 nF							
4.7 nF							
6.8 nF							
10 nF			1.25 ±0.2		1.6 ±0.2		
15 nF							
22 nF							
33 nF							
47 nF	1.15 ±0.2	1.25 ±0.2	1.6 ±0.2	1.6 ±0.2			
68 nF							
100 nF							
150 nF		1.6 ±0.2				1.6 ±0.2	
220 nF							
330 nF							
470 nF							
680 nF	1.6 ±0.2	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)



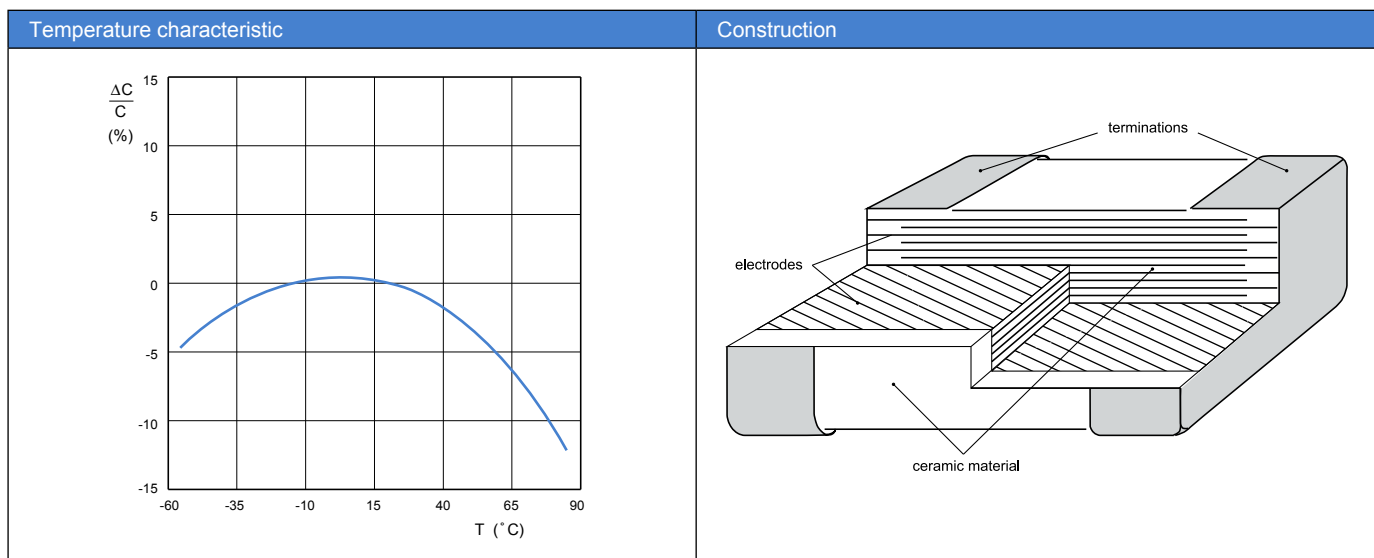
MLCC Selection Charts

X5R - General purpose & High capacitance, 01005 to 1210



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 ⁽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	1005M	1.0 ±0.05 ⁽¹⁾	0.5 ±0.05 ⁽¹⁾	0.15	0.30	0.40
			1.0 ±0.15 ⁽²⁾	0.5 ±0.15 ⁽²⁾	0.15	0.30	0.40
			1.0 ±0.20 ⁽³⁾	0.5 ±0.20 ⁽³⁾	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 ±0.20 ⁽²⁾	0.8 ±0.20 ⁽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 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 = 2.2 µF, 16V/25V and C = 4.7 µF; 0603, C ≥ 10 µF; 0805 to 1812, C > 100 nF
 3. Dimension for size 0402, C ≥ 10 µF



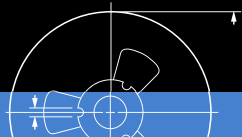
MLCC Selection Charts

X5R - General purpose & High capacitance, 01005 to 0402

X5R																	
General purpose & High capacitance																	
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					
100 pF	0.2 ±0.02	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	0.2 ±0.02	0.2 ±0.02															
330 pF																	
470 pF	0.2 ±0.02	0.2 ±0.02															
680 pF																	
1.0 nF	0.2 ±0.02	0.2 ±0.02				0.3 ±0.03											
1.5 nF																	
2.2 nF	0.2 ±0.02	0.2 ±0.02															
3.3 nF																	
4.7 nF	0.2 ±0.02	0.2 ±0.02															
6.8 nF																	
10 nF	0.2 ±0.02	0.2 ±0.02															
15 nF																	
22 nF	0.2 ±0.02																
33 nF																	
47 nF	0.2 ±0.02																
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	0.2 ±0.02		0.3 ±0.03	0.3 ±0.03								0.5 ±0.05					
330 nF																	
470 nF			0.3 ±0.03							0.5 ±0.1	0.5 ±0.1	0.5 ±0.1					
680 nF																	
1 000 nF			0.3 ±0.05	0.3 ±0.05				*		0.5 ±0.05	0.5 ±0.05						
2.2 µF								*		0.5 ±0.15	0.5 ±0.15						
4.7 µF								0.5 ±0.15*	0.5 ±0.15								
10 µF								0.5 ±0.2	0.5 ±0.2								
22 µF								0.5 ±0.2									
Tape width	8 mm																

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

*: 0402 low profile, T=0.3+/-0.03mm.



MLCC Selection Charts

X5R - General purpose & High capacitance, 0603 / 0805

X5R												
General purpose & High capacitance												
Capacitance	0603						0805					
	4 V	6.3 V	10 V	16 V	25 V	50 V	4 V	6.3 V	10 V	16 V	25 V	50 V
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												
6.8 nF												
10 nF	0.8 ±0.1	0.8 ±0.1	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	0.6 ±0.1
15 nF												
22 nF												
33 nF												
47 nF												
68 nF												
100 nF								0.85 ±0.1	0.85 ±0.1	0.85 ±0.1	0.85 ±0.1	0.85 ±0.1
150 nF												
220 nF												
330 nF												
470 nF												
680 nF												
1 000 nF	*	*	*	*	*					1.25 ±0.2	1.25 ±0.2	1.25 ±0.2
2.2 µF	*	*	*			0.8 ±0.2		1.25 ±0.2	1.25 ±0.2			
4.7 µF				0.8 ±0.15	0.8 ±0.15					*	*	
10 µF												
22 µF	0.8 ±0.2	0.8 ±0.2	0.8 ±0.2									
47 µF												
100 µF							1.25 ±0.2					
Tape width	8 mm											

Note: Values in shaded cells indicate thickness class (unit: mm)
 *:0603 low profile, T=0.5+/-0.05mm; 0805 low profile, T=0.85+/-0.1mm

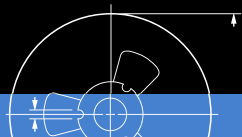


MLCC Selection Charts

X5R - General purpose & High capacitance, 1206

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

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

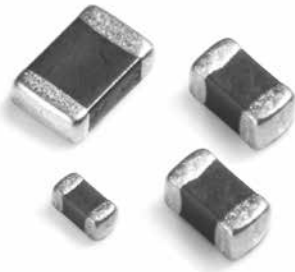


MLCC Selection Charts

X5R - General purpose & High capacitance, 1210

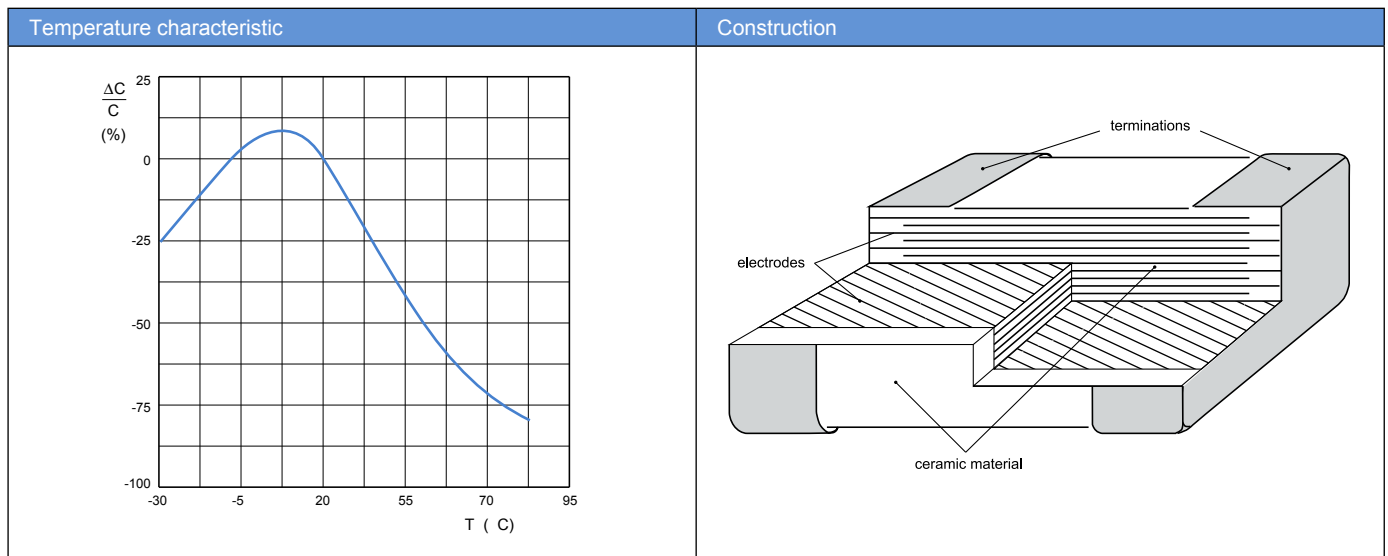
X5R					
General purpose & High capacitance					
Capacitance	1210				
	6.3 V	10 V	16 V	25 V	50 V
100 pF					
150 pF					
220 pF					
330 pF					
470 pF					
680 pF					
1.0 nF					
1.5 nF					
2.2 nF	0.85 ±0.1	0.85 ±0.1	0.85 ±0.1	0.85 ±0.1	0.85 ±0.1
3.3 nF					
4.7 nF					
6.8 nF					
10 nF					
15 nF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

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



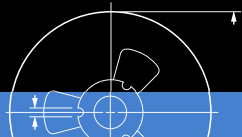
Features

- 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
	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 50V, 0402

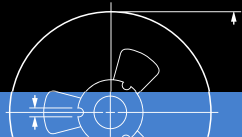
Y5V					
General purpose & High capacitance					
Capacitance	0402				
	6.3 V	10 V	16 V	25 V	50 V
10 nF	0.5 ±0.05	0.5 ±0.05	0.5 ±0.05	0.5 ±0.05	0.5 ±0.05
22 nF					
47 nF					
100 nF					
220 nF					
470 nF					
1 000 nF					
Tape width	8 mm				

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



Y5V										
General purpose & High capacitance										
Capacitance	0603					0805				
	6.3 V	10 V	16 V	25 V	50 V	6.3 V	10 V	16 V	25 V	50 V
10 nF	0.8 ±0.1	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	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	0.85 ±0.1	0.85 ±0.1	
470 nF										
1 000 nF										
2.2 µF										
4.7 µF	1.25 ±0.2	1.25 ±0.2	1.25 ±0.2	1.25 ±0.2	1.25 ±0.2	1.25 ±0.2				
10 µF										
22 µF										
Tape width	8 mm									

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



MLCC Selection Charts

Y5V - General purpose & High capacitance 6.3 to 50V, 1206 / 1210

Y5V										
General purpose & High capacitance										
Capacitance	1206					1210				
	6.3 V	10 V	16 V	25 V	50 V	6.3 V	10 V	16 V	25 V	50 V
10 nF	0.6 ±0.1	0.6 ±0.1	0.6 ±0.1	0.6 ±0.1	0.6 ±0.1					
22 nF										
47 nF										
100 nF										
220 nF										
470 nF	0.85 ±0.1	0.85 ±0.1	0.85 ±0.1	0.85 ±0.1	0.85 ±0.1					
1 000 nF					1.15 ±0.1					
2.2 µF										
4.7 µF			1.15 ±0.1	1.6 ±0.2		1.5 ±0.1	1.5 ±0.1	1.5 ±0.1	1.5 ±0.1	1.5 ±0.1
10 µF			1.6 ±0.2			1.6 ±0.2	1.6 ±0.2	1.6 ±0.2		
22 µF										
47 µF										
Tape width	8 mm									

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



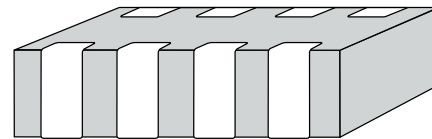
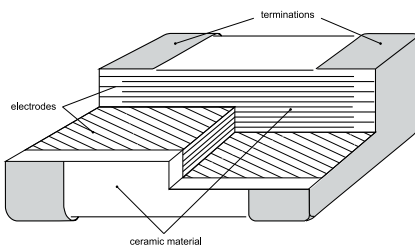
Features

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

Applications

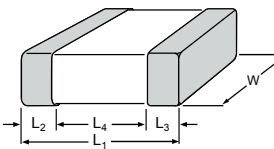
- All general purpose applications
- Entertainment applications
- Comfort / security applications
- Information applications

Construction



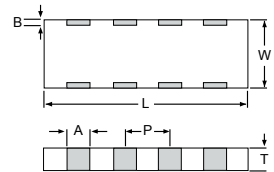
Dimensions

Discrete capacitors - Automotive grade

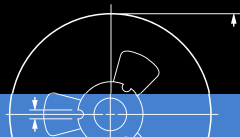
	Case size designation		Dimensions in mm				
	Inch-based	Metric	L1	W	L2 / L3 min	L2 / L3 max	L4 min
	0402	1005M	1.0 ±0.05	0.5 ±0.05	0.15	0.30	0.40
	0603	1608M	1.6 ±0.20	0.8 ±0.10	0.20	0.60	0.40
	0805	2012M	2.0 ±0.20	1.25 ±0.20	0.25	0.75	0.55
	1206	3216M	3.2 ±0.30	1.6 ±0.20	0.25	0.75	1.40
	1210	3225M	3.2 ±0.30	2.5 ±0.20	0.25	0.75	1.40
	1812	4532M	4.5 ±0.40	3.2 ±0.30	0.25	0.75	2.20

Dimensions

4C arrays

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

Note: 1. Available for NP0 and X7R



MLCC Selection Charts

NP0 - Automotive grade, 0402 to 0805

NP0							
Automotive Grade							
Capacitance	0402	0603			0805		
	50 V	50 V	100V	250V	50 V	100 V	250 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
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	0.85 ±0.1						
330 pF							
390 pF							
470 pF							
560 pF							
680 pF							
820 pF							
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)

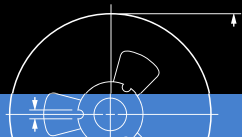


MLCC Selection Charts

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				
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	1.25 ±0.2	1.25 ±0.2	1.25 ±0.2	1.25 ±0.2	1.25 ±0.2
1.2 nF									
1.5 nF									
1.8 nF									
2.2 nF									
2.7 nF									
3.3 nF									
3.9 nF									
4.7 nF									
5.6 nF									
6.8 nF									
8.2 nF									
10 nF									
Tape width	8mm								

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



MLCC Selection Charts

X7R - Automotive grade, 0402 / 0603

X7R									
Automotive grade									
Capacitance	0402				0603				
	10 V	16 V	25 V	50 V	10 V	16 V	25 V	50 V	100V
100 pF									
150 pF									
180 pF									
220 pF	0.5 ±0.05	0.5 ±0.05	0.5 ±0.05	0.5 ±0.05					
330 pF									
390 pF									
470 pF									
680 pF									
1 000 pF					0.8 ±0.1	0.8 ±0.1	0.8 ±0.1	0.8 ±0.1	0.8 ±0.1
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								

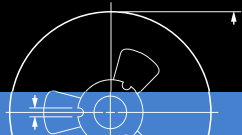
Note: Values in shaded cells indicate thickness class (unit: mm)

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		
1 000 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		
1.5 nF									
2.2 nF						1.25 ±0.2			
3.3 nF									
4.7 nF									
6.8 nF									
10 nF									
15 nF									
18 nF									
22 nF									
27 nF					1.25 ±0.2				
33 nF									
47 nF									
68 nF									
100 nF									
150 nF	1.25 ±0.2	1.25 ±0.2	1.25 ±0.2	0.85 ±0.1					
220 nF				1.25 ±0.2					
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

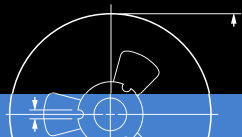
X7R - Automotive grade, 1206

X7R								
Automotive grade								
Capacitance	1206							
	6.3 V	10 V	16 V	25V	50V	100V	250 V	
100 pF								
150 pF								
180 pF								
220 pF								
330 pF								
390 pF								
470 pF								
680 pF								
1 000 pF								
1.5 nF								
2.2 nF								
3.3 nF								
4.7 nF								
6.8 nF								
10 nF								
15 nF								
18 nF								
22 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	1.25 ±0.2	
27 nF								
33 nF						1.25 ±0.2		
47 nF								
68 nF								
100 nF					1.15 ±0.1			
150 nF								
220 nF					1.6 ±0.2			
270 nF								
330 nF								
390 nF								
470 nF	1.0 ±0.1	1.0 ±0.1	1.0 ±0.1	1.0 ±0.1				
680 nF	1.15 ±0.1	1.15 ±0.1	1.15 ±0.1	1.15 ±0.1				
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	1210						1812		
	6.3 V	10 V	16 V	25V	50V	100V	250 V	50 V	100 V
100 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	1.25 ±0.2		
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	1.25 ±0.2				
470 nF								1.6 ±0.2	1.6 ±0.2
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

NPO/ X7R - Automotive grade 4-C Arrays, 0508, 0612

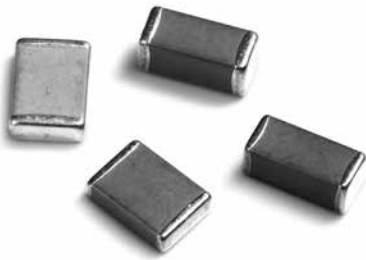
NPO		
4-C arrays		
Capacitance	0508	0612
	6.3 V	10 V
10 pF	0.6 ±0.1	0.8 ±0.1
12 pF		
15 pF		
18 pF		
22 pF		
33 pF		
39 pF		
47 pF		
56 pF		
68 pF		
82 pF		
100 pF		
120 pF		
150 pF		
180 pF		
220 pF		
330 pF		
390 pF		
470 pF		
Tape width	8mm	

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

X7R										
4-C arrays										
Capacitance	0508			0612						
	16 V	25 V	50 V	16 V	25 V	50 V				
220 pF				0.8 ±0.1	0.8 ±0.1	0.8 ±0.1				
330 pF										
470 pF										
680 pF										
1 nF	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										
4.7 nF										
5.6 nF										
6.8 nF										
8.2 nF										
10 nF										
12 nF										
15 nF										
18 nF										
22 nF										
27 nF										
33 nF										
47 nF										
56 nF										
68 nF										
82 nF										
100 nF										
Tape width	8mm									

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



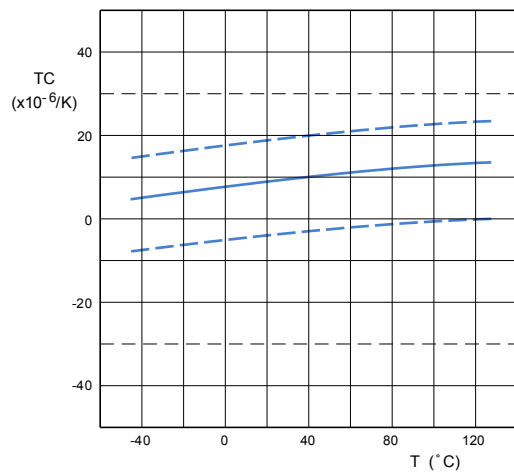


Features

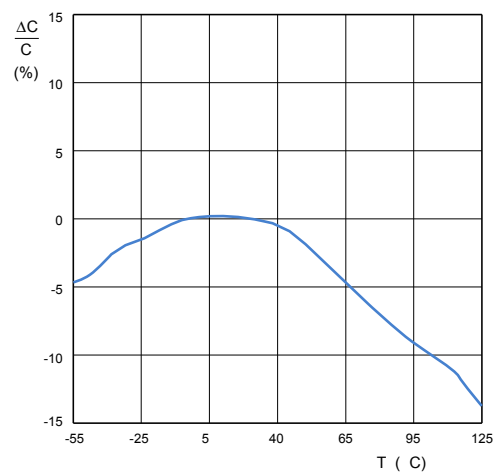
- Capable of operating at high voltage levels
- For high frequency snubber
- Decoupling/ Smoothing function
- TUV certificate No.: 50031668
- UL certificate No.: E238900

Temperature characteristic

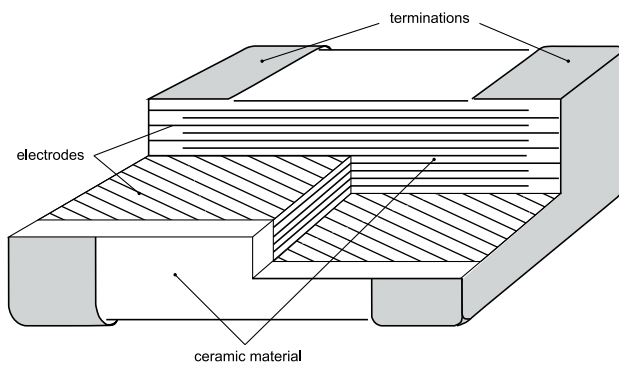
NP0



X7R

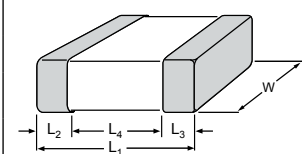


Construction

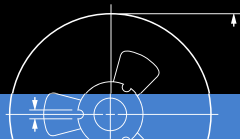


Dimensions

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

NP0 - High voltage SC type, 1808 / 1812

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

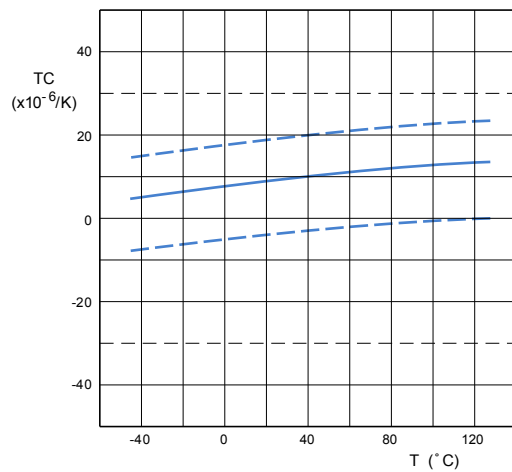


Features

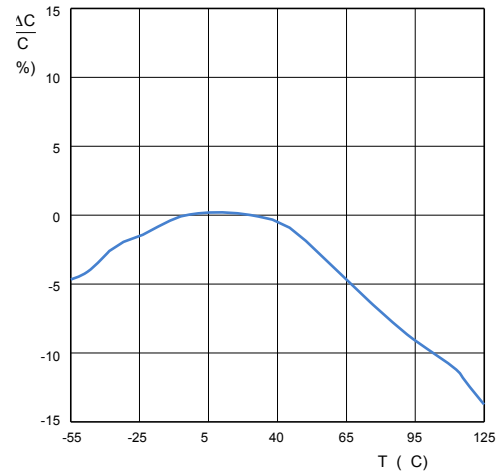
- Less than 50% board space of an equivalent discrete component
- High volumetric efficiency
- Increased throughput, by time saved in mounting

Temperature characteristic

NP0

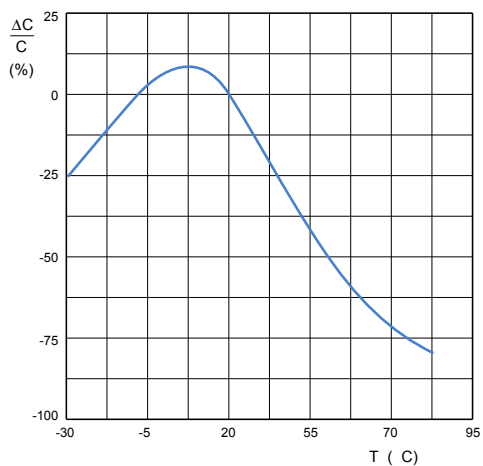


X7R

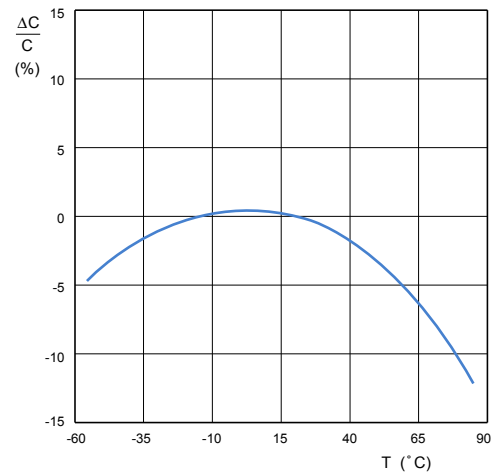


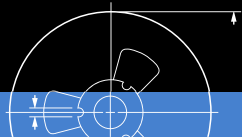
Temperature characteristic

Y5V



X5R





MLCC Selection Charts

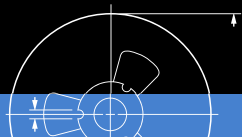
NP0 / X7R / Y5V / X5R - 4C Arrays, 0508 / 0612

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 / X5R - 4C Arrays, 0508 / 0612

X5R		
4C arrays		
Capacitance	0508	0612
	10 V	10 V
100 nF	0.6 ±0.1	0.8 ±0.1
120 nF		
150 nF		
180 nF		
220 nF		
270 nF	0.85 ±0.1	
330 nF		
470 nF		
560 nF		
680 nF		
820 nF		
1000 nF		
2.2 uF		
Tape width	8 mm	

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

X7R							
4C arrays							
Capacitance	0508			0612			
	16 V	25 V	50 V	16 V	25 V	50 V	100 V
1 nF	0.6 ±0.1	0.6 ±0.1	0.6 ±0.1	0.8 ±0.1	0.8 ±0.1	0.8 ±0.1	
1.2 nF							
1.5 nF							
1.8 nF							
2.2 nF							
2.7 nF							
3.3 nF							
4.7 nF							
5.6 nF							
6.8 nF							
8.2 nF							
10 nF							
12 nF							0.85 ±0.1
15 nF							
18 nF							
22 nF							
27 nF							
33 nF							
47 nF							
56 nF							
68 nF							
82 nF							
100 nF							
220 nF							
470 nF							
Tape width	8 mm						

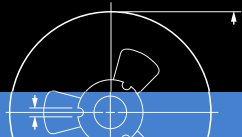
Note: Values in shaded cells indicate thickness class (unit: mm)



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)



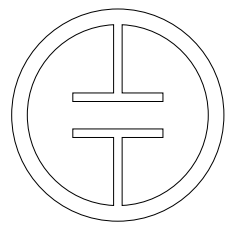


MLCC Engineering Design Kits

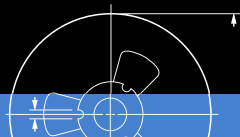
Sample kits

Sample book (small)	Description	Size	Volt.	Cap range
CC0402000000SB000	CC0402 Commodity	0402	$\leq 50V$	$<1\mu F$
CC0603000000SB000	CC0603 Commodity	0603	$\leq 50V$	$<1\mu F$
CC0805000000SB000	CC0805 Commodity	0805	$\leq 50V$	$<1\mu F$
CC1206000000SB000	CC1206 Commodity	1206	$\leq 50V$	$<1\mu F$
CQ0201000000SB000	HiQ 0201	0201	25V	0.2pF to 10pF
CQ0402000000SB000	HiQ 0402	0402	50V	0.2pF to 33pF
CQ0603000000SB000	HiQ 0603	0603	50V	0.2pF to 47pF
CQ0805000000SB000	HiQ 0805	0805	250V	0.2pF to 100pF
HV777S0000000000	Hi-Voltage sample book	0805 to 1206	100V to 630V	47pF to 1 μF
AC7777000000SB000	AC sample book	0402 to 1206	16V to 100V	10pF to 1 μF
HC8888000000SB000	Hi-Cap Series	0201 to 1210	6.3V to 25V	1 μF to 220 μF
HCV8888000000SB000	HCV Series	0402 to 1210	6.3V to 100V	1 μF to 22 μF
SS1111000000SB000	CC Small Size series	01005 + 0201	6.3V to 50V	0.5pF to 2.2 μF
CS8888000000SB000	Soft termination Series	0402 to 1206	16V to 1000V	100pF to 1 μF





SMD CERAMIC EMI FILTER CAPACITORS
X2Y[®] PRODUCTS



X2Y® Product Selection Charts

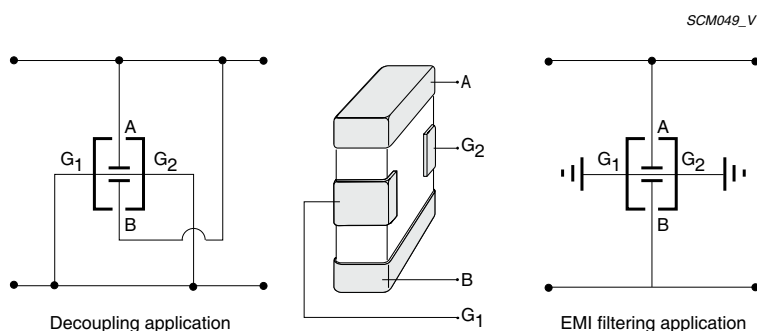
SMD ceramic EMI filter capacitors X2Y® series



Features

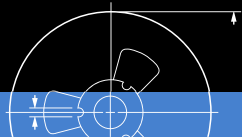
- Broadband Filtering and Decoupling: X2Y® is effective up to 10 GHz and frequencies beyond
- Ultra Low ESL: Noise cancellation within X2Y® makes ESL reducing from nanohenry to picohenry levels
- Bypass: Unlike feedthrough capacitors, X2Y® is in bypass, so no DC current limitations
- Matched Y-caps: 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
	1.5	20%	100	0.65	CX 0603 MR X7R 0BB 152
	2.2	20%	100	0.65	CX 0603 MR X7R 0BB 222
	4.7	20%	100	0.65	CX 0603 MR X7R 0BB 472
	5.6	20%	100	0.65	CX 0603 MR X7R 0BB 562
	10	20%	50 / 63	0.65	CX 0603 MR X7R 9BB 103
	15	20%	25	0.65	CX 0603 MR X7R 8BB 153
	18	20%	25	0.65	CX 0603 MR X7R 8BB 183
	22	20%	25	0.65	CX 0603 MR X7R 8BB 223
	39	20%	16	0.65	CX 0603 MR X7R 7BB 393
	47	20%	16	0.65	CX 0603 MR X7R 7BB 473
	56	20%	16	0.65	CX 0603 MR X7R 7BB 563
	100	20%	10	0.65	CX 0603 MR X7R 6BB 104
	180	20%	10	0.65	CX 0603 MR X7R 6BB 184
	220	20%	10	0.65	CX 0603 MR X7R 6BB 224
	270	20%	10	0.65	CX 0603 MR X7R 6BB 274
	330	20%	10	0.65	CX 0603 MR X7R 6BB 334
0805	1	20%	100	0.85	CX 0805 MR X7R 0BB 102
	1.5	20%	100	0.85	CX 0805 MR X7R 0BB 152
	2.2	20%	100	0.85	CX 0805 MR X7R 0BB 222
	4.7	20%	100	0.85	CX 0805 MR X7R 0BB 472
	5.6	20%	100	0.85	CX 0805 MR X7R 0BB 562
	10	20%	100	0.85	CX 0805 MR X7R 0BB 103
	15	20%	50 / 63	0.85	CX 0805 MR X7R 9BB 153
	18	20%	50 / 63	0.85	CX 0805 MR X7R 9BB 183
	22	20%	50 / 63	0.85	CX 0805 MR X7R 9BB 223
	47	20%	16	0.85	CX 0805 MR X7R 7BB 473
	56	20%	16	0.85	CX 0805 MR X7R 7BB 563
	100	20%	16	0.85	CX 0805 MR X7R 7BB 104
	180	20%	10	0.85	CX 0805 MR X7R 6BB 184
1206	10	20%	100	1.2	CX 1206 MK X7R 0BB 103
	15	20%	100	1.2	CX 1206 MK X7R 0BB 153
	18	20%	100	1.2	CX 1206 MK X7R 0BB 183
	22	20%	100	1.2	CX 1206 MK X7R 0BB 223
	33	20%	100	1.2	CX 1206 MK X7R 0BB 333
	39	20%	50 / 63	1.2	CX 1206 MK X7R 9BB 393
	47	20%	50 / 63	1.2	CX 1206 MK X7R 9BB 473
	56	20%	50 / 63	1.2	CX 1206 MK X7R 9BB 563
	100	20%	50 / 63	1.2	CX 1206 MK X7R 9BB 104
	180	20%	16	1.2	CX 1206 MK X7R 7BB 184
	220	20%	16	1.2	CX 1206 MK X7R 7BB 224
	270	20%	16	1.2	CX 1206 MK X7R 7BB 274
	330	20%	16	1.2	CX 1206 MK X7R 7BB 334
	390	20%	16	1.2	CX 1206 MK X7R 7BB 394
	470	20%	10	1.2	CX 1206 MK X7R 6BB 474



X2Y® Product Selection Charts

Ordering information

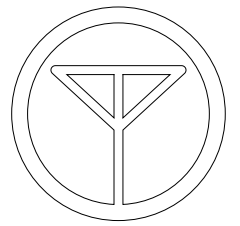
X5R					
Size	Y-Capacitor		Voltage rating (V)	Thickness (mm)	Global part number
	Capacitance (nF)	Tolerance (%)			
0603	180	20%	10	0.65	CX 0603 MR X5R 6BB 184
	220	20%	10	0.65	CX 0603 MR X5R 6BB 224
	330	20%	10	0.65	CX 0603 MR X5R 6BB 334
	390	20%	10	0.65	CX 0603 MR X5R 6BB 394
	470	20%	10	0.65	CX 0603 MR X5R 6BB 474

Note: 1. Special values are available on request

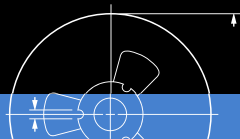
Thickness classes and packing quantities		
Thickness Classification (mm)	Quantity per reel	
	8 mm tape width	
	Ø180mm / 7"	
	0603 - 1410	
	Paper	Blister
0.60 ±0.10	4 000	---
0.85 ±0.10	4 000	---
1.20 ±0.15	---	3 000
1.60 ±0.15	---	2 000
1.90 ±0.20	---	2 000

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

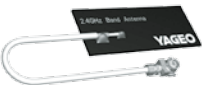
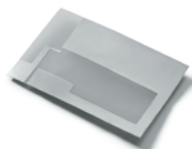
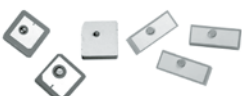
Introduction

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).

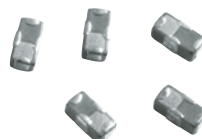
Our products cover a wide variety of wireless communication protocols, including Bluetooth & IEEE 802.11b/g, WPAN (Wireless Personal Area Network), WLAN (Wireless Local Area Network), WMAN (Wireless Metropolitan Area Network), WWAN (Wireless Wide Area Network) and LTE (Long Term Evolution).

Wireless Components

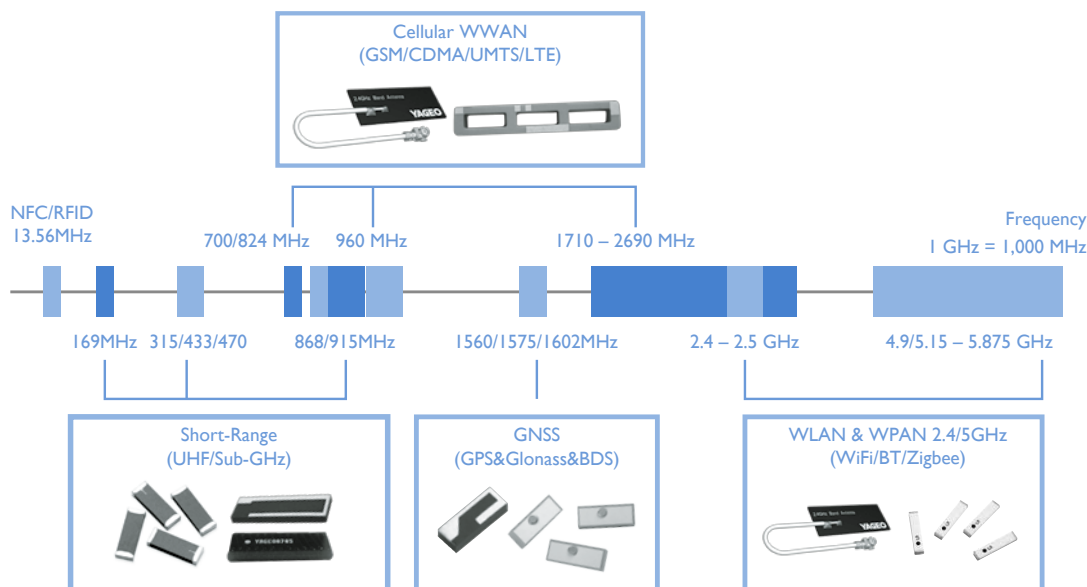
Antenna

				
Metal	PCB	FPCB	LTCC / Ceramic	Patch / Ceramic

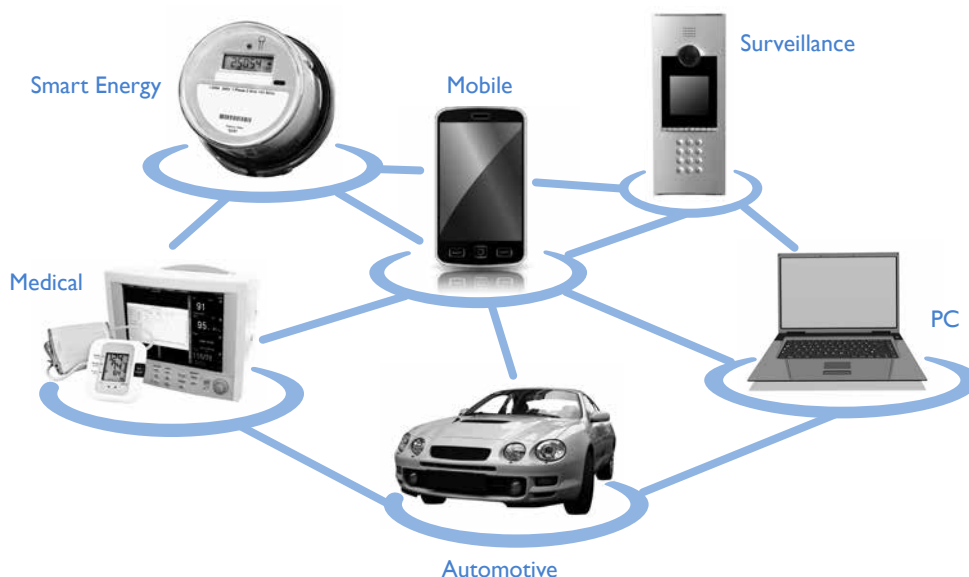
LTCC Balun/ Filter/ Balun + Filter (Combo) / X2Y

				
Balun	Filter	Diplexer	Balanced Filter	X2Y Filter

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 1.6x0.8 mm

Multi-Band & High Efficiency

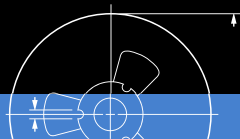
- WWAN: Quad-band (850/900/1800/1900 MHz) to Penta-band (850/900/1800/1900/2100 MHz)
- Support 4G cellular network LTE 700 MHz (Band 12,13,17), 2300/2600 MHz
- Multi-band 2.3/2.4/2.7 & 5 GHz supporting WLAN/WiMAX/LTE
- Operating in dual navigational systems GPS & Glonass: 1575 – 1606 MHz

High Reliability

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

Easy Installation

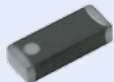
- Reliable adhesive tape, surface mount, and flexible cable/connector selection



Wireless Components Selection Charts

Antenna - 2.4 GHz

2.4 GHz

Model	Part No./ Description	Electrical Data	Mechanical Data
	ANT1204F001R2400A 1204 2.4GHz PIFA Chip Ante	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
	ANT9520LL06R2400A 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 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 7836 2.4GHz Chip Antenna	Freq. Range: 2400~2500 MHz VSWR * : 2.0 (Max) Polarization: Linear Peak Gain : 3.93 dBi(Typ.)	Size (mm) : 7.8*3.6*0.5 Operating Temp.: -40 ~ 105°C RoHS Compliance
	ANT7020LL05R2400A 7020 2.4GHz Chip Antenna	Freq. Range: 2400~2500 MHz VSWR * : 2.8 (Max) Polarization: Linear Peak Gain : 2.62 dBi(Typ.)	Size (mm) : 7.0*2.0*0.8 Operating Temp.: -40 ~ 105°C RoHS Compliance
	ANT5320LL45R2400A 5320 2.4GHz Chip Antenna	Freq. Range: 2400~2500 MHz VSWR * : 2.0 (Max) Polarization: Linear Peak Gain : 5.5 dBi(Typ.)	Size (mm) : 5.3*2.0*1.2 Operating Temp.: -40 ~ 105°C RoHS Compliance
	ANT5320LL24R2400A 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 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 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 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 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
	ANT2012LL13R2400A 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

* VSWR depends on the environment

Wireless Components Selection Charts

Antenna - 2.4/ 5 GHz

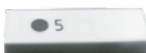
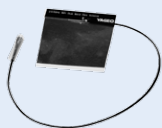
2.4 GHz

Model	Part No./ Description	Electrical Data	Mechanical Data
	ANT1608LL14R2400A 1608 2.4GHz PIFA Chip Antenna	Freq. Range : 2400~2500 MHz VSWR* : 3.0 (Max) Polarization : Linear Peak Gain : 2.0 dBi(Typ.)	Size (mm) : 1.6*0.8*0.4 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

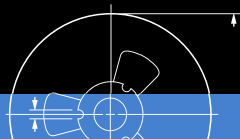
2.4 GHz / GPS

Model	Part No./ Description	Electrical Data	Mechanical Data
	ANT1003LL15R1524A 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 / 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

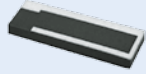
Model	Part No./ Description	Electrical Data	Mechanical Data
	ANT1003LL05R2455A 1003 2.4+5GHz Chip Antenna	Freq. Range : 2400~2500/ 5150~5875 MHz VSWR* : 2.8 (Max) Polarization : Linear Peak Gain : 2.45 dBi / 1.55dBi(Typ.)	Size (mm) : 10*3*1.6 Operating Temp. : -40 ~ 105°C RoHS Compliance
	ANT5320LL04R2455A 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 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
	ANT1608LL14R2455A 1608 2.4+5GHz Chip Antenna	Freq. Range : 2400 - 2500/5150 - 5875 MHz VSWR* : 6/3.5 (Max) Polarization : Linear Peak Gain : 3.11 / 3.43 dBi(Typ.)	Size (mm) : 1.6*0.8*0.4 Operating Temp. : -40~105°C RoHS Compliance
	ANT3216A063R2455A 3216 2.4+5GHz Chip Antenna	Freq. Range : 2400 - 2500/5150 - 5875 MHz VSWR* : 2 (Max) Polarization : Linear Peak Gain : 1.59 / 2.23 dBi(Typ.)	Size (mm) : 3.05*1.55*0.55 Operating Temp. : -40~105°C RoHS Compliance
	ANTX200P002B24553 2.4+5GHz PCB Antenna	Freq. Range : 2400 - 2500/5150 - 5875MHz VSWR* : 2.5 (Max) Polarization : Linear Peak Gain : 2.3 dBi(Typ.)	Size (mm) : 40*43*0.55 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 : 5.1 dBi(Typ.)	Size (mm) : 50*10*0.9 Operating Temp. : -40 ~ 80°C RoHS Compliance

* VSWR depends on the environment



Wireless Components Product Selection Charts

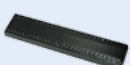
Antenna - 5 GHz/ Cellular WWAN / Short Range

5 GHz			
Model	Part No./ Description	Electrical Data	Mechanical Data
	ANT3216LL05R5000A 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
Cellular WWAN			
Model	Part No./ Description	Electrical Data	Mechanical Data
	ANT2112A010B0918A 2112 Cellular-Band Chip Antenna	Freq. Range : 824~960 / 1710~1990 MHz VSWR* : 2.0 (Max) Polarization: Linear Peak Gain : 0.5 ~ 1 dBi(Typ.)	Size (mm) : 21*12*0.5 Operating Temp.: -40 ~ 105°C RoHS Compliance
	ANT3505B002TWPENS 3505 Penta-band Antenna	Freq. Range : 824~960 / 1710~2170 MHz VSWR* : 2.8 / 3.5 (Max) Polarization: Linear Peak Gain : 2.9 dBi(Typ.)	Size (mm) : 35*5*6 Operating Temp.: -40 ~ 105°C RoHS Compliance
	ANT1204LL00R0918A 1204 Cellular-Band Chip Antenna	Freq. Range : 900/1800 MHz VSWR* : 3.0 (Max) Polarization: Linear Peak Gain : N/A	Size (mm) : 12*4*1.2 Operating Temp.: -40 ~ 105°C RoHS Compliance
	ANTX100P001BWPEN3 Penta-band PCB Antenna	Freq. Range : 824~960 / 1710~2170 MHz VSWR* : 2.5 Max (Low Band) 3.5 Max (High Band) Polarization: Linear Peak Gain : 4.2 dBi(Typ.)	Size (mm) : 50*20*0.55 Operating Temp.: -40 ~ 80°C Cable* : Φ1.13 / 100mm Connector: I-PEX Mounting: Adhesive Tape RoHS Compliance
	ANT4005B000RVVHEXS 4005 LTE Antenna	Freq. Range : 698 - 960/1710 - 2690 MHz VSWR* : 3.0 Max (Low Band) Polarization: Linear Peak Gain : 3.2 / 4.0 dBi(Typ.)	Size (mm) : 40*5*6 Operating Temp.: -40 ~ 80°C RoHS Compliance
Short-Range			
Model	Part No./ Description	Electrical Data	Mechanical Data
	ANT1204LL05R0915A 1204 915MHz Chip Antenna	Freq. Range : 915 MHz VSWR* : 2.0 (Max) Polarization: Linear Peak Gain : 3.32 dBi(Typ.)	Size (mm) : 12*4*1.6 Operating Temp.: -40 ~ 105°C RoHS Compliance
	ANT1204LL08R0870A 1204 870MHz Chip Antenna	Freq. Range : 870 MHz VSWR* : 2.0 (Max) Polarization: Linear Peak Gain : 0.5 dBi(Typ.)	Size (mm) : 12*4*1.6 Operating Temp.: -40 ~ 105°C RoHS Compliance
	ANT1204LL17R0870A 1204 870MHz PIFA Chip Antenna	Freq. Range : 870 MHz VSWR* : 2.8 (Max) Polarization: Linear Peak Gain : 1.05 dBi(Typ.)	Size (mm) : 12*4*1.0 Operating Temp.: -40 ~ 105°C RoHS Compliance
	ANT7020LL05R0870A 7020 870MHz Chip Antenna	Freq. Range : 870 MHz VSWR* : 2.0 (Max) Polarization: Linear Peak Gain : N/A	Size (mm) : 7.0*2.0*0.7 Operating Temp.: -40 ~ 105°C RoHS Compliance
	ANT1204F002R0433A 1204 433MHz Chip Antenna	Freq. Range : 315/ 433 MHz VSWR* : 2.0 (Max) Polarization: Linear Peak Gain : 0.79 dBi(Typ.)	Size (mm) : 12*4*1.6 Operating Temp.: -40 ~ 105°C RoHS Compliance

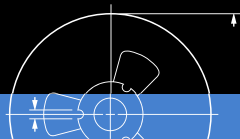
* VSWR depends on the environment

Wireless Components Selection Charts

Antenna - Short-Range/ GPS

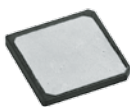
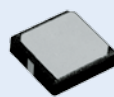
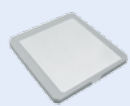
Short-Range			
Model	Part No./ Description	Electrical Data	Mechanical Data
	ANT1204LL20R0433A 1204 433MHz Chip Antenna	Freq. Range : 315/ 433 MHz VSWR* : 3.0 (Max) Polarization : Linear Peak Gain : 0.83 dBi(Typ.)	Size (mm) : 12*4*1.2 Operating Temp. : -40 ~ 105°C RoHS Compliance
	ANT2405F001R0169A 2405 169MHz Chip Antenna	Freq. Range : 169 MHz VSWR* : 2.0 (Max) Polarization : Linear Peak Gain : N/A	Size (mm) : 24*5*1.6 Operating Temp. : -40 ~ 105°C RoHS Compliance
	ANT1204F005R0915A 1204 915MHz Chip Antenna	Freq. Range : 915 MHz VSWR* : 2.0 (Max) Polarization : Linear Peak Gain : 1.59 dBi(Typ.)	Size (mm) : 12*4*1.6 Operating Temp. : -40 ~ 85°C RoHS Compliance
	ANT1204F007R0870A 1204 870MHz Chip Antenna	Freq. Range : 870 MHz VSWR* : 2.0 (Max) Polarization : Linear Peak Gain : 1.67 dBi(Typ.)	Size (mm) : 12*4*1.6 Operating Temp. : -40 ~ 85°C RoHS Compliance
GPS			
Model	Part No./ Description	Electrical Data	Mechanical Data
	ANT8010LL05R1575A 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 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 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 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
	ANT3216A063R1575A 3216 GPS Chip Antenna	Freq. Range : 1575 MHz Peak Gain : 1 dBic(Typ.) VSWR* : 2.0 (Max) Polarization : Linear	Size (mm) : 3.05*1.55*0.55 Operating Temp. : -40 ~ 105°C Mounting : PIN RoHS Compliance
	ANT1010B00FT1575S 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
	ANT1212B00DT1575S 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
	ANT1515B00DT1575S 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
	ANT1515B00FT1575S 15154 GPS Patch Ant	Freq. Range : 1575 MHz VSWR* : 2.0 (Max) Polarization : RHCP Peak Gain : 2.0 dBic(Typ.)	Size (mm) : 15*15*4 Operating Temp. : -40 ~ 105°C Mounting : PIN RoHS Compliance

* VSWR depends on the environment



Wireless Components Selection Charts

Antenna - GPS

GPS			
Model	Part No./ Description	Electrical Data	Mechanical Data
	ANT1818B00AT1575S 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
	ANT1818B00BT1575S 18184 GPS Patch Antenna	Freq. Range : 1575 MHz VSWR * : 2.0 (Max) Polarization : RHCP Peak Gain : 2 dBic(Typ.)	Size (mm) : 18*18*4 Operating Temp. : -40 ~ 105°C Mounting : SMD RoHS Compliance
	ANT1818B00CT1575S 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
	ANT1818B00DT1575S 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
	ANT1818B00ET1575S 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
	ANT2525B00AT1575S 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
	ANT2525B00BT1575S 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
	ANT2525B00CT1575S 25252 GPS Patch Antenna	Freq. Range : 1575 MHz VSWR * : 2.0 (Max) Polarization : RHCP Peak Gain : 4.5 dBic(Typ.)	Size (mm) : 25*25*2 Operating Temp. : -40 ~ 105°C Mounting : PIN RoHS Compliance
	ANT2525B00DT1575S 25254 GPS Patch Antenna	Freq. Range : 1575 MHz VSWR * : 2.0 (Max) Polarization : RHCP Peak Gain : 5 dBic(Typ.)	Size (mm) : 25*25*4 Operating Temp. : -40 ~ 105°C Mounting : PIN RoHS Compliance
	ANT2525B00ET1575S 25252 GPS Patch Antenna	Freq. Range : 1575 MHz VSWR * : 2.0 (Max) Polarization : RHCP Peak Gain : 4.5 dBic(Typ.)	Size (mm) : 25*25*2 Operating Temp. : -40 ~ 105°C Mounting : PIN RoHS Compliance
	ANT2525B00FT1575S 25254 GPS Patch Antenna	Freq. Range : 1575 MHz VSWR * : 2.0 (Max) Polarization : RHCP Peak Gain : 5 dBic(Typ.)	Size (mm) : 25*25*4 Operating Temp. : -40 ~ 105°C Mounting : PIN RoHS Compliance
	ANT1606B00DT1575S 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

* VSWR depends on the environment

Wireless Components Selection Charts

Antenna - GPS / Glonass / Active Antenna/ GPS+BD

GPS+Glonass

Model	Part No./ Description	Electrical Data	Mechanical Data
	ANT1818B00BT1516S 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
	ANT1818B00DT1516S 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
	ANT2525B00BT1516S 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
	ANT2525B00DT1516S 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

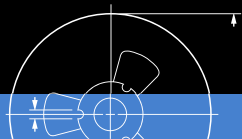
Active GPS

Model	Part No./ Description	Electrical Data	Mechanical Data
	ANT2525JB08B1575A 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
	ANT1515JB27B1575A 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
	ANT1606JB12B1575A 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 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 - GPS+BD/ Others

GPS+BD

Model	Part No./ Description	Electrical Data	Mechanical Data
	ANT2525B00FT15BDS 25254 GPS+BD Patch Antenna	Freq. Range : 1575/1561 MHz VSWR* : 2.0 (Max) Polarization : RHCP Peak Gain : 7 dBic(Typ.)	Size (mm) : 25*25*4 Operating Temp. : -40 ~ 105°C Mounting : PIN RoHS Compliance
	ANT1818B00FT15BDS 18184 GPS+BD Patch Antenna	Freq. Range : 1575/1561 MHz VSWR* : 2.0 (Max) Polarization : RHCP Peak Gain : 5.6 dBic(Typ.)	Size (mm) : 18*18*4 Operating Temp. : -40 ~ 105°C Mounting : PIN RoHS Compliance
	ANT1515B00FT15BDS 15154 GPS+BD Patch Antenna	Freq. Range : 1575/1561 MHz VSWR* : 2.0 (Max) Polarization : RHCP Peak Gain : 4.8 dBic(Typ.)	Size (mm) : 15*15*4 Operating Temp. : -40 ~ 105°C Mounting : PIN RoHS Compliance
	ANT1212B00FT15BDS 12124 GPS+BD Patch Antenna	Freq. Range : 1575/1561 MHz VSWR* : 2.0 (Max) Polarization : RHCP Peak Gain : 2.5 dBic(Typ.)	Size (mm) : 12*12*4 Operating Temp. : -40 ~ 105°C Mounting : PIN RoHS Compliance

GNSS

Model	Part No./ Description	Electrical Data	Mechanical Data
	ANT1204LL04RGNSSA 1204 GNSS Chip Antenna	Freq. Range : 1559 - 1610 MHz VSWR* : 2.0 (Max) Polarization : RHCP Peak Gain : 2.32 dBic(Typ.)	Size (mm) : 12*4*1.1 Operating Temp. : -40 ~ 105°C RoHS Compliance
	ANT2525B00FTGNSSS 25254 GNSS Patch Antenna	Freq. Range : 1559 - 1610 MHz VSWR* : 2.0 (Max) Polarization : RHCP Peak Gain : 5.16 dBic(Typ.)	Size (mm) : 25*25*4 Operating Temp. : -40 ~ 105°C Mounting : PIN RoHS Compliance
	ANT1818B00FTGNSSS 18184 GNSS Patch Antenna	Freq. Range : 1559 - 1610 MHz VSWR* : 3.5 (Max) Polarization : RHCP Peak Gain : 3 dBic(Typ.)	Size (mm) : 18*18*4 Operating Temp. : -40 ~ 105°C Mounting : PIN RoHS Compliance

FM

Model	Part No./ Description	Electrical Data	Mechanical Data
	ANT2405F001R0098A 2405 FM Chip Antenna	Freq. Range : 88 MHz VSWR* : 2.0 (Max) Polarization : Linear Peak Gain : N/A	Size (mm) : 24*5*1.6 Operating Temp. : -40 ~ 105°C RoHS Compliance
	ANT1105LF00R0098A 1105 FM (Ferrite) Chip Antenna	Freq. Range : 88 MHz VSWR* : 2.0 (Max) Polarization : Linear Peak Gain : N/A	Size (mm) : 11*5*1.3 Operating Temp. : -40 ~ 105°C RoHS Compliance

SDARS

Model	Part No./ Description	Electrical Data	Mechanical Data
	ANT2525B00FT2300S 25254 SDARS Patch Antenna	Freq. Range : 2320~2345 MHz VSWR* : 2.0 (Max) Polarization : LHCP Peak Gain : 7.7 dBic(Typ.)	Size (mm) : 25*25*4 Operating Temp. : -40 ~ 105°C Mounting : PIN RoHS Compliance
	ANT2020B00FT2300S 20204 SDARS Patch Antenna	Freq. Range : 2320~2345 MHz VSWR* : 2.0 (Max) Polarization : LHCP Peak Gain : 6 dBic(Typ.)	Size (mm) : 20*20*4 Operating Temp. : -40 ~ 105°C Mounting : PIN RoHS Compliance
	ANT1818B00FT2300S 18184 SDARS Patch Antenna	Freq. Range : 2320~2345 MHz VSWR* : 2.0 (Max) Polarization : LHCP Peak Gain : 7.6 dBic(Typ.)	Size (mm) : 18*18*4 Operating Temp. : -40 ~ 105°C Mounting : PIN RoHS Compliance

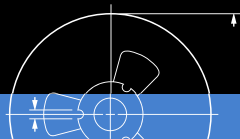
* VSWR depends on the environment

Wireless Components Selection Charts

Filters

Filter (BPF)				
Model	Part No./ Description	Electrical Data		Mechanical Data
	BPF2520LL03R2400A	Freq. Range: 2400-2500MHz	Attenuation	Size(mm): 2.5*2.0*0.95
	2520 2.4G BPF Type03	Insertion Loss: 1.5dB(Max) VSWR [*] : 2.0dB(Max)	40dB Min @ 880~960MHz 30dB Min @ 1710~1785MHz 30dB Min @ 1850~1910MHz 20dB Min @ 4800~5000MHz 30dB Min @ 7200~7500MHz	Operating Temp.: -40~85°C RoHS Compliance
	BPF2520LL04R2400A	Freq. Range: 2400-2500MHz	Attenuation	Size(mm): 2.5*2.0*0.95
	2520 2.4G BPF Type04	Insertion Loss: 1.8dB(Max) VSWR [*] : 2.0dB(Max)	45dB Min @ 750~960MHz 35dB Min @ 1710~1785MHz 35dB Min @ 1920~1990MHz 20dB Min @ 4800~5000MHz 30dB Min @ 7200~7500MHz	Operating Temp.: -40~85°C RoHS Compliance
	BPF2012LL19R2400A	Freq. Range: 2400-2500MHz	Attenuation	Size(mm): 2.5*2.0*0.95
	2012 2.4G BPF Type19	Insertion Loss: 2.8dB(Max) VSWR [*] : 2.0dB(Max)	45dB Min @ 750~960MHz 35dB Min @ 1710~1785MHz 35dB Min @ 1920~1990MHz 20dB Min @ 4800~5000MHz 30dB Min @ 7200~7500MHz	Operating Temp.: -40~85°C RoHS Compliance
	BPF2012LL03R2400A	Freq. Range: 2400-2500MHz	Attenuation	Size(mm): 2.0*1.25*1.0
	2012 2.4G BPF Type03	Insertion Loss: 2.3dB(Max) VSWR [*] : 2.0dB(Max)	40dB Min @ 1000~1600MHz 40dB Min @ 4900MHz 25dB Min @ 7500MHz	Operating Temp.: -40~85°C RoHS Compliance
	BPF2012LL03R5000A	Freq. Range: 4900-5900 MHz	Attenuation:	Size(mm): 2.0*1.25*0.85
	2012 5G BPF Type03	Insertion Loss: 2.2dB (Max) VSWR [*] : 2.0 (Max)	25dB Min @ 6850~7150MHz 20dB Min @ 7500~9000MHz	Operating Temp.: -40~85°C RoHS Compliance
	BPF2012LL12R5000A	Freq. Range: 5149-5875 MHz	Attenuation:	Size(mm): 2.0*1.25*0.95
	2012 5G BPF Type12	Insertion Loss: 2.2dB (Max) VSWR [*] : 2.0 (Max)	30dB Min @ 500~4000MHz 20dB Min @ 4600MHz	Operating Temp.: -40~85°C RoHS Compliance
	BPF2012LL01R5000A	Freq. Range: 4900-5950 MHz	Attenuation:	Size(mm): 2.0*1.2*1
	2012 5G BPF Type01	Insertion Loss: 1.5dB (Max) VSWR [*] : 2.0 (Max)	30dB Min @ 1280~3000MHz 25dB Min @ 3300~4000MHz 25dB Min @ 9800~11900MHz	Operating Temp.: -40~85°C RoHS Compliance
	BPF2012LL05R5000A	Freq. Range: 5150-5850 MHz	Attenuation:	Size(mm): 2.0*1.2*0.8
	2012 5G BPF Type05	Insertion Loss: 1.8dB (Max) VSWR [*] : 2.0 (Max)	30dB Min @ 2400~2500MHz 20dB Min @ 4700MHz	Operating Temp.: -40~85°C RoHS Compliance
	BPF2012LM47R2400A	Freq. Range: 2400-2500MHz	Attenuation	Size(mm): 2.0*1.25*0.95
	2012 2.4G BPF Type47	Insertion Loss: 1.8dB(Max) VSWR [*] : 2.0dB(Max)	30dB Min @ 824~915MHz 30dB Min @ 1545~1605MHz 35dB Min @ 1710~1990MHz 30dB Min @ 2170MHz 30dB Min @ 4800~5000MHz 25dB Min @ 7200~7500MHz	Operating Temp.: -40~85°C RoHS Compliance
	BPF1608LM17R2400A	Freq. Range: 2400-2500MHz	Attenuation	Size(mm): 1.6*0.8*0.6
	1608 2.4G BPF Type17	Insertion Loss: 2.7dB(Max) VSWR [*] : 2.0dB(Max)	38dB Min @ 880~915MHz 35dB Min @ 1710~1850MHz 35dB Min @ 1850~1910MHz 35dB Min @ 1920~1990MHz 25dB Min @ 2110~2170MHz 30dB Min @ 4800~5000MHz 30dB Min @ 7200~7500MHz	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
	BPF1608LM02R2400A 1608 2.4G BPF Type02	Freq. Range: 2400-2500 MHz Insertion Loss: 1.7 dB (Max) VSWR *: 2.0 (Max)	Attenuation: 30dB Min @ 880~960 MHz 20dB Min @ 1710~1990 MHz 8.5dB Min @ 2170 MHz 20dB Min @ 4800~5000 MHz 25dB Min @ 7200~7500 MHz Size(mm): 1.6*0.8*0.6 Operating Temp.: -40~85°C RoHS Compliance
	BPF1608LM11R2400A 1608 2.4G BPF Type11	Freq. Range: 2400-2500 MHz Insertion Loss: 1.8 dB (Max) VSWR *: 2.0 (Max)	Attenuation: 20dB Min @ 1710~1990 MHz 6.5dB Min @ 2110~2170 MHz 25dB Min @ 4800~5000 MHz 20dB Min @ 7200~7500 MHz Size(mm): 1.6*0.8*0.6 Operating Temp.: -40~85°C RoHS Compliance

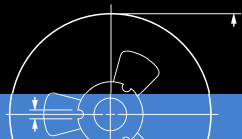
Filter (LPF)

Model	Part No./ Description	Electrical Data	Mechanical Data
	LPF2012LM59RWPENA 2012 LTE LPF Type59	Freq. Range: 800-2025 MHz Insertion Loss: 0.5dB Max @ 800~1000MHz 0.8dB Max @ 1700~1910MHz 1.5dB Max @ 2120~2025MHz VSWR *: 1.5 (Max)	Attenuation 26dB Min @ 2300~6100MHz 35dB Min @ 3400~3820MHz Size(mm): 2.0*1.25*0.9 Operating Temp.: -40~85°C RoHS Compliance
	LPF1608LL53R2400A 1608 2.4G LPF Type53	Freq. Range: 2400-2500 MHz Insertion Loss: 0.48dB (Max) VSWR *: 1.5 (Max)	Attenuation: 35dB Min @ 4800~5000 MHz 27dB Min @ 7200~7500 MHz Size(mm): 1.6*0.8*0.65 Operating Temp.: -40~85°C RoHS Compliance
	LPF1608LL52R2500A 1608 Wimax LPF Type52	Freq. Range: 2300-2700MHz Insertion Loss: 1.25dB(Max) VSWR *: 1.5dB(Max)	Attenuation: 35dB Min @ 4800~5390MHz 25dB Min @ 7200~8085MHz Size(mm): 1.6*0.8*0.65 Operating Temp.: -40~105 °C RoHS Compliance
	LPF1608LL54RWHEXA 1608 LTE LPF Type54	Freq. Range: 699-2690MHz Insertion Loss: 0.25dB(Max) VSWR *: 1.5dB(Max)	Attenuation: 23dB Min @ 5150~5960MHz Size(mm): 1.6*0.8*0.6 Operating Temp.: -40~85 °C RoHS Compliance
	LPF1608LL55R0709A 1608 LTE LPF Type55	Freq. Range: 698-960 MHz Insertion Loss: 0.6dB Max @ 698~830MHz 0.7dB Max @ 830~900MHz 0.75dB Max @ 900~915MHz 0.9dB Max @ 915~960MHz VSWR *: 2.0 (Max)	Attenuation 30dB Min @ 1554~1830MHz 35dB Min @ 2097~2745MHz Size(mm): 1.6*0.8*0.6 Operating Temp.: -40~85°C RoHS Compliance
	LPF1608LL56RWHEXA 1608 LTE LPF Type56	Freq. Range: 600-2700MHz Insertion Loss: 0.5dB(Max) VSWR *: 2.0dB(Max)	Attenuation: 30dB Min @ 4800~8000MHz 25dB Min @ 8500~12500MHz Size(mm): 1.6*0.8*0.65 Operating Temp.: -40~85 °C RoHS Compliance
	LPF1608LL57R2400A 1608 2.4G LPF Type57	Freq. Range: 2400-2500MHz Insertion Loss: 0.6dB(Max) VSWR *: 2.0dB(Max)	Attenuation: 35dB Min @ 4800~5000MHz 30dB Min @ 7200~7500MHz Size(mm): 1.6*0.8*0.65 Operating Temp.: -40~85 °C RoHS Compliance
	LPF1005LL50R2400A 1005 2.4G LPF Type50	Freq. Range: 2400-2500MHz Insertion Loss: 0.5dB(Max) VSWR *: 2.0dB(Max)	Attenuation: 25dB Min @ 4800~5000MHz 20dB Min @ 7200~7500MHz Size(mm): 1.0*0.5*0.35 Operating Temp.: -40~85 °C RoHS Compliance
	LPF1005LL51R2400A 1005 2.4G LPF Type51	Freq. Range: 2400-2500MHz Insertion Loss: 0.5dB(Max) VSWR *: 2.0dB(Max)	Attenuation: 25dB Min @ 4800~5000MHz 20dB Min @ 7200~7500MHz Size(mm): 1.0*0.5*0.35 Operating Temp.: -40~85 °C RoHS Compliance

* VSWR depends on the environment

Filter (Diplexer)				
Model	Part No./ Description	Electrical Data		Mechanical Data
	DPX2012LL87R2455A 2012 2.4/5GHz Diplexer Type85	Freq. Range: 2400-2500MHz/ 4900-5950MHz Insertion Loss: Low: 0.6dB High: 0.9dB VSWR *: 2.0 (Max)	Attenuation Low Band: 20dB(Min).@4800~5000MHz 20dB(Min).@7200~7500MHz High Band: 20dB(Min).@824~915MHz 20dB(Min).@1800~2500MHz	Size(mm): 2.0*1.25*0.5 Operating Temp.: -40~85°C RoHS Compliance
	DPX2012LL85R2455A 2012 2.4/5GHz Diplexer Type85	Freq. Range: 2400-2500MHz/ 4900-5900MHz Insertion Loss: Low : 0.7dB/ High: 0.9dB VSWR *: 2.0 (Max)	Attenuation: 20dB Min @ 4900~5900 MHz 20dB Min @ 2400~2500 MHz	Size(mm): 2.0*1.2*0.85 Operating Temp.: -40~85°C RoHS Compliance
	DPX2012LL89R2455A 2012 2.4/5GHz Diplexer Type89	Freq. Range: 2400-2500MHz/ 4900-5950MHz Insertion Loss: Low : 0.5dB/ High: 0.65dB VSWR *: 2.0 (Max)	Attenuation: 20dB Min.,2f0 @4800~5000 MHz 20dB Min.,3f0 @7200~7500 MHz 20dB Min. @ 824~915 MHz 20dB Min. @1800~2500 MHz 10dB Ref.,2f0@9800~11900 MHz	Size(mm): 2.0*1.2*0.5 Operating Temp.: -40~85°C RoHS Compliance
	DPX1608LL80R2455A 1608 2.4/5GHz Diplexer Type80	Freq. Range: 2400-2500MHz/ 4900-6000MHz Insertion Loss: Low: 0.7dB/ High: 0.8dB VSWR *:	Attenuation: Low Band: 20dB(Min). @4800~5000MHz 20dB(Min). @7200~7500MHz High Band: 28dB(Min). @860~960MHz 23dB(Min). @1545~1605MHz 23dB(Min). @1710~1990MHz 28dB(Min). @2170MHz 8dB(Min). @8100MHz 15dB(Min). @8820~9800MHz 27dB(Min). @9800~11800MHz	Size(mm): 1.6*0.8*0.6 Operating Temp.: -40~85°C RoHS Compliance
	DPX1608LL85R2455A 1608 2.4/5GHz Diplexer Type85	Low: 2.0dB(Max)/ High: 1.7dB(Max)		Size(mm): 1.6*0.8*0.6 Operating Temp.: -40~85°C RoHS Compliance
	DPX1608LL86R2455A 1608 2.4/5GHz Diplexer Type86	Freq. Range: 2400-2500MHz/ 4900-5950MHz Insertion Loss: Low: 0.6dB/ High: 1.2dB VSWR *: 2.0 (Max)	Attenuation: Low Band: 20dB(Min).@4800-5000MHz High Band: 28dB(Min).@30-2700MHz 10dB(Min).@9800-11900MHz 5dB(Min).@14700-17850MHz	Size(mm): 1.6*0.8*0.6 Operating Temp.: -40~85°C RoHS Compliance
	DPX1608LL87R1524A 1608 1.575/2.4GHz Diplexer Type87	Freq. Range: 1570-1610MHz/ 2400-2500 MHz/4900-6000 MHz Insertion Loss: Low: 0.6dB/ High: 0.7dB/0.6dB VSWR *: 2.0 dB (Max)	Attenuation: Low Band: 15 dB(Min) @2400~2500MHz 15 dB(Min) @4900~6000MHz High Band: 15 dB(Min) @1570~1610MHz	

* VSWR depends on the environment



Wireless Components Selection Charts

Filter

Filter (Triplexer)

Model	Part No./ Description	Electrical Data	Mechanical Data
	TPX2012LL90R1525A 2012 1.575/2.4/5GHz Triplexer Type90	Freq. Range: 1570-1610MHz/ 2400-2500MHz/4900-5950MHz Insertion Loss: Low: 0.8dB/ Mid.: 0.7dB/ High: 0.8dB VSWR*: Low: 2.0dB(Max)/ Mid.: 2.0dB(Max) High: 1.6dB(Max)	Attenuation: Low Band: 20dB(Min). @2400~2500MHz 20dB(Min). @4800~6000MHz Mid Band: 17.5dB(Min). @4800~5000MHz 10dB(Min). @1545~1605MHz 10dB(Min). @9600~10000MHz High Band: 27dB(Min). @860~960MHz 25dB(Min). @1545~1605MHz 25dB(Min). @1710~1990MHz 30dB(Min). @2170MHz 8dB(Min). @8100MHz 15dB(Min). @8820~9800MHz 27dB(Min). @9800~10760MHz 25dB(Min). @10760~11800MHz
	TPX2012LL95R1525A 2012 1.575/2.4/5GHz Triplexer Type95		Size(mm): 2.0*1.2*0.9 Operating Temp.: -40~85°C RoHS Compliance

* VSWR depends on the environment

Balun

Model	Part No./ Description	Electrical Data	Mechanical Data
	BLN1608LL01R5000A 1608 5G Balun Type01, 50100	Freq. Range: 4900-5950MHz Insertion Loss: 1.2 dB (Max) VSWR*: 2.0 (Max)	Unbalanced Impedance: 50Ω Balanced Impedance: 100Ω Phase Difference: 180 ±10 degree Amplitude Difference: 1.5 dB (Max)
	BLN1608LL01R2400A 1608 2.4G Balun Type01, 50100	Freq. Range: 2400-2500MHz Insertion Loss: 1.1 dB (Max) VSWR*: 2.0 (Max)	Unbalanced Impedance: 50Ω Balanced Impedance: 100Ω Phase Difference: 180 ±10 degree Amplitude Difference: 2 dB (Max)
	BLN1608LL30R2400A 1608 2.4G Balun Type30 5050	Freq. Range: 2400-2500MHz Insertion Loss: 1.2dB(Max) VSWR*: 2.0dB(Max)	Unbalanced Impedance: 50Ω Balanced Impedance: 50Ω Phase Difference: 180 ± 10 degree Amplitude Difference: 2 dB (Max)
			Size(mm): 1.6*0.8*0.65 Operating Temp.: -40~85°C RoHS Compliance

* VSWR depends on the environment

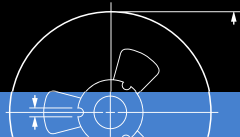
Balance Filter (Combo)

Model	Part No./ Description	Electrical Data		Mechanical Data
	BLF2012LL98R2400A	Freq. Range: 2400-2500MHz	Attenuation:	Size(mm): 2.0*1.2*0.9
	2012 2.4G Combo Type98	Insertion Loss: 3.5dB (Max)	40dB Min@880~960MHz	Operating Temp.: -40~85°C
		VSWR*: 2.0 (Max)	25dB Min@1300~1600MHz	RoHS Compliance
		Unbalanced Impedance: 50Ω	35dB Min@4800~5000MHz	
		Balanced Impedance: Conjugate match to CSR BC03/04 series	30dB Min@7200~7500MHz	
		Phase Difference:		
		180 ±5 degree @25°C		
		Amplitude Balance:		
		1.0 dB (Max)		

Coupler

Model	Part No./ Description	Electrical Data		Mechanical Data
	CPL451171509HEX4K	Freq. Range: 689.5-960.5MHz	Coupling:	Size(mm): 1.6*0.8*0.7
	1608 WWAN<E Coupler Type09	1700-2100MHz/2300-2700MHz	23~28dB@689.5-960.5MHz	Operating Temp.: -40~85°C
		Insertion Loss: 0.25dB(Max)/ 0.3dB(Max)/ 0.4dB(Max)	19.5~22.5dB@1700-2100MHz	RoHS Compliance
		VSWR*: 1.4dB(Max)	19.5~24.5dB@2300-2700MHz	
	CPL1608LL12WHEXA	Freq. Range: 689-960MHz	Coupling:	Size(mm): 1.6*0.8*0.6
	1608 WWAN<E Coupler Type12	1710-2170MHz/2300-2690MHz	23~27dB@689-960MHz	Operating Temp.: -30~85°C
		Insertion Loss: 0.2dB(Max)/ 0.25dB(Max)/ 0.3dB(Max)	21.5~26.5dB@1710-2170MHz	RoHS Compliance
		VSWR*: 1.45dB(Max)	22.5~27.5dB@2300-2690MHz	

* VSWR depends on the environment



Wireless Components Selection Charts

Product information - Ordering Information

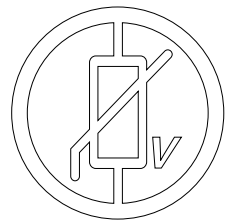
Explanation of ordering code - New

Ordering example : ANT3216A063R2400A

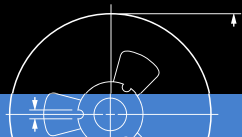
ANT	3216	A	063	R	2400	A
Product Type (code 1) ANT: Antenna BPF: Band-Pass Filter LPF: Low-Pass Filter BLN: Balun BLF: Balun Filter DPX: Diplexer	(1) Size (mm) - SMD (LTCC) (code 2) 3216: 3.2 x 1.6 mm 2012: 2.0 x 1.2 mm 2520: 2.5 x 2.0 mm	(2) Connector - Cable length (mm) Stand-alone (code 2) Ex: X100 – IPEX connector, 100 mm cable length X: IPEX, M: MMCX, S: SMA, Z: Stripped 100: 100 mm cable length	Type (code 3) L, F, A: Chip antenna / Filter / Balun B: Bulk antenna P: PCB X: FPCB S: Metal E: External J: Integrated antenna	Frequency Band (MHz)(code 6) 2400: 2.4 – 2.5 GHz; 2455: 2.4&5 GHz 1575: GPS; 1516: GPS+Glonass 0433: 433 MHz 0870: 868 MHz 0918: 900/1800 MHz WQUD: 850/900/1800/1900 MHz WPEN: 850/900/1800/1900/2100 MHz	Packing Style (code 5) R: Tape & Reel T: Tray B: Bulk	Factory Control Code / Cable Type (code 7)

M2M Application : Antenna Ordering code ANT5B000000020150		
Product Series	PART NUMBER	Frequency Range (MHz)
2.4GHz	ANT8010LL04R2400A	2400 - 2500
	ANT3216A063R2400A	2400 - 2500
	ANT3216LL00R2400A	2400 - 2500
	ANT2012LL13R2400A	2400 - 2500
	ANT1608LL14R2400A	2400 - 2500
	ANTX200P001B24003	2400 - 2500
2.4/5 GHz	ANT5320LL04R2455A	2400 - 2500 5150 - 5875
	ANT5320LL24R2455A	2400 - 2500 5150 - 5875
	ANT3216A063R2455A	2400 - 2500 5150 - 5875
	ANT1608LL14R2455A	2400 - 2500 5150 - 5875
	ANTX100P001B24553	2400 - 2500 5150 - 5875
	ANTX200P002B24553	2400 - 2500 5150 - 5875
	ANT8010LL05R1575A	1575
	ANT5320LL14R1575A	1575
	ANT3216LL15R1575A	1575
	ANT1212B00DT1575S	1575
GPS	ANT1515B00FT1575S	1575
	ANT1818B00AT1575S	1575
	ANT2525B00DT1575S	1575
	ANT1204LL04RGNSSA	1559 - 1610
	ANT2525B00FTGNSSS	1559 - 1610
GPS& GLONASS	ANT5320LL14R1516A	1575 / 1602
	ANT8010LL05R1516A	1575 / 1602
	ANT1818B00BT1516S	1575 / 1602
	ANT2525B00DT1516S	1575 / 1602
2.4GHz + GPS	ANT5320LL17R1524A	1575 / 2400
Cellular WWAN	ANT2112A010B0918A	900 / 1800
	ANT1204LL00R0918A	900 / 1800
	ANT3505B002TWPENS	824 - 960 1710 - 2170
	ANT4005B000RWHEXS	698 - 960 1710 - 2690
	ANTX100P001BWPEN3	824 - 960 1710 - 2170
	ANT2405F001R0169A	169
	ANT1204F002R0433A	315/433
	ANT1204LL20R0433A	315/433
SDARS	ANT1204LL08R0870A	870/915
	ANT1204F007R0870A	870/915
	ANT2525B00FT2300S	2320 - 2345
Active GPS	ANT1818J30B1575A	1575

WiFi /BT Application : Chip Antenna & Filter Ordering code ANT5B000000020151		
Freq.	Frequency Range (MHz)	PART NUMBER
Chip Antenna		
2.4 GHz	2400 - 2500	ANT8010LL04R2400A
	2400 - 2500	ANT3216A063R2400A
	2400 - 2500	ANT3216LL00R2400A
	2400 - 2500	ANT2012LL13R2400A
	2400 - 2500	ANT1608LL14R2400A
	2400 - 2500	ANT5320LL04R2455A
2.4/5 GHz	2400 - 2500	5150 - 5875
	2400 - 2500	5150 - 5875
	2400 - 2500	5150 - 5875
	2400 - 2500	5150 - 5875
	2400 - 2500	5150 - 5875
	2400 - 2500	5150 - 5875
GPS	1575	ANT8010LL05R1575A
	1575	ANT5320LL14R1575A
	1575	ANT3216LL15R1575A
GPS & GLONASS	1575 / 1602	ANT8010LL05R1516A
	1575 / 1602	ANT5320LL14R1516A
2.4GHz + GPS	1575 / 2400	ANT5320LL17R1524A
Band-Pass Filter		
2.45 GHz	2400 - 2500	BPF2012LL03R2400A
	2400 - 2500	BPF1608LM02R2400A
Low-Pass Filter		
2.45 GHz	2400 - 2500	LPF1608LL53R2400A
Diplexer / Triplexer		
2.4/5 GHz	2400 - 2500	DPX1608LL80R2455A
	2400 - 2500	DPX1608LL85R2455A
GPS/2.4	1575 / 2400	DPX1608LL87R1524A
GPS/2.4/5 GHz	1575 / 2400 /5000	TPX2012LL90R1525A
	1575 / 2400 /5000	TPX2012LL95R1525A
Balun		
2.45 GHz	2400 - 2500	BLN1608LL30R2400A
	2400 - 2500	BLN1608LL01R2400A
5 GHz	5000	BLN1608LL01R5000A
Combo		
2.45 GHz	2400 - 2500	BLF2012LL98R2400A



MULTILAYER CHIP VARISTORS



MLV Product Selection Charts

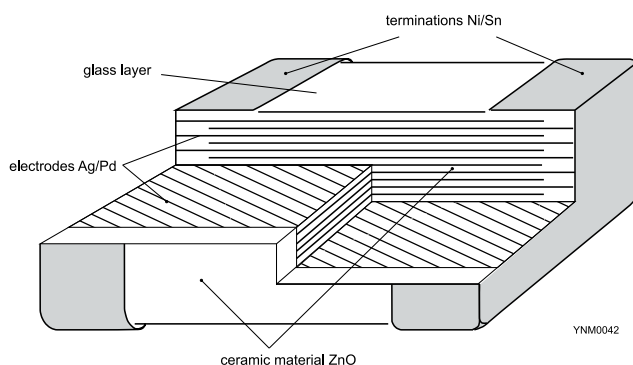
Multilayer Chip Varistors, 0402 to 1206



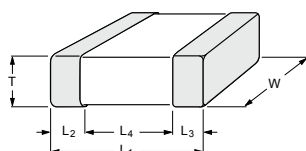
Features

- 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

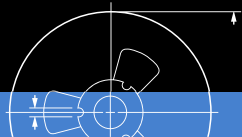
Type	Thickness classification (mm)	8 mm tape width per reel
		180 mm / 7"
		Paper
0402	0.50 ± 0.10	10 000
0603	0.80 ± 0.10	4 000
0805	0.85 ± 0.10	4 000
1206	0.85 ± 0.10	4 000

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				0.5 ±0.10		
82 pF										
100 pF		0.5 ±0.10	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	0.80 ±0.10		0.80 ±0.10		0.80 ±0.10		0.80 ±0.10		
33 pF									
50 pF									
82 pF									
100 pF		0.80 ±0.10	0.80 ±0.10		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									
300 pF									
350 pF			0.80 ±0.10						
360 pF									
470 pF									
650 pF									
680 pF									
800 pF									
900 pF									
Tape width	8 mm								

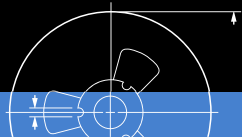
Note: Values in shaded cells indicate thickness class (unit: mm)

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

Global part number	
Ordering example: VRS0402KR55R680N	
	V R S 0 4 0 2 K R 5 5 R 6 8 0 N
Series name (code 1-2) ———	Capacitance tolerance (code 16)
VR = Varistor	K = $\pm 10\%$
Chip type (code 3) ———	L = $\pm 15\%$
S = Single chip	M = $\pm 20\%$
Size code (code 4-7) ———	N = $\pm 30\%$
0402	Capacitance value (code 13-15)
0603	680 = 68 pF
0805	(2 significant digits+number of zeros;
1206	the 3rd digit signifies the multiplying
Varistor voltage tolerance (code 8) ———	factor, and letter R is decimal point)
K = $\pm 10\%$	0 = x 1
L = $\pm 15\%$	1 = x 10 ¹
M = $\pm 20\%$	Maximum working voltage (code 10-12)
S = Special range	33R = 3.3 V
Packing style (code 9) ———	55R = 5.5 V
R = paper tape reel Ø7 inch	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

Note:

Note:

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