

# Thick Film Chip Resistor multicomp<sup>PRO</sup>



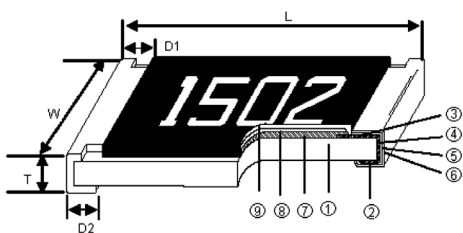
## Features

- Small size and light weight
- Highly reliable multilayer electrode construction
- Compatible with all soldering process

## Applications

- Telecommunication equipment
- Radio and tape recorders, TV tuners
- Video cameras, watches, pocket calculators
- Automotive industry
- Computers, instruments
- Medical and military equipment

## Construction



No.	Part Name
1	Alumina Substrate
2	Bottom Electrode (Ag-Pd)
3	Top Electrode (Ag)
4	Edge Electrode (NiCr)
5	Barrier Layer (Ni)

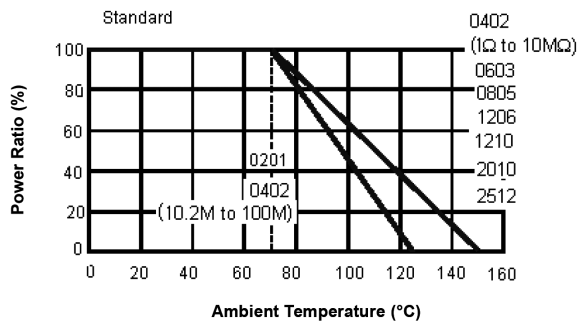
No.	Part Name
6	External Electrode (Sn)
7	Resistor Layer (RuO <sub>2</sub> /Ag)
8	Primary Overcoat (Glass)
9	Secondary Overcoat (Epoxy)

## Dimensions

Size (Inch)	L (mm)	W (mm)	T (mm)	D1 (mm)	D2 (mm)	Weight (g) (1000 pcs)
0201	0.6 ±0.03	0.3 ±0.03	0.23 ±0.03	0.15 ±0.05	0.15 ±0.05	0.15
0402	1 ±0.05	0.5 ±0.05	0.35 ±0.05	0.2 ±0.1	0.2 ±0.1	0.62
0603	1.6 ±0.1	0.8 ±0.1	0.45 ±0.1	0.3 ±0.2	0.3 ±0.2	2.042
0805	2 ±0.1	1.25 ±0.1	0.5 ±0.1	0.35 ±0.2	0.4 ±0.2	4.368
1206	3.1 ±0.1	1.55 ±0.1	0.55 ±0.1	0.5 ±0.25	0.5 ±0.2	8.947
1210	3.2 ±0.2	2.6 ±0.15	0.55 ±0.1	0.5 ±0.25	0.5 ±0.2	15.959
2010	5 ±0.2	2.5 ±0.15	0.55 ±0.1	0.6 ±0.25	0.5 ±0.2	24.241
2512	6.35 ±0.2	3.2 ±0.15	0.55 ±0.1	0.6 ±0.25	0.5 ±0.2	39.448

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## Derating Curve



## Standard Electrical Specifications

Item Type	Power Rating at 70°C Jumper Rated Current	Operating Temperature Range	Maximum Operating Voltage	Maximum Overload Voltage	Resistance Range		TCR (PPM/°C)
					±1%	±5%	
0201	1/20W	-55 to +125°C	25V	50V	1Ω to 1MΩ		±200
Jumper	1A				0Ω (<50mΩ)		-
0402	1/16W	-55 to +155°C	50V	100V	1Ω to 9.76Ω 10Ω to 1MΩ 1.02MΩ to 10MΩ		±200 ±100 ±200
		-55 to +125°C			10.2MΩ to 20MΩ 20.5MΩ to 100MΩ		±200 ±400
Jumper	1A	-55 to +155°C			0Ω (<50mΩ)		-
0603	1/10W	-55 to +155°C			50V	100V	1Ω to 9.76Ω 10Ω to 1MΩ 1.02MΩ to 20MΩ 20.5MΩ to 100MΩ
Jumper	1A	-55 to +155°C	0Ω (<50mΩ)				-
0805	1/8W	-55 to +155°C	150V	300V	1Ω to 9.76Ω 10Ω to 1MΩ 1.02MΩ to 20MΩ 20.5MΩ to 100MΩ		±200 ±100 ±200 ±400
1206	1/4W		200V	400V	0Ω (<50mΩ)		-
Jumper	2A				0Ω (<50mΩ)		-
1210	1/3W		-55 to +155°C	200V	400V	1Ω to 9.76Ω 10Ω to 1MΩ 1.02MΩ to 20MΩ 20.5MΩ to 39MΩ	
Jumper	2.5A	-55 to +155°C	0Ω (<50mΩ)			-	
2010	3/4W	-55 to +155°C	200V	400V	1Ω to 9.76Ω 10Ω to 1MΩ 1.02MΩ to 20MΩ 20.5MΩ to 100MΩ		±200 ±100 ±200 ±400
					Jumper	3.5A	0Ω (<50mΩ)

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Item Type	Power Rating at 70°C Jumper Rated Current	Operating Temperature Range	Maximum Operating Voltage	Maximum Overload Voltage	Resistance Range		TCR (PPM/°C)
					±1%	±5%	
2512	1W	-55 to +155°C	250V	500V	1Ω to 9.76Ω 10Ω to 1MΩ 1.02MΩ to 20MΩ 20.5MΩ to 100MΩ		±200 ±100 ±200 ±400
Jumper	4A				0Ω (<50mΩ)		-

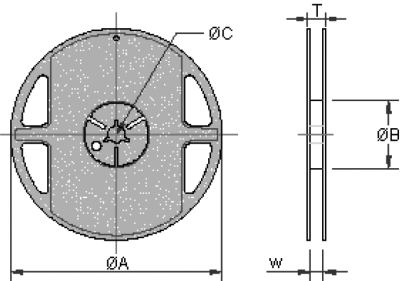
## Environmental Characteristics

Item	Requirement			Test Method
	±1% and Below	±5%	Jumper	
Temperature Coefficient of Resistance (TCR)	As specification			-55°C to +125/+155°C, 25°C is the reference temperature
Short Time Overload	±(1.0% +0.05Ω)	±(2.0% +0.05Ω)	<50mΩ	RCWV* 2.5 or Maximum overload voltage for 5 seconds, 2 seconds for high power series
Insulation Resistance	≥10G			Maximum overload voltage for 1 minute
Endurance	±(2.0% +0.10Ω)	±(3.0% +0.10Ω)	<100mΩ	70 ±2°C, Maximum working voltage for 1000 hours with 1.5 hours "ON" and 0.5 hours "OFF"
Damp Heat with Load	±(2.0% +0.10Ω)	±(3.0% +0.10Ω)		40±2°C, 90 to 95% R.H. Maximum working voltage for 1000 hours with 1.5 hours "ON" and 0.5 hours "OFF"
Dry Heat	±(1.0% +0.05Ω)	±(1.5% +0.10Ω)	<50mΩ	at +125/+155°C for 1000 hours
Bending Strength	±(1.0% +0.05Ω)	±(1.0% +0.05Ω)		Bending once for 5 seconds 2010, 2512 sizes: 2mm Other sizes: 3mm
Solderability	95% Minimum Coverage			245 ±5°C for 3 seconds
Resistance to Soldering Heat	±(0.5% + 0.05Ω)	±(1.0% + 0.05Ω)	<50mΩ	260 ±5°C for 10 seconds
Voltage Proof	No breakdown or flashover			1.42 times RCWV (RMS) for 1 minute
Leaching	Individual leaching area ≤5% Total leaching area ≤10%			260 ±5°C for 30 seconds
Rapid Change of temperature	±(0.5% +0.05Ω)	±(1.0% +0.05Ω)	<50mΩ	-55°C to +125/+155°C, 5 cycles

Storage temperature : 25±3°C; Humidity <80%RH.

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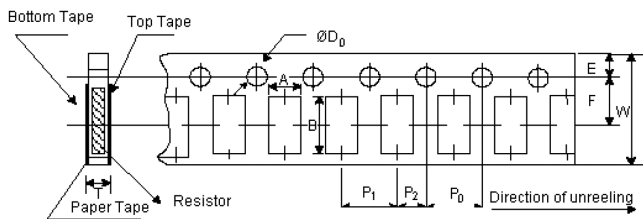
## Packaging (Reel specifications and packaging quantity)



Size (Inch)	Packaging Quantity		Tape Width	Reel Diameter	ØA	ØB	ØC	W	T
0201	Paper	15K	8mm	7 inch	178.5±1.5	60 <sup>+1/-0</sup>	13.0±0.2	9.0±0.5	12.5±0.5
0201 0402	Paper	10K	8mm	7 inch	178.5±1.5	60 <sup>+1/-0</sup>	13.0±0.2	9.0±0.5	12.5±0.5
		20K		10 inch	254±1	100±0.5	13.0±0.2	9.5±0.5	13.5±0.5
		40K							
0603 0805 1206 1210		5K		13 inch	330±1	100±0.5	13.0±0.2	9.5±0.5	13.5±0.5
		10K							
		20K							
2010 2512	Embossed	4K	12mm	7 inch	178.5±1.5	60 <sup>+1/-0</sup>	13.0±0.5	13.0±0.5	15.5±0.5
		8K		10 inch	250±1	62±0.5	13.0±0.5	12.5±0.5	16.5±0.5

Dimensions : Millimetres

## Paper tape specifications

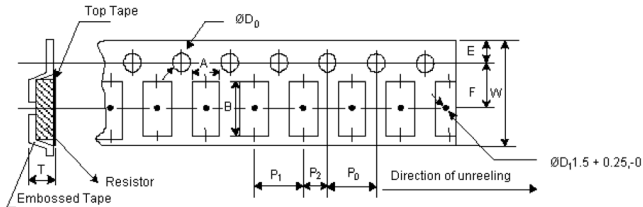


Size (Inch)	A	B	W	E	F	P <sub>0</sub>	P <sub>1</sub>	P <sub>2</sub>	ØD <sub>0</sub>	T
0201	0.38±0.05	0.68±0.05	8±0.2	1.75±0.1	3.5±0.05	4±0.1	2±0.05	2±0.05	1.5+0.1,-0	0.42±0.2
0402	0.65±0.1	1.15±0.1	8±0.2	1.75±0.1	3.5±0.05	4±0.1	2±0.05	2±0.05	1.5+0.1,-0	0.45±0.1
0603	1.1±0.1	1.9±0.1	8±0.2	1.75±0.1	3.5±0.05	4±0.1	4±0.05	2±0.05	1.5+0.1,-0	0.70±0.1
0805	1.6±0.1	2.4±0.2	8±0.2	1.75±0.1	3.5±0.05	4±0.1	4±0.05	2±0.05	1.5+0.1,-0	0.85±0.1
1206	1.9±0.1	3.5±0.2	8±0.2	1.75±0.1	3.5±0.05	4±0.1	4±0.05	2±0.05	1.5+0.1,-0	0.85±0.1
1210	2.8±0.1	3.5±0.2	8±0.2	1.75±0.1	3.5±0.05	4±0.1	4±0.05	2±0.05	1.5+0.1,-0	0.85±0.1

Dimensions : Millimetres

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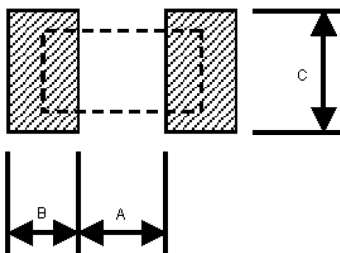
## Embossed Plastic Tape Specifications



Size (Inch)	A	B	W	E	F	P <sub>0</sub>	P <sub>1</sub>	P <sub>2</sub>	ØD <sub>0</sub>	T
2010	2.8±0.2	5.5±0.2	12±0.3	1.75±0.1	5.5±0.05	4±0.1	4±0.1	2±0.05	1.5+0.1, -0	1.2 <sup>+0</sup>
2512	3.5±0.2	6.7±0.2	12±0.3	1.75±0.1	5.5±0.05	4±0.1	4±0.1	2±0.05	1.5+0.1, -0	1.2 <sup>+0</sup>

Dimensions : Millimetres

## Recommend Land Pattern



Size (Inch)	A	B	C
0201	0.3	0.25	0.3
0402	0.5	0.45	0.6
0603	0.9	0.6	0.9
0805	1.2	0.7	1.3
1206	2	0.9	1.6
1210	2	0.9	2.8
2010	3.8	0.9	2.8
2512	3.8	1.6	3.5

Dimensions : Millimetres

## Part Number Explanation

<b>MC</b>	<b>0201</b>	<b>L6</b>	<b>F</b>	<b>8201</b>	<b>SE</b>
	Dimensions (L × W)	Resistance Tolerance		Resistance	
	0201, 0402 0603, 0805 1206, 1210 2010, 2512	F: ±1% J: ±5%		3 Significant Digits Last digit represents The number of zeroes to follow. R = Decimal Point 3573 = 357kΩ 86R2 = 86.2Ω 5600 = 560Ω	

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