

General Purpose Thick Film Resistors (CR Series)



Features:

- RoHS Compliant (5/6) and Halogen Free
- TCR as low as $\pm 100\text{ppm}$
- Available Sizes 01005 to 2512
- Stable over temperature range
- Good power dissipation capabilities (Rated power is conservatively rated)
- 100% matte Tin over Nickel with wrap around termination for excellent solderability
- Some values available for conductive epoxy application (suitable for MRI applications)

Part Number Structure

CR	1206	- 8W	- 103	J		T			
Series	Size	Power Rating	Resistance	Tolerance	Termination	Packaging	Optional Reel Identifier		
01005	32W = 0.031W	3 DIGIT (J TOL.)	2R2=2.2Ω	D = ± 0.5%	Leave blank for standard termination.	T = Tape & Reel	Leave blank if standard Reel size.		
0201	20W = 0.05W		103=10KΩ	F = ± 1%					
0402	16W = 0.063W	4 DIGIT (D & F TOL.)	10R2=10.2Ω	J = ± 5%	P = Palladium Silver Termination (PdAg)		Add "-13" if 13" Reel is required		
0603	10W = 0.10W		1002=10KΩ	Leave blank for zero ohm value					
0805	8W = 0.125W	Jumper	3 zeros						
1206	4W = 0.25W								
1210	2W = 0.50W								
2010	1W = 1W								
2512	2W =2W								

Note: 1% E24 values may be marked with a 3 digit code.

Example P/N: CR1206-8W-103JT

Standard temination finish is 100% matte Tin (Sn) over Nickel.

Dimensions

Size	Unit: inches (mm)				
	L	W	T	C ₁	C ₂
01005	0.016 $\pm$ 0.0008 (0.4 $\pm$ 0.02)	0.008 $\pm$ 0.0008 (0.2 $\pm$ 0.02)	0.005 $\pm$ 0.0008 (0.13 $\pm$ 0.02)	0.003 $\pm$ 0.001 (0.08 $\pm$ 0.03)	0.003 $\pm$ 0.001 (0.08 $\pm$ 0.03)
0201	0.024 $\pm$ 0.002 (0.6 $\pm$ 0.05)	0.012 $\pm$ 0.001 (0.3 $\pm$ 0.02)	0.010 $\pm$ 0.002 (0.25 $\pm$ 0.05)	0.020 $\pm$ 0.008 (0.50 $\pm$ 0.20)	0.006 $\pm$ 0.002 (0.15 $\pm$ 0.05)
0402	0.040 $\pm$ 0.002 (1.0 $\pm$ 0.05)	0.020 $\pm$ 0.001 (0.5 $\pm$ 0.02)	0.014 $\pm$ 0.002 (0.35 $\pm$.05)	0.008 $\pm$ 0.004 (0.2 $\pm$ 0.1)	0.008 $\pm$ 0.004 (0.2 $\pm$ 0.1)
0603	0.063 $\pm$ 0.004 (1.6 $\pm$ 0.1)	0.031 $\pm$ 0.004 (0.8 $\pm$ 0.1)	0.018 $\pm$ 0.004 (0.45 $\pm$ 0.1)	0.012 $\pm$ 0.006 (0.30 $\pm$ 0.15)	0.012 $\pm$ 0.006 (0.30 $\pm$ 0.15)
0805	0.079 $\pm$ 0.006 (2.0 $\pm$ 0.15)	0.050 $\pm$ 0.006 (1.25 $\pm$ 0.15)	0.018 $\pm$ 0.006 (0.45 $\pm$ 0.15)	0.014 $\pm$ 0.006 (0.35 $\pm$ 0.15)	0.014 $\pm$ 0.006 (0.35 $\pm$ 0.15)
1206	0.126 $\pm$ 0.006 (3.2 $\pm$ 0.15)	0.063 $\pm$ 0.006 (1.6 $\pm$ 0.15)	0.022 $\pm$ 0.006 (0.56 $\pm$ 0.15)	0.020 $\pm$ 0.008 (0.50 $\pm$ 0.20)	0.020 $\pm$ 0.008 (0.50 $\pm$ 0.20)
1210	0.126 $\pm$ 0.006 (3.2 $\pm$ 0.15)	0.098 $\pm$ 0.006 (2.50 $\pm$ 0.15)	0.022 $\pm$ 0.006 (0.56 $\pm$ 0.15)	0.020 $\pm$ 0.008 (0.50 $\pm$ 0.20)	0.020 $\pm$ 0.008 (0.50 $\pm$ 0.20)
2010	0.197 $\pm$ 0.006 (5.0 $\pm$ 0.15)	0.098 $\pm$ 0.006 (2.50 $\pm$ 0.15)	0.022 $\pm$ 0.006 (0.56 $\pm$ 0.15)	0.026 $\pm$ 0.008 (0.65 $\pm$ 0.25)	0.024 $\pm$ 0.008 (0.60 $\pm$ 0.20)
2512 (1W)	0.248 $\pm$ 0.006 (6.3 $\pm$ 0.15)	0.126 $\pm$ 0.006 (3.2 $\pm$ 0.15)	0.022 $\pm$ 0.006 (0.56 $\pm$ 0.15)	0.026 $\pm$ 0.008 (0.65 $\pm$ 0.25)	0.024 $\pm$ 0.008 (0.60 $\pm$ 0.20)
2512 (2W)	0.248 $\pm$ 0.006 (6.3 $\pm$ 0.15)	0.126 $\pm$ 0.006 (3.2 $\pm$ 0.15)	0.024 $\pm$ 0.008 (0.60 $\pm$ 0.20)	0.024 $\pm$ 0.008 (0.60 $\pm$ 0.20)	0.020 $\pm$ 0.008 (0.50 $\pm$ 0.20)

Structure

1	Alumina Substrate	6	Tin Plating
2	Backside Electrode	7	Primary Coating
3	Topside Electrode	8	Secondary Layer
4	Edge Electrode	9	Resistive layer
5	Nickel Plating	10	Marking

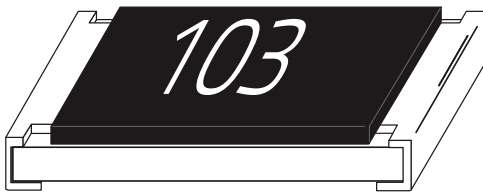
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Electrical Specifications and Range

Size	01005	0201	0402		0603		0805		1206		1210		2010		2512	
Power Rating at 70°C (W)	0.03W (1/32W)	0.05W (1/20W)	0.063W (1/16W)	0.010W (1/10W)	0.063W (1/16W)	0.10W (1/10W)	0.10W (1/10W)	0.125W (1/8W)	0.125W (1/8W)	0.25W (1/4W)	0.50W (1/2W)	0.50W (1/2W)	1.0W	1.0W	1.0W	2.0W
Max. Working Voltage	$\sqrt{PR}$ or 15V whichever is less	$\sqrt{PR}$ or 25V whichever is less	$\sqrt{PR}$ or 50V whichever is less		$\sqrt{PR}$ or 50V whichever is less		$\sqrt{PR}$ or 150V whichever is less		$\sqrt{PR}$ or 200V whichever is less		$\sqrt{PR}$ or 200V whichever is less		$\sqrt{PR}$ or 200V whichever is less		$\sqrt{PR}$ or 200V whichever is less	
Operating Temp. Range	-55°C to +125°C	-55°C to +125°C	-55°C to +155°C		-55°C to +155°C		-55°C to +155°C		-55°C to +155°C		-55°C to +155°C		-55°C to +155°C		-55°C to +155°C	
Zero Ohm (Jumper)	Current Rating	0.5A	0.5A	1A	1A	1A	2A	2A	2A	2.5A	2.5A	3.5A	3.5A	4A	4A	4A
Tolerance	TCR	Resistance Range	Resistance Range	Resistance Range	Resistance Range	Resistance Range	Resistance Range	Resistance Range	Resistance Range	Resistance Range	Resistance Range	Resistance Range	Resistance Range	Resistance Range	Resistance Range	Resistance Range
±0.5% (D)	±100ppm	-	-	10Ω - 1MΩ	-	10Ω - 1MΩ	10Ω - 1MΩ	10Ω - 1MΩ	10Ω - 1MΩ	-	-	-	-	-	-	-
	±200ppm	-	-	1.02MΩ - 10MΩ	-	1.02MΩ - 10MΩ	1.02MΩ - 10MΩ	1.02MΩ - 10MΩ	1.02MΩ - 10MΩ	-	-	-	-	-	-	-
±1% (F)	±100ppm	-	-	10Ω - 1MΩ	10Ω - 1MΩ	10Ω - 1MΩ	10Ω - 1MΩ	10Ω - 1MΩ	10Ω - 1MΩ	10Ω - 1MΩ	10Ω - 1MΩ	10Ω - 1MΩ	10Ω - 1MΩ	10Ω - 1MΩ	10Ω - 1MΩ	10Ω - 1MΩ
	±200ppm	-	10Ω - 10MΩ	1Ω - 9.76Ω; 1.02MΩ - 21.5MΩ	1Ω - 9.76Ω; 1.02MΩ - 10MΩ	1Ω - 9.76Ω; 1.02MΩ - 21.5MΩ	1Ω - 9.76Ω; 1.02MΩ - 21.5MΩ	1Ω - 9.76Ω; 1.02MΩ - 21.5MΩ	1Ω - 9.76Ω; 1.02MΩ - 21.5MΩ	1Ω - 9.76Ω; 1.02MΩ - 20MΩ	1Ω - 9.76Ω; 1.02MΩ - 20MΩ	1Ω - 9.76Ω; 1.02MΩ - 20MΩ	1Ω - 9.76Ω; 1.02MΩ - 20MΩ	1Ω - 9.76Ω; 1.02MΩ - 20MΩ	1Ω - 9.76Ω; 1.02MΩ - 20MΩ	1Ω - 9.76Ω; 1.02MΩ - 20MΩ
	±250ppm	100Ω - 1MΩ	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	±300ppm	10Ω - 99Ω	-	-	-	-	-	-	-	20.5MΩ - 21.5MΩ	-	20.5MΩ - 21.5MΩ	-	-	-	-
±5% (J)	±100ppm	-	-	-	-	-	-	-	-	10Ω - 1MΩ	-	10Ω - 1MΩ	-	-	10Ω - 1MΩ	-
	±200ppm	-	1Ω - 10MΩ	1Ω - 10MΩ	1Ω - 10MΩ	1Ω - 10MΩ	1Ω - 10MΩ	1Ω - 10MΩ	1Ω - 10MΩ	1Ω - 9.76Ω; 1.02MΩ - 20MΩ	1Ω - 9.76Ω; 1.02MΩ - 20MΩ	1Ω - 9.76Ω; 1.02MΩ - 20MΩ	1Ω - 9.76Ω; 1.02MΩ - 20MΩ	1Ω - 9.76Ω; 1.02MΩ - 20MΩ	1Ω - 10MΩ	1Ω - 9.76Ω
	±250ppm	100Ω - 1MΩ	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	±300ppm	10Ω - 99Ω	-	-	-	-	-	-	-	20.5MΩ - 21.5MΩ	-	20.5MΩ - 21.5MΩ	-	-	-	-
	±350ppm	-	-	-	-	10MΩ - 22MΩ	10MΩ - 22MΩ	10MΩ - 22MΩ	10MΩ - 22MΩ	-	-	-	-	-	-	-

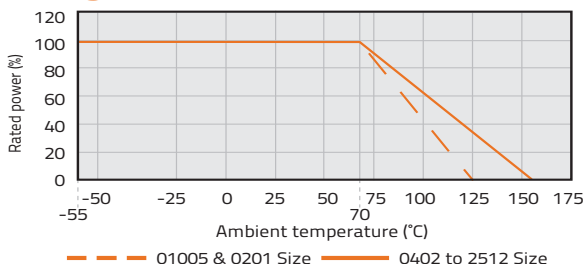
NOTE: Overload Voltage=2.5* $\sqrt{P \times R}$.

Marking Code



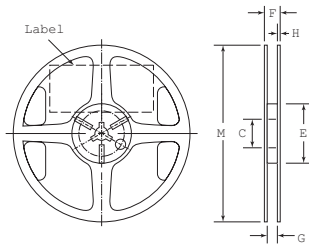
- 1% E-24 values for 0603 size and larger are typically marked with the standard 3 digit marking code.
- 1% E-96 values for 0805 size and larger, will be marked with standard 4 digit marking code.
- 5% E-24 values for 0603 size and larger, will be marked with standard 3 digit marking code.
- 0603 - 1% E-96 values will be marked with a standard 3 digit alpha numeric code (Please see page 61 for alpha numeric codes).
- 01005, 0201 and 0402 cannot be marked.
- 5% E-24 values for 1210~2512, may be marked with 4 digit marking code.

Derating Curve



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Reel Specifications

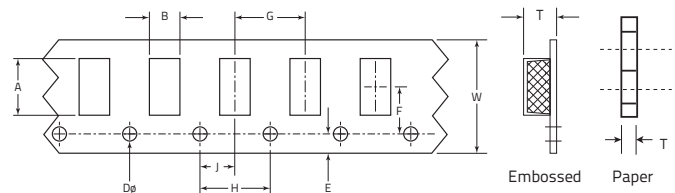


Unit: mm (inch)

C	E	F	G	H	M
13.0 ± 0.2 (0.51 ± 0.008)	60.0 ± 1.0 (2.36 ± 0.03)	11.4 ± 1.0 (0.45 ± 0.04)	9.0 ± .3 (0.35 ± 0.012)	1.5 ± .3 (0.06 ± 0.012)	180 ± 2.0 (7.09 ± 0.08)

Minimum of 30 empty pockets at the beginning of reel, 65 minimum empty pockets at the end.

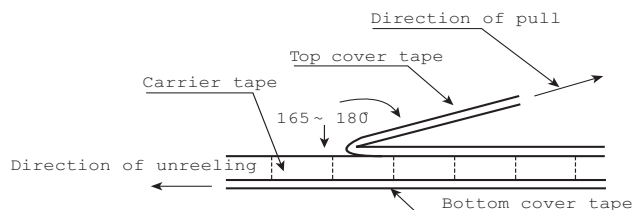
Tape Specifications



All dimensions in mm.

Tape	Size (inches)	A	B	W	E	F	T	G	H	J	Dø
Paper	01005	0.45 ± 0.03	0.25 ± 0.03	8.0 ± 0.2	1.75 ± 0.1	3.5 ± 0.05	0.40 ± 0.10	2.0 ± 0.05	4.0 ± 0.1	2.0 ± 0.05	1.5 + 0.1-0
	0201	0.7 ± 0.08	0.4 ± 0.08	8.0 ± 0.2	1.75 ± 0.1	3.5 ± 0.05	0.42 ± 0.20	2.0 ± 0.05	4.0 ± 0.1	2.0 ± 0.05	1.5 + 0.1-0
	0402	1.15 ± 0.1	0.65 ± 0.1	8.0 ± 0.2	1.75 ± 0.1	3.5 ± 0.05	0.45 ± 0.10	2.0 ± 0.05	4.0 ± 0.1	2.0 ± 0.05	1.5 + 0.1-0
	0603	1.9 ± 0.1	1.1 ± 0.1	8.0 ± 0.2	1.75 ± 0.1	3.5 ± 0.05	0.70 ± 0.10	4.0 ± 0.1	4.0 ± 0.1	2.0 ± 0.05	1.5 + 0.1-0
	0805	2.4 ± 0.1	1.65 ± 0.1	8.0 ± 0.2	1.75 ± 0.1	3.5 ± 0.05	0.85 ± 0.10	4.0 ± 0.1	4.0 ± 0.1	2.0 ± 0.05	1.5 + 0.1-0
	1206	3.5 ± 0.1	1.9 ± 0.1	8.0 ± 0.2	1.75 ± 0.1	3.5 ± 0.05	0.85 ± 0.10	4.0 ± 0.1	4.0 ± 0.1	2.0 ± 0.05	1.5 + 0.1-0
	1210	3.5 ± 0.1	2.8 ± 0.1	8.0 ± 0.2	1.75 ± 0.1	3.5 ± 0.05	0.85 ± 0.10	4.0 ± 0.1	4.0 ± 0.1	2.0 ± 0.05	1.5 + 0.1-0
Embossed	2010	5.4 ± 0.2	2.9 ± 0.2	12.0 ± 0.1	1.75 ± 0.1	5.5 ± 0.5	1.2	4.0 ± 0.1	4.0 ± 0.1	2.0 ± 0.05	1.5 + 0.1-0
	2512	6.9 ± 0.2	3.6 ± 0.2	12.0 ± 0.1	1.75 ± 0.1	5.5 ± 0.5	1.2	8.0 ± 0.1	4.0 ± 0.1	2.0 ± 0.05	1.5 + 0.1-0

Peel Back Force and Direction Diagram



Peel back force and direction of peel back angle should follow EIA481-1-A. Peel back force should be between 0.1N – 1.3N and peel back angle of 165° – 180°.