BOURNS®

CRN SERIES

Low Ohmic Metal Film Resistor

*RoHS COMPLIANT

Features

- High power rating up to 2 watts
- Metal thick film technology
- Low resistance from 47 mΩ to 10 Ω
- RoHS compliant* without exemption

Applications

- Low voltage power supplies
- Industry controllers
- Digital meters
- Current sensing

Sustainability

- Small size reduces material use
- High pallet density for lower CO_2
- Energy-saving low-power design
- High efficiency, low power loss
- ISO 14001, low impact energy

Product Overview

Bourns® CRN Series offers reliable, low-ohmic current sensing performance in compact surface-mount packages. Based on metal thick-film technology, these resistors provide high power ratings up to 2 W, excellent thermal stability, and full RoHS compliance without exemption, supporting the development of next-generation energy-efficient and environmentally responsible electronics.

With a resistance range from 47 mΩ to 10 Ω, multiple TCR options (±100, ±200 ppm/°C), and tolerance choices of ±1 % and ±5 %, the CRN Series delivers a combination of high performance, stability, and design flexibility—ideal for applications such as battery management systems, low-voltage power supplies, industrial controllers, and digital meters.

Bourns® CRN Series minimizes environmental impact through its efficient metal thick-film construction and reduced power loss.

Electrical Characteristics (@ T_A = 25 °C Unless Otherwise Noted)

Model	Power Rating @ 70 °C		Max. Voltage		Resistance Range (Ω)	TCR (ppm/°C)	Tolerance
			Work	Overload			
CRN0603	Standard	0.125 W	337 mV	754 mV	47 m to 91 m	±200	±1 % ±5 %
					100 m to 910 m	±100	
	High	0.25 W	477 mV	1.067 V	47 m to 91 m	±200	
					100 m to 910 m	±100	
CRN0805	Standard	0.25 W	477 mV	1.067 V	47 m to 910 m	±100	
	High	0.5 W	675 mV	1.508 V	47 m to 910 m		
CRN1206	Standard	0.33 W	551 mV	1.232 V	47 m to 910 m	±100	
		0.25 W	1.58 V	3.54 V	1 to 10		
	High	0.75 W	826 mV	1.847 V	47 m to 910 m		
		0.5 W	2.24 V	5.00 V	1 to10		
CRN1210	Standard	0.67 W	779 mV	1.742 V	47 m to 910 m	±100	
	High	0.75 W	826 mV	1.847 V	47 m to 910 m		
CRN2010	Standard	0.75 W	826 mV	6.12 V	47 m to 910 m	±100	
					1 to 10		
	High	1 W	957 mV	7.07 V	47 m to 910 m		
					1 to 10		
CRN2512	Standard	1 W	957 mV	7.07 V	47 m to 910 m	±100	
					1 to 10		
	High	2 W	1.349 V	10 V	47 m to 910 m		
					1 to 10		

Notes:

- Rated voltage (V) is calculated as $\sqrt{(P \times R)}$, and must not exceed the maximum working voltage.
- High = High power rating.

Environmental Characteristics

Operating Temperature ..... -55 °C to +155 °C
Storage Conditions
Temperature ..... +5 °C to +40 °C
Humidity ..... 20 % to 70 %
Moisture Sensitivity Level 1

* RoHS Directive 2015/863, Mar 31, 2015 and Annex.
Specifications are subject to change without notice.
Users should verify actual device performance in their specific applications.

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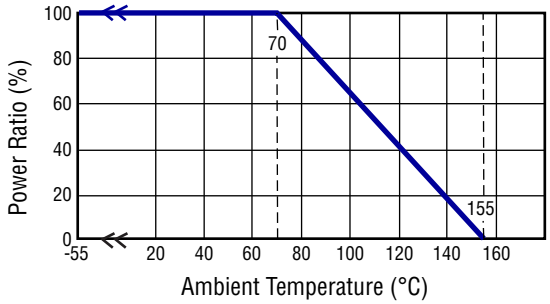
Current Rating Thermal Derating Curve



Typical Part Marking

0603 Size	0805~2512 Size
3-Digit Marking to Identify the Resistance Value	4-Digit Marking to Identify the Resistance Value
	
Example: 1R0 = 1 Ω R12 = 120 mΩ 68M = 68 mΩ	Example: 5R90 = 5.9 Ω R068 = 68 mΩ R120 = 120 mΩ

How to Order

CRN 1206 - F X - __ R020 E PF

Model
- CRN = Metal Film Chip Resistor

Size
- 0603 = 0603 (1608)
- 0805 = 0805 (2012)
- 1206 = 1206 (3216)
- 1210 = 1210 (3225)
- 2010 = 2010 (5025)
- 2512 = 2512 (6332)

Resistance Tolerance
- F = ±1 %
- J = ±5 %

TCR (PPM/°C)
- X = ±100
- W = ±200

Power Code
- Blank = Standard Power
- H = High power model

Resistance Value Code
- "R" represents decimal point
- ±1 % tolerance all values and ±5% tolerance <1 Ω: 4 digits
  (Example: R047 = 47 mΩ, 2R00 = 2Ω, 10R0 = 10Ω)
- ±5 % tolerance ≥1 Ω: 3 digits
  (Example: 5R0= 5 Ω, 1R2 = 1.2 Ω)

Packaging
- E = 7-inch reel
- 0603, 0805, 1206, 1210 sizes: 5,000 pcs. per reel
- 2010, 2512 sizes: 4,000 pcs. per reel

Termination
- PF = Matte Tin-plated (RoHS Compliant without Exemption)

Performance Characteristics

Test	Conditions	Specification	
		Reference	Limit
Temperature Coefficient of Resistance	+25 to +155 °C	IEC 60115-1 Clause 4.8	Refer to TCR
Short Time Overload	5x Rated Power for 5 Seconds	IEC 60115-1 Clause 4.13	J: ΔR≤ ±2 % F: ΔR≤ ±1 %
Operational Life	1000 Hours at Rated Power at +70 ±2 °C, 90 Minutes "ON", 30 Minutes "OFF"	IEC 60115-1, Clause 4.25	ΔR ≤ ±(3 % +0.5 mΩ)
Resistance to Solder Heat	+260 ±5 °C, 10+1 Second Dwell	IEC 60115-1, Clause 4.18	1.ΔR ≤ ±(1 % +0.1 Ω)
Solderability	245 ±2 °C Dipping Time: 3 Seconds	IEC 60115-1, Clause 4.17 J-STD-002	>95 % Tin Coverage
Board Flex / Bending	2 mm Deflection (1206, 2010, 2512) 3 mm Deflection (0603, 0805)	IEC 60115-1 / JIS C 5201-1, Clause 4.33	J: ΔR≤ ±1 % F: ΔR≤ ±0.5 %
Insulation Resistance	Test Voltage 100 ± 15 V	IEC 60115-1, Clause 4.6	Between Termination and Coating Must be Over 1000 MΩ

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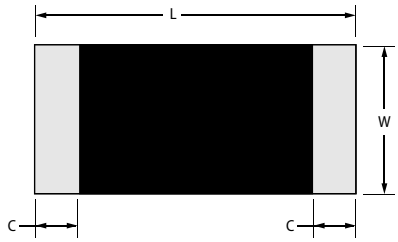
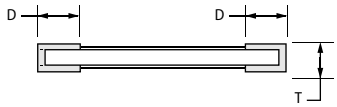
Product Dimensions



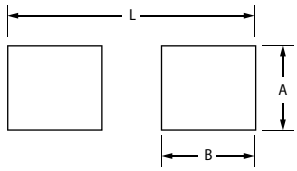


DIMENSIONS: MM / (INCHES)

Model	Dimension				
	L	W	C	D	T
CRN0603	1.60 ± 0.10 (0.063 ± 0.004)	0.80 ± 0.10 (0.031 ± 0.004)	0.30 ± 0.20 (0.012 ± 0.008)	0.30 ± 0.20 (0.012 ± 0.008)	0.45 ± 0.10 (0.018 ± 0.004)
CRN0805	2.00 ± 0.10 (0.079 ± 0.004)	1.25 ± 0.10 (0.049 ± 0.004)	0.40 ± 0.20 (0.016 ± 0.008)	0.40 ± 0.20 (0.016 ± 0.008)	0.50 ± 0.10 (0.020 ± 0.004)
CRN1206	3.10 ± 0.10 (0.122 ± 0.004)	1.60 ± 0.10 (0.063 ± 0.004)	0.50 ± 0.25 (0.020 ± 0.010)	0.50 ± 0.25 (0.020 ± 0.010)	0.55 ± 0.10 (0.022 ± 0.004)
CRN1210	3.10 ± 0.10 (0.122 ± 0.004)	2.60 ± 0.10 (0.102 ± 0.004)	0.50 ± 0.25 (0.020 ± 0.010)	0.50 ± 0.25 (0.020 ± 0.010)	0.55 ± 0.10 (0.022 ± 0.004)
CRN2010	5.00 ± 0.20 (0.197 ± 0.008)	2.50 ± 0.20 (0.098 ± 0.008)	0.60 ± 0.25 (0.024 ± 0.010)	0.60 ± 0.25 (0.024 ± 0.010)	0.60 ± 0.10 (0.024 ± 0.004)
CRN2512	6.30 ± 0.20 (0.248 ± 0.008)	3.10 ± 0.20 (0.122 ± 0.008)	0.60 ± 0.25 (0.024 ± 0.010)	0.90 ± 0.25 (0.035 ± 0.010)	0.60 ± 0.15 (0.024 ± 0.006)

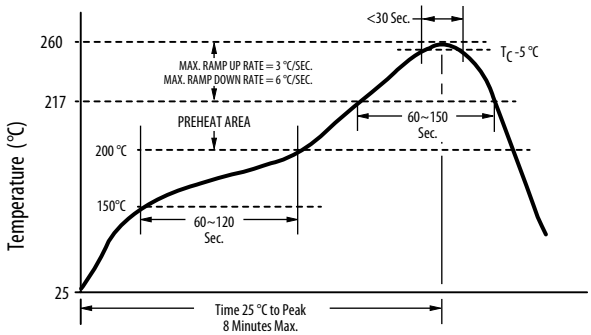
Recommended Solder Pad Layout

Model	Dimension		
	A	B	L
CRN0603	0.90 (0.035)	1.00 (0.039)	3.00 (0.118)
CRN0805	1.30 (0.051)	1.15 (0.045)	3.50 (0.138)
CRN1206	1.80 (0.071)	1.30 (0.051)	4.70 (0.185)
CRN1210	3.00 (0.118)	1.30 (0.051)	4.70 (0.185)
CRN2010	3.00 (0.118)	1.50 (0.059)	6.80 (0.268)
CRN2512	3.70 (0.146)	1.60 (0.063)	7.60 (0.29)



DIMENSIONS: MM / (INCHES)

Solder Reflow Recommendations



REFLOW TIMES: 3 TIMES MAX.

Profile Feature	Pb Free Assembly
Preheat - Temperature Min. (T_{smin}) - Temperature Max. (T_{smax}) - Time(t_s) from T_{smin} to T_{smax}	 150 °C 200 °C 60-120 seconds
Ramp-up Rate (T_L to T_p)	3 °C/second max.
Liquidous temperature (T_L)	217 °C
Time (t_L) maintained above T_L	60-150 seconds
Peak package body temperature (T_p)	260 °C
Time within 5 °C of Actual Peak Temperature (t_p)	<30 seconds
Ramp-Down Rate (T_p to T_L)	6 °C/second max.
Time 25 °C to Peak Temperature	8 minutes max.

* Tolerance for peak profile temperature (T_p) is defined as a supplier minimum and a user maximum.

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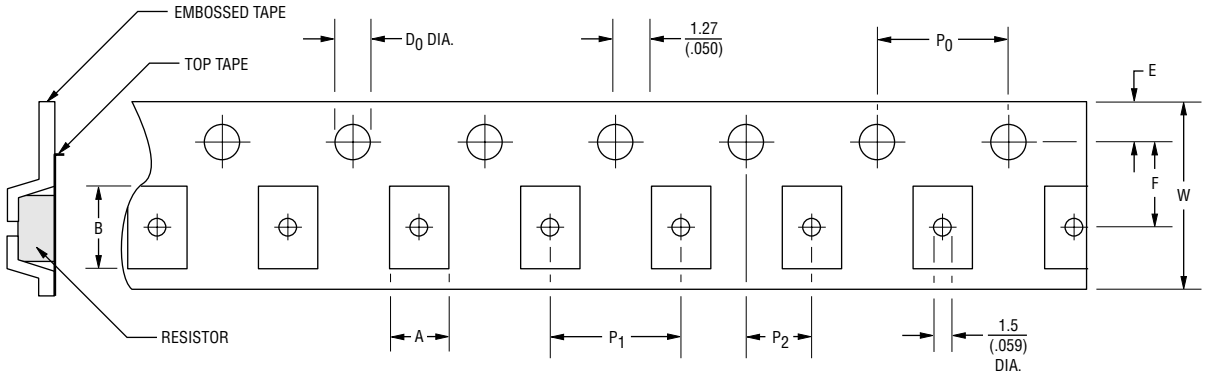
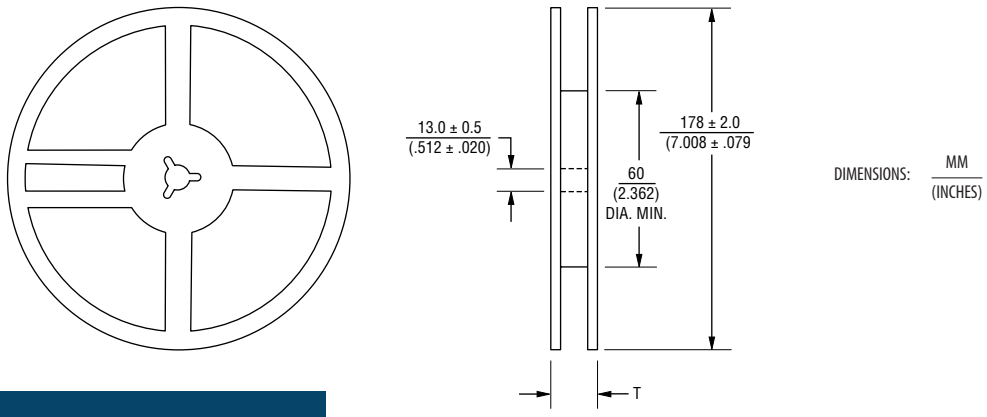
Packaging Specifications

(Conforms to EIA RS-481A)



Model	Dimension										
	A	B	W	F	E	P1	P2	P0	D0	T	G
CRN0603	1.10 ± 0.20 (.043 ± .008)	1.90 ± 0.20 (.075 ± .008)	8.0 ± 0.30 (.315 ± .012)	3.5 ± 0.05 (.138 ± .002)	1.75 ± 0.10 (.069 ± .004)	4.0 ± 0.10 (.157 ± .004)	2.0 ± 0.05 (.079 ± .002)	4.0 ± 0.10 (.157 ± .004)	1.5 +0.1/-0 (.059 +.004/-0)	14.3 (.587) MAX.	10.0 ± 1.5 (.394 ± .059)
CRN0805	1.65 ± 0.20 (.065 ± .008)	2.40 ± 0.20 (.095 ± .008)									
CRN1206	2.00 ± 0.20 (.079 ± .008)	3.60 ± 0.20 (.142 ± .008)									
CRN1210	3.00 ± 0.20 (.118 ± .008)	3.60 ± 0.20 (.142 ± .008)									
CRN2010	2.80 ± 0.20 (.110 ± .008)	5.50 ± 0.20 (.217 ± .008)	12.0 ± 0.30 (.472 ± .012)	5.5 ± 0.10 (.217 ± .004)						16.7 (.657) MAX	13.8 ± 1.5 (.543 ± .059)
CRN2512	3.5 ± 0.20 (.138 ± .008)	6.7 ± 0.20 (.264 ± .008)									



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