

## Features

- Resistance value as low as 0.001 ohm
- High power density
- Inductance less than 5 nH
- Low thermal EMF: <math>\lt; 3 \mu\text{V}/^\circ\text{C}</math> (CRF0805 and CRF1206); <math>\lt; 40 \mu\text{V}/^\circ\text{C}</math> (CRF2512)
- RoHS compliant\*
- AEC-Q200 compliant

## Applications

- Power supplies
- Stepper motor drives
- Input amplifiers

## CRF Series - High Power Current Sense Chip Resistor

### Electrical Characteristics

Rating	CRF0805	CRF1206	CRF2512
Power Rating @ 70 °C	0.5 W	1 W	(0.001 to 0.010 $\Omega$ ) 2 W (0.011 to 0.050 $\Omega$ ) 1 W
Operating Temperature Range	-55 °C to +170 °C		
Derated to Zero Load at	+170 °C		
Maximum Working Voltage	$(P \times R)^{1/2}$		
Resistance	0.001 ~ 0.025 $\Omega$	0.001 ~ 0.050 $\Omega$	0.001 ~ 0.050 $\Omega$
Resistance Tolerance	$\pm 1\%$ , $\pm 5\%$		
Temperature Coefficient	$\pm 50$ PPM/°C		

### Additional Information

Click these links for more information:



### Performance Characteristics

Test	Conditions	Specification		
		CRF0805	CRF1206	CRF2512
Thermal Shock	-55 °C to +150 °C, 300 Cycles, 15 minutes	$\Delta R < \pm 1\%$	$\Delta R < \pm 0.5\%$	
Short Time Overload	5 X Rated Power for 5 seconds	$\Delta R < \pm 0.5\%$	$\Delta R < \pm 0.5\%$	
Low Temperature Storage	-55 °C for 1000 hours	$\Delta R < \pm 0.5\%$	$\Delta R < \pm 0.5\%$	
High Temperature Exposure	1000 hours @ + 170 °C	$\Delta R < \pm 1\%$	$\Delta R < \pm 0.5\%$	
Bias Humidity	+ 85 °C, 85 % RH, 10 % Bias, 1000 hours	N/A	$\Delta R < \pm 1\%$	
Mechanical Shock	100 g for 6 milliseconds, 5 pulses	N/A	$\Delta R < \pm 0.5\%$	
Vibration	Frequency varied 10-2000 KHZ in one minute, 3 directions, 12 hours	N/A	$\Delta R < \pm 0.5\%$	
Load Life	1000 hours at rated power at +70 °C, 1.5 hours on, 0.5 hours off	$\Delta R < \pm 1\%$	$\Delta R < \pm 1\%$	
Resistance to Solder Heat	+260 °C, 10-12 second dwell, 25 mm/second emergence	$\Delta R < \pm 0.5\%$	$\Delta R < \pm 0.5\%$	
Moisture Resistance	MIL-STD-202 Method 106, 0 % power (7a and 7b not required)	$\Delta R < \pm 0.5\%$	$\Delta R < \pm 0.5\%$	

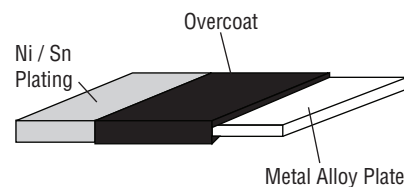


**WARNING Cancer and Reproductive Harm**  
[www.P65Warnings.ca.gov](http://www.P65Warnings.ca.gov)

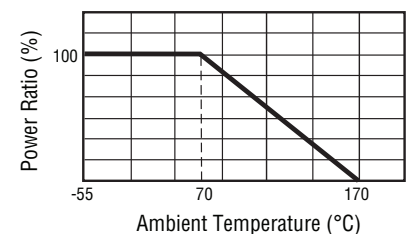
\*RoHS Directive 2015/863, Mar 31, 2015 and Annex. Specifications are subject to change without notice. Users should verify actual device performance in their specific applications.

The products described herein and this document are subject to specific legal disclaimers as set forth on the last page of this document, and at [www.bourns.com/docs/legal/disclaimer.pdf](http://www.bourns.com/docs/legal/disclaimer.pdf).

### Construction



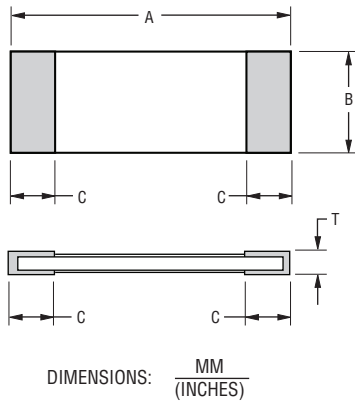
### Derating Curve



# CRF Series - High Power Current Sense Chip Resistor

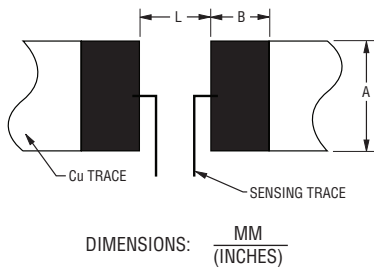
**BOURNS®**

## Product Dimensions



Dim.	CRF0805	CRF1206	CRF2512	
			0.001 ~ 0.003 Ω	0.004 ~ 0.050 Ω
A	$\frac{2.0 \pm 0.10}{(0.079 \pm 0.004)}$	$\frac{3.20 \pm 0.20}{(0.126 \pm 0.008)}$	$\frac{6.40 \pm 0.20}{(0.252 \pm 0.008)}$	$\frac{6.40 \pm 0.20}{(0.252 \pm 0.008)}$
B	$\frac{1.25 \pm 0.10}{(0.049 \pm 0.004)}$	$\frac{1.65 \pm 0.20}{(0.064 \pm 0.008)}$	$\frac{3.20 \pm 0.20}{(0.126 \pm 0.008)}$	$\frac{3.20 \pm 0.20}{(0.126 \pm 0.008)}$
C	$\frac{0.65 \pm 0.20}{(0.026 \pm 0.008)}$ R = 1 & 1.5 $\frac{0.40 \pm 0.20}{(0.016 \pm 0.008)}$ 2 <= R <= 25	$\frac{0.50 \pm 0.30}{(0.0197 \pm 0.012)}$	$\frac{2.00 \pm 0.30}{(0.079 \pm 0.012)}$	$\frac{0.95 \pm 0.30}{(0.037 \pm 0.012)}$
T	$\frac{0.60 \pm 0.20}{(0.024 \pm 0.008)}$	$\frac{0.60 \pm 0.20}{(0.024 \pm 0.008)}$	$\frac{0.60 \pm 0.20}{(0.024 \pm 0.008)}$	$\frac{0.60 \pm 0.20}{(0.024 \pm 0.008)}$

## Recommended Solder Pad Layout



Dim.	CRF0805	CRF1206		CRF2512	
	0.003 ~ 0.020 Ω	0.001 Ω	0.002 ~ 0.030 Ω	0.001 ~ 0.003 Ω	0.004 ~ 0.050 Ω
A	$\frac{1.4}{(0.055)}$	$\frac{1.8}{(0.070)}$	$\frac{1.8}{(0.070)}$	$\frac{4.0}{(0.157)}$	$\frac{4.0}{(0.157)}$
B	$\frac{1.15}{(0.045)}$	$\frac{2.3}{(0.090)}$	$\frac{1.7}{(0.066)}$	$\frac{3.1}{(0.122)}$	$\frac{2.1}{(0.083)}$
L	$\frac{0.7}{(0.028)}$ R = 1 & 1.5 $\frac{1.2}{(0.047)}$ 2 <= R <= 25	$\frac{1.0}{(0.039)}$	$\frac{1.6}{(0.062)}$	$\frac{1.3}{(0.051)}$	$\frac{4.1}{(0.161)}$

## Resistance Value Tables

### CRF0805

Code	R Value	Code	R Value
R001	0.001	R008	0.008
R002	0.002	R009	0.009
R003	0.003	R010	0.010
R004	0.004	R015	0.015
R005	0.005	R020	0.020
R006	0.006	R025	0.025

### CRF1206

Code	R Value	Code	R Value
R001	0.001	R012	0.012
R002	0.002	R014	0.014
R003	0.003	R015	0.015
3L50	0.0035	R016	0.016
R004	0.004	R018	0.018
R005	0.005	R020	0.020
R006	0.006	R022	0.022
R007	0.007	R025	0.025
R008	0.008	R030	0.030
R009	0.009	R040	0.040
R010	0.010	R050	0.050

### CRF2512 (1W)

Code	R Value	Code	R Value
R011	0.011	R030	0.030
R012	0.012	R033	0.033
R015	0.015	R035	0.035
R018	0.018	R040	0.040
R020	0.020	R050	0.050
R025	0.025		

### CRF2512 (2W)

Code	R Value	Code	R Value
R001	0.001	R005	0.005
1L50	0.0015	R006	0.006
R002	0.002	R007	0.007
R003	0.003	R008	0.008
R004	0.004	R010	0.010

Specifications are subject to change without notice.

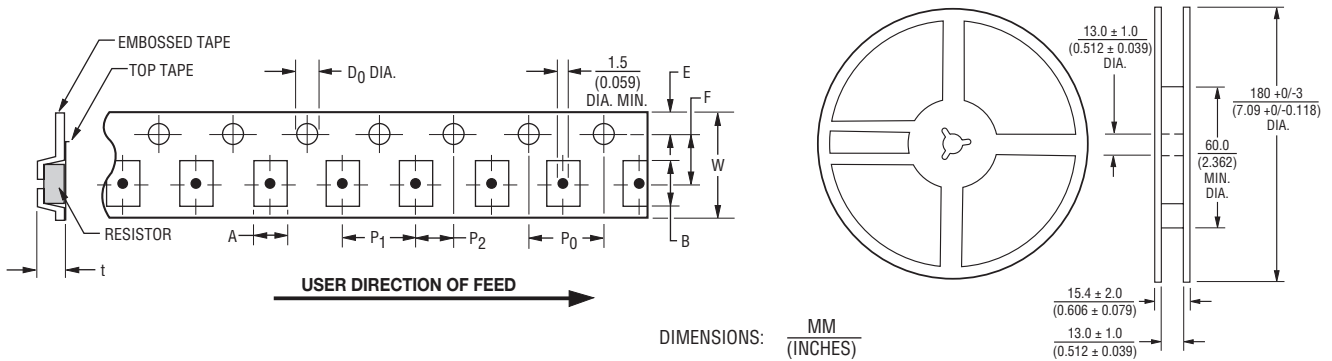
Users should verify actual device performance in their specific applications.

The products described herein and this document are subject to specific legal disclaimers as set forth on the last page of this document, and at [www.bourns.com/docs/legal/disclaimer.pdf](http://www.bourns.com/docs/legal/disclaimer.pdf).

# CRF Series - High Power Current Sense Chip Resistor

**BOURNS®**

## Packaging Dimensions (Conforms to EIA RS-481A)



Packing	Model	A	B	W	F	E	P1	P2	P0	D0	t
Paper Tape	CRF0805	$\frac{1.6 \pm 0.15}{(0.063 \pm 0.006)}$	$\frac{2.4 \pm 0.20}{(0.094 \pm 0.008)}$	$\frac{8.0 \pm 0.20}{(0.315 \pm 0.008)}$	$\frac{3.5 \pm 0.05}{(0.138 \pm 0.002)}$	$\frac{1.75 \pm 0.10}{(0.069 \pm 0.004)}$	$\frac{4.0 \pm 0.10}{(0.157 \pm 0.004)}$	$\frac{2.0 \pm 0.1}{(0.079 \pm 0.004)}$	$\frac{4.0 \pm 0.1}{(0.157 \pm 0.004)}$	$\frac{1.5+0.1/-0}{(0.059+0.004/-0)}$	$\frac{0.84 \pm 0.10}{(0.033 \pm 0.004)}$
Paper Tape	CRF1206	$\frac{2.0 \pm 0.15}{(0.079 \pm 0.006)}$	$\frac{3.6 \pm 0.20}{(0.142 \pm 0.008)}$	$\frac{8.0 \pm 0.20}{(0.315 \pm 0.008)}$	$\frac{3.5 \pm 0.05}{(0.138 \pm 0.002)}$	$\frac{1.75 \pm 0.10}{(0.069 \pm 0.004)}$	$\frac{4.0 \pm 0.10}{(0.157 \pm 0.004)}$	$\frac{2.0 \pm 0.05}{(0.079 \pm 0.002)}$	$\frac{4.0 \pm 0.05}{(0.157 \pm 0.002)}$	$\frac{1.5+0.1/-0}{(0.059+0.004/-0)}$	$\frac{0.85 \pm 0.15}{(0.033 \pm 0.006)}$
Embossed Tape	CRF2512	$\frac{3.60 \pm 0.20}{(0.142 \pm 0.008)}$	$\frac{6.9 \pm 0.20}{(0.272 \pm 0.008)}$	$\frac{12.0 \pm 0.20}{(0.472 \pm 0.008)}$	$\frac{5.5 \pm 0.05}{(0.217 \pm 0.002)}$	$\frac{1.75 \pm 0.10}{(0.069 \pm 0.004)}$	$\frac{4.0 \pm 0.10}{(0.157 \pm 0.004)}$	$\frac{2.0 \pm 0.05}{(0.079 \pm 0.002)}$	$\frac{2.0 \pm 0.05}{(0.079 \pm 0.002)}$	$\frac{1.5+0.1/-0}{(0.059+0.004/-0)}$	$\frac{0.85 \pm 0.15}{(0.033 \pm 0.006)}$

## How to Order

**CRF 0805 - F Z - R020 E LF**

Model \_\_\_\_\_  
(CRF = Precision Chip Resistor)

Size \_\_\_\_\_  
0805 = 0805 Size  
1206 = 1206 Size  
2512 = 2512 Size

Resistance Tolerance \_\_\_\_\_  
• F = ±1 %  
• J = ±5 %

TCR (PPM/°C) \_\_\_\_\_  
• Z = ±50 PPM/°C

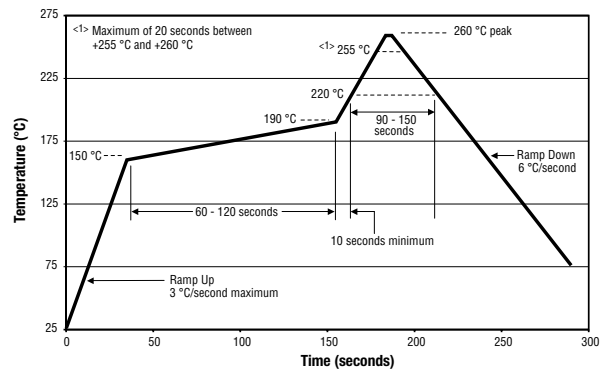
Resistance Value Code \_\_\_\_\_  
(See Resistance Value Tables)

Packaging \_\_\_\_\_  
• E = 5,000 pcs./180 mm (7-inch) reel (CRF0805 & CRF1206)  
or 4,000 pcs./180 mm (7-inch) reel (CRF2512)

Termination \_\_\_\_\_  
• LF = Tin-plated (RoHS compliant)

## Soldering Profile

Can be soldered in accordance with IPC/JEDEC-J-STD-020.



REV. 09/22

Specifications are subject to change without notice.

Users should verify actual device performance in their specific applications.

The products described herein and this document are subject to specific legal disclaimers as set forth on the last page of this document, and at [www.bourns.com/docs/legal/disclaimer.pdf](http://www.bourns.com/docs/legal/disclaimer.pdf).

This legal disclaimer applies to purchasers and users of Bourns® products manufactured by or on behalf of Bourns, Inc. and its affiliates (collectively, "Bourns").

Unless otherwise expressly indicated in writing, Bourns® products and data sheets relating thereto are subject to change without notice. Users should check for and obtain the latest relevant information and verify that such information is current and complete before placing orders for Bourns® products.

The characteristics and parameters of a Bourns® product set forth in its data sheet are based on laboratory conditions, and statements regarding the suitability of products for certain types of applications are based on Bourns' knowledge of typical requirements in generic applications. The characteristics and parameters of a Bourns® product in a user application may vary from the data sheet characteristics and parameters due to (i) the combination of the Bourns® product with other components in the user's application, or (ii) the environment of the user application itself. The characteristics and parameters of a Bourns® product also can and do vary in different applications and actual performance may vary over time. Users should always verify the actual performance of the Bourns® product in their specific devices and applications, and make their own independent judgments regarding the amount of additional test margin to design into their device or application to compensate for differences between laboratory and real world conditions.

Unless Bourns has explicitly designated an individual Bourns® product as meeting the requirements of a particular industry standard (e.g., ISO/TS 16949) or a particular qualification (e.g., UL listed or recognized), Bourns is not responsible for any failure of an individual Bourns® product to meet the requirements of such industry standard or particular qualification. Users of Bourns® products are responsible for ensuring compliance with safety-related requirements and standards applicable to their devices or applications.

Bourns® products are not recommended, authorized or intended for use in nuclear, lifesaving, life-critical or life-sustaining applications, nor in any other applications where failure or malfunction may result in personal injury, death, or severe property or environmental damage. Unless expressly and specifically approved in writing by two authorized Bourns representatives on a case-by-case basis, use of any Bourns® products in such unauthorized applications might not be safe and thus is at the user's sole risk. Life-critical applications include devices identified by the U.S. Food and Drug Administration as Class III devices and generally equivalent classifications outside of the United States.

Bourns expressly identifies those Bourns® standard products that are suitable for use in automotive applications on such products' data sheets in the section entitled "Applications." Unless expressly and specifically approved in writing by two authorized Bourns representatives on a case-by-case basis, use of any other Bourns® standard products in an automotive application might not be safe and thus is not recommended, authorized or intended and is at the user's sole risk. If Bourns expressly identifies a sub-category of automotive application in the data sheet for its standard products (such as infotainment or lighting), such identification means that Bourns has reviewed its standard product and has determined that if such Bourns® standard product is considered for potential use in automotive applications, it should only be used in such sub-category of automotive applications. Any reference to Bourns® standard product in the data sheet as compliant with the AEC-Q standard or "automotive grade" does not by itself mean that Bourns has approved such product for use in an automotive application.

Bourns® standard products are not tested to comply with United States Federal Aviation Administration standards generally or any other generally equivalent governmental organization standard applicable to products designed or manufactured for use in aircraft or space applications. Bourns expressly identifies Bourns® standard products that are suitable for use in aircraft or space applications on such products' data sheets in the section entitled "Applications." Unless expressly and specifically approved in writing by two authorized Bourns representatives on a case-by-case basis, use of any other Bourns® standard product in an aircraft or space application might not be safe and thus is not recommended, authorized or intended and is at the user's sole risk.

The use and level of testing applicable to Bourns® custom products shall be negotiated on a case-by-case basis by Bourns and the user for which such Bourns® custom products are specially designed. Absent a written agreement between Bourns and the user regarding the use and level of such testing, the above provisions applicable to Bourns® standard products shall also apply to such Bourns® custom products.

Users shall not sell, transfer, export or re-export any Bourns® products or technology for use in activities which involve the design, development, production, use or stockpiling of nuclear, chemical or biological weapons or missiles, nor shall they use Bourns® products or technology in any facility which engages in activities relating to such devices. The foregoing restrictions apply to all uses and applications that violate national or international prohibitions, including embargos or international regulations. Further, Bourns® products and Bourns technology and technical data may not under any circumstance be exported or re-exported to countries subject to international sanctions or embargoes. Bourns® products may not, without prior authorization from Bourns and/or the U.S. Government, be resold, transferred, or re-exported to any party not eligible to receive U.S. commodities, software, and technical data.

To the maximum extent permitted by applicable law, Bourns disclaims (i) any and all liability for special, punitive, consequential, incidental or indirect damages or lost revenues or lost profits, and (ii) any and all implied warranties, including implied warranties of fitness for particular purpose, non-infringement and merchantability.

*For your convenience, copies of this Legal Disclaimer Notice with German, Spanish, Japanese, Traditional Chinese and Simplified Chinese bilingual versions are available at:*

*Web Page:* <http://www.bourns.com/legal/disclaimers-terms-and-policies>

*PDF:* <http://www.bourns.com/docs/Legal/disclaimer.pdf>