



## Features

- Resistance value as low as 0.001 ohm
- High power density
- Inductance less than 5 nH
- RoHS compliant\*
- AEC-Q200 qualified, automotive grade

## 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 Ω) 2 W<br>(0.011 to 0.050 Ω) 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                  | 0.005 ~ 0.020 Ω      | 0.001 ~ 0.030 Ω   | 0.001 ~ 0.050 Ω                                  |
| Resistance Tolerance        | 1 %, ±5 %            |   |  |
| Temperature Coefficient     | ±100 PPM/°C          | (0.001 Ω) ±275 PPM/°C<br>(0.002 to 0.010 Ω) ±100 PPM/°C<br>(>0.010 Ω) ± 75 PPM/°C |  |

## Performance Characteristics

| Test                      | Conditions   | Specification                          |  |         |
|---------------------------|--|--|--|---------|
|                           |  | CRF0805                                | CRF1206                                | CRF2512 |
| Thermal Shock             | -55 °C to +150 °C,<br>300 Cycles, 15 minutes                             | $\Delta R \pm(1 \% + 0.0005 \Omega)$   | $\Delta R \pm(0.5 \% + 0.0005 \Omega)$ |         |
| Short Time Overload       | 5 X Rated Power for 5 seconds  | $\Delta R \pm(0.5 \% + 0.0005 \Omega)$ | $\Delta R \pm(0.5 \% + 0.0005 \Omega)$ |         |
| Low Temperature Storage   | -55 °C for 1000 hours  | $\Delta R \pm(0.5 \% + 0.0005 \Omega)$ | $\Delta R \pm(0.5 \% + 0.0005 \Omega)$ |         |
| High Temperature Exposure | 1000 hours @ + 170 °C  | $\Delta R \pm(1 \% + 0.0005 \Omega)$   | $\Delta R \pm(0.5 \% + 0.0005 \Omega)$ |         |
| Bias Humidity             | + 85 °C, 85 % RH,<br>10 % Bias, 1000 hours                               | N/A                                    | $\Delta R \pm(1 \% + 0.0005 \Omega)$   |         |
| Mechanical Shock          | 100 g for 6 milliseconds,<br>5 pulses                                    | N/A                                    | $\Delta R \pm(0.5 \% + 0.0005 \Omega)$ |         |
| Vibration                 | Frequency varied 10-2000 KHz<br>in one minute, 3 directions,<br>12 hours | N/A                                    | $\Delta R \pm(0.5 \% + 0.0005 \Omega)$ |         |
| Load Life                 | 1000 hours at rated power at<br>+70 °C, 1.5 hours on, 0.5 hours<br>off   | $\Delta R \pm(1 \% + 0.0005 \Omega)$   | $\Delta R \pm(1 \% + 0.0005 \Omega)$   |         |
| Resistance to Solder Heat | +260 °C, 10-12 second dwell,<br>25 mm/second emergence                   | $\Delta R \pm(0.5 \% + 0.0005 \Omega)$ | $\Delta R \pm(0.5 \% + 0.0005 \Omega)$ |         |
| Moisture Resistance       | MIL-STD-202 Method 106, 0 %<br>power (7a and 7b not required)            | $\Delta R \pm(1 \% + 0.0005 \Omega)$   | $\Delta R \pm(0.5 \% + 0.0005 \Omega)$ |         |

\*RoHS Directive 2002/95/EC Jan. 27, 2003 including annex and RoHS Recast 2011/65/EU June 8, 2011.

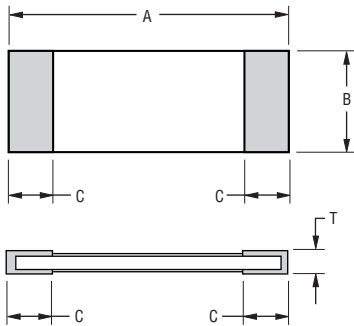
Specifications are subject to change without notice.

The device characteristics and parameters in this data sheet can and do vary in different applications and actual device performance may vary over time. Users should verify actual device performance in their specific applications.

# CRF Series - High Power Current Sense Chip Resistor

**BOURNS®**

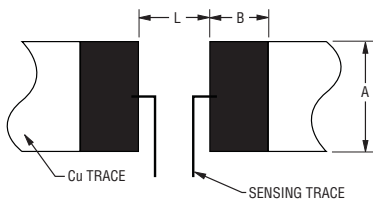
## Product Dimensions



| Dim. | CRF0805                                   | CRF1206                                    | CRF2512                                   |
|------|---|--|---|
| A    | $\frac{2.0 \pm 0.10}{(0.079 \pm 0.004)}$  | $\frac{3.20 \pm 0.20}{(0.126 \pm 0.008)}$  | $\frac{6.40 \pm 0.20}{(0.252 \pm 0.008)}$ |
| B    | $\frac{1.25 \pm 0.10}{(0.049 \pm 0.004)}$ | $\frac{1.65 \pm 0.20}{(0.064 \pm 0.008)}$  | $\frac{3.20 \pm 0.20}{(0.126 \pm 0.008)}$ |
| C    | $\frac{0.40 \pm 0.20}{(0.016 \pm 0.008)}$ | $\frac{0.50 \pm 0.30}{(0.0197 \pm 0.012)}$ | $\frac{0.95 \pm 0.30}{(0.037 \pm 0.012)}$ |
| T    | $\frac{0.60 \pm 0.20}{(0.024 \pm 0.008)}$ | $\frac{0.60 \pm 0.20}{(0.024 \pm 0.008)}$  | $\frac{0.60 \pm 0.20}{(0.024 \pm 0.008)}$ |

DIMENSIONS:  $\frac{\text{MM}}{\text{(INCHES)}}$

## Recommended Solder Pad Layout



| Dim. | CRF0805                | CRF1206               |                       | CRF2512               |                       |
|------|------------------------|-----------------------|-----------------------|-----------------------|-----------------------|
|      | 0.005 ~ 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    | $\frac{1.2}{(0.047)}$  | $\frac{1.0}{(0.039)}$ | $\frac{1.6}{(0.062)}$ | $\frac{1.3}{(0.051)}$ | $\frac{4.1}{(0.161)}$ |

DIMENSIONS:  $\frac{\text{MM}}{\text{(INCHES)}}$

## Construction



## Resistance Value Tables

### CRF0805

| Code | R Value | Code | R Value |
|------|---------|------|---------|
| R005 | 0.005   | R010 | 0.010   |
| R009 | 0.009   | R020 | 0.020   |

### CRF1206

| Code | R Value | Code | R Value |
|------|---------|------|---------|
| R001 | 0.001   | R010 | 0.010   |
| R002 | 0.002   | R012 | 0.012   |
| R004 | 0.004   | R014 | 0.014   |
| R005 | 0.005   | R015 | 0.015   |
| R006 | 0.006   | R020 | 0.020   |
| R007 | 0.007   | R022 | 0.022   |
| R008 | 0.008   | R025 | 0.025   |
| R009 | 0.009   | R030 | 0.030   |

### 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   | R006 | 0.006   |
| R002 | 0.002   | R007 | 0.007   |
| R003 | 0.003   | R008 | 0.008   |
| R004 | 0.004   | R010 | 0.010   |
| R005 | 0.005   |      |         |

## Derating Curve



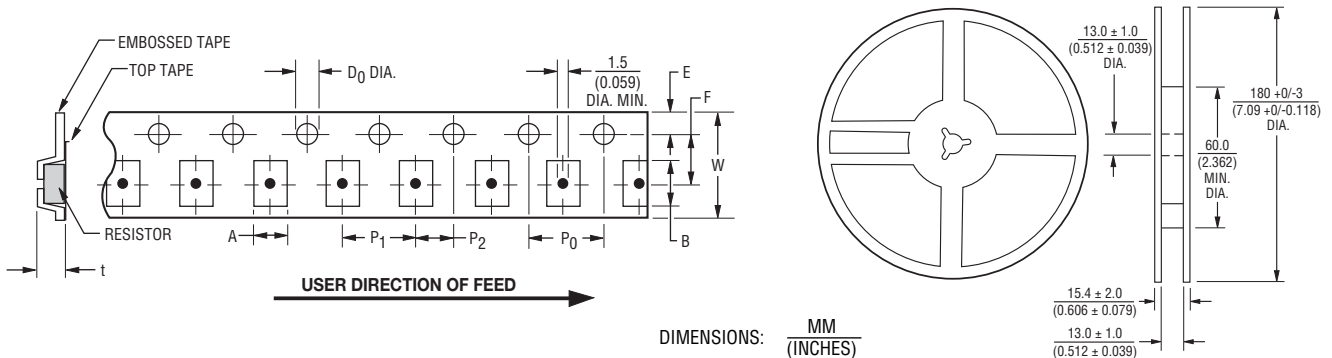
Specifications are subject to change without notice.

The device characteristics and parameters in this data sheet can and do vary in different applications and actual device performance may vary over time. Users should verify actual device performance in their specific applications.

# 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 | 1.6 ± 0.15<br>(0.063 ± 0.006)  | 2.4 ± 0.20<br>(0.094 ± 0.008) | 8.0 ± 0.20<br>(0.315 ± 0.008)  | 3.5 ± 0.05<br>(0.138 ± 0.002) | 1.75 ± 0.10<br>(0.069 ± 0.004) | 4.0 ± 0.10<br>(0.157 ± 0.004) | 2.0 ± 0.1<br>(0.079 ± 0.004)  | 4.0 ± 0.1<br>(0.157 ± 0.004)  | 1.5+0.1/-0<br>(0.059+0.004/-0) | 0.84 ± 0.10<br>(0.033 ± 0.004) |
| Paper Tape    | CRF1206 | 2.0 ± 0.15<br>(0.079 ± 0.006)  | 3.6 ± 0.20<br>(0.142 ± 0.008) | 8.0 ± 0.20<br>(0.315 ± 0.008)  | 3.5 ± 0.05<br>(0.138 ± 0.002) | 1.75 ± 0.10<br>(0.069 ± 0.004) | 4.0 ± 0.10<br>(0.157 ± 0.004) | 2.0 ± 0.05<br>(0.079 ± 0.002) | 4.0 ± 0.05<br>(0.157 ± 0.002) | 1.5+0.1/-0<br>(0.059+0.004/-0) | 0.85 ± 0.15<br>(0.033 ± 0.006) |
| Embossed Tape | CRF2512 | 3.60 ± 0.20<br>(0.142 ± 0.008) | 6.9 ± 0.20<br>(0.272 ± 0.008) | 12.0 ± 0.20<br>(0.472 ± 0.008) | 5.5 ± 0.05<br>(0.217 ± 0.002) | 1.75 ± 0.10<br>(0.069 ± 0.004) | 4.0 ± 0.10<br>(0.157 ± 0.004) | 2.0 ± 0.05<br>(0.079 ± 0.002) | 2.0 ± 0.05<br>(0.079 ± 0.002) | 1.5+0.1/-0<br>(0.059+0.004/-0) | 0.85 ± 0.15<br>(0.033 ± 0.006) |

## How to Order

### CRF 0805 - F X - 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 = ± 75 PPM/°C (>0.010 ohm)  
• X = ±100 PPM/°C (0.002 ohm ~ 0.010 ohm & Model CRF0805 only)  
• V = ±275 PPM/°C (0.001 ohm)

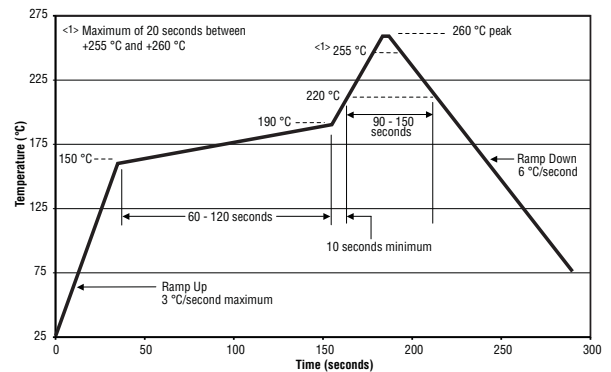
Resistance Value \_\_\_\_\_  
"R" (decimal point) followed by three significant digits  
(example: R020 = 0.020 ohm)

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. 07/15

Specifications are subject to change without notice.

The device characteristics and parameters in this data sheet can and do vary in different applications and actual device performance may vary over time. Users should verify actual device performance in their specific applications.