



## Features

- Resistance value as low as 0.001 ohm
- High power density
- Inductance less than 5 nH
- 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 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                  | 0.003 ~ 0.020 Ω      | 0.001 ~ 0.030 Ω | 0.001 ~ 0.050 Ω                                  |
| Resistance Tolerance        | 1 %, ±5 %            |                 |  |
| Temperature Coefficient     | ±50 PPM/°C           |                 |  |

### Performance Characteristics

| Test                      | Conditions   | Specification           |                         |         |
|---------------------------|--|-------------------------|-------------------------|---------|
|                           |  | CRF0805                 | CRF1206                 | CRF2512 |
| Thermal Shock             | -55 °C to +150 °C,<br>300 Cycles, 15 minutes                             | $\Delta R < \pm 1 \%$   | $\Delta R < \pm 0.5 \%$ |         |
| 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,<br>10 % Bias, 1000 hours                               | N/A                     | $\Delta R < \pm 1 \%$   |         |
| Mechanical Shock          | 100 g for 6 milliseconds,<br>5 pulses                                    | N/A                     | $\Delta R < \pm 0.5 \%$ |         |
| Vibration                 | Frequency varied 10-2000 KHz<br>in one minute, 3 directions,<br>12 hours | N/A                     | $\Delta R < \pm 0.5 \%$ |         |
| Load Life                 | 1000 hours at rated power at<br>+70 °C, 1.5 hours on, 0.5 hours<br>off   | $\Delta R < \pm 1 \%$   | $\Delta R < \pm 1 \%$   |         |
| Resistance to Solder Heat | +260 °C, 10-12 second dwell,<br>25 mm/second emergence                   | $\Delta R < \pm 0.5 \%$ | $\Delta R < \pm 0.5 \%$ |         |
| Moisture Resistance       | MIL-STD-202 Method 106, 0 %<br>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 2002/95/EC Jan. 27, 2003 including annex and RoHS Recast 2011/65/EU June 8, 2011.  
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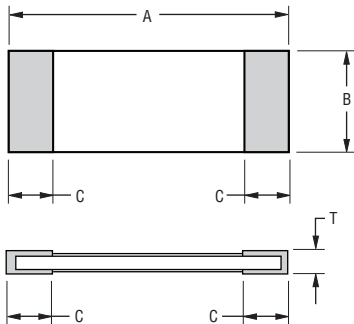
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# CRF Series - High Power Current Sense Chip Resistor

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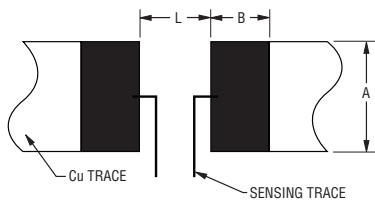
## Product Dimensions



| 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    | $\frac{0.40 \pm 0.20}{(0.016 \pm 0.008)}$ | $\frac{0.50 \pm 0.30}{(0.0197 \pm 0.012)}$ | $\frac{2.00 \pm 0.30}{(0.079 \pm 0.012)}$ | $\frac{0.95 \pm 0.30}{(0.037 \pm 0.012)}$ |
| T    | $\frac{0.60 \pm 0.20}{(0.024 \pm 0.008)}$ | $\frac{0.60 \pm 0.20}{(0.024 \pm 0.008)}$  | $\frac{0.60 \pm 0.20}{(0.024 \pm 0.008)}$ | $\frac{0.60 \pm 0.20}{(0.024 \pm 0.008)}$ |

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

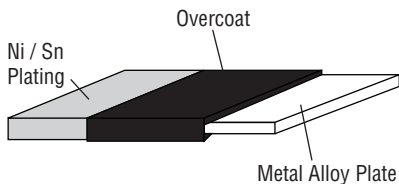
## Recommended Solder Pad Layout



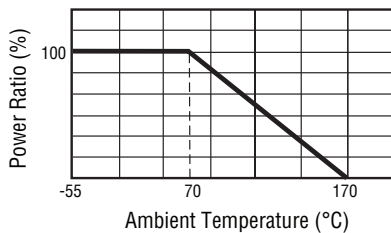
DIMENSIONS:  $\frac{\text{MM}}{(\text{INCHES})}$

| 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    | $\frac{1.2}{(0.047)}$  | $\frac{1.0}{(0.039)}$ | $\frac{1.6}{(0.062)}$ | $\frac{1.3}{(0.051)}$ | $\frac{4.1}{(0.161)}$ |

## Construction



## Derating Curve



## Resistance Value Tables

### CRF0805

| Code | R Value | Code | R Value |
|------|---------|------|---------|
| R003 | 0.003   | R009 | 0.009   |
| R004 | 0.004   | R010 | 0.010   |
| R005 | 0.005   | R020 | 0.020   |
| R009 | 0.009   |      |         |

### CRF1206

| Code | R Value | Code | R Value |
|------|---------|------|---------|
| R001 | 0.001   | R010 | 0.010   |
| R002 | 0.002   | R012 | 0.012   |
| 3L50 | 0.0035  | R014 | 0.014   |
| R004 | 0.004   | R015 | 0.015   |
| 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   |      |         |

### 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   |

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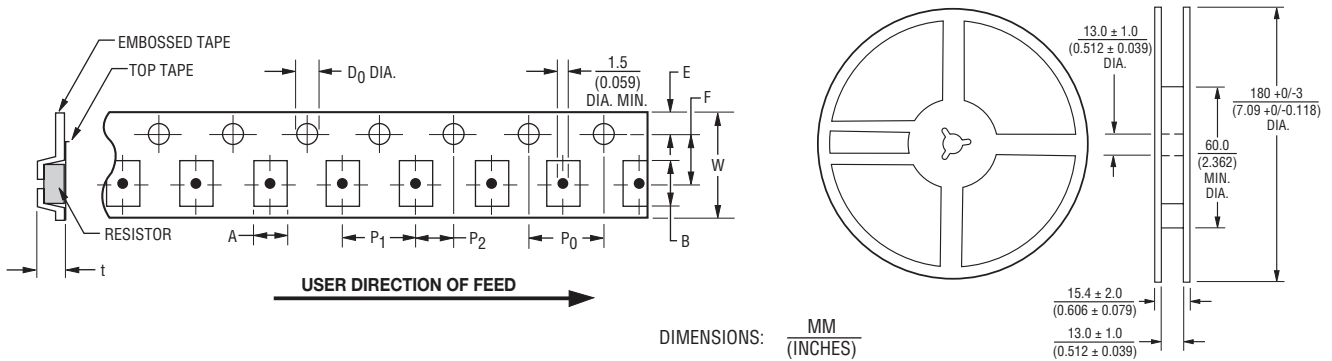
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## Packaging Dimensions (Conforms to EIA RS-481A)



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

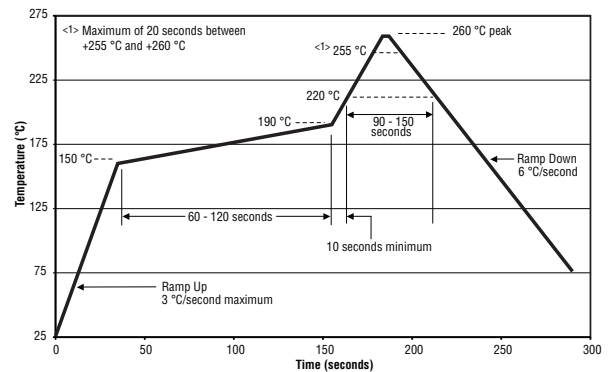
## How to Order

**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. 09/18

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