



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 (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 (0.002 to 0.010 Ω) ±100 PPM/°C (>0.010 Ω) ± 75 PPM/°C | |

Performance Characteristics

| Test | Conditions | Specification | | |
|---------------------------|--|--|--|---------|
| | | CRF0805 | CRF1206 | CRF2512 |
| Thermal Shock | -55 °C to +150 °C, 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, 10 % Bias, 1000 hours | N/A | $\Delta R \pm(1 \% + 0.0005 \Omega)$ | |
| Mechanical Shock | 100 g for 6 milliseconds, 5 pulses | N/A | $\Delta R \pm(0.5 \% + 0.0005 \Omega)$ | |
| Vibration | Frequency varied 10-2000 KHz in one minute, 3 directions, 12 hours | N/A | $\Delta R \pm(0.5 \% + 0.0005 \Omega)$ | |
| Load Life | 1000 hours at rated power at +70 °C, 1.5 hours on, 0.5 hours 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, 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 % 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.

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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



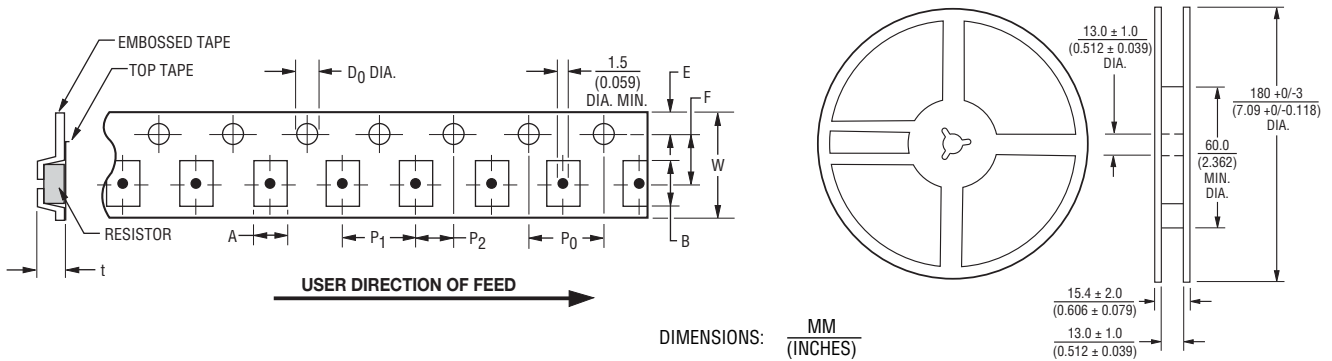
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Packaging Dimensions (Conforms to EIA RS-481A)



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



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