


## Features

- RoHS compliant*
- Power rating at 70 °C: CR0603 - 0.10 W, CR0805 - 0.125 W, CR1206 - 0.25 W
- Tight tolerances of bottom electrode width
- Suitable for all types of soldering processes
- Three layer contacting process with nickel barrier prevents leaching and provides excellent solderability
- Paper tape on reel for automatic placement
- Optional resistor available designed for greater withstand in sulfurous environments

# CR0603/CR0805/CR1206 - Chip Resistors

### Electrical Characteristics

| Characteristic | Model CR0603 | Model CR0805 | Model CR1206 |
|---|---|---|---|
| Power Rating @ 70 °C | 1/10 W | 1/8 W | 1/4 W |
| Operating Temperature Range | -55 °C to +155 °C | | |
| Derated to 0 Load at | +155 °C | | |
| Maximum Working Voltage | 50 V | 150 V | 200 V |
| Maximum Overload Voltage | 100 V | 300 V | 400 V |
| Resistance Range: 1 % E-96 + E-24 | 10 ohms ≤ R ≤ 1M ohms ±100 PPM/°C<br>1M ohms ≤ R ≤ 10M ohms ±200 PPM/°C | | |
| Resistance Range: 5 % E-24 | 10 ohms ≤ R ≤ 10M ohms ±200 PPM/°C<br>1 ohm ≤ R ≤ 10 ohms<br>10M ohms < R ≤ 20 M ohms ±400 PPM/°C | | |
| Zero Ohm Jumper <0.05 ohm Rated / Maximum Current | 1 A / 2.5 A | 1 A / 2.5 A | 2 A / 5 A |

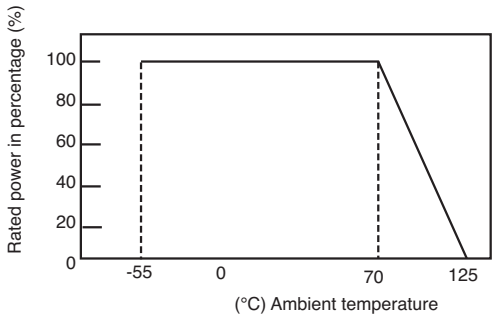
For Standard Values Used in Capacitors, Inductors, and Resistors, click here.

### Chip Dimensions

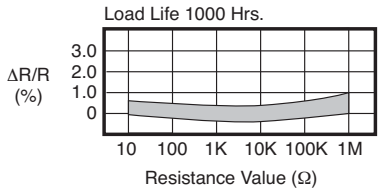
| Dimension | Model CR0603 | Model CR0805 | Model CR1206 |
|---|---|---|---|
| L | 1.60±0.10 (0.063±0.004) | 2.00±0.15 (0.079±0.006) | 3.20±0.25 (0.126±0.010) |
| W | 0.80±0.10 (0.031±0.004) | 1.25±0.15 (0.049±0.006) | 1.60±0.15 (0.063±0.006) |
| H | 0.45±0.10 (0.018±0.004) | 0.50±0.10 (0.020±0.004) | 0.60±0.15 (0.024±0.006) |
| I1 | 0.30±0.20 (0.012±0.008) | 0.40±0.20 (0.016±0.008) | 0.50±0.25 (0.020±0.010) |
| I2 | 0.30±0.20 (0.012±0.008) | 0.40±0.20 (0.016±0.008) | 0.50±0.20 (0.020±0.010) |

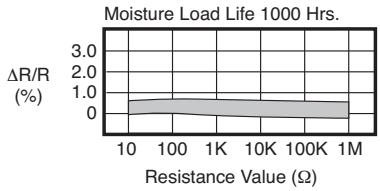
DIMENSIONS: MM / (INCHES)

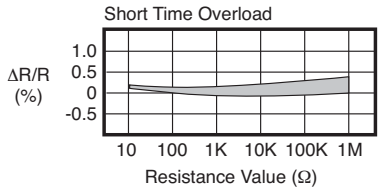
### Derating Curve



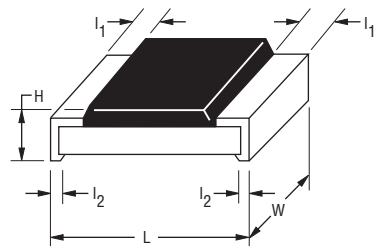

### Characteristic Data

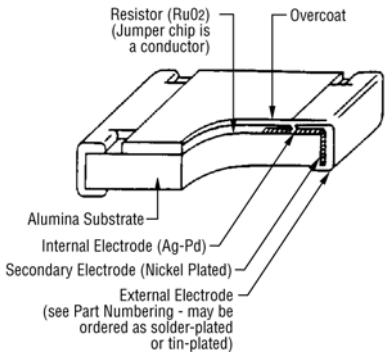



### Characteristic Data




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

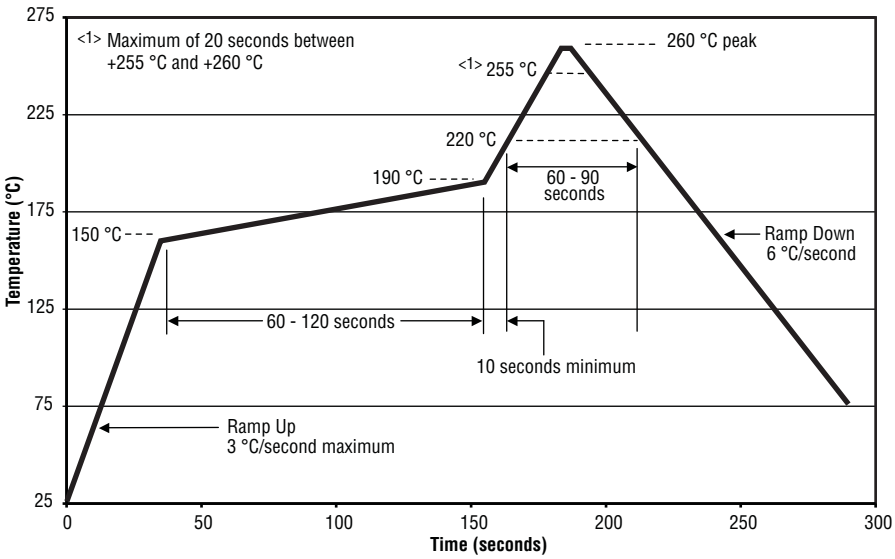
Specifications are subject to change without notice. The device characteristics and parameters in this data sheet can and do vary in different applications and actual device performance may vary over time. Users should verify actual device performance in their specific applications.

**Performance Characteristics (Tests According to MIL-STD-202, MIL-R-55342B, EIA RS-396)**

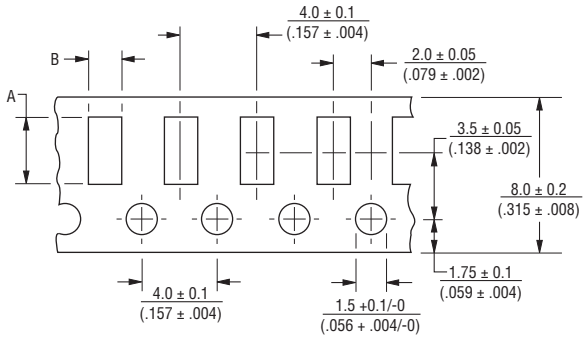
| Test | Procedure | Method | Specification | Deviation from Nominal | |
|---|---|---|---|---|---|
| | | | | 1 % | 5 % |
| DC Resistance | — | MIL-STD-202 303<br>EIA RS-396 4.4 | MIL-R-55342D 4.7.2 | F: ≤±1 % | ≤±5.0 % |
| Thermal Shock | -40 °C, 60 minutes;<br>+125 °C, 60 minutes | MIL-STD-202 107<br>EIA RS-396 4.5 | MIL-R-55342D 4.7.3 | ≤±0.5 % +0.05 W | ≤±1 % +0.05 W |
| Low Temperature Operation | -55 °C, 1 hour off;<br>45 minutes on | MIL-R-55342D 4.7.4<br>EIA RS-396 4.6 | MIL-R-55342D 4.7.4 | ≤±0.5 % 0.05 W | ≤±1.0 % +0.05 W |
| Short Time Overload | Rated Voltage x 2.5;<br>5 seconds<br>CR0603: 100 V max.<br>CR0805; 300 V max.<br>CR1206: 400 V max. | MIL-R-55342D 4.7.5<br>EIA RS-396 4.7 | MIL-R-55342D 4.7.5 | ≤±1 % +0.05 W | ≤±2.0 % +0.05 W |
| High Temperature Exposure | +125 °C; 1000 hours | MIL-R-55342D 4.7.6<br>EIA RS-396 4.8 | MIL-R-55342D 4.7.6 | ≤±1.0 % +0.05 W | ≤+2.0 % +0.1 W |
| Resistance to Soldering Heat | 260 °C, 10 seconds | MIL-R-55342D 4.7.7 | MIL-R-55342D 4.7.7 | ≤±0.5 % +0.05 W | ≤±1.0 % +0.05 W |
| Moisture Resistance | 90-98 %RH; 10 cycles | MIL-STD-202 106D<br>EIA RS-396 4.9 | MIL-R-55342D 4.7.8 | ≤±0.5 % +0.05 W | ≤±2.0 % +0.05 W |
| Load Life 1000 Hours | +70 °C; 1.5 hours on,<br>0.5 hours off;<br>1000 hours | MIL-STD-202 108<br>Condition D<br>EIA RS-396 4.12 | MIL-R-55342D 4.7.10 | ≤±1.0 % +0.05 W | ≤±3.0 % +0.1 W |
| Solderability | +235 °C; 3 seconds | MIL-STD-202 208<br>EIA RS-396 4.11 | MIL-R-55342D 4.7.11 | ≥95 % of area covered | ≥95 % of area covered |
| Terminal Strength | Pull Test | MIL-R-55342D 4.7.12 | MIL-R-55342D 4.7.12 | ≥500 g | ≥500 g |
| Current Noise | Quan-Tech Model 315B | MIL-STD-202 308 | MIL-R-55342D 6.6 | R≤1k W; max. 1 mV/V<br>R≤10k W; max. 3 mV/V<br>R≤100k W; max. 6 mV/V<br>R≤1M W; max. 10 mV/V | R≤1k W; max. 1 mV/V<br>R≤10k W; max. 3 mV/V<br>R≤100k W; max. 6 mV/V<br>R≤2M W; max. 10 mV/V |
| Humidity, Steady State | +40 °C; 90-95 % RH,<br>1344 Hours | MIL-STD-202 103B<br>Condition D | — | ≤±2.5 % +0.05 W | ≤±2.5 % +0.05 W |
| Salt Spray | 96 hours | MIL-STD-202 101D<br>Condition A | — | ≤±1.0 % +0.2 W | ≤±1.0 % +0.1 W |
| Vibration | 10-2000 Hz, 6 hours | MIL-STD-202 201A | — | ≤±0.5 % +0.1 W | ≤±1.0 % +0.1 W |
| Voltage Coefficient | — | MIL-STD-202 309 | — | ≤100 ppm/V | ≤100 ppm/V |
| Insulation Resistance | Test Potential 500V<br>CR0603: 100V | MIL-STD-202 302<br>Condition B | — | ≥103M W | ≥103M W |
| Dielectric Withstanding Voltage | — | MIL-STD-202 301 | — | ≥500 V (CR1206, CR0805)<br>≥300 V (CR0603) | |
| Drop Test | 1 m | MIL-STD-202 203B | — | ≤±0.5 % +0.1 W | ≤±1.0 % +0.1 W |
| Bending Test | 5 mm/90 mm; 10 sec. | — | — | ≤±1 % +0.05 W | ≤±1.0 % +0.05 W |
| Sulphur Test* | 50 °C H2S 3PPM 95 % | — | — | ≤±1 % +0.05 W | ≤±1.0 % +0.05 W |

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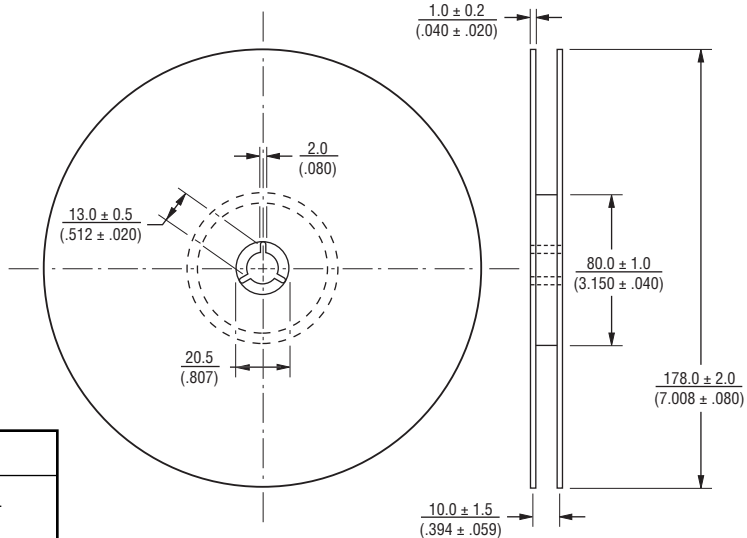
## Soldering Profile for RoHS Compliant Chip Resistors and Arrays




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




Maximum 1 mm (.040) thick
*Cumulative tolerance over 10 holes: ±0.2 mm




| Series | A | B |
|---|---|---|
| CR0603 | 1.9 ± 0.2 (.075 ± .008) | 1.1 ± 0.2 (.043 ± .008) |
| CR0805 | 2.4 ± 0.2 (.094 ± .008) | 1.65 ± 0.2 (.065 ± .008) |
| CR1206 | 3.57 ± 0.2 (.161 ± .008) | 2.00 ± 0.2 (.079 ± .008) |

DIMENSIONS: MM (INCHES)

Marking on reel: Part number, quantity, resistance value and tolerance, date code.

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## Resistor Markings

CR0603
CR0805
CR1206




E-24 marking
Value = 10K ohms

CR0805
CR1206




E-96 marking
Value = 44.2K ohms

CR0603
EIA-96 Marking




1 % marking
Value = 12.4K ohms

## Marking Explanation

- E-24: 3 digits, first two digits are significant, third digit is number of zeros.

  Letter R is decimal point.
- E-96: 4 digits, first three digits are significant, fourth digit is number of zeros.

  Letter R is decimal point.

  0603 E-96: EIA-96 marking (see table below).

## EIA-96 Marking for CR0603, 1 %

| Code | R Value | Code | R Value | Code | R Value | Code | R Value | Code | R Value | Code | R Value | Code | R Value | Code | R Value |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 01 | 100 | 13 | 133 | 25 | 178 | 37 | 237 | 49 | 316 | 61 | 422 | 73 | 562 | 85 | 750 |
| 02 | 102 | 14 | 137 | 26 | 182 | 38 | 243 | 50 | 324 | 62 | 432 | 74 | 576 | 86 | 768 |
| 03 | 105 | 15 | 140 | 27 | 187 | 39 | 249 | 51 | 332 | 63 | 442 | 75 | 590 | 87 | 787 |
| 04 | 107 | 16 | 143 | 28 | 191 | 40 | 255 | 52 | 340 | 64 | 453 | 76 | 604 | 88 | 806 |
| 05 | 110 | 17 | 147 | 29 | 196 | 41 | 261 | 53 | 348 | 65 | 464 | 77 | 619 | 89 | 825 |
| 06 | 113 | 18 | 150 | 30 | 200 | 42 | 267 | 54 | 357 | 66 | 475 | 78 | 634 | 90 | 845 |
| 07 | 115 | 19 | 154 | 31 | 205 | 43 | 274 | 55 | 365 | 67 | 487 | 79 | 649 | 91 | 866 |
| 08 | 118 | 20 | 158 | 32 | 210 | 44 | 280 | 56 | 374 | 68 | 499 | 80 | 665 | 92 | 887 |
| 09 | 121 | 21 | 162 | 33 | 215 | 45 | 287 | 57 | 383 | 69 | 511 | 81 | 681 | 93 | 909 |
| 10 | 124 | 22 | 165 | 34 | 221 | 46 | 294 | 58 | 392 | 70 | 523 | 82 | 698 | 94 | 931 |
| 11 | 127 | 23 | 169 | 35 | 226 | 47 | 301 | 59 | 402 | 71 | 536 | 83 | 715 | 95 | 953 |
| 12 | 130 | 24 | 174 | 36 | 232 | 48 | 309 | 60 | 412 | 72 | 549 | 84 | 732 | 96 | 976 |

This table shows the first two digits for the three-digit EIA-96 part marking scheme. The third character is a letter multiplier:
$Y=10^{-2}$ $X=10^{-1}$ $A=10^{0}$ $B=10^{1}$ $C=10^{2}$ $D=10^{3}$ $E=10^{4}$ $F=10^{5}$

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## How To Order

**CR 1206 - F X - 8252 E LF**

Model
(CR = Chip Resistor)

Size
- 0603
- 0805
- 1206

Resistance Tolerance
F = ±1 % .. Use with "X" TCR code only for values from 10 ohms through 1 megohm;
use with "W" TCR code only for values from 1 megohm through 10 megohms.
J = ±5 % ... Use with "W" TCR code for values from 10 ohms through 10 megohms;
use with "/" TCR code for zero ohm (jumper) for values from 1 ohm through 9.1 ohms.

TCR (ppm/°C)
X = ±100
W = ±200
/ = ±400

Resistance Value

For 1 % Tolerance:
<100 ohms.....“R” represents decimal point *(example: 24R3 = 24.3 ohms)*.
≥100 ohms.....First three digits are significant, fourth digit represents number of zeros to follow (*example: 8252 = 82.5k ohms)*.

For 5 % Tolerance:
<10 ohms.....“R” represents decimal point *(example: 4R7 = 4.7 ohms)*.
≥10 ohms.....First two digits are significant, third digit represents number of zeros to follow *(example: 474 = 470k ohms; 000 = Jumper)*.

Packaging
E = Paper Tape (5,000 pcs.) on 7 ” Plastic Reel

Termination
LF = Tin-plated (RoHS Compliant)
AS = Tin-plated (RoHS Compliant), sulfur-resistant version



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