



## 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
- AEC-Q200 approval upon request
- Three layer contacting process with nickel barrier prevents leaching and provides excellent solderability
- Paper tape on reel for automatic placement

## 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 %<br>E-96 + E-24                 | $10 \text{ ohms} \leq R \leq 1 \text{ M ohms}$<br>$\pm 100 \text{ PPM}/^{\circ}\text{C}$<br>$1 \text{ M ohms} < R \leq 10 \text{ M ohms}$<br>$\pm 200 \text{ PPM}/^{\circ}\text{C}$                                               |              |              |
| Resistance Range: 5 %<br>E-24                        | $10 \text{ ohms} \leq R \leq 10 \text{ M ohms}$<br>$\pm 200 \text{ PPM}/^{\circ}\text{C}$<br>$1 \text{ ohm} \leq R < 10 \text{ ohms}$<br>$10 \text{ M ohms} < R \leq 20 \text{ M ohms}$<br>$\pm 400 \text{ PPM}/^{\circ}\text{C}$ |              |              |
| Zero Ohm Jumper <0.05 ohm<br>Rated / Maximum Current | 1 A / 2.5 A                                                                                                                                                                                                                       | 2 A / 5 A    | 2 A / 5 A    |

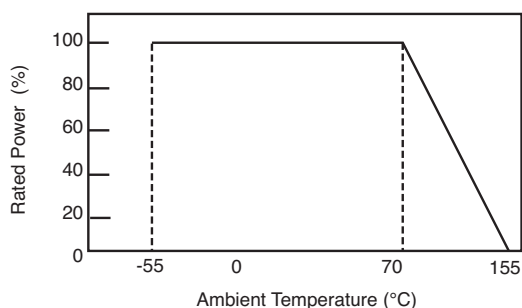
For Standard Values Used in Capacitors, Inductors, and Resistors, [click here](#).

### Chip Dimensions

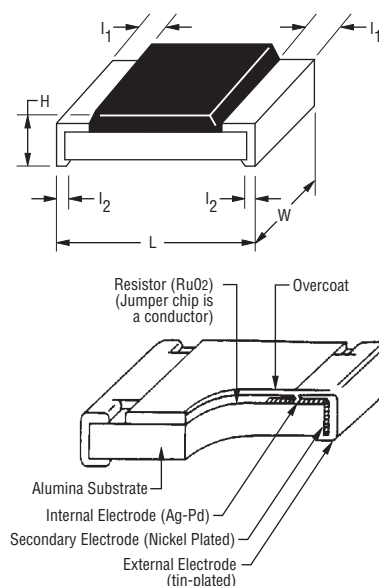
| Dimension | Model CR0603                              | Model CR0805                              | Model CR1206                              |
|-----------|-------------------------------------------|-------------------------------------------|-------------------------------------------|
| L     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

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

### Derating Curve



### 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.

# CR0603/CR0805/CR1206 - Chip Resistors

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## Performance Characteristics

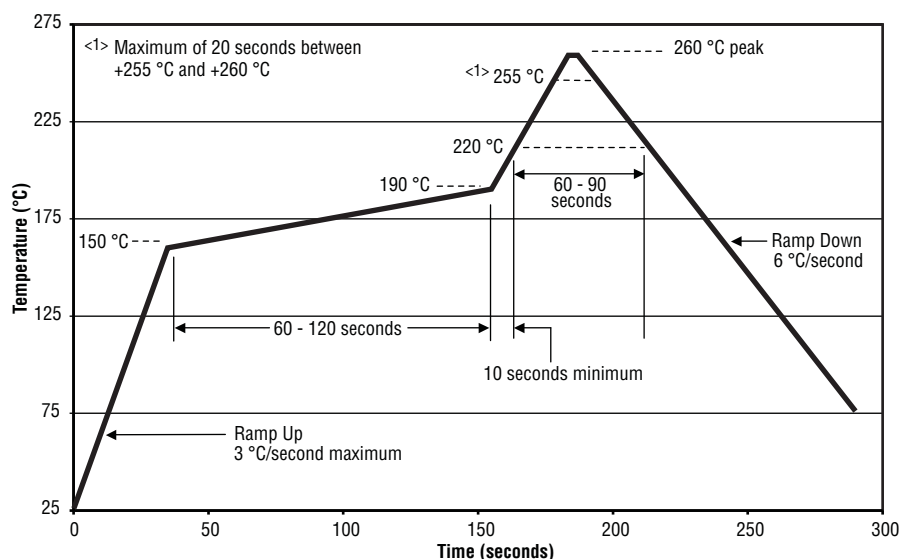
| Test                            | Procedure                                                                                            | Method                                            | Specification       | Test Limits $\Delta R$                                                                                                   |                                  |
|---------------------------------|------------------------------------------------------------------------------------------------------|---------------------------------------------------|---------------------|--------------------------------------------------------------------------------------------------------------------------|----------------------------------|
|                                 |                                                                                                      |                                                   |                     | 1 %                                                                                                                      | 5 %                              |
| DC Resistance                   | --                                                                                                   | MIL-STD-202 303<br>EIA RS-396 4.4                 | MIL-R-55342D 4.7.2  | $\leq \pm 1 \%$                                                                                                          | $\leq \pm 5.0 \%$                |
| 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  | $\leq \pm(0.5 \% + 0.05 \Omega)$                                                                                         | $\leq \pm(1.0 \% + 0.05 \Omega)$ |
| 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  | $\leq \pm(1 \% + 0.05 \Omega)$                                                                                           | $\leq \pm(2 \% + 0.05 \Omega)$   |
| 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  | $\leq \pm(1.0 \% + 0.05 \Omega)$                                                                                         | $\leq \pm(2.0 \% + 0.1 \Omega)$  |
| Resistance to Solder Heat       | 260 °C, 10 seconds                                                                                   | MIL-R-55342D 4.7.7                                | MIL-R-55342D 4.7.7  | $\leq \pm(0.5 \% + 0.05 \Omega)$                                                                                         | $\leq \pm(1.0 \% + 0.05 \Omega)$ |
| Moisture Resistance             | 90-98 % RH, 10 cycles                                                                                | MIL-STD-202 106D<br>EIA RS-396 4.9                | MIL-R-55342D 4.7.8  | $\leq \pm(0.5 \% + 0.05 \Omega)$                                                                                         | $\leq \pm(2.0 \% + 0.05 \Omega)$ |
| Load Life                       | +70 °C; 1.5 hours "ON",<br>0.5 hours "OFF"; 1000 hours                                               | MIL-STD-202 108<br>Condition D<br>EIA RS-396 4.12 | MIL-R-55342D 4.7.10 | $\leq \pm(1.0 \% + 0.05 \Omega)$                                                                                         | $\leq \pm(3.0 \% + 0.1 \Omega)$  |
| Solderability                   | +235 °C; 3 seconds                                                                                   | MIL-STD-202 208<br>EIA RS-396 4.11                | MIL-R-55342D 4.7.11 | $\geq 95 \%$ of area covered                                                                                             |                                  |
| Terminal Strength               | Pull Test                                                                                            | MIL-R-55342D 4.7.12                               | MIL-R-55342D 4.7.12 | $\geq 500$ g                                                                                                             |                                  |
| Current Noise                   | Quan-Tech Model 315B                                                                                 | MIL-STD-202 308                                   | MIL-R-55342D 6.6    | R $\leq 1$ kW; 1 mV/V max.<br>R $\leq 10$ kW; 3 mV/V max.<br>R $\leq 100$ kW; 6 mV/V max.<br>R $\leq 1$ MW; 10 mV/V max. |                                  |
| Humidity, Steady State          | +40 °C; 90-95 % RH,<br>1344 hours                                                                    | MIL-STD-202 103B<br>Condition D                   | --                  | $\leq \pm(2.5 \% + 0.05 \Omega)$                                                                                         | $\leq \pm(2.5 \% + 0.05 \Omega)$ |
| Salt Spray                      | 96 hours                                                                                             | MIL-STD-202 101D<br>Condition A                   | --                  | $\leq \pm(1.0 \% + 0.2 \Omega)$                                                                                          | $\leq \pm(1.0 \% + 0.1 \Omega)$  |
| Vibration                       | 10-2000 Hz, 6 hours                                                                                  | MIL-STD-202 201A                                  | --                  | $\leq \pm(0.5 \% + 0.1 \Omega)$                                                                                          | $\leq \pm(1.0 \% + 0.1 \Omega)$  |
| Voltage Coefficient             | --                                                                                                   | MIL-STD-202 309                                   | --                  | $\leq 100$ ppm/V                                                                                                         |                                  |
| Insulation Resistance           | Test potential: 500V<br>CR0603: 100 V                                                                | MIL-STD-202 302<br>Condition B                    | --                  | $\geq 1$ G $\Omega$                                                                                                      |                                  |
| Dielectric Withstanding Voltage | --                                                                                                   | MIL-STD-202 301                                   | --                  | CR0805, CR1206: $\geq 500$ V<br>CR0603: $\geq 300$ V                                                                     |                                  |
| Drop Test                       | 1 m                                                                                                  | MIL-STD-202 203B                                  | --                  | $\leq \pm(0.5 \% + 0.1 \Omega)$                                                                                          | $\leq \pm(1 \% + 0.1 \Omega)$    |
| Bending Test                    | 5 mm/90 mm, 10 seconds                                                                               | --                                                | --                  | $\leq \pm(1 \% + 0.05 \Omega)$                                                                                           | $\leq \pm(1 \% + 0.05 \Omega)$   |
| Thermal Shock                   | -55 °C for 30 minutes,<br>+155 °C for 30 minutes,<br>5 cycles                                        | IEC 60115-1-4.19                                  | --                  | $\leq \pm(0.5 \% + 0.05 \Omega)$                                                                                         | $\leq \pm(1 \% + 0.05 \Omega)$   |
| Resistance to Dry Heat          | 125 $\pm 5$ °C for 96 $\pm 4$ hours                                                                  | IEC 60115-1-4.23.2                                | --                  | $\leq \pm(1 \% + 0.05 \Omega)$                                                                                           | $\leq \pm(2 \% + 0.1 \Omega)$    |

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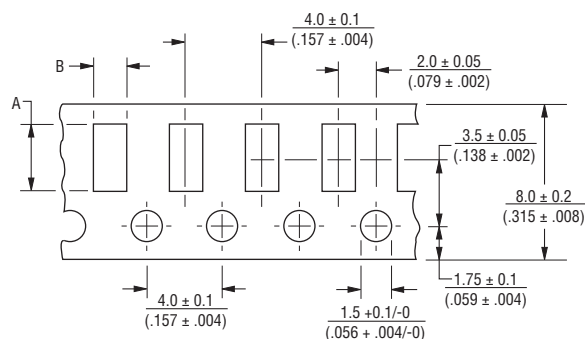
# CR0603/CR0805/CR1206 - Chip Resistors

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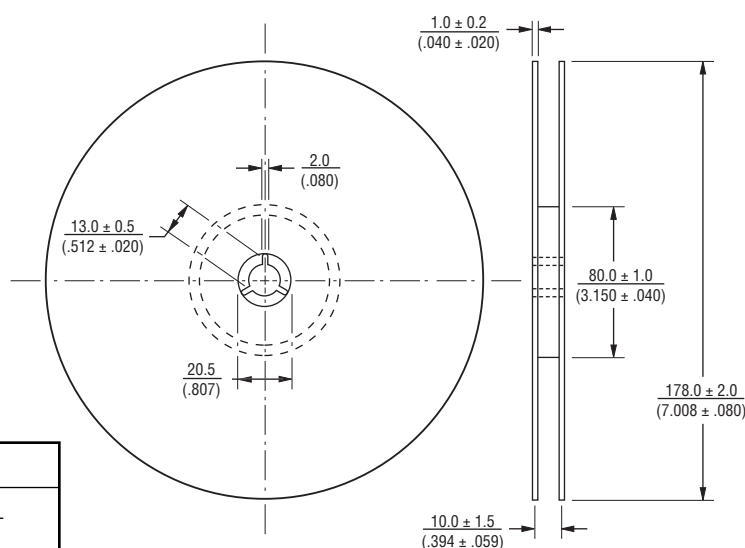
## Soldering Profile for RoHS Compliant Chip Resistors and Arrays



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



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



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

| Series | A                                      | B                                      |
|--------|----------------------------------------|----------------------------------------|
| CR0603 | $\frac{1.9 \pm 0.2}{(.075 \pm .008)}$  | $\frac{1.1 \pm 0.2}{(.043 \pm .008)}$  |
| CR0805 | $\frac{2.4 \pm 0.2}{(.094 \pm .008)}$  | $\frac{1.65 \pm 0.2}{(.065 \pm .008)}$ |
| CR1206 | $\frac{3.57 \pm 0.2}{(.161 \pm .008)}$ | $\frac{2.00 \pm 0.2}{(.079 \pm .008)}$ |

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

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# CR0603/CR0805/CR1206 - Chip Resistors

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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<sup>-2</sup> X=10<sup>-1</sup> A=10<sup>0</sup> B=10<sup>1</sup> C=10<sup>2</sup> D=10<sup>3</sup> E=10<sup>4</sup> F=10<sup>5</sup>

# CR0603/CR0805/CR1206 - Chip Resistors

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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 =  $\pm 1\%$  ..... 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 =  $\pm 5\%$  ..... Use with "W" TCR code for values from 10 ohms through 10 megohms;  
Use with "Z" TCR code for values above 10 megohms through 20 megohms;  
Use with "/" TCR code for zero ohm (jumper) and values from 1 ohm through 9.1 ohms.

TCR (ppm/ $^{\circ}$ C) \_\_\_\_\_  
X =  $\pm 100$   
W =  $\pm 200$   
Z =  $\pm 400$   
/ = Used with "J" Resistance Tolerance code for zero ohm (jumper) and values from 1 ohm through 9.1 ohms.

Resistance Value \_\_\_\_\_

### For 1 % Tolerance:

<100 ohms..... "R" represents decimal point (example: 24R3 = 24.3 ohms).

$\geq 100$  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).

$\geq 10$  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)