



Features

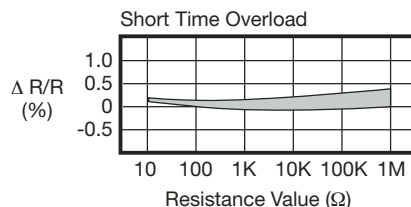
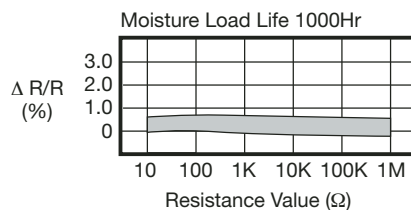
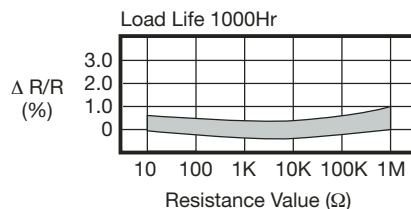
- Lead free version available (see How to Order "Termination" options)
- RoHS compliant*
- Power rating at 70 °C: CR0603 - 0.10 W, CR0805 - 0.125 W, CR1206 - 0.25 W
- Tight tolerances of bottom electrode width
- Three layer contacting process with nickel barrier prevents leaching and provides excellent solderability
- Suitable for all types of soldering processes
- 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 +125 °C | | |
| Derated to 0 Load at | +125 °C | | |
| Maximum Working Voltage | 50 V | 100 V | 200 V |
| Maximum Overload Voltage | 100 V | 200 V | 400 V |
| Resistance Range: 1 %, E-96 + E-24 | 10 ohms - 1 megohm | | |
| Resistance Range: 5 %, E-24 Zero Ohm Jumper <0.01 ohms | 1 ohms - 10 megohms | | |
| Temperature Coefficient | Special value on request 1 %: ±100 ppm/°C 5 %: ±200 ppm/°C 1 ohm - 10 ohms: -200 ppm/°C to +500 ppm/°C | | |

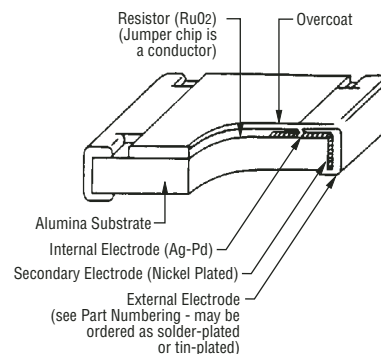
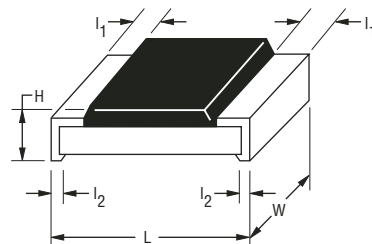
Characteristic Data



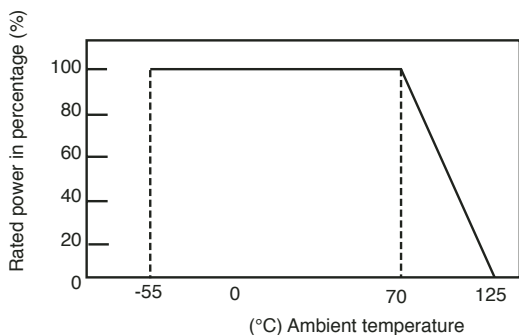
Chip Dimensions

| 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 | $\frac{0.45 \pm 0.10}{(0.018 \pm 0.004)}$ | $\frac{0.50 \pm 0.10}{(0.020 \pm 0.004)}$ | $\frac{0.60 \pm 0.15}{(0.024 \pm 0.006)}$ |
| l ₁ | $\frac{0.30 \pm 0.20}{(0.012 \pm 0.008)}$ | $\frac{0.40 \pm 0.20}{(0.016 \pm 0.008)}$ | $\frac{0.50 \pm 0.25}{(0.020 \pm 0.010)}$ |
| l ₂ | $\frac{0.30 \pm 0.20}{(0.012 \pm 0.008)}$ | $\frac{0.40 \pm 0.20}{(0.016 \pm 0.008)}$ | $\frac{0.50 \pm 0.20}{(0.020 \pm 0.010)}$ |

Dimensional Drawing



Derating Curve



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

*RoHS Directive 2002/95/EC Jan 27 2003 including Annex Specifications are subject to change without notice. Customers should verify actual device performance in their specific applications.

CR0603/CR0805/CR1206 - Chip Resistors

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

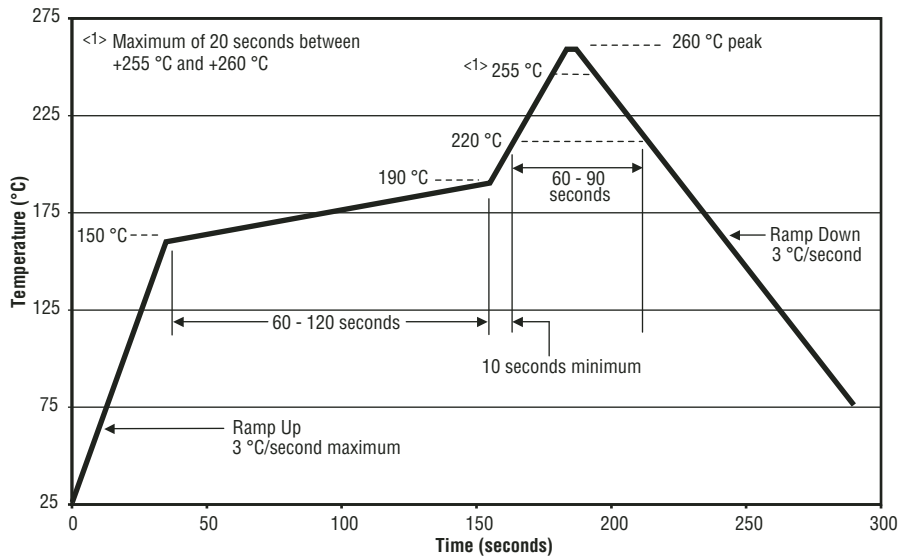
| Test | Procedure | Method | Specification | Deviation from Nominal | |
|---------------------------------|---|---|---------------------|--|--|
| | | | | 1 % | 5 % |
| DC Resistance | — | MIL-STD-202 303 EIA RS-396 4.4 | MIL-R-55342D 4.7.2 | F: $\leq \pm 1\%$ | $\leq \pm 5.0\%$ |
| Thermal Shock | -40 °C, 60 minutes; +125 °C, 60 minutes | MIL-STD-202 107 EIA RS-396 4.5 | MIL-R-55342D 4.7.3 | $\leq \pm 0.5\% + 0.05\ \Omega$ | $\leq \pm 1\% + 0.05\ \Omega$ |
| Low Temperature Operation | -55 °C, 1 hour off; 45 minutes on | MIL-R-55342D 4.7.4 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; 5 seconds CR0603: 100 V max. CR0805: 300 V max. CR1206: 400 V max. | MIL-R-55342D 4.7.5 EIA RS-396 4.7 | MIL-R-55342D 4.7.5 | $\leq \pm 1\% + 0.05\ \Omega$ | $\leq \pm 2.0\% + 0.05\ \Omega$ |
| High Temperature Exposure | +125 °C; 1000 hours | MIL-R-55342D 4.7.6 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 Soldering 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 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 1000 Hours | +70 °C; 1.5 hours on, 0.5 hours off; 1000 hours | MIL-STD-202 108 Condition D 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 EIA RS-396 4.11 | MIL-R-55342D 4.7.11 | $\geq 95\%$ of area covered | $\geq 95\%$ of area covered |
| Terminal Strength | Pull Test | MIL-R-55342D 4.7.12 | MIL-R-55342D 4.7.12 | $\geq 500\text{ g}$ | $\geq 500\text{ g}$ |
| Current Noise | Quan-Tech Model 315B | MIL-STD-202 308 | MIL-R-55342D 6.6 | $R \leq 1\text{k}\ \Omega$; max. $1\ \mu\text{V/V}$ $R \leq 10\text{k}\ \Omega$; max. $3\ \mu\text{V/V}$ $R \leq 100\text{k}\ \Omega$; max. $6\ \mu\text{V/V}$ $R \leq 1\text{M}\ \Omega$; max. $10\ \mu\text{V/V}$ | $R \leq 1\text{k}\ \Omega$; max. $1\ \mu\text{V/V}$ $R \leq 10\text{k}\ \Omega$; max. $3\ \mu\text{V/V}$ $R \leq 100\text{k}\ \Omega$; max. $6\ \mu\text{V/V}$ $R \leq 2\text{M}\ \Omega$; max. $10\ \mu\text{V/V}$ |
| Humidity, Steady State | +40 °C; 90-95 % RH, 1344 Hours | MIL-STD-202 103B Condition D | — | $\leq \pm 2.5\% + 0.05\ \Omega$ | $\leq \pm 2.5\% + 0.05\ \Omega$ |
| Salt Spray | 96 hours | MIL-STD-202 101D 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 | — | $\leq 100\text{ ppm/V}$ | $\leq 100\text{ ppm/V}$ |
| Insulation Resistance | Test Potential 500V CR0603: 100V | MIL-STD-202 302 Condition B | — | $\geq 10^9\text{ M}\ \Omega$ | $\geq 10^9\text{ M}\ \Omega$ |
| Dielectric Withstanding Voltage | — | MIL-STD-202 301 | — | $\geq 500\text{ V}$ (CR1206, CR0805) $\geq 300\text{ V}$ (CR0603) | |
| Drop Test | 1 m | MIL-STD-202 203B | — | $\leq \pm 0.5\% + 0.1\ \Omega$ | $\leq \pm 1.0\% + 0.1\ \Omega$ |
| Bending Test | 5 mm/90 mm; 10 sec. | — | — | $\leq \pm 1\% + 0.05\ \Omega$ | $\leq \pm 1.0\% + 0.05\ \Omega$ |

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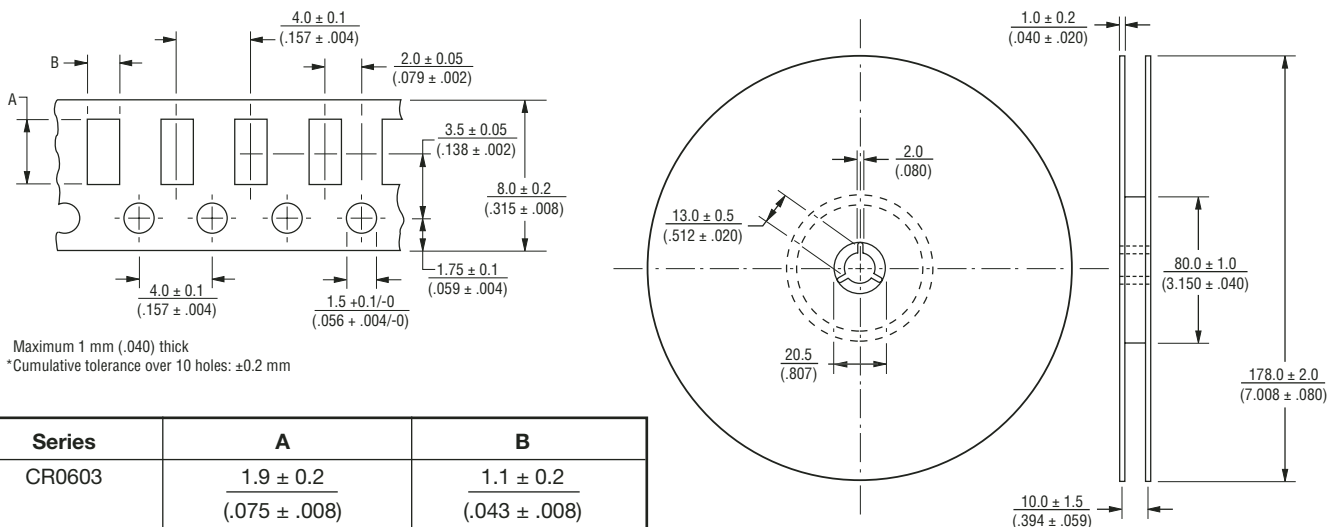
CR0603/CR0805/CR1206 - Chip Resistors



Soldering Profile for Lead Free Chip Resistors and Arrays



Packaging Dimensions (Conforms to EIA RS-481A)



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

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=10⁻² X=10⁻¹ A=10⁰ B=10¹ C=10² D=10³ E=10⁴ F=10⁵

Chip Resistor and Chip Array Lab Kits Available

| Part Number | Style | TR tol. | R-range | Values | E-Series |
|-----------------------|----------------------|---------|----------------------|------------|-------------------------------------|
| Chip Resistors | Chip Size | | | | |
| CR1206-JW-LAB1 | 1206 | 5 % | 1 ohm to 10 megohms | 146 | E-24 10 ohms to 1 megohm, Rest E-12 |
| CR0805-JW-LAB2 | 0805 | 5 % | 24 ohms to 1 megohm | 121 | E-24 |
| CR1206-FX-LAB3 | 1206 | 1 % | 10 ohms to 1 megohm | 122 | E-24 |
| CR1206-FX-LAB4 | 1206 | 1 % | 10 ohms to 1 megohm | 242 | E-48 |
| CR0805-FX-LAB5 | 0805 | 1 % | 75 ohms to 1 megohm | 101 | E-24 |
| CR0603-JW-LAB6 | 0603 | 5 % | 3.3 ohms to 1 megohm | 128 | E-24 10 ohms to 1 megohm, Rest E-12 |
| CR0603-FX-LAB7 | 0603 | 1 % | 10 ohms to 1 megohm | 122 | E-24 |
| Chip Arrays | Resistor Size | | | | |
| CAT16-J4-LAB1 | 0603 | 5 % | 10 ohms to 1 megohm | 62 concave | E-12 4 resistors in a 1206 size |
| CAY16-J4-LAB2 | 0603 | 5 % | 10 ohms to 1 megohm | 62 convex | E-12 4 resistors in a 1206 size |

- All Lab Kits have 50 pieces per value
- Jumper is included

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CR0603/CR0805/CR1206 - Chip Resistors

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How To Order

| | | | | | | | | | |
|---|----|------|---|---|---|---|------|---|-------|
| Model _____ (CR = Chip Resistor) | CR | 1206 | - | F | X | - | 8252 | E | _____ |
| Size _____ • 0603 • 0805 • 1206 | | | | | | | | | |
| Resistance Tolerance _____ F = ±1 %Used with "X" TCR code only for values from 10 ohms through 1 megohm. J = ±5 %Used with "W" TCR code for values from 10 ohms through 10 megohms. Used with "/" TCR code for zero ohm (jumper) and for values from 1 ohm through 9.1 ohms. | | | | | | | | | |
| TCR (ppm/°C) _____ X = ±100Used with "F" Resistance Tolerance code only for values from 10 ohms through 1 megohm. W = ±200Used with "J" Resistance Tolerance code for values from 10 ohms through 10 megohms. / = -250 to +500 ..Used with "J" Resistance Tolerance code only for zero ohm (jumper), and for values from 1 ohm through 9.1 ohms. | | | | | | | | | |
| Resistance Value _____ For 1 % Tolerance: <100 ohms "R" represents decimal point (example: 24R3 = 24.3 ohms) ≥100 ohmsFirst 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 ohmsFirst 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 (lead free) __ = Solder-plated | | | | | | | | | |