

Features

- Thick film technology
- High power surge withstanding
- RoHS compliant*
- Halogen free**
- AEC-Q200 compliant

Applications

- Power supplies
- Digital meters
- Consumer electronics
- LED lighting
- Industry control boards

CHP-Q Series Ultra-High Power Chip Resistor

Electrical Characteristics

| Characteristic | Model | | |
|---|-------------------|-------------|-------------|
| | CHP0603Q | CHP0805Q | CHP1206Q |
| Power Rating @ 70 °C | 0.33 W | 0.5 W | 0.75 W |
| Operating Temperature Range | -55 °C to +155 °C | | |
| Derated to Zero Load at | +155 °C | | |
| Maximum Working Voltage | 75 V | 200 V | 250 V |
| Maximum Overload Voltage | 125 V | 300 V | 500 V |
| Resistance Tolerance | ±1 %, ±5 % | | |
| Temperature Coefficient 1 ohm to 9.76 ohms (±1 %, E24 & E96 Series) | ±200 ppm/°C | ±200 ppm/°C | ±200 ppm/°C |
| 10 ohms to 1 megohm (±1 %, E24 & E96 Series) | ±100 ppm/°C | ±100 ppm/°C | ±100 ppm/°C |
| 1 ohm to 1 megohm (±5 %, E24 Series) | ±200 ppm/°C | ±200 ppm/°C | ±200 ppm/°C |

Note: Solder pad and trace size should be evaluated and board surface temperature should not exceed +105 °C when applying full rated power.

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

Additional Information

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WARNING Cancer and Reproductive Harm - www.P65Warnings.ca.gov

* RoHS Directive 2015/863, Mar 31, 2015 and Annex.

**Bourns considers a product to be "halogen free" if (a) the Bromine (Br) content is 900 ppm or less; (b) the Chlorine (Cl) content is 900 ppm or less; and (c) the total Bromine (Br) and Chlorine (Cl) content is 1500 ppm or less.

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Users should verify actual device performance in their specific applications.

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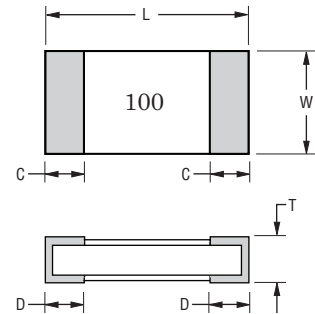
CHP-Q Series Ultra-High Power Chip Resistor

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Product Dimensions

| Model | L | W | C | D | T |
|----------|---|---|---|---|---|
| CHP0603Q | $\frac{1.60 \pm 0.10}{(0.062 \pm 0.004)}$ | $\frac{0.80 \pm 0.10}{(0.031 \pm 0.004)}$ | $\frac{0.30 \pm 0.20}{(0.012 \pm 0.008)}$ | $\frac{0.30 \pm 0.20}{(0.012 \pm 0.008)}$ | $\frac{0.45 \pm 0.10}{(0.018 \pm 0.004)}$ |
| CHP0805Q | $\frac{2.00 \pm 0.10}{(0.079 \pm 0.004)}$ | $\frac{1.25 \pm 0.10}{(0.049 \pm 0.004)}$ | $\frac{0.40 \pm 0.20}{(0.016 \pm 0.008)}$ | $\frac{0.40 \pm 0.20}{(0.016 \pm 0.008)}$ | $\frac{0.50 \pm 0.10}{(0.020 \pm 0.004)}$ |
| CHP1206Q | $\frac{3.10 \pm 0.10}{(0.122 \pm 0.004)}$ | $\frac{1.60 \pm 0.10}{(0.062 \pm 0.004)}$ | $\frac{0.50 \pm 0.25}{(0.020 \pm 0.010)}$ | $\frac{0.50 \pm 0.25}{(0.020 \pm 0.010)}$ | $\frac{0.55 \pm 0.10}{(0.022 \pm 0.004)}$ |

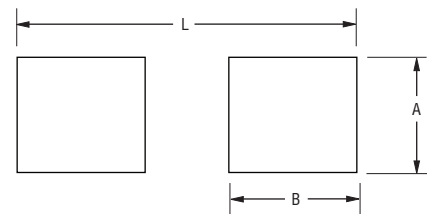
DIMENSIONS: $\frac{\text{MM}}{(\text{INCHES})}$



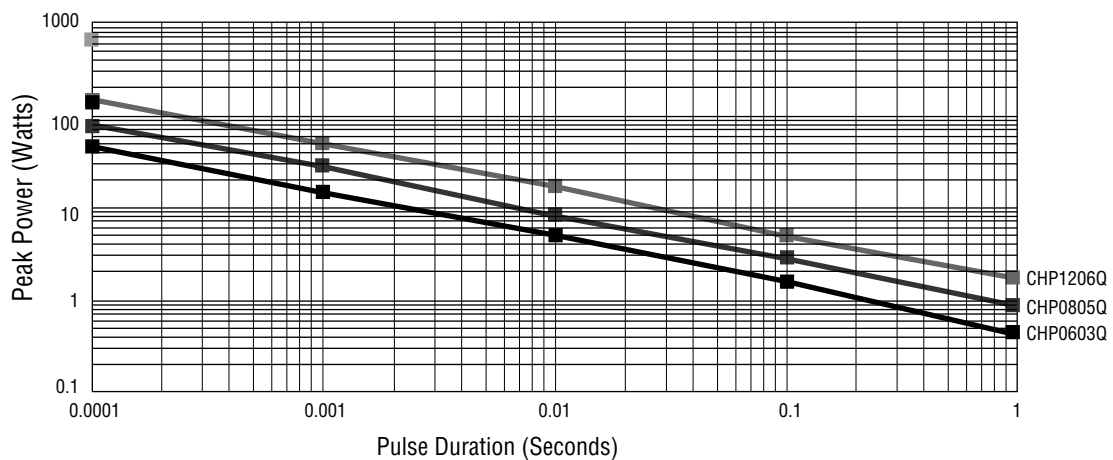
Recommended Solder Pad Layout

| Model | A | B | L |
|----------|-----------------------|-----------------------|-----------------------|
| CHP0603Q | $\frac{0.90}{(.035)}$ | $\frac{1.00}{(.039)}$ | $\frac{3.00}{(.118)}$ |
| CHP0805Q | $\frac{1.30}{(.051)}$ | $\frac{1.15}{(.045)}$ | $\frac{3.50}{(.138)}$ |
| CHP1206Q | $\frac{1.80}{(.071)}$ | $\frac{1.30}{(.051)}$ | $\frac{4.70}{(.185)}$ |

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



Surge Performance



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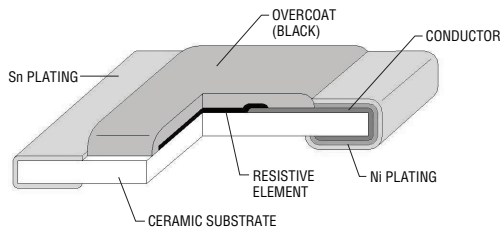
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CHP-Q Series Ultra-High Power Chip Resistor

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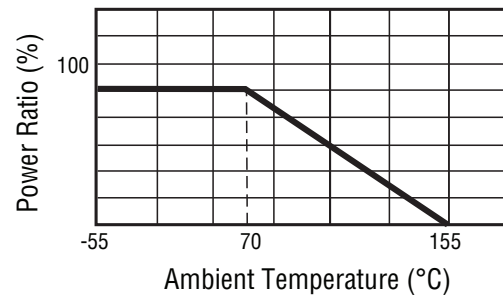
Construction



Environmental Characteristics

Moisture Sensitivity Level..... 1

Derating Curve



Rated Voltage

The rated voltage is calculated by the following formula:

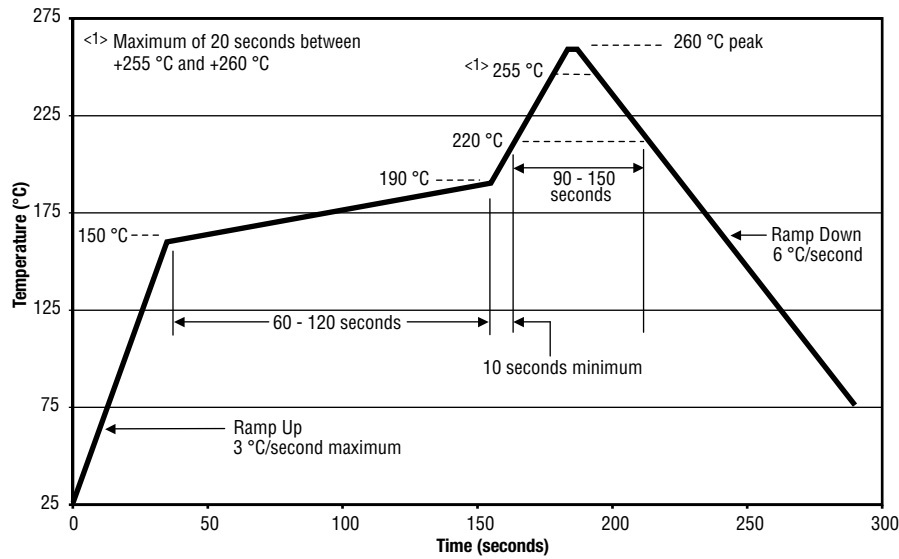
$$V = \sqrt{P \times R}$$

V: Rated Voltage (V)

P: Rated Power (W)

R: Resistance Value (Ω)

Soldering Profile



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CHP-Q Series Ultra-High Power Chip Resistor

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How to Order

CHP 0603 Q F X - 1002 E LF

Model _____
CHP = High Power Surge Resistor

Size _____
0603 = 0603 Size
0805 = 0805 Size
1206 = 1206 Size

Feature _____
Q = AEC-Q200 Compliant

Resistance Tolerance _____
F = $\pm 1\%$
J = $\pm 5\%$

TCR (See Electrical Characteristics chart) _____
W = ± 200 PPM/ $^{\circ}$ C
X = ± 100 PPM/ $^{\circ}$ C

Resistance Value _____
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)
5 % Tolerance:
 ≥ 10 ohms.....First two digits are significant, third digit represents number of zeros to follow
(example: 474 = 470K ohms)

Packaging _____
E = 5,000 pieces on 180 mm (7 inch) plastic reel, paper tape

Termination _____
LF = Tin-plated (RoHS Compliant)

CHP-Q Series Ultra-High Power Chip Resistor

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Performance Characteristics

| Test Item | Method | Procedure | Test Limits ΔR |
|-------------------------------------|---------------------|--|---|
| Electrical Characteristics | AEC-Q200 Table 7.1 | Measure the resistance value | DC Resistance: F: $\pm 1\%$; J: $\pm 5\%$ TCR: Within specifications |
| High Temperature Exposure (Storage) | AEC-Q200 Table 7.3 | 1000 hours @ T = 125 °C unpowered; Measurement at 24 ± 2 hours after test conclusion | J: $\Delta R \leq \pm(3\% + 0.1 \Omega)$ F: $\Delta R \leq \pm(1\% + 0.05 \Omega)$ |
| Temperature Cycling | AEC-Q200 Table 7.4 | 1000 cycles (-55 °C to +125 °C); Measurement at 24 ± 2 hours after test conclusion | J: $\Delta R \leq \pm(1\% + 0.1 \Omega)$ F: $\Delta R \leq \pm(0.5\% + 0.05 \Omega)$ No mechanical damage |
| Moisture Resistance | AEC-Q200 Table 7.6 | Test 65 °C / 80-100 % RH / 10 cycles; Measurement at 24 ± 2 hours after test conclusion (t = 24 hours/cycle) | J: $\Delta R \leq \pm(1\% + 0.1 \Omega)$ F: $\Delta R \leq \pm(0.5\% + 0.05 \Omega)$ |
| Biased Humidity | AEC-Q200 Table 7.7 | 1000 hours 85 °C / 85 % RH, 10 % of operating power; Measurement at 24 ± 2 hours after test conclusion | J: $\Delta R \leq \pm(3\% + 0.1 \Omega)$ F: $\Delta R \leq \pm(1\% + 0.05 \Omega)$ |
| Operational Life | AEC-Q200 Table 7.8 | Test 1000 hours @ T _A = 125 °C at specified rated power; Measurement at 24 ± 2 hours after test conclusion | J: $\Delta R \leq \pm(3\% + 0.1 \Omega)$ F: $\Delta R \leq \pm(1\% + 0.05 \Omega)$ |
| Mechanical Shock | AEC-Q200 Table 7.13 | Test peak value: 100 g's, wave: hail-sine; Duration: 6 ms, Velocity: 12.3 ft/sec. | Within product specification tolerance and no visible damage |
| Vibration | AEC-Q200 Table 7.14 | 5 g's for 20 min., 12 cycles each of 3 orientations; Test from 10-2000 Hz | J: $\Delta R \leq \pm(1\% + 0.1 \Omega)$ F: $\Delta R \leq \pm(0.5\% + 0.05 \Omega)$ No mechanical damage |
| Resistance to Solder Heat | AEC-Q200 Table 7.15 | Solder dipping @ 270 °C ± 5 °C for 10 sec. ± 1 sec. | J: $\Delta R \leq \pm(1\% + 0.1 \Omega)$ F: $\Delta R \leq \pm(0.5\% + 0.05 \Omega)$ No mechanical damage |
| Thermal Shock | AEC-Q200 Table 7.16 | -55 to 155 °C / dwell time 15 min / max transfer time 20 sec / 300 cycles | J: $\Delta R \leq \pm(1\% + 0.1 \Omega)$ F: $\Delta R \leq \pm(0.5\% + 0.05 \Omega)$ No mechanical damage |
| ESD | AEC-Q200-002 | Test contact min. 1 kV | $\Delta R \leq \pm(1\% + 0.1 \Omega)$ |
| Solderability | AEC-Q200 Table 7.18 | a) Baking 155 °C 4H, dipping 235 °C 5 sec b) Steam 8H, dipping 215 °C 5 sec c) Steam 8H, dipping 260 °C 7 sec | Over 95 % of termination must be covered with solder |
| Flammability | AEC-Q200 Table 7.20 | UL-94 V-0 or V-1 are acceptable | Refer to UL-94 |
| Board Flex | AEC-Q200 Table 7.21 | Bending 2 mm (1206Q), 3 mm (0805Q, 0603Q) | J: $\Delta R \leq \pm(1\% + 0.1 \Omega)$ F: $\Delta R \leq \pm(0.5\% + 0.05 \Omega)$ No mechanical damage |
| Terminal Strength | AEC-Q200 Table 7.22 | Force 1.8 Kg for 60 sec | No mechanical damage |

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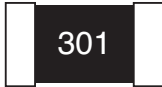
CHP-Q Series Ultra-High Power Chip Resistor

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Typical Part Marking

±5 % (E24):

CHP0603Q, CHP0805Q, CHP1206Q



Resistance value is expressed by 3 digits. The first two digits represent the significant figures of the nominal resistance value in ohms; the third digit represents the exponent for a base of 10.

Example: **301** = $30 \times 10^1 = 300 \text{ ohms}$

±1 % (E24/E96):

CHP0805Q, CHP1206Q



Resistance value is expressed by 4 digits. The first three digits represent the significant figures of the nominal resistance value in ohms; the third digit represents the exponent for a base of 10.

Example: **1542** = $154 \times 10^2 = 15.4K \text{ ohms}$

±1 % (E24):

CHP0603Q



Resistance value is expressed by 3 digits. The first two digits represent the significant figures of the nominal resistance value in ohms; the third digit represents the exponent for a base of 10.

Example: **222** = $22 \times 10^2 = 2.2K \text{ ohms}$

±1 % (E96):

CHP0603Q



Resistance value is expressed by 2 digits followed by an alpha character multiplier. (Refer to marking table below.)

Example: **01B** = $100 \times 10^1 = 1K \text{ ohms}$

| 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 E96 part marking scheme. The third character is a letter multiplier: A=10⁰ B=10¹ C=10² D=10³ E=10⁴ F=10⁵ G=10⁶ H=10⁷ X=10⁻¹ Y=10⁻² Z=10⁻³

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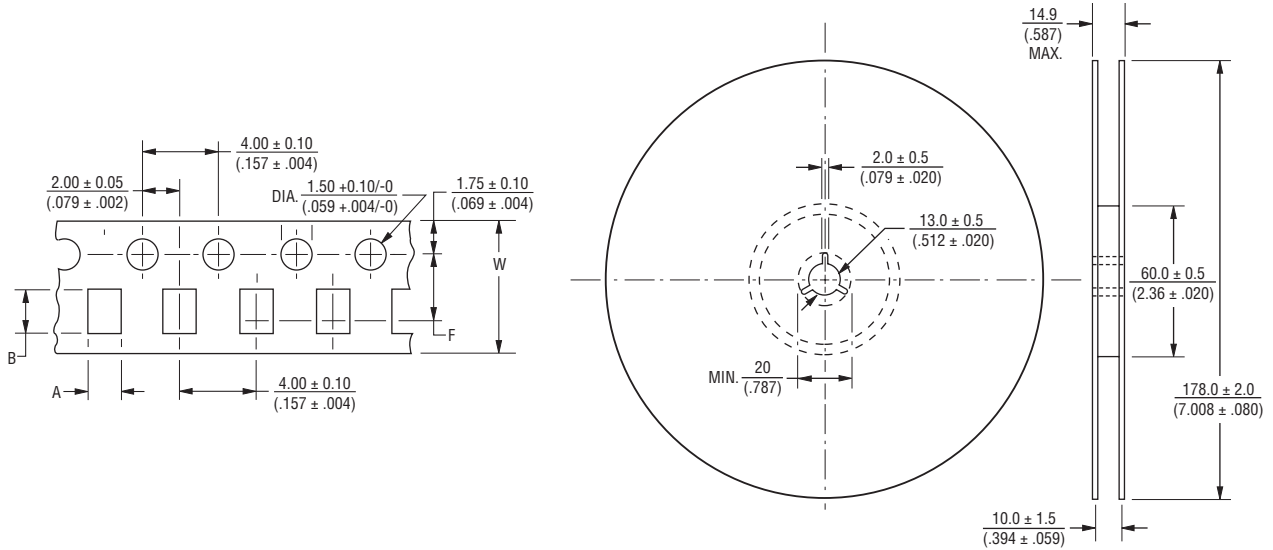
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CHP-Q Series Ultra-High Power Chip Resistor

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Packaging Dimensions (Conforms to EIA RS-481A)



| Model | Tape Type | Pieces per Reel | A | B | W | F |
|----------|-----------|-----------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|
| CHP0603Q | Paper | 5,000 | 1.10 ± 0.20 (.043 ± .008) | 1.90 ± 0.20 (.075 ± .008) | 8.00 ± 0.30 (.315 ± .012) | 3.50 ± 0.05 (.138 ± .002) |
| CHP0805Q | | | 1.65 ± 0.20 (.065 ± .008) | 2.40 ± 0.20 (.094 ± .008) | | |
| CHP1206Q | | | 2.00 ± 0.20 (.079 ± .008) | 3.60 ± 0.20 (.142 ± .008) | | |

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

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