



Features

- Thick film technology
- Power rating up to 3 watts @ 70 °C
- High power surge withstanding
- RoHS compliant*
- Halogen free**



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

CHP Series Ultra-High Power Chip Resistors

Electrical Characteristics

| Characteristic | Model | | | |
|---------------------------------------------------------------------------|-------------------|----------------|-------------|------------------|
| | CHP0603 | CHP0805 | CHP1206 | CHP2512 |
| Power Rating @ 70 °C | 0.33 W | 0.5 W | 0.75 W | 3 W |
| Operating Temperature Range | -55 °C to +155 °C | | | |
| Derated to Zero Load at | +155 °C | | | |
| Maximum Working Voltage 1 ohm to 1 megohm 0.1 ohm to 0.91 ohm | 75 V - | 200 V - | 250 V - | 250 V 1652 mV |
| Maximum Overload Voltage 1 ohm to 1 megohm 0.1 ohm to 0.91 ohm | 125 V - | 300 V - | 500 V - | 500 V 3695 mV |
| Resistance Tolerance | ±1 %, ±5 % | | | |
| Temperature Coefficient 1 ohm to 9.76 ohms (±1 %, E24 & E96 Series) | ±200 ppm/°C | ±150 ppm/°C*** | ±100 ppm/°C | ±100 ppm/°C |
| 10 ohms to 1 megohm (±1 %, E24 & E96 Series) | ±100 ppm/°C | ±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 | ±200 ppm/°C |
| 0.1 ohm to 0.91 ohm (±1 %, E24 Series) | - | - | - | ±100 ppm/°C |
| 0.1 ohm to 0.91 ohm (±5 %, E24 Series) | - | - | - | ±200 ppm/°C |

***TCR code assigned as "X" - see How to Order chart.

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](#).

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* 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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Applications

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

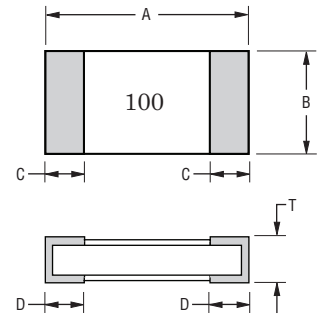
CHP Series Ultra-High Power Chip Resistors

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Product Dimensions

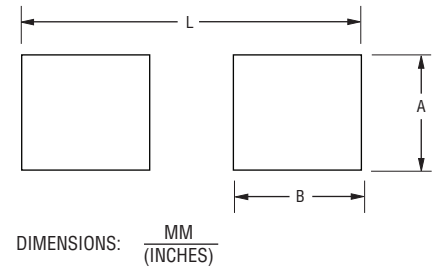
| Model | L | W | C | D | T |
|---------|-------------------------------------------|-------------------------------------------|-------------------------------------------|-------------------------------------------|-------------------------------------------|
| CHP0603 | $\frac{1.60 \pm 0.10}{(0.063 \pm 0.004)}$ | $\frac{0.80 \pm 0.10}{(0.031 \pm 0.004)}$ | $\frac{0.30 \pm 0.20}{(0.012 \pm 0.008)}$ | $\frac{0.30 \pm 0.30}{(0.012 \pm 0.008)}$ | $\frac{0.45 \pm 0.10}{(0.018 \pm 0.004)}$ |
| CHP0805 | $\frac{2.00 \pm 0.10}{(0.079 \pm 0.004)}$ | $\frac{1.25 \pm 0.10}{(0.049 \pm 0.004)}$ | $\frac{0.40 \pm 0.20}{(0.016 \pm 0.008)}$ | $\frac{0.40 \pm 0.20}{(0.016 \pm 0.008)}$ | $\frac{0.50 \pm 0.10}{(0.020 \pm 0.004)}$ |
| CHP1206 | $\frac{3.10 \pm 0.10}{(0.122 \pm 0.004)}$ | $\frac{1.60 \pm 0.10}{(0.063 \pm 0.004)}$ | $\frac{0.50 \pm 0.25}{(0.020 \pm 0.010)}$ | $\frac{0.50 \pm 0.25}{(0.020 \pm 0.010)}$ | $\frac{0.55 \pm 0.10}{(0.022 \pm 0.004)}$ |
| CHP2512 | $\frac{6.40 \pm 0.20}{(0.252 \pm 0.008)}$ | $\frac{3.10 \pm 0.20}{(0.122 \pm 0.008)}$ | $\frac{0.45 \pm 0.25}{(0.018 \pm 0.010)}$ | $\frac{1.80 \pm 0.25}{(0.071 \pm 0.010)}$ | $\frac{0.60 \pm 0.15}{(0.024 \pm 0.006)}$ |

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



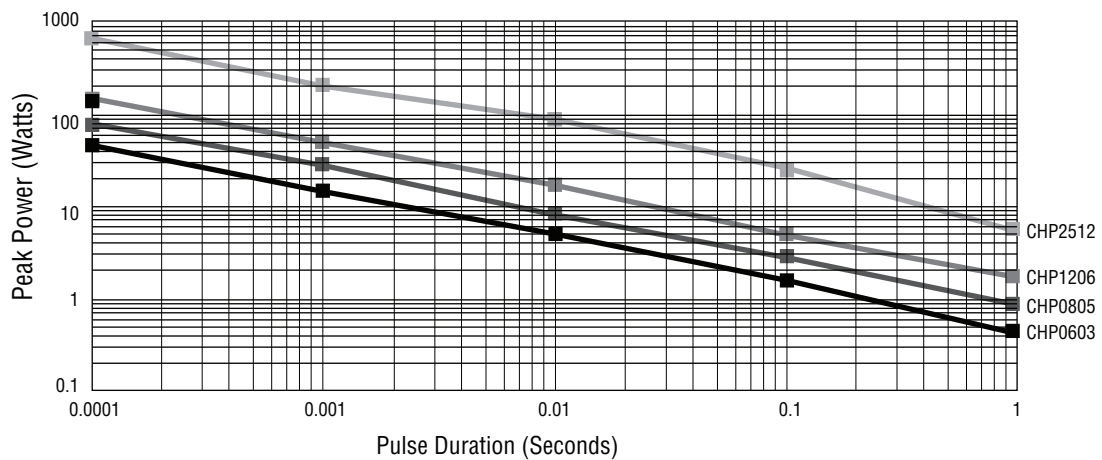
Recommended Solder Pad Layout

| Model | A | B | L |
|---------|------------------------|------------------------|------------------------|
| CHP0603 | $\frac{0.90}{(0.035)}$ | $\frac{1.00}{(0.039)}$ | $\frac{3.00}{(0.118)}$ |
| CHP0805 | $\frac{1.30}{(0.051)}$ | $\frac{1.15}{(0.045)}$ | $\frac{3.50}{(0.138)}$ |
| CHP1206 | $\frac{1.80}{(0.071)}$ | $\frac{1.30}{(0.051)}$ | $\frac{4.70}{(0.185)}$ |
| CHP2512 | $\frac{3.70}{(0.146)}$ | $\frac{2.45}{(0.096)}$ | $\frac{7.60}{(0.299)}$ |



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

Surge Performance



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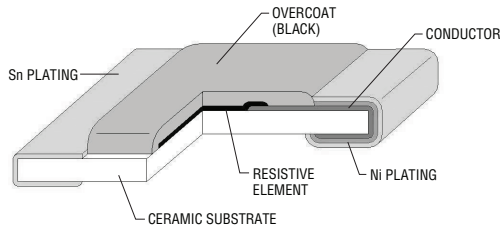
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CHP Series Ultra-High Power Chip Resistors

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Construction



Rated Voltage

The rated voltage is calculated by the following formula:

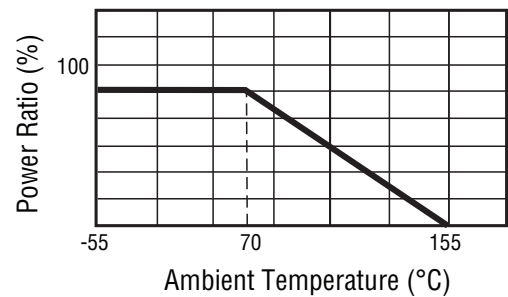
$$V = \sqrt{P \times R}$$

V: Rated Voltage (V)
P: Rated Power (W)
R: Resistance Value (Ω)

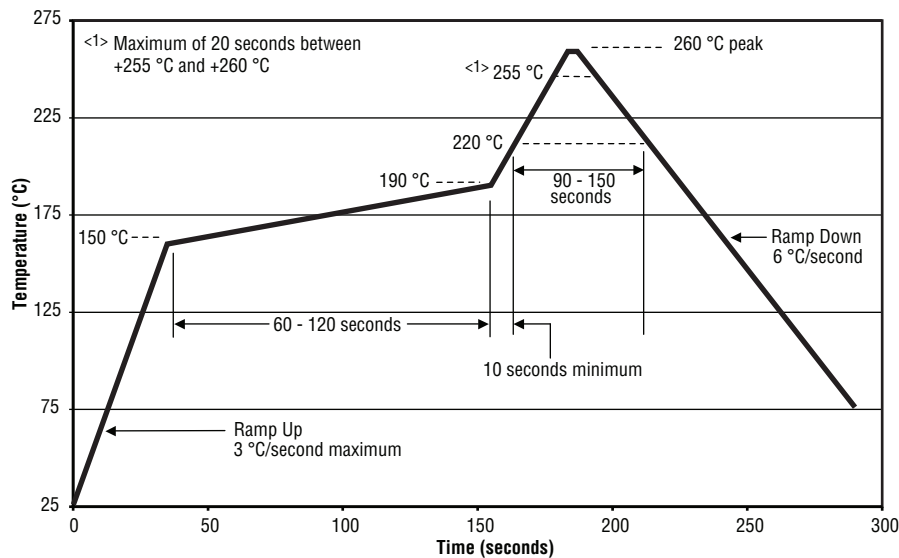
Environmental Characteristics

Moisture Sensitivity Level..... 1
 ESD Classification (HBM)..... 1A

Derating Curve



Soldering Profile



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CHP Series Ultra-High Power Chip Resistors

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How to Order

CHP 0603 - F X - 1002 E LF

Model _____
 CHP = High Power Surge Resistor

Size _____
 0603 = 0603 Size
 0805 = 0805 Size
 1206 = 1206 Size
 2512 = 2512 Size

Resistance Tolerance _____
 F = ±1 %
 J = ±5 %

TCR (See Electrical Characteristics chart) _____
 W = ±200 PPM/°C
 X = ±100 PPM/°C (also includes CHP0805: 1 ohm to 9.76 ohms = ±150 PPM/°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.....“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)

Packaging _____
 E = 5,000 pieces on 180 mm (7 inch) plastic reel, paper tape - CHP0603, CHP0805, CHP1206
 3,000 pieces on 180 mm (7 inch) reel, plastic tape - CHP2512

Termination _____
 LF = Tin-plated (RoHS Compliant)

Performance Characteristics

| Test | Procedure (IEC 60115-1) | Test Limits ΔR |
|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------|
| Short Time Overload | 5 times rated power for 5 seconds | 1 % Tolerance ≤ ±1 % 5 % Tolerance ≤ ±2 % |
| Temperature Cycling | Repeat 5 cycles as follows: -55 °C (30 min.) --> 25 °C (2-3 min.)--> 155 °C (30 min.) --> 25 °C (2~2 min.) | 1 % Tolerance ≤ ±0.5 % 5 % Tolerance ≤ ±1 % |
| Load Life | 1.5 hours at rated voltage followed by a pause of 0.5 hour at 70 ± 2 °C; Cycle repeated for 1000 hours | 1 % Tolerance ≤ ±1 % 5 % Tolerance ≤ ±3 % |
| Load Life with Humidity | 40 ±2 °C with 90~95 % relative humidity; DC rated voltage for 1.5 hours “ON”, 0.5 hour “OFF”; Cycle repeated for 1000 hours | 1 % Tolerance ≤ ±1 % 5 % Tolerance ≤ ±3 % |
| Resistance to Solder Heat | 260 ±5 °C for 10 ±1 seconds | 1 % Tolerance ≤ ±0.5 % 5 % Tolerance ≤ ±1 % |
| Solderability | After immersing flux, dip in 245 ±2 °C molten solder bath for 3 ± 0.5 seconds | At least 95 % of termination must be covered with solder.. |
| Board Flex | Bending 2 mm | 1 % Tolerance ≤ ±0.5 % 5 % Tolerance ≤ ±1 % |

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CHP Series Ultra-High Power Chip Resistors

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Typical Part Marking

±5 % (E24):

CHP0603, CHP0805, CHP1206, CHP2512

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.

301

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

±1 % (E24/E96):

CHP0805, CHP1206, CHP2512

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.

1542

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

±1 % (E24):

CHP0603

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.

222

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

±1 % (E96):

CHP0603

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

01B

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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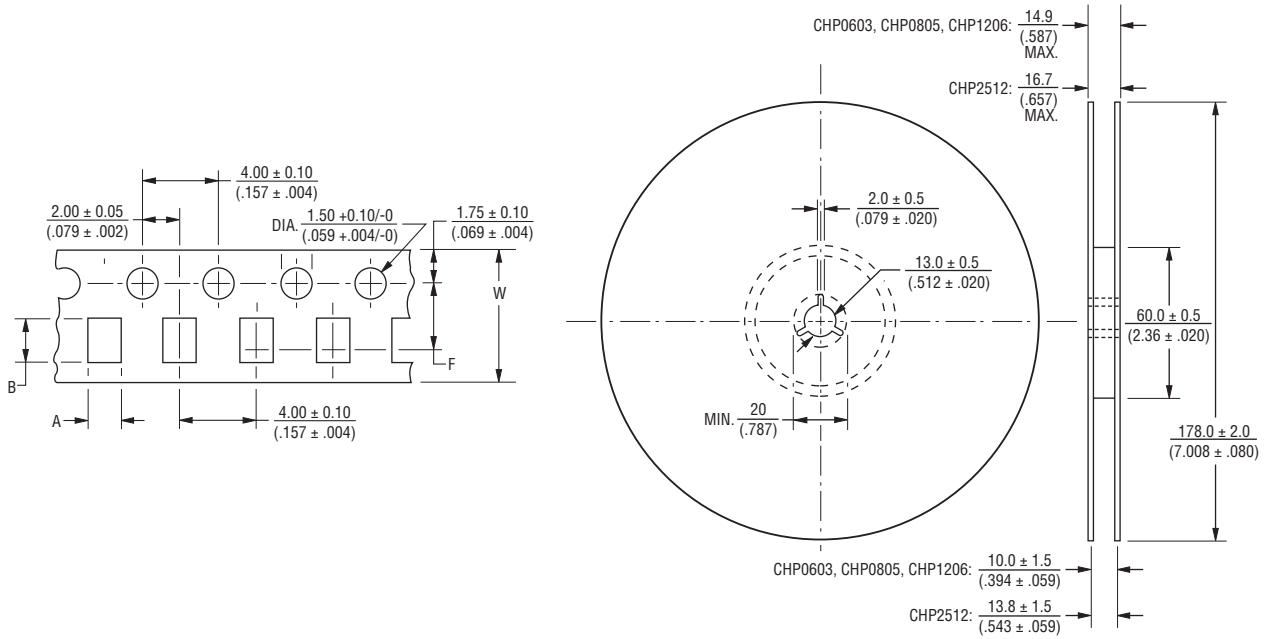
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Packaging Dimensions (Conforms to EIA RS-481A)



| Model | Tape Type | Pieces per Reel | A | B | W | F |
|---------|-----------|-----------------|-----------------------------------------|-----------------------------------------|------------------------------------------|-----------------------------------------|
| CHP0603 | Paper | 5,000 | $\frac{1.10 \pm 0.20}{(.043 \pm .008)}$ | $\frac{1.90 \pm 0.20}{(.075 \pm .008)}$ | $\frac{8.00 \pm 0.30}{(.315 \pm .012)}$ | $\frac{3.50 \pm 0.05}{(.138 \pm .002)}$ |
| CHP0805 | | | $\frac{1.65 \pm 0.20}{(.065 \pm .008)}$ | $\frac{2.40 \pm 0.20}{(.094 \pm .008)}$ | | |
| CHP1206 | | | $\frac{2.00 \pm 0.20}{(.079 \pm .008)}$ | $\frac{3.60 \pm 0.20}{(.142 \pm .008)}$ | | |
| CHP2512 | Plastic | 3,000 | $\frac{3.50 \pm 0.20}{(.138 \pm .008)}$ | $\frac{6.70 \pm 0.20}{(.264 \pm .008)}$ | $\frac{12.00 \pm 0.30}{(.472 \pm .012)}$ | $\frac{5.50 \pm 0.05}{(.217 \pm .002)}$ |

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

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