

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

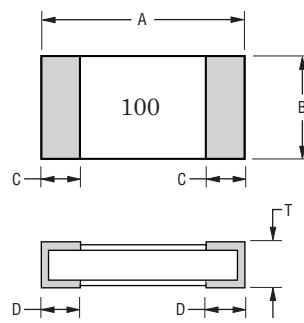
CHP Series Ultra-High Power Chip Resistors

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Product Dimensions

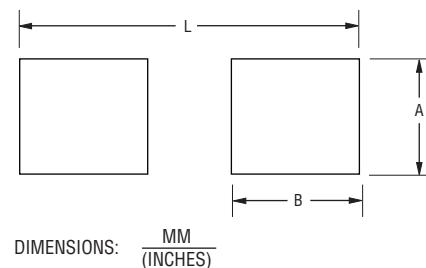
Model	L	W	C	D	T
CHP0603	1.60 ± 0.10 (0.063 ± 0.004)	0.80 ± 0.10 (0.031 ± 0.004)	0.30 ± 0.20 (0.012 ± 0.008)	0.30 ± 0.30 (0.012 ± 0.008)	0.45 ± 0.10 (0.018 ± 0.004)
CHP0805	2.00 ± 0.10 (0.079 ± 0.004)	1.25 ± 0.10 (0.049 ± 0.004)	0.40 ± 0.20 (0.016 ± 0.008)	0.40 ± 0.20 (0.016 ± 0.008)	0.50 ± 0.10 (0.020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

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

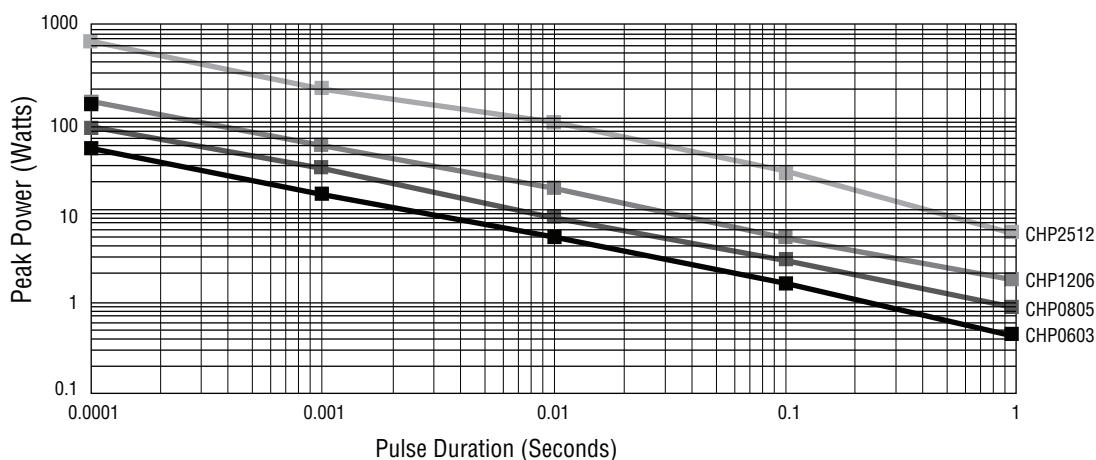


Recommended Solder Pad Layout

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



Surge Performance



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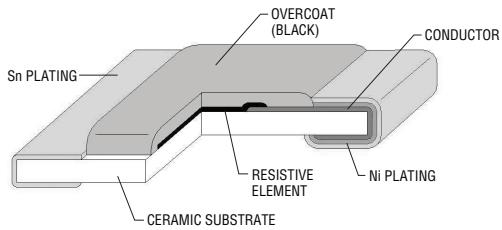
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CHP Series Ultra-High Power Chip Resistors

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Construction



Rated Voltage

The rated voltage is calculated by the following formula:

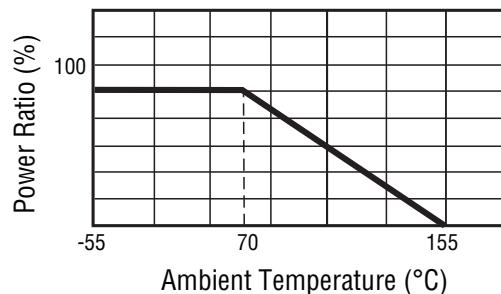
$$V = \sqrt{P \times R}$$

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

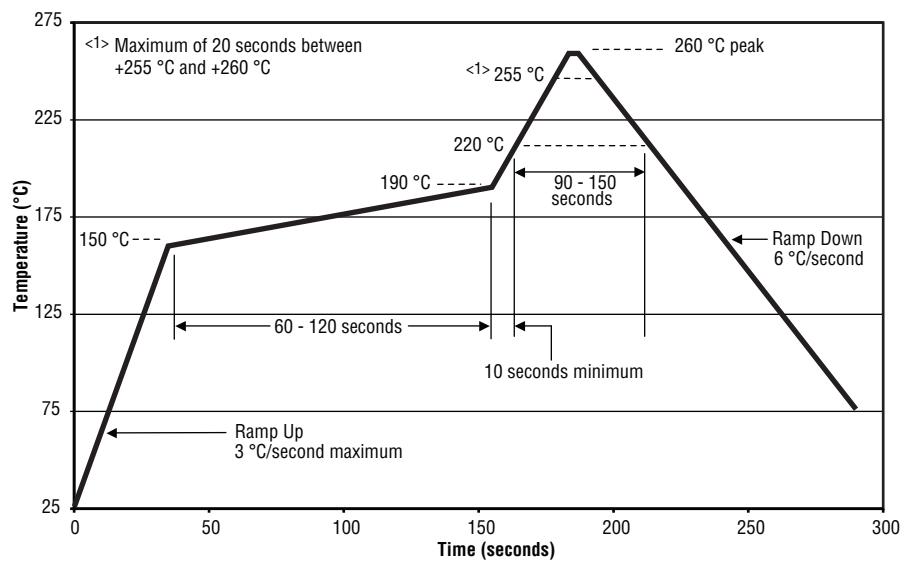
Environmental Characteristics

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 = $\pm 1\%$ J = $\pm 5\%$						
TCR (See Electrical Characteristics chart)	W = ± 200 PPM/ $^{\circ}$ C X = ± 100 PPM/ $^{\circ}$ C (also includes CHP0805: 1 ohm to 9.76 ohms = ± 150 PPM/ $^{\circ}$ C)						
Resistance Value	<u>1 % Tolerance:</u> <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)						
	<u>5 % Tolerance:</u> <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 $\leq \pm 1\%$ 5 % Tolerance $\leq \pm 2\%$
Temperature Cycling	Repeat 5 cycles as follows: -55 $^{\circ}$ C (30 min.) --> 25 $^{\circ}$ C (2-3 min.)--> 155 $^{\circ}$ C (30 min.) --> 25 $^{\circ}$ C (2~2 min.)	1 % Tolerance $\leq \pm 0.5\%$ 5 % Tolerance $\leq \pm 1\%$
Load Life	1.5 hours at rated voltage followed by a pause of 0.5 hour at 70 ± 2 $^{\circ}$ C; Cycle repeated for 1000 hours	1 % Tolerance $\leq \pm 1\%$ 5 % Tolerance $\leq \pm 3\%$
Load Life with Humidity	40 ± 2 $^{\circ}$ 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 $\leq \pm 1\%$ 5 % Tolerance $\leq \pm 3\%$
Resistance to Solder Heat	260 ± 5 $^{\circ}$ C for 10 ± 1 seconds	1 % Tolerance $\leq \pm 0.5\%$ 5 % Tolerance $\leq \pm 1\%$
Solderability	After immersing flux, dip in 245 ± 2 $^{\circ}$ 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 $\leq \pm 0.5\%$ 5 % Tolerance $\leq \pm 1\%$

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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																
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=10⁻⁷ X=10⁻¹ Y=10⁻² Z=10⁻³

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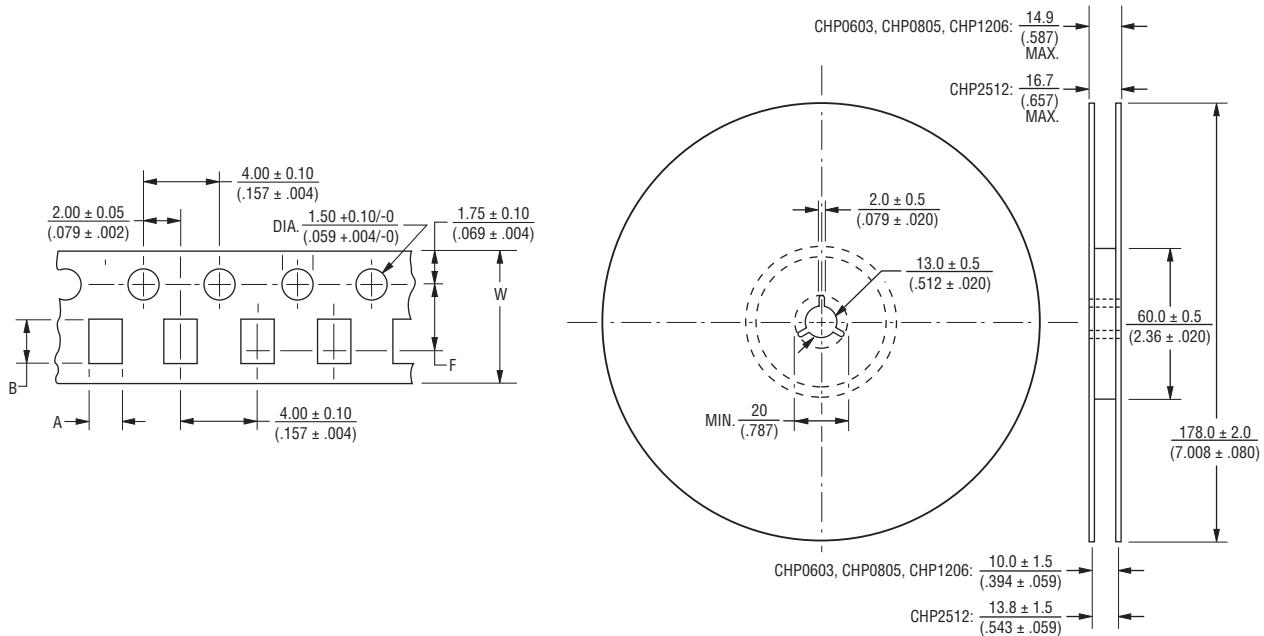
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Packaging Dimensions (Conforms to EIA RS-481A)



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

DIMENSIONS: MM (INCHES)

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