



## 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](http://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)  10 ohms to 1 megohm (±1 %, E24 & E96 Series)  1 ohm to 1 megohm (±5 %, E24 Series)  0.1 ohm to 0.91 ohm (±1 %, E24 Series)  0.1 ohm to 0.91 ohm (±5 %, E24 Series)	±200 ppm/°C  ±100 ppm/°C  ±200 ppm/°C  —  —	±150 ppm/°C***  ±100 ppm/°C  ±200 ppm/°C  —  —	±100 ppm/°C  ±100 ppm/°C  ±200 ppm/°C  —  —	±100 ppm/°C  ±100 ppm/°C  ±200 ppm/°C  ±100 ppm/°C  ±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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## Applications

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

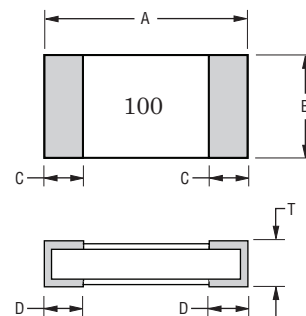
## CHP Series Ultra-High Power Chip Resistors

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### Product Dimensions

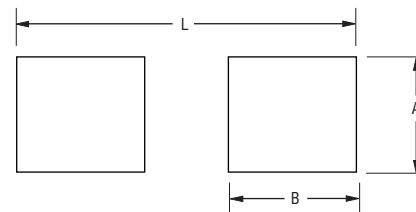
Model	L	W	C	D	T
CHP0603	$\frac{1.60 \pm 0.10}{(0.063 \pm 0.004)}$	$\frac{0.80 \pm 0.10}{(0.031 \pm 0.004)}$	$\frac{0.30 \pm 0.20}{(0.012 \pm 0.008)}$	$\frac{0.30 \pm 0.30}{(0.012 \pm 0.008)}$	$\frac{0.45 \pm 0.10}{(0.018 \pm 0.004)}$
CHP0805	$\frac{2.00 \pm 0.10}{(0.079 \pm 0.004)}$	$\frac{1.25 \pm 0.10}{(0.049 \pm 0.004)}$	$\frac{0.40 \pm 0.20}{(0.016 \pm 0.008)}$	$\frac{0.40 \pm 0.20}{(0.016 \pm 0.008)}$	$\frac{0.50 \pm 0.10}{(0.020 \pm 0.004)}$
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:  $\frac{\text{MM}}{(\text{INCHES})}$



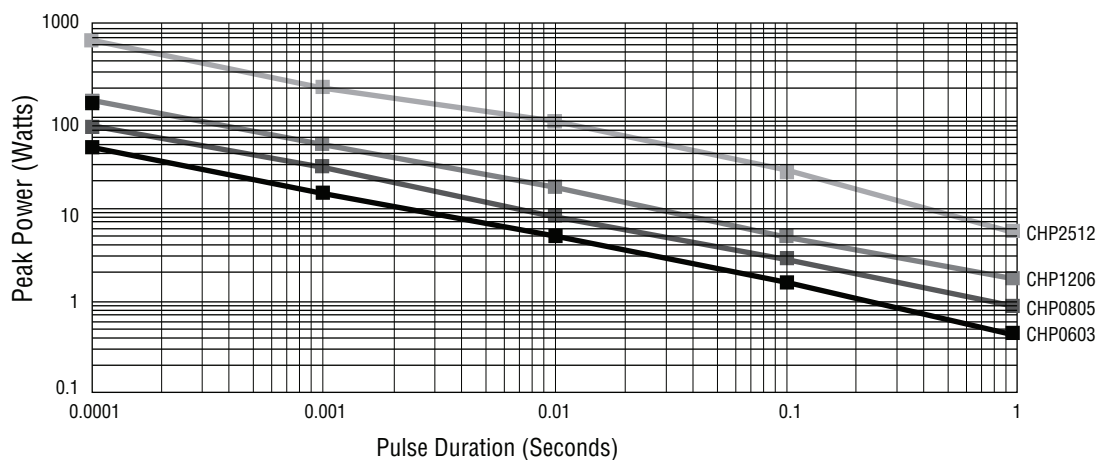
### Recommended Solder Pad Layout

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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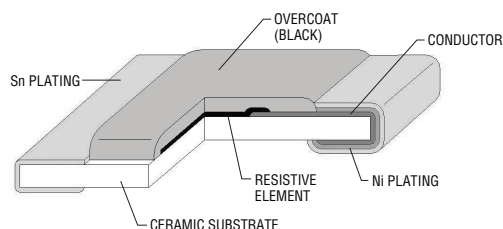
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# CHP Series Ultra-High Power Chip Resistors

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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)

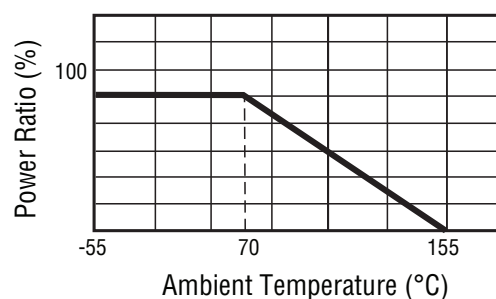
**R:** Resistance Value ( $\Omega$ )

## Environmental Characteristics

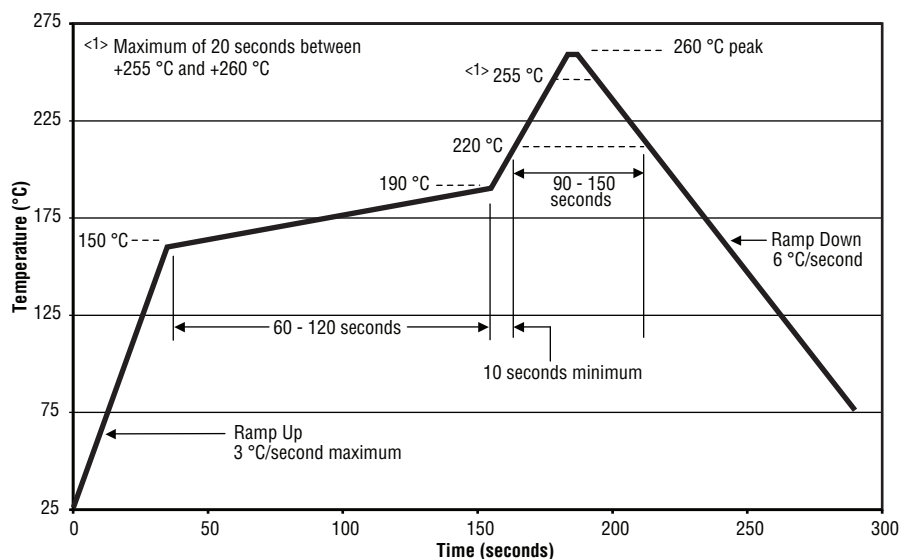
Moisture Sensitivity Level..... 1

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 =  $\pm 200$  PPM/ $^{\circ}$ C  
 X =  $\pm 100$  PPM/ $^{\circ}$ C (also includes CHP0805: 1 ohm to 9.76 ohms =  $\pm 150$  PPM/ $^{\circ}$ C)

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

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 $\Delta R$
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 $\pm$ 2 $^{\circ}$ C; Cycle repeated for 1000 hours	1 % Tolerance $\leq \pm 1\%$ 5 % Tolerance $\leq \pm 3\%$
Load Life with Humidity	40 $\pm$ 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 $\pm$ 5 $^{\circ}$ C for 10 $\pm$ 1 seconds	1 % Tolerance $\leq \pm 0.5\%$ 5 % Tolerance $\leq \pm 1\%$
Solderability	After immersing flux, dip in 245 $\pm$ 2 $^{\circ}$ C molten solder bath for 3 $\pm$ 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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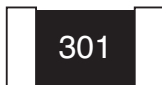
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## CHP Series Ultra-High Power Chip Resistors

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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.

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

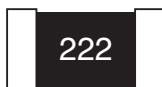
#### ±1 % (E24/E96): CHP0805, CHP1206, CHP2512



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.

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

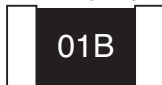
#### ±1 % (E24): CHP0603



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.

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.)

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=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> G=10<sup>6</sup> H=10<sup>7</sup> X=10<sup>-1</sup> Y=10<sup>-2</sup> Z=10<sup>-3</sup>

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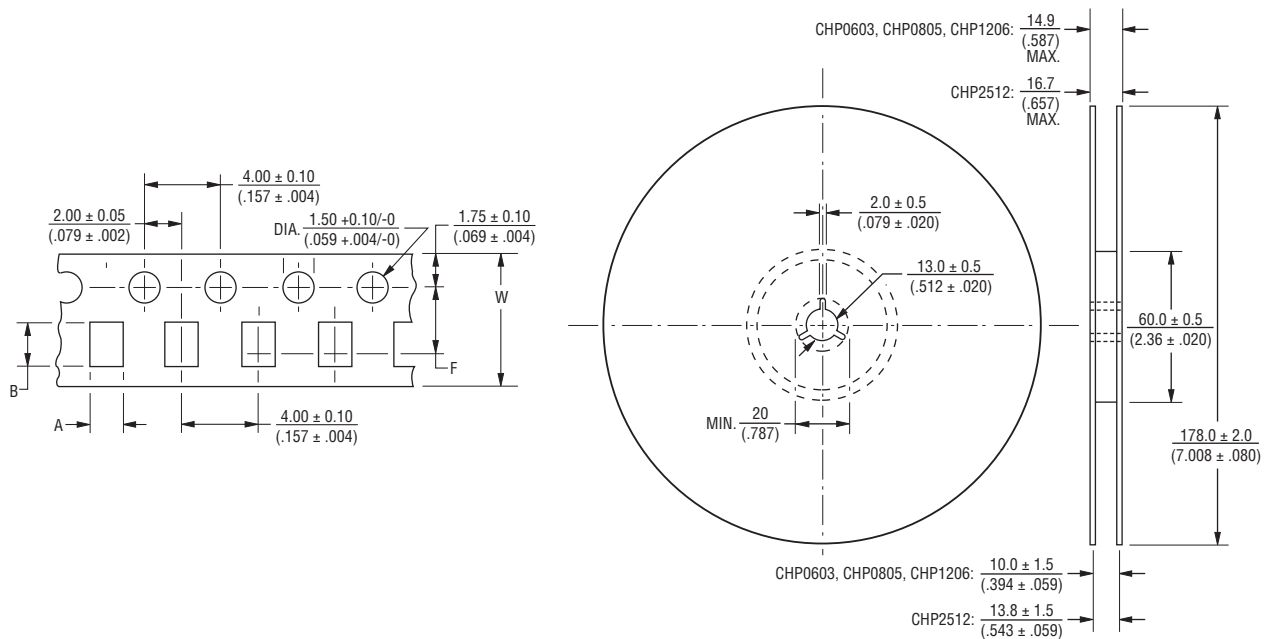
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## Packaging Dimensions (Conforms to EIA RS-481A)



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

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

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[CHP2512-FX-1001ELF](#) [CHP1206-JW-101ELF](#) [CHP1206-FX-1001ELF](#)