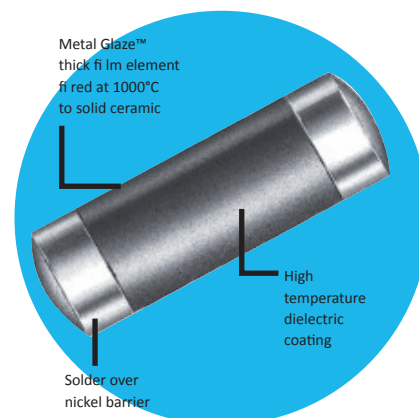


# Cylindrical High Power Surface Mount Metal Glaze™

## CHP Series

- Up to 2 watts
- Up to 1000 volts
- 0.2 ohm to 2.2 megohm range
- RoHS-compliant version available
- 150°C maximum operating temperature



 All Pb-free parts comply with EU Directive 2011/65/EU (RoHS2)

## Electrical Data

| IRC Type | Industry Foot-print | Size Code <sup>1</sup> | Maximum Power Rating      | Working Voltage <sup>2</sup> | Maximum Voltage | Resistance Range (ohms) <sup>3</sup> | Product Category | Tolerance (±%) <sup>3</sup> | TCR (ppm/°C) <sup>3</sup> |
|----------|---------------------|------------------------|---------------------------|------------------------------|-----------------|--------------------------------------|------------------|-----------------------------|---------------------------|
| CHP 1/8  | 1206                | B & C                  | 1/4W @ 70°C               | 200                          | 400             | 0.1 to 0.99                          | Low Range        | 1, 2, 5                     | 100                       |
|          |                     |                        |                           |                              |                 | 1.0 to 1.0 M                         | Standard         | 1, 2, 5                     | 50, 100                   |
|          |                     |                        |                           |                              |                 | 20 to 348K                           | Tight Tolerance  | 0.25, 0.5                   | 50, 100                   |
| CHP 1/2  | 2010                | D & E                  | 1/2W @ 70°C               | 300                          | 600             | 0.1 to 0.99                          | Low Range        | 1, 2, 5                     | 100                       |
|          |                     |                        |                           |                              |                 | 1.0 to 348K                          | Standard         | 1, 2, 5                     | 50, 100                   |
|          |                     |                        |                           |                              |                 | 20 to 348K                           | Tight Tolerance  | 0.25, 0.5                   | 50, 100                   |
| CHP 1    | 2512                | F                      | 1W @ 70°C                 | 350                          | 700             | 0.1 to 0.99                          | Low Range        | 1, 2, 5                     | 100                       |
|          |                     |                        |                           |                              |                 | 1.0 to 2.21M                         | Standard         | 1, 2, 5                     | 50, 100                   |
|          |                     |                        |                           |                              |                 | 20 to 348K                           | Tight Tolerance  | 0.25, 0.5                   | 50, 100                   |
| CHP 2    | 3610                | H                      | 2W @ 25°C<br>1.33W @ 70°C | 500                          | 1000            | 0.2 to 0.99                          | Low Range        | 1, 2, 5                     | 100                       |
|          |                     |                        |                           |                              |                 | 1.0 to 2.21M                         | Standard         | 1, 2, 5                     | 50, 100                   |

<sup>1</sup>See pages 2 & 3 for product dimensions, recommended solder pads, and standard packaging.

<sup>2</sup>Not to exceed  $\sqrt{P \times R}$

<sup>3</sup>Consult factory for tighter TCR, tolerance, or resistance values.

## Environmental Data

| Characteristics                   | Maximum Change                       | Test Method                                                                                                        |
|-----------------------------------|--------------------------------------|--------------------------------------------------------------------------------------------------------------------|
| Thermal Shock                     | ±0.25% +.01 Ω                        | MIL-PRF-55342H, §4.8.3<br>(MIL-STD-202, Method 107G: +150°C / -65°C)                                               |
| Low Temperature Operation         | ±0.25% +.01 Ω                        | MIL-PRF-55342H, §4.8.5<br>(-65°C)                                                                                  |
| Short Time Overload               | ±0.5% +.01 Ω<br>±1% for R>100KΩ      | MIL-PRF-55342H, §4.8.6                                                                                             |
| High Temperature Exposure         | ±0.5% +.01 Ω                         | MIL-PRF-55342H, §4.8.7<br>(150°C x 100 Hours)                                                                      |
| Resistance to Bonding Exposure    | ±0.25% +.01 Ω                        | MIL-PRF-55342H, §4.8.8.2                                                                                           |
| Moisture Resistance               | ±0.5% +.01 Ω                         | MIL-PRF-55342H, §4.8.8.2<br>(MIL-STD-202, Method 106G)                                                             |
| Temperature Coefficient           | As specified                         | MIL-PRF-55342H, §4.8.10<br>(MIL-STD-202, Method 304)                                                               |
| Life Test                         | ±1% +.01 Ω                           | MIL-PRF-55342H, §4.8.11<br>(MIL-STD-202, Method 108A: 2000 Hours @ 70°C)                                           |
| Solderability                     | 95% minimum coverage                 | MIL-PRF-55342H, §4.8.12<br>(MIL-STD-202, Method 208H)                                                              |
| Terminal Adhesion Strength (push) | ±1% +.01 Ω<br>(no mechanical damage) | IRC – defined<br>1200 gram push from underside of mounted device for 60 sec                                        |
| Terminal Adhesion Strength (flex) | ±1% +.01 Ω<br>(no mechanical damage) | IRC-defined<br>Device mounted in center of 90mm long board, deflected 1 mm to exert pull on contacts for 5 seconds |

### General Note

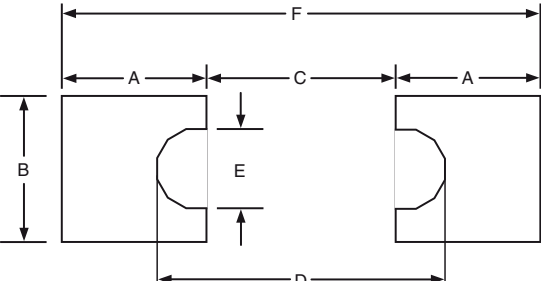
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## Physical Data

| IRC Type | Size Code | Industry Footprint | Actual Size                                                                       |  |                                                             |                                 |
|----------|-----------|--------------------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------|---------------------------------|
|          |           |                    |                                                                                   | Dimensions (Inches and (mm))                                                       |                                                             |                                 |
|          |           |                    |                                                                                   | L                                                                                  | W                                                           | C                               |
| CHP 1/8  | B         | 1206               |  | 0.128 ± 0.007<br>(3.25 ± 0.18)                                                     | 0.057 ± 0.006<br>(1.45 ± 0.15)                              | 0.020 ± 0.010<br>(0.51 ± 0.25)  |
| MRC 1/2  | C         | 1206               |  | 0.128 ± 0.007<br>(3.25 ± 0.18)                                                     | 0.063 ± 0.010<br>(1.60 ± 0.25)                              | 0.020 ± 0.010<br>(0.51 ± 0.25)  |
| CHP 1/2  | D         | 2010               |  | 0.200 ± 0.010<br>(5.08 ± 0.25)                                                     | 0.079 (nom.) -0.006 / +0.011<br>(2.01 (nom.) -0.15 / +0.28) | 0.030 ± 0.010<br>(0.761 ± 0.25) |
| CHP 1    | F         | 2512               |  | 0.251 ± 0.010<br>(6.38 ± 0.25)                                                     | 0.079 (nom.) -0.006 / +0.011<br>(2.01 (nom.) -0.15 / +0.28) | 0.040 ± 0.010<br>(1.02 ± 0.25)  |
| CHP 2    | H         | 3610               |  | 0.367 ± 0.010<br>(9.32 ± 0.25)                                                     | 0.105 (nom.) -0.006 / +0.011<br>(2.67 (nom.) -0.15 / +0.28) | 0.050 ± 0.010<br>(1.27 ± 0.25)  |

## Recommended Solder Pad Dimensions (Reflow):

|  |                    |                              |                 |                 |                 |                 |                  |
|--------------------------------------------------------------------------------------|--------------------|------------------------------|-----------------|-----------------|-----------------|-----------------|------------------|
| Size Code                                                                            | Industry Footprint | Dimensions (Inches and (mm)) |                 |                 |                 |                 |                  |
|                                                                                      |                    | A                            | B               | C               | D               | E               | F                |
| B & C                                                                                | 1206               | 0.076<br>(1.93)              | 0.093<br>(2.36) | 0.058<br>(1.47) | 0.098<br>(2.49) | 0.032<br>(0.81) | 0.211<br>(5.36)  |
| D                                                                                    | 2010               | 0.111<br>(2.82)              | 0.126<br>(3.20) | 0.096<br>(2.44) | 0.152<br>(3.86) | 0.040<br>(1.02) | 0.318<br>(8.08)  |
| E                                                                                    | 2010               | 0.170<br>(4.32)              | 0.160<br>(4.06) | 0.072<br>(1.83) | 0.132<br>(3.35) | 0.044<br>(1.12) | 0.412<br>(10.46) |
| F                                                                                    | 2512               | 0.121<br>(3.07)              | 0.126<br>(3.20) | 0.127<br>(3.23) | 0.183<br>(4.65) | 0.040<br>(1.02) | 0.369<br>(9.37)  |
| H                                                                                    | 3610               | 0.170<br>(4.32)              | 0.160<br>(4.06) | 0.213<br>(5.41) | 0.273<br>(6.93) | 0.044<br>(1.12) | 0.553<br>(14.05) |

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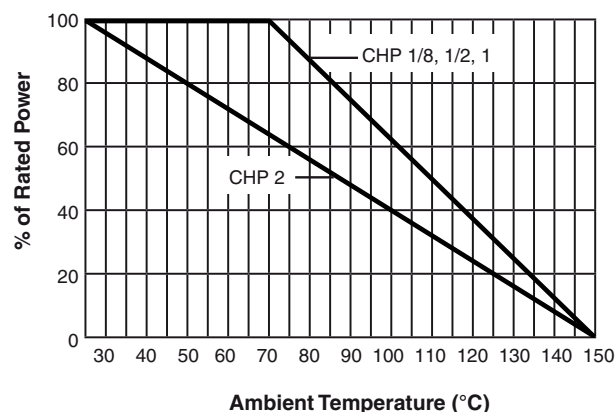
CHP Series

## Standard Reel Packaging per EIA-481:

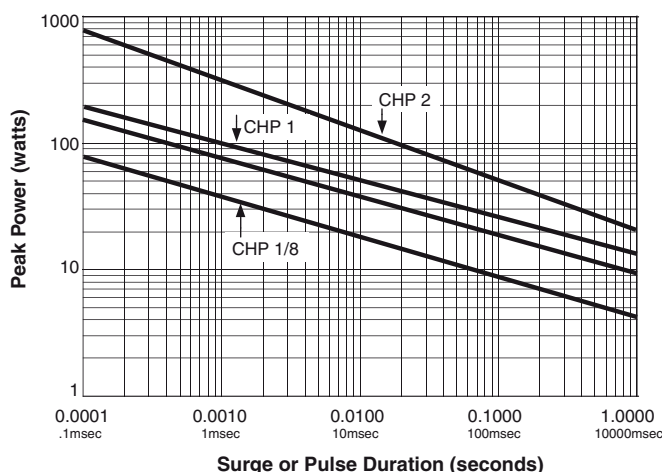
| IRC Type           | Size Code | Industry Footprint | Reel Diameter* | Quantity Per Reel | Carrier Tape Width | Component Pitch |
|--------------------|-----------|--------------------|----------------|-------------------|--------------------|-----------------|
| CHP 1/8<br>MRC 1/2 | B<br>C    | 1206               | 7"             | 2,500 max.        | 8mm                | 4mm             |
|                    |           |                    | 13"            | 10,000 max.       |                    |                 |
| CHP 1/2<br>MRC 1   | D<br>E    | 2010               | 7"             | 1,500 max.        | 12mm               | 4mm             |
|                    |           |                    | 13"            | 5,000 max.        |                    |                 |
| CHP 1              | F         | 2512               | 7"             | 1,500 max.        | 12mm               | 4mm             |
|                    |           |                    | 13"            | 5,000 max.        |                    |                 |
| CHP 2              | H         | 3610               | 13"            | 1,500 max.        | 24mm               | 4mm             |

\*The 13" reel is considered standard and will be supplied unless otherwise specified.

## Power Derating Curve



## Repetitive Surge Curve



Note: Use for repetitive pulses where the average power dissipation is not to exceed the component rating at 70°C. Surge handling capacity for low-repetitive surges may be significantly greater than shown above. Contact factory for recommendations.

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# Ordering Procedure

This product has two valid part numbers:

**European (Welwyn) Part Number: CHP1-220KFI** (CHP1 with TCR  $\pm 100\text{ppm}/^\circ\text{C}$  at 220 kilohms  $\pm 1\%$ , Pb-free)

|   |   |   |   |  |  |  |   |   |   |   |   |   |   |
|---|---|---|---|--|--|--|---|---|---|---|---|---|---|
| C | H | P | 1 |  |  |  | - | 2 | 2 | 0 | K | F | I |
| 1 |   |   | 2 |  |  |  | 3 |   |   | 4 |   | 5 |   |

| 1<br>Type | 2<br>TCR (ppm/°C)  | 3<br>Value           | 4<br>Tolerance   | 5<br>Termination & Packing |               |
|-----------|--------------------|----------------------|------------------|----------------------------|---------------|
| CHP1/8    | Omit for $\pm 100$ | E24 = 3/4 characters | C = $\pm 0.25\%$ | I = Pb-free, Tape Pack     |               |
| CHP1/2    | -50 = $\pm 50$     | E96 = 4/5 characters | D = $\pm 0.5\%$  | PB = SnPb, Tape Pack       |               |
| CHP1      |                    | R = ohms             | F = $\pm 1\%$    | CHP1/8                     | 2500/7" reel  |
| CHP2      |                    | K = kilohms          | G = $\pm 2\%$    | CHP1/2, 1                  | 1500/7" reel  |
|           |                    | M = megohms          | J = $\pm 5\%$    | CHP2                       | 1500/13" reel |

**USA (IRC) Part Number: CHP11002203FLF** (CHP1 with TCR  $\pm 100\text{ppm}/^\circ\text{C}$  at 220 kilohms  $\pm 1\%$ , Pb-free)

|   |   |   |   |   |   |   |   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| C | H | P | 1 | 1 | 0 | 0 | 2 | 2 | 0 | 3 | F | L | F |
| 1 |   |   | 2 |   |   | 3 |   |   | 4 |   | 5 |   |   |

| 1<br>Type | 2<br>TCR        | 3<br>Value                    | 4<br>Tolerance   | 5<br>Termination & Packing   |               |
|-----------|-----------------|-------------------------------|------------------|------------------------------|---------------|
| CHP1/8    | 50 = $\pm 50$   | 3 digits + multiplier         | C = $\pm 0.25\%$ | Omit for SnPb, Standard pack |               |
| CHP1/2    | 100 = $\pm 100$ | R = ohms for values <100 ohms | D = $\pm 0.5\%$  | LF = Pb-free, Standard pack  |               |
| CHP1      |                 |                               | F = $\pm 1\%$    | CHP1/8                       | 2500/7" reel  |
| CHP2      |                 |                               | G = $\pm 2\%$    | CHP1/2 & 1                   | 1500/7" reel  |
|           |                 |                               | J = $\pm 5\%$    | CHP2                         | 1500/13" reel |

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