

# Thick Film Chip Resistors, High Voltage



## LINKS TO ADDITIONAL RESOURCES



## FEATURES

- High voltage up to 3000 V
- Outstanding stability < 0.5 %
- Flow solderable
- Automatic placement capability
- Tape and reel packaging available
- Termination style:  
3-sided wraparound termination
- Internationally standardized sizes
- Termination material: solder-coated nickel barrier or solder coated non-magnetic terminations standard
- Multiple styles, termination materials and configurations, allow wide design flexibility
- Epoxy bondable or wire bondable non-magnetic terminations available
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)



Available  
**RoHS\***  
Available  
**HALOGEN  
FREE**

## Note

\* This datasheet provides information about parts that are RoHS-compliant and / or parts that are non RoHS-compliant. For example, parts with lead (Pb) terminations are not RoHS-compliant. Please see the information / tables in this datasheet for details

| STANDARD ELECTRICAL SPECIFICATIONS |           |                                               |                                             |                                             |                                     |                                                                               |
|------------------------------------|-----------|-----------------------------------------------|---------------------------------------------|---------------------------------------------|-------------------------------------|-------------------------------------------------------------------------------|
| GLOBAL MODEL                       | CASE SIZE | POWER RATING<br>$P_{70^{\circ}\text{C}}$<br>W | MAXIMUM WORKING VOLTAGE <sup>(1)</sup><br>V | RESISTANCE RANGE <sup>(2)</sup><br>$\Omega$ | TOLERANCE <sup>(3)</sup><br>$\pm$ % | TEMPERATURE COEFFICIENT <sup>(4)</sup><br>(-55 °C to +155 °C)<br>$\pm$ ppm/°C |
| CRHP1206                           | 1206      | 0.50                                          | 1675                                        | 2M to 100M                                  | 0.5                                 | 100                                                                           |
|                                    |           |                                               |                                             | 2M to 1G                                    | 1, 2, 5, 10, 20                     |                                                                               |
|                                    |           |                                               |                                             | 1.1G to 8G                                  | 2, 5, 10, 20                        |                                                                               |
| CRHP1210                           | 1210      | 0.70                                          | 1870                                        | 4M to 100M                                  | 0.5                                 | 100                                                                           |
|                                    |           |                                               |                                             | 4M to 1G                                    | 1, 2, 5, 10, 20                     |                                                                               |
|                                    |           |                                               |                                             | 1.1G to 10G                                 | 2, 5, 10, 20                        |                                                                               |
| CRHP2010                           | 2010      | 1.0                                           | 2000                                        | 6M to 100M                                  | 0.5                                 | 100                                                                           |
|                                    |           |                                               |                                             | 6M to 1G                                    | 1, 2, 5, 10, 20                     |                                                                               |
|                                    |           |                                               |                                             | 1.1G to 10G                                 | 2, 5, 10, 20                        |                                                                               |
|                                    |           |                                               |                                             | 11G to 35G                                  | 5, 10, 20                           |                                                                               |
| CRHP2510                           | 2510      | 1.2                                           | 2500                                        | 10M to 100M                                 | 0.5                                 | 100                                                                           |
|                                    |           |                                               |                                             | 10M to 1G                                   | 1, 2, 5, 10, 20                     |                                                                               |
|                                    |           |                                               |                                             | 1.1G to 10G                                 | 2, 5, 10, 20                        |                                                                               |
|                                    |           |                                               |                                             | 11G to 40G                                  | 5, 10, 20                           |                                                                               |
| CRHP2512                           | 2512      | 1.5                                           | 3000                                        | 10M to 100M                                 | 0.5                                 | 100                                                                           |
|                                    |           |                                               |                                             | 10M to 1G                                   | 1, 2, 5, 10, 20                     |                                                                               |
|                                    |           |                                               |                                             | 1.1G to 10G                                 | 2, 5, 10, 20                        |                                                                               |
|                                    |           |                                               |                                             | 11G to 50G                                  | 5, 10, 20                           |                                                                               |

## Notes

- For non-standard sizes, lower values or higher power rating requirement, contact factory
- <sup>(1)</sup> Continuous working voltage shall be  $\sqrt{P \times R}$  or maximum working voltage, whichever is less
- <sup>(2)</sup> Resistance values below 1 G $\Omega$  are calibrated at 100 V<sub>DC</sub>, and values of 1 G $\Omega$  and above are calibrated at 1000 V<sub>DC</sub>. Calibration at other voltages available upon request
- <sup>(3)</sup> Contact factory for tighter tolerances
- <sup>(4)</sup> Reference only: not for all values specified. Consult factory for your size and value

## GLOBAL PART NUMBER INFORMATION

New Global Part Numbering: **CRHP1206AF100MFKFB** (preferred part number format)

| GLOBAL MODEL | SIZE                                                                    | TERMINAL STYLE     | TERMINAL MATERIAL                                    | RESISTANCE VALUE                                                                                    | TOLERANCE                                                                                                                | TCR                                                                                                                                                    | SOLDER TERMINATION                                                   | PACKAGING                                                                                                                                                                                       |
|--------------|-------------------------------------------------------------------------|--------------------|------------------------------------------------------|-----------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>CRHP</b>  | <b>1206</b><br><b>1210</b><br><b>2010</b><br><b>2510</b><br><b>2512</b> | <b>A</b> = 3-sided | <b>F</b> = nickel barrier<br><b>G</b> = non-magnetic | <b>M</b> = MΩ<br><b>G</b> = GΩ<br><b>4M70</b> = 4.7 MΩ<br><b>10M0</b> = 10 MΩ<br><b>1G00</b> = 1 GΩ | <b>D</b> = ± 0.5 %<br><b>F</b> = ± 1 %<br><b>G</b> = ± 2 %<br><b>J</b> = ± 5 %<br><b>K</b> = ± 10 %<br><b>M</b> = ± 20 % | <b>K</b> = 100 ppm<br><b>L</b> = 150 ppm<br><b>N</b> = 200 ppm<br><b>R</b> = 250 ppm<br><b>M</b> = 300 ppm<br><b>W</b> = 350 ppm<br><b>P</b> = 500 ppm | <b>E</b> = Sn100<br><b>F</b> = Sn95/Ag5, HSD<br><b>T</b> = Sn90/Pb10 | <b>B</b> = bulk<br>(250 pcs max.)<br><b>F</b> = T/R<br>(full reel)<br><b>1</b> = T/R<br>(1000 pcs)<br><b>5</b> = T/R<br>(500 pcs)<br><b>T</b> = T/R<br>(250 pcs min.)<br><b>W</b> = waffle tray |

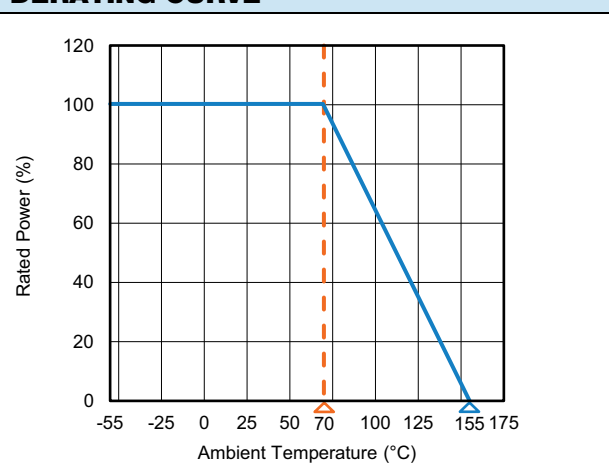
## MECHANICAL SPECIFICATIONS

|                   |                                                                                    |
|-------------------|------------------------------------------------------------------------------------|
| Resistive element | Ruthenium oxide                                                                    |
| Encapsulation     | Glass                                                                              |
| Substrate         | 96 % alumina                                                                       |
| Termination       | Solder-coated nickel barrier or solder coated non-magnetic terminations standard   |
| Solder finish     | Pure tin or tin/lead solder alloys standard.<br>Tin/silver solder alloy available. |

## ENVIRONMENTAL SPECIFICATIONS

|                       |                                                        |
|-----------------------|--------------------------------------------------------|
| Operating temperature | -55 °C to +155 °C                                      |
| Life                  | Less than 0.5 % change when tested at full rated power |
| Short time overload   | Less than 0.5 % ΔR                                     |

## DERATING CURVE



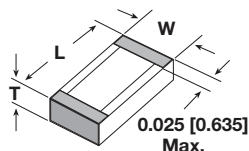
### Note

- Reference only: not for all values specified. Consult factory for your size and value

## VOLTAGE COEFFICIENT OF RESISTANCE CHART

| SIZE     | VALUE (Ω)   | VCR (ppm/V) | FURTHER INSTRUCTIONS              |
|----------|-------------|-------------|-----------------------------------|
| CRHP1206 | 2M to 199M  | 25          | Values over 200M, consult factory |
| CRHP1210 | 4M to 200M  | 25          | Values over 200M, consult factory |
| CRHP2010 | 6M to 99M   | 15          | Values over 1G, consult factory   |
|          | 100M to 1G  | 20          |                                   |
| CRHP2510 | 10M to 99M  | 10          | Values over 1G, consult factory   |
|          | 100M to 1G  | 15          |                                   |
| CRHP2512 | 10M to 999M | 10          | Values over 5G, consult factory   |
|          | 1G to 5G    | 25          |                                   |

**DIMENSIONS** in inches (millimeters)

Termination Style A  
(3-sided wraparound)


| MODEL    | LENGTH (L)<br>± 0.006 (0.152) | WIDTH (W)<br>± 0.006 (0.152) | THICKNESS (T)<br>± 0.002 (0.051) |
|----------|-------------------------------|------------------------------|----------------------------------|
| CRHP1206 | 0.125                         | 0.063                        | 0.025                            |
| CRHP1210 | 0.125                         | 0.100                        | 0.025                            |
| CRHP2010 | 0.200                         | 0.100                        | 0.025                            |
| CRHP2510 | 0.250                         | 0.100                        | 0.025                            |
| CRHP2512 | 0.250                         | 0.126                        | 0.025                            |

| TYPE       | TERMINATION MATERIAL | TERMINATION STYLE    | TERMINATION STYLE / MATERIAL CODE | SOLDER TERMINATION CODE                           |
|------------|----------------------|----------------------|-----------------------------------|---------------------------------------------------|
| Solderable | Nickel barrier       | 3-sided (wraparound) | AF                                | E or T (standard);<br>F (optional) <sup>(1)</sup> |
|            | Non-magnetic         | 3-sided (wraparound) | AG                                | E or T (standard);<br>F (optional) <sup>(1)</sup> |

**Note**
<sup>(1)</sup> Standard solder plating for the nickel barrier and non-magnetic parts is solder terminations E or T.  
Hot solder dipped termination F is also available

**PERFORMANCE**

| TEST                           | CONDITIONS OF TEST                                    | TEST RESULTS<br>(TYPICAL TEST LOTS) |
|--------------------------------|-------------------------------------------------------|-------------------------------------|
| Life                           | MIL-STD-202, method 108, 1000 h rated power at +70 °C | ≤ ± 0.5 %                           |
| High temperature exposure      | MIL-STD-202, method 108                               | ≤ ± 0.2 %                           |
| Low temperature operation      | MIL-PRF-55342, paragraph 4.8.5                        | ≤ ± 0.05 %                          |
| Resistance to bonding exposure | MIL-STD-202, methods 210                              | ≤ ± 0.1 %                           |
| Moisture resistance            | MIL-PRF-55342, paragraph 4.8.9                        | ≤ ± 0.06 %                          |
| Solder mounting integrity      | MIL-PRF-55342, paragraph 4.8.13, 2 kg for 30 s        | No evidence of mechanical damage    |
| Solderability                  | MIL-STD-202, method 208                               | 95 % coverage                       |



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