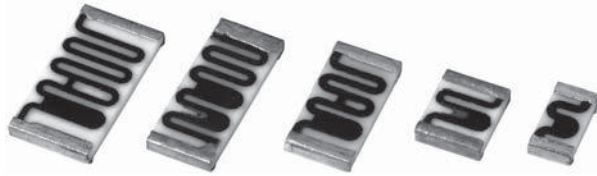


## Thick Film Chip Resistors, High Voltage



### FEATURES

- High voltage up to 3000 V
- Outstanding stability < 0.5 %
- Flow solderable
- Custom sizes available
- Automatic placement capability
- Tape and reel packaging available
- Termination style: 3-sided wraparound termination or single termination flip chip standard; 5-sided wraparound termination available
- Internationally standardized sizes
- Suitable for solderable, epoxy bondable, or wire bondable applications
- Termination material: solder-coated nickel barrier or solder coated non-magnetic terminations standard; gold, palladium silver, platinum gold, platinum silver or platinum palladium gold terminations available
- 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)



**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 |
| CRHV1206                           | 1206      | 0.30  | 1500  | 2M to 100M                                  | 0.5                                 | 100   |
|                                    |           |   |   | 2M to 1G                                    | 1, 2, 5, 10, 20                     |   |
|                                    |           |   |   | 1.1G to 8G                                  | 2, 5, 10, 20                        |   |
| CRHV1210                           | 1210      | 0.45  | 1750  | 4M to 100M                                  | 0.5                                 | 100   |
|                                    |           |   |   | 4M to 1G                                    | 1, 2, 5, 10, 20                     |   |
|                                    |           |   |   | 1.1G to 10G                                 | 2, 5, 10, 20                        |   |
| CRHV2010                           | 2010      | 0.50  | 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                           |   |
| CRHV2510                           | 2510      | 0.60  | 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                           |   |
| CRHV2512                           | 2512      | 1.0   | 3000  | 12M to 100M                                 | 0.5                                 | 100   |
|                                    |           |   |   | 12M 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. The TC for "AA" option is typically 200 ppm

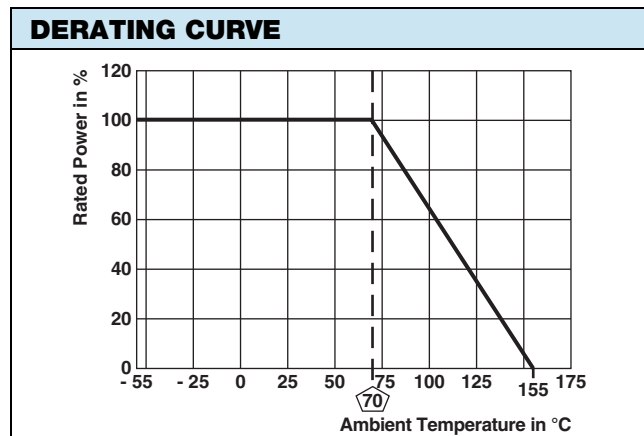
| GLOBAL PART NUMBER INFORMATION   |                                      |  |   |  |  |   |  |   |   |   |   |   |   |   |   |   |   |
|--|--------------------------------------|--|---|--|--|---|--|---|---|---|---|---|---|---|---|---|---|
| New Global Part Numbering: CRHV1206AF100MFKFB (preferred part number format)   |                                      |  |   |  |  |   |  |   |   |   |   |   |   |   |   |   |   |
| C  | R                                    | H  | V   | 1  | 2  | 0   | 6  | A   | F | 1 | 0 | 0 | M | F | K | F | B |
| GLOBAL MODEL   | SIZE                                 | TERMINAL STYLE                             | TERMINAL MATERIAL   | RESISTANCE VALUE   | TOLERANCE  | TCR   | SOLDER TERMINATION   | PACKAGING   |   |   |   |   |   |   |   |   |   |
| CRHV   | 1206<br>1210<br>2010<br>2510<br>2512 | A = 3-sided<br>B = top only<br>C = 5-sided | F = nickel barrier<br>G = non-magnetic<br>A = palladium silver<br>B = platinum gold<br>C = gold<br>D = platinum silver<br>E = platinum palladium gold | M = MΩ<br>G = GΩ<br>4M70 = 4.7 MΩ<br>10M0 = 10 MΩ<br>1G00 = 1 GΩ | D = ± 0.5 %<br>F = ± 1 %<br>G = ± 2 %<br>J = ± 5 %<br>K = ± 10 %<br>M = ± 20 % | K = 100 ppm<br>L = 150 ppm<br>N = 200 ppm<br>R = 250 ppm<br>M = 300 ppm<br>W = 350 ppm<br>P = 500 ppm | E = Sn100<br>F = Sn95/Ag5, HSD<br>N = No solder<br>S = Sn62/Pb36/Ag2, HSD<br>T = Sn90/Pb10 | B = bulk<br>F = T/R (full reel)<br>1 = T/R (1000 pcs)<br>5 = T/R (500 pcs)<br>T = T/R (250 pcs min.)<br>W = waffle tray |   |   |   |   |   |   |   |   |   |
| Historical Part Numbering: CRHV1206AF1006F100e2 (will continue to be accepted) |                                      |  |   |  |  |   |  |   |   |   |   |   |   |   |   |   |   |
| CRHV   | 1206                                 | A  | F   | 1006   | F  | 100   | e2   |   |   |   |   |   |   |   |   |   |   |
| HISTORICAL MODEL   | SIZE                                 | TERM STYLE                                 | TERM MATERIAL   | RESISTANCE VALUE   | TOLERANCE  | TCR   | SOLDER TERMINATION   |   |   |   |   |   |   |   |   |   |   |

**Note**

- For additional information on packaging, refer to the Surface Mount Resistor Packaging document ([www.vishay.com/doc?31543](http://www.vishay.com/doc?31543))

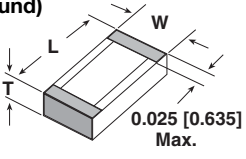
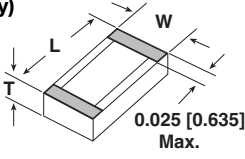
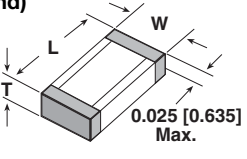
| MECHANICAL SPECIFICATIONS |   |
|---------------------------|---|
| Resistive element         | Ruthenium oxide   |
| Encapsulation             | Glass   |
| Substrate                 | 96 % alumina  |
| Termination               | Solder-coated nickel barrier or solder coated non-magnetic terminations standard. Gold, palladium silver, platinum gold, platinum silver, platinum palladium gold terminations available. |
| Solder finish             | Pure tin or tin/lead solder alloys standard. Tin/silver or tin/lead/silver solder alloys 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                                     |


**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              |
| CRHV1206                                | 2M to 199M  | 25          | Values over 200M, consult factory |
| CRHV1210                                | 4M to 200M  | 25          | Values over 200M, consult factory |
| CRHV2010                                | 6M to 99M   | 15          | Values over 1G, consult factory   |
|   | 100M to 1G  | 20          |                                   |
| CRHV2510                                | 10M to 99M  | 10          | Values over 1G, consult factory   |
|   | 100M to 1G  | 15          |                                   |
| CRHV2512                                | 12M to 999M | 10          | Values over 5G, consult factory   |
|   | 1G to 5G    | 25          |                                   |

| DIMENSIONS in inches (millimeters)   |  |              |  |   |
|--|--|--------------|--|---|
| <b>Termination Style A</b><br>(3-sided wraparound)  | <b>Termination Style B</b><br>(Top conductor only)  |              |  |   |
|  | <b>Termination Style C</b><br>(5-sided wraparound)    | <b>MODEL</b> | <b>LENGTH (L)</b><br>$\pm 0.006$ (0.152) | <b>WIDTH (W)</b><br>$\pm 0.006$ (0.152) |
|  | CRHV1206   | 0.125        | 0.063                                    | 0.025                                   |
|  | CRHV1210   | 0.125        | 0.100                                    | 0.025                                   |
|  | CRHV2010   | 0.200        | 0.100                                    | 0.025                                   |
|  | CRHV2510   | 0.250        | 0.100                                    | 0.025                                   |
|  | CRHV2512   | 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 or S (optional) <sup>(3)</sup> |
|                                  |                                 | Top only (flip chip) | BF                               |  |
|                                  | Non-magnetic                    | 3-sided (wraparound) | AG                               | E or T (standard);<br>F or S (optional) <sup>(3)</sup> |
|                                  |                                 | Top only (flip chip) | BG                               |  |
| Epoxy bondable/<br>solderable    | Platinum palladium gold         | 3-sided (wraparound) | AE                               | N (standard);<br>F or S (optional) <sup>(1)</sup>      |
|                                  |                                 | Top only (flip chip) | BE                               |  |
|                                  |                                 | 5-sided (wraparound) | CE                               |  |
| Wire bondable/<br>Epoxy bondable | Gold                            | 3-sided (wraparound) | AC                               | N  |
|                                  |                                 | Top only (flip chip) | BC                               |  |
|                                  |                                 | 5-sided (wraparound) | CC                               |  |
| Epoxy bondable                   | Palladium silver <sup>(2)</sup> | 3-sided (wraparound) | AA                               | N  |
|                                  |                                 | Top only (flip chip) | BA                               |  |
|                                  |                                 | 5-sided (wraparound) | CA                               |  |
|                                  | Platinum gold                   | 3-sided (wraparound) | AB                               |  |
|                                  |                                 | Top only (flip chip) | BB                               |  |
|                                  |                                 | 5-sided (wraparound) | CB                               |  |
|                                  | Platinum silver                 | 3-sided (wraparound) | AD                               |  |
|                                  |                                 | Top only (flip chip) | BD                               |  |
|                                  |                                 | 5-sided (wraparound) | CD                               |  |

**Notes**

- (1) Use solder termination N for applications requiring epoxy bondable mounting, and solder terminations F or S for applications requiring solderable mounting
- (2) While not recommended, palladium silver terminations could be used for solderable applications when using a solder alloy containing silver. If the solder paste being used to solder the palladium silver terminated parts to the boards does not have a silver-based composition, then the silver in the terminations could begin to leach when it is exposed to liquid non-silver-based solders, causing the potential for solderability and/or solder joint issues
- (3) Standard solder plating for the nickel barrier and non-magnetic parts is solder terminations E or T. Hot solder dipped terminations F or S are also available

| PERFORMANCE                    |   |                                  |
|--------------------------------|---|----------------------------------|
| TEST                           | CONDITIONS OF TEST                                    | TEST RESULTS (TYPICAL TEST LOTS) |
| Life                           | MIL-STD-202, method 108, 1000 h rated power at +70 °C | $\leq \pm 0.5$ %                 |
| High temperature exposure      | MIL-STD-202, method 108                               | $\leq \pm 0.2$ %                 |
| Low temperature operation      | MIL-PRF-55342, paragraph 4.8.5                        | $\leq \pm 0.05$ %                |
| Resistance to bonding exposure | MIL-STD-202, methods 210                              | $\leq \pm 0.1$ %                 |
| Moisture resistance            | MIL-PRF-55342, paragraph 4.8.9                        | $\leq \pm 0.06$ %                |
| 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                    |

**Note**

- This summary is based on testing done on values up to 2 G $\Omega$



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