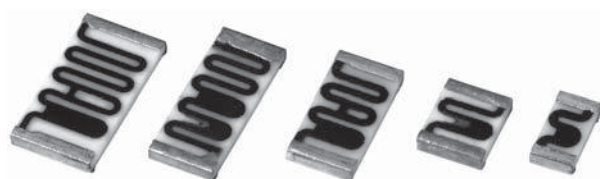


# Thick Film Chip Resistors, High Voltage



## 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)



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>$P_{70\text{ }^{\circ}\text{C}}$<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>$\pm \text{ppm}/^{\circ}\text{C}$ |
|--------------|-----------|-------------------------------------------------------|---------------------------------------------|---------------------------------------------|--------------------------------------|----------------------------------------------------------------------------------------------------|
| 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.

**GLOBAL PART NUMBER INFORMATION**

New Global Part Numbering: CRHV1206AF100MFKFB (preferred part number format)

| 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**

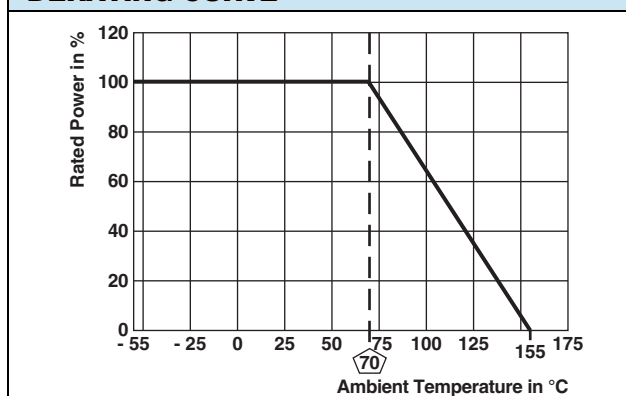
- For additional information on packaging, refer to the Surface Mount Resistor Packaging document ([www.vishay.com/doc?31543](http://www.vishay.com/doc?31543)).

**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**

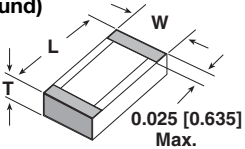
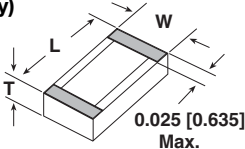
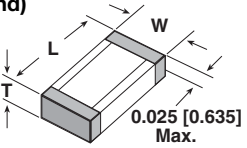
|                       |                                                        |
|-----------------------|--------------------------------------------------------|
| Operating temperature | -55 °C to +155 °C                                      |
| Life                  | Less than 0.5 % change when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

**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              |
|----------|-------------|-------------|-----------------------------------|
| 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><b>(3-sided wraparound)</b>  |  | <b>Termination Style B</b><br><b>(Top conductor only)</b>  |                                      |                                         |
| <b>Termination Style C</b><br><b>(5-sided wraparound)</b>  |  | <b>MODEL</b>                                                                                                                                  | <b>LENGTH (L)</b><br>± 0.006 (0.152) | <b>WIDTH (W)</b><br>± 0.006 (0.152)     |
|                                                                                                                                             |  | CRHV1206                                                                                                                                      | 0.125                                | 0.063                                   |
|                                                                                                                                             |  | CRHV1210                                                                                                                                      | 0.125                                | 0.100                                   |
|                                                                                                                                             |  | CRHV2010                                                                                                                                      | 0.200                                | 0.100                                   |
|                                                                                                                                             |  | CRHV2510                                                                                                                                      | 0.250                                | 0.100                                   |
|                                                                                                                                             |  | CRHV2512                                                                                                                                      | 0.250                                | 0.126                                   |
|                                                                                                                                             |  |                                                                                                                                               |                                      | <b>THICKNESS (T)</b><br>± 0.002 (0.051) |
|                                                                                                                                             |  |                                                                                                                                               |                                      | 0.025                                   |
|                                                                                                                                             |  |                                                                                                                                               |                                      | 0.025                                   |
|                                                                                                                                             |  |                                                                                                                                               |                                      | 0.025                                   |
|                                                                                                                                             |  |                                                                                                                                               |                                      | 0.025                                   |
|                                                                                                                                             |  |                                                                                                                                               |                                      | 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                               |                                                        |
|                                  |                                 | 5-sided (wraparound) | CF                               |                                                        |
|                                  | 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 liquidus 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.



## Disclaimer

ALL PRODUCT, PRODUCT SPECIFICATIONS AND DATA ARE SUBJECT TO CHANGE WITHOUT NOTICE TO IMPROVE RELIABILITY, FUNCTION OR DESIGN OR OTHERWISE.

Vishay Intertechnology, Inc., its affiliates, agents, and employees, and all persons acting on its or their behalf (collectively, "Vishay"), disclaim any and all liability for any errors, inaccuracies or incompleteness contained in any datasheet or in any other disclosure relating to any product.

Vishay makes no warranty, representation or guarantee regarding the suitability of the products for any particular purpose or the continuing production of any product. To the maximum extent permitted by applicable law, Vishay disclaims (i) any and all liability arising out of the application or use of any product, (ii) any and all liability, including without limitation special, consequential or incidental damages, and (iii) any and all implied warranties, including warranties of fitness for particular purpose, non-infringement and merchantability.

Statements regarding the suitability of products for certain types of applications are based on Vishay's knowledge of typical requirements that are often placed on Vishay products in generic applications. Such statements are not binding statements about the suitability of products for a particular application. It is the customer's responsibility to validate that a particular product with the properties described in the product specification is suitable for use in a particular application. Parameters provided in datasheets and/or specifications may vary in different applications and performance may vary over time. All operating parameters, including typical parameters, must be validated for each customer application by the customer's technical experts. Product specifications do not expand or otherwise modify Vishay's terms and conditions of purchase, including but not limited to the warranty expressed therein.

Except as expressly indicated in writing, Vishay products are not designed for use in medical, life-saving, or life-sustaining applications or for any other application in which the failure of the Vishay product could result in personal injury or death. Customers using or selling Vishay products not expressly indicated for use in such applications do so at their own risk. Please contact authorized Vishay personnel to obtain written terms and conditions regarding products designed for such applications.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted by this document or by any conduct of Vishay. Product names and markings noted herein may be trademarks of their respective owners.

## Material Category Policy

**Vishay Intertechnology, Inc. hereby certifies that all its products that are identified as RoHS-Compliant fulfill the definitions and restrictions defined under Directive 2011/65/EU of The European Parliament and of the Council of June 8, 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment (EEE) - recast, unless otherwise specified as non-compliant.**

**Please note that some Vishay documentation may still make reference to RoHS Directive 2002/95/EC. We confirm that all the products identified as being compliant to Directive 2002/95/EC conform to Directive 2011/65/EU.**

**Vishay Intertechnology, Inc. hereby certifies that all its products that are identified as Halogen-Free follow Halogen-Free requirements as per JEDEC JS709A standards. Please note that some Vishay documentation may still make reference to the IEC 61249-2-21 definition. We confirm that all the products identified as being compliant to IEC 61249-2-21 conform to JEDEC JS709A standards.**



Компания «ЭлектроПласт» предлагает заключение долгосрочных отношений при поставках импортных электронных компонентов на взаимовыгодных условиях!

Наши преимущества:

- Оперативные поставки широкого спектра электронных компонентов отечественного и импортного производства напрямую от производителей и с крупнейших мировых складов;
- Поставка более 17-ти миллионов наименований электронных компонентов;
- Поставка сложных, дефицитных, либо снятых с производства позиций;
- Оперативные сроки поставки под заказ (от 5 рабочих дней);
- Экспресс доставка в любую точку России;
- Техническая поддержка проекта, помощь в подборе аналогов, поставка прототипов;
- Система менеджмента качества сертифицирована по Международному стандарту ISO 9001;
- Лицензия ФСБ на осуществление работ с использованием сведений, составляющих государственную тайну;
- Поставка специализированных компонентов (Xilinx, Altera, Analog Devices, Intersil, Interpoint, Microsemi, Aeroflex, Peregrine, Syfer, Eurofarad, Texas Instrument, Miteq, Cobham, E2V, MA-COM, Hittite, Mini-Circuits, General Dynamics и др.);

Помимо этого, одним из направлений компании «ЭлектроПласт» является направление «Источники питания». Мы предлагаем Вам помощь Конструкторского отдела:

- Подбор оптимального решения, техническое обоснование при выборе компонента;
- Подбор аналогов;
- Консультации по применению компонента;
- Поставка образцов и прототипов;
- Техническая поддержка проекта;
- Защита от снятия компонента с производства.



#### Как с нами связаться

**Телефон:** 8 (812) 309 58 32 (многоканальный)

**Факс:** 8 (812) 320-02-42

**Электронная почта:** [org@eplast1.ru](mailto:org@eplast1.ru)

**Адрес:** 198099, г. Санкт-Петербург, ул. Калинина, дом 2, корпус 4, литера А.