# Pulse Proof Thick Film Chip Resistors



## FEATURES

- High pulse performance, up to 10 kW
- High pulse voltage up to 4 kV, 1.2 µs / 50 µs
- Stability at different environmental conditions $\Delta R/R \leq 1$ % (1000 h rated power at 70 °C)
- AEC-Q200 qualified
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

RoHS COMPLIANT

HALOGEN FREE

## LINKS TO ADDITIONAL RESOURCES

3D Models

The pulse proof thick film chip resistor series is the perfect choice for high pulse load performance resistors. Typical applications include automotive DC-DC converters and on-board chargers, lighting ballasts, and storage drivers.

## APPLICATIONS

- DC-DC converters
- On-board chargers
- Lighting ballasts
- Storage drivers

## TECHNICAL SPECIFICATIONS

| DESCRIPTION | D10/CRCW0402-IF e3 | D11/CRCW0603-IF e3 | D12/CRCW0805-IF e3 | D25/CRCW1206-IF e3 | CRCW1210-IF e3 | CRCW2010-IF e3 | CRCW2512-IF e3 |
|---|---|---|---|---|---|---|---|
| Imperial size | 0402 | 0603 | 0805 | 1206 | 1210 | 2010 | 2512 |
| Metric size code | RR1005M | RR1608M | RR2012M | RR3216M | RR3225M | RR5025M | RR6332M |
| Resistance range | 1 Ω to 100 kΩ | | | | | | |
| Resistance tolerance | ± 10 %; ± 5 % | | | | | | |
| Temperature coefficient | ± 200 ppm/K | | | | | | |
| Rated dissipation, $P_{70}$ (1) | 0.063 W | 0.10 W | 0.125 W | 0.25 W | 0.50 W | 0.75 W | 1.0 W |
| Operating voltage, $U_{max.}$ $AC_{RMS}$/DC | 50 V | 75 V | 150 V | 200 V | 200 V | 400 V | 500 V |
| Permissible film temperature, $\vartheta_{F\ max.}$ (1) | 155 °C | | | | | | |
| Operating temperature range | -55 °C to +155 °C | | | | | | |
| Max. resistance change at $P_{70}$ for resistance range, $\lvert\Delta R/R\rvert$ after: | | | | | | | |
| 1000 h | ≤ 1.0 % | | | | | | |
| 8000 h | ≤ 2.0 % | | | | | | |
| Permissible voltage against ambient (insulation): | | | | | | | |
| 1 min, $U_{ins}$ | 75 V | 100 V | 200 V | 300 V | 300 V | 300 V | 300 V |
| Failure rate: $FIT_{observed}$ | ≤ 0.1 x $10^{-9}$/h | | | | | | |

**Note**

(1) Please refer to “Application Information” below



For technical questions, contact: thickfilmchip@vishay.com

THIS DOCUMENT IS SUBJECT TO CHANGE WITHOUT NOTICE. THE PRODUCTS DESCRIBED HEREIN AND THIS DOCUMENT ARE SUBJECT TO SPECIFIC DISCLAIMERS, SET FORTH AT www.vishay.com/doc?91000

## APPLICATION INFORMATION

When the resistor dissipates power, a temperature rise above the ambient temperature occurs, dependent on the thermal resistance of the assembled resistor together with the printed circuit board. The rated dissipation applies only if the permitted film temperature is not exceeded.

These resistors do not feature a limited lifetime when operated within the permissible limits. However, resistance value drift increasing over operating time may result in exceeding a limit acceptable to the specific application, thereby establishing a functional lifetime.

**TEMPERATURE COEFFICIENT AND RESISTANCE RANGE**

| TYPE / SIZE | TCR | TOLERANCE | RESISTANCE | E-SERIES |
|---|---|---|---|---|
| **D10/CRCW0402-IF e3** | ± 200 ppm/K | ± 10 %<br>± 5 % | 1.0 Ω to 100 kΩ | E24 |
| **D11/CRCW0603-IF e3** | ± 200 ppm/K | ± 10 %<br>± 5 % | 1.0 Ω to 100 kΩ | E24 |
| **D12/CRCW0805-IF e3** | ± 200 ppm/K | ± 10 %<br>± 5 % | 1.0 Ω to 100 kΩ | E24 |
| **D25/CRCW1206-IF e3** | ± 200 ppm/K | ± 10 %<br>± 5 % | 1.0 Ω to 100 kΩ | E24 |
| **CRCW1210-IF e3** | ± 200 ppm/K | ± 10 %<br>± 5 % | 1.0 Ω to 100 kΩ | E24 |
| **CRCW2010-IF e3** | ± 200 ppm/K | ± 10 %<br>± 5 % | 1.0 Ω to 100 kΩ | E24 |
| **CRCW2512-IF e3** | ± 200 ppm/K | ± 10 %<br>± 5 % | 1.0 Ω to 100 kΩ | E24 |

**PACKAGING**

| TYPE / SIZE | CODE | QUANTITY | PACKAGING STYLE | WIDTH | PITCH | PACKAGING DIMENSIONS |
|---|---|---|---|---|---|---|
| **D10/CRCW0402-IF e3** | ED = ET7 | 10 000 | Paper tape according to IEC 60286-3, type 1a | 8 mm | 2 mm | Ø 180 mm / 7" |
| | EE = EF4 | 50 000 | | | | Ø 330 mm / 13" |
| **D11/CRCW0603-IF e3** | EI = ET2 | 5000 | | 8 mm | 2 mm | Ø 180 mm / 7" |
| | ED = ET3 | 10 000 | | | | Ø 180 mm / 7" |
| | EE = ET8 | 50 000 | | | | Ø 330 mm / 13" |
| | EA = ET1 | 5000 | | | 4 mm | Ø 180 mm / 7" |
| | EC = ET6 | 20 000 | | | | Ø 330 mm / 13" |
| **D12/CRCW0805-IF e3** | EA = ET1 | 5000 | | 8 mm | 4 mm | Ø 180 mm / 7" |
| | EC = ET6 | 20 000 | | | | Ø 330 mm / 13" |
| **D25/CRCW1206-IF e3** | EA = ET1 | 5000 | | 8 mm | 4 mm | Ø 180 mm / 7" |
| | EC = ET6 | 20 000 | | | | Ø 330 mm / 13" |
| **CRCW1210-IF e3** | EA = ET1 | 5000 | | 8 mm | 4 mm | Ø 180 mm / 7" |
| | EC = ET6 | 20 000 | | | | Ø 330 mm / 13" |
| **CRCW2010-IF e3** | EF = E02 | 4000 | Blister tape according to IEC 60286-3 type 2a | 12 mm | 4 mm | Ø 180 mm / 7" |
| **CRCW2512-IF e3** | EG = E67 | 2000 | | 12 mm | 8 mm | Ø 180 mm / 7" |
| | EH = E82 | 4000 | | | 4 mm | |


For technical questions, contact: thickfilmchip@vishay.com
THIS DOCUMENT IS SUBJECT TO CHANGE WITHOUT NOTICE. THE PRODUCTS DESCRIBED HEREIN AND THIS DOCUMENT ARE SUBJECT TO SPECIFIC DISCLAIMERS, SET FORTH AT www.vishay.com/doc?91000

## PART NUMBER AND PRODUCT DESCRIPTION

**Part Number: CRCW08051R00JNEAIF**

| C | R | C | W | 0 | 8 | 0 | 5 | 1 | R | 0 | 0 | J | N | E | A | I | F |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|

| TYPE | VALUE | TOLERANCE | TCR | PACKAGING | SPECIAL |
|---|---|---|---|---|---|
| **CRCW0402**<br>**CRCW0603**<br>**CRCW0805**<br>**CRCW1206**<br>**CRCW1210**<br>**CRCW2010**<br>**CRCW2512** | **R** = decimal<br>**K** = thousand | **J** = ± 5 %<br>**K** = ± 10 % | **N** = ± 200 ppm/K | **EA, EC, ED, EE, EF, EG, EH, EI** | Up to 2 digits<br>**IF** = pulse proof |

**Product Description: D12/CRCW0805-IF 200 1R0 5 % ET1 e3**

| D12/CRCW0805-IF | 200 | 1R0 | 5 % | ET1 | e3 |
|---|---|---|---|---|---|
| TYPE | TCR | RESISTANCE VALUE | TOLERANCE | PACKAGING | LEAD (Pb)-FREE |
| **D10/CRCW0402-IF**<br>**D11/CRCW0603-IF**<br>**D12/CRCW0805-IF**<br>**D25/CRCW1206-IF**<br>**CRCW1210-IF**<br>**CRCW2010-IF**<br>**CRCW2512-IF** | ± **200** ppm/K | **1R0** = 1 Ω<br>**10K** = 10 kΩ | ± **5 %**<br>± **10 %** | **ET1, ET2, ET3, ET6, ET7, ET8, EF4, E02, E67, E82** | **e3** = pure tin termination finish |



For technical questions, contact: thickfilmchip@vishay.com

THIS DOCUMENT IS SUBJECT TO CHANGE WITHOUT NOTICE. THE PRODUCTS DESCRIBED HEREIN AND THIS DOCUMENT ARE SUBJECT TO SPECIFIC DISCLAIMERS, SET FORTH AT www.vishay.com/doc?91000

## DESCRIPTION

Production is strictly controlled and follows an extensive set of instructions established for reproducibility. A cermet film layer and a glass-over are deposited on a high grade ($Al_2O_3$) ceramic substrate with its prepared inner contacts. The resistor elements are covered by a protective coating designed for electrical, mechanical and climatic protection. The terminations receive a final pure tin on nickel plating. The result of the determined production is verified by an extensive testing procedure on 100 % of the individual chip resistors. Only accepted products are laid directly into the tape in accordance with **IEC 60286-3 Type 1a and Type 2a** [(1)].

## ASSEMBLY

The resistors are suitable for processing on automatic SMD assembly systems. They are suitable for automatic soldering using wave, reflow or vapor phase as shown in **IEC 61760-1** [(1)]. The encapsulation is resistant to all cleaning solvents commonly used in the electronics industry, including alcohols, esters and aqueous solutions. The suitability of conformal coatings, potting compounds and their processes, if applied, shall be qualified by appropriate means to ensure the long-term stability of the whole system.

The resistors are RoHS-compliant, the pure tin plating provides compatibility with lead (Pb)-free and lead-containing soldering processes. Solderability is specified for 2 years after production or requalification. The permitted storage time is 20 years. The immunity of the plating against tin whisker growth has been proven under extensive testing.

## MATERIALS

Vishay acknowledges the following systems for the regulation of hazardous substances:

- IEC 62474, Material Declaration for Products of and for the Electrotechnical Industry, with the list of declarable substances given therein [(2)]
- The Global Automotive Declarable Substance List (GADSL) [(3)]
- The REACH regulation (1907/2006/EC) and the related list of substances with very high concern (SVHC) [(4)] for its supply chain

The products do not contain any of the banned substances as per IEC 62474, GADSL, or the SVHC list, see www.vishay.com/how/leadfree.

Hence the products fully comply with the following directives:

- 2000/53/EC End-of-Life Vehicle Directive (ELV) and Annex II (ELV II)
- 2011/65/EU Restriction of the Use of Hazardous Substances Directive (RoHS) with amendment 2015/863/EU
- 2012/19/EU Waste Electrical and Electronic Equipment Directive (WEEE)

Vishay pursues the elimination of conflict minerals from its supply chain, see the Conflict Minerals Policy at www.vishay.com/doc?49037.

## APPROVALS

The resistors are qualified according to AEC-Q200.

Where applicable, the resistors are tested in accordance with **EN 140401-802** which refers to **EN 60115-1**, **EN 60115-8** and the variety of environmental test procedures of the **IEC 60068** [(1)] series.

## RELATED PRODUCTS

For more information about pulse proof and high power products please refer to CRCW-HP e3, “Pulse Proof, High Power Thick Film Chip Resistors” datasheet (www.vishay.com/doc?20043)

For anti-surge and high power products, please refer to RCS e3, “Anti-Surge, High Power Thick Film Chip Resistors” datasheet (www.vishay.com/doc?20065)

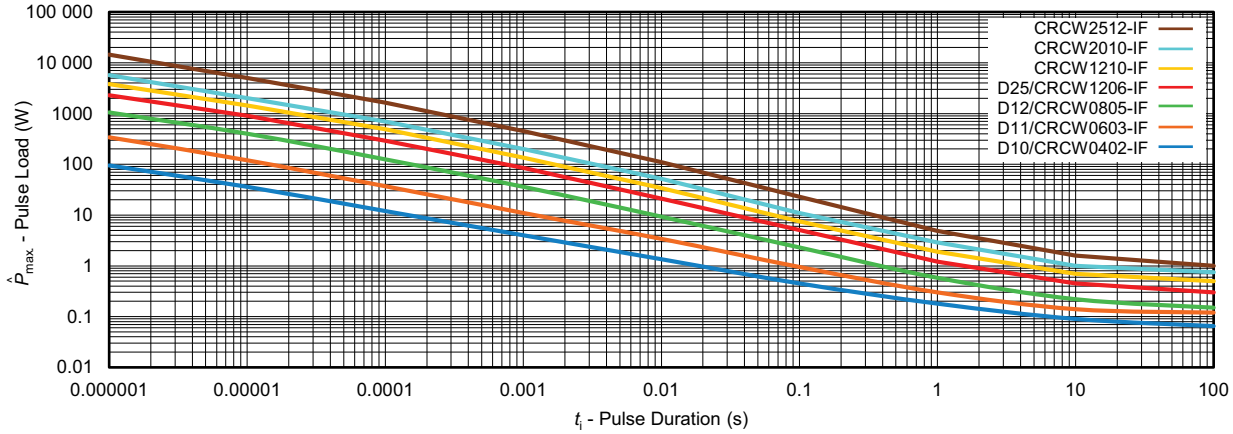
**Notes**

(1) The quoted IEC standards are also released as EN standards with the same number and identical contents
(2) The IEC 62474 list of declarable substances is maintained in a dedicated database, which is available at http://std.iec.ch/iec62474
(3) The Global Automotive Declarable Substance List (GADSL) is maintained by the American Chemistry Council and available at www.gadsl.org
(4) The SVHC list is maintained by the European Chemical Agency (ECHA) and available at http://echa.europa.eu/candidate-list-table


For technical questions, contact: thickfilmchip@vishay.com
THIS DOCUMENT IS SUBJECT TO CHANGE WITHOUT NOTICE. THE PRODUCTS DESCRIBED HEREIN AND THIS DOCUMENT ARE SUBJECT TO SPECIFIC DISCLAIMERS, SET FORTH AT www.vishay.com/doc?91000

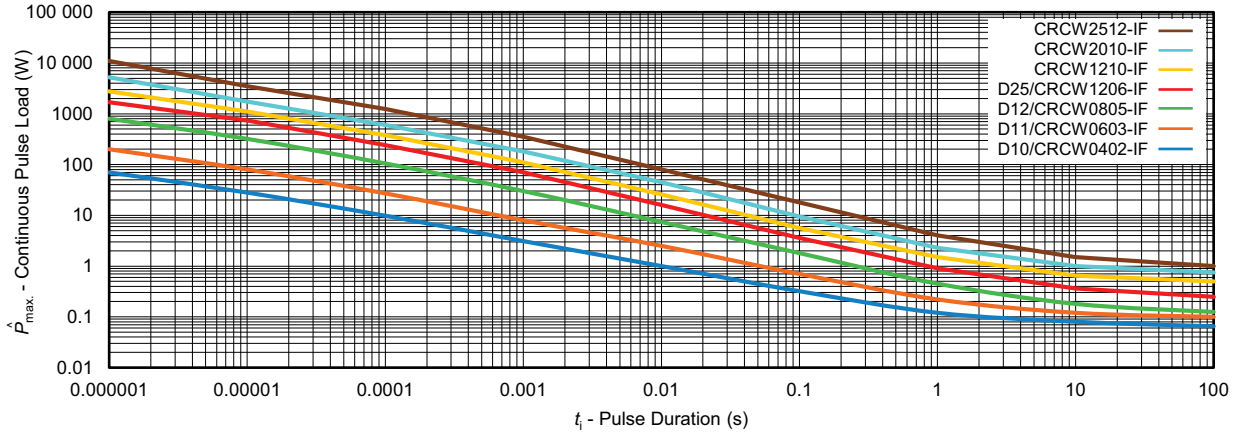
## FUNCTIONAL PERFORMANCE

### Single Pulse



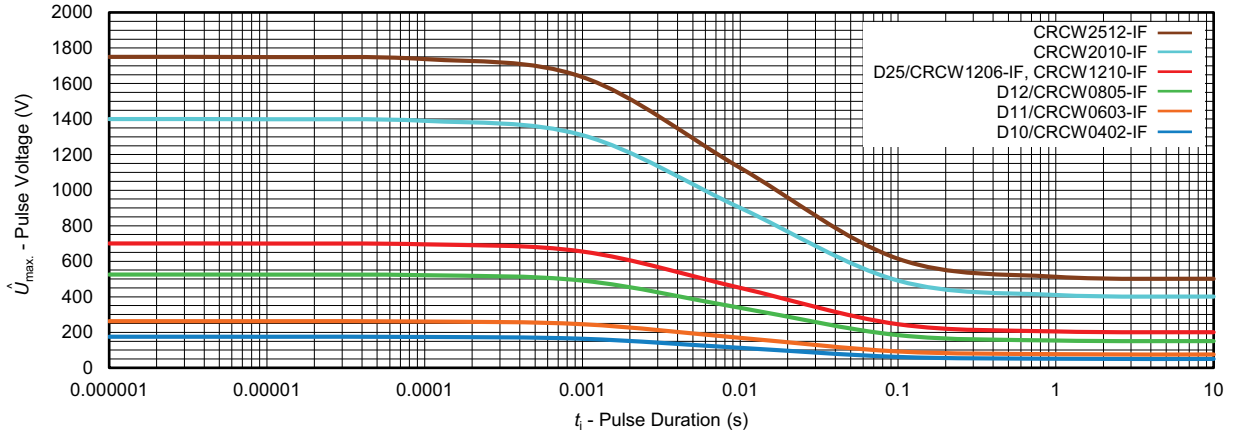

Maximum pulse load, single pulse; applicable if $\overline{P} \rightarrow 0$ and n < 1000 and $\hat{U} = \hat{U}_{max.}$;
for permissible resistance change equivalent to 8000 h operation

### Continuous Pulse




Maximum pulse load, continuous pulses; applicable if $\overline{P} \leq P\ (\vartheta_{amb})$ and $\hat{U} = \hat{U}_{max.}$;
for permissible resistance change equivalent to 8000 h operation

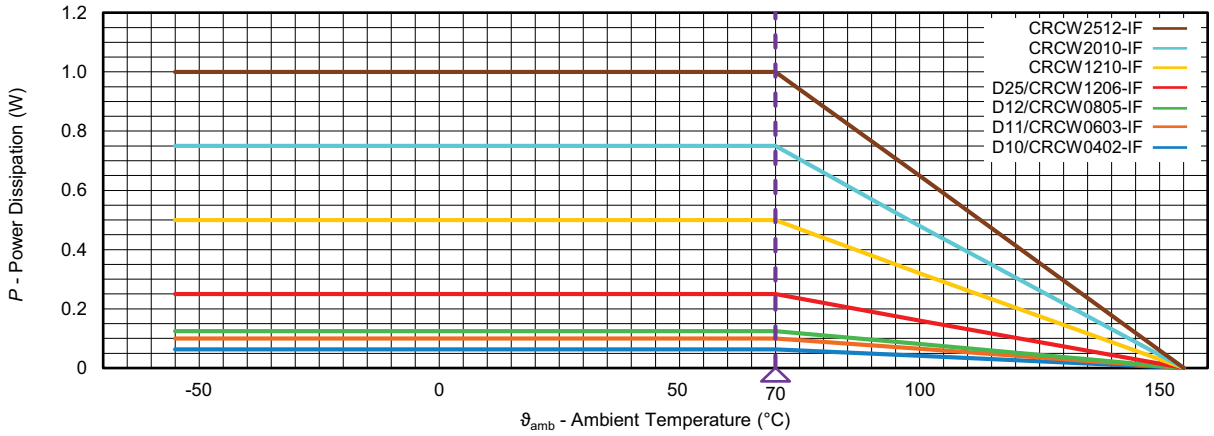
### Pulse Voltage



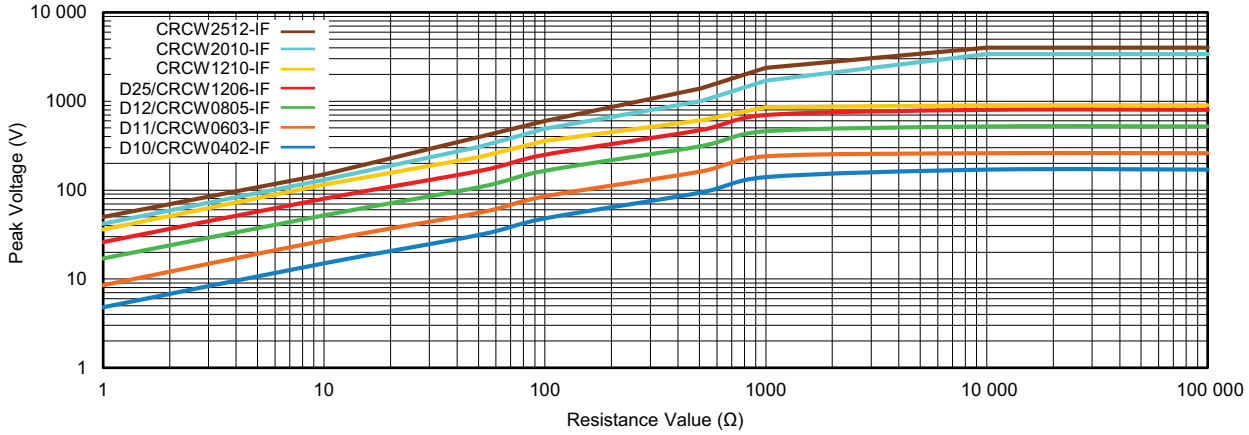

Maximum pulse voltage, single and continuous pulses; applicable if $\hat{P} = \hat{P}_{max.}$;
for permissible resistance change equivalent to 8000 h operation


For technical questions, contact: thickfilmchip@vishay.com
THIS DOCUMENT IS SUBJECT TO CHANGE WITHOUT NOTICE. THE PRODUCTS DESCRIBED HEREIN AND THIS DOCUMENT ARE SUBJECT TO SPECIFIC DISCLAIMERS, SET FORTH AT www.vishay.com/doc?91000

### Derating

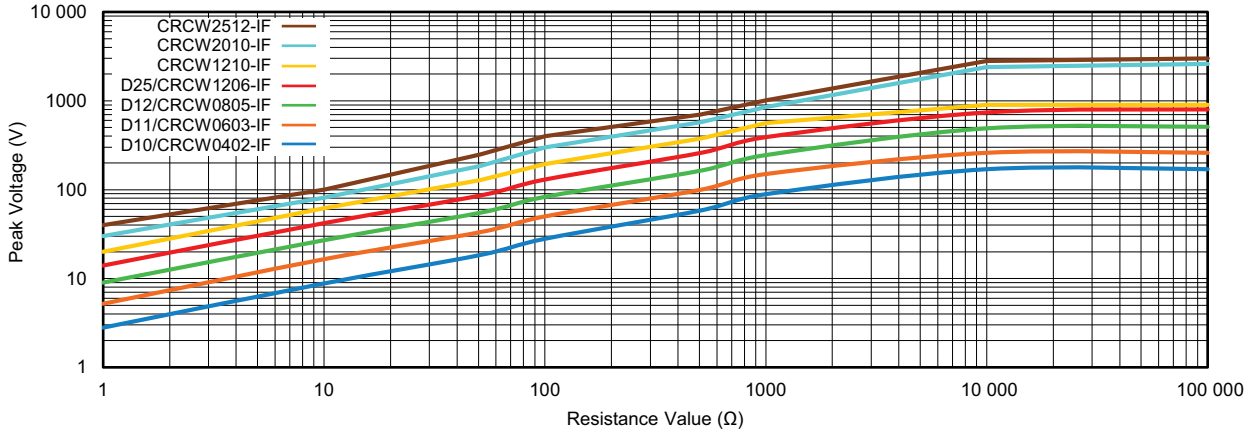



### 1.2 µs / 50 µs Pulse




Pulse load rating in accordance to EN 60115-1, 4.27; 1.2 µs / 50 µs;
5 pulses at 12 s intervals; for permissible resistance change 1 %

### 10 µs / 700 µs Pulse




Pulse load rating in accordance to EN 60115-1, 4.27; 10 µs / 700 µs;
10 pulses at 1 min intervals; for permissible resistance change 1 %


For technical questions, contact: thickfilmchip@vishay.com
THIS DOCUMENT IS SUBJECT TO CHANGE WITHOUT NOTICE. THE PRODUCTS DESCRIBED HEREIN AND THIS DOCUMENT ARE SUBJECT TO SPECIFIC DISCLAIMERS, SET FORTH AT www.vishay.com/doc?91000

## TESTS AND REQUIREMENTS

All executed tests are carried out in accordance with the following specifications:

EN 60115-1, generic specification

EN 60115-8 (successor of EN 140400), sectional specification

EN 140401-802, detail specification

IEC 60068-2-xx, test methods

The parameters stated in the Test Procedures and Requirements table are based on the required tests and permitted limits of EN 140401-802. The table presents only the most important tests, for the full test schedule refer to the documents listed above. However, some additional tests and a number of improvements against those minimum requirements have been included.

The testing also covers most of the requirements specified by EIA/IS-703 and JIS-C-5201-1.

The tests are carried out under standard atmospheric conditions in accordance with IEC 60068-1, 4.3, whereupon the following values are applied:

Temperature: 15 °C to 35 °C

Relative humidity: 25 % to 75 %

Air pressure: 86 kPa to 106 kPa (860 mbar to 1060 mbar).

A climatic category LCT / UCT / 56 is applied, defined by the lower category temperature (LCT), the upper category temperature (UCT), and the duration of exposure in the damp heat, steady state test (56 days). The components are mounted for testing on boards in accordance with EN 60115-8, 2.4.2 unless otherwise specified.

**TEST PROCEDURES AND REQUIREMENTS**

| EN 60115-1 CLAUSE | IEC 60068-2 [1] TEST METHOD | TEST | PROCEDURE | REQUIREMENTS PERMISSIBLE CHANGE ($\Delta R$) |
|---|---|---|---|---|
| | | | | STABILITY CLASS 2 OR BETTER |
| | | | Stability for product types: | 1 Ω to 100 kΩ |
| | | | D/CRCW-IF e3 | |
| 4.5 | - | Resistance | - | ± 5 %; ± 10 % |
| 4.8 | - | Temperature coefficient | At (20 / -55 / 20) °C and (20 / 125 / 20) °C | ± 200 ppm/K |
| 4.25.1 | - | Endurance at 70 °C | $U = \sqrt{P_{70} \times R} \leq U_{max.}$<br>1.5 h on; 0.5 h off<br>70 °C; 1000 h<br>70 °C; 8000 h | <br><br>± (1 % $R$ + 0.05 Ω)<br>± (2 % $R$ + 0.1 Ω) |
| 4.25.3 | - | Endurance at upper category temperature | 155 °C; 1000 h | ± (1 % $R$ + 0.05 Ω) |
| 4.24 | 78 (Cab) | Damp heat, steady state | (40 ± 2) °C;<br>(93 ± 3) % RH;<br>56 days | ± (1 % $R$ + 0.05 Ω) |
| 4.37 | 67 (Cy) | Damp heat, steady state, accelerated | (85 ± 2) °C; (85 ± 5) % RH;<br>$U = \sqrt{0.1 \times P_{85} \times R}$; $U \leq 100$ V;<br>1000 h | ± (1 % $R$ + 0.05 Ω) |
| 4.23 | - | Climatic sequence: | | ± (1 % $R$ + 0.05 Ω) |
| 4.23.2 | 2 (Ba) | Dry heat | 125 °C; 16 h | |
| 4.23.3 | 30 (Db) | Damp heat, cyclic | 55 °C; 24 h; ≥ 90 % RH; 1 cycle | |
| 4.23.4 | 1 (Ab) | Cold | -55 °C; 2 h | |
| 4.23.5 | 13 (M) | Low air pressure | 8.5 kPa; 2 h; (25 ± 10) °C | |
| 4.23.6 | 30 (Db) | Damp heat, cyclic | 55 °C; 5 days; > 90 % RH; 5 cycles | |
| 4.23.7 | - | DC load | $U = \sqrt{P_{70} \times R} \leq U_{max.}$; 1 min | |
| - | 1 (Aa) | Cold | -55 °C; 2 h | ± (0.25 % $R$ + 0.05 Ω) |
| 4.19 | 14 (Na) | Rapid change of temperature | 30 min. at -55 °C and 30 min. at 125 °C<br>1000 cycles | ± (1 % $R$ + 0.05 Ω) |
| 4.13 | - | Short time overload | $U = 2.5 \times \sqrt{(P_{70} \times R)} \leq 2 \times U_{max.}$;<br>whichever is the less severe; 5 s | ± (2 % $R$ + 0.05 Ω) |
| 4.27 | - | Single pulse high voltage overload | Severity no. 4:<br>$U = 10 \times \sqrt{P_{70} \times R}$<br>or $U \leq 2 \times U_{max.}$;<br>whichever is the less severe;<br>10 pulses 10 µs / 700 µs | ± (1 % $R$ + 0.05 Ω) |


For technical questions, contact: thickfilmchip@vishay.com
THIS DOCUMENT IS SUBJECT TO CHANGE WITHOUT NOTICE. THE PRODUCTS DESCRIBED HEREIN AND THIS DOCUMENT ARE SUBJECT TO SPECIFIC DISCLAIMERS, SET FORTH AT www.vishay.com/doc?91000

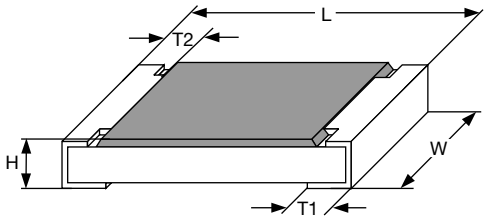
| TEST PROCEDURES AND REQUIREMENTS | | | | |
|---|---|---|---|---|
| EN 60115-1 CLAUSE | IEC 60068-2 [1] TEST METHOD | TEST | PROCEDURE | REQUIREMENTS PERMISSIBLE CHANGE ($\Delta R$) |
| | | | | STABILITY CLASS 2 OR BETTER |
| | | | Stability for product types: | 1 Ω to 100 kΩ |
| | | | D/CRCW-IF e3 | |
| 4.39 | - | Periodic electric overload | $U = \sqrt{15 \times P_{70} \times R}$<br>$U \leq 2 \times U_{max.}$;<br>whichever is the less severe;<br>0.1 s on; 2.5 s off; 1000 cycles | ± (1 % $R$ + 0.05 Ω)<br>no visible damage |
| 4.38 | - | Electrostatic discharge (human body model) | IEC 61340-3-1 [1];<br>3 positive + 3 negative discharges;<br>ESD voltage according to the size | ± (1 % $R$ + 0.05 Ω) |
| 4.22 | 6 (Fc) | Vibration | Endurance by sweeping;<br>10 Hz to 2000 Hz;<br>no resonance;<br>amplitude ≤ 1.5 mm or ≤ 200 m/s$^2$;<br>7.5 h | ± (0.25 % $R$ + 0.05 Ω)<br>no visible damage |
| 4.17 | 58 (Td) | Solderability | Solder bath method,<br>Sn60Pb40; non-activated flux<br>(235 ± 5) °C; (2 ± 0.2) s | Good tinning (≥ 95 % covered);<br>no visible damage |
| | | | Solder bath method,<br>Sn96.5Ag3Cu0.5 or Sn99.3Cu0.7;<br>non-activated flux<br>(245 ± 5) °C or (250 ± 5) °C;<br>(3 ± 0.3) s | |
| 4.18 | 58 (Td) | Resistance to soldering heat | Soldering bath method;<br>(260 ± 5) °C; (10 ± 1) s | ± (0.25 % $R$ + 0.05 Ω) |
| 4.29 | 45 (XA) | Component solvent resistance | Isopropyl alcohol;<br>+50 °C; method 2 | No visible damage |
| 4.32 | 21 ($Ue_3$) | Shear (adhesion) | CRCW0402-IF: 9 N<br>CRCW0603-IF to CRCW2512-IF: 17.7 N | No visible damage |
| 4.33 | 21 ($Ue_1$) | Substrate bending | Depth 2 mm; 3 times | ± (0.25 % $R$ + 0.05 Ω)<br>no visible damage,<br>no open circuit in bent position |
| 4.7 | - | Voltage proof | $U$ = 1.4 x $U_{ins}$; 60 s | No flashover or breakdown |
| 4.35 | - | Flammability, needle flame test | IEC 60695-11-5 [1];<br>10 s | No burning after 30 s |

**Note**

[1] The quoted IEC standards are also released as EN standards with the same number and identical contents

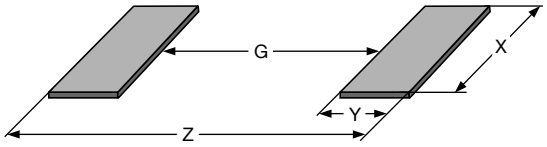

For technical questions, contact: thickfilmchip@vishay.com
THIS DOCUMENT IS SUBJECT TO CHANGE WITHOUT NOTICE. THE PRODUCTS DESCRIBED HEREIN AND THIS DOCUMENT ARE SUBJECT TO SPECIFIC DISCLAIMERS, SET FORTH AT www.vishay.com/doc?91000

## DIMENSIONS




| DIMENSIONS AND MASS | | | | | | |
|---|---|---|---|---|---|---|
| TYPE / SIZE | L (mm) | W (mm) | H (mm) | T1 (mm) | T2 (mm) | MASS (mg) |
| D10/CRCW0402-IF e3 | 1.0 ± 0.05 | 0.5 ± 0.05 | 0.35 ± 0.05 | 0.25 ± 0.10 | 0.2 ± 0.10 | 0.65 |
| D11/CRCW0603-IF e3 | 1.55 + 0.10 / - 0.05 | 0.85 ± 0.1 | 0.45 ± 0.05 | 0.3 ± 0.20 | 0.3 ± 0.20 | 2 |
| D12/CRCW0805-IF e3 | 2.0 + 0.20 / - 0.10 | 1.25 ± 0.15 | 0.5 ± 0.10 | 0.3 + 0.20 / - 0.10 | 0.3 ± 0.20 | 5.5 |
| D25/CRCW1206-IF e3 | 3.2 + 0.10 / - 0.20 | 1.6 ± 0.15 | 0.55 ± 0.05 | 0.45 ± 0.20 | 0.4 ± 0.20 | 10 |
| CRCW1210-IF e3 | 3.2 ± 0.20 | 2.5 ± 0.2 | 0.55 ± 0.05 | 0.45 ± 0.20 | 0.4 ± 0.20 | 16 |
| CRCW2010-IF e3 | 5.0 ± 0.15 | 2.5 ± 0.15 | 0.6 ± 0.10 | 0.6 ± 0.20 | 0.6 ± 0.20 | 25.5 |
| CRCW2512-IF e3 | 6.3 ± 0.20 | 3.15 ± 0.15 | 0.6 ± 0.10 | 0.6 ± 0.20 | 0.6 ± 0.20 | 40.5 |

## SOLDER PAD DIMENSIONS




| RECOMMENDED SOLDER PAD DIMENSIONS | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| TYPE / SIZE | WAVE SOLDERING | | | | REFLOW SOLDERING | | | |
| | G (mm) | Y (mm) | X (mm) | Z (mm) | G (mm) | Y (mm) | X (mm) | Z (mm) |
| D10/CRCW0402-IF e3 | - | - | - | - | 0.45 | 0.60 | 0.60 | 1.65 |
| D11/CRCW0603-IF e3 | 0.65 | 1.10 | 1.25 | 2.85 | 0.75 | 0.75 | 1.00 | 2.25 |
| D12/CRCW0805-IF e3 | 0.90 | 1.30 | 1.60 | 3.50 | 1.00 | 0.95 | 1.45 | 2.90 |
| D25/CRCW1206-IF e3 | 1.40 | 1.40 | 1.95 | 4.20 | 1.50 | 1.05 | 1.80 | 3.60 |
| CRCW1210-IF e3 | 1.80 | 1.45 | 2.95 | 4.70 | 1.70 | 1.10 | 2.80 | 3.90 |
| CRCW2010-IF e3 | 3.40 | 1.65 | 2.85 | 6.70 | 3.50 | 1.45 | 2.80 | 6.40 |
| CRCW2512-IF e3 | 4.60 | 1.60 | 3.65 | 7.80 | 4.75 | 1.45 | 3.50 | 7.65 |

**Note**

- The rated dissipation applies only if the permitted film temperature is not exceeded. Furthermore, a high level of ambient temperature or of power dissipation may raise the temperature of the solder joint, hence special solder alloys or board materials may be required to maintain the reliability of the assembly.
  The given solder pad dimensions reflect the considerations for board design and assembly as outlined e.g. in standards IEC 61188-5-x or in publication IPC-7351. They do not guarantee any supposed thermal properties, particularly as these are also strongly influenced by many other parameters. Still, the given solder pad dimensions will be found adequate for most general applications


For technical questions, contact: thickfilmchip@vishay.com
THIS DOCUMENT IS SUBJECT TO CHANGE WITHOUT NOTICE. THE PRODUCTS DESCRIBED HEREIN AND THIS DOCUMENT ARE SUBJECT TO SPECIFIC DISCLAIMERS, SET FORTH AT www.vishay.com/doc?91000

# 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.

Hyperlinks included in this datasheet may direct users to third-party websites. These links are provided as a convenience and for informational purposes only. Inclusion of these hyperlinks does not constitute an endorsement or an approval by Vishay of any of the products, services or opinions of the corporation, organization or individual associated with the third-party website. Vishay disclaims any and all liability and bears no responsibility for the accuracy, legality or content of the third-party website or for that of subsequent links.

Vishay products are not designed for use in life-saving or life-sustaining applications or any application in which the failure of the Vishay product could result in personal injury or death unless specifically qualified in writing by Vishay. 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.

*© 2026 VISHAY INTERTECHNOLOGY, INC. ALL RIGHTS RESERVED*



THIS DOCUMENT IS SUBJECT TO CHANGE WITHOUT NOTICE. THE PRODUCTS DESCRIBED HEREIN AND THIS DOCUMENT ARE SUBJECT TO SPECIFIC DISCLAIMERS, SET FORTH AT www.vishay.com/doc?91000