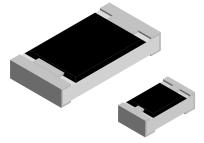
D/CRCW-HR

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Lead (Pb)-Bearing Thick Film, Rectangular High Value Chip Resistor



FEATURES

- High resistance values (up to 470M)
- Suitable for voltage dividers and hybrids
- Lead (Pb)-bearing termination plating on Ni barrier layer
- Metal glaze on high quality ceramic
- Material categorization: For definitions of compliance please see <u>www.vishay.com/doc?99912</u>

| STANDARD ELECTRICAL SPECIFICATIONS | | | | | | | | | |
|------------------------------------|----------------------|------------------------|---|---|-------------------------------------|----------------|--------------------------|--------|--|
| MODEL | CASE SIZE INCH | CASE SIZE METRIC | POWER RATING P ₇₀ W | LIMITING ELEMENT VOLTAGE U _{max.} AC _{RMS} /DC V | TEMPERATURE COEFFICIENT ppm/K | TOLERANCE % | RESISTANCE RANGE Ω | SERIES | |
| D11/CRCW0603-HR | 0603 | RR 1608M | 0.10 | 75 | ± 500 | ± 5 | 11M to 470M | E24 | |
| D12/CRCW0805-HR | 0805 | RR 2012M | 0.125 | 150 | ± 500 | ± 5 | 11M to 470M | E24 | |
| D25/CRCW1206-HR | 1206 | RR 3216M | 0.25 | 200 | ± 500 | ± 5 | 11M to 470M | E24 | |

Notes

• These resistors do not feature a limited lifetime when operated within the limits of rated dissipation, permissible operating voltage, and permissible film temperature. However, the resistance typically increase due to the resistor's film temperature over operating time, generally known as drift. The drift may exceed the stability requirements of an individual application circuit and thereby limits the functional time.

Marking and packaging: See datasheet "Surface Mount Resistor Marking" (<u>www.vishay.com/doc?20020</u>)

• Power rating depends on the max. temperature at the solder point, the component placement density and the substrate material.

| TECHNICAL SPECIFICATIONS | | | | | | |
|--|------|-------------------|--------------------------------|-----------------|--|--|
| PARAMETER | UNIT | D11/CRCW0603-HR | D12/CRCW0805-HR | D25/CRCW1206-HR | | |
| Rated Dissipation at P_{70} ⁽¹⁾ | W | 0.1 | 0.125 | 0.25 | | |
| Operating Voltage Umax. ACRMS/DC | V | 75 | 150 | 200 | | |
| Voltage Coefficient | %/V | | < 100M: < 0.1 > 100M: < 0.3 | | | |
| Insulation Voltage U _{ins} (1 min) | V | 100 | 100 200 300 | | | |
| Insulation Resistance | Ω | > 10 ⁹ | | | | |
| Operating Temperature Range | °C | - 55 to + 155 | | | | |
| Weight | mg | 2 | 5.5 | 10 | | |

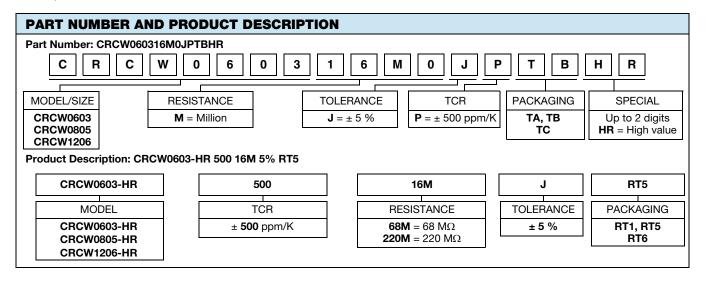
Note

⁽¹⁾ The power dissipation on the resistor generates a temperature rise against the local ambient, depending on the heat flow support of the printed-circuit board (thermal resistance). The rated dissipation applies only if the permitted film temperature of 155 °C is not exceeded.

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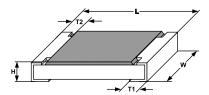
SHA'

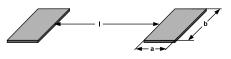
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| PACKAGING | | | | | | | |
|-------------|-----------------|----------|--------------------|-------|-------|---------------|--|
| MODEL | CODE | QUANTITY | CARRIER TAPE | WIDTH | PITCH | REEL DIAMETER | |
| | TA = RT1 | 5000 | | | | 180 mm/7" | |
| CRCW0603-HR | TB = RT5 | 10 000 | | 8 mm | 4 mm | 285 mm/11.25" | |
| | TC = RT6 20 000 | | | | | 330 mm/13" | |
| | TA = RT1 | 5000 | Paper tape acc. to | 8 mm | 4 mm | 180 mm/7" | |
| CRCW0805-HR | TB = RT5 | 10 000 | IEC 60068-3 | | | 285 mm/11.25" | |
| | TC = RT6 | 20 000 | Type I | | | 330 mm/13" | |
| | TA = RT1 | 5000 | | | | 180 mm/7" | |
| CRCW1206-HR | TB = RT5 10 000 | | | 8 mm | 4 mm | 285 mm/11.25" | |
| | TC = RT6 | 20 000 | | | | 330 mm/13" | |

DIMENSIONS





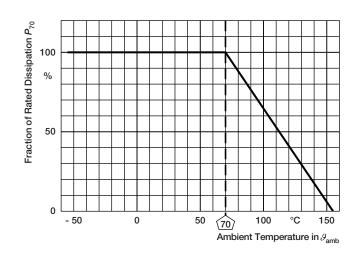
| SIZE DIMENSIONS in millimeters | | | | | SOLDER PAD DIMENSIONS in millimeters | | | | | | | |
|--------------------------------|--------------------------------|----------------------------------|-------------|-----------------|--------------------------------------|------------------|-----|-----|----------------|-----|-----|-----|
| 3 | SIZE DIMENSIONS in millimeters | | | | | REFLOW SOLDERING | | | WAVE SOLDERING | | | |
| INCH | METRIC | L | w | н | T1 | T2 | а | b | I | а | b | I |
| 0603 | 1608 | 1.55 ^{+ 0.10} - 0.05 | 0.85 ± 0.1 | 0.45 ± 0.05 | 0.3 ± 0.2 | 0.3 ± 0.2 | 0.5 | 0.9 | 1.0 | 0.9 | 0.9 | 1.0 |
| 0805 | 2012 | 2.0 + 0.20 - 0.10 | 1.25 ± 0.15 | 0.45 ± 0.05 | 0.3 + 0.20 - 0.10 | 0.3 ± 0.2 | 0.7 | 1.3 | 1.2 | 0.9 | 1.3 | 1.3 |
| 1206 | 3216 | 3.2 ^{+ 0.10} - 0.20 | 1.6 ± 0.15 | 0.55 ± 0.05 | 0.45 ± 0.2 | 0.4 ± 0.2 | 0.9 | 1.7 | 2.0 | 1.1 | 1.7 | 2.3 |

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DERATING



| IESI PRO | UCEDUKES | SAND REQUIREMENTS | | 1 | | |
|--------------------------|------------------------|---|---|--|--|--|
| EN 60115-1 CLAUSE | IEC 60068-2 TEST | TEST | PROCEDURE | REQUIREMENTS PERMISSIBLE CHANGE (∆R) | | |
| OLAGOL | METHOD | | | STABILITY CLASS 2 OR BETTER | | |
| | | | Stability for product types: | | | |
| | | | D/CRCW-HR | 11 M Ω to 470 M Ω | | |
| 4.5 | _ | Resistance | - | ± 5 % | | |
| 4.13 | _ | Short time overload | $U = 2.5 \text{ x } \sqrt{P_{70} \text{ x } R} \le 2 \text{ x } U_{\text{max.}};$ Duration acc. to style | \pm (0.5 % R + 0.05 Ω) | | |
| 4.17.2 | 58 (Td) | Solderability | Solder bath method; Sn60Pb40 | Good tinning (≥ 95 % covered); no visible damage | | |
| 4.8.4.2 | _ | Temperature coefficient | 20 °C/- 55 °C/20 °C and 20 °C/125 °/20 °C | ± 500 ppm/K | | |
| 4.32 | 21 (Uu ₃) | Shear (adhesion) | RR 1608: 9 N RR 2012 and RR 3216: 45 N | No visible damage | | |
| 4.33 | 21 (Uu ₁) | Substrate bending | Depth 2 mm; 3 times | No visible damage, no open circuit in ben position $\pm (0.25 \% R + 0.05 \Omega)$ | | |
| 4.19 | 14 (Na) | Rapid change of temperature | 30 min. at - 55 °C; 30 min. at 125 °C 5 cycles 1000 cycles | \pm (0.5 % R + 0.05 Ω) \pm (1 % R + 0.05 Ω) | | |
| 4.23 4.23.2 4.23.3 | 2 (Ba) 30 (Db) | Climatic sequence: Dry Heat Damp heat, cyclic | 125 °C; 16 h 55 °C; ≥ 90 % RH; | | | |
| 4.23.4 4.23.5 | 1 (Aa) 13 (M) | Cold Low air pressure | 24 h; 1 cycle - 55 °C; 2 h 1 kPa; (25 ± 10) °C; 1 h | \pm (2 % R + 0.1 Ω) | | |
| 4.23.6 4.23.7 | 30 (Db) | Damp heat, cyclic | 55 °C; ≥ 90 % RH 24 h; 5 cycle <i>U</i> = √P ₇₀ x <i>R</i> | | | |
| 7.20.1 | - | D.C. Load | | | | |
| 4.25.1 | _ | Endurance at 70 °C | U = √P ₇₀ x R ≤ U _{max.} 1.5 h on; 0.5 h off; 70 °C; 1000 h 70 °C; 8000 h | ± (2 % <i>R</i> + 0.1 Ω) ± (4 % <i>R</i> + 0.1 Ω) | | |

Document Number: 20011

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| TEST PROCEDURES AND REQUIREMENTS | | | | | | | |
|----------------------------------|-------------------------------------|--|---|---|--|--|--|
| EN 60115-1 CLAUSE | IEC 60068-2 TEST | TEST | PROCEDURE | REQUIREMENTS PERMISSIBLE CHANGE (∆R) | | | |
| GLAUSE | METHOD | | | STABILITY CLASS 2 OR BETTER | | | |
| | | | Stability for product types: | | | | |
| | | D/CRCW-HR | 11 M Ω to 470 M Ω | | | | |
| 4.18.2 | 58 (Td) | Resistance to soldering heat | Solder bath method (260 ± 5) °C; (10 ± 1) s | ± (0.5 % <i>R</i> + 0.05 Ω) | | | |
| 4.24 | 78 (Cab) Damp heat, steady state | | (40 ± 2) °C; (93 ± 3) % RH; 56 days | ± (2 % <i>R</i> + 0.1 Ω) | | | |
| 4.25.3 | - | Endurance at upper category temperature | 155 °C; 1000 h | \pm (2 % R + 0.1 Ω) | | | |

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

- EN 60115-1, generic specification
- EN 140400, sectional specification
- EN 140401-802, detail specification
- IEC 60068-2-x, variety of environmental test procedures

Packaging of components is done in paper or blister tapes according to IEC 60286-3.



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