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Vishay/Dale
CRA04P0830000ZTD

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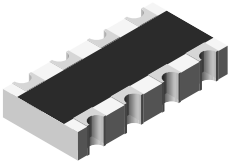
# Thick Film Chip Resistor Array



The CRA04P thick film resistor array is constructed on a high grade ceramic body with concave terminations. A small package enables the design of high density circuits. The single component reduces board space, component counts and assembly costs.

## FEATURES

- Concave terminal array with square corners
- Wide ohmic range: 1R0 to 1M0
- 8 terminal package with isolated resistors
- Pure tin solder contacts on Ni barrier layer, provides compatibility with lead (Pb)-free and lead containing soldering processes
- Material categorization: For definitions of compliance please see www.vishay.com/doc?99912

RoHS COMPLIANT HALOGEN FREE

## STANDARD ELECTRICAL SPECIFICATIONS

| MODEL | CIRCUIT | POWER RATING $P_{70\,°C}$ W | LIMITING ELEMENT VOLTAGE MAX. V≅ | TEMPERATURE COEFFICIENT ± ppm/K | TOLERANCE ± % | RESISTANCE RANGE Ω | E-SERIES |
|---|---|---|---|---|---|---|---|
| CRA04P | 03 | 0.063 | 50 | 100 | 2 | 10 to 1M | 24 |
| | | | | 200 | 5 | 1 to 1M | 24 |
| | | Zero-Ohm-Resistor: $R_{max.}$ = 50 mΩ, $I_{max.}$ = 1 A | | | | | |

## TECHNICAL SPECIFICATIONS

| PARAMETER | UNIT | CRA04P |
|---|---|---|
| Rated dissipation $P_{70}$ (1) | W per element | 0.063 |
| Limiting element voltage $U_{max.}$ AC/DC | V | 50 |
| Insulation voltage $U_{ins}$ (1 min) | V | 100 |
| Insulation resistance | Ω | > $10^9$ |
| Category temperature range | °C | - 55 to + 155 |

**Note**

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

## PART NUMBER AND PRODUCT DESCRIPTION

**Part Number: CRA04P08347K0JTD (2)**

| C | R | A | 0 | 4 | P | 0 | 8 | 3 | 4 | 7 | K | 0 | J | T | D | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|

| MODEL | TERMINAL STYLE | PIN | CIRCUIT | VALUE | TOLERANCE | PACKAGING (3) | SPECIAL |
|---|---|---|---|---|---|---|---|
| **CRA04** | **P** | **08** | **3** = 03 | **R** = Decimal<br>**K** = Thousand<br>**M** = Million<br>**0000** = 0 Ω Jumper | **G** = ± 2 %<br>**J** = ± 5 %<br>**Z** = 0 Ω Jumper | **TD**<br>**TC**<br>**PZ** | Up to 2 digits |

**Product Description: CRA04P 08 03 47K 5 % RT7 e3**

| CRA04P | 08 | 03 | 47K | 5 % | RT7 | e3 |
|---|---|---|---|---|---|---|
| MODEL | TERMINAL COUNT | CIRCUIT TYPE | RESISTANCE VALUE | TOLERANCE | PACKAGING (3) | LEAD (Pb)-FREE |
| **CRA04P** | **08** | **03** | **10R** = 10 Ω<br>**47K** = 47 Ω<br>**1M** = 1 MΩ<br>**0R0** = 0 Ω Jumper | **± 2 %**<br>**± 5 %** | **RT7**<br>**RT6**<br>**PZ** | **e3** = Pure tin termination finish |

**Notes**

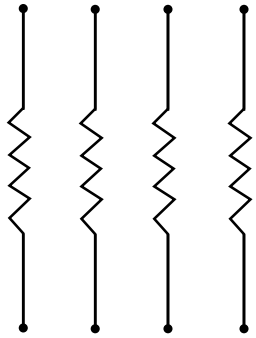
(2) Preferred way for ordering products is by use of the PART NUMBER.
(3) Please refer to the table PACKAGING, see next page.

## PACKAGING

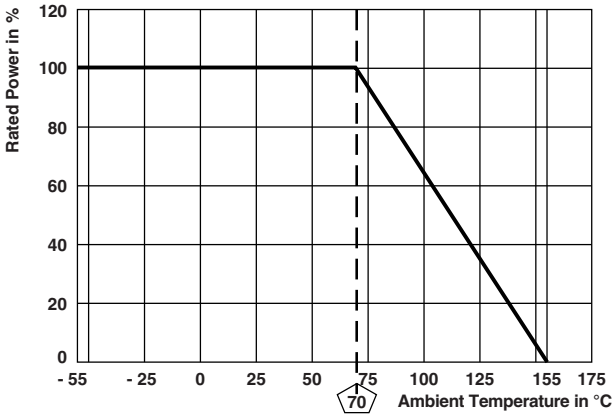
| MODEL | TAPE WIDTH | DIAMETER | PITCH | PIECES/REEL | PACKAGING CODE | |
|---|---|---|---|---|---|---|
| | | | | | PAPER TAPE | |
| | | | | | PART NUMBER | PRODUCT DESCRIPTION |
| CRA04P | 8 mm | 180 mm/7" | 2 mm | 10 000 | TD | RT7 |
| | | 330 mm/13" | 2 mm | 20 000 | TC | RT6 |
| | | 330 mm/13" | 2 mm | 50 000 | PZ | PZ |

## CIRCUIT

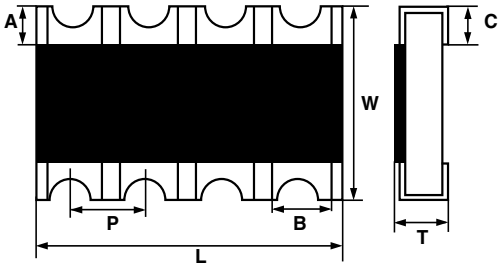
**03 Circuit**



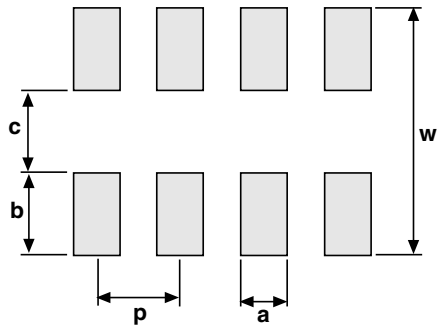
## DERATING




## DIMENSIONS




| PIN NO# | DIMENSIONS in millimeters | | | | | | |
|---|---|---|---|---|---|---|---|
| | L | A | B | C | $P_{NOM.}$ | T | W |
| 8 | 2.00 | 0.20 | 0.32 | 0.25 | 0.50 | 0.45 | 1.00 |
| TOL. | ± 0.20 | ± 0.10 | ± 0.10 | ± 0.15 | - | ± 0.10 | ± 0.10 |




| SOLDER PAD DIMENSIONS in millimeters | | | | | |
|---|---|---|---|---|---|
| | c | w | p | a | b |
| WAVE | 0.5 | 1.5 | 0.5 | 0.32 | 0.5 |

## TEST PROCEDURES AND REQUIREMENTS

| EN 60115-1 CLAUSE | IEC 60068-2 TEST METHOD | TEST | PROCEDURE | REQUIREMENTS PERMISSIBLE CHANGE ($\Delta R$) (1) | |
|---|---|---|---|---|---|
| | | | | STABILITY CLASS 2 OR BETTER | |
| | | | Stability for product type: CRA04P | 10 Ω to 1 MΩ | 1 Ω to 1 MΩ |
| 4.5 | - | Resistance | - | ± 2 % | ± 5 % |
| 4.7 | - | Voltage proof | $U$ = 1.4 x $U_{ins}$; 60 s | No flashover or breakdown | |
| 4.13 | - | Short time overload | $U = 2.5 \times \sqrt{P_{70} \times R}$ ≤ 2 × $U_{max.}$; Duration according to style | ± (0.5 % $R$ + 0.05 Ω) | |
| 4.17.2 | 58 (Td) | Solderability | Solder bath method; Sn60Pb40; non-activated flux; (235 ± 5) °C; (2 ± 0.2) s | Good tinning (≥ 95 % covered) no visible damage | |
| | | | Solder bath method; Sn96.5Ag3Cu0.5; non-activated flux; (245 ± 5) °C; (3 ± 0.3) s | Good tinning (≥ 95 % covered) no visible damage | |
| 4.8.4.2 | - | Temperature coefficient | (20/- 55/20) °C and (20/125/20) °C | ± 100 ppm/K | ± 200 ppm/K |
| 4.32 | 21 ($U_{U3}$) | Shear (adhesion) | 45 N | No visible damage | |
| 4.33 | 21 ($U_{U1}$) | Substrate bending | Depth 2 mm; 3 times | No visible damage, no open circuit in bent position ± (0.25 % $R$ + 0.05 Ω) | |
| 4.19 | 14 (Na) | Rapid change of temperature | 30 min. at - 55 °C; 30 min at 125 °C<br>5 cycles<br>1000 cycles | ± (0.5 % $R$ + 0.05 Ω)<br>± (1 % $R$ + 0.05 Ω) | |
| 4.23 | - | Dry heat | - | ± (2 % $R$ + 0.05 Ω) | |
| 4.23.2 | 2 (Ba) | Damp heat, cyclic | 125 °C; 16 h | | |
| 4.23.3 | 30 (Db) | Cold | 55 °C; ≥ 90 % RH; 24 h; 1 cycle | | |
| 4.23.4 | 1 (Aa) | Low air pressure | - 55 °C; 2 h | | |
| 4.23.5 | 13 (M) | - | 1 kPa; (25 ± 10) °C; 1 h | | |
| 4.23.6 | 30 (Db) | Damp heat, cyclic | 55 °C; ≥ 90 % RH; 24 h; 5 cycle | | |
| 4.23.7 | - | D.C. load | $U = \sqrt{P_{70} \times R}$ | | |
| 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 | ± (2 % $R$ + 0.1 Ω)<br>± (4 % $R$ + 0.1 Ω) | |
| 4.18.2 | 58 (Td) | Resistance to soldering heat | Solder bath method; (260 ± 5) °C; (10 ± 1) s | ± (0.5 % $R$ + 0.05 Ω) | |
| 4.35 | - | Flammability, needle flame test | IEC 60695-11-5; 10 s | No burning after 30 s | |
| 4.24 | 78 (Cab) | Damp heat, steady state | (40 ± 2) °C; (93 ± 3) % RH; 56 days | ± (1 % $R$ + 0.05 Ω) | |
| 4.25.3 | - | Endurance at upper category temperature | 155 °C; 1000 h | ± (2 % $R$ + 0.1 Ω) | |
| 4.40 | - | Electrostatic discharge (human body model) | IEC 61340-3-1; 3 positive and 3 negative discharges; ESD voltage according to style | ± (1 % $R$ + 0.05 Ω) | |
| 4.29 | 45 (XA) | Component solvent resistance | Isopropyl alcohol; 50 °C; method 2 | No visible damage | |
| 4.30 | 45 (XA) | Solvent resistance of marking | Isopropyl alcohol; 50 °C; method 1; toothbrush | Marking legible, no visible damage | |
| 4.22 | 6 (Fc) | Vibration, endurance by sweeping | f = 10 Hz to 2000 Hz; x, y, z ≤ 1.5 mm; A ≤ 200 m/s²; 10 sweeps per axis | ± (0.5 % $R$ + 0.05 Ω) | |
| 4.37 | - | Periodic electric overload | $U = \sqrt{15 \times P_{70} \times R} \leq 2 \times U_{max.}$<br>0.1 s on; 2.5 s off; 1000 cycles | ± (1 % $R$ + 0.05 Ω) | |
| 4.27 | - | Single pulse high voltage overload, 10 µs/700 µs | $\hat{U} = 10 \times \sqrt{P_{70} \times R} \leq 2 \times U_{max.}$<br>10 pulses | ± (1 % $R$ + 0.05 Ω) | |

**Note**

(1) Figures are given for a single element.

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, environmental test procedures

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

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