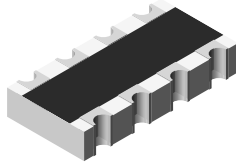


## Thick Film, Resistor Array



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
- Lead (Pb)-free solder contacts on Ni barrier layer
- Pure tin plating provides compatibility with lead (Pb)-free and lead containing soldering processes
- Compatible with "Restriction of the use of Hazardous Substances" (RoHS) directive 2002/95/EC (issue 2004)



| STANDARD ELECTRICAL SPECIFICATIONS  |         |   |   |                                     |                |                                 |          |
|---|---------|---|---|-------------------------------------|----------------|---------------------------------|----------|
| MODEL   | CIRCUIT | POWER RATING<br>$P_{70\text{ }^\circ\text{C}}$<br>W | LIMITING ELEMENT<br>VOLTAGE MAX<br>$V_{\equiv}$ | TEMPERATURE<br>COEFFICIENT<br>ppm/K | TOLERANCE<br>% | RESISTANCE<br>RANGE<br>$\Omega$ | E-SERIES |
| CRA04P  | 03      | 0.063   | 50  | $\pm 100$                           | $\pm 2$        | 10R - 1M0                       | 24       |
|   |         |   |   | $\pm 200$                           | $\pm 5$        | 1R0 - 1M0                       | 24       |
| Zero-Ohm-Resistor: $R_{\text{max}} = 50 \text{ m}\Omega$ , $I_{\text{max}} = 1 \text{ A}$ |         |   |   |                                     |                |                                 |          |

| TECHNICAL SPECIFICATIONS                 |                         |                    |
|--|-------------------------|--------------------|
| PARAMETER                                | UNIT                    | CRA04P             |
| Rated Dissipation at 70 °C <sup>2)</sup> | W per element           | 0.063              |
| Limiting Element Voltage <sup>1)</sup>   | $V_{\equiv}$            | 50                 |
| Insulation Voltage (1 min)               | $V_{\text{dc/ac peak}}$ | 100                |
| Category Temperature Range               | °C                      | - 55/+ 125 (+ 155) |
| Insulation Resistance                    | $\Omega$                | $> 10^9$           |

#### Notes

1. Rated voltage:  $\sqrt{P \times R}$
2. 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.

| PART NUMBER AND PRODUCT DESCRIPTION            |                |              |  |  |   |                                  |                |   |   |   |   |   |   |   |   |  |  |
|--|----------------|--------------|--|--|---|----------------------------------|----------------|---|---|---|---|---|---|---|---|--|--|
| PART NUMBER: CRA04P08347K0JTD                  |                |              |  |  |   |                                  |                |   |   |   |   |   |   |   |   |  |  |
| C  | R              | A            | 0  | 4  | P   | 0                                | 8              | 3 | 4 | 7 | K | 0 | J | T | D |  |  |
| MODEL  | TERMINAL STYLE | PIN          | CIRCUIT  | VALUE  | TOLERANCE   | PACKAGING <sup>2)</sup>          | SPECIAL        |   |   |   |   |   |   |   |   |  |  |
| CRA04  | P              | 08           | 3 = 03   | R = Decimal<br>K = Thousand<br>M = Million<br>0000 = 0 $\Omega$ Jumper | G = $\pm 2\%$<br>J = $\pm 5\%$<br>Z = 0 $\Omega$ Jumper | TD<br>TC<br>PZ                   | up to 2 digits |   |   |   |   |   |   |   |   |  |  |
| PRODUCT DESCRIPTION: CRA04P 08 03 473 J RT7 e3 |                |              |  |  |   |                                  |                |   |   |   |   |   |   |   |   |  |  |
| CRA04P   | 08             | 03           | 473  | J  | RT7   | e3                               |                |   |   |   |   |   |   |   |   |  |  |
| MODEL  | TERMINAL COUNT | CIRCUIT TYPE | RESISTANCE VALUE   | TOLERANCE  | PACKAGING <sup>2)</sup>                                 | LEAD (Pb)-FREE                   |                |   |   |   |   |   |   |   |   |  |  |
| CRA04P   | 08             | 03           | 473 = 47 k $\Omega$<br>4R7 = 4.7 $\Omega$<br>100 = 10 $\Omega$<br>000 = 0 $\Omega$ Jumper<br>First two digits (3 for 1 %) are significant. Last digit is the multiplier. | G = $\pm 2\%$<br>J = $\pm 5\%$<br>Z = 0 $\Omega$ Jumper                | RT7<br>RT6<br>PZ  | e3 = Pure Tin Termination Finish |                |   |   |   |   |   |   |   |   |  |  |

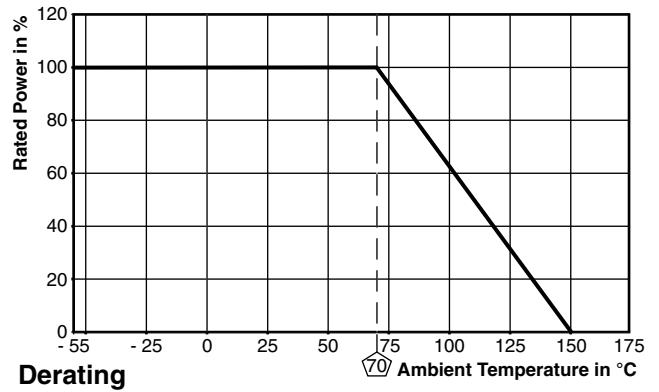
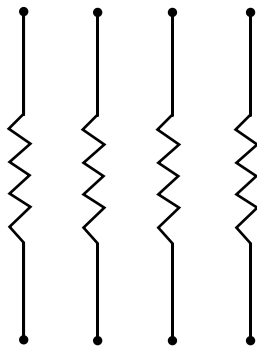
#### Notes

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

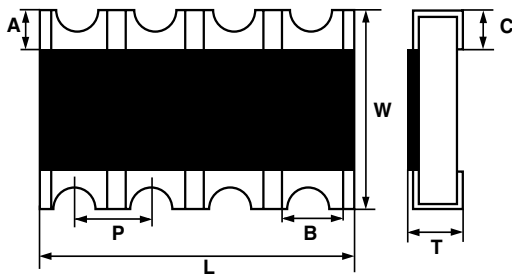
| PACKAGING |            |            |       |             |              |                     |
|-----------|------------|------------|-------|-------------|--------------|---------------------|
| MODEL     | TAPE WIDTH | DIAMETER   | PITCH | PIECES/REEL | PACKING CODE |                     |
|           |            |            |       |             | 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**

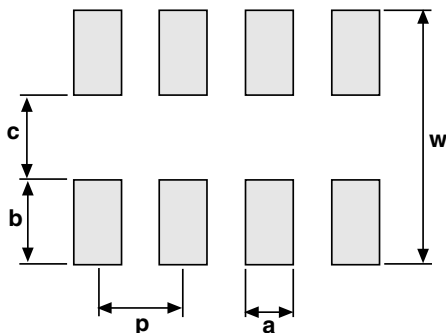
03 Circuit



**DIMENSIONS**



| PIN NO# | DIMENSIONS [in millimeters] |        |        |        |                  |        |        |
|---------|-----------------------------|--------|--------|--------|------------------|--------|--------|
|         | L                           | A      | B      | C      | P <sub>NOM</sub> | T      | W      |
| 8       | 2.00                        | 0.20   | 0.32   | 0.25   | 0.50             | 0.35   | 1.00   |
| TOL     | ± 0.10                      | ± 0.10 | ± 0.10 | ± 0.10 | -                | ± 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 |

| <b>TEST PROCEDURES AND REQUIREMENTS</b>          |  |  |                            |
|--|--|--|----------------------------|
| EN 60115-1                                       |  |  |                            |
| TEST (clause)                                    | CONDITIONS OF TEST   | REQUIREMENTS PERMISSIBLE CHANGE ( $\Delta R/R$ ) <sup>1)</sup> |                            |
|  |  | STABILITY CLASS 2 OR BETTER                                    |                            |
|  | stability for product types:<br><b>CRA04P</b>  | 10 $\Omega$ to 1 M $\Omega$                                    | 1 $\Omega$ to 1 M $\Omega$ |
| Resistance (4.5)                                 | -  | $\pm 2\%$  | $\pm 5\%$                  |
| Temperature coefficient (4.8.4.2)                | 20/- 55/20 °C and 20/125/20 °C   | $\pm 100$ ppm/K  | $\pm 200$ ppm/K            |
| Overload (4.13)                                  | $U = 2.5 \times (P_{70} \times R)^{1/2}$<br>$\leq 2 \times U_{max}$ ; 0.5 s  | $\pm (0.5\% R + 0.05 \Omega)$                                  |                            |
| Solderability (4.17.5) <sup>2)</sup>             | Aging 4 h at 155 °C, dryheat<br>Solder bath method; 235 °C; 2 s<br>Visual examination  | Good tinning ( $\geq 95\%$ covered)<br>no visible damage       |                            |
| Resistance to soldering heat (4.18.2)            | Solder bath method;<br>(260 $\pm$ 5) °C; (10 $\pm$ 1) s  | $\pm (0.5\% R + 0.05 \Omega)$                                  |                            |
| Rapid change of temperature (4.19)               | 30 min. at LCT = - 55 °C;<br>30 min. at UCT = 125 °C; 5 cycles   | $\pm (0.5\% R + 0.05 \Omega)$                                  |                            |
| Damp heat, steady state (4.24)                   | (40 $\pm$ 2) °C; 56 days;<br>(93 $\pm$ 3) % RH   | $\pm (2\% R + 0.1 \Omega)$                                     |                            |
| Climatic sequence (4.23)                         | 16 h at UCT = 125 °C; 1 cycle at 55 °C;<br>2 h at LCT = - 55 °C;<br>1 h/1 kPa at 15 °C to 35 °C;<br>5 cycles at 55 °C<br>$U = (P_{70} \times R)^{1/2}$<br>$U = U_{max}$ ; whichever is less severe | $\pm (2\% R + 0.1 \Omega)$                                     |                            |
| Endurance at 70 °C (4.25.1)                      | $U = (P_{70} \times R)^{1/2}$<br>$U = U_{max}$ ; whichever is less severe<br>1.5 h on; 0.5 h off;<br>70 °C; 1000 h   | $\pm (2\% R + 0.1 \Omega)$                                     |                            |
| Extended endurance (4.25.1.8)                    | Duration extended to 8000 hours  | $\pm (4\% R + 0.1 \Omega)$                                     |                            |
| Endurance at upper category temperature (4.25.3) | UCT = 125 °C; 1000 h   | $\pm (2\% R + 0.1 \Omega)$                                     |                            |

**Notes**

1. Figures are given for a single element.
2. Solderability is specified for 2 years after production or requalification. Permitted storage time is 20 years.

| <b>APPLICABLE SPECIFICATIONS</b> |  |
|----------------------------------|--|
| • EN 60115-1                     | Generic Specification                    |
| • EN 140400                      | Sectional Specification                  |
| • EN 140401-802                  | Detail Specification                     |
| • IEC 60068-2-X                  | Variety of environmental test procedures |
| • EIA 481                        | Packaging of SMD components              |



## Notice

Specifications of the products displayed herein are subject to change without notice. Vishay Intertechnology, Inc., or anyone on its behalf, assumes no responsibility or liability for any errors or inaccuracies.

Information contained herein is intended to provide a product description only. No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted by this document. Except as provided in Vishay's terms and conditions of sale for such products, Vishay assumes no liability whatsoever, and disclaims any express or implied warranty, relating to sale and/or use of Vishay products including liability or warranties relating to fitness for a particular purpose, merchantability, or infringement of any patent, copyright, or other intellectual property right.

The products shown herein are not designed for use in medical, life-saving, or life-sustaining applications. Customers using or selling these products for use in such applications do so at their own risk and agree to fully indemnify Vishay for any damages resulting from such improper use or sale.