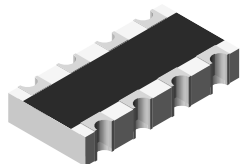




## Thick Film Chip Resistor Array



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](http://www.vishay.com/doc?99912)



**RoHS**  
COMPLIANT  
HALOGEN  
**FREE**

| 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>$\pm$ ppm/K | TOLERANCE<br>$\pm$ % | RESISTANCE<br>RANGE<br>$\Omega$ | E-SERIES |
| CRA04P  | 03      | 0.063   | 50   | 100                                       | 2                    | 10 to 1M                        | 24       |
|   |         |   |  | 200                                       | 5                    | 1 to 1M                         | 24       |
| Zero-Ohm-Resistor: $R_{\text{max.}} = 50\text{ m}\Omega$ , $I_{\text{max.}} = 1\text{ A}$ |         |   |  |   |                      |                                 |          |

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

**Note**

<sup>(1)</sup> 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 <sup>(1)</sup>    |                |              |  |  |   |                                  |                |   |   |   |   |   |   |   |   |  |  |
| 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 47K 5% RT7 e3 |                |              |  |  |   |                                  |                |   |   |   |   |   |   |   |   |  |  |
| CRA04P  | 08             | 03           | 47K  | 5%   | RT7   | e3                               |                |   |   |   |   |   |   |   |   |  |  |
| MODEL   | TERMINAL COUNT | CIRCUIT TYPE | RESISTANCE VALUE   | TOLERANCE  | PACKAGING <sup>(3)</sup>                                | LEAD (Pb)-FREE                   |                |   |   |   |   |   |   |   |   |  |  |
| CRA04P  | 08             | 03           | 10R = 10 $\Omega$<br>47K = 47 $\Omega$<br>1M = 1 M $\Omega$<br>0R0 = 0 $\Omega$ jumper | $\pm 2\%$<br>$\pm 5\%$   | RT7<br>RT6<br>PZ  | e3 = pure tin termination finish |                |   |   |   |   |   |   |   |   |  |  |

**Notes**

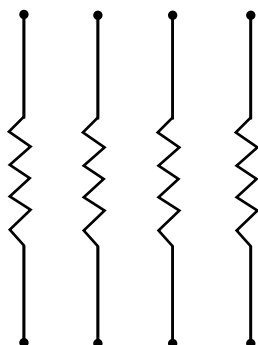
- <sup>(1)</sup> Preferred way for ordering products is by use of the PART NUMBER
- <sup>(2)</sup> Please refer to the table PACKAGING, see next page



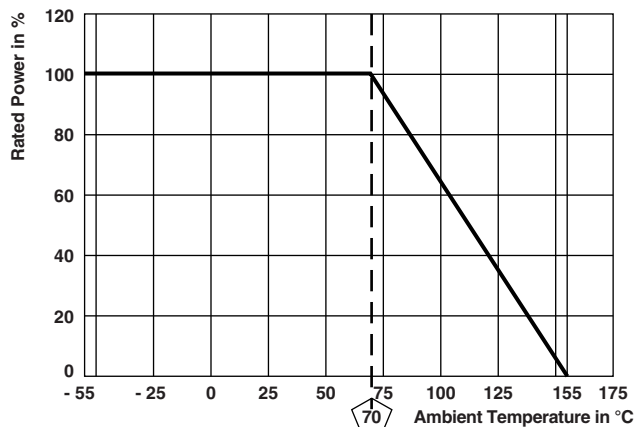
| PACKAGING |            |            |       |             |                |                     |
|-----------|------------|------------|-------|-------------|----------------|---------------------|
| MODEL     | TAPE WIDTH | DIAMETER   | PITCH | PIECES/REEL | PACKAGING CODE |                    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

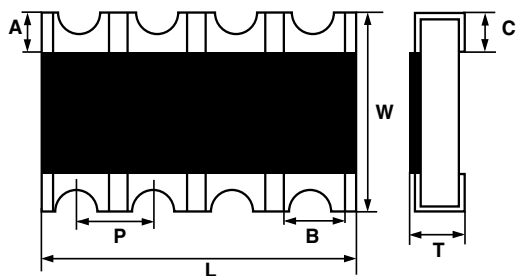
03 Circuit



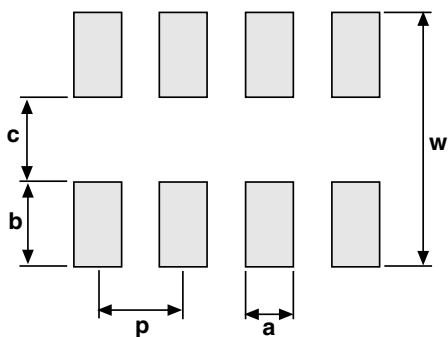
**DERATING**



**DIMENSIONS**



| PIN NO# | DIMENSIONS in millimeters |        |        |        |                   |        |        |
|---------|---------------------------|--------|--------|--------|-------------------|--------|--------|
|         | L                         | A      | B      | C      | P <sub>NOM.</sub> | 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 ( $\Delta R$ ) <sup>(1)</sup>                            |                            |
|                                  |                         |   |   | STABILITY CLASS 2 OR BETTER  |                            |
|                                  |                         |   | Stability for product type:   | 10 $\Omega$ to 1 M $\Omega$  | 1 $\Omega$ to 1 M $\Omega$ |
|                                  |                         |   | <b>CRA04P</b>   |  |                            |
| 4.5                              | -                       | Resistance  | -   | $\pm 2\%$  | $\pm 5\%$                  |
| 4.7                              | -                       | Voltage proof   | $U = 1.4 \times U_{ins}$ ; 60 s   | No flashover or breakdown  |                            |
| 4.13                             | -                       | Short time overload   | $U = 2.5 \times \sqrt{P_{70} \times R}$<br>$\leq 2 \times U_{max}$ ; Duration according to style                          | $\pm (0.5\% R + 0.05 \Omega)$  |                            |
| 4.17.2                           | 58 (Td)                 | Solderability   | Solder bath method; Sn60Pb40;<br>non-activated flux; (235 $\pm$ 5) $^{\circ}$ C; (2 $\pm$ 0.2) s                          | Good tinning ( $\geq 95\%$ covered)<br>no visible damage                                 |                            |
|                                  |                         |   | Solder bath method; Sn96.5Ag3Cu0.5;<br>non-activated flux; (245 $\pm$ 5) $^{\circ}$ C; (3 $\pm$ 0.3) s                    | Good tinning ( $\geq 95\%$ covered)<br>no visible damage                                 |                            |
| 4.8.4.2                          | -                       | Temperature coefficient                                       | (20/- 55/20) $^{\circ}$ C and (20/125/20) $^{\circ}$ C  | $\pm 100$ ppm/K  | $\pm 200$ ppm/K            |
| 4.32                             | 21 (U <sub>J3</sub> )   | Shear (adhesion)  | 45 N  | No visible damage  |                            |
| 4.33                             | 21 (U <sub>J1</sub> )   | Substrate bending   | Depth 2 mm; 3 times   | No visible damage,<br>no open circuit in bent position<br>$\pm (0.25\% R + 0.05 \Omega)$ |                            |
| 4.19                             | 14 (Na)                 | Rapid change of temperature                                   | 30 min. at - 55 $^{\circ}$ C; 30 min at 125 $^{\circ}$ C<br>5 cycles<br>1000 cycles                                       | $\pm (0.5\% R + 0.05 \Omega)$<br>$\pm (1\% R + 0.05 \Omega)$                             |                            |
| 4.23                             | -                       | Dry heat  | -   | $\pm (2\% R + 0.05 \Omega)$  |                            |
| 4.23.2                           | 2 (Ba)                  | Damp heat, cyclic   | 125 $^{\circ}$ C; 16 h  |  |                            |
| 4.23.3                           | 30 (Db)                 | Cold  | 55 $^{\circ}$ C; $\geq 90\%$ RH; 24 h; 1 cycle  |  |                            |
| 4.23.4                           | 1 (Aa)                  | Low air pressure  | - 55 $^{\circ}$ C; 2 h  |  |                            |
| 4.23.5                           | 13 (M)                  | -   | 1 kPa; (25 $\pm$ 10) $^{\circ}$ C; 1 h  |  |                            |
| 4.23.6                           | 30 (Db)                 | Damp heat, cyclic   | 55 $^{\circ}$ C; $\geq 90\%$ RH; 24 h; 5 cycle  |  |                            |
| 4.23.7                           | -                       | D.C. load   | $U = \sqrt{P_{70} \times R}$  |  |                            |
| 4.25.1                           | -                       | Endurance at 70 $^{\circ}$ C                                  | $U = \sqrt{P_{70} \times R} \leq U_{max}$ .<br>1.5 h on; 0.5 h off;<br>70 $^{\circ}$ C; 1000 h<br>70 $^{\circ}$ C; 8000 h | $\pm (2\% R + 0.1 \Omega)$<br>$\pm (4\% R + 0.1 \Omega)$                                 |                            |
| 4.18.2                           | 58 (Td)                 | Resistance to soldering heat                                  | Solder bath method; (260 $\pm$ 5) $^{\circ}$ C; (10 $\pm$ 1) s  | $\pm (0.5\% R + 0.05 \Omega)$  |                            |
| 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 $\pm$ 2) $^{\circ}$ C; (93 $\pm$ 3) % RH; 56 days   | $\pm (1\% R + 0.05 \Omega)$  |                            |
| 4.25.3                           | -                       | Endurance at upper category temperature                       | 155 $^{\circ}$ C; 1000 h  | $\pm (2\% R + 0.1 \Omega)$   |                            |
| 4.40                             | -                       | Electrostatic discharge (human body model)                    | IEC 61340-3-1; 3 positive and 3 negative discharges; ESD voltage according to style                                       | $\pm (1\% R + 0.05 \Omega)$  |                            |
| 4.29                             | 45 (XA)                 | Component solvent resistance                                  | Isopropyl alcohol; 50 $^{\circ}$ C; method 2  | No visible damage  |                            |
| 4.30                             | 45 (XA)                 | Solvent resistance of marking                                 | Isopropyl alcohol; 50 $^{\circ}$ C; method 1; toothbrush  | Marking legible,<br>no visible damage  |                            |
| 4.22                             | 6 (Fc)                  | Vibration, endurance by sweeping                              | f = 10 Hz to 2000 Hz; x, y, z $\leq 1.5$ mm;<br>A $\leq 200$ m/s <sup>2</sup> ; 10 sweeps per axis                        | $\pm (0.5\% R + 0.05 \Omega)$  |                            |
| 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                        | $\pm (1\% R + 0.05 \Omega)$  |                            |
| 4.27                             | -                       | Single pulse high voltage overload,<br>10 $\mu$ s/700 $\mu$ s | $\dot{U} = 10 \times \sqrt{P_{70} \times R} \leq 2 \times U_{max}$ .<br>10 pulses   | $\pm (1\% R + 0.05 \Omega)$  |                            |

**Note**

<sup>(1)</sup> 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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