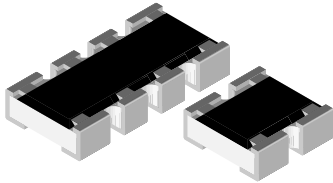




**THE DATASHEET OF
CRA04S08324R0JTD**



Thick Film Resistor Array



The CRA04S thick film resistor array is constructed on a high grade ceramic body with convex terminations. A small package enables the design of high density circuits. The single component reduces board space, component counts, and assembly costs.

FEATURES

- Convex terminal array with square corners
- Wide ohmic range: 10R to 1M Ω
- 4 or 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 $P_{70^\circ\text{C}}$ W | LIMITING ELEMENT VOLTAGE MAX. V_{\equiv} | TEMPERATURE COEFFICIENT ppm/K | TOLERANCE % | RESISTANCE RANGE Ω | E-SERIES |
| CRA04S | 03 | 0.063 | 50 | ± 100 | ± 1 | 10R - 1M Ω | 24 + 96 |
| | | | | ± 200 | $\pm 2; \pm 5$ | | 24 |
| Zero-Ohm-Resistor: $R_{\text{max.}} \leq 50 \text{ m}\Omega$, $I_{\text{max.}} = 1 \text{ A}$ | | | | | | | |

| TECHNICAL SPECIFICATIONS | | |
|---|-------------------------|-------------------|
| PARAMETER | UNIT | CRA04S |
| Rated Dissipation at 70 °C ⁽²⁾ | W per element | 0.063 |
| Limiting Element Voltage ⁽¹⁾ | V_{\equiv} | 50 |
| Insulation Voltage (1 min) | $V_{\text{dc/ac peak}}$ | 100 |
| Category Temperature Range | °C | - 55 to + 155 |
| Insulation Resistance | Ω | > 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 rate dissipation applies only if the permitted film temperature of 155 °C is not exceeded.

| PART NUMBER AND PRODUCT DESCRIPTION | | | | | | | | | | | | | | | | | |
|--|----------------|--------------|---|--|--------------------------|--|---|--------------------------|---|----------------|---|---|---|---|---|--|--|
| PART NUMBER: CRA04S08347K0JTD | | | | | | | | | | | | | | | | | |
| C | R | A | 0 | 4 | S | 0 | 8 | 3 | 4 | 7 | K | 0 | J | T | D | | |
| MODEL | TERMINAL STYLE | PIN | CIRCUIT | VALUE | | TOLERANCE | | PACKAGING ⁽⁴⁾ | | SPECIAL | | | | | | | |
| CRA04 | S | 04 08 | 3 = 03 | R = Decimal K = Thousand M = Million 0000 = 0 Ω Jumper | | F = $\pm 1\%$ G = $\pm 2\%$ J = $\pm 5\%$ Z = 0 Ω Jumper | | TD TC PZ | | Up to 2 digits | | | | | | | |
| PRODUCT DESCRIPTION: CRA04S 08 03 473 J RT7 e3 | | | | | | | | | | | | | | | | | |
| CRA04S | 08 | 03 | 473 | J | RT7 | e3 | | | | | | | | | | | |
| MODEL | TERMINAL COUNT | CIRCUIT TYPE | RESISTANCE VALUE | TOLERANCE | PACKAGING ⁽⁴⁾ | LEAD (Pb)-FREE | | | | | | | | | | | |
| CRA04S | 04 08 | 03 | 473 = 47 k Ω 4702 = 47 k Ω 10R0 = 10 Ω 100 = 10 Ω 000 = 0 Ω Jumper First two digits (3 for 1%) are significant. Last digit is the multiplier. | F = $\pm 1\%$ G = $\pm 2\%$ J = $\pm 5\%$ Z = 0 Ω Jumper | RT7 RT6 PZ | e3 = Pure tin Termination finish | | | | | | | | | | | |

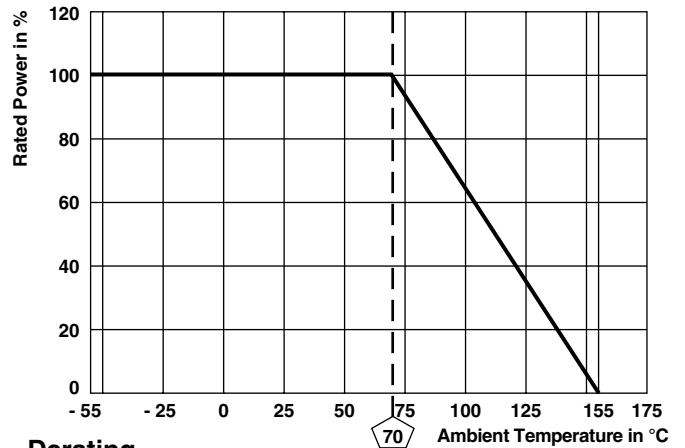
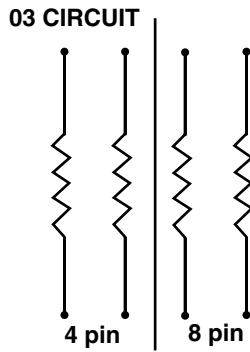
Notes

⁽³⁾ Preferred way for ordering products is by use of the PART NUMBER

⁽⁴⁾ Please refer to the table PACKAGING, see next page

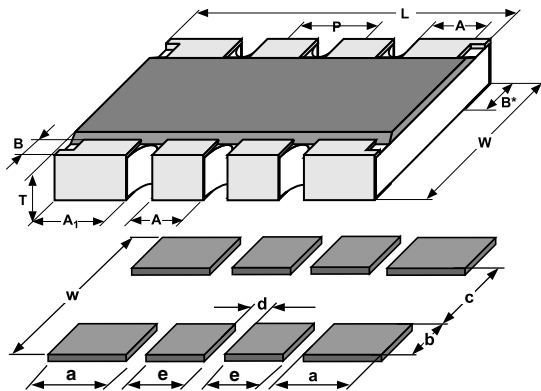
| PACKAGING | | | | | | |
|-----------|------------|------------|-------|-------------|----------------|---------------------|
| MODEL | TAPE WIDTH | DIAMETER | PITCH | PIECES/REEL | PACKAGING CODE | |
| | | | | | PAPER TAPE | |
| | | | | | PART NUMBER | PRODUCT DESCRIPTION |
| CRA04S | 8 mm | 180 mm/7" | 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



Derating

DIMENSIONS



| PIN NO# | DIMENSIONS [in millimeters] | | | | | | | |
|---------|-----------------------------|--------|----------------|--------|-------|------------------|-------|--------|
| | L | A | A ₁ | B | B* | P _{NOM} | T | W |
| 4 | 1.0 ± 0.1 | - | 0.33 | 0.15 | 0.25 | 0.65 | 0.35 | 1.0 |
| 8 | 2.0 ± 0.2 | 0.30 | 0.4 | 0.15 | 0.25 | 0.50 | 0.45 | 1.0 |
| TOL. | - | ± 0.15 | ± 0.15 | ± 0.10 | ± 0.1 | - | ± 0.1 | ± 0.15 |

| SOLDER PAD DIMENSIONS [in millimeters] | | | | | | |
|--|------|------|-----|-----|-----|-----|
| | c | w | d | a | b | e |
| WAVE | 0.45 | 1.45 | 0.2 | 0.4 | 0.5 | 0.3 |

The dimensions shown are for a 8 pin part. For parts with different pin numbers use the same pitch and add or subtract pads as required.

| TEST PROCEDURES AND REQUIREMENTS | | | |
|---|---|--|--------------------------------|
| EN 60115-1 | | | |
| TEST (clause) | CONDITIONS OF TEST | REQUIREMENTS PERMISSIBLE CHANGE ($\Delta R/R$) ⁽¹⁾ | |
| | | STABILITY CLASS 1 OR BETTER | STABILITY CLASS 2 OR BETTER |
| | Stability for product types: CRA04S | 10 Ω to 1 M Ω | 10 Ω to 1 M Ω |
| Resistance (4.5) | - | $\pm 1 \%$ | $\pm 2 \%$; $\pm 5 \%$ |
| Temperature coefficient (4.8.4.2) | 20/- 55/20 °C and 20/125/20 °C | ± 100 ppm/K | ± 200 ppm/K |
| Overload (4.13) | $U = 2.5 \times (P_{70} \times R)^{1/2}$ $\leq 2 \times U_{max.}$; 0.5 s | $\pm (0.25 \% R + 0.05 \Omega)$ | $\pm (0.5 \% R + 0.05 \Omega)$ |
| Solderability (4.17.5) ⁽²⁾ | Aging 4 h at 155 °C, dryheat solder bath method; 235 °C; 2 s visual examination | Good tinning ($\geq 95 \%$ covered) no visible damage | |
| Resistance to soldering heat (4.18.2) | Solder bath method; (260 \pm 5) °C; (10 \pm 1) s | $\pm (0.25 \% R + 0.05 \Omega)$ | $\pm (0.5 \% R + 0.05 \Omega)$ |
| Rapid change of temperature (4.19) | 30 min at LCT = - 55 °C; 30 min at UCT = 125 °C; 5 cycles | $\pm (0.25 \% R + 0.05 \Omega)$ | $\pm (0.5 \% R + 0.05 \Omega)$ |
| Damp heat, steady state (4.24) | (40 \pm 2) °C; 56 days; (93 \pm 3) % RH | $\pm (1 \% R + 0.05 \Omega)$ | $\pm (2 \% R + 0.1 \Omega)$ |
| Climatic sequence (4.23) | 16 h at UCT = 125 °C; 1 cycle at 55 °C; 2 h at LCT = - 55 °C; 1 h/1 kPa at 15 °C to 35 °C; 5 cycles at 55 °C $U = (P_{70} \times R)^{1/2}$ $U = U_{max.}$; whichever is less severe | $\pm (1 \% R + 0.05 \Omega)$ | $\pm (2 \% R + 0.1 \Omega)$ |
| Endurance at 70 °C (4.25.1) | $U = (P_{70} \times R)^{1/2}$ $U = U_{max.}$; whichever is less severe 1.5 h ON; 0.5 h OFF; 70 °C; 1000 h | $\pm (1 \% R + 0.05 \Omega)$ | $\pm (2 \% R + 0.1 \Omega)$ |
| Extended endurance (4.25.1.8) | Duration extended to 8000 h | $\pm (2 \% R + 0.1 \Omega)$ | $\pm (4 \% R + 0.1 \Omega)$ |
| Endurance at upper category temperature (4.25.3) | UCT = 125 °C; 1000 h | $\pm (1 \% R + 0.05 \Omega)$ | $\pm (2 \% R + 0.1 \Omega)$ |

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

APPLICABLE SPECIFICATIONS

- | | |
|-----------------|--|
| • 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 |



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