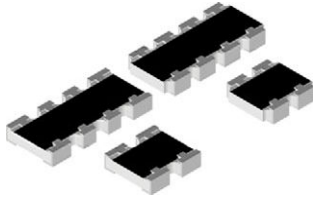


## Thick Film Chip Resistor Array



CRA06E and CRA06S Thick Film resistor arrays are 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 available with either scalloped corners (E version) or square corners (S version)
- Wide ohmic range: 10  $\Omega$  to 1 M $\Omega$
- 4 or 8 terminal package with isolated resistors
- AEC-Q200 qualified
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)

| STANDARD ELECTRICAL SPECIFICATIONS  |         |                               |  |   |                      |                                 |                 |
|---|---------|-------------------------------|--|---|----------------------|---------------------------------|-----------------|
| MODEL   | CIRCUIT | POWER RATING<br>$P_{70}$<br>W | LIMITING ELEMENT<br>VOLTAGE MAX.<br>$V_{\equiv}$ | TEMPERATURE<br>COEFFICIENT<br>$\pm$ ppm/K | TOLERANCE<br>$\pm$ % | RESISTANCE<br>RANGE<br>$\Omega$ | SERIES          |
| CRA06E<br>CRA06S  | 03      | 0.063                         | 50   | 100<br>200                                | 1<br>2; 5            | 10R to 1M                       | E24; E96<br>E24 |
| Zero-Ohm-Resistor: $R_{max.} = 50 \text{ m}\Omega$ , $I_{max.} = 1 \text{ A}$ |         |                               |  |   |                      |                                 |                 |

| TECHNICAL SPECIFICATIONS                  |                          |                   |
|---|--------------------------|-------------------|
| PARAMETER                                 | UNIT                     | CRA06E AND CRA06S |
| Rated dissipation at 70 °C <sup>(1)</sup> | W per element            | 0.063             |
| Limiting element voltage <sup>(2)</sup>   | $V_{\equiv}$             | 50                |
| Insulation voltage (1 min)                | $V_{DC/AC \text{ PEAK}}$ | 100               |
| Category temperature range                | °C                       | -55 to +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 rates dissipation applies only if the permitted film temperature of 155 °C is not exceed

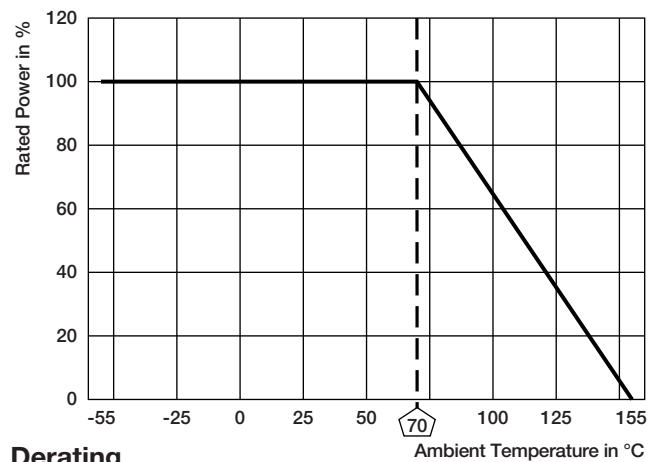
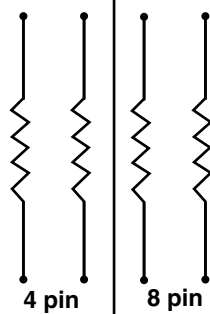
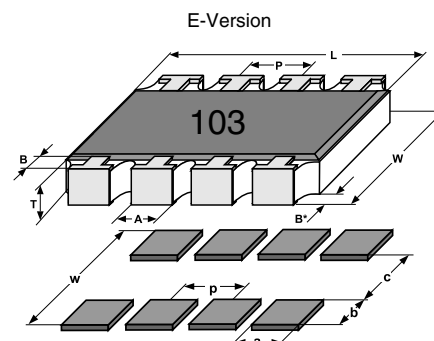
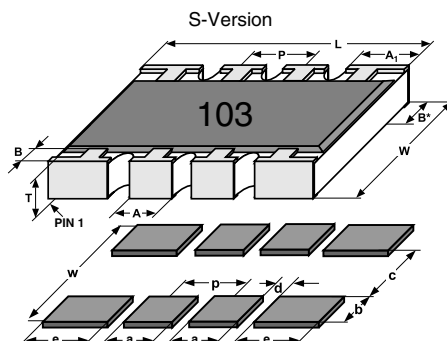
| PART NUMBER AND PRODUCT DESCRIPTION  |                |              |  |  |  |                                  |                |   |   |   |   |   |   |   |   |  |  |
|--|----------------|--------------|--|--|--|----------------------------------|----------------|---|---|---|---|---|---|---|---|--|--|
| Part Number: CRA06S08347K0JTA <sup>(1)</sup>                               |                |              |  |  |  |                                  |                |   |   |   |   |   |   |   |   |  |  |
| C  | R              | A            | 0  | 6  | S  | 0                                | 8              | 3 | 4 | 7 | K | 0 | J | T | A |  |  |
| MODEL  | TERMINAL STYLE | PIN          | CIRCUIT  | VALUE  | TOLERANCE  | PACKAGING <sup>(2)</sup>         | SPECIAL        |   |   |   |   |   |   |   |   |  |  |
| CRA06  | S<br>E         | 04<br>08     | 3 = 03   | R = decimal<br>K = thousand<br>M = million<br>0000 = 0 $\Omega$ jumper   | F = $\pm 1$ %<br>G = $\pm 2$ %<br>J = $\pm 5$ %<br>Z = 0 $\Omega$ jumper | TA<br>TC                         | Up to 2 digits |   |   |   |   |   |   |   |   |  |  |
| Product Description: CRA06S 08 03 -05 473 J RT1 e3                         |                |              |  |  |  |                                  |                |   |   |   |   |   |   |   |   |  |  |
| CRA06S   | 08             | 03           | 473  | J  | RT1  | e3                               |                |   |   |   |   |   |   |   |   |  |  |
| MODEL  | TERMINAL COUNT | CIRCUIT TYPE | RESISTANCE VALUE   | TOLERANCE  | PACKAGING  | LEAD (Pb)-FREE                   |                |   |   |   |   |   |   |   |   |  |  |
| CRA06E<br>CRA06S   | 04<br>08       | 03           | 1R0 = 1 $\Omega$<br>10R = 10 $\Omega$<br>47K = 47 k $\Omega$<br>1M0 = 1 M $\Omega$<br>0R0 = jumper | F = $\pm 1$ %<br>G = $\pm 2$ %<br>J = $\pm 5$ %<br>Z = 0 $\Omega$ jumper | RT1<br>RT6   | e3 = pure tin termination finish |                |   |   |   |   |   |   |   |   |  |  |
| First two digits (3 for 1 %) are significant. Last digit is the multiplier |                |              |  |  |  |                                  |                |   |   |   |   |   |   |   |   |  |  |

#### Notes

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

| AVAILABLE TYPES AND RANGES |                |         |                         |              |
|----------------------------|----------------|---------|-------------------------|--------------|
| MODEL                      | TERMINAL COUNT | CIRCUIT | TEMPERATURE COEFFICIENT | TOLERANCE    |
| CRA06S                     | 04             | 03      | ± 100 ppm/K             | ± 1 %        |
|                            |                |         | ± 200 ppm/K             | ± 2 %; ± 5 % |
|                            | 08             | 03      | ± 100 ppm/K             | ± 1 %        |
|                            |                |         | ± 200 ppm/K             | ± 2 %; ± 5 % |
| CRA06E                     | 08             | 03      | ± 100 ppm/K             | ± 1 %        |
|                            |                |         | ± 200 ppm/K             | ± 2 %; ± 5 % |

| PACKAGING |            |       |               |                |                     |
|-----------|------------|-------|---------------|----------------|---------------------|
| MODEL     | TAPE WIDTH | PITCH | PIECES / REEL | PACKAGING CODE |                     |
|           |            |       |               | PAPER TAPE     |                     |
|           |            |       |               | PART NUMBER    | PRODUCT DESCRIPTION |
| CRA06     | 180 mm/7"  | 4 mm  | 5000          | TA             | RT1                 |
|           | 330 mm/13" | 4 mm  | 20 000        | TC             | RT6                 |

**CIRCUIT**
**03 CIRCUIT**

**DIMENSIONS**


| MODEL  | PIN NO# | DIMENSIONS in millimeters |        |                |        |        |       |       |        |
|--------|---------|---------------------------|--------|----------------|--------|--------|-------|-------|--------|
|        |         | L                         | A      | A <sub>1</sub> | B      | B*     | P     | T     | W      |
| CRA06S | 4       | 1.6                       | 0.38   | 0.61           | 0.3    | 0.3    | 0.8   | 0.5   | 1.5    |
| CRA06E | 8       | 3.2                       | 0.38   | -              | 0.3    | 0.3    | 0.8   | 0.5   | 1.5    |
| CRA06S | 8       | 3.2                       | 0.38   | 0.61           | 0.3    | 0.3    | 0.8   | 0.5   | 1.5    |
|        | TOL.    | ± 0.15                    | ± 0.15 | ± 0.15         | ± 0.15 | ± 0.15 | ± 0.1 | ± 0.1 | ± 0.15 |

| REFLOW SOLDER PAD DIMENSIONS in millimeters |      |     |     |      |     |      |      |      |
|---|------|-----|-----|------|-----|------|------|------|
| MODEL                                       | PINS | c   | w   | d    | p   | a    | b    | e    |
| CRA06S                                      | 4    | 0.8 | 3.1 | 0.36 |     | 0.44 | 1.15 |      |
| CRA06E<br>CRA06S                            | 8    | 0.8 | 3.1 | 0.36 | 0.8 | 0.44 | 1.15 | 0.63 |



**TEST PROCEDURES AND REQUIREMENTS**

| EN 60115-1                                       |  |   |                                |
|--|--|---|--------------------------------|
| TEST (clause)                                    | CONDITIONS OF TEST   | REQUIREMENTS PERMISSIBLE CHANGE ( $\Delta R/R$ ) <sup>(1)</sup> |                                |
|  |  | STABILITY CLASS 1 OR BETTER                                     | STABILITY CLASS 2 OR BETTER    |
|  | Stability for product types:<br><b>CRA06E / CRA06S</b>   | 10 $\Omega$ to 1 M $\Omega$                                     | 10 $\Omega$ to 1 M $\Omega$    |
| Resistance (4.5)                                 | -  | $\pm 1 \%$  | $\pm 2 \%$ ; $\pm 5 \%$        |
| Temperature coefficient (4.8.4.2)                | (20 / -55 / 20) °C and<br>(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   | $\pm (0.25 \% R + 0.05 \Omega)$                                 | $\pm (0.5 \% R + 0.05 \Omega)$ |
| Solderability (4.17.5) <sup>(2)</sup>            | Aging 4 h at 155 °C, dry heat solder bath method; 235 °C; 2 s 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  | $\pm (0.25 \% R + 0.05 \Omega)$                                 | $\pm (0.5 \% R + 0.05 \Omega)$ |
| Rapid change of temperature (4.19)               | 30 min at LCT = -55 °C;<br>30 min at UCT = 125 °C; 5 cycles  | $\pm (0.25 \% R + 0.05 \Omega)$                                 | $\pm (0.5 \% R + 0.05 \Omega)$ |
| Damp heat, steady state (4.24)                   | (40 $\pm$ 2) °C; 56 days;<br>(93 $\pm$ 3) % RH   | $\pm (1 \% R + 0.05 \Omega)$                                    | $\pm (2 \% R + 0.1 \Omega)$    |
| Climatic sequence (4.23)                         | 16 h at UCT = 125 °C; 1 cycle at 55 °C;<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 | $\pm (1 \% R + 0.05 \Omega)$                                    | $\pm (2 \% R + 0.1 \Omega)$    |
| Endurance at 70 °C (4.25.1)                      | $U = (P_{70} \times R)^{1/2}$<br>$U = U_{max.}$ ; whichever is less severe<br>1.5 h ON; 0.5 h OFF;<br>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**

<sup>(1)</sup> Figures are given for a single element

<sup>(2)</sup> 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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