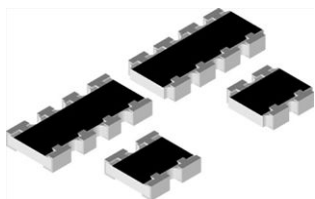




## Thick Film Chip Resistor Array



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>$V_{\Sigma}$ | 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>   | $V_{\Sigma}$             | 50                |
| Insulation voltage (1 min)                | $V_{DC/AC \text{ PEAK}}$ | 100               |
| Category temperature range                | °C                       | -55 to +155       |
| Insulation resistance                     | $\Omega$                 | $> 10^9$          |

#### Notes

<sup>(1)</sup> Rated voltage:  $\sqrt{P \times R}$

<sup>(2)</sup> 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>

|                   |                |  |          |         |                                                                 |                                                       |                          |  |                |  |  |  |  |  |  |  |  |
|-------------------|----------------|--|----------|---------|-----------------------------------------------------------------|-------------------------------------------------------|--------------------------|--|----------------|--|--|--|--|--|--|--|--|
| CRA06S08347K0JT 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 Ω jumper | F = ± 1 %<br>G = ± 2 %<br>J = ± 5 %<br>Z = 0 Ω 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<br><br>First two digits (3 for 1 %) are significant. Last digit is the multiplier | F = $\pm 1$ %<br>G = $\pm 2$ %<br>J = $\pm 5$ %<br>Z = 0 $\Omega$ jumper | RT1<br>RT6 | 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 table PACKAGING, see next page



## AVAILABLE TYPES AND RANGES

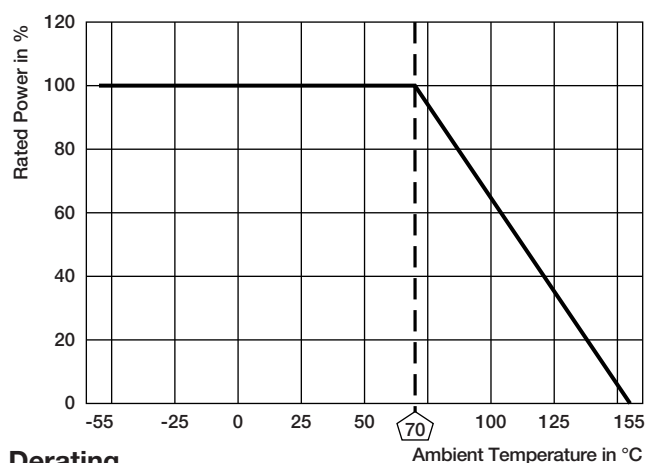
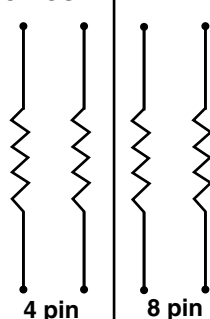
| MODEL  | TERMINAL COUNT | CIRCUIT | TEMPERATURE COEFFICIENT | TOLERANCE          |
|--------|----------------|---------|-------------------------|--------------------|
| CRA06S | 04             | 03      | $\pm 100$ ppm/K         | $\pm 1\%$          |
|        |                |         | $\pm 200$ ppm/K         | $\pm 2\%; \pm 5\%$ |
|        | 08             | 03      | $\pm 100$ ppm/K         | $\pm 1\%$          |
|        |                |         | $\pm 200$ ppm/K         | $\pm 2\%; \pm 5\%$ |
| CRA06E | 08             | 03      | $\pm 100$ ppm/K         | $\pm 1\%$          |
|        |                |         | $\pm 200$ ppm/K         | $\pm 2\%; \pm 5\%$ |

## 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                 |

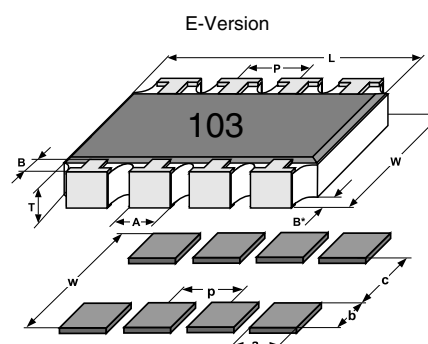
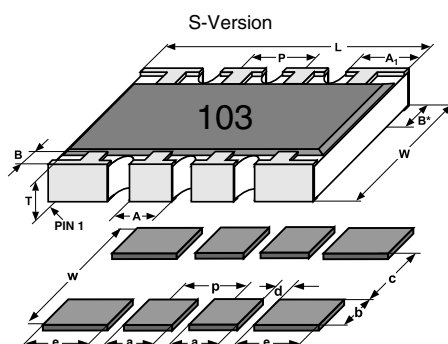
## CIRCUIT

03 CIRCUIT



Derating

## 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.    | $\pm 0.15$                | $\pm 0.15$ | $\pm 0.15$     | $\pm 0.15$ | $\pm 0.15$ | $\pm 0.1$ | $\pm 0.1$ | $\pm 0.15$ |

| 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<br>(clause)                                    | CONDITIONS OF TEST                                                                                                                                                                                | REQUIREMENTS<br>PERMISSIBLE CHANGE ( $\Delta R/R$ ) <sup>(1)</sup> |                                |
|-----------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------|--------------------------------|
|                                                     |                                                                                                                                                                                                   | STABILITY<br>CLASS 1 OR BETTER                                     | STABILITY<br>CLASS 2 OR BETTER |
|                                                     | Stability for product types:                                                                                                                                                                      |                                                                    |                                |
|                                                     | <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<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                                                                                                                                         | $\pm (0.25 \% R + 0.05 \Omega)$                                    | $\pm (0.5 \% R + 0.05 \Omega)$ |
| 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<br>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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