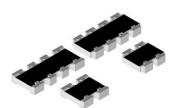


# **Thick Film Chip Resistor Array**



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**



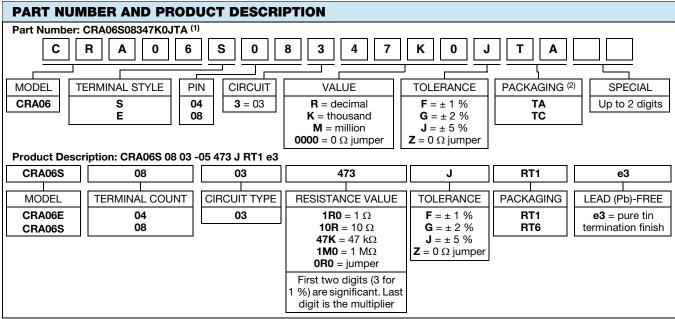
- Convex terminal array available with either scalloped corners (E version) or square corners (S version)
- Wide ohmic range: 10  $\Omega$  to 1 M $\Omega$
- 4 or 8 terminal package with isolated resistors
- AEC-Q200 qualified
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

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

| TECHNICAL SPECIFICATIONS       |                         |                   |  |  |  |  |  |  |
|--------------------------------|-------------------------|-------------------|--|--|--|--|--|--|
| PARAMETER                      | UNIT                    | CRA06E AND CRA06S |  |  |  |  |  |  |
| Rated dissipation at 70 °C (1) | W per element           | 0.063             |  |  |  |  |  |  |
| Limiting element voltage (2)   | V≅                      | 50                |  |  |  |  |  |  |
| Insulation voltage (1 min)     | V <sub>DC/AC PEAK</sub> | 100               |  |  |  |  |  |  |
| Category temperature range     | °C                      | -55 to +155       |  |  |  |  |  |  |
| Insulation resistance          | Ω                       | > 10 <sup>9</sup> |  |  |  |  |  |  |

#### **Notes**

- (1) Rated voltage:  $\sqrt{P \times R}$
- 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



#### Notes

Revison: 28-Feb-17

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

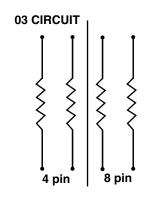
Document Number: 31002

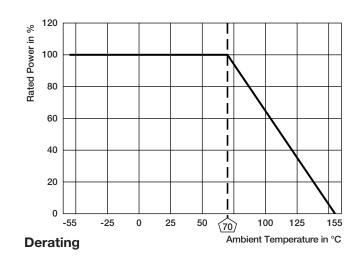


| AVAILABLE TYPES AND RANGES |  |    |             |              |  |  |  |
|----------------------------|--|----|-------------|--------------|--|--|--|
| MODEL                      | DEL TERMINAL COUNT CIRCUIT TEMPERATURE COEFFICIENT |    | TOLERANCE   |              |  |  |  |
|                            | 04   | 03 | ± 100 ppm/K | ± 1 %        |  |  |  |
| CRA06S                     | 04   | 03 | ± 200 ppm/K | ± 2 %; ± 5 % |  |  |  |
| Chaucs                     | 08   | 03 | ± 100 ppm/K | ± 1 %        |  |  |  |
|                            | 00   | 03 | ± 200 ppm/K | ± 2 %; ± 5 % |  |  |  |
| CRA06E                     | 08   | 03 | ± 100 ppm/K | ± 1 %        |  |  |  |
| Chaude                     | 00   | 03 | ± 200 ppm/K | ± 2 %; ± 5 % |  |  |  |

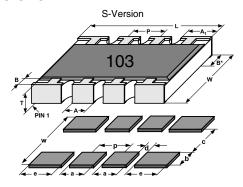
| PACKAGING |            |       |               |                           |                        |  |  |  |
|-----------|------------|-------|---------------|---------------------------|------------------------|--|--|--|
|           |            | PITCH | PIECES / REEL | PACKAGING CODE PAPER TAPE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

## **CIRCUIT**

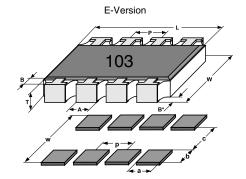




### **DIMENSIONS**



| MODEL  | PIN  | <b>DIMENSIONS</b> in millimeters |        |                |        |        |       |       |        |  |
|--------|------|----------------------------------|--------|----------------|--------|--------|-------|-------|--------|--|
| MODEL  | NO#  | L                                | Α      | A <sub>1</sub> | В      | B*     | Р     | Т     | 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                      |   |     |     |      |     |      |      | е    |  |
| 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 |  |



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| TEST PROCEDURES AND REQUIREMENTS EN 60115-1      |  |  |                                |  |  |  |  |  |
|--|--|--|--------------------------------|--|--|--|--|--|
|  |  |  |                                |  |  |  |  |  |
| (clause)   | CONDITIONS OF TEST   | STABILITY<br>CLASS 1 OR BETTER                     | STABILITY<br>CLASS 2 OR BETTER |  |  |  |  |  |
|  | Stability for product types:   | 10 Ω to 1 MΩ                                       | 10 Ω to 1 MΩ                   |  |  |  |  |  |
|  | CRA06E / CRA06S  | 10 22 10 1 10122                                   | 10 22 to 1 10122               |  |  |  |  |  |
| Resistance (4.5)                                 | -  | ± 1 %  | ± 2 %; ± 5 %                   |  |  |  |  |  |
| Temperature coefficient (4.8.4.2)                | (20 / -55 / 20) °C and<br>(20 / 125 / 20) °C   | ± 100 ppm/K  | ± 200 ppm/K                    |  |  |  |  |  |
| Overload (4.13)                                  | $U = 2.5 \times (P_{70} \times R)^{1/2}$<br>$\leq 2 \times U_{\text{max}}$ ; 0.5 s   | ± (0.25 % R + 0.05 Ω)                              | ± (0.5 % R + 0.05 Ω)           |  |  |  |  |  |
| Solderability (4.17.5) (2)                       | Aging 4 h at 155 °C, dry heat solder bath method; 235 °C; 2 s visual examination   | Good tinning (≥ 95 % covered)<br>no visible damage |                                |  |  |  |  |  |
| Resistance to soldering heat (4.18.2)            | Solder bath method; $(260 \pm 5)$ °C; $(10 \pm 1)$ s   | ± (0.25 % R + 0.05 Ω)                              | ± (0.5 % R + 0.05 Ω)           |  |  |  |  |  |
| Rapid change of temperature (4.19)               | 30 min at LCT = -55 °C;<br>30 min at UCT = 125 °C; 5 cycles  | ± (0.25 % R + 0.05 Ω)                              | ± (0.5 % R + 0.05 Ω)           |  |  |  |  |  |
| Damp heat, steady state (4.24)                   | (40 ± 2) °C; 56 days;<br>(93 ± 3) % RH   | ± (1 % R + 0.05 Ω)                                 | ± (2 % R + 0.1 Ω)              |  |  |  |  |  |
| 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 <sub>70</sub> x R) <sup>1/2</sup><br>U = U <sub>max.</sub> ; whichever is less severe | ± (1 % R + 0.05 Ω)                                 | ± (2 % R + 0.1 Ω)              |  |  |  |  |  |
| Endurance at 70 °C (4.25.1)                      | $U = (P_{70} \times R)^{1/2}$<br>$U = U_{\text{max.}}$ ; whichever is less severe<br>1.5 h ON; 0.5 h OFF;<br>70 °C; 1000 h   | ± (1 % R + 0.05 Ω)                                 | ± (2 % R + 0.1 Ω)              |  |  |  |  |  |
| Extended endurance (4.25.1.8)                    | Duration extended to 8000 h  | ± (2 % R + 0.1 Ω)                                  | ± (4 % R + 0.1 Ω)              |  |  |  |  |  |
| Endurance at upper category temperature (4.25.3) | UCT = 125 °C; 1000 h   | ± (1 % R + 0.05 Ω)                                 | ± (2 % R + 0.1 Ω)              |  |  |  |  |  |

#### Notes

### **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

<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



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