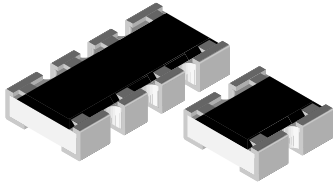


## Thick Film Resistor Array



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 $\Omega$
- 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 $\Omega$	E-SERIES
CRA04S	03	0.063	50	$\pm 100$	$\pm 1$	10R - 1M $\Omega$	24 + 96
				$\pm 200$	$\pm 2; \pm 5$		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 <sup>(2)</sup>	W per element	0.063
Limiting Element Voltage <sup>(1)</sup>	$V_{\equiv}$	50
Insulation Voltage (1 min)	$V_{\text{dc/ac peak}}$	100
Category Temperature Range	°C	- 55 to + 155
Insulation Resistance	$\Omega$	> 10 <sup>9</sup>

**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 rate dissipation applies only if the permitted film temperature of 155 °C is not exceeded.

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

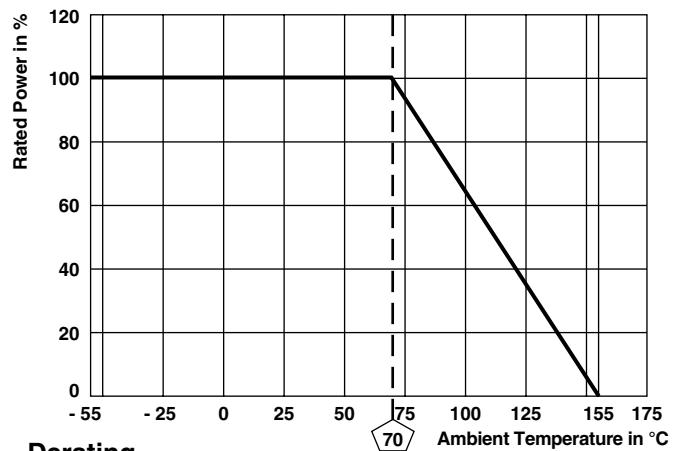
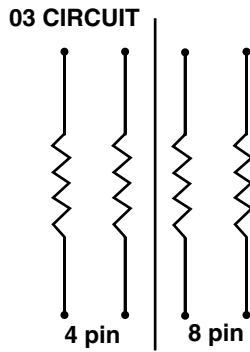
**Notes**

<sup>(3)</sup> Preferred way for ordering products is by use of the PART NUMBER

<sup>(4)</sup> Please refer to the table PACKAGING, see next page

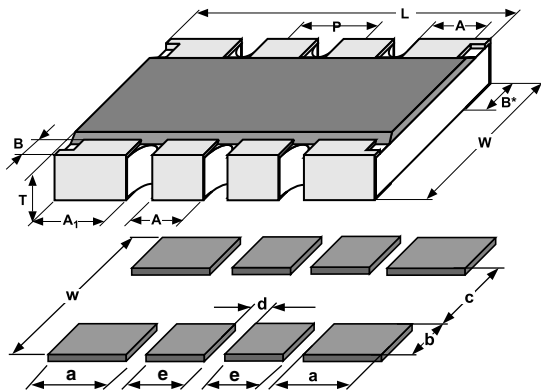
PACKAGING						
MODEL	TAPE WIDTH	DIAMETER	PITCH	PIECES/REEL	PACKAGING CODE	
					PAPER TAPE	
					PART NUMBER	PRODUCT DESCRIPTION
CRA04S	8 mm	180 mm/7"	2 mm	10 000	TD	RT7
		330 mm/13"	2 mm	20 000	TC	RT6
		330 mm/13"	2 mm	50 000	PZ	PZ

**CIRCUIT**



Derating

**DIMENSIONS**



PIN NO#	DIMENSIONS [in millimeters]							
	L	A	A <sub>1</sub>	B	B*	P <sub>NOM</sub>	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.

<b>TEST PROCEDURES AND REQUIREMENTS</b>			
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: <b>CRA04S</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 20/125/20 °C	$\pm 100$ ppm/K	$\pm 200$ ppm/K
Overload (4.13)	$U = 2.5 \times (P_{70} \times R)^{1/2}$ $\leq 2 \times U_{max.}$ ; 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, 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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