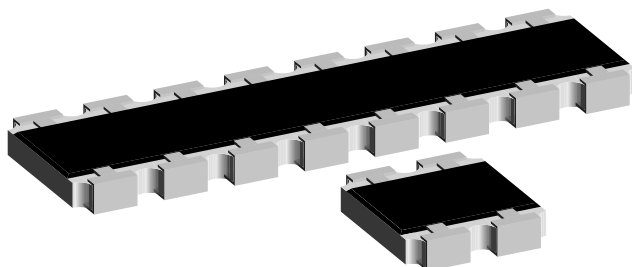


Thick Film Resistor Array



FEATURES

- Convex terminal array available with either scalloped corners (E version) or square corners (S version)
- Wide ohmic range: 10R to 1M Ω
- 4, 8, 10 or 16 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
CRA12E CRA12S	01; 02; 20	0.100	50	± 100	± 1	10R - 1M0	24 + 96
	03	0.125		± 200	$\pm 2; \pm 5$		24
		Zero-Ohm-Resistor: $R_{\text{max.}} = 50 \text{ m}\Omega$, $I_{\text{max.}} = 1.5 \text{ A}$					

TECHNICAL SPECIFICATIONS

PARAMETER	UNIT	CRA12E & S - 01/02/20 CIRCUIT	CRA12E & S - 03 CIRCUIT
Rated Dissipation at 70 °C ⁽²⁾	W per element	0.1	0.125
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 rated dissipation applies only if permitted film temperature of 155 °C is not exceeded.

PART NUMBER AND PRODUCT DESCRIPTION

PART NUMBER: CRA12E08347K0JTR

PART NUMBER: CR-RES-004-TR-001																	
C	R	A	1	2	E	0	8	3	4	7	K	0	J	T	R		
MODEL	TERMINAL STYLE	PIN	CIRCUIT	VALUE	TOLERANCE	PACKAGING ⁽⁴⁾		SPECIAL									
CRA12	S E	04 08 10 16	1 = 01 2 = 02 3 = 03 8 = 20	R = Decimal K = Thousand M = Million 0000 = 0 Ω Jumper	F = ± 1 % G = ± 2 % J = ± 5 % Z = 0 Ω Jumper	TR TL		Up to 2 digits									

PRODUCT DESCRIPTION: CRA12S 08 03 473 J RB8 e3

CRA12S	08	03	473	J	RB8	e3
MODEL	TERMINAL COUNT	CIRCUIT TYPE	RESISTANCE VALUE	TOLERANCE	PACKAGING ⁽⁴⁾	LEAD (Pb)-FREE
CRA12E CRA12S	04 08 10 16	01 02 03 20	473 = 47 k Ω 4702 = 47 k Ω 10R0 = 10 Ω 100 = 10 Ω 000 = 0 Ω Jumper First two digits (three for 1 %) are significant. Last digit is the multiplier	F = $\pm 1\%$ G = $\pm 2\%$ J = $\pm 5\%$ Z = 0 Ω Jumper	RB8 RD7	e3 = Pure tin Termination finish

Notes

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

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



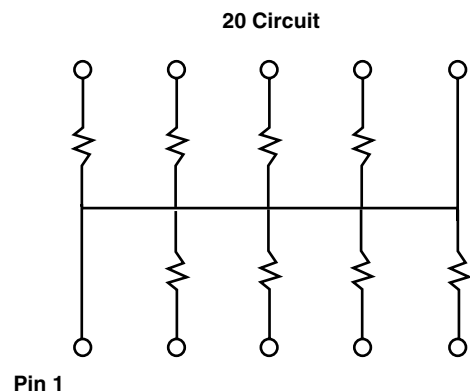
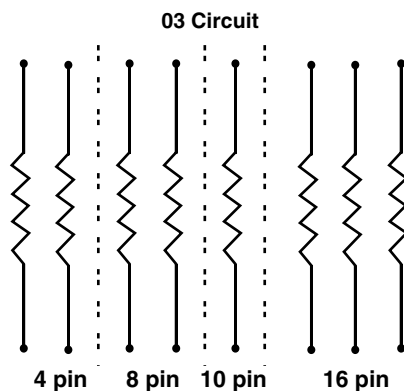
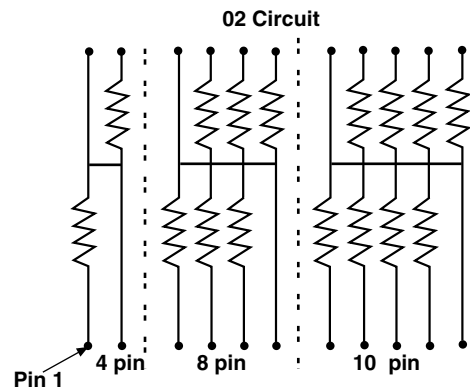
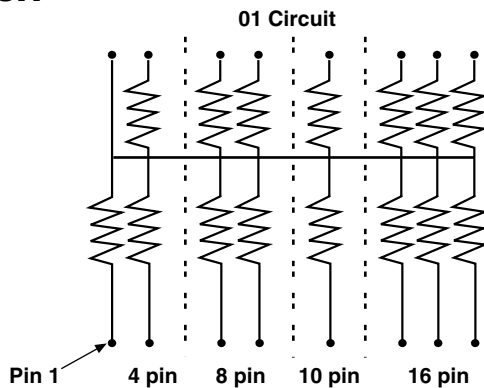
AVAILABLE TYPES AND RANGES

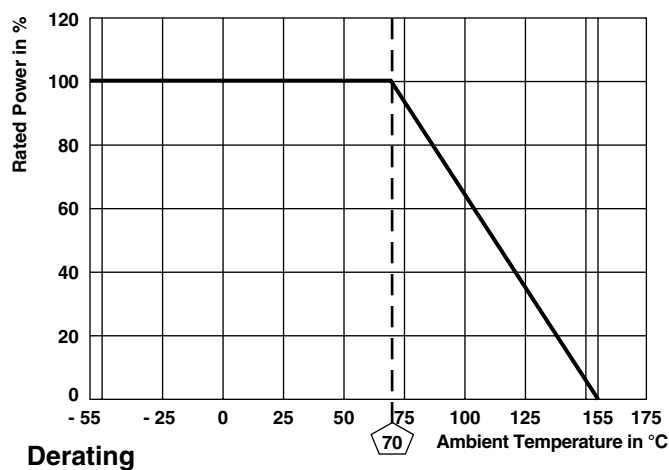
MODEL	TERMINAL COUNT	CIRCUIT	TEMPERATURE COEFFICIENT	TOLERANCE
CRA12 S	08	03	± 100 ppm/K ± 200 ppm/K	± 1 % ± 5 %; ± 2 %
	10	01		
		02		
		03		
20				
CRA12 E	04	01 03		
	08	01 02 03 20		
	10			
	16			

PACKAGING

MODEL	TAPE WIDTH	DIAMETER	PITCH	PIECES/REEL	PACKAGING CODE	
					BLISTER TAPE	
					PART NUMBER	PRODUCT DESCRIPTION
CRA12 E 04	8 mm	180 mm/7"	4 mm	2000	TR	RB8
CRA12 E 08	12 mm	180 mm/7"	8 mm	2000	TR	RB8
CRA12 S 08						
CRA12 E 10						
CRA12 S 10	24 mm	330 mm/13"	8 mm	5000	TL	RD7
CRA12 E 16	24 mm	330 mm/13"	8 mm	2000	TR	RB8
				5000	TL	RD7

CIRCUIT

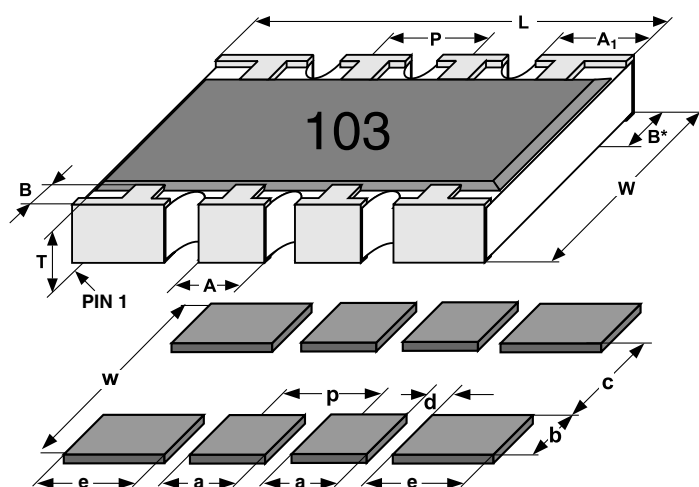




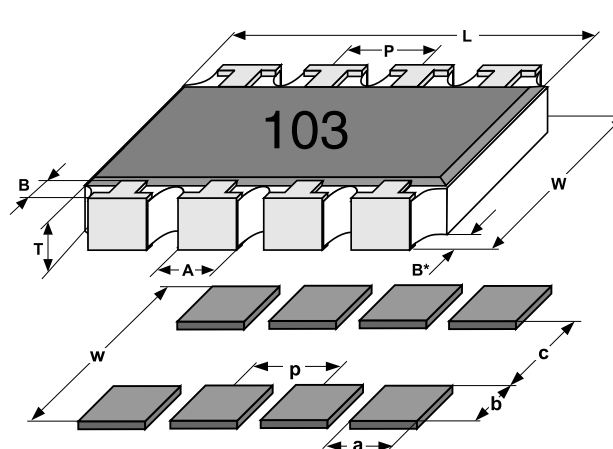
DIMENSIONS

8 -Terminal device

S-Version



E-Version



MODEL	PIN NO#	DIMENSIONS [in millimeters]							
		L	A	A*	B	B*	P	T	W
CRA12E	4	2.54	0.79	-	0.51	0.38	1.27	0.53	3.05
CRA12E	8	5.08	0.79	-	0.51	0.38	1.27	0.53	3.05
CRA12S	8	5.08	0.79	0.89	0.51	0.38	1.27	0.53	3.05
CRA12E	10	6.40	0.79	-	0.51	0.38	1.27	0.53	3.05
CRA12S	10	6.40	0.79	0.89	0.51	0.38	1.27	0.53	3.05
CRA12E	16	10.30	0.79	-	0.51	0.38	1.27	0.53	3.05
	TOL.	-0.15	-0.15	-0.15	-0.25	-0.2	-0.1	-0.1	-0.15

SOLDER PAD DIMENSIONS [in millimeters]							
	c	w	d	p	a	b	e
WAVE	2.2	4.3	0.57	1.27	0.71	1.05	1.09
REFLOW	2.2	3.9	0.57	1.27	0.71	0.86	1.09

The dimensions shown are for 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 ⁽¹⁾	
		STABILITY CLASS 1 OR BETTER	STABILITY CLASS 2 OR BETTER
	Stability for product types: CRA12E/CRA12S	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 $^{\circ}\text{C}$ and 20/125/20 $^{\circ}\text{C}$	± 100 ppm/K	± 200 ppm/K
Overload (4.13)	$U = 2.5 \times (P_{70} \times R)^{1/2}$ $\leq 2 \times U_{\max.}$; 1 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 $^{\circ}\text{C}$, dryheat Solder bath method; 235 $^{\circ}\text{C}$; 1 s Visual examination	Good tinning ($\geq 95 \%$ covered) no visible damage	
Resistance to soldering heat (4.18.2)	Solder bath method; (260 ± 5) $^{\circ}\text{C}$; (10 ± 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 $^{\circ}\text{C}$; 30 min. at UCT = 125 $^{\circ}\text{C}$; 5 cycles	$\pm (0.25 \% R + 0.05 \Omega)$	$\pm (0.5 \% R + 0.05 \Omega)$
Damp heat, steady state (4.24)	(40 ± 2) $^{\circ}\text{C}$; 56 days; (93 ± 3) % RH	$\pm (1 \% R + 0.05 \Omega)$	$\pm (2 \% R + 0.1 \Omega)$
Climatic sequence (4.23)	16 h at UCT = 125 $^{\circ}\text{C}$; 1 cycle at 55 $^{\circ}\text{C}$; 2 h at LCT = - 55 $^{\circ}\text{C}$; 1 h/1 kPa at 15 $^{\circ}\text{C}$ to 35 $^{\circ}\text{C}$; 5 cycles at 55 $^{\circ}\text{C}$ $U = (P_{70} \times R)^{1/2}$ $U = U_{\max.}$; whichever is less severe	$\pm (1 \% R + 0.05 \Omega)$	$\pm (2 \% R + 0.1 \Omega)$
Endurance at 70 $^{\circ}\text{C}$ (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 $^{\circ}\text{C}$; 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 $^{\circ}\text{C}$; 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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