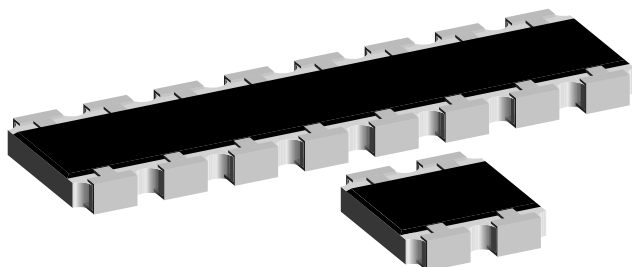


Thick Film Resistor Array



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_{E}	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_{E}	50	
Insulation Voltage (1 min)	$V_{\text{dc/ac peak}}$	100	
Category Temperature Range	°C	- 55/+ 125 (+ 155)	
Insulation Resistance	Ω	$> 10^9$	

Notes

- 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 rated dissipation applies only if permitted film temperature of 155 °C is not exceeded.

PART NUMBER AND PRODUCT DESCRIPTION

PART NUMBER: CRA12E08347K0JTR

C		R		A		1		2		E		0		8		3		4		7		K		0		J		T		R					
MODEL		TERMINAL STYLE				PIN		CIRCUIT		VALUE				TOLERANCE				PACKAGING ²⁾				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 ²⁾	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	F = $\pm 1\%$ G = $\pm 2\%$ J = $\pm 5\%$ Z = 0 Ω Jumper	RB8 RD7	e3 = Pure Tin Termination Finish
First two digits (three for 1 %) are significant. Last digit is the multiplier						

Notes

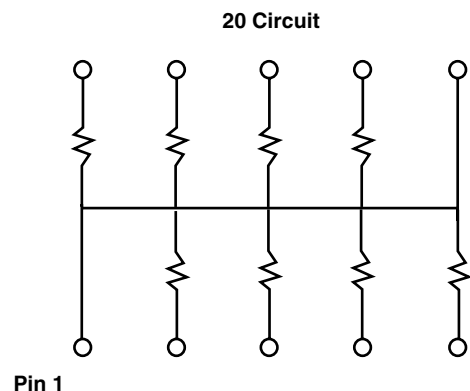
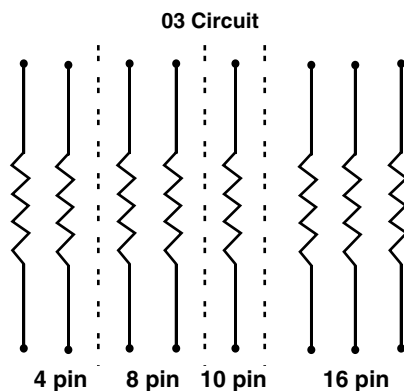
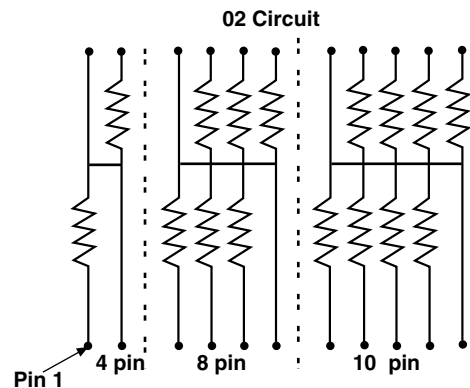
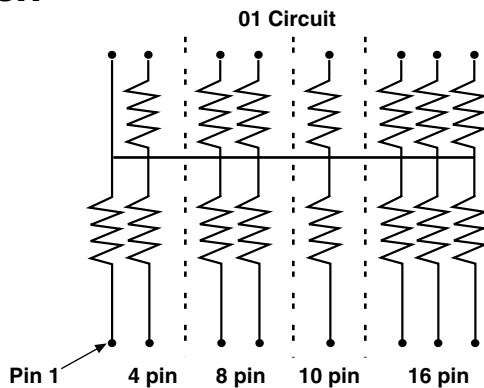
- Preferred way for ordering products is by use of the PART NUMBER
- Please refer to table PACKAGING, see next page

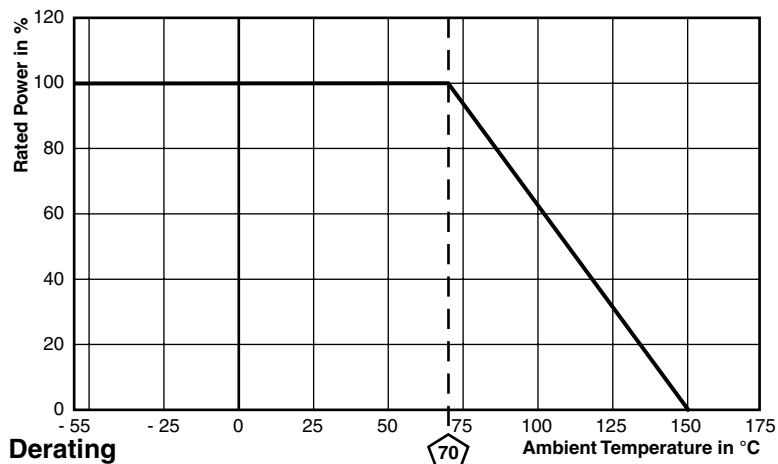
**AVAILABLE TYPES AND RANGES**

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

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" 330 mm/13"	8 mm	2000 5000	TR	RB8
CRA12 S 08					TL	RD7
CRA12 E 10						
CRA12 S 10						
CRA12 E 16	24 mm	330 mm/13"	8 mm	2000 5000	TR TL	RB8 RD7

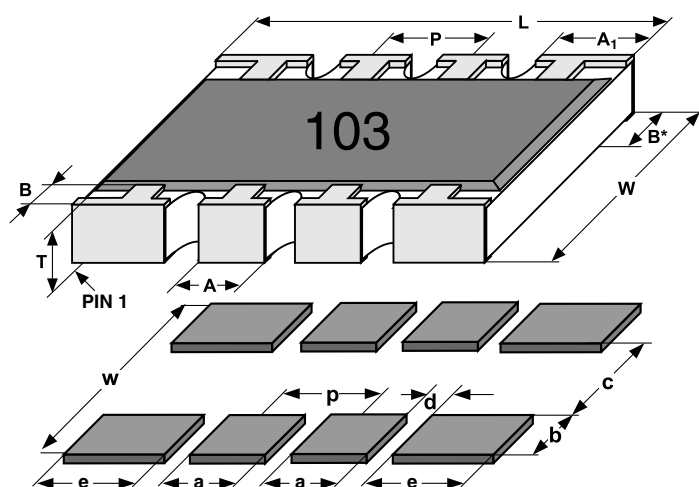
CIRCUIT



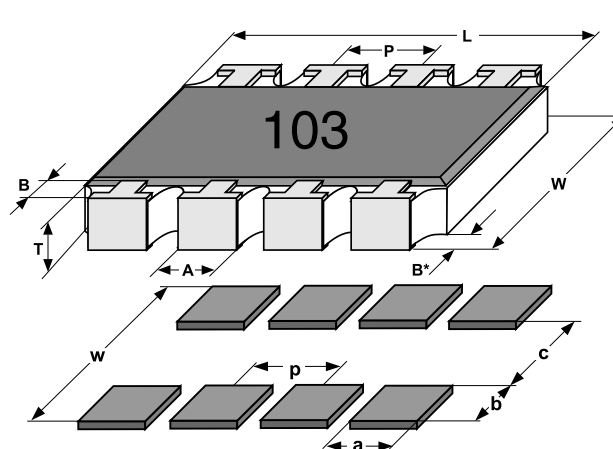
DIMENSIONS

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 MΩ	10 Ω to 1 MΩ
Resistance (4.5)	-	± 1 %	± 2 %; ± 5 %
Temperature coefficient (4.8.4.2)	20/- 55/20 °C and 20/125/20 °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	± (0.25 % R + 0.05 Ω)	± (0.5 % R + 0.05 Ω)
Solderability (4.17.5) ²⁾	Aging 4 h at 155 °C, dryheat Solder bath method; 235 °C; 1 s Visual examination	Good tinning (≥ 95 % covered) no visible damage	
Resistance to soldering heat (4.18.2)	Solder bath method; (260 ± 5) °C; (10 ± 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; 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; (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; 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	± (1 % R + 0.05 Ω)	± (2 % R + 0.1 Ω)
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	± (1 % R + 0.05 Ω)	± (2 % R + 0.1 Ω)
Extended endurance (4.25.1.8)	Duration extended to 8000 hours	± (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

- Figures are given for a single element.
- 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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