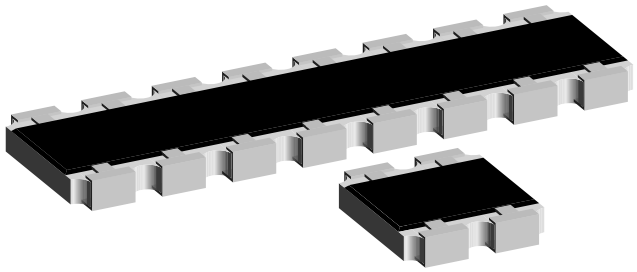
Thick Film Resistor Array



FEATURES

- Convex terminal array available with either scalloped corners (E version) or square corners (S version)
- Wide ohmic range: 10R to 1M0
- 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 $P_{70\,°C}$ W	LIMITING ELEMENT VOLTAGE MAX. V≅	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	± 2; ± 5		24
		Zero-Ohm-Resistor: $R_{max.}$ = 50 mΩ, $I_{max.}$ = 1.5 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≅	50	
Insulation Voltage (1 min)	$V_{dc/ac\ peak}$	100	
Category Temperature Range	°C	- 55 to + 155	
Insulation Resistance	Ω	> 10^9	

Notes

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

(2) The power dissiaption 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 (3)

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 kΩ 4702 = 47 kΩ 10R0 = 10 Ω 100 = 10 Ω 000 = 0 Ω Jumper First two digits (three for 1 %) are significant. Last digit is the multiplier	F = ± 1 % G = ± 2 % J = ± 5 % Z = 0 Ω Jumper	RB8 RD7	e3 = Pure tin Termination fnish

Notes

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

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

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AVAILABLE TYPES AND RANGES

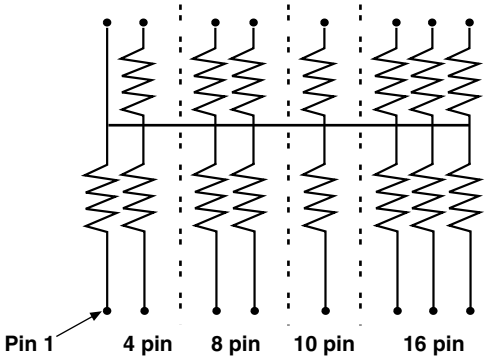
MODEL	TERMINAL COUNT	CIRCUIT	TEMPERATURE COEFFICIENT	TOLERANCE
CRA12 S	08	03	± 100 ppm/K ± 200 ppm/K	± 1 % ± 5 %; ± 2 %
	10	01 02 03 20		
CRA12 E	04	01 03		
	08	01 02 03 20		
	10			
	16			

PACKAGING

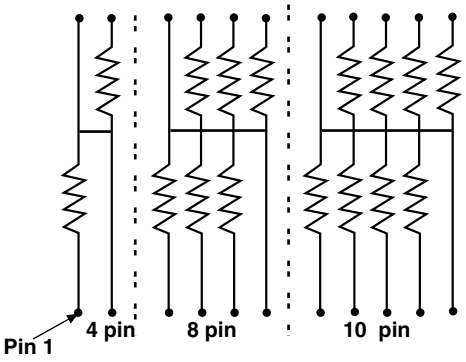
MODEL	TAPE WIDTH	DIAMETER	PITCH	PIECES/REEL	PACKAGING CODE	
					BLISTER TAPE	
					PART NUMBER	PRODUCT DESCRIPTION
CRA12 E 04	8 mm	180 mm/7"	4 mm	2000	TR	RB8
CRA12 E 08 CRA12 S 08 CRA12 E 10 CRA12 S 10	12 mm	180 mm/7" 330 mm/13"	8 mm	2000 5000	TR TL	RB8 RD7
CRA12 E 16	24 mm	330 mm/13"	8 mm	2000 5000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

CIRCUIT

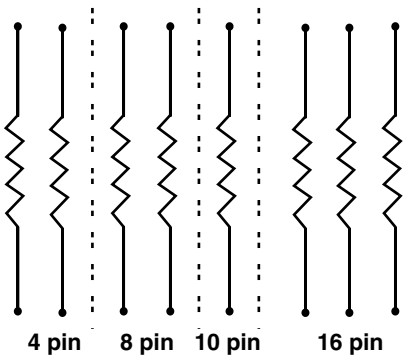
01 Circuit



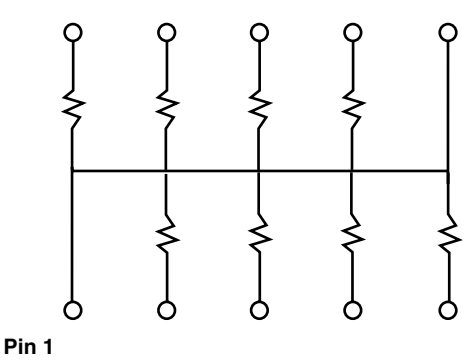
02 Circuit



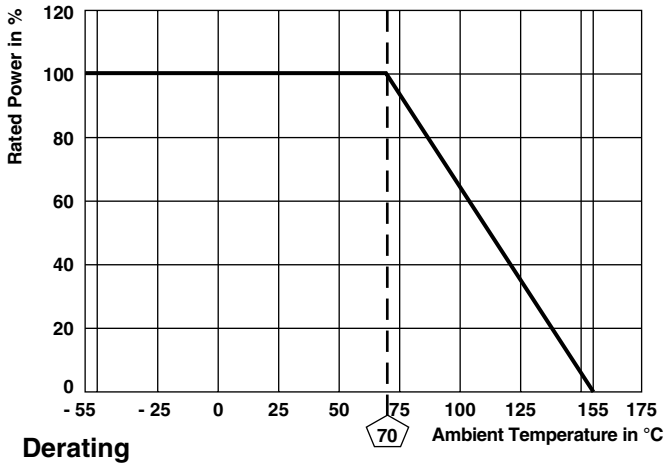
03 Circuit



20 Circuit

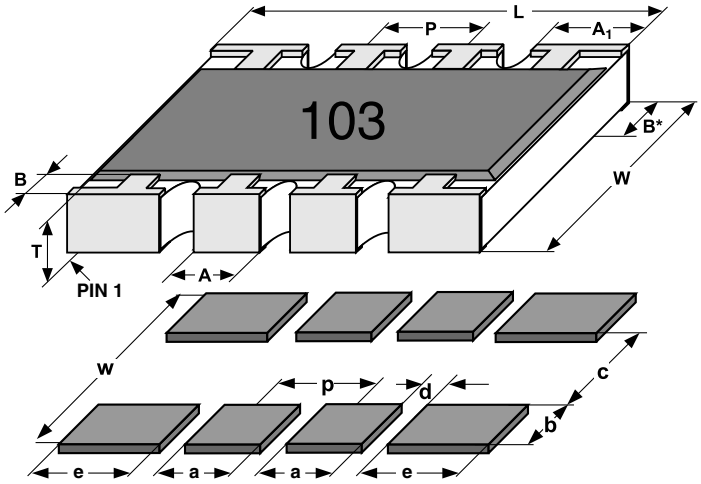


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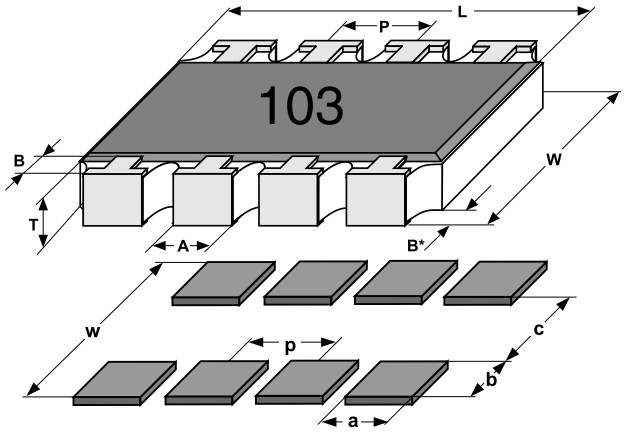


DIMENSIONS

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 substract pads as required.

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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)	$U = 2.5 \times (P_{70} \times R)^{1/2}$ ≤ 2 x $U_{max.}$; 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 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

(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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