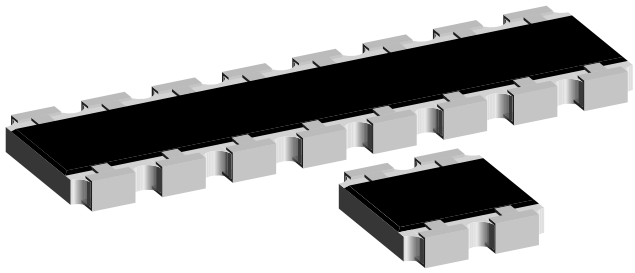
Thick Film Resistor Array



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

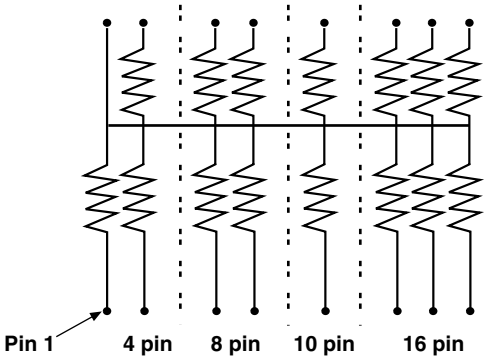
(4) Please refer to table PACKAGING, see next page

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			

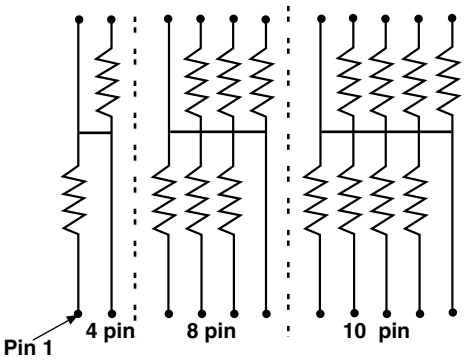
PACKAGING						
MODEL	TAPE WIDTH	DIAMETER	PITCH	PIECES/REEL	PACKAGING CODE	
					BLISTER TAPE	
					PART NUMBER	PRODUCT DESCRIPTION
CRA12 E 04	8 mm	180 mm/7"	4 mm	2000	TR	RB8
CRA12 E 08 CRA12 S 08 CRA12 E 10 CRA12 S 10	12 mm	180 mm/7" 330 mm/13"	8 mm	2000 5000	TR TL	RB8 RD7
CRA12 E 16	24 mm	330 mm/13"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

CIRCUIT

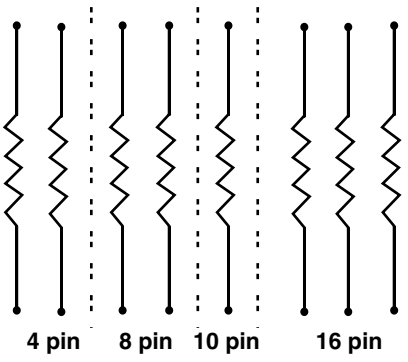
01 Circuit



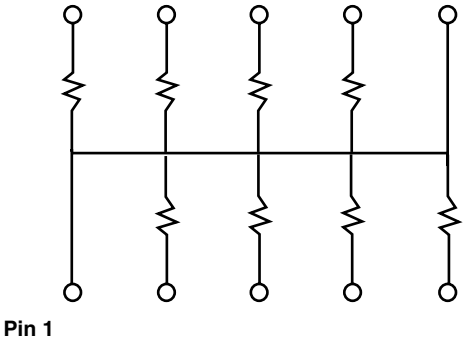
02 Circuit

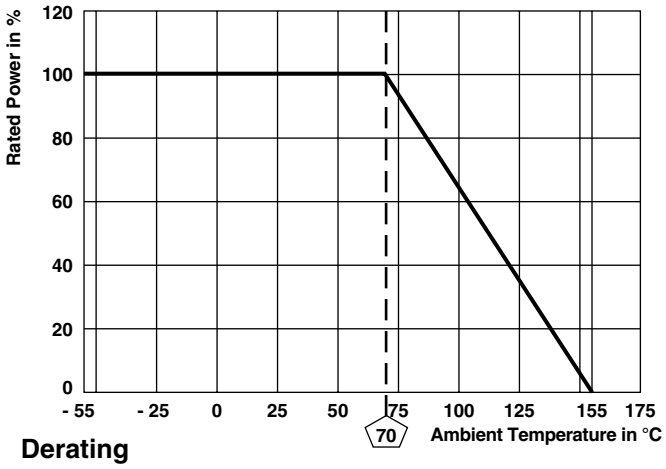


03 Circuit



20 Circuit

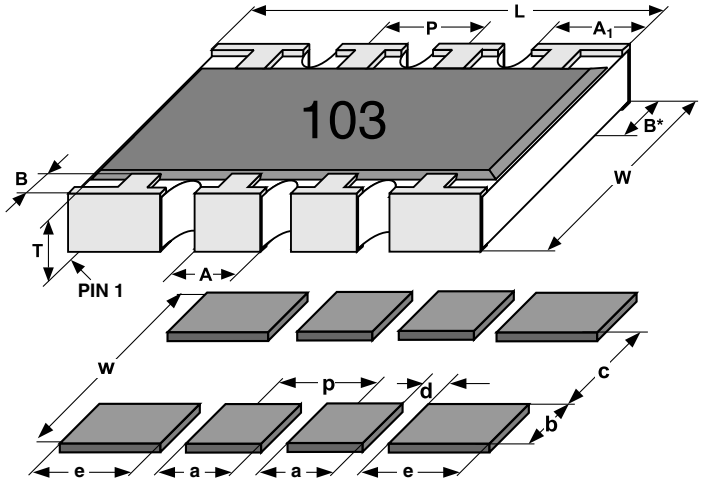




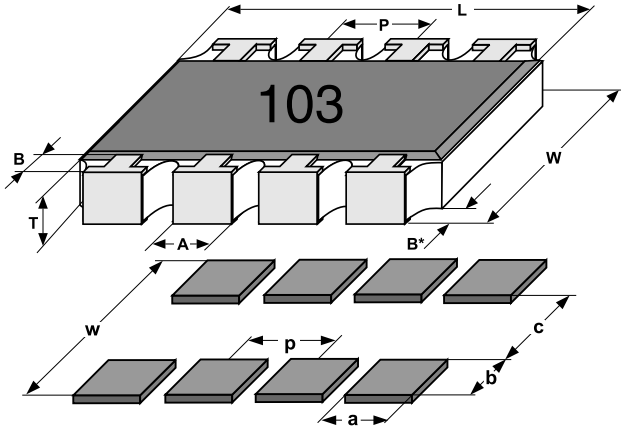
Derating

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.

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 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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