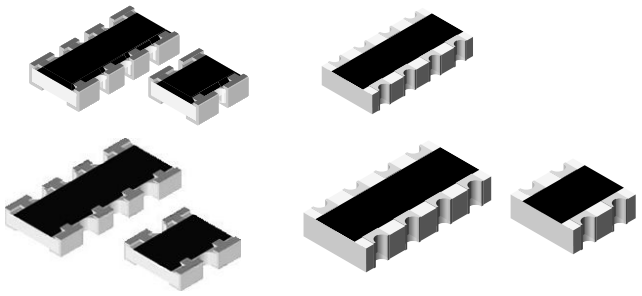
Thick Film Commodity Resistor Array



FEATURES

- High volume product suitable for commercial applications
- Convex or concave terminal array with square corners
- 4 or 8 terminal package with isolated resistors
- Pure tin solder contacts on Ni barrier layer provides compatibility with lead (Pb)-free and lead containing processes
- Material categorization: For definitions of compliance please see www.vishay.com/doc?99912

RoHS COMPLIANT HALOGEN FREE

STANDARD ELECTRICAL SPECIFICATIONS

MODEL	CIRCUIT	POWER RATING $P_{70\,°C}$ W	LIMITING ELEMENT VOLTAGE $U_{max.}$ AC/DC	TEMPERATURE COEFFICIENT ppm/K	TOLERANCE %	RESISTANCE RANGE Ω	SERIES
CRA04S CRA04P	03	0.063	50	± 200	± 1 ± 2; ± 5	10 to 1M	E24; E96 E24
		Zero-Ohm-Resistor available; $R_{max.}$ = 50 mΩ, $I_{max.}$ = 1 A					
CRA06S CRA06P	03	0.063	50	± 200	± 1 ± 2; ± 5	10 to 1M	E24; E96 E24
		Zero-Ohm-Resistor available; $R_{max.}$ = 50 mΩ, $I_{max.}$ = 1 A					

Notes

- These resistors do not feature a lifetime limitation when operated within the limits of rated dissipation, permissible operating voltage and permissible film temperature. However, the resistance typically increases due to the resistor's film temperature over operating time, generally known as drift. The drift may exceed the stability requirements of an individual application circuit and thereby limits the functional lifetime.
- Marking: See data sheet "Surface Mount Resistor Marking" (www.vishay.com/doc?20020)
- Power rating depends on the max. temperature at the solder point, the component placement density and the substrate material.

TECHNICAL SPECIFICATIONS

PARAMETER	UNIT	CRA04	CRA06
Power rating P_{70} (1)	W per element	0.063	
Limiting element voltage $U_{max.}$ AC_{RMS}/DC	V	50	
Insulation voltage $U_{ins.}$ (1 min)	V	> 100	
Insulation resistance	Ω	$> 10^9$	
Operating temperature range	°C	- 55 to + 155	

Note

(1) 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 the permitted film temperature of 155 °C is not exceeded.

PART NUMBER AND PRODUCT DESPRIPTION

Part Number: CRA06S08347K0JTABC

C	R	A	0	6	S	0	8	3	4	7	K	0	J	T	A	B	C

MODEL	TERMINAL STYLE	PIN	CIRCUIT	RESISTANCE	TOLERANCE	PACKAGING	SPECIAL
CRA04 **CRA06**	**S** = Convex **P** = Concave	**04** **08**	**3** = 03	**R** = Decimal **K** = Thousand **M** = Million **0000** = 0 Ω jumper	**F** = ± 1 % **G** = ± 2 % **J** = ± 5 % **Z** = 0 Ω Jumper	**TA** **TC** **TD**	**BC** = Commodity

Product Description: CRA06S-BC 08 03 47K 5 % RT1 e3

CRA06S-BC	08	03	47K	5 %	RT1	e3
MODEL	PIN	CIRCUIT TYPE	RESISTANCE	TOLERANCE	PACKAGING	LEAD (Pb)-FREE
CRA04S-BC **CRA04P-BC** **CRA06S-BC** **CRA06P-BC**	**04** **08**	**03**	**10R** = 10 Ω **47K** = 47 kΩ **1M** = 1 MΩ **0R0** = Jumper	± 1 % ± 2 % ± 5 %	**RT1** **RT2** **RT3** **RT5** **RT6** **RT7**	**e3** = Pure tin termination finish

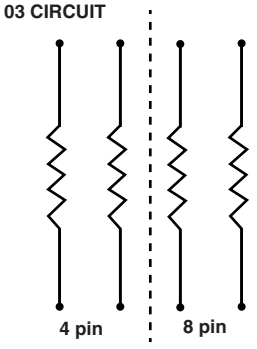
AVAILABLE TYPES AND RANGES

MODEL	TERMINAL COUNT	CIRCUIT	TEMPERATURE COEFFICIENT	TOLERANCE
CRA04S	04 08	03	± 200 ppm/K	± 1 %, ± 2 %, ± 5 %
CRA04P	08			
CRA06S **CRA06P**	04 08			

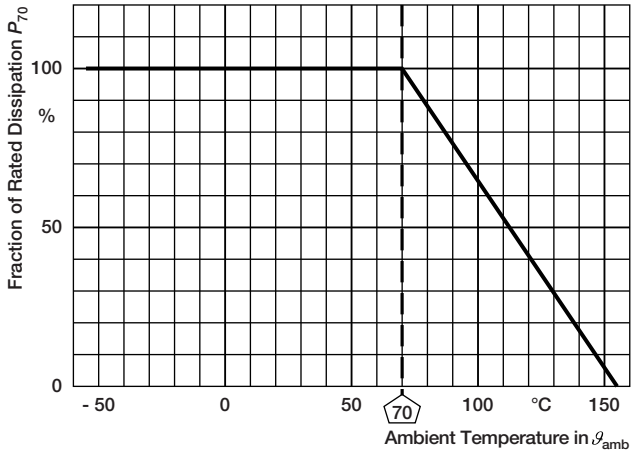
PACKAGING

MODEL	UNIT	PAPER TAPE ON REEL ACC. TO IEC 60286-3, TYPE I		
		QUANTITY	PART NUMBER	PRODUCT DESC.
CRA04S **CRA04P**	180 mm/7"	10 000	TD	RT7
	254 mm/10"	20 000	TI	RT2
	330 mm/13"	30 000	TL	RT3
CRA06 **CRA06P**	180 mm/7"	5000	TA	RT1
	254 mm/10"	10 000	TB	RT5
	330 mm/13"	20 000	TC	RT6

CIRCUIT

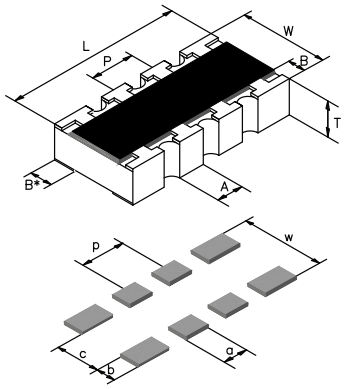


DERATING



DIMENSIONS

CRA..S08



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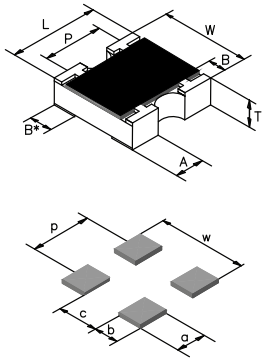

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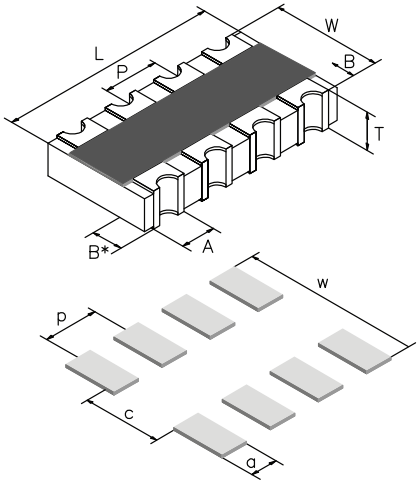

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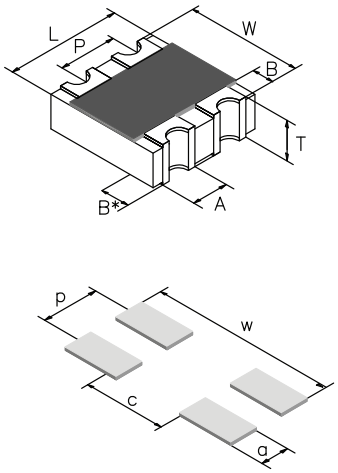

MODEL	PIN #	DIMENSIONS in millimeters						
		L	W	H	B	B*	A	P
CRA04S	4	1 ± 0.1	1 ± 0.1	0.3 ± 0.05	0.15 ± 0.1	0.25 ± 0.1	0.33 ± 0.1	0.67
	8	2 ± 0.1	1 ± 0.1	0.4 ± 0.1	0.2 ± 0.1	0.25 ± 0.1	0.3 ± 0.1	0.50
CRA04P	8	2 ± 0.1	1 ± 0.1	0.4 ± 0.1	0.15 ± 0.1	0.25 ± 0.1	0.3 ± 0.1	0.50
CRA06S	4	1.6 ± 0.15	1.6 ± 0.15	0.45 ± 0.1	0.3 ± 0.15	0.3 ± 0.15	0.6 ± 0.1	0.80
	8	3.2 ± 0.2	1.6 ± 0.15	0.5 ± 0.1	0.3 ± 0.15	0.3 ± 0.15	0.5 ± 0.1	0.80
CRA06P	4	1.6 ± 0.15	1.6 ± 0.15	0.55 ± 0.1	0.3 ± 0.15	0.4 ± 0.15	0.5 ± 0.1	0.80
	8	3.2 ± 0.15	1.6 ± 0.15	0.55 ± 0.1	0.35 ± 0.15	0.45 ± 0.15	0.5 ± 0.1	0.80

MODEL	PINS	RECOMMENDED SOLDER PAD DIMENSIONS in millimeters				
		c	w	p	a	b
CRA04S	4	0.5	2.0	0.67	0.33	0.34
	8	0.5	2.0	0.5	0.28	0.22
CRA04P	8	0.5	2.0	0.5	0.28	0.22
CRA06S	4	1.0	2.6	0.8	0.4	0.4
	8	1.0	2.6	0.8	0.4	0.4
CRA06P	4	1.0	2.6	0.8	0.4	0.4
	8	1.0	2.6	0.8	0.4	0.4

TEST PROCEDURES AND REQUIREMENTS

EN 60115-1 CLAUSE	IEC 60068-2 TEST METHOD	TEST	PROCEDURE	REQUIREMENTS PERMISSIBLE CHANGE (ΔR)	
				STABILITY CLASS 1 OR BETTER	STABILITY CLASS 2 OR BETTER
			Stability for product types:	10 Ω to 1 MΩ	
			CRA04S, CRA04P CRA06S, CRA06P		
4.5	-	Resistance	-	± 1 %	± 2 %; ± 5 %
4.13	-	Short time overload	$U = 2.5 \times \sqrt{P_{70} \times R} \leq 2 \times U_{max.}$; duration acc. to style	± (1 % R + 0.05 Ω)	± (2 % R + 0.05 Ω)
4.17.2	58 (Td)	Solderability	Solder bath method; Sn60Pb40	Good tinning (≥ 95 % covered); no visible damage	
			Solder bath method; Sn96,5Ag3Cu0,5 non-activated flux; (245 ± 5) °C; (3 ± 0,3) s		
4.8.4.2	-	Temperature coefficient	20 °C, - 55 °C, 20 °C and 20 °C, 125 °C, 20 °C	± 200 ppm/K	
4.32	21 (Ue)	Shear (adhesion)	20 N	No visible damage	
4.33	21 (Ue)	Substrate bending	Depth 2 mm; 3 times	No visible damage, no open circuit in bent position ± (1.0 % R + 0.05 Ω)	
4.19	14 Na	Rapid change of temperature	30 min at - 55 °C; 30 min at 125 °C; 5 cycles 1000 cycles	± (0.5 % R + 0.05 Ω) ± (1 % R + 0.05 Ω)	
4.23 4.23.2 4.23.3 4.23.4 4.23.5 4.23.6 4.23.7	- 2 (Ba) 30 (Db) 1 (Aa) 13 (M) 30 (Db) -	Climatic sequence Dry heat Damp heat, cyclic Cold Low air pressure Damp heat, cyclic	- 125 °C; 16 h 55 °C; ≥ 90 % RH 24 h; 1 cycle - 55 °C; 2 h 1 kPa; (25 ± 10) °C; 1 h 55 °C; ≥ 90 % RH 24 h; 5 cycle $U = (P_{70} \times R)^{1/2}$	± (1 % R + 0.05 Ω)	± (2 % R + 0.1 Ω)
4.25.1	-	Endurance at 70 °C	$U = \sqrt{P_{70} \times R} \leq U_{max.}$; 1.5 h on; 0.5 h off; 70 °C; 1000 h	± (1 % R + 0.1 Ω)	± (2 % R + 0.1 Ω)
4.18.2	58 (Td)	Resistance to soldering heat	Solder bath method; (260 ± 5) °C; (10 ± 1) s	± (1 % R + 0.05 Ω)	
4.24	78 (Cab)	Damp heat, steady state	(40 ± 2) °C; (93 ± 3) % RH; 56 days	± (1 % R + 0.05 Ω)	± (2 % R + 0.1 Ω)
4.25.3	-	Endurance at upper category temperature	55 °C; 1000 h	± (1 % R + 0.05 Ω)	± (2 % R + 0.1 Ω)
4.40	-	Electrostatic discharge (human body model)	IEC 61340-3-1 3 pos. + 3 neg. discharges; ESD voltage acc. to style	± (1 % R + 0.05 Ω)	
4.29	45 (XA)	Component solvent resistance	Isopropyl alcohol; 50 °C; method 2	No visible damage	
4.30	45 (XA)	Solvent resistance of marking	Isopropyl alcohol; 50 °C; method 1, toothbrush	Marking legible, no visible damage	

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

Packaging of components is done in paper according to IEC 60286-3.