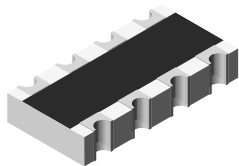


Thick Film Chip Resistor Array



The CRA04P thick film resistor array is constructed on a high grade ceramic body with concave terminations. A small package enables the design of high density circuits. The single component reduces board space, component counts and assembly costs.

FEATURES

- Concave terminal array with square corners
- Wide ohmic range: 1R0 to 1M0
- 8 terminal package with isolated resistors
- Pure tin solder contacts on Ni barrier layer, provides compatibility with lead (Pb)-free and lead containing soldering 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 $P_{70^{\circ}\text{C}}$ W	LIMITING ELEMENT VOLTAGE MAX. $V_{\cong}$	TEMPERATURE COEFFICIENT $\pm$ ppm/K	TOLERANCE $\pm$ %	RESISTANCE RANGE Ω	E-SERIES
CRA04P	03	0.063	50	100	2	10 to 1M	24
				200	5	1 to 1M	24
		Zero-Ohm-Resistor: $R_{\text{max}} = 50 \text{ m}\Omega$, $I_{\text{max}} = 1 \text{ A}$					

TECHNICAL SPECIFICATIONS

PARAMETER	UNIT	CRA04P
Rated dissipation $P_{70\text{ }^{\circ}\text{C}}$ ⁽¹⁾	W per element	0.063
Limiting element voltage $U_{\text{max. AC/DC}}$	V	50
Insulation voltage U_{ins} (1 min)	V	100
Insulation resistance	Ω	> 10 ⁹
Category temperature range	°C	- 55 to + 155

Note

⁽¹⁾ Power rating depends on the max. temperature at the solder point, the component placement density and the substrate material.

PART NUMBER AND PRODUCT DESCRIPTION

Part Number: CRA04P08347K0JTD ⁽²⁾

C	R	A	0	4	P	0	8	3	4	7	K	0	J	T	D		
MODEL	TERMINAL STYLE	PIN	CIRCUIT	VALUE			TOLERANCE		PACKAGING ⁽³⁾		SPECIAL						
CRA04	P	08	3 = 03	R = Decimal K = Thousand M = Million 0000 = 0 Ω Jumper			G = ± 2 % J = ± 5 % Z = 0 Ω Jumper		TD TC PZ		Up to 2 digits						
Product Description: CRA04P 08 03 47K 5 % RT7 e3																	
CRA04P	08	03	47K			5 %		RT7		e3							
MODEL	TERMINAL COUNT	CIRCUIT TYPE	RESISTANCE VALUE			TOLERANCE		PACKAGING ⁽³⁾		LEAD (Pb)-FREE							
CRA04P	08	03	10R = 10 Ω 47K = 47 Ω 1M = 1 MΩ 0R0 = 0 Ω Jumper			± 2 % ± 5 %		RT7 RT6 PZ		e3 = Pure tin termination finish							

Notes

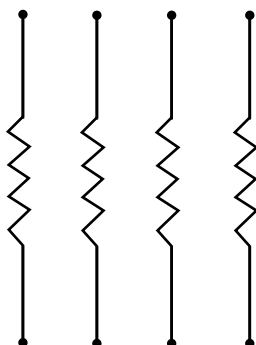
⁽²⁾ Preferred way for ordering products is by use of the PART NUMBER.

⁽³⁾ Please refer to the table PACKAGING, see next page.

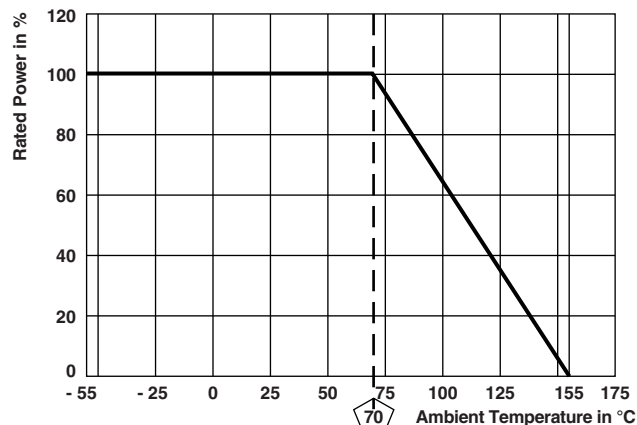
PACKAGING						
MODEL	TAPE WIDTH	DIAMETER	PITCH	PIECES/REEL	PACKAGING CODE	
					PAPER TAPE	
					PART NUMBER	PRODUCT DESCRIPTION
CRA04P	8 mm	180 mm/7"	2 mm	10 000	TD	RT7
		330 mm/13"	2 mm	20 000	TC	RT6
		330 mm/13"	2 mm	50 000	PZ	PZ

CIRCUIT

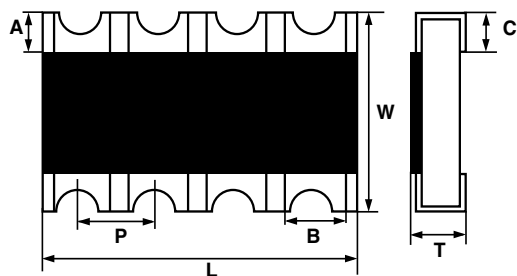
03 Circuit



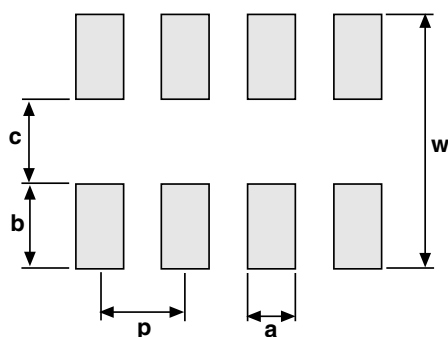
DERATING



DIMENSIONS



PIN NO#	DIMENSIONS in millimeters						
	L	A	B	C	P _{NOM.}	T	W
8	2.00	0.20	0.32	0.25	0.50	0.45	1.00
TOL.	± 0.20	± 0.10	± 0.10	± 0.15	-	± 0.10	± 0.10



SOLDER PAD DIMENSIONS in millimeters					
	c	w	p	a	b
WAVE	0.5	1.5	0.5	0.32	0.5

TEST PROCEDURES AND REQUIREMENTS					
EN 60115-1 CLAUSE	IEC 60068-2 TEST METHOD	TEST	PROCEDURE	REQUIREMENTS PERMISSIBLE CHANGE (ΔR) ⁽¹⁾	
				STABILITY CLASS 2 OR BETTER	
			Stability for product type:	10 Ω to 1 M Ω	1 Ω to 1 M Ω
			CRA04P		
4.5	-	Resistance	-	$\pm 2 \%$	$\pm 5 \%$
4.7	-	Voltage proof	$U = 1.4 \times U_{ins}$; 60 s	No flashover or breakdown	
4.13	-	Short time overload	$U = 2.5 \times \sqrt{P_{70} \times R}$ $\leq 2 \times U_{max.}$; Duration according to style	$\pm (0.5 \% R + 0.05 \Omega)$	
4.17.2	58 (Td)	Solderability	Solder bath method; Sn60Pb40; non-activated flux; (235 $\pm$ 5) $^{\circ}$ C; (2 $\pm$ 0.2) s	Good tinning ($\geq 95 \%$ covered) no visible damage	
			Solder bath method; Sn96.5Ag3Cu0.5; non-activated flux; (245 $\pm$ 5) $^{\circ}$ C; (3 $\pm$ 0.3) s	Good tinning ($\geq 95 \%$ covered) no visible damage	
4.8.4.2	-	Temperature coefficient	(20/- 55/20) $^{\circ}$ C and (20/125/20) $^{\circ}$ C	± 100 ppm/K	± 200 ppm/K
4.32	21 (U _{U3})	Shear (adhesion)	45 N	No visible damage	
4.33	21 (U _{U1})	Substrate bending	Depth 2 mm; 3 times	No visible damage, no open circuit in bent position $\pm (0.25 \% R + 0.05 \Omega)$	
4.19	14 (Na)	Rapid change of temperature	30 min. at - 55 $^{\circ}$ C; 30 min at 125 $^{\circ}$ C 5 cycles 1000 cycles	$\pm (0.5 \% R + 0.05 \Omega)$ $\pm (1 \% R + 0.05 \Omega)$	
4.23	-	Dry heat	-	$\pm (2 \% R + 0.05 \Omega)$	
4.23.2	2 (Ba)	Damp heat, cyclic	125 $^{\circ}$ C; 16 h		
4.23.3	30 (Db)	Cold	55 $^{\circ}$ C; $\geq 90 \%$ RH; 24 h; 1 cycle		
4.23.4	1 (Aa)	Low air pressure	- 55 $^{\circ}$ C; 2 h		
4.23.5	13 (M)	-	1 kPa; (25 $\pm$ 10) $^{\circ}$ C; 1 h		
4.23.6	30 (Db)	Damp heat, cyclic	55 $^{\circ}$ C; $\geq 90 \%$ RH; 24 h; 5 cycle		
4.23.7	-	D.C. load	$U = \sqrt{P_{70} \times R}$		
4.25.1	-	Endurance at 70 $^{\circ}$ C	$U = \sqrt{P_{70} \times R} \leq U_{max.}$ 1.5 h on; 0.5 h off; 70 $^{\circ}$ C; 1000 h 70 $^{\circ}$ C; 8000 h	$\pm (2 \% R + 0.1 \Omega)$ $\pm (4 \% R + 0.1 \Omega)$	
4.18.2	58 (Td)	Resistance to soldering heat	Solder bath method; (260 $\pm$ 5) $^{\circ}$ C; (10 $\pm$ 1) s	$\pm (0.5 \% R + 0.05 \Omega)$	
4.35	-	Flammability, needle flame test	IEC 60695-11-5; 10 s	No burning after 30 s	
4.24	78 (Cab)	Damp heat, steady state	(40 $\pm$ 2) $^{\circ}$ C; (93 $\pm$ 3) % RH; 56 days	$\pm (1 \% R + 0.05 \Omega)$	
4.25.3	-	Endurance at upper category temperature	155 $^{\circ}$ C; 1000 h	$\pm (2 \% R + 0.1 \Omega)$	
4.40	-	Electrostatic discharge (human body model)	IEC 61340-3-1; 3 positive and 3 negative discharges; ESD voltage according to style	$\pm (1 \% R + 0.05 \Omega)$	
4.29	45 (XA)	Component solvent resistance	Isopropyl alcohol; 50 $^{\circ}$ C; method 2	No visible damage	
4.30	45 (XA)	Solvent resistance of marking	Isopropyl alcohol; 50 $^{\circ}$ C; method 1; toothbrush	Marking legible, no visible damage	
4.22	6 (Fc)	Vibration, endurance by sweeping	f = 10 Hz to 2000 Hz; x, y, z ≤ 1.5 mm; A ≤ 200 m/s ² ; 10 sweeps per axis	$\pm (0.5 \% R + 0.05 \Omega)$	
4.37	-	Periodic electric overload	$U = \sqrt{15 \times P_{70} \times R} \leq 2 \times U_{max.}$ 0.1 s on; 2.5 s off; 1000 cycles	$\pm (1 \% R + 0.05 \Omega)$	
4.27	-	Single pulse high voltage overload, 10 μ s/700 μ s	$\dot{U} = 10 \times \sqrt{P_{70} \times R} \leq 2 \times U_{max.}$ 10 pulses	$\pm (1 \% R + 0.05 \Omega)$	

Note

⁽¹⁾ Figures are given for a single element.

All tests are carried out in accordance with the following specifications:

- EN 60115-1, generic specification
- EN 140400, sectional specification
- EN 140401-802, detail specification
- IEC 60068-2, environmental test procedures

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



Disclaimer

ALL PRODUCT, PRODUCT SPECIFICATIONS AND DATA ARE SUBJECT TO CHANGE WITHOUT NOTICE TO IMPROVE RELIABILITY, FUNCTION OR DESIGN OR OTHERWISE.

Vishay Intertechnology, Inc., its affiliates, agents, and employees, and all persons acting on its or their behalf (collectively, "Vishay"), disclaim any and all liability for any errors, inaccuracies or incompleteness contained in any datasheet or in any other disclosure relating to any product.

Vishay makes no warranty, representation or guarantee regarding the suitability of the products for any particular purpose or the continuing production of any product. To the maximum extent permitted by applicable law, Vishay disclaims (i) any and all liability arising out of the application or use of any product, (ii) any and all liability, including without limitation special, consequential or incidental damages, and (iii) any and all implied warranties, including warranties of fitness for particular purpose, non-infringement and merchantability.

Statements regarding the suitability of products for certain types of applications are based on Vishay's knowledge of typical requirements that are often placed on Vishay products in generic applications. Such statements are not binding statements about the suitability of products for a particular application. It is the customer's responsibility to validate that a particular product with the properties described in the product specification is suitable for use in a particular application. Parameters provided in datasheets and/or specifications may vary in different applications and performance may vary over time. All operating parameters, including typical parameters, must be validated for each customer application by the customer's technical experts. Product specifications do not expand or otherwise modify Vishay's terms and conditions of purchase, including but not limited to the warranty expressed therein.

Except as expressly indicated in writing, Vishay products are not designed for use in medical, life-saving, or life-sustaining applications or for any other application in which the failure of the Vishay product could result in personal injury or death. Customers using or selling Vishay products not expressly indicated for use in such applications do so at their own risk. Please contact authorized Vishay personnel to obtain written terms and conditions regarding products designed for such applications.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted by this document or by any conduct of Vishay. Product names and markings noted herein may be trademarks of their respective owners.

Material Category Policy

Vishay Intertechnology, Inc. hereby certifies that all its products that are identified as RoHS-Compliant fulfill the definitions and restrictions defined under Directive 2011/65/EU of The European Parliament and of the Council of June 8, 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment (EEE) - recast, unless otherwise specified as non-compliant.

Please note that some Vishay documentation may still make reference to RoHS Directive 2002/95/EC. We confirm that all the products identified as being compliant to Directive 2002/95/EC conform to Directive 2011/65/EU.

Vishay Intertechnology, Inc. hereby certifies that all its products that are identified as Halogen-Free follow Halogen-Free requirements as per JEDEC JS709A standards. Please note that some Vishay documentation may still make reference to the IEC 61249-2-21 definition. We confirm that all the products identified as being compliant to IEC 61249-2-21 conform to JEDEC JS709A standards.