



High-Precision Thin Film Chip Resistor Arrays, Sulfur Resistant



LINKS TO ADDITIONAL RESOURCES



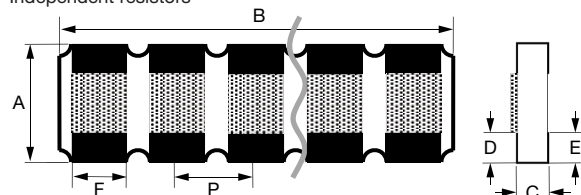
PRA arrays can be used in most applications requiring a matched pair (or set) of resistor elements. The networks provide 1 ppm/°C TCR tracking, a ratio tolerance as tight as 0.01 %, and outstanding stability.

They are available in pitch:

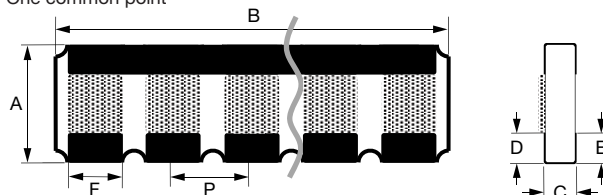
- 0.70 mm for PRA074 (based on case 0402)
- 1.00 mm for PRA100 (based on case 0603)
- 1.35 mm for PRA135 (based on case 0805)
- 1.82 mm for PRA182 (based on case 1206)

DIMENSIONS

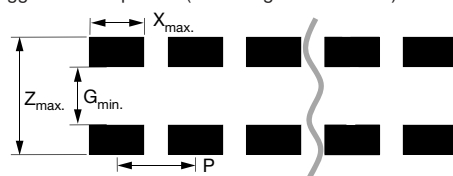
Independent resistors



One common point



Suggested land pattern (according to IPC-7351A)



FEATURES

- High-stability passivated nichrome resistive layer 0.02 % on ratio, 1000 h at Pn at +70 °C
- Tight TCR (10 ppm/°C) and TCR tracking (to 1 ppm/°C)
- Very low noise < -35 dB and voltage coefficient < 0.01 ppm/V
- Ratio tolerance to 0.01 % ($R \geq 200R$)
- High-temperature (230 °C) version, see PRA HT
- ESA-qualified version, see PRA HR
- SMD wraparound chip resistor array
- Thin film technology
- Option to withstand humidity test of AEC-Q200
- Sulfur resistant (per ASTM B809-95 humid vapor test)
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912



RoHS
COMPLIANT
HALOGEN
FREE
Available
GREEN
(5-2008)
Available

TYPICAL PERFORMANCE

	ABSOLUTE	TRACKING
TCR	10 ppm/°C	2 ppm/°C
	ABSOLUTE	RATIO
TOL.	0.1 %	0.01 %

DIM.	PRA074 (0402 base)		PRA100 (0603 base)		PRA135 (0805 base)		PRA182 (1206 base)	
	mm	mil	mm	mil	mm	mil	mm	mil
A	1.00 ± 0.15	40 ± 6	1.52 ± 0.15	60 ± 6	1.91 ± 0.15	75 ± 6	3.06 ± 0.15	120 ± 6
B	B = N x P (± 0.2 mm) B = N x P (± 8 mil)							
C	0.50 ± 0.13	20 ± 5	0.50 ± 0.13	20 ± 5	0.5 ± 0.13	20 ± 5	0.50 ± 0.13	20 ± 5
D	0.25 ± 0.1	10 ± 4	0.38 ± 0.13	15 ± 5	0.38 ± 0.13	15 ± 5	0.40 ± 0.13	16 ± 5
E	0.25 ± 0.1	10 ± 4	0.38 ± 0.13	15 ± 5	0.38 ± 0.13	15 ± 5	0.40 ± 0.13	16 ± 5
F	0.55 ± 0.1	21.5 ± 4	0.70 ± 0.1	27.6 ± 4	1.05 ± 0.1	41.4 ± 4	1.525 ± 0.1	60 ± 4
P	0.70	27.5	1	40	1.35	53	1.825	72
G _{min.}	0.29	11.4	0.49	19.3	0.88	34.5	1.99	78.3
X _{max.}	0.51	20	0.66	26	1.01	39.8	1.49	58.7
Z _{max.}	2.05	80.7	2.57	101.2	2.96	116.5	4.11	161.8

Note

- N represents number of resistors

**GLOBAL PART NUMBER INFORMATION ⁽¹⁾**

New Global Part Numbering: PRA100I4-5K62BWB T 9 9

P	R	A	1	0	0	I	4	-	5	K	6	2	B	W	B	T	9	9
GLOBAL MODEL	CONFIG.	NUMBERS OF RESISTORS	VALUE (2)	ABS. TOL.	RATIO TOL.	TERMINATION	PACKAGING	OPTION										
PRA074 PRA100 PRA135 PRA182	I: independent C: common	2 to 8	Decimal R or K	B = 0.1 % D = 0.5 %	B = 0.1 % W = 0.05 % P = 0.02 % L = 0.01 %	B: SnPb over nickel barrier N: SnAg over nickel barrier G: gold over nickel barrier	For more information see "Codification of Packaging" table	Leave blank if no option										

B: lead bearing version
N and G: lead (Pb)-free / RoHS version

For different ohmic values on a given network a specific part number is used

CNW	1368	T
GLOBAL MODEL	REFERENCE	For more information see "Codification of Packaging" table

Historical Part Number Example: PRA100 I 4 5K62 0.1 % 0.05 % TR R0051

PRA100	I	4	5K62	0.1 %	0.05 %	TR	R0099
HISTORICAL MODEL	CONFIG.	NUMBERS OF RESISTORS	OHMIC VALUE	ABS. TOL.	RATIO TOL.	PACKAGING	OPTION

Notes

- (1) Part number can only have 18 digits. Depending on information needed a compromise has to be found. Consult Vishay
 (2) When the last digit(s) of the ohmic value is (are) 0, it (they) must be omitted
 E.g.: PRA100I4-2K20BWN → must be ordered under PRA100I4-2K2BWN
 PRA100I4-2K00BWN → must be ordered under PRA100I4-2KBWN

STANDARD ELECTRICAL SPECIFICATIONS

MODEL	SIZE	RESISTANCE RANGE Ω	POWER RATING PER RESISTOR ⁽¹⁾ W	ABSOLUTE TOLERANCE $\pm$ %	RATIO TOLERANCE ⁽²⁾ %	ABSOLUTE TCR ⁽³⁾ $\pm$ ppm/°C	RATIO TCR ⁽⁴⁾ $\pm$ ppm/°C
PRA074	074	10 to 100K	0.040	0.1, 0.5	0.01, 0.02, 0.05, 0.1	10	1, 2
PRA100	100	10 to 250K	0.100	0.1, 0.5	0.01, 0.02, 0.05, 0.1	10	1, 2
PRA135	135	10 to 500K	0.125	0.1, 0.5	0.01, 0.02, 0.05, 0.1	10	1, 2
PRA182	182	10 to 2M	0.200	0.1, 0.5	0.01, 0.02, 0.05, 0.1	10	1, 2

Notes

- (1) At +70 °C
 (2) 0.02 % ($R \geq 50 \Omega$), 0.01 % ($R \geq 200 \Omega$)
 (3) At -40 °C to +125 °C
 (4) At -40 °C to +125 °C, 1 ppm/°C on request

CLIMATIC SPECIFICATIONS

Operating temperature range ⁽¹⁾	-55 °C to +155 °C
--	-------------------

Note

- (1) For temperature up to 230 °C, see PRA HT
www.vishay.com/doc?53057 or consult factory

PERFORMANCE VS. HUMID SULFUR VAPOR

Test conditions	50 °C $\pm$ 2 °C, 85 % $\pm$ 4 % RH, exposure time 500 h
Test results	Resistance drift < (0.05 % R + 0.05 Ω), no corrosion products observed

PERFORMANCES

TEST	SPECIFICATIONS
Noise	$\leq$ -35 dB
Voltage coefficient	$\leq$ 0.01 ppm/V
Limiting voltage	PRA074
	PRA100
	PRA135
	PRA182
	40 V
	50 V
	100 V
	150 V

**MECHANICAL SPECIFICATIONS**

Substrate	Alumina
Technology	Thin film
Film	Nickel chromium with mineral passivation
Terminations	B type: SnPb over nickel barrier
	N type: SnAg over nickel barrier
	G type: Gold over nickel barrier

SPECIAL FEATURES

Resistance values can be different on a given network (R_{max}/R_{min} as high as 300). Tooling charges might be required depending on the ohmic values in the same network. Please, consult Vishay Sfernice for ohmic values, tolerances and also temperature coefficient (e.g. $\pm 1 \text{ ppm}/^\circ\text{C}$) outside the standard range.

AEC-Q200 OPTION: 0058

Vishay Sfernice offers a part compliant to AEC-Q200 specification.

PACKAGING

Several types of packaging are available: waffle-pack and tape and reel.

SIZE	MOQ	NUMBER OF PIECES PER PACKAGE		
		WAFFLE PACK MAX. QUANTITY PER BOX	TAPE AND REEL ⁽¹⁾	
			MIN.	MAX.
PRA074 x 2	100	400	100	5000
PRA074 x 3		100	100	4000
PRA074 x 4		140	100	4000
PRA074 x 5		140		
PRA074 x 6		60		
PRA074 x 7		60		
PRA074 x 8		60		
PRA100 x 2	100	100	100	4000
PRA100 x 3		140	100	4000
PRA100 x 4		60	100	4000
PRA100 x 5		50		
PRA100 x 6		50	100	3000
PRA100 x 7		50		
PRA100 x 8		28	100	4000
PRA135 x 2	100	140	100	4000
PRA135 x 3		60		
PRA135 x 4		60	100	4000
PRA135 x 5		50		
PRA135 x 6		28	100	4000
PRA135 x 7		24		
PRA135 x 8		24		
PRA182 x 2	100	60	100	2000
PRA182 x 3		60	100	4000
PRA182 x 4		50	100	2000
PRA182 x 5		21	100	1500
PRA182 x 6		24		
PRA182 x 7		24		
PRA182 x 8		20		

Note

⁽¹⁾ Other sizes upon request

CODIFICATION OF PACKAGING

CODE 18	PACKAGING
WAFFLE PACK	
W	100 min., 1 mult.
PLASTIC TAPE (Standard for all sizes.)	
T	100 min., 1 mult.
TA	100 min., 100 mult.
TB	250 min., 250 mult.
TC	500 min., 500 mult.
TD	1000 min., 1000 mult.
TE	2500 min., 2500 mult.
TF	Full tape (quantity depending on size of chips)

PACKAGING RULES

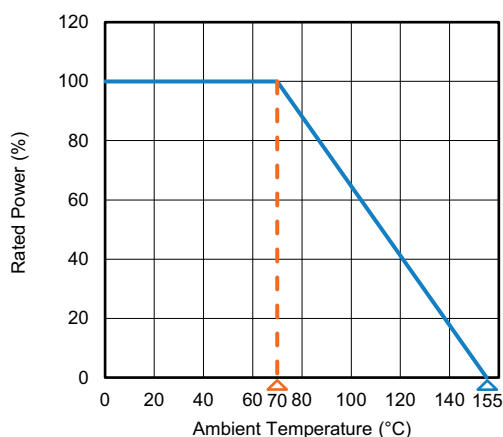
Waffle Pack

Can be filled up to maximum quantity indicated in the table here above, taking into account the minimum order quantity. When quantity ordered exceeds maximum quantity of a single waffle pack, the waffle packs are stacked up on the top of each other and closed by one single cover. **To get “not stacked up” waffle pack in case of ordered quantity > maximum number of pieces per package: Please consult Vishay Sfernice for specific ordering code.**

Tape and Reel

Can be filled up to maximum quantity indicated in the table here above, taking into account the minimum order quantity. When quantity ordered is between the MOQ and the maximum reel capacity, only one reel is provided. **When several reels are needed for ordered quantity within MOQ and maximum reel capacity: Please consult Vishay Sfernice for specific ordering code.**

POWER RATING



Note

(1) PRA074 is NOT marked. For CNW of size 074, only a “dot” is marked to identify R1

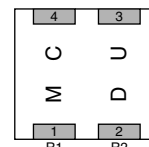
MARKING (1)

On the primary package, printed information includes Vishay S.A. trademark series and model, schematic number of resistors, ohmic value, absolute tolerance, ratio tolerance, type of termination: B tinned over nickel barrier.

Marking on parts:

All resistors inside network have same ohmic value:

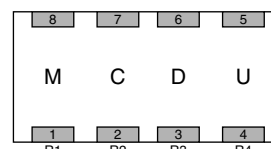
If number of resistors inside network < or = 3



For instance ohmic value 13K:

Coded 1302: M = 1, C = 3, D = 0, U = 2

If number of resistors inside networks > 3

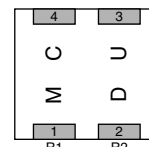


E.g.: 4 resistors in the network:

Ohmic value 13K: Coded 1302: M = 1, C = 3, D = 0, U = 2

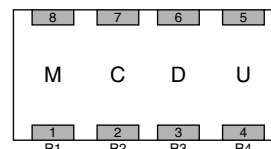
Resistors inside the network have different ohmic value, a CNW number is assigned by Vishay Sfernice

If number of resistors inside network < or = 3



E.g.: CNW1538: M = 1, C = 5, D = 3, U = 8

If number of resistors inside networks > 3



E.g.: 4 resistors in the network:

E.g.: CNW1314: M = 1, C = 3, D = 1, U = 4

PERFORMANCE

TESTS	CONDITIONS CECC REQUIREMENTS	DRIFTS	
		ABSOLUTE PER (Typical Values)	RATIO
Overload	2.5 Un/2 s	0.05 % Rn + 0.05 Ω	0.01 % Rn
Climatic sequences	-55 °C to +155 °C/5 moisture cycles	0.1 % Rn + 0.05 Ω	0.01 % Rn
Thermal shock	-55 °C to +155 °C/5 cycles 30'	0.05 % Rn + 0.05 Ω	0.01 % Rn
Load life	1000 h/Pn at 70 °C	0.1 % Rn + 0.05 Ω	0.02 % Rn
Resistance to solder heat	260 °C/10 s	0.05 % Rn + 0.05 Ω	0.01 % Rn
Moisture resistance	0.01 Pn at + 40 °C 93 % RH	0.1 % Rn + 0.05 Ω	0.01 % Rn
High temperature storage	1000 h/no load at +155 °C	0.1 % Rn + 0.05 Ω	0.02 % Rn

Note

- Rn: nominal resistance



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.

Hyperlinks included in this datasheet may direct users to third-party websites. These links are provided as a convenience and for informational purposes only. Inclusion of these hyperlinks does not constitute an endorsement or an approval by Vishay of any of the products, services or opinions of the corporation, organization or individual associated with the third-party website. Vishay disclaims any and all liability and bears no responsibility for the accuracy, legality or content of the third-party website or for that of subsequent links.

Vishay products are not designed for use in life-saving or life-sustaining applications or any application in which the failure of the Vishay product could result in personal injury or death unless specifically qualified in writing by Vishay. 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.