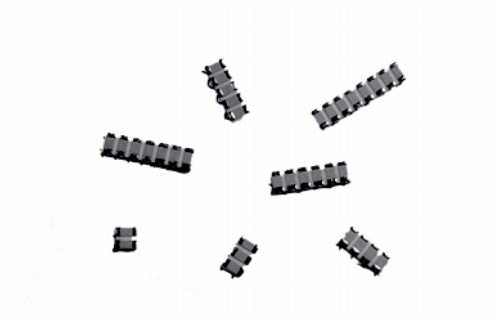
High Precision Thin Film Chip Resistor Arrays



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 0.7 mm, 1 mm, 1.35 mm, and 1.82 mm pitch.

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
- Material categorization: For definitions of compliance please see www.vishay.com/doc?99912

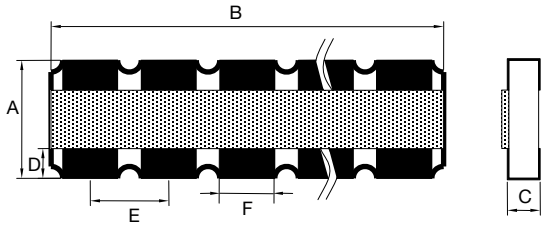
Pb-free
RoHS COMPLIANT
GREEN (5-2008) Available

TYPICAL PERFORMANCE

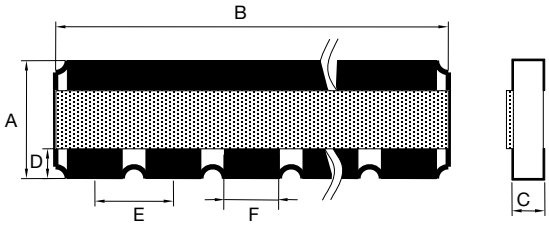
	ABSOLUTE	TRACKING
TCR	10 ppm/°C	2 ppm/°C
	ABSOLUTE	RATIO
TOL.	0.1 %	0.01 %

DIMENSIONS

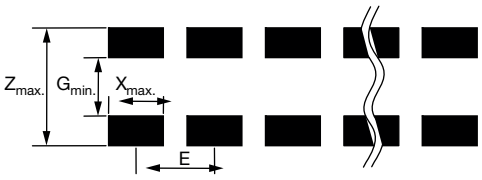
Independent resistors



One common point



Suggested land pattern
(according to IPC-7351A)



DIM.	PRA073		PRA074		PRA100		PRA135		PRA182	
	mm	mil	mm	mil	mm	mil	mm	mil	mm	mil
A	0.75 ± 0152	29.5 ± 6	1.00 ± 0.152	40 ± 6	1.52 ± 0.152	60 ± 6	1.91 ± 0.152	75 ± 6	3.06 ± 0.152	120 ± 6
B	B = N x E (± 0.2 mm) B = N x E (± 8 mil)									
C	0.5 ± 0.127	20 ± 5	0.5 ± 0.127	20 ± 5	0.5 ± 0.127	20 ± 5	0.5 ± 0.127	20 ± 5	0.5 ± 0.127	20 ± 5
D	0.15 ± 0.08	5.9 ± 3	0.25 ± 0 .1	10 ± 4	0.38 ± 0.13	15 ± 5	0.38 ± 0.13	15 ± 5	0.4 ± 0.13	16 ± 5
E	0.7	27.5	0.7	27.5	1	40	1.35	53	1.825	72
F	0.55 ± 0.1	21.5 ± 4	0.55 ± 0.1	21.5 ± 4	0.7 ± 0.1	27.6 ± 4	1.05 ± 0.1	41.4 ± 4	1.525 ± 0.1	6 ± 4
$G_{min.}$	0.28	11	0.29	11.4	0.49	19.3	0.88	34.5	1.99	78.3
$X_{max.}$	0.51	20	0.51	20	0.66	26	1.01	39.8	1.49	58.7
$Z_{max.}$	1.8	70.9	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: PRA100I4-5K62BWBT51

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
PRA073 **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	**Blank** = Waffle pack **T** (3) = Tape and reel	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
GLOBAL MODEL	REFERENCE

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) can be omitted.
E.g.: PRA100I4-2K20BWN → can be ordered under PRAHT100I4-2K2BWGT
PRA100I4-2K00BWN → can be ordered under PRAHT100I4-1KBWGT

(3) Tape and reel not available for all sizes - see table.

STANDARD ELECTRICAL SPECIFICATIONS

MODEL	SIZE	RESISTANCE RANGE Ω	POWER RATING PER RESISTOR (1) W	ABSOLUTE TOLERANCE ± %	RATIO TOLERANCE (2) %	ABSOLUTE TCR (3) ± ppm/°C	RATIO TCR (4) ± ppm/°C
PRA073	073	10 to 50K	0.030	0.1, 0.5	0.01, 0.02, 0.05, 0.1	10	1, 2
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 o 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, 1ppm/°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.

PERFORMANCES

TEST		SPECIFICATIONS
Noise		≤ - 35 dB
Voltage coefficient		≤ 0.01 ppm/V
Limiting voltage	PRA073	20 V
	PRA074	40 V
	PRA100	50 V
	PRA135	100 V
	PRA182	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. ± 1 ppm/°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.

		NUMBER OF PIECES PER PACKAGE		
SIZE	MOQ	WAFFLE PACK MAX. QUANTITY PER BOX	TAPE AND REEL [1]	
			MIN.	MAX.
PRA073 x 2	100	400		
PRA073 x 3		100		
PRA073 x 4		140		
PRA073 x 5		140		
PRA073 x 6		60		
PRA073 x 7		60		
PRA073 x 8		60		
PRA074 x 2	100	400		
PRA074 x 3		100		
PRA074 x 4		140		
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	4000
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	4000
PRA182 x 3		60	100	4000
PRA182 x 4		50	100	4000
PRA182 x 5		21	100	4000
PRA182 x 6		24		
PRA182 x 7		24		
PRA182 x 8		20		

Note

[1] Other sizes upon request

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.

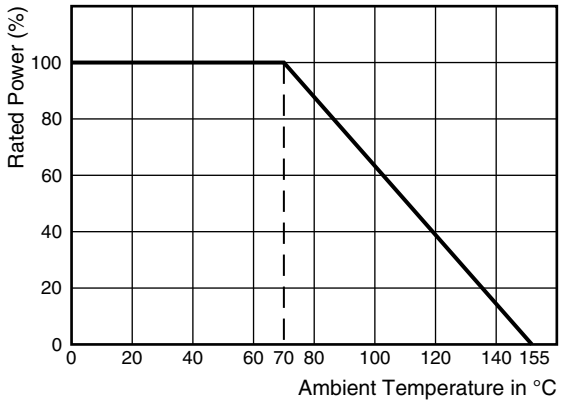
To get "not stacked up" waffle pack in case of ordered quantity > maximum number of pieces per package: Please consult Vishay Sfernice for specific ordering code.

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



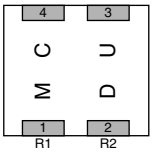
MARKING (1)

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:

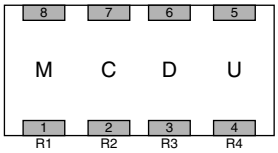
All resistors inside network have same ohmic value:

If number of resistors inside network < or = 3



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

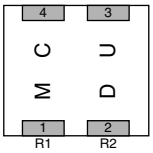
If number of resistors inside networks > 3



E.g.: 4 resistors in the network:
Ohmic value 13K: Coded 1302: M = 1, C = 3, D = 0, U = 2

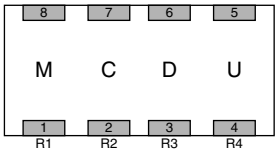
Resistors inside the network have different ohmic value, a CNW number is assigned by Vishay Sfernice

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

Note

(1) PRA073 and PRA074 are NOT marked. For CNW of size 073 and 074, only a "dot" is marked to identify R1.

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 + 155 °C/5 moisture cycles	0.1 % Rn + 0.05 Ω	0.01 % Rn
Thermal shock	- 55 °C + 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

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