

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 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 % ($R \geq 200R$)
- Pre-tinned terminations over nickel barrier
- High temperature (230 °C) version see PRA HT
- ESA qualified version see PRA HR
- SMD wraparound chip resistor array
- Thin film technology
- AEC-Q200 qualified available
- Compliant to RoHS Directive 2002/95/EC



Notes

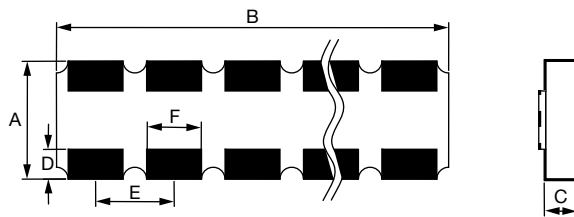
- * Pb containing terminations are not RoHS compliant, exemptions may apply
- ** Please see document "Vishay Material Category Policy": www.vishay.com/doc?99902

TYPICAL PERFORMANCE

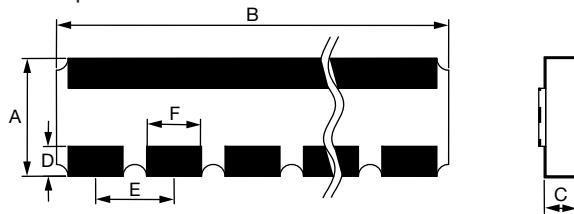
	ABSOLUTE	TRACKING
TCR	10 ppm/°C	2 ppm/°C
	ABSOLUTE	RATIO
TOL.	0.1 %	0.01 %

DIMENSIONS

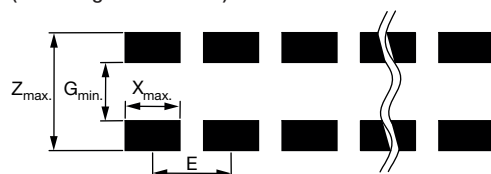
Independent resistors



One common point



Suggested land pattern (according to IPC-7351A)



DIM.	PRA 100		PRA 135		PRA 182	
	mm	mil	mm	mil	mm	mil
A	1.52 ± 0.152	60 ± 6	1.91 ± 0.152	75 ± 6	3.06 ± 0.152	120 ± 6
B	B = N ⁽¹⁾ x E (± 0.2 mm/± 8 mil)					
C	0.5 ± 0.127	20 ± 5	0.5 ± 0.127	20 ± 5	0.5 ± 0.127	20 ± 5
D	0.38 ± 0.13	15 ± 5	0.38 ± 0.13	15 ± 5	0.40 ± 0.13	16 ± 5
E	1	40	1.35	53	1.825	72
F	0.7 ± 0.1	27.6 ± 4	1.05 ± 0.1	41.4 ± 4	1.525 ± 0.1	60 ± 4
G _{min.}	0.21	8.3	0.60	23.6	1.71	67.3
X _{max.}	0.66	26	1.01	39.8	1.49	58.7
Z _{max.}	2.57	101.2	2.96	116.5	4.11	161.8

Note

(1) N represents number of resistors



GLOBAL PART NUMBER INFORMATION (1)												
New Global Part Numbering: PRA100I4-5K62BWB-T99												
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				
PRA 100 PRA 135 PRA 182	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				
For different ohmic values on a given network a specific part number is used <table border="1" style="margin-left: 20px;"> <tr> <td>CNW</td><td>1368</td></tr> <tr> <td>GLOBAL MODEL</td><td>REFERENCE</td></tr> </table>									CNW	1368	GLOBAL MODEL	REFERENCE
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			
TEST		SPECIFICATIONS	CONDITION
Resistance range	PRA 100	10 Ω to 250 kΩ	
	PRA 135	10 Ω to 500 kΩ	
	PRA 182	10 Ω to 2 MΩ	
Tolerance	Absolute	± 0.5 % or ± 1.0 %	
	Ratio	0.1 %, 0.05 %, 0.02 % (R ≥ 50 Ω), 0.01 % (R ≥ 200 Ω)	
TCR	Absolute	± 10 ppm/°C	- 40 °C + 125 °C
	Ratio	2 ppm/°C (1 ppm/°C on request)	- 40 °C + 125 °C
Power rating	PRA 100	100 mW per resistor	At + 70 °C
	PRA 135	125 mW per resistor	At + 70 °C
	PRA 182	200 mW per resistor	At + 70 °C
Operating temperature range (4)		- 55 °C to + 155 °C	
Noise		≤ - 35 dB	
Voltage coefficient		≤ 0.01 ppm/V	
Limiting voltage	PRA 100	50 V	
	PRA 135	100 V	
	PRA 182	150 V	

Note

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



QUICK PROTOTYPING

Vishay Sfernice can offer quick prototyping service in 3 weeks production time for standard and custom networks (independent resistors - For networks with common point lead time might be longer). (Logistics time to add to this lead time). No NRE require for prototyping (small quantity). Tooling charges might be required for custom networks series (definitive set of masks).

Check availability with Vishay/Sfernice before ordering. Use option 0120. Prototypes are intended to check design, but are not qualification parts. They are not 100 % representative of definitive parts.

Performances offered for quick prototypes:

10 ppm/°C absolute/2 ppm/°C ratio

0.1 % absolute tolerance/0.05 % ratio tolerance

Ohmic range: 100R to 100K (PRA100)
100R to 100K (PRA135)
100R to 800K (PRA182)

Quantity: 5 to 20 pieces

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.

SIZE	MOQ	NUMBER OF PIECES PER PACKAGE		
		WAFFLE PACK MAX. QUANTITY PER BOX	TAPE AND REEL ⁽¹⁾	
			MIN.	MAX.
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
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
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.

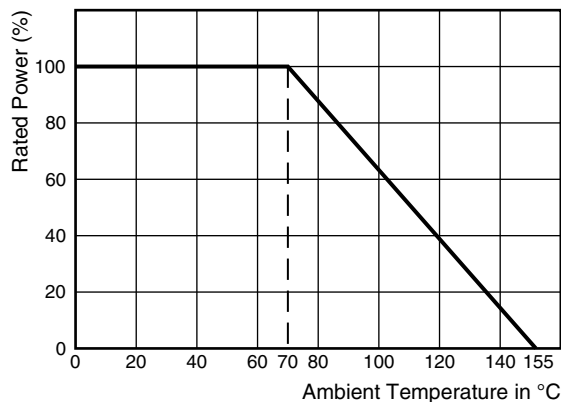
To get “not stacked up” waffle pack in case of ordered quantity > maximum number of pieces per package: Please consult Vishay Sfernice for specific ordering code.

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



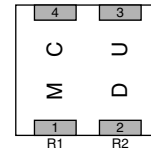
MARKING

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:

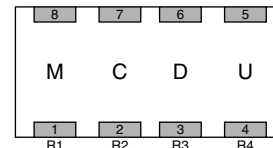
If number of resistors inside network < 3



For instance ohmic value 13K:

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

If number of resistors inside networks > or = 3

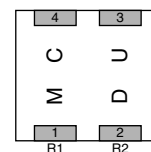


E.g.: 4 resistors in the network:

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

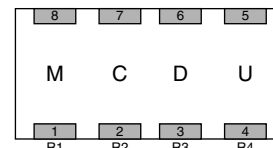
Resistors inside the network have different ohmic value, a CNW number is assigned by Vishay Sfernice

If number of resistors inside network < 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 + 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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