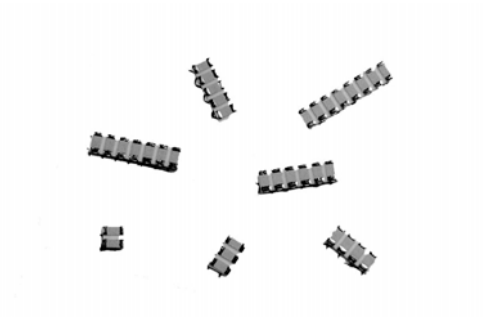
High Precision Thin Film Chip Resistor Arrays



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 P_n 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 option (200 °C)
- SMD wraparound chip resistor array
- Thin film technology
- Compliant to RoHS directive 2002/95/EC

Pb-free Available

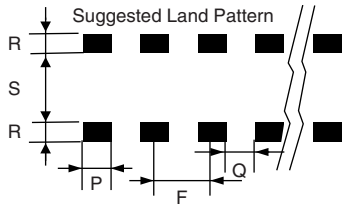
RoHS* COMPLIANT

GREEN (5-2008)** Available

TYPICAL PERFORMANCE

	ABSOLUTE	TRACKING
TCR	10 ppm/°C	2 ppm/°C
	ABSOLUTE	RATIO
TOL.	0.1 %	0.05 %

DIMENSIONS

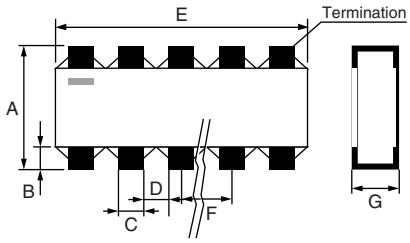


DIM.	PRA 100		PRA 135		PRA 182	
	mm	mil	mm	mil	mm	mil
A	1.6 $^{+0.2}_{-0.1}$	63	1.85 $^{+0.2}_{-0.1}$	72	3.0 $^{+0.2}_{-0.1}$	118
B	0.4 $^{+0.2}_{-0.2}$	16	0.4 $^{+0.2}_{-0.2}$	16	0.4 $^{+0.2}_{-0.2}$	16
C	0.65 $^{+0.15}_{-0.15}$	25.5	1.05 $^{+0.15}_{-0.15}$	41	1.3 $^{+0.35}_{-0.15}$	51
D	0.25	10	0.25	10	0.25	10
E (1)	E = (N x F) ± 0.2 mm		E = (N x F) ± 8 mil			
F	1	40	1.35	53.1	1.82	72
G	0.4 $^{+0.1}_{-0}$	15	0.4 $^{+0.1}_{-0}$	15	0.4 $^{+0.1}_{-0}$	15
P	0.7	27.5	1.05	41.3	1.52	59.8
Q	0.3	12	0.3	12	0.3	12
R	1	40	1	40	1	40
S	0.6	23.5	0.8	31.5	1.8	70.8

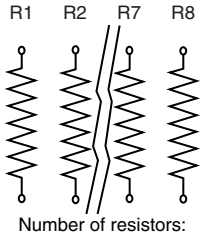
Note

(1) E depends on number of resistors

I: Independent resistors

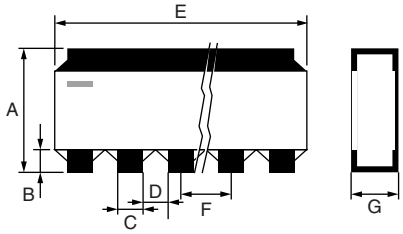


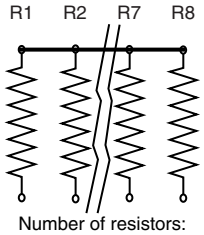
Electrical diagram



Number of resistors:
2 to 8
R1 = R2 = ... R8

C: One common point N resistors





Number of resistors:
2 to 8
R1 = R2 = ... R8

* Pb containing terminations are not RoHS compliant, exemptions may apply

** Please see document “Vishay Material Category Policy”: www.vishay.com/doc?99902

GLOBAL PART NUMBER INFORMATION

New Global Part Numbering: PRA100I4-5K62BWBT51

P	R	A	1	0	0	I	4	-	5	K	6	2	B	W	B	T	5	1

GLOBAL MODEL	CONFIG.	NUMBERS OF RESISTORS	VALUE (1)	ABS. TOL.	RATIO TOL.	TERMINATION	PACKAGING	OPTION
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** (2) = 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	R0051
HISTORICAL MODEL	CONFIG.	NUMBERS OF RESISTORS	OHMIC VALUE	ABS. TOL.	RATIO TOL.	PACKAGING	OPTION

Notes

(1) 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 PRA100I4-2K2BWN
PRA100I4-2K00BWN → can be ordered under PRA100I4-2KBWN

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

STANDARD ELECTRICAL SPECIFICATIONS

TEST		SPECIFICATIONS	CONDITION
Resistance range:	**PRA 100**	100 Ω to 250 kΩ	
	PRA 135	100 Ω to 400 kΩ	
	PRA 182	100 Ω to 1.6 MΩ	
Tolerance:	**Absolute**	± 0.5 % to ± 0.1 %	
	Ratio	0.1 %, 0.05 %, 0.02 %, 0.01 % ($R \geq 200R$)	
TCR:	**Absolute**	± 10 ppm/°C	- 40 °C + 125 °C
	Ratio	2 ppm/°C (1 ppm/°C on request)	- 40 °C + 155 °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 (3)		- 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

(3) For temperature up to 200 °C, please consult factory

HIGH TEMPERATURE OPTION: 0051

Vishay Sfernice offers a high temperature option for applications requiring withstanding to temperature up to 200 °C. Please refer to application note “Power Dissipation - High Temperature SCH” www.vishay.com/doc?53047 for recommendations and mounting considerations.

Operating temperature range: - 55 °C; + 200 °C

Minimum ohmic value: 250 Ω

Absolute TCR: 10 ppm/°C typical (maximum 15 ppm/°C)

TCR tracking: 2 ppm/°C typical (maximum 5 ppm/°C)

Load life stability at 200 °C: < 0.1 % at 0.1 P_n after 1000 h

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.

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	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.

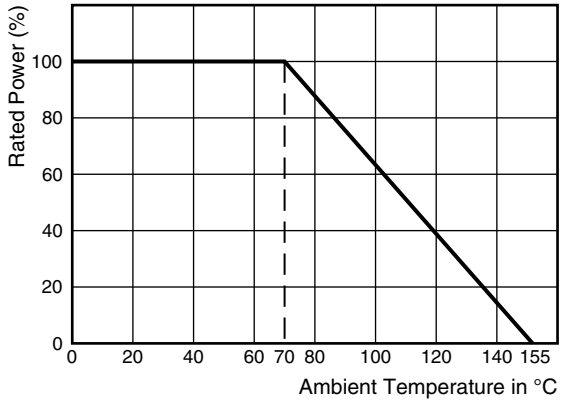
To get "not stacked up" waffle pack in case of ordered quantity > maximum number of pieces per package: Please consult Vishay Sfernice for specific ordering code.

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



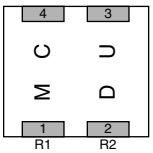
MARKING

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:

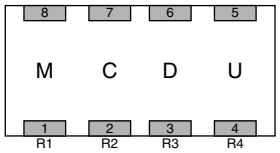
All resistors inside network have same ohmic value:

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

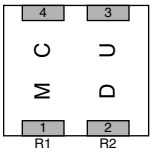


E.g.: 4 resistors in the network:

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

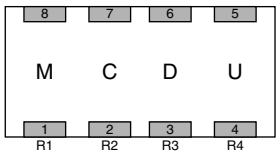
Resistors inside the network have different ohmic value, a CNW number is assigned by Vishay Sfernice

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 U_n/2 s	0.05 % R_n + 0.05 Ω	0.01 % R_n
Climatic sequences	- 55 °C + 155 °C/5 moisture cycles	0.1 % R_n + 0.05 Ω	0.01 % R_n
Thermal shock	- 55 °C + 155 °C/5 cycles 30'	0.05 % R_n + 0.05 Ω	0.01 % R_n
Load life	1000 h/P_n at + 70 °C	0.1 % R_n + 0.05 Ω	0.02 % R_n
Resistance to solder heat	260 °C/10 s	0.05 % R_n + 0.05 Ω	0.01 % R_n
Moisture resistance	0.01 P_n at + 40 °C 93 % RH	0.1 % R_n + 0.05 Ω	0.01 % R_n
High temperature storage	1000 h/no load at + 155 °C	0.1 % R_n + 0.05 Ω	0.02 % R_n

Note
- R_n: Nominal resistance

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