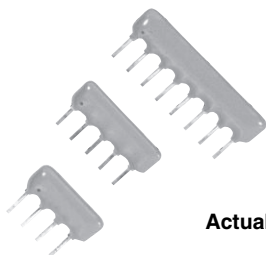


# Conformal Coating, Single-In-Line Thin Film Resistor, Through Hole Networks



Actual Size

## DESIGN SUPPORT TOOLS

[click logo to get started](#)

**3D**  
Models  
Available

These networks are designed to be used in analog circuits in conjunction with operational amplifiers. In addition to the standard models, Vishay also offers semi-custom or custom networks.

## FEATURES

- Standard design - no NRE
- Low TCR (10 ppm/°C)
- Excellent TCR tracking (< 2 ppm/°C)
- Low noise (< -35 dB)
- High stability (0.005 % on ratio, after 2000 h at Pn at +70 °C)
- Through hole SIL resistors networks
- Evolution to SMD version see PRA datasheet ([www.vishay.com/doc?53033](http://www.vishay.com/doc?53033))
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)



**RoHS**  
COMPLIANT

## STANDARD ELECTRICAL SPECIFICATIONS

MODEL	RESISTANCE RANGE Ω	POWER RATING PER RESISTOR <sup>(1)</sup> W	POWER RATING PER PACKAGE W	ABSOLUTE TOLERANCE ± %	RATIO TOLERANCE <sup>(2)</sup> ± %	ABSOLUTE TCR <sup>(3)</sup> ± ppm/°C	RATIO TCR <sup>(4)</sup> ppm/°C
TAS (CNS)	1K to 9.9M	0.100	Varies with size	0.1	0.01, 0.02, 0.05	10, 15	2

### Notes

- (1) at +70 °C  
(2) ± 0.02 % or ± 0.01 % on request  
(3) ± 10 ppm/°C at 0 °C to 70 °C, 15 ppm/°C at -40 °C to 125 °C  
(4) 1 ppm/°C on request

## PERFORMANCES

TEST	SPECIFICATIONS	CONDITIONS
Stability ( $\Delta R$ ratio)	0.005 %	2000 h at +70 °C at Pn
Voltage coefficient	< 0.002 ppm/V	
Working voltage	100 V	
Noise	-35 dB typical	
Thermal EMF	0.1 $\mu V/^\circ C$	
Shelf life stability	50 ppm maximum	1 year

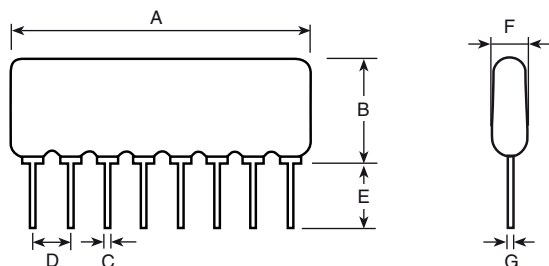
## CLIMATIC SPECIFICATIONS

Operating temperature range	-40 °C to +125 °C
Storage temperature range	-55 °C to +125 °C

## MECHANICAL SPECIFICATIONS

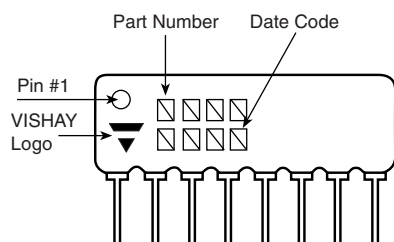
Resistive element	Passivated nichrome
Substrate material	Alumina
Body	Epoxy-conformal coating
Terminals	Tin / silver on Cu alloy
Marking resistance to solvents	Laser marking

## DIMENSIONS



DIMENSION	INCHES	MILLIMETERS
A	(see table below)	(see table below)
B	0.261	6,62 max.
C	0.020	0.51
D	0.1	2.54
E	0.125	3.17 min.
F	0.100	2.54 max.
G	0.010	0.25

## MARKING



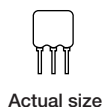
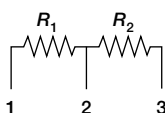
PIN COUNT		3	4	5	6	7	8	9	10
A <sub>max.</sub>	inch	0.330	0.430	0.530	0.630	0.730	0.830	0.930	1.030
	mm	8.38	10.92	13.46	16	18.54	21.08	23.62	26.16

## SCHEMATIC

### TWO EQUAL RESISTORS

$R_1 = R_2$

SMD version: see PRA datasheet



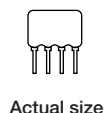
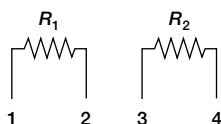
### ORDERING INFORMATION

$R_1 = 1 \text{ k}\Omega$	TAS 209	50 $\text{k}\Omega$	TAS 214
$R_1 = 2 \text{ k}\Omega$	TAS 210	100 $\text{k}\Omega$	TAS 215
$R_1 = 5 \text{ k}\Omega$	TAS 211	200 $\text{k}\Omega$	TAS 216
$R_1 = 10 \text{ k}\Omega$	TAS 212	500 $\text{k}\Omega$	TAS 217
$R_1 = 20 \text{ k}\Omega$	TAS 213	1 $\text{M}\Omega$	TAS 218

### TWO EQUAL RESISTORS

$R_1 = R_2$

SMD version: see PRA datasheet



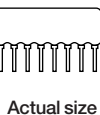
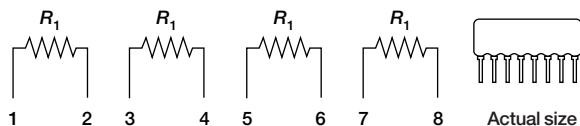
### ORDERING INFORMATION

$R_1 = 1 \text{ k}\Omega$	TAS 365
$R_1 = 10 \text{ k}\Omega$	TAS 363
$R_1 = 100 \text{ k}\Omega$	TAS 348

### FOUR EQUAL RESISTORS

$R_1$

SMD version: see PRA datasheet



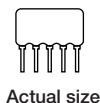
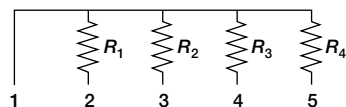
### ORDERING INFORMATION

$R_1 = 1 \text{ k}\Omega$	TAS 329
$R_1 = 5 \text{ k}\Omega$	TAS 1002
$R_1 = 10 \text{ k}\Omega$	TAS 158
$R_1 = 100 \text{ k}\Omega$	TAS 288

### FOUR EQUAL RESISTORS, ONE COMMON

$$R_1 = R_2 = R_3 = R_4$$

SMD version: see PRA datasheet



#### ORDERING INFORMATION

$$R_1 = 10 \text{ k}\Omega \quad \text{TAS 366}$$

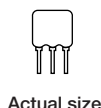
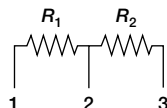
$$R_1 = 100 \text{ k}\Omega \quad \text{TAS 367}$$

### RATIO DIVIDER 10:1

$$R_1 + R_2 = 10 \text{ k}\Omega, 100 \text{ k}\Omega, 1 \text{ M}\Omega$$

SMD version: see PRA datasheet

$$\frac{R_1 + R_2}{R_2} = 10$$



#### ORDERING INFORMATION

$$R_1 + R_2 = 9 \text{ k}\Omega + 1 \text{ k}\Omega = 10 \text{ k}\Omega \quad \text{TAS 280}$$

$$R_1 + R_2 = 90 \text{ k}\Omega + 10 \text{ k}\Omega = 100 \text{ k}\Omega \quad \text{TAS 193}$$

$$R_1 + R_2 = 900 \text{ k}\Omega + 100 \text{ k}\Omega = 1 \text{ M}\Omega \quad \text{TAS 281}$$

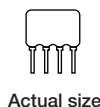
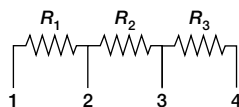
### RATIO DIVIDER 10:1, 100:1

$$R_1 + R_2 + R_3 = 100 \text{ k}\Omega \text{ and } R_2 + R_3 = 10 \text{ k}\Omega$$

SMD version: see PRA datasheet

$$\frac{R_1 + R_2 + R_3}{R_3} = 100$$

$$\frac{R_1 + R_2 + R_3}{R_2 + R_3} = 10$$



#### ORDERING INFORMATION

$$R_1 + R_2 + R_3 = 100 \text{ k}\Omega \quad \text{TAS 330}$$

$$\text{with } R_1 = 90 \text{ k}\Omega$$

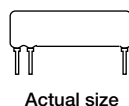
$$R_2 = 9 \text{ k}\Omega$$

$$R_3 = 1 \text{ k}\Omega$$

### RATIO DIVIDER 100:1

$$R_1 + R_2 = 10 \text{ M}\Omega$$

$$\frac{R_1 + R_2}{R_1} = 100$$



#### ORDERING INFORMATION

$$R_1 + R_2 = 10 \text{ M}\Omega \quad \text{TAS 112}$$

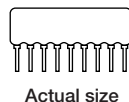
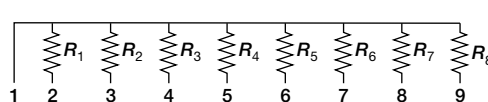
$$\text{with } R_1 = 100 \text{ k}\Omega$$

$$R_2 = 9.9 \text{ M}\Omega$$

### EIGHT EQUAL RESISTORS, ONE COMMON

$$R_1 = R_2 = R_3 = R_4 = R_5 = R_6 = R_7 = R_8$$

SMD version: see PRA datasheet



#### ORDERING INFORMATION

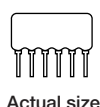
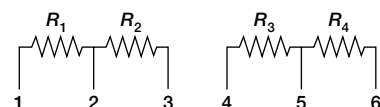
$$R_1 = 10 \text{ k}\Omega \quad \text{TAS 368}$$

$$R_1 = 100 \text{ k}\Omega \quad \text{TAS 369}$$

### DIVIDER NETWORK 10:1

$$\frac{R_2}{R_1} = \frac{R_4}{R_3} = 10$$

SMD version: see PRA datasheet



#### ORDERING INFORMATION

$$\text{TAS 220}$$

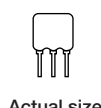
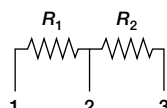
$$\text{with } R_1 = R_2 = 10 \text{ k}\Omega$$

$$R_2 = R_4 = 100 \text{ k}\Omega$$

### DIVIDER NETWORK 10:1

$$\frac{R_1}{R_2} = 10$$

SMD version: see PRA datasheet



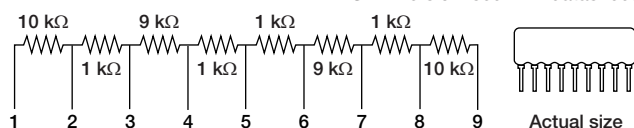
#### ORDERING INFORMATION

$$R_1 = 100 \text{ k}\Omega, R_2 = 10 \text{ k}\Omega \quad \text{TAS 282}$$

$$R_1 = 1 \text{ M}\Omega, R_2 = 100 \text{ k}\Omega \quad \text{TAS 283}$$

## EIGHT RESISTORS NETWORK

SMD version: see PRA datasheet



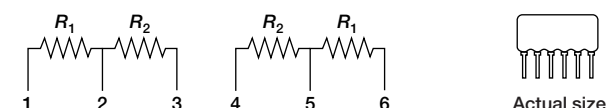
### ORDERING INFORMATION

TAS 272

## DIVIDER NETWORK 10:1

$$\frac{R_1}{R_2} = 10$$

SMD version: see PRA datasheet



### ORDERING INFORMATION

 $R_1 = 10 \text{ k}\Omega$ ,  $R_2 = 1 \text{ k}\Omega$  TAS 328

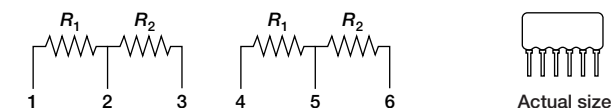
 $R_1 = 100 \text{ k}\Omega$ ,  $R_2 = 10 \text{ k}\Omega$  TAS 284

 $R_1 = 1 \text{ M}\Omega$ ,  $R_2 = 100 \text{ k}\Omega$  TAS 285

## DIVIDER NETWORK 1:1

$$R_1 = R_2$$

SMD version: see PRA datasheet



### ORDERING INFORMATION

 $R_1 = 5 \text{ k}\Omega$  TAS 225

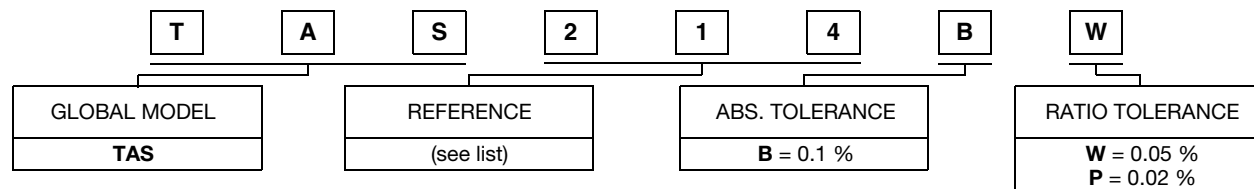
 $R_1 = 10 \text{ k}\Omega$  TAS 286

 $R_1 = 100 \text{ k}\Omega$  TAS 219

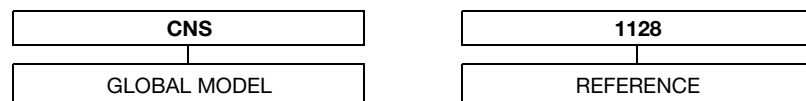
 $R_1 = 1 \text{ M}\Omega$  TAS 287

## GLOBAL PART NUMBER INFORMATION

New Global Part Numbering: TAS214BW (preferred part number format)



Custom Network: CNS 1128



### Note

- For custom specification a specific part number will be issued by Vishay Sfernice. E.g. CNS1128



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