



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



DESIGN SUPPORT TOOLS

click logo to get started



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)
- Material categorization: for definitions of compliance please see <u>www.vishav.com/doc?99912</u>

| STANDARD ELECTRICAL SPECIFICATIONS | | | | | | | |
|------------------------------------|--------------------------|--|-------------------------------------|------------------------------|--|--|---------------------------------------|
| MODEL | RESISTANCE RANGE Ω | POWER RATING PER RESISTOR (1) W | POWER RATING PER PACKAGE W | ABSOLUTE TOLERANCE ± % | RATIO TOLERANCE ⁽²⁾ ± % | ABSOLUTE TCR ⁽³⁾ ± ppm/°C | RATIO TCR ⁽⁴⁾ 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 (∆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 μV/°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 | |

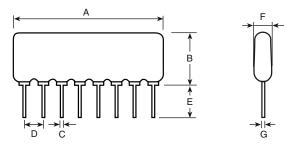
| MECHANICAL SPECIFICATIONS | | |
|--------------------------------|--------------------------|--|
| Resistive element | Passivated nichrome | |
| Substrate material | Alumina | |
| Body | Epoxy-conformal coating | |
| Terminals | Tin / silver on Cu alloy | |
| Marking resistance to solvents | Laser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

Revision: 02-Mar-18 Document Number: 60040



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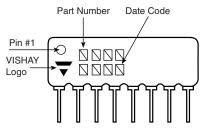
DIMENSIONS



INCHES DIMENSION MILLIMETERS Α (see table below) (see table below) В 0.261 6,62 max. С 0.51 0.020 D 0.1 2.54 Е 0.125 3.17 min. F 0.100 2.54 max. G 0.010 0.25

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

MARKING



SCHEMATIC

 $R_1 = R_2$

TWO EQUAL RESISTORS



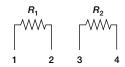
SMD version: see PRA datasheet

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

TWO EQUAL RESISTORS



SMD version: see PRA datasheet

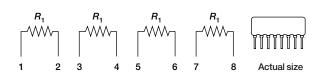




| ORDERING INFORMATION | | |
|-----------------------------|---------|--|
| $R_1 = 1 \text{ k}\Omega$ | TAS 365 | |
| $R_1 = 10 \text{ k}\Omega$ | TAS 363 | |
| $R_1 = 100 \text{ k}\Omega$ | TAS 348 | |

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 | |



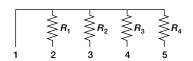
www.vishay.com

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FOUR EQUAL RESISTORS, ONE COMMON



SMD version: see PRA datasheet





| ORDERING INFORMATION | | | |
|----------------------|------|---------|--|
| $R_1 = 1$ | 0 kΩ | TAS 366 | |
| $R_1 = 10$ | 0 kΩ | TAS 367 | |

RATIO DIVIDER 10:1

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

SMD version: see PRA datasheet

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





| OKDEKI | ORDERING INFORMATION | | | | |
|---------------|---|---------|--|--|--|
| $R_1 + R_2 =$ | $9 \text{ k}\Omega + 1 \text{ k}\Omega = 10 \text{ k}\Omega$ | TAS 280 | | | |
| $R_1 + R_2 =$ | $90 \text{ k}\Omega + 10 \text{ k}\Omega = 100 \text{ k}\Omega$ | TAS 193 | | | |
| $R_1 + R_2 =$ | 900 kΩ + 100 kΩ = 1 MΩ | TAS 281 | | | |

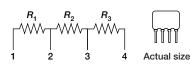
RATIO DIVIDER 10:1, 100:1

 $R_1 + R_2 + R_3 = 100 \text{ k}\Omega \text{ and}$ $R_2 + R_3^2 = 10 \text{ k}\Omega$

SMD version: see PRA datasheet

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

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



| ORDERING INFORMATION | | | | |
|---|---------------------|---------|--|--|
| $R_1 + R_2 + R_3 = 100 \text{ k}\Omega$ | TAS 330 | | | |
| | with R ₁ | = 90 kΩ | | |
| | R_2 | = 9 kΩ | | |
| | R ₃ | = 1 kΩ | | |

RATIO DIVIDER 100:1

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

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

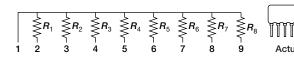




| ORDERING INFORMATION | | |
|----------------------------------|---------|--|
| $R_1 + R_2 = 10 \text{ M}\Omega$ | TAS 112 | |
| with R_1 = | 100 kΩ | |
| R ₂ = | 9.9 ΜΩ | |

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

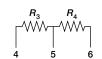


| ORDERING INFORMATION | | |
|-----------------------------|---------|--|
| $R_1 = 10 \text{ k}\Omega$ | TAS 368 | |
| $R_1 = 100 \text{ k}\Omega$ | TAS 369 | |

DIVIDER NETWORK 10:1

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

SMD version: see PRA datasheet



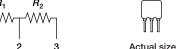


| ORDERING INFORMATION | | |
|----------------------|---------|--|
| | TAS 220 | |
| with $R_1 = R_2 =$ | 10 kΩ | |
| $R_2 = R_4 =$ | 100 kΩ | |

DIVIDER NETWORK 10:1

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

SMD version: see PRA datasheet

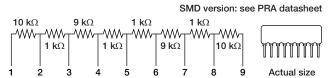


| ORDERING INFORMATION | |
|---|---------|
| $R_1 = 100 \text{ k}\Omega, R_2 = 10 \text{ k}\Omega$ | TAS 282 |
| $R_1 = 1 \text{ M}\Omega, R_2 = 100 \text{ k}\Omega$ | TAS 283 |



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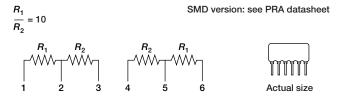
EIGHT RESISTORS NETWORK



ORDERING INFORMATION

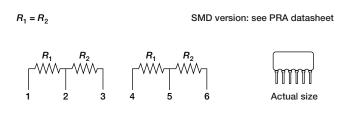
TAS 272

DIVIDER NETWORK 10:1

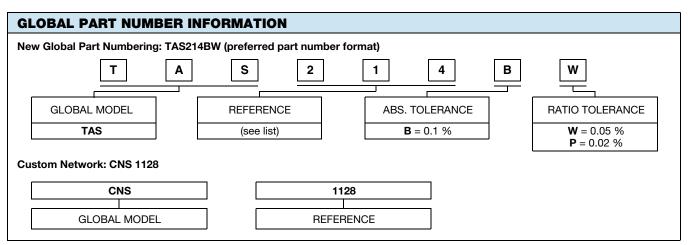


| ORDERING INFORMATION | |
|---|---------|
| $R_1 = 10 \text{ k}\Omega, R_2 = 1 \text{ k}\Omega$ | TAS 328 |
| $R_1 = 100 \text{ k}\Omega, R_2 = 10 \text{ k}\Omega$ | TAS 284 |
| $R_1 = 1 \text{ M}\Omega, R_2 = 100 \text{ k}\Omega$ | TAS 285 |

DIVIDER NETWORK 1:1



| 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 | |



Note

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



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