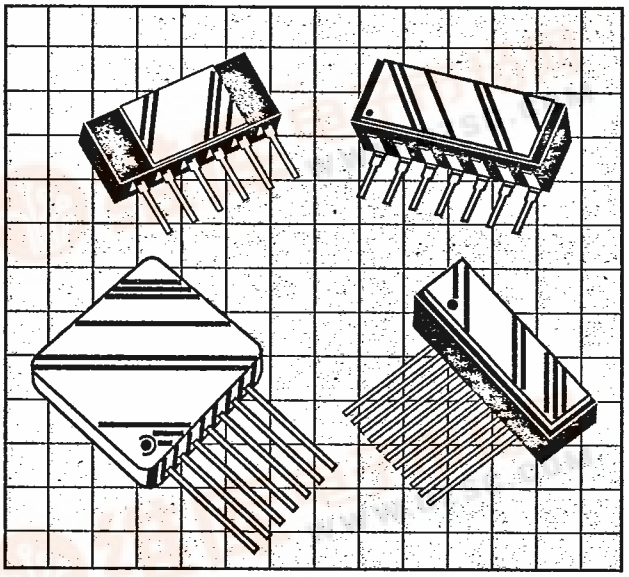
DATA SHEET VPN-100

T-62-05

Precision Hermetic SIP Resistor Networks

A COMPANY OF VISHAY FOIL RESISTORS



Models 1461, 1462, 1463, 1464 and 1466

VISHAY Precision Hermetic Resistor Networks are now available in SIP (Single-In-Line Pin) configurations. Five models are available , using either Bulk Metal® Foil (1Ω to 30KΩ) chips or state-of-the-art thin film (30KΩ to 500KΩ) chips, and providing the high level performance of other VISHAY Bulk Metal® Foil and thin film products.

Ordering Information

Networks are custom designed and built. Therefore, a special part number is assigned which defines the package, circuit design, resistance values, tolerances, match, TCR, etc. Consult VISHAY Applications Engineering Department for assistance.

- **Resistance Range**
  Thin Film: 30KΩ to 500KΩ
  Bulk Metal® Foil: 1Ω to 30KΩ
- **Resistance Tolerance**
  Thin Film: ±0.02% tightest; ±1% loosest
  Bulk Metal® Foil: ±0.005% tightest; ±1% loosest
- **Temperature Coefficient of Resistance**
  (–55°C to +125°C)
  Thin Film: ±15 ppm/°C, Absolute
  Bulk Metal® Foil: ±5 ppm/°C, Absolute
- **TCR Tracking**
  Thin Film: to 3 ppm/°C
  Bulk Metal® Foil: to 0.5 ppm/°C
- **Power Rating**
  0.1 watt per chip @ +70°C
- **Load Life Stability** (1,000 hours @ +70°C)
  Thin Film: ±0.1% ΔR maximum
  Bulk Metal® Foil: ±0.015% ΔR maximum
- **Hermeticity**
  < 5 x 10^{-7} cc/sec

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TABLE 1 PACKAGE TYPES AND CHARACTERISTICS

VISHAY Model Number	Number of Leads	Chip Capacity[1]	Maximum Dimensions[2] L H TH	Lead Length (Minimum)	Lead Spacing
1461	6	3	0.586 x 0.300 x 0.100	0.150	0.100
1462	7	12	0.425 x 0.425 x 0.130	0.350	0.050
1463	7	10	0.785 x 0.360 x 0.130	0.125	0.100
1464	8	12	0.810 x 0.360 x 0.130	0.125	0.100
1466	11	5	0.900 x 0.250 x 0.130	0.400	0.050

NOTES

1. Chips used are V15x5 (150 x 50 mils). For values 10KΩ and below, V5x5 (50x50 mils) foil chips can be used providing more chip capacity. If both Bulk Metal® Foil and thin film chips are used in the network, the TC (temperature coefficient) tracking will be 10 ppm/°C typical, 15 ppm/°C maximum.
2. Height (H) dimension is top of the package to lead seating plane.

TABLE 2 VISHAY Miniature Thin Film & Bulk Metal®SIP Network Performance vs MIL-R-83401 Specs

Test or Condition		MIL-R-83401C C	V	H	K	M	VISHAY Thin Film Typical	Maximum	VISHAY Bulk Metal® Foil Typical	Maximum
Resistance Temp Characteristic (ppm/°C)		±50	±50	±50	±100	±300	±10	±15	±2 ppm/°C	±5 ppm/°C
Tracking To Reference Element (-55 to +125°C)		±5 ppm/°C	±5 ppm/°C	NA	NA	NA	±3 ppm/°C	±5 ppm/°C	±2 ppm/°C	±5 ppm/°C
Maximum Ambient Temp at Rated Wattage		+70°C								
Maximum Ambient Temp at Zero Power		+125°C								
Thermal Shock and Power Conditioning	ΔR	±0.25%	±0.25%	±0.50%	±0.70%	±0.70%	±0.01%	±0.02%	±0.003%	±0.015%
	ΔRatio	±0.03%	±0.03%	NA	NA	NA	±0.01%	±0.02%	±0.003%	±0.015%
Low Temperature Operation	ΔR	±0.10%	±0.10%	±0.10%	±0.25%	±0.50%	±0.005%	±0.01%	±0.005%	±0.01%
	ΔRatio	±0.02%	±0.02%	NA	NA	NA	±0.005%	±0.01%	±0.005%	±0.01%
Short Time Overload	ΔR	±0.10%	±0.10%	±0.10%	±0.25%	±0.50%	±0.005%	±0.01%	±0.002%	±0.01%
	ΔRatio	±0.02%	±0.02%	NA	NA	NA	±0.005%	±0.01%	±0.002%	±0.01%
Terminal Strength	ΔR	±0.10%	±0.10%	±0.25%	±0.25%	±0.25%	±0.002%	±0.01%	±0.001%	±0.01%
	ΔRatio	±0.03%	±0.03%	NA	NA	NA	±0.002%	±0.01%	±0.001%	±0.01%
Resistance to Soldering Heat	ΔR	±0.10%	±0.10%	±0.10%	±0.25%	±0.25%	±0.005%	±0.01%	±0.002%	±0.01%
	ΔRatio	±0.02%	±0.02%	NA	NA	NA	±0.005%	±0.01%	±0.001%	±0.01%
Moisture Resistance	ΔR	±0.20%	±0.20%	±0.40%	±0.50%	±0.50%	±0.003%	±0.01%	±0.003%	±0.01%
	ΔRatio	±0.02%	±0.02%	NA	NA	NA	±0.003%	±0.01%	±0.003%	±0.01%
Shock (Specified Pulse)	ΔR	±0.25%	±0.25%	±0.25%	±0.25%	±0.25%	±0.002%	±0.01%	±0.001%	±0.01%
	ΔRatio	±0.03%	±0.03%	NA	NA	NA	±0.002%	±0.01%	±0.001%	±0.01%
Vibration, High Frequency	ΔR	±0.25%	±0.25%	±0.25%	±0.25%	±0.25%	±0.002%	±0.01%	±0.001%	±0.01%
	ΔRatio	±0.03%	±0.03%	NA	NA	NA	±0.002%	±0.01%	±0.001%	±0.01%
Load Life (+70°C, Full Power, 1,000 Hours)	ΔR	±0.10%	±0.10%	±0.50%	±0.50%	±2.00%	±0.05%	±0.1%	±0.015%	±0.025%
	ΔRatio	±0.03%	±0.03%	NA	NA	NA	±0.01%	±0.025%	±0.005%	±0.01%
+25°C Power Rating (1,000 Hours)	ΔR	±0.10%	±0.10%	±0.50%	±0.50%	±2.00%	±0.02%	±0.05%	±0.002%	±0.01%
	ΔRatio	±0.03%	±0.03%	NA	NA	NA	±0.005%	±0.01%	±0.001%	±0.01%
High Temperature Exposure (+125°C, 100 Hours)	ΔR	±0.10%	±0.10%	±0.20%	±0.50%	±1.00%	±0.03%	±0.05%	±0.005%	±0.01%
	ΔRatio	±0.03%	±0.03%	NA	NA	NA	±0.01%	±0.02%	±0.005%	±0.01%
Low Temperature Storage	ΔR	±0.10%	±0.10%	±0.10%	±0.25%	±0.50%	±0.01%	±0.02%	±0.002%	±0.01%
	ΔRatio	±0.02%	±0.02%	NA	NA	NA	±0.01%	±0.02%	±0.002%	±0.01%
Insulation Resistance		10,000MΩ								
Resistance Tolerance and, when applicable, Resistance Ratio Accuracy		±0.1% (B) ±0.5% (D) ±1.0% (F)	±0.1% (B) ±0.5% (D) ±1.0% (F)	±0.1% (B) ±0.5% (D) ±1.0% (F)	±0.5% (D) ±1.0% (F) ±2.0% (G)	±1.0% (F) ±2.0% (G) ±5.0% (J)	±0.02% ±0.05% (A)	±0.1% (B) ±0.5% (D) ±1.0% (F)	±0.005% (V) ±0.01% (T) ±0.05% (A)	±0.1% (B) ±0.5% (D) ±1.0% (F)

NOTES

1. ΔR's are not cumulative. For purposes of determining reliability calculations, consider the characteristics shown as figures of merit and allow no more than ±0.05% ΔR lifetime. Allow proportionately less if the severity of anticipated environmental stress is small compared to the tests as defined in MIL-R-83401.
2. Post Manufacturing Operation (PMO)—screening—has the effect of minimizing ΔR's. Consult VISHAY Applications Engineering Department for details.
3. ΔRatio refers to the change in ratio between resistors within the network package from before, to after, the specified test.