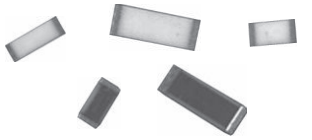
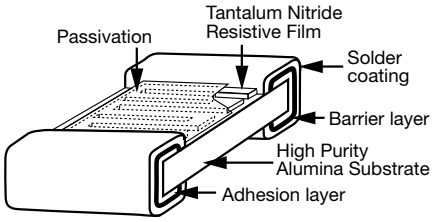
# Precision Thin Film Non-Magnetic Resistor, Surface Mount Chip, ± 25 ppm/°C, Tolerances to 0.1 %



Actual Size
1505

These devices eliminate materials that would disturb magnetic fields applications such as in MRI magnetic resonance imaging machines. The PNM series chip resistor has been carefully engineered with non-magnetic materials to eliminate the effects of these stray magnetic fields on circuit performance, thereby resulting in simplified shielding requirements and improved sound quality in audio applications. Providing signal conditioning without distortion from magnetic fields.

## CONSTRUCTION




## FEATURES

- Non-magnetic
- Moisture resistant
- High purity alumina substrate
- Non-standard values available
- MIL-STD-202 method 106 moisture resistance with 10 % power
- 100 % visual inspected per MIL-PRF-55342
- Very low noise and voltage coefficient (< -30 dB)
- Non-inductive
- Laser-trimmed tolerances to ± 0.1 %
- Wraparound resistance less than 10 mΩ
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

Pb-free Available

RoHS* Available

HALOGEN FREE Available

**Note**

* This datasheet provides information about parts that are RoHS-compliant and / or parts that are non RoHS-compliant. For example, parts with lead (Pb) terminations are not RoHS-compliant. Please see the information / tables in this datasheet for details

## TYPICAL PERFORMANCE

| | ABSOLUTE |
|---|---|
| TCR | 25 |
| TOL. | 0.1 |

## STANDARD ELECTRICAL SPECIFICATIONS

| TEST | SPECIFICATIONS | CONDITIONS |
|---|---|---|
| **Material** | Tantalum nitride | - |
| **Resistance Range** | 10 Ω to 3 MΩ | - |
| **TCR: Absolute** | ± 25 ppm/°C to ± 100 ppm/°C | -55 °C to +125 °C |
| **Tolerance: Absolute** | ± 0.1 % to ± 1.0 % | +25 °C |
| **Stability: Absolute** | $\Delta R$ ± 0.03 % | - |
| **Stability: Ratio** | - | - |
| **Voltage Coefficient** | 0.1 ppm/V | - |
| **Working Voltage** | 75 V to 200 V | - |
| **Operating Temperature Range** | -55 °C to +155 °C | - |
| **Storage Temperature Range** | -55 °C to +155 °C | - |
| **Noise** | < -30 dB | - |
| **Shelf Life Stability: Absolute** | - | - |

## COMPONENT RATINGS

| CASE SIZE (1) | POWER RATING (mW) | WORKING VOLTAGE (V) | RESISTANCE RANGE (Ω) |
|---|---|---|---|
| 0402 | 50 | 75 | 20 to 35K |
| 0502 | 100 | 75 | 20 to 65K |
| 0505 | 150 | 75 | 20 to 130K |
| 0603 | 150 | 75 | 10 to 130K |
| 0805 | 200 | 100 | 10 to 301K |
| 0705 | 200 | 100 | 10 to 301K |
| 1005 | 250 | 100 | 10 to 301K |
| 1010 | 500 | 150 | 50 to 600K |
| 1206 | 400 | 200 | 10 to 1M |
| 1505 | 400 | 150 | 10 to 1M |
| 2208 | 750 | 150 | 10 to 1.75M |
| 2010 | 800 | 200 | 10 to 2M |
| 2512 | 1000 | 200 | 10 to 3M |

**Note**

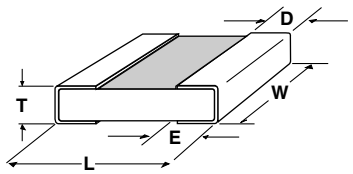
(1) 0705 and 0805 are the same (only use 0805 when ordering)



For technical questions, contact: thinfilm@vishay.com

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## DIMENSIONS in inches




| CASE SIZE | L | W | T | D | E |
|---|---|---|---|---|---|
| 0402 | 0.042 ± 0.008 | 0.022 ± 0.005 | 0.012 to 0.033 | 0.010 ± 0.005 | 0.010 ± 0.005 |
| 0502 | 0.055 ± 0.006 | 0.025 ± 0.005 | 0.012 to 0.033 | 0.010 ± 0.005 | 0.015 ± 0.005 |
| 0505 | 0.055 ± 0.006 | 0.050 ± 0.005 | 0.012 to 0.033 | 0.010 ± 0.005 | 0.015 ± 0.005 |
| 0603 | 0.064 ± 0.006 | 0.032 ± 0.005 | 0.020 Max. | 0.012 ± 0.005 | 0.015 ± 0.005 |
| 0705, 0805 (1) | 0.080 ± 0.006 | 0.050 ± 0.005 | 0.015 to 0.033 | 0.015 ± 0.005 | 0.015 ± 0.005 |
| 1005 | 0.105 ± 0.007 | 0.050 ± 0.005 | 0.015 to 0.033 | 0.015 ± 0.005 | 0.015 ± 0.005 |
| 1010 | 0.105 ± 0.007 | 0.100 ± 0.005 | 0.015 to 0.033 | 0.015 ± 0.005 | 0.015 ± 0.005 |
| 1206 | 0.126 ± 0.008 | 0.063 ± 0.005 | 0.015 to 0.033 | 0.020 + 0.005/- 0.010 | 0.020 + 0.005/- 0.010 |
| 1505 | 0.155 ± 0.007 | 0.050 ± 0.005 | 0.015 to 0.033 | 0.015 ± 0.005 | 0.015 ± 0.005 |
| 2010 | 0.209 ± 0.009 | 0.098 ± 0.005 | 0.015 to 0.033 | 0.020 ± 0.005 | 0.020 ± 0.005 |
| 2208 | 0.230 ± 0.007 | 0.075 ± 0.005 | 0.015 to 0.033 | 0.020 ± 0.005 | 0.020 ± 0.005 |
| 2512 | 0.259 ± 0.009 | 0.124 ± 0.005 | 0.015 to 0.033 | 0.020 ± 0.005 | 0.020 ± 0.005 |

**Note**

(1) 0705 and 0805 are the same (only use 0805 when ordering)

## ENVIRONMENTAL TESTS (Vishay Performance vs. MIL-PRF-55342 Requirements)

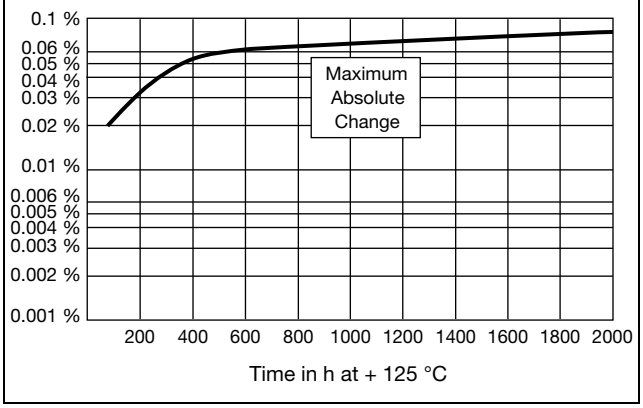
| ENVIRONMENTAL TEST | | LIMITS MIL-PRF-55342 CHARACTERISTIC "H" | TYPICAL VISHAY PERFORMANCE |
|---|---|---|---|
| **Resistance Temperature Characteristic** | | ± 50 ppm/°C | ± 35 ppm/°C |
| **Max. Ambient Temperature at Rated Wattage** | | +70 °C | +70 °C |
| **Max. Ambient Temperature at Power Derating** | | +150 °C | +150 °C |
| **Thermal Shock** | $\Delta R$ | ± 0.25 % | ± 0.040 % |
| **Low Temperature Operation** | $\Delta R$ | ± 0.25 % | ± 0.005 % |
| **Short Time Overload** | $\Delta R$ | ± 0.10 % | ± 0.010 % |
| **High Temperature Exposure** | $\Delta R$ | ± 0.20 % | ± 0.150 % |
| **Resistance to Bonding Exposure** | $\Delta R$ | ± 0.25 % | ± 0.005 % |
| **Moisture Resistance** | $\Delta R$ | ± 0.40 % | ± 0.029 % |
| **Life + 70 °C at 1000 hours** | $\Delta R$ | ± 0.50 % | ± 0.03 % |
| **Insulation Resistance** | | 10 000 Ω minimum | > 100 000 MΩ |



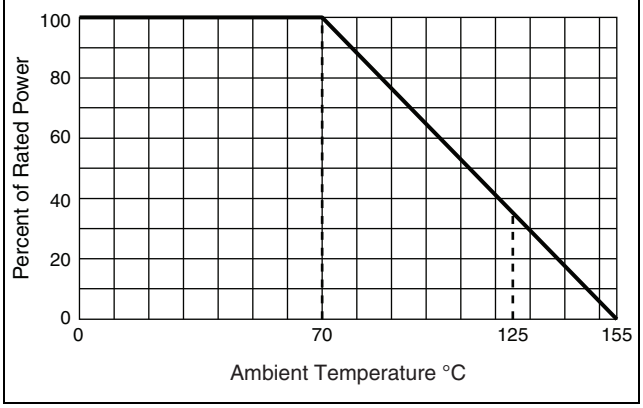
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## FILM LOAD LIFE STABILITY (at +125 °C)




## DERATING CURVE




## GLOBAL PART NUMBER INFORMATION

| P | N | M | 1 | 2 | 0 | 6 | E | 1 | 0 | 0 | 2 | B | B | T | 1 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|

| GLOBAL MODEL | CASE SIZE | TCR CHARACTERISTIC | RESISTANCE | TOLERANCE | TERMINATION | PACKAGING |
|---|---|---|---|---|---|---|
| **PNM** non-magnetic resistor | **0402**<br>**0502**<br>**0505**<br>**0603**<br>**0805**<br>**1005**<br>**1010**<br>**1206**<br>**1505**<br>**2208**<br>**2010**<br>**2512** | **E** = 25 ppm ($R$ > 100 Ω)<br>**H** = 50 ppm ($R$ > 50 Ω)<br>**K** = 100 ppm ($R$ > 10 Ω) | The first 3 digits are significant figures and the last digit specifies the number of zeros to follow. "R" designates the decimal point.<br><br>Example:<br>10R0 = 10 Ω<br>1000 = 100 Ω<br>1001 = 1 kΩ | **B** = ± 0.1 % [1]<br>**D** = ± 0.5 %<br>**F** = ± 1 %<br>**G** = ± 2 %<br>**J** = ± 5 % | **B** = wraparound Sn/Pb solder 63 % Sn/ 37 % Pb<br>**S** = wraparound lead (Pb)-free solder 96.5 % Sn/3.0 % Ag/ 0.5 % Cu RoHS compliant - e1 | **BS** = BULK 100 min., 1 mult<br>**WS** = WAFFLE 100 min., 1 mult<br><br>TAPE AND REEL<br>**T0** = 100 min., 100 mult<br>**T1** = 1000 min., 1000 mult [2]<br>**T3** = 300 min., 300 mult<br>**T5** = 500 min., 500 mult<br>**TF** = Full reel<br>**TS** = 100 min., 1 mult |

**Notes**

[1] B = 0.1 % tolerance available only above 100 Ω

[2] Preferred packaging code



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