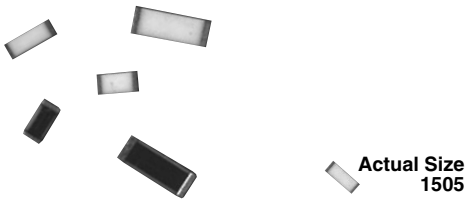
# Commercial Thin Film Chip Resistors




These chip resistors are available in both “top side” and “wraparound” termination styles in a variety of sizes. They incorporate self passivated, enhanced Tantalum Nitride films, to give superior performance on moisture resistance, voltage coefficient, power handling and resistance stability. The terminations consist of an adhesion layer, a leach resistant nickel barrier, and solder coating. This product will out-perform all requirements of characteristic H of MIL-PRF-55342.

## FEATURES

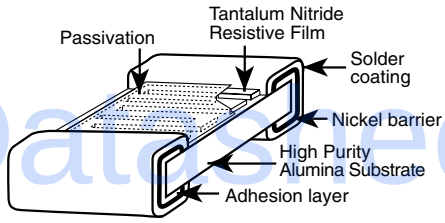
- Lead (Pb)-free or Sn/Pb terminations available
- Moisture resistant
- High purity alumina substrate
- Non-standard values available
- Will pass + 85 °C, 85 % relative humidity and 10 % rated power
- 100 % visual inspected per MIL-PRF-55342
- Very low noise and voltage coefficient (< - 30 dB)
- Non-inductive
- Laser-trimmed tolerances to ± 0.1 %
- Wraparound resistance less than 10 mΩ
- Epoxy bondable termination available

Pb-free Available

RoHS* COMPLIANT

SURFACE MOUNT CHIPS

## CONSTRUCTION




## TYPICAL PERFORMANCE

| | ABS |
|---|---|
| TCR | 25 |
| TOL | 0.1 |



## STANDARD ELECTRICAL SPECIFICATIONS

| TEST | SPECIFICATIONS | CONDITIONS |
|---|---|---|
| Material | Tantalum nitride | |
| Absolute TCR | ± 25 ppm/°C, ± 50 ppm/°C, ± 100 ppm/°C | - 55 °C to + 125 °C |
| Absolute Tolerance | ± 1.0 %, ± 0.5 % and ± 0.1 % | + 25 °C |
| Operating Temperature Range | - 55 °C to + 125 °C | |
| Noise | < - 25 dB | |

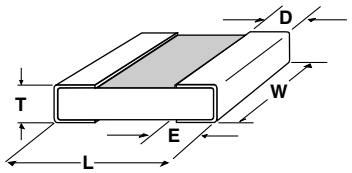
| CASE SIZE | POWER RATING (mW) | MAX. WORKING VOLTAGE | RESISTANCE RANGE - (Ω) |
|---|---|---|---|
| 0402 | 50 | 75 | 20 - 35K |
| 0502 | 100 | 75 | 20 - 65K |
| 0505 | 150 | 75 | 20 - 130K |
| 0603 | 150 | 75 | 10 - 80K |
| 0805 (1), 0705 (1) | 200 | 100 | 10 - 301K |
| 1005 | 250 | 100 | 10 - 301K |
| 1010 | 500 | 150 | 50 - 600K |
| 1206 | 400 | 200 | 10 - 1M |
| 1505 | 400 | 150 | 10 - 1M |
| 2208 | 750 | 150 | 10 - 1.75M |
| 2010 | 800 | 200 | 10 - 2M |
| 2512 | 1000 | 200 | 10 - 3M |

**Note**

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

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

## DIMENSIONS in inches

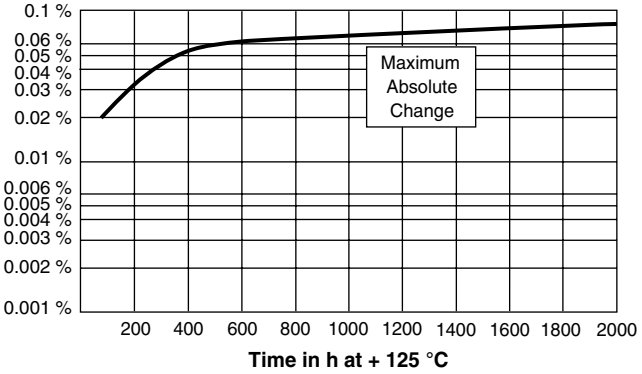



| CASE SIZE | TERM | L | W | T | D | E |
|---|---|---|---|---|---|---|
| 0402 | B | 0.042 ± 0.008 | 0.022 ± 0.005 | 0.012 to 0.033 | 0.010 ± 0.005 | 0.010 ± 0.005 |
| 0502 | B | 0.055 ± 0.006 | 0.025 ± 0.005 | 0.012 to 0.033 | 0.010 ± 0.005 | 0.015 ± 0.005 |
| 0505 | B | 0.055 ± 0.006 | 0.050 ± 0.005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

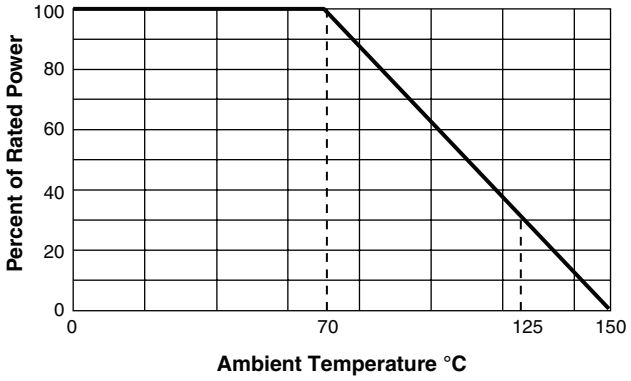
| ENVIRONMENTAL TESTS (VISHAY PERFORMANCE VS. MIL-PRF-55342 REQUIREMENTS) | | | |
|---|---|---|---|
| ENVIRONMENTAL TEST | | LIMITS MIL-PRF-55342 CHARACTERISTIC "H" | TYPICAL VISHAY PERFORMANCE |
| Resistance Temperature Characteristic | | ± 50 ppm/°C | ± 35 ppm/°C |
| Max. Ambient Temp. at Rated Wattage | | + 70 °C | + 70 °C |
| Max. Ambient Temp. at Power Derating | | + 150 °C | + 150 °C |
| Thermal Shock | $\Delta R$ | ± 0.25 % | ± 0.040 % |
| Low Temperature Operation | ΔR | ± 0.25 % | ± 0.005 % |
| Short Time Overload | ΔR | ± 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 % | ± 0.035 % |
| Insulation Resistance | Ω | 10 000 Minimum | > 100 000 MΩ |

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

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




## DERATING CURVE




SURFACE MOUNT CHIPS

## GLOBAL PART NUMBER INFORMATION

**New Global Part Numbering: PTN1206E1002BBT1 (preferred part number format)**

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

**GLOBAL MODEL**
**PTN**

**CASE SIZE**
**0402**
**0502**
**0505**
**0603**
**0805**
**1005**
**1010**
**1206**
**1505**
**2208**
**2010**
**2512**

**TCR CHARACTERISTIC**
**E** = ± 25 ppm/°C
**H** = ± 50 ppm/°C
**K** = ± 100 ppm/°C

**< 50 Ω**

± 100 ppm/°C best

**RESISTANCE**
The first 3 digits are significant figures and the last digit specifies the number of zeros to follow. "R" designates the decimal point.

Example:
10R0 = 10 Ω
1000 = 100 Ω
1001 = 1 kΩ

**TOLERANCE**
**B** = ± 0.1 %
**D** = ± 0.5 %
**F** = ± 1 %
**G** = ± 2 %
**J** = ± 5 %

**TERMINATION**
**B** = Wraparound Sn/Pb solder 63 % Sn/ 37 % Pb w/ nickel barrier
**G** = Wraparound Au over Ni (gold) termination epoxy bondable RoHS compliant - e4
**S** = Wraparound lead (Pb)-free solder 96.5 % Sn/3.0 %Ag/ 0.5 % Cu RoHS compliant - e1

**PACKAGING**
**BS** = BULK
100 Min 1 Mult
**WS** = WAFFLE
100 Min 1 Mult

TAPE AND REEL
**T0** = 100 Min 100 Mult
**T1** = 1000 Min 1000 Mult
**T3** = 300 Min 300 Mult
**T5** = 500 Min 500 Mult
**TF** = Full Reel
**TS** = 100 Min 1 Mult

**Historical Part Number example: PTN0805H8801BBT**

| PTN | 0805 | H | 8801 | B | B | T |
|---|---|---|---|---|---|---|
| STYLE | CASE SIZE | TCR CHARACTERISTIC | OHMIC VALUE | TOLERANCE | TERMINATION | PACKAGING |

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