

Precision Automotive High Temperature (155 °C at full rated power) Thin Film Chip Resistor, AEC-Q200 Qualified



The terminations consist of an adhesion layer, a leach resistant nickel barrier and gold plating compatible with high temperature solder systems.

CONSTRUCTION



FEATURES

- Resistance range: 1.0 Ω to 1 MΩ
- AEC-Q200 qualified, table 7F
- AEC-Q200 qualified, ESD rated class 1C (< 1 kΩ: 1 kV; > 1 kΩ: 2 kV)
- Laser trimmed to any value
- Intrinsic moisture protected resistor element
- Moisture resistant to MIL-STD-202, method 106
- Tantalum nitride resistor film on alumina substrate
- 100 % visual inspected per MIL-PRF-55342
- Laser-trimmed tolerances to ± 0.1 %
- Load life stability 0.2 % at 1000 h at 155 °C and 100 % rated power
- Very low noise and voltage coefficient (< - 30 dB, < 0.1 ppm/V)
- Sulfur resistant (per ASTM B809-95 humid vapor test)
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912



RoHS
COMPLIANT
HALOGEN
FREE
GREEN
(5-2008)

TYPICAL PERFORMANCE

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

STANDARD ELECTRICAL SPECIFICATIONS

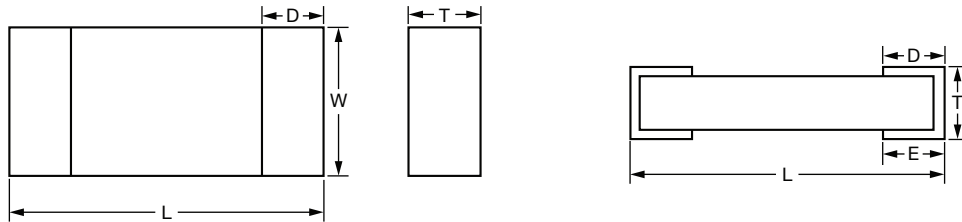
| TEST | SPECIFICATIONS | CONDITIONS |
|--|-----------------------------|--|
| Material | Tantalum nitride | - |
| Resistance Range | 1.0 Ω to 1 MΩ | - |
| TCR: Absolute | ± 25 ppm/°C to ± 100 ppm/°C | - 55 °C to + 175 °C |
| Tolerance: Absolute | ± 0.1 % to ± 1.0 % | + 25 °C |
| Stability: Absolute | ± 0.2 % | 1000 h at 155 °C and 100 % rated power |
| Stability: Ratio | Not applicable | - |
| Voltage Coefficient | Less than 0.1 ppm/V | - |
| Working Voltage | 75 V | - |
| Operating Temperature Range | - 55 °C to + 250 °C | - |
| Storage Temperature Range ⁽¹⁾ | - 55 °C to + 250 °C | - |
| Noise | < - 30 dB | - |
| Shelf Life Stability: Absolute | 100 ppm | 1 year at 25 °C |

Note

⁽¹⁾ Storage temperature rating is for device only.

COMPONENT RATINGS

| CASE SIZE | POWER RATING (mW) | WORKING VOLTAGE (V) | RESISTANCE RANGE (Ω) |
|-----------|-------------------|---------------------|----------------------|
| 0402 | 50 | 75 | 1.5 to 51K |
| 0603 | 150 | 75 | 2.75 to 120K |
| 0805 | 200 | 100 | 2.75 to 301K |
| 1206 | 400 | 200 | 1.0 to 1M |

DIMENSIONS in inches


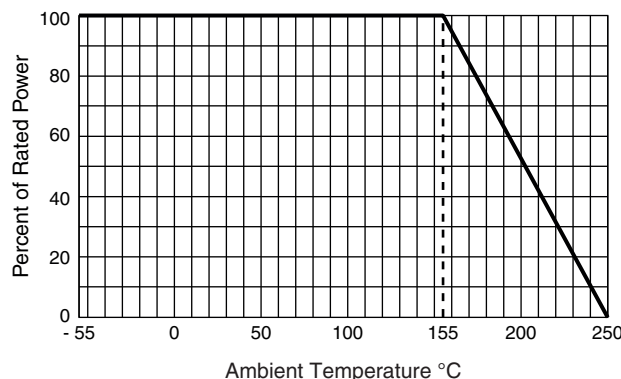
| CASE SIZE | L | W | T | D | E |
|-----------|---------------|---------------|---------------|------------------------|-----------------------|
| 0402 | 0.042 ± 0.008 | 0.022 ± 0.005 | 0.015 ± 0.003 | 0.010 ± 0.005 | 0.010 ± 0.005 |
| 0603 | 0.064 ± 0.006 | 0.032 ± 0.005 | 0.015 ± 0.003 | 0.012 ± 0.005 | 0.015 ± 0.005 |
| 0805 | 0.080 ± 0.006 | 0.050 ± 0.005 | 0.015 ± 0.003 | 0.016 ± 0.008 | 0.015 ± 0.005 |
| 1206 | 0.126 ± 0.008 | 0.063 ± 0.005 | 0.015 ± 0.003 | 0.020 + 0.005 / - 0.01 | 0.020 + 0.005 / -0.01 |

ENVIRONMENTAL TESTS

| ENVIRONMENTAL TEST | CONDITIONS | TYPICAL VISHAY PERFORMANCE |
|------------------------------|--|---|
| High temperature storage | MIL-STD-202 method 108, 1000 h at 125 °C | ± 0.05 % |
| Temperature cycling | JESD22 method JA-104, 1000 cycles, - 55 °C to + 155 °C | ± 0.115 % |
| Moisture resistance | MIL-STD-202 method 106 | ± 0.017 % |
| Biased humidity | MIL-STD-202 method 103, 1000 h at 85 °C, 85 % RH, 10 % rated power | ± 0.133 % |
| Life | MIL-STD-202 method 108, 1000 h at 155 °C | ± 0.20 % at 100 % rated power and 155 °C. Effective film temperature is 200 °C. |
| Mechanical shock | MIL-STD-202 method 213, condition C | ± 0.008 % |
| Vibration | MIL-STD-202 method 204, 10 Hz to 2 kHz | ± 0.008 % |
| Resistance to soldering heat | MIL-STD-202 method 210, condition B | ± 0.09 % |
| Electrostatic discharge | AEC-Q200-002, human body (< 1 kΩ: 1 kV; > 1 kΩ: 2 kV) | ± 0.10 % at 2 kV |
| Solderability | MIL-STD-883 method 2003 para 2.3.1 and J-STD-002 | Pass |
| Die shear | MIL-PRF-55342 | Pass |
| Flame retardance | AEC-Q200-001 para 4.0 | Pass |

MECHANICAL SPECIFICATIONS

| | |
|--------------------|---|
| Resistive element | Tantalum nitride |
| Substrate material | Alumina |
| Terminations | Gold (10 μin. min.) over nickel (50 μin. min.) |

DERATING CURVE




| GLOBAL PART NUMBER INFORMATION | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| New Global Part Numbering: PATT0603E1002BG1 | | | | | | | | | | | | | | | | |
| P | A | T | T | 0 | 6 | 0 | 3 | E | 1 | 0 | 0 | 2 | B | G | T | 1 |
| GLOBAL MODEL PATT | CASE SIZE 0402 0603 0805 1206 | TCR CHARACTERISTIC E = ± 25 ppm/°C H = ± 50 ppm/°C K = ± 100 ppm/°C ⁽¹⁾ L = ± 200 ppm/°C | 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 1002 = 10 kΩ | TOLERANCE B = ± 0.1 % D = ± 0.5 % F = ± 1.0 % G = ± 2.0 % J = ± 5.0 % | TERMINATION G = Wraparound gold over nickel barrier | PACKAGING BULK BS = 100 min., 1 mult WAFFLE WS = 100 min., 1 mult WO = 100 min., 100 mult WI = 100 min., 1 mult (item single lot date code) WP = 100 min., 1 mult (package unit single lot date code) 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 TI = 100 min., 1 mult (item single lot date code) TP = 100 min., 1 mult (package unit single lot date code) | | | | | | | | | | |

Note

⁽¹⁾ Characteristic TCR - ($R < 10 \Omega$)

| RESISTANCE | TCR (ppm/°C) | TOLERANCE (%) |
|-----------------------------|------------------|-------------------|
| 10 Ω to 1 MΩ | 25, 50, 100, 200 | 0.1, 0.5, 1, 2, 5 |
| 5 Ω to 10 Ω ⁽²⁾ | 100, 200 | 1, 2, 5 |
| 1.0 Ω to 5 Ω ⁽²⁾ | 200 | 1, 2, 5 |

Note

⁽²⁾ Resistance values from 1.0 Ω to 10 Ω are undergoing PPAP qualification; results are expected to be similar to PPAP qualified 10 Ω to 120 kΩ.



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