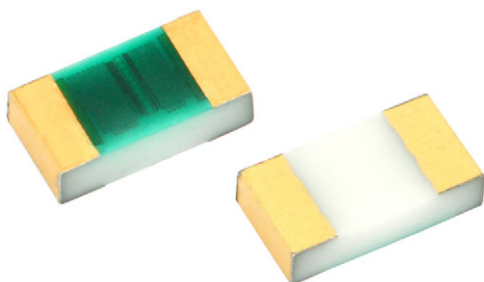


# Precision Automotive High Temperature (155 °C at Full Rated Power) Thin Film Chip Resistor, AEC-Q200 Qualified

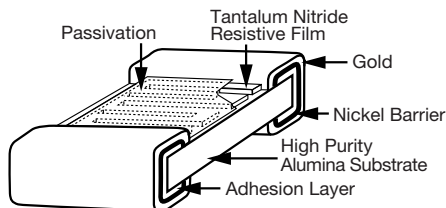


## LINKS TO ADDITIONAL RESOURCES



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

## CONSTRUCTION



**ATTENTION!**  
Observe Precautions for  
Handling Electrostatic Sensitive Devices!

## FEATURES

- Resistance range: 1.0  $\Omega$  to 1 M $\Omega$
- AEC-Q200 qualified, table 7F
- AEC-Q200 qualified, ESD rated class 1C (< 1 k $\Omega$ : 1 kV; > 1 k $\Omega$ : 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  $\pm 0.1$  %
- 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](http://www.vishay.com/doc?99912)



**RoHS**  
COMPLIANT  
HALOGEN  
**FREE**  
**GREEN**  
(5-2008)

## TYPICAL PERFORMANCE

	ABSOLUTE
TCR	25
TOL.	0.1

## STANDARD ELECTRICAL SPECIFICATIONS

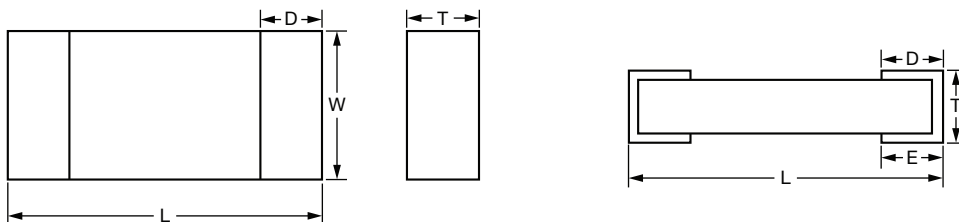
TEST	SPECIFICATIONS	CONDITIONS
Material	Tantalum nitride	-
Resistance Range	1.0 $\Omega$ to 1 M $\Omega$	-
TCR: Absolute	$\pm 25$ ppm/°C to $\pm 100$ ppm/°C	-55 °C to +175 °C
Tolerance: Absolute	$\pm 0.1$ % to $\pm 1.0$ %	+25 °C
Stability: Absolute	$\pm 0.2$ %	1000 h at 155 °C and 100 % rated power
Stability: 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 <sup>(1)</sup>	-55 °C to +250 °C	-
Noise	< -30 dB	-
Shelf Life Stability: Absolute	100 ppm	1 year at 25 °C

### Note

<sup>(1)</sup> Storage temperature rating is for device only

## COMPONENT RATINGS

CASE SIZE	POWER RATING (mW)	WORKING VOLTAGE (V)	RESISTANCE RANGE ( $\Omega$ )
0402	50	75	1.0 to 51K
0603	150	75	1.0 to 120K
0805	200	100	1.0 to 301K
1206	400	200	1.0 to 1M

**DIMENSIONS** in inches


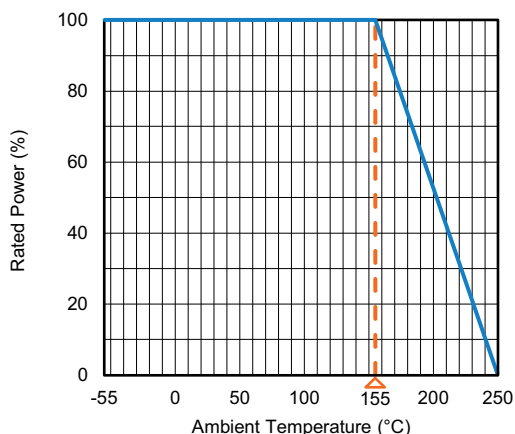
CASE SIZE	L	W	T	D	E
0402	0.042 ± 0.008	0.022 ± 0.005	0.015 ± 0.003	0.010 ± 0.005	0.010 ± 0.005
0603	0.064 ± 0.006	0.032 ± 0.005	0.015 ± 0.003	0.012 ± 0.005	0.015 ± 0.005
0805	0.080 ± 0.006	0.050 ± 0.005	0.015 ± 0.003	0.016 ± 0.008	0.015 ± 0.005
1206	0.126 ± 0.008	0.063 ± 0.005	0.015 ± 0.003	0.020 ± 0.005 / - 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: PATT0603E1002BGT1

GLOBAL MODEL	CASE SIZE	TCR CHARACTERISTIC	RESISTANCE	TOLERANCE	TERMINATION	PACKAGING
PATT	0402 0603 0805 1206	E = $\pm 25$ ppm/ $^{\circ}$ C H = $\pm 50$ ppm/ $^{\circ}$ C K = $\pm 100$ ppm/ $^{\circ}$ C <sup>(1)</sup> L = $\pm 200$ ppm/ $^{\circ}$ C	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 $\Omega$ 1000 = 100 $\Omega$ 1002 = 10 k $\Omega$	B = $\pm 0.1$ % D = $\pm 0.5$ % F = $\pm 1.0$ % G = $\pm 2.0$ % J = $\pm 5.0$ %	G = wraparound gold over nickel barrier	BULK BS = 100 min., 1 mult. WAFFLE WS = 100 min., 1 mult. W0 = 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

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

RESISTANCE	TCR (ppm/ $^{\circ}$ C)	TOLERANCE (%)
10 $\Omega$ to 1 M $\Omega$	25, 50, 100, 200	0.1, 0.5, 1, 2, 5
5 $\Omega$ to 10 $\Omega$ <sup>(1)</sup>	100, 200	1, 2, 5
1.0 $\Omega$ to 5 $\Omega$ <sup>(1)</sup>	200	1, 2, 5

## Note

<sup>(1)</sup> Resistance values from 1.0  $\Omega$  to 10  $\Omega$  are undergoing PPAP qualification; results are expected to be similar to PPAP qualified 10  $\Omega$  to 120 k $\Omega$



## Disclaimer

ALL PRODUCT, PRODUCT SPECIFICATIONS AND DATA ARE SUBJECT TO CHANGE WITHOUT NOTICE TO IMPROVE RELIABILITY, FUNCTION OR DESIGN OR OTHERWISE.

Vishay Intertechnology, Inc., its affiliates, agents, and employees, and all persons acting on its or their behalf (collectively, "Vishay"), disclaim any and all liability for any errors, inaccuracies or incompleteness contained in any datasheet or in any other disclosure relating to any product.

Vishay makes no warranty, representation or guarantee regarding the suitability of the products for any particular purpose or the continuing production of any product. To the maximum extent permitted by applicable law, Vishay disclaims (i) any and all liability arising out of the application or use of any product, (ii) any and all liability, including without limitation special, consequential or incidental damages, and (iii) any and all implied warranties, including warranties of fitness for particular purpose, non-infringement and merchantability.

Statements regarding the suitability of products for certain types of applications are based on Vishay's knowledge of typical requirements that are often placed on Vishay products in generic applications. Such statements are not binding statements about the suitability of products for a particular application. It is the customer's responsibility to validate that a particular product with the properties described in the product specification is suitable for use in a particular application. Parameters provided in datasheets and / or specifications may vary in different applications and performance may vary over time. All operating parameters, including typical parameters, must be validated for each customer application by the customer's technical experts. Product specifications do not expand or otherwise modify Vishay's terms and conditions of purchase, including but not limited to the warranty expressed therein.

Hyperlinks included in this datasheet may direct users to third-party websites. These links are provided as a convenience and for informational purposes only. Inclusion of these hyperlinks does not constitute an endorsement or an approval by Vishay of any of the products, services or opinions of the corporation, organization or individual associated with the third-party website. Vishay disclaims any and all liability and bears no responsibility for the accuracy, legality or content of the third-party website or for that of subsequent links.

Vishay products are not designed for use in life-saving or life-sustaining applications or any application in which the failure of the Vishay product could result in personal injury or death unless specifically qualified in writing by Vishay. Customers using or selling Vishay products not expressly indicated for use in such applications do so at their own risk. Please contact authorized Vishay personnel to obtain written terms and conditions regarding products designed for such applications.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted by this document or by any conduct of Vishay. Product names and markings noted herein may be trademarks of their respective owners.