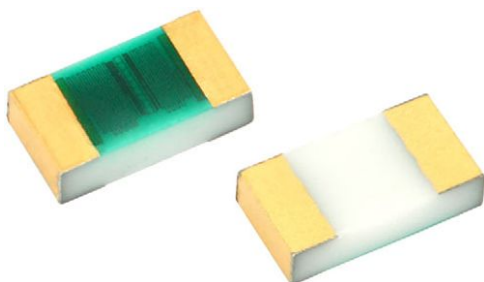


# Precision Automotive High Temperature (155 °C at Full Rated Power) Thin Film Chip Resistor, AEC-Q200 Qualified

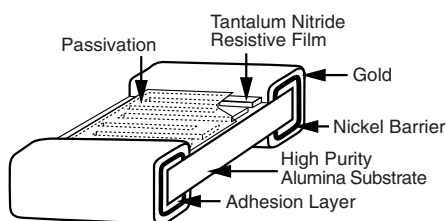


## LINKS TO ADDITIONAL RESOURCES



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

## CONSTRUCTION



## 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

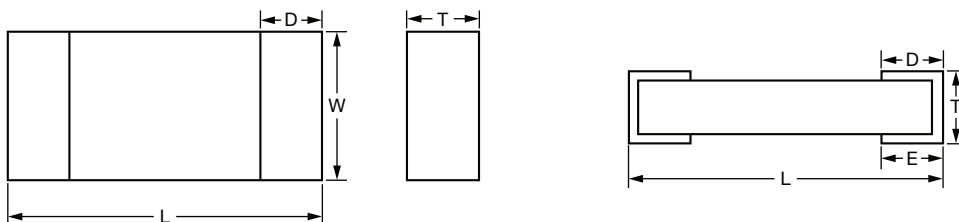
TEST	SPECIFICATIONS	CONDITIONS
Material	Tantalum nitride	-
Resistance Range	1.0 $\Omega$ to 1 M $\Omega$	-
TCR: Absolute	$\pm 25$ ppm/ $^{\circ}$ C to $\pm 100$ ppm/ $^{\circ}$ C	-55 $^{\circ}$ C to +175 $^{\circ}$ C
Tolerance: Absolute	$\pm 0.1$ % to $\pm 1.0$ %	+25 $^{\circ}$ C
Stability: Absolute	$\pm 0.2$ %	1000 h at 155 $^{\circ}$ 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 $^{\circ}$ C to +250 $^{\circ}$ C	-
Storage Temperature Range <sup>(1)</sup>	-55 $^{\circ}$ C to +250 $^{\circ}$ C	-
Noise	< -30 dB	-
Shelf Life Stability: Absolute	100 ppm	1 year at 25 $^{\circ}$ 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	1.5 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


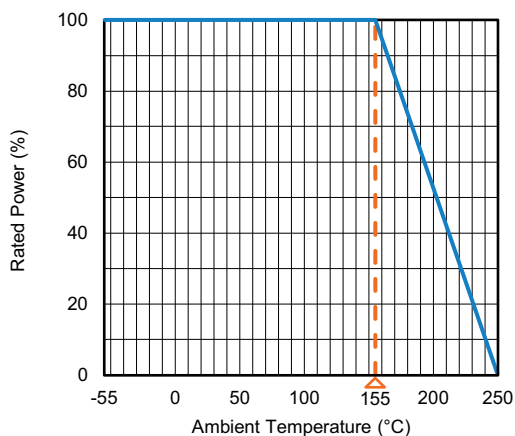
CASE SIZE	L	W	T	D	E
0402	0.042 ± 0.008	0.022 ± 0.005	0.015 ± 0.003	0.010 ± 0.005	0.010 ± 0.005
0603	0.064 ± 0.006	0.032 ± 0.005	0.015 ± 0.003	0.012 ± 0.005	0.015 ± 0.005
0805	0.080 ± 0.006	0.050 ± 0.005	0.015 ± 0.003	0.016 ± 0.008	0.015 ± 0.005
1206	0.126 ± 0.008	0.063 ± 0.005	0.015 ± 0.003	0.020 ± 0.005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

<b>P</b>	<b>A</b>	<b>T</b>	<b>T</b>	<b>0</b>	<b>6</b>	<b>0</b>	<b>3</b>	<b>E</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>2</b>	<b>B</b>	<b>G</b>	<b>T</b>	<b>1</b>
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 $\Omega$



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