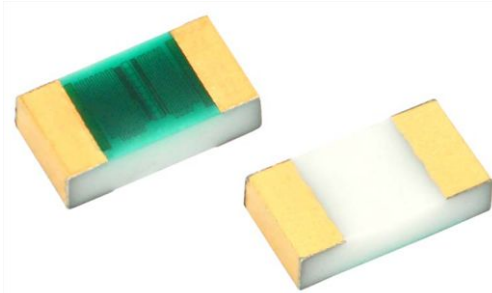


## Precision Automotive High Temperature (155 °C at full rated power) Thin Film Chip Resistor, AEC-Q200 Qualified



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  $\Omega$  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.)





GLOBAL PART NUMBER INFORMATION																
New Global Part Numbering: PATT0603E1002BGT1																
P	A	T	T	0	6	0	3	E	1	0	0	2	B	G	T	1
GLOBAL MODEL <b>PATT</b>	CASE SIZE <b>0402</b> <b>0603</b> <b>0805</b> <b>1206</b>	TCR CHARACTERISTIC <b>E</b> = ± 25 ppm/°C <b>H</b> = ± 50 ppm/°C <b>K</b> = ± 100 ppm/°C <sup>(1)</sup> <b>L</b> = ± 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>B</b> = ± 0.1 % <b>D</b> = ± 0.5 % <b>F</b> = ± 1.0 % <b>G</b> = ± 2.0 % <b>J</b> = ± 5.0 %	TERMINATION <b>G</b> = Wraparound gold over nickel barrier	PACKAGING BULK <b>BS</b> = 100 min., 1 mult WAFFLE <b>WS</b> = 100 min., 1 mult <b>WO</b> = 100 min., 100 mult <b>WI</b> = 100 min., 1 mult (item single lot date code) <b>WP</b> = 100 min., 1 mult (package unit single lot date code) TAPE AND REEL <b>T0</b> = 100 min., 100 mult <b>T1</b> = 1000 min., 1000 mult <b>T3</b> = 300 min., 300 mult <b>T5</b> = 500 min., 500 mult <b>TF</b> = Full reel <b>TS</b> = 100 min., 1 mult <b>TI</b> = 100 min., 1 mult (item single lot date code) <b>TP</b> = 100 min., 1 mult (package unit single lot date code)										

**Note**

<sup>(1)</sup> 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 <sup>(2)</sup>	100, 200	1, 2, 5
1.0 Ω to 5 Ω <sup>(2)</sup>	200	1, 2, 5

**Note**

<sup>(2)</sup> 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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