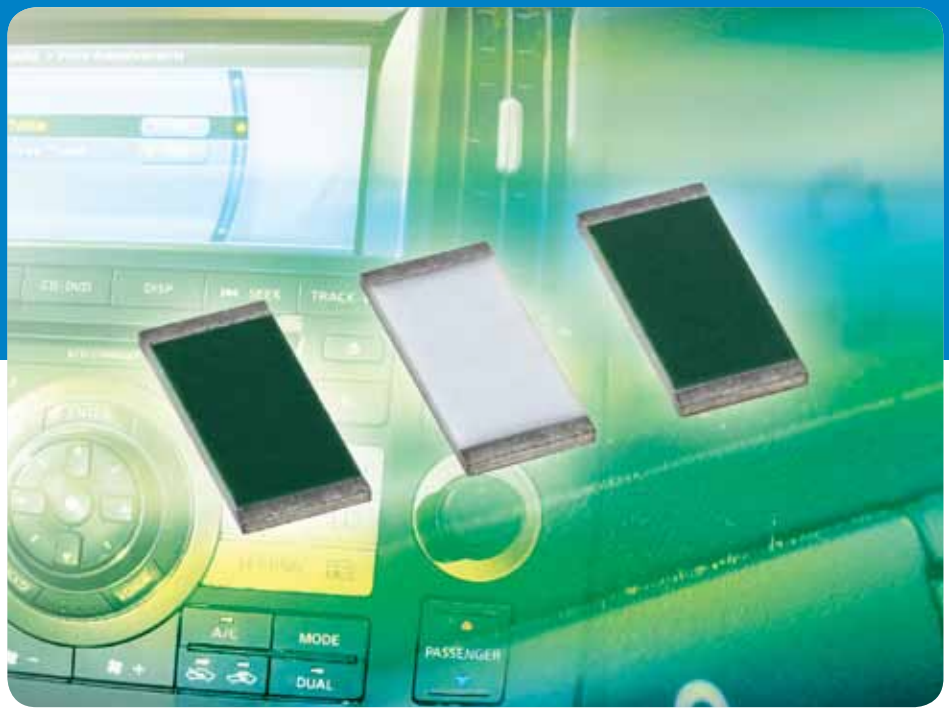
THIN FILM RESISTORS

PAT Series



Precision Automotive Thin Film Chip Resistors AEC-Q200-Qualified, 2-kV ESD Rating

KEY BENEFITS

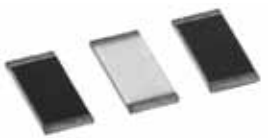
- Resistance range: 10 Ω to 3 MΩ
- RoHS-compliant
- AEC-Q200-compliant
- AEC-Q200 ESD-rated Class 1C (2 kV)
- Moisture-resistant tantalum nitride resistor film on high-purity alumina substrate
- TCR of ± 25 ppm/°C
- Tolerances to ± 0.1 %
- Stable film and performance characteristics: < 0.05 % at 2000 hours at 70 °C
- Power rating to 1 W

APPLICATIONS

- Automotive equipment
- Telecommunications
- Industrial equipment
- Test and measurement equipment

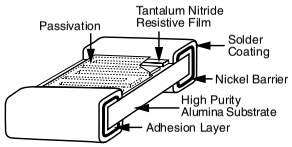
Datasheet is available on our web site at www.vishay.com
for PAT Series - http://www.vishay.com/doc?60024

Precision Automotive Thin Film Chip Resistors, AEC-Q200 Qualified, 2 kV ESD Rating



These chip resistors are available in wraparound terminations styles in 12 case sizes. They incorporate self passivated enhanced tantalum nitride resistor film to give superior performance on moisture resistance, electrostatic discharge, voltage coefficient, power handling and resistance stability. The terminations consist of an adhesion layer, a leach resistant nickel barrier, and solder coating (lead (Pb)-free). This product will out-perform all requirements of AEC-Q200.

CONSTRUCTION



FEATURES

- Resistance range: 10 Ω to 3 MΩ
- AEC-Q200 ESD rated class 1C (2 kV)
- Laser trimmed to any value
- Lead (Pb)-free
- Moisture resistant to MIL-STD-202, method 202
- Tantalum nitride resistor film on high purity alumina substrate
- 100 % visual inspected per MIL-PRF-55342
- Laser-trimmed tolerances to ± 0.1 %
- Load life stability < 0.05 % at 1000 h at 70 °C
- Very low noise and voltage coefficient (< - 30 dB, < 0.1 ppm/V)
- Compliant to RoHS directive 2002/95/EC

Pb-free
RoHS COMPLIANT
GREEN (5-2008)**

TYPICAL PERFORMANCE

	ABSOLUTE
TCR	25
TOL.	0.1

STANDARD ELECTRICAL SPECIFICATIONS

TEST	SPECIFICATIONS	CONDITIONS
Material	Tantalum nitride	-
Resistance Range	10 Ω to 3 MΩ	-
TCR: Absolute	± 25 ppm/°C to ± 100 ppm/°C	- 55 °C to + 125 °C
Tolerance: Absolute	± 0.1 % to ± 1.0 %	+ 25 °C
Stability: Absolute	± 0.05 %	2000 h at 70 °C rated power
Stability: Ratio	Not applicable	-
Voltage Coefficient	Less than 0.1 ppm/V	-
Working Voltage	75 V to 200 V	-
Operating Temperature Range	- 55 °C to + 150 °C	-
Storage Temperature Range	- 55 °C to + 150 °C	-
Noise	< - 30 dB	-
Shelf Life Stability: Absolute	100 ppm	1 year at 25 °C

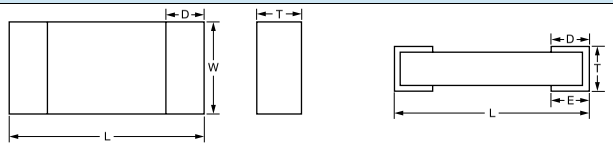
COMPONENT RATINGS

CASE SIZE	POWER RATING (mW)	WORKING VOLTAGE (V)	RESISTANCE RANGE (Ω)
0402	50	75	20 to 35K
0603	150	75	10 to 80K
0805	200	100	10 to 301K
1206	400	200	10 to 1M
1505	400	150	10 to 1M
2208	750	150	10 to 1.75M
2010	800	200	10 to 2M
2512	1000	200	10 to 3M

* Pb containing terminations are not RoHS compliant, exemptions may apply
** Please see document "Vishay Material Category Policy": www.vishay.com/doc?99902

Revision: 30-Nov-09

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	0.015 ± 0.005	0.015 ± 0.005
1206	0.126 ± 0.008	0.063 ± 0.005	0.015 ± 0.003	0.020 + 0.005, - 0.010	0.020 + 0.005, - 0.010
1505	0.155 ± 0.007	0.050 ± 0.005	0.015 ± 0.003	0.015 ± 0.005	0.015 ± 0.005
2010	0.209 ± 0.009	0.098 ± 0.005	0.015 ± 0.003	0.020 ± 0.005	0.020 ± 0.005
2208	0.230 ± 0.007	0.075 ± 0.005	0.015 ± 0.003	0.020 ± 0.005	0.020 ± 0.005
2512	0.259 ± 0.009	0.124 ± 0.005	0.015 ± 0.003	0.020 ± 0.005	0.020 ± 0.005

ENVIRONMENTAL TESTS (Vishay Performance vs. AEC-Q200 Requirements)

ENVIRONMENTAL TEST		CONDITIONS	LIMITS PER AEC-Q200	TYPICAL VISHAY PERFORMANCE
Resistance Temperature Characteristic		- 55 °C to + 125 °C	± 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
High Temperature Storage	ΔR	MIL-STD-202, 108, 1000 h at 125 °C	± 0.1 %	+ 0.016 %
Temperature Cycling	ΔR	JESD22, JA-104, 1000 cycles, - 55 °C to + 125 °C	± 0.15 %	+ 0.013 %
Moisture Resistance	ΔR	MIL-STD-202, 106	± 0.20 %	+ 0.0010 %
Biased Humidity	ΔR	MIL-STD-202, 103, 1000 h at 85 °C, 85 % RH, 10 % P	± 0.10 %	+ 0.0297 %
Life	ΔR	MIL-STD-202, 108 at 125 °C, 1000 h	± 0.1 %	+ 0.0220 %
Mechanical Shock	ΔR	MIL-STD-202, method 213, condition C	± 0.1 %	+ 0.0130 %
Vibration	ΔR	MIL-STD-202 method 204, 10 Hz to 2 kHz	± 0.1 %	+ 0.0030 %
Resistance to Soldering Heat	ΔR	MIL-STD-202, 204, condition B	± 0.10 %	+ 0.0150 %
Electrostatic Discharge	ΔR	AEC-Q200-002 at 2 kV, human body	± 0.10 %	- 0.032 %
Solderability	Visual	J-STD-002, method B and B1	95 %	Acceptable
Terminal Strength	ΔR	AEC-Q200-006 at 1 kg for 60 s	± 0.10 %	+ 0.012 %
Flame Retardance	Visual	AEC-Q200-001 para 4.0		Acceptable

GLOBAL PART NUMBER INFORMATION

New Global Part Numbering: PAT1206E1002BBT1

P	A	T	1	2	0	6	E	1	0	0	2	B	B	T	1

GLOBAL MODEL
PAT

CASE SIZE
0402
0603
0805
1206
1505
2010
2208
2512

TCR CHARACTERISTIC
E = ± 25 ppm/°C
H = ± 50 ppm/°C
K = ± 100 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
S = Wraparound lead (Pb)-free solder w/nickel barrier

PACKAGING
TAPE AND REEL
T1 = 1000 min., 1000 mult
TF = Full reel
TS = 100 min., 1 mult

Build Vishay into your Design