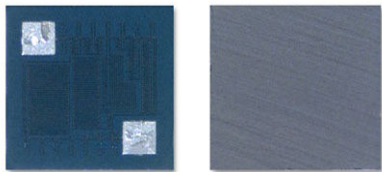


## Thin Film Top-Contact Resistor for High Temperature Applications



Product may not be to scale

The TSFM series of single-value resistors chips offer a small size, wide ohmic value range and excellent power capacity, maintaining these qualities to temperatures up to 250 °C. The TSFM Tantalum Nitride resistor material offers excellent resistance to high moisture environments. The TSFMs are manufactured using Vishay Electro-Films (EFI) sophisticated thin-film equipment and manufacturing technology. The TSFMs are 100 % electrically tested and visually inspected to MIL-STD-883, method 2032 class H or K.

### FEATURES

- Qualified to operate at elevated temperatures up to 250 °C
- DC power rating up to 250 mW
- Small Size: 0.02" square
- Case: 0202
- Self passivating tantalum nitride film
- Oxidized silicon substrate
- Wide value range: 100 Ω to 100 kΩ

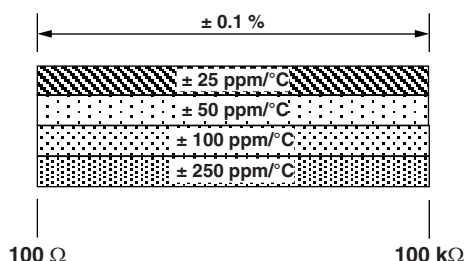
### APPLICATIONS

Vishay EFI TSFM top-contact 0.02" square resistor chips are designed to operate at elevated temperatures and power loads in many types of hybrid (chip and wire) assemblies. They are ideally suited for extreme environment applications such as "down hole" drilling.

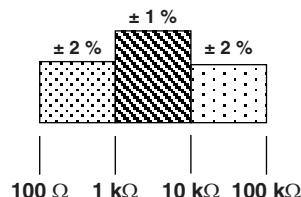
### TEMPERATURE COEFFICIENT OF RESISTANCE, VALUES, AND TOLERANCES

PARAMETER	VALUE	UNIT
Resistance Range	100 to 100K	Ω
Tolerances	± 0.1	%
TCR	± 25; ± 50; ± 100; ± 250	ppm/°C

Tightest Standard Tolerance Available

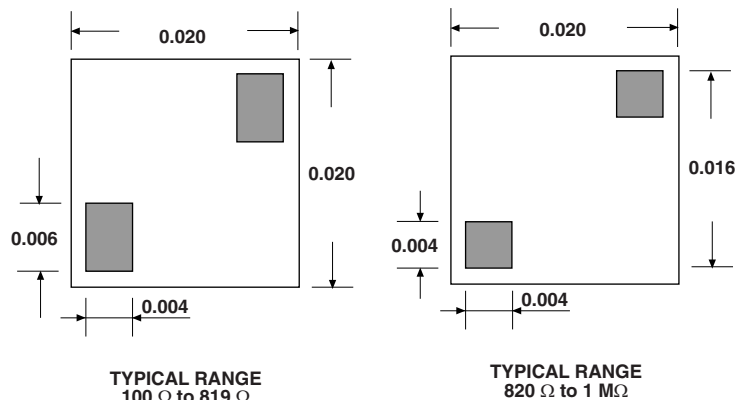


Load Life Stability, 1000 h, +125 °C, 175 mW



### STANDARD ELECTRICAL SPECIFICATIONS

PARAMETER	VALUE	UNIT
Noise, MIL-STD-202, Method 308	-35	dB
Moisture Resistance, MIL-STD-202, Method 106 - Hermetic Applications	± 0.5 max. ΔR/R	%
Stability, 1000 h, +125 °C, 175 mW	Down to ± 1	%
Operating Temperature Range	-55 to +250	°C
Thermal Shock, MIL-STD-202, Method 107, Test Condition F	± 0.25 max. ΔR/R	%
High Temperature Exposure, +250 °C, 1000 h	Down to ± 1	%
Dielectric Voltage Breakdown	200	V
Operating Voltage	100 max.	V
DC Power Rating at +125 °C (Derated to Zero at +250 °C)	250 at 70 °C	mW
5 x Rated Power Short-Time Overload, +25 °C, 5 s	± 0.25 max. ΔR/R	%

**CONFIGURATIONS** in inches

**SCHEMATIC**


<b>MECHANICAL SPECIFICATIONS</b> in inches (millimeters)	
PARAMETER	
Chip Size	0.020 x 0.020 $\pm$ 0.003 (0.5 x 0.5 $\pm$ 0.076)
Chip Thickness	0.010 $\pm$ 0.002 (0.254 $\pm$ 0.05)
Chip Substrate Material	Oxidized silicon, 10 k $\text{\AA}$ minimum SiO <sub>2</sub>
Film Material	Tantalum nitride, self-passivating
Passivation	None
Bonding Pad Size	0.004 x 0.004 (0.10 x 0.10)
Number of Pads	2
Pad Material	100 $\mu$ " Au
Backing	None, lapped silicon (Au optional)

<b>GLOBAL PART NUMBER INFORMATION</b>									
Global Part Number: <b>TSFM50000FKGNHWS</b>									
Global Part Number Description: <b>TSFM 5K 1% 100 ppm/<math>^{\circ}</math>C Au None H WS</b>									
<b>T</b>	<b>S</b>	<b>F</b>	<b>M</b>	<b>5</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>F</b>
<b>K</b>	<b>G</b>	<b>N</b>	<b>H</b>	<b>W</b>	<b>S</b>				
MODEL	RESISTANCE	RESISTANCE MULTIPLIER CODE	TOL. CODE (%)	TCR (ppm/ $^{\circ}$ C)	TERMINATION	BACK METAL	VISUAL CLASS	PACKAGING CODE	
<b>TSFM</b> 20 x 20 size Ta <sub>2</sub> N on silicon	First 4 digits are significant figures of resistance	<b>C</b> = 0.001 <b>B</b> = 0.01 <b>A</b> = 0.1 <b>0</b> = 1 <b>1</b> = 10 <b>2</b> = 100 <b>3</b> = 1000	<b>B</b> = 0.1 <b>C</b> = 0.25 <b>D</b> = 0.5 <b>F</b> = 1.0 <b>G</b> = 2.0 <b>H</b> = 2.5 <b>J</b> = 5.0 <b>K</b> = 10.0	<b>E</b> = $\pm$ 25 <b>C</b> = $\pm$ 50 <b>K</b> = $\pm$ 100 <b>M</b> = $\pm$ 250	<b>G</b> = Au	<b>G</b> = Au <b>N</b> = None	<b>H</b> = Class H <b>K</b> = Class K	<b>WS</b> = Waffle pack 100 min., 1 mult	



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