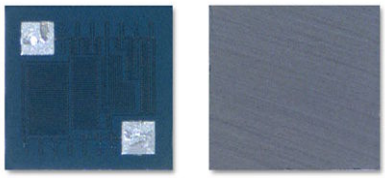
Thin Film Top-Contact Resistor for High Temperature Applications



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

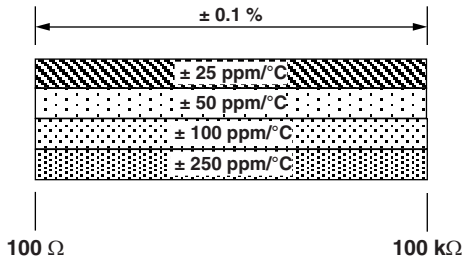
- Qualified to operate at elevated temperatures up to 250 °C
- DC power rating up to 250 mW
- Small Size: 0.02" square
- Case: 0202
- Self passivating tantalum nitride film
- Oxidized silicon substrate
- Wide value range: 100 Ω to 100 kΩ

APPLICATIONS

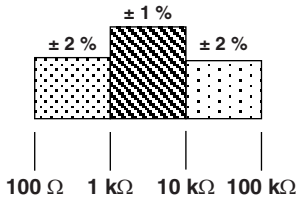
Vishay EFI TSFM top-contact 0.02" square resistor chips are designed to operate at elevated temperatures and power loads in many types of hybrid (chip and wire) assemblies. They are ideally suited for extreme environment applications such as “down hole” drilling.

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

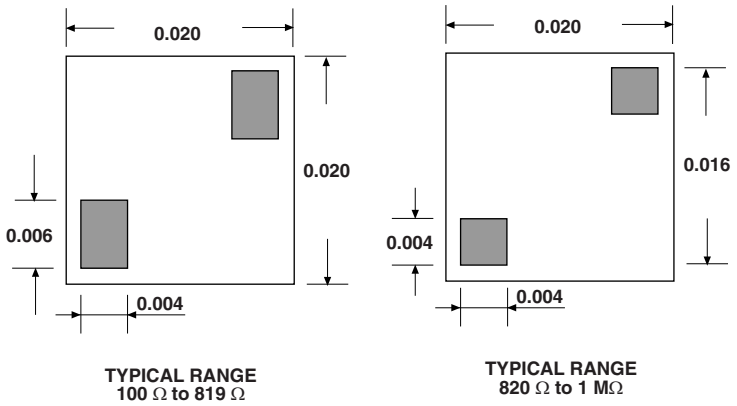


Load Life Stability, 1000 h, +125 °C, 175 mW



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. $\Delta R/R$	%
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. $\Delta R/R$	%
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. $\Delta R/R$	%

CONFIGURATIONS in inches



TYPICAL RANGE
100 Ω to 819 Ω

TYPICAL RANGE
820 Ω to 1 MΩ

SCHEMATIC

MECHANICAL SPECIFICATIONS in inches (millimeters)	
PARAMETER	
Chip Size	0.020 x 0.020 ± 0.003 (0.5 x 0.5 ± 0.076)
Chip Thickness	0.010 ± 0.002 (0.254 ± 0.05)
Chip Substrate Material	Oxidized silicon, 10 kÅ minimum SiO_2
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 µ" Au
Backing	None, lapped silicon (Au optional)

GLOBAL PART NUMBER INFORMATION

Global Part Number: TSFM50000FKGNHWS

Global Part Number Description: TSFM 5K 1 % 100 ppm/°C Au None H WS

T	S	F	M	5	0	0	0	0	F	K	G	N	H	W	S

MODEL	RESISTANCE	RESISTANCE MULTILPLIER CODE	TOL. CODE (%)	TCR (ppm/°C)	TERMINATION	BACK METAL	VISUAL CLASS	PACKAGING CODE
TSFM 20 x 20 size Ta2N on silicon	First 4 digits are significant figures of resistance	**C** = 0.001 **B** = 0.01 **A** = 0.1 **0** = 1 **1** = 10 **2** = 100 **3** = 1000	**B** = 0.1 **C** = 0.25 **D** = 0.5 **F** = 1.0 **G** = 2.0 **H** = 2.5 **J** = 5.0 **K** = 10.0	**E** = ± 25 **C** = ± 50 **K** = ± 100 **M** = ± 250	**G** = Au	**G** = Au **N** = None	**H** = Class H **K** = Class K	**WS** = Waffle pack 100 min., 1 mult

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.

Except as expressly indicated in writing, Vishay products are not designed for use in medical, life-saving, or life-sustaining applications or for any other application in which the failure of the Vishay product could result in personal injury or death. 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.