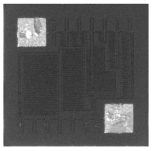
# Thin Film Top-Contact Resistor





Product may not be to scale

The SFM series single-value resistor chips offer a small size, wide ohmic value range and excellent power capacity.
The SFMs tantalum nitride resistor material offers excellent resistance to high moisture environments.
The SFMs are manufactured using Vishay Electro-Films (EFI) sophisticated thin film equipment and manufacturing technology. The SFMs are 100% electrically tested and visually inspected to MIL-STD-883.

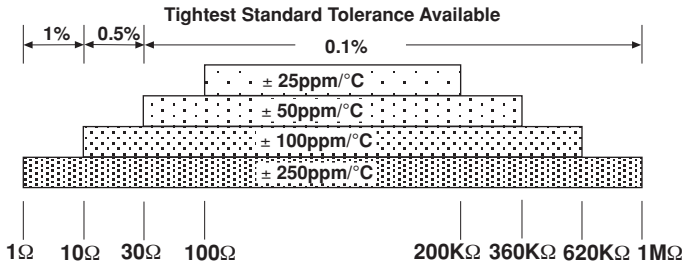
## FEATURES

- Small size: 0.020 inches square
- Resistance range: 1.0Ω to 1MΩ
- DC power rating: 250mW
- Oxidized silicon substrate for good power dissipation
- Resistor material tantalum nitride, self passivating
- Moisture resistant

## APPLICATIONS

Vishay EFI SFM top-contact resistor chips are designed to handle substantial power loads in many types of hybrid packages. They are ideally suited for this purpose because of their small size.

## TEMPERATURE COEFFICIENT OF RESISTANCE, VALUES AND TOLERANCES




| PROCESS CODE | |
|---|---|
| CLASS H* | CLASS K* |
| 050 | 123 |
| 051 | 122 |
| 045 | 121 |
| 040 | 120 |

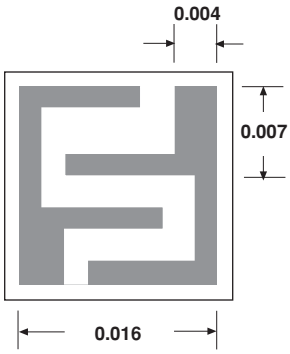
*MIL-PRF-38534 inspection criteria

## STANDARD ELECTRICAL SPECIFICATIONS

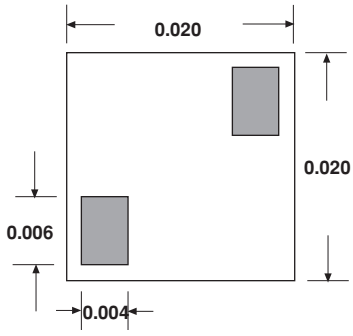
| PARAMETER | |
|---|---|
| Noise, MIL-STD-202, Method 308<br>100Ω - 250kΩ<br>< 100Ω or > 251kΩ | <br>- 35dB typical<br>- 20dB typical |
| Moisture resistance, MIL-STD-202<br>Method 106 | ± 0.5% maximum ΔR/R |
| Stability, 1000 hours, + 125°C, 125mW | ± 0.25% maximum ΔR/R |
| Operating temperature range | - 55°C to + 125°C |
| Thermal shock, MIL-STD-202,<br>Method 107, Test condition F | ± 0.25% maximum ΔR/R |
| High temperature exposure, + 150°C, 100 hours | ± 0.5% maximum ΔR/R |
| Dielectric voltage breakdown | 200V |
| Insulation resistance | $10^{12}$ minimum |
| Operating voltage | 100V maximum |
| DC power rating at + 70°C (derated to zero at + 175°C) | 250mW |
| 5 x rated power short-time overload, + 25°C, 5 seconds | ± 0.25% maximum ΔR/R |

VISHAY ELECTRO-FILMS • FRANCE +33.4.93.37.28.24 FAX: +33.4.93.37.27.31 • GERMANY +49.9287.710 FAX: +49 9287.70435 • ISRAEL +972.3.557.0945 FAX: +972.3.558.9121
• ITALY + 39.2.300.11911 FAX: +39.2.300.11999 • JAPAN +81.3.5464.6411 FAX: +81.3.5464.6433 • SINGAPORE +65.788.6668 FAX: +65.788.0988
• SWEDEN +46.8.594.70590 FAX: +46.8.594.70581 • UK +44 191 514 8237 FAX: +44 1953 457 722 • USA: (401) 738-9150 FAX: (401) 738-4389

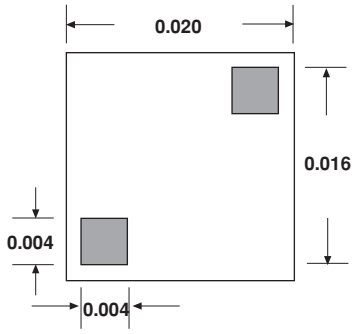
## CONFIGURATIONS in inches




TYPICAL RANGE
1Ω - 29Ω




TYPICAL RANGE
30Ω - 819Ω




TYPICAL RANGE
820Ω - 1MΩ

## SCHEMATIC

## MECHANICAL SPECIFICATIONS in inches

| PARAMETER | |
|---|---|
| Chip size | 0.020 x 0.020 ± 0.003 (0.5 x 0.5 ± 0.076mm) |
| Chip thickness | 0.010 ± 0.002 (0.254 ± 0.05mm) |
| Chip substrate material | Oxidized silicon, 10kÅ minimum $SiO_2$ |
| Resistor material | Tantalum nitride, self-passivating |
| Bonding pad size | 0.004 x 0.004 (0.10 x 0.10mm) |
| Number of pads | 2 |
| Pad material | 25kÅ minimum aluminum |
| Backing | None, lapped semiconductor silicon |

**OPTIONS:** Gold backing for eutectic die attach
Gold bonding pads, 15kÅ minimum thickness
Consult Applications Engineer

## ORDERING INFORMATION

Example: 100% visual, 10KΩ, ± 1%, ± 100ppm/°C TCR, Aluminum Pads, Class H Visual inspection

| **W** | **SFM** | **045** | **1000** | **1** | **F** |
|---|---|---|---|---|---|
| INSPECTION /PACKAGING | PRODUCT FAMILY | PROCESS CODE | RESISTANCE VALUE | MULTIPLIER CODE | TOLERANCE CODE |
| W = 100% visually inspected parts in matrix tray per MIL-STD-883<br>X = Sample , commercial visually inspected parts loaded in matrix trays (4% AQL) | | See Process Code Table | Use first 4 digits of resistance | **D** = 0.0001<br>**C** = 0.001<br>**B** = 0.01<br>**A** = 0.1<br>**0** = 1<br>**1** = 10<br>**2** = 100<br>**3** = 1000<br>**4** = 10000 | **B** = 0.1%<br>**C** = 0.2%<br>**D** = 0.5%<br>**F** = 1.0%<br>**G** = 2.0%<br>**H** = 2.5%<br>**J** = 5.0%<br>**K** = 10% |