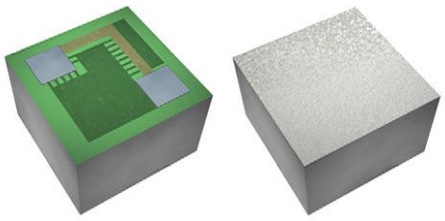
# Thin Film, Top-Contact Miniature Resistor



Product may not be to scale

The MSFM series of single-value precision resistors chips offer a small size, wide ohmic value range and high power rating. The MSFM tantalum nitride resistor material offers excellent resistance to high moisture environments. The MSFMs are manufactured using Vishay Electro-Films (EFI) sophisticated thin-film equipment and manufacturing technology. The MSFMs are 100 % electrically tested and visually inspected to MIL-STD-883, method 2032, class H or K.

## FEATURES

- Wire bondable
- Small size: 0.015" square
- Case: 0101
- Wide value range: 2.5 Ω to 400 kΩ
- DC power rating up to 125 mW
- Self passivating tantalum nitride film
- Oxidized silicon substrate
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

Pb-free

RoHS COMPLIANT

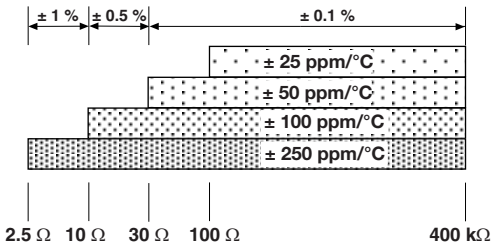
HALOGEN FREE GREEN (5-2008)

## APPLICATIONS

Vishay EFI MSFM top-contact 0.015" square resistor chips are designed for hybrid (chip and wire) assemblies. They are ideally suited for compact designs due to their ultra small form factor.

| TEMPERATURE COEFFICIENT OF RESISTANCE, VALUES, AND TOLERANCES | | |
|---|---|---|
| **PARAMETER** | **VALUE** | **UNIT** |
| Total Resistance Range | 2.5 to 400K | Ω |
| Standard Tolerances | ± 0.1, ± 0.5, ± 1 | % |
| TCR | ± 25, ± 50, ± 100, ± 250 | ppm/°C |

**Tightest Standard Available Tolerance and TCR**




| STANDARD ELECTRICAL SPECIFICATIONS | | |
|---|---|---|
| **PARAMETER** | **VALUE** | **UNIT** |
| Noise, MIL-STD-202, Method 308<br>> 100 Ω<br>< 100 Ω | <br>-35<br>-20 | dB |
| Moisture Resistance, MIL-STD-202 Method 106 | ± 0.5 max. Δ*R*/*R* | % |
| Stability, 1000 h, +70 °C, 125 mW | ± 0.5 max. Δ*R*/*R* | % |
| Operating Temperature Range | -55 to +125 | °C |
| Thermal Shock, MIL-STD-202, Method 107, Test Condition F | ± 0.2 max. Δ*R*/*R* | % |
| High Temperature Exposure, +150 °C, 100 h | ± 0.5 max. Δ*R*/*R* | % |
| Dielectric Voltage Breakdown | 200 | V |
| Insulation Resistanc e | $10^{12}$ min. | Ω |
| Operating Voltage | 100 max. | V |
| DC Power Rating up to +70 °C<br>(Linear derated to zero at +175 °C) | 0.125 | W |
| 5x Rated Power Short-Time Overload, +25 °C, 5 s | ± 0.25 max. Δ*R*/*R* | % |



For technical questions, contact: efi@vishay.com

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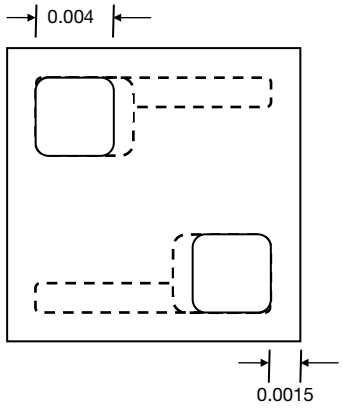
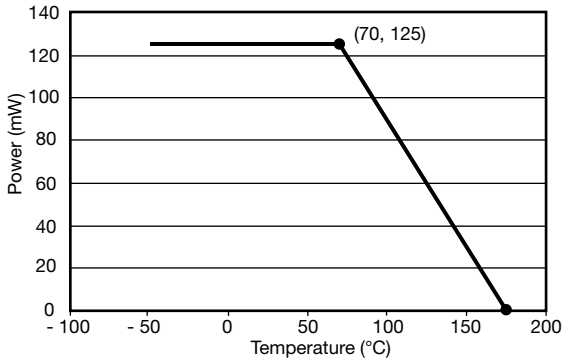
**DIMENSIONS** in inches




| MECHANICAL SPECIFICATIONS | |
|---|---|
| **PARAMETER** | **VALUE** |
| Chip Size | 0.015" x 0.015" ± 0.002" (0.381 mm x 0.381 mm ± 0.05 mm) |
| Chip Thickness | 0.010" ± 0.002" (0.254 mm ± 0.05 mm) |
| Chip Substrate Material | Oxidized silicon, 10 kÅ minimum oxide |
| Resistor Material | Tantalum nitride, self-passivating |
| Bonding Pad Size | 0.004" x 0.004" (0.1 mm x 0.1 mm) |
| Number of Pads | 2 |
| Pad Material | 10 kÅ minimum aluminum (Au optional) |
| Backing | None, lapped silicon |

## POWER DERATING CURVE




## GLOBAL PART NUMBER INFORMATION

**Global Part Number: MSFM10001FKANHWS**

**Global Part Number Description: MSFM 10K 1 %, 100 ppm/°C, Al, no back metal, class H, WS**

| M | S | F | M | 1 | 0 | 0 | 0 | 1 | F | K | A | N | H | W | S |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|

| MODEL | RESISTANCE | RESISTANCE MULTIPLIER CODE | TOLERANCE CODE (%) | TCR (ppm/°C) | TERMINATION | BACK METAL | VISUAL CLASS | PACKAGING CODE |
|---|---|---|---|---|---|---|---|---|
| **MSFM**<br>15 x 15 size Ta2N on silicon | First 4 digits are significant figures of resistance | **C** = 0.001<br>**B** = 0.01<br>**A** = 0.1<br>**0** = 1<br>**1** = 10<br>**2** = 100 | **B** = 0.1<br>**C** = 0.25<br>**D** = 0.5<br>**F** = 1.0<br>**G** = 2.0<br>**H** = 2.5<br>**J** = 5.0<br>**K** = 10.0 | **E** = ± 25<br>**C** = ± 50<br>**K** = ± 100<br>**M** = ± 250 | **G** = Au<br>**A** = Al | **G** = Au<br>**N** = none | **H** = class H<br>**K** = class K | **WS** = waffle pack 100 min., 1 mult |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