

## 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, method 2032 class H or K.

### FEATURES

- Wire bondable
- Small size: 0.020 inches square
- Case: 0202
- Resistance range: 1.0  $\Omega$  to 1 M $\Omega$
- DC power rating: 250 mW
- Oxidized silicon substrate for good power dissipation
- Resistor material: tantalum nitride, self-passivating
- Moisture resistant
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)



**RoHS**  
COMPLIANT  
HALOGEN  
**FREE**  
**GREEN**  
(5-2008)

### 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 |                                             |                   |
|---------------------------------------------------------------|---------------------------------------------|-------------------|
| PARAMETER                                                     | VALUE                                       | UNIT              |
| Total resistance range                                        | 1 to 1M                                     | $\Omega$          |
| Standard tolerances                                           | $\pm 0.1$ , $\pm 0.5$ , $\pm 1$             | %                 |
| TCR                                                           | $\pm 25$ , $\pm 50$ , $\pm 100$ , $\pm 250$ | ppm/ $^{\circ}$ C |



| STANDARD ELECTRICAL SPECIFICATIONS                                                                     |                              |              |
|--------------------------------------------------------------------------------------------------------|------------------------------|--------------|
| PARAMETER                                                                                              | VALUE                        | UNIT         |
| Noise, MIL-STD-202, method 308<br>100 $\Omega$ to 250 k $\Omega$<br>< 100 $\Omega$ or > 251 k $\Omega$ | -35 typ.<br>-20 typ.         | dB           |
| Moisture resistance, MIL-STD-202 method 106                                                            | $\pm 0.5$ max. $\Delta R/R$  | %            |
| Stability, 1000 h, +125 $^{\circ}$ C, 125 mW                                                           | $\pm 0.25$ max. $\Delta R/R$ | %            |
| Operating temperature range                                                                            | -55 to +150                  | $^{\circ}$ C |
| Thermal shock, MIL-STD-202, method 107, test condition F                                               | $\pm 0.25$ max. $\Delta R/R$ | %            |
| High temperature exposure, +150 $^{\circ}$ C, 100 h                                                    | $\pm 0.5$ max. $\Delta R/R$  | %            |
| Dielectric voltage breakdown                                                                           | 200                          | V            |
| Insulation resistance                                                                                  | $10^{12}$ min.               | $\Omega$     |
| Operating voltage                                                                                      | 100 max.                     | V            |
| DC power rating at +70 $^{\circ}$ C (derated to zero at +175 $^{\circ}$ C)                             | 0.250                        | W            |
| 5 x rated power short-time overload, +25 $^{\circ}$ C, 5 s                                             | $\pm 0.25$ max. $\Delta R/R$ | %            |

**CONFIGURATIONS** in inches

**SCHEMATIC**


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

| GLOBAL PART NUMBER INFORMATION                                                         |                                                      |                                                                            |                                                                                      |                                                                   |                  |                    |                            |                                       |   |   |   |   |   |
|----------------------------------------------------------------------------------------|------------------------------------------------------|----------------------------------------------------------------------------|--------------------------------------------------------------------------------------|-------------------------------------------------------------------|------------------|--------------------|----------------------------|---------------------------------------|---|---|---|---|---|
| Global Part Number: SFM50000FKANHWS                                                    |                                                      |                                                                            |                                                                                      |                                                                   |                  |                    |                            |                                       |   |   |   |   |   |
| Global Part Number Description: SFM 5K 1 %, 100 ppm/°C, Al, no back metal, class H, WS |                                                      |                                                                            |                                                                                      |                                                                   |                  |                    |                            |                                       |   |   |   |   |   |
| S                                                                                      | F                                                    | M                                                                          | 5                                                                                    | 0                                                                 | 0                | 0                  | F                          | K                                     | A | N | H | W | S |
| MODEL                                                                                  | RESISTANCE                                           | RESISTANCE MULTIPLIER CODE                                                 | TOLERANCE CODE (%)                                                                   | TCR (ppm/°C)                                                      | TERMINATION      | BACK METAL         | VISUAL CLASS               | PACKAGING CODE                        |   |   |   |   |   |
| SFM                                                                                    | 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<br>3 = 1000 | 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 | E = ± 25<br>C = ± 50<br>K = ± 100<br>M = ± 250<br>R =<br>0 / -250 | G = Au<br>A = Al | G = Au<br>N = none | H = class H<br>K = class K | WS = waffle pack<br>100 min., 1 mult. |   |   |   |   |   |



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