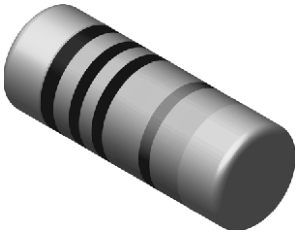
# SMM0207

Vishay Draloric

# Thin Film MELF Resistors



## FEATURES

- MELF resistor with high power rating
- AEC-Q200 qualified
- Advanced thin film technology
- Pure tin termination on nickel barrier, plated on press fit steel caps
- Compliant to RoHS Directive 2002/95/EC

AUTOMOTIVE GRADE

Pb-free

RoHS COMPLIANT

GREEN (5-2008)**

## STANDARD ELECTRICAL SPECIFICATIONS

| MODEL | POWER RATING (1) $P_{70}$ W | LIMITING ELEMENT VOLTAGE DC or $AC_{RMS}$ V | TEMPERATURE COEFFICIENT ppm/K | TOLERANCE % | RESISTANCE RANGE Ω | E-SERIES |
|---|---|---|---|---|---|---|
| SMM0207 | 1.0 | 350 | ± 50 | ± 0.5 | 1R0 to 2M21 | 24; 96 |
| SMM0207 | 1.0 | 350 | ± 50 | ± 1 | 1R0 to 10M | 24; 96 |
| SMM0207 | 1.0 | 350 | ± 100 | ± 5 | R16 to R91 | 24 |
| Zero-Ohm-Resistor: OMM0207 | | $R_{max.}$ = 10 mΩ | $I_{max.}$ = 5 A | | | |

**Note**

(1) Permissible dissipation depends on the maximum temperature at the solder joint, the component placement density and the substrate material.

## TECHNICAL SPECIFICATIONS

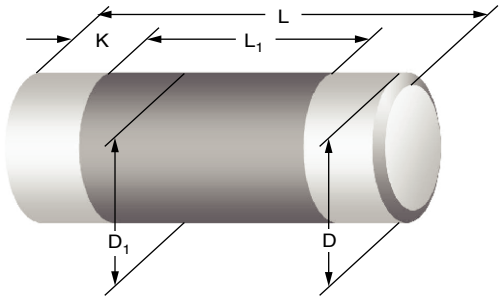
| PARAMETER | UNIT | SMM0207 |
|---|---|---|
| Power rating $P_{70}$ | W | 1 |
| Limiting element voltage, DC or $AC_{RMS}$ | V | 350 |
| Insulation voltage (1 min), DC or $AC_{PEAK}$ | V | 500 |
| Insulation resistance | Ω | ≥ $10^{10}$ |
| Category temperature range | °C | - 55 to + 155 |
| Failure rate: $FIT_{observed}$ | ≤ 0.1 x $10^{-9}$/h | |

**Notes**

- The power dissipation on the resistor generates a temperature rise against the local ambient, depending on the heat flow support of the printed-circuit board (thermal resistance). The rated dissipation applies only if the permitted film temperature of 155 °C is not exceeded.
- The specification of this product is based on a test board, providing a thermal resistance of approximately 85 K/W.
- These resistors do not feature a limited lifetime when operated within the permissible limits. However, resistance value drift increasing over operating time may result in exceeding a limit acceptable to the specific application, thereby establishing a functional lifetime.

** Please see document “Vishay Material Category Policy”: www.vishay.com/doc?99902

## DIMENSIONS

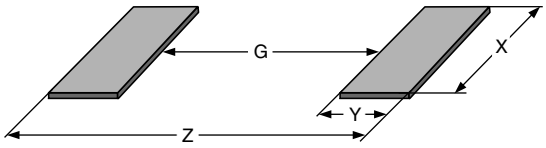



| DIMENSIONS AND MASS | | | | | | |
|---|---|---|---|---|---|---|
| TYPE | L (mm) | $D_{max.}$ (mm) | $L_{1\ min.}$ (mm) | $D_1$ (mm) | K (mm) | MASS (mg) |
| SMM0207<br>OMM0207 | 5.8 + 0/- 0.3 | 2.2 | 2.6 | D + 0/- 0.2 | 1.25 ± 0.2 | 77 |

**Notes**

- Color code marking is applied according to IEC 60062 (1) in five bands. Each color band appears as a single solid line, voids are permissible if at least $^2/_3$ of the band is visible from each radial angle of view. The last color band for tolerance is approximately 50 % wider than the other bands.
- Zero ohm jumper are marked with one centered black band.

## PATTERN STYLES FOR MELF RESISTORS




| RECOMMENDED SOLDER PAD DIMENSIONS | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| TYPE | WAVE SOLDERING | | | | REFLOW SOLDERING | | | |
| | G (mm) | Y (mm) | X (mm) | Z (mm) | G (mm) | Y (mm) | X (mm) | Z (mm) |
| SMM0207<br>OMM0207 | 2.4 | 2.3 | 2.6 | 7.0 | 2.6 | 2.0 | 2.4 | 6.6 |

**Notes**

- The given solder pad dimensions reflect the considerations for board design and assembly as outlined e.g. in standards IEC 61188-5-x, or in publication IPC-7351.
- The specified dissipation of 1 W relies on special support from the printed-circuit board in order to achieve the required heat flow. Specification of a particular conductor size is not feasible since its thermal performance depends on a variety of influences from the actual PCB design and from the application environment.

## PART NUMBER AND PRODUCT DESCRIPTION

**Part Number: SMM02070C5620FBS00**
**Part Number: OMM02070000000BS00**

| S | M | M | 0 | 2 | 0 | 7 | 0 | C | 5 | 6 | 2 | 0 | F | B | S | 0 | 0 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| O | M | M | 0 | 2 | 0 | 7 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | B | S | 0 | 0 |

| MODEL | VERSION | TCR | RESISTANCE | TOLERANCE | PACKAGING |
|---|---|---|---|---|---|
| **SMM0207**<br>**OMM0207** | **0** = Neutral | **C** = ± 50 ppm/K<br>**B** = ± 100 ppm/K<br>**0** = Jumper | **3 digit value**<br>**1 digit multiplier**<br>**0000 =** Jumper<br>MULTIPLIER<br>**7** = $*10^{-3}$ **2** = $*10^{2}$<br>**8** = $*10^{-2}$ **3** = $*10^{3}$<br>**9** = $*10^{-1}$ **4** = $*10^{4}$<br>**0** = $*10^{0}$ **5** = $*10^{5}$<br>**1** = $*10^{1}$ | **D** = ± 0.5 %<br>**F** = ± 1 %<br>**J** = ± 5 %<br>**0** = Jumper | **BP**<br>**BS** |

**Product Description: SMM0207 50 562R 1 % BS**
**Product Description: OMM0207 0R0 BS**

| | | | | |
|---|---|---|---|---|
| **SMM0207** | **50** | **562R** | **1 %** | **BS** |
| **OMM0207** | **-** | **0R0** | **-** | **BS** |
| MODEL | TCR | RESISTANCE | TOLERANCE | PACKAGING |
| **SMM0207**<br>**OMM0207** | ± **50** ppm/K<br>± **100** ppm/K | **100R** = 100 Ω<br>**2M21** = 2.21 MΩ<br>**0R0** = Jumper | ± **0.5** %<br>± **1** %<br>± **5** % | **BP**<br>**BS** |

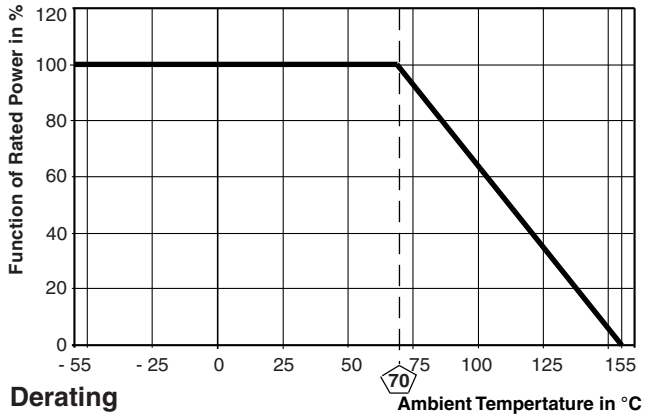
**Note**

- Products can be ordered using either the PART NUMBER or the PRODUCT DESCRIPTION.

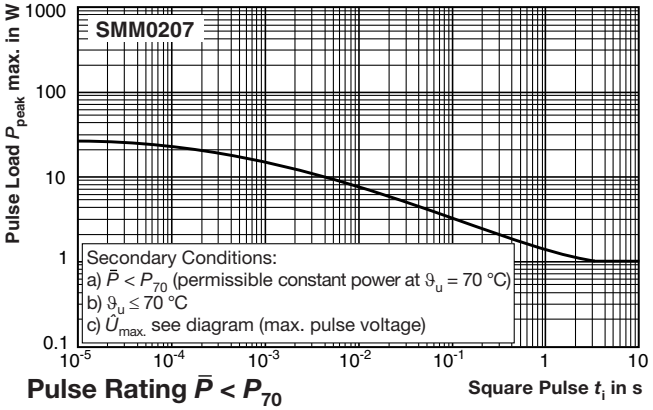
## PACKAGING

| TYPE | CODE | QUANTITY | CARRIER TAPE | WIDTH | PITCH | REEL DIAMETER |
|---|---|---|---|---|---|---|
| SMM0207<br>OMM0207 | BP | 1500 | Blister tape acc. IEC 60286-3 Type II | 12 mm | 4 mm | 180 mm/7" |
| | BS | 7500 | | | | 330 mm/13" |

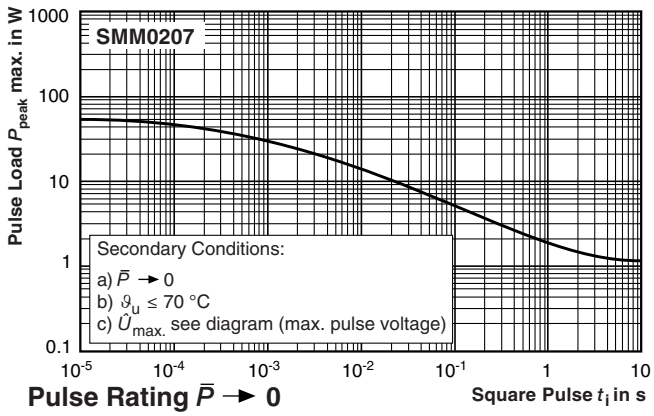
## FUNCTIONAL PERFORMANCE



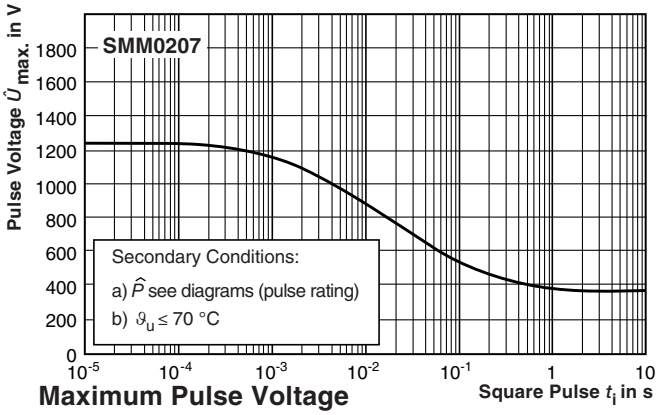

**Derating**



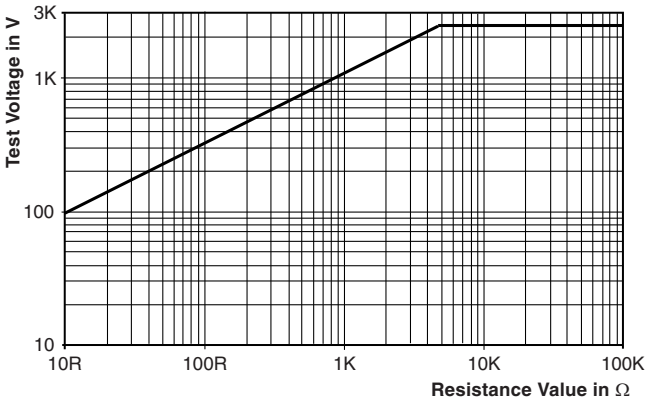

**Pulse Rating $\bar{P} < P_{70}$**



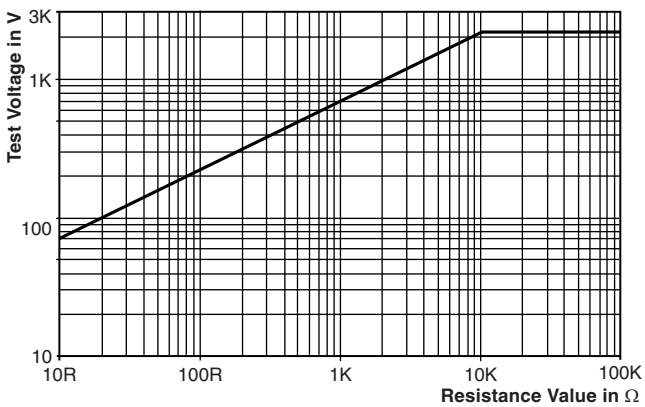

**Pulse Rating $\bar{P} \rightarrow 0$**



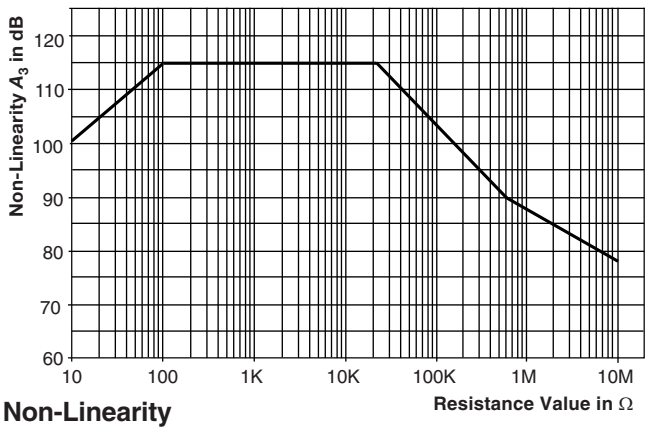

**Maximum Pulse Voltage**



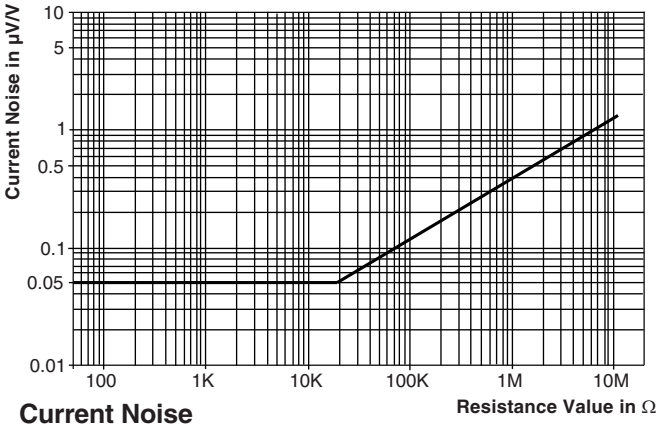

**Single Pulse High Voltage Overload Capability 1.2/50 acc. EN 60115-1, 4.27**




**Single Pulse High Voltage Overload Capability 10/700 acc. EN 60115-1, 4.27**




**Non-Linearity**




**Current Noise**

## TEST PROCEDURES AND REQUIREMENTS

| TEST | CONDITIONS OF TEST | REQUIREMENTS PERMISSIBLE CHANGE ($\Delta R$) | | | |
|---|---|---|---|---|---|
| | | STABILITY CLASS 0.25 | STABILITY CLASS 0.5 | STABILITY CLASS 1 | STABILITY CLASS 2 |
| | | 10 Ω to 1 MΩ | 1 Ω to 10 Ω | < 1 Ω | > 1 MΩ |
| Endurance test at 70 °C<br>IEC 60115-1, 4.25.1 | $U = \sqrt{P_{70} \times R} \leq U_{max.}$;<br>1.5 h "on", 0.5 h "off" | | | | |
| | at 70 °C, 1000 h | ± (0.25 % $R$ + 0.05 Ω) | | | ± (0.5 % $R$ + 0.05 Ω) |
| | at 70 °C, 8000 h | ± (0.5 % $R$ + 0.05 Ω) | | | ± (1.0 % $R$ + 0.05 Ω) |
| Endurance at UCT<br>IEC 60115-1, 4.25.3 | at 125 °C, 1000 h | ± (0.25 % $R$ + 0.05 Ω) | | | ± (0.5 % $R$ + 0.05 Ω) |
| Damp heat steady state<br>40 °C/93 % RH<br>IEC 60115-1, 4.24 and<br>IEC 60068-2-78 | 56 days;<br>$U = 0.1 \times \sqrt{P_{70} \times R}$;<br>$U_{max.}$ = 20 V | ± (0.25 % $R$ + 0.05 Ω) | ± (0.5 % $R$ + 0.05 Ω) | | |
| Damp heat steady state<br>accelerated 85 °C/85 % RH | 1000 h;<br>$U = 0.3 \times \sqrt{P_{70} \times R}$;<br>$U_{max.}$ = 40 V | ± (1.0 % $R$ + 0.05 Ω) | | | ± (2.0 % $R$ + 0.05 Ω) |
| Rapid change of temperature;<br>1000 cycles<br>IEC 60115-1, 4.19 and<br>IEC 60068-2-14 | 30 min at LCT;<br>30 min at UCT;<br>LCT = - 55 °C;<br>UCT = 125 °C | ± (0.25 % $R$ + 0.05 Ω) | | | |
| Overload test<br>IEC 60115-1, 4.13 | $U = 2.5 \times \sqrt{P_{70} \times R} \leq 2 \times U_{max.}$;<br>5 s | ± (0.05 % + 0.01 Ω/$R$) | | | ± (0.1 % $R$ + 0.05 Ω) |
| Electrostatic discharge (HBM)<br>IEC 60340-3-1 | 3 positive + 3 negative<br>discharges 4 kV | ± (0.5 % $R$ + 0.05 Ω) | | | |
| Resistance to soldering heat<br>IEC 60115-1, 4.18.2 and<br>IEC 60068-2-58 | Solder bath method<br>(260 ± 5) °C;<br>10 s | ± (0.05 % $R$ + 0.01 Ω) | ± (0.1 % $R$ + 0.05 Ω) | | |

## APPLICABLE SPECIFICATIONS

| | |
|---|---|
| • EN 60115-1 | Generic specification |
| • EN 140400 | Sectional specification |
| • EN 140401-803 | Detail specification |
| • IEC 60068-2-x | Variety of environmental test procedures |
| • IEC 60286-3 | Packaging of SMD components |

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