Power Metal Strip® Resistors, High Power (7 W), Low Value (Down to 0.001 Ω), Surface Mount

FEATURES
- Improved thermal management incorporated into design
- All welded construction of the Power Metal Strip resistors are ideal for all types of current sensing, voltage division, and pulse applications
- Proprietary processing technique produces extremely low resistance values
- Sulfur resistance by construction that is unaffected by high sulfur environments
- Very low inductance (< 5 nH)
- Solid metal nickel-chrome or manganese-copper alloy resistive element with low TCR (< 20 ppm/°C)
- Low thermal EMF (< 3 μV/°C)
- AEC-Q200 qualified (1)

LINKS TO ADDITIONAL RESOURCES
- 3D Models
- Design Tools
- Videos

STANDARD ELECTRICAL SPECIFICATIONS

<table>
<thead>
<tr>
<th>GLOBAL MODEL</th>
<th>SIZE</th>
<th>POWER RATING $P_{70\ °C}$ W</th>
<th>RESISTANCE VALUE RANGE $\Omega$</th>
<th>WEIGHT (typical) g/1000 pieces</th>
</tr>
</thead>
<tbody>
<tr>
<td>WSHM2818</td>
<td>2818</td>
<td>7 (1)</td>
<td>TOL. ± 0.5 %</td>
<td>0.010 to 0.1</td>
</tr>
<tr>
<td>WSHM2818</td>
<td>2818</td>
<td>6</td>
<td>TOL ± 1.0 %</td>
<td>0.001 to 0.1</td>
</tr>
</tbody>
</table>

Note
(1) The WSHM2818 is rated at 7 W with maximum surface temperature of 180 °C

GLOBAL PART NUMBER INFORMATION

Global Part Numbering: WSHM2818R1000FEA (visit www.vishay.net Vishay Dale parts numbering manual for all options)

<table>
<thead>
<tr>
<th>W</th>
<th>S</th>
<th>H</th>
<th>M</th>
<th>2</th>
<th>8</th>
<th>1</th>
<th>8</th>
<th>R</th>
<th>1</th>
<th>0</th>
<th>0</th>
<th>0</th>
<th>F</th>
<th>E</th>
<th>A</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</tr>
</tbody>
</table>

GLOBAL MODEL
WSHM2818

RESISTANCE VALUE
$L = m\Omega^*$
$R = \text{decimal}$
$4L000 = 0.004 \Omega$
$R0100 = 0.01 \Omega$
* Use "L" for resistance values < 0.01 Ω

TOLERANCE CODE
$D = \pm 0.5 \%$
$F = \pm 1.0 \%$

PACKAGING CODE (1)
$EA = \text{lead (Pb)-free, tape / reel}$
$EK = \text{lead (Pb)-free, bulk}$

SPECIAL
(dash number)
(up to 2 digits)
from 1 to 99 as applicable

PATENT(S): www.vishay.com/patents
This Vishay product is protected by one or more United States and international patents.

Notes
- SMD Power Metal Strip Marking (www.vishay.com/doc?730327)
(1) Packaging code: EB (lead (Pb)-free) and TB (tin / lead) are non-standard packaging codes designating 1000 piece reels. These non-standard packaging codes are identical to our standard EA (lead (Pb)-free) and TA (tin / lead), except that they have a package quantity of 1000 pieces
WSHM2818
Vishay Dale

**TECHNICAL SPECIFICATIONS**

<table>
<thead>
<tr>
<th>PARAMETER</th>
<th>UNIT</th>
<th>RESISTOR CHARACTERISTICS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Component temperature coefficient (including terminal)</td>
<td>ppm/°C</td>
<td>± 200 for 1 mΩ to 5.99 mΩ</td>
</tr>
<tr>
<td></td>
<td></td>
<td>± 75 for 6 mΩ to 200 mΩ</td>
</tr>
<tr>
<td>Element TCR</td>
<td>ppm/°C</td>
<td>&lt; 20</td>
</tr>
<tr>
<td>Inductance</td>
<td>nH</td>
<td>&lt; 5</td>
</tr>
<tr>
<td>Operating temperature range</td>
<td>°C</td>
<td>-65 to +170</td>
</tr>
<tr>
<td>Maximum working voltage</td>
<td>V</td>
<td>((P \times R)^{1/2})</td>
</tr>
</tbody>
</table>

**Notes**

(1) Component TCR - total TCR that includes the TCR effects of the resistor element and the copper terminal
(2) Element TCR - only applies to the alloy used for the resistor element; refer to item 1 in the construction illustration on the following page
(3) Maximum working voltage - the WSHM is not voltage sensitive, but is limited by power / energy dissipation and is also not ESD sensitive

**DIMENSIONS** in inches (millimeters)

![Dimensions Diagram]

**Notes**

- 3D models available: [www.vishay.com/doc?730324](http://www.vishay.com/doc?730324)
- Surface mount solder profile recommendations: [www.vishay.com/doc?731052](http://www.vishay.com/doc?731052)

<table>
<thead>
<tr>
<th>MODEL</th>
<th>RESISTANCE RANGE</th>
<th>DIMENSIONS</th>
<th>SOLDER PAD DIMENSIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Ω</td>
<td>L (in)</td>
<td>W (in)</td>
</tr>
<tr>
<td>WSHM2818</td>
<td>0.001 to 0.2</td>
<td>0.280 ± 0.010 (7.1 ± 0.25)</td>
<td>0.180 ± 0.010 (4.6 ± 0.25)</td>
</tr>
</tbody>
</table>

**TYPICAL SENSING LAYOUT**

![Typical Sensing Layout]

**SENSING WITH VIA LAYOUT** (best performance)

![Sensing with VIA Layout]

**Notes**

- Sensing locations are based on the construction of the part; terminals are wrapped from the outside to underneath. These options place the sensing location nearest the temperature stable resistance element, which minimizes contact resistance and optimizes TCR

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For technical questions, contact: ww2bresistors@vishay.com

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DERATING

PULSE CAPABILITY

PERFORMANCE

<table>
<thead>
<tr>
<th>TEST</th>
<th>CONDITIONS OF TEST</th>
<th>TEST LIMITS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thermal shock</td>
<td>-55 °C to +150 °C, 1000 cycles, 15 min at each extreme</td>
<td>± 0.5 %</td>
</tr>
<tr>
<td>Short time overload</td>
<td>4x rated power for 5 s</td>
<td>± 1.0 %</td>
</tr>
<tr>
<td>Low temperature operation</td>
<td>-65 °C for 24 h</td>
<td>± 0.5 %</td>
</tr>
<tr>
<td>High temperature exposure</td>
<td>1000 h at +170 °C</td>
<td>± 1.0 %</td>
</tr>
<tr>
<td>Bias humidity</td>
<td>+85 °C, 85 % RH, 10 % bias, 1000 h</td>
<td>± 0.5 %</td>
</tr>
<tr>
<td>Mechanical shock</td>
<td>100 g’s for 6 ms, 5 pulses</td>
<td>± 0.5 %</td>
</tr>
<tr>
<td>Vibration</td>
<td>Frequency varied 10 Hz to 2000 Hz in 1 min, 3 directions, 12 h</td>
<td>± 0.5 %</td>
</tr>
<tr>
<td>Load life</td>
<td>1000 h at 70 °C, 1.5 h “ON”, 0.5 h “OFF”</td>
<td>± 1.0 %</td>
</tr>
<tr>
<td>Resistance to solder heat</td>
<td>+260 °C solder, 10 s to 12 s dwell, 25 mm/s emergence</td>
<td>± 0.5 %</td>
</tr>
<tr>
<td>Moisture resistance</td>
<td>MIL-STD-202, method 106, 0 % power, 7b not required</td>
<td>± 0.5 %</td>
</tr>
</tbody>
</table>

PACKAGING

<table>
<thead>
<tr>
<th>MODEL</th>
<th>TAPE WIDTH</th>
<th>DIAMETER</th>
<th>PIECES/REEL</th>
<th>CODE</th>
</tr>
</thead>
<tbody>
<tr>
<td>WSHM2818</td>
<td>16 mm/embossed plastic</td>
<td>330 mm / 13*</td>
<td>3500</td>
<td>EA</td>
</tr>
</tbody>
</table>

Notes
- Embossed carrier tape per EIA-481
- Additional packaging details at www.vishay.com/doc?20051

ADDITIONAL RESOURCES

Video: Power Metal Strip Short Time Overload
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