# 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)
- PATENT(S): www.vishay.com/patents
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

AUTOMOTIVE GRADE

Pb-free

e3

RoHS COMPLIANT

HALOGEN FREE GREEN (5-2008)

## LINKS TO ADDITIONAL RESOURCES

3D Models | Design Tools | Videos

**Notes**

- Follow link to Overview of Automotive Grade Products for more details: www.vishay.com/doc?49924

(1) Flame retardance test may not be applicable to some resistor technologies

## STANDARD ELECTRICAL SPECIFICATIONS

| GLOBAL MODEL | SIZE | POWER RATING $P_{70\ °C}$ W | RESISTANCE VALUE RANGE Ω | | WEIGHT (typical) g/1000 pieces |
|---|---|---|---|---|---|
| | | | TOL. ± 0.5 % | TOL ± 1.0 % | |
| WSHM2818 | 2818 | 7 (1) | 0.010 to 0.1 | 0.001 to 0.1 | 167.8 |
| WSHM2818 | 2818 | 6 | 0.101 to 0.2 | 0.101 to 0.2 | 167.8 |

**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)

| W | S | H | M | 2 | 8 | 1 | 8 | R | 1 | 0 | 0 | 0 | F | E | A | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|

| GLOBAL MODEL | RESISTANCE VALUE | TOLERANCE CODE | PACKAGING CODE (1) | SPECIAL |
|---|---|---|---|---|
| **WSHM2818** | **L** = mΩ* <br> **R** = decimal <br> **4L000** = 0.004 Ω <br> **R0100** = 0.01 Ω <br><br> * Use "**L**" for resistance values < 0.01 Ω | **D** = ± 0.5 % <br> **F** = ± 1.0 % | **EA** = lead (Pb)-free, tape / reel <br> **EK** = lead (Pb)-free, bulk | (dash number) (up to 2 digits) from **1** to **99** as applicable |

**Notes**

- SMD Power Metal Strip Marking (www.vishay.com/doc?30327)

(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

**PATENT(S): www.vishay.com/patents**

**This Vishay product is protected by one or more United States and international patents.**



For technical questions, contact: ww2bresistors@vishay.com

| TECHNICAL SPECIFICATIONS | | |
|---|---|---|
| **PARAMETER** | **UNIT** | **RESISTOR CHARACTERISTICS** |
| Component temperature coefficient (including terminal) (1) | ppm/°C | ± 200 for 1 mΩ to 5.99 mΩ |
| | | ± 75 for 6 mΩ to 200 mΩ |
| Element TCR (2) | ppm/°C | < 20 |
| Inductance | nH | < 5 |
| Operating temperature range | °C | -65 to +170 |
| Maximum working voltage (3) | V | $(P \times R)^{1/2}$ |

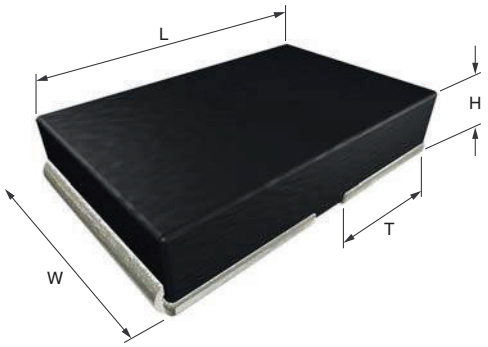
**Notes**

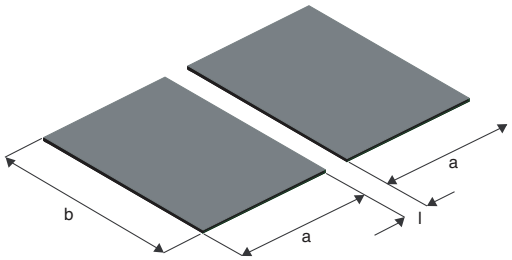
(1) Component TCR - total TCR that includes the TCR effects of the resistor element and the copper terminal

(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)



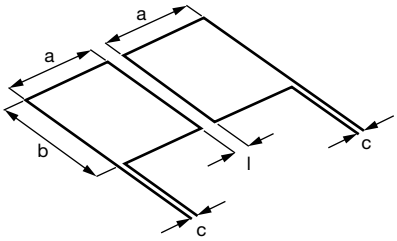




**Notes**

- 3D models available: www.vishay.com/doc?30324
- Surface mount solder profile recommendations: www.vishay.com/doc?31052

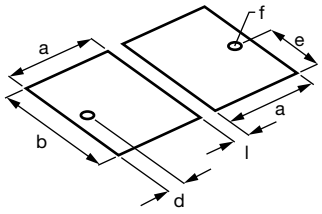
| MODEL | RESISTANCE RANGE Ω | DIMENSIONS | | | | SOLDER PAD DIMENSIONS | | |
|---|---|---|---|---|---|---|---|---|
| | | L | W | H | T | a | b | l |
| WSHM2818 | 0.001 to 0.2 | 0.280 ± 0.010 (7.1 ± 0.25) | 0.180 ± 0.010 (4.6 ± 0.25) | 0.059 ± 0.010 (1.50 ± 0.25) | 0.125 ± 0.010 (3.18 ± 0.25) | 0.138 (3.5) | 0.200 (5.1) | 0.024 (0.61) |

## **TYPICAL SENSING LAYOUT**




| a | b | c | l |
|---|---|---|---|
| 0.138 (3.51) | 0.210 (5.33) | 0.020 (0.51) | 0.024 (0.61) |

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

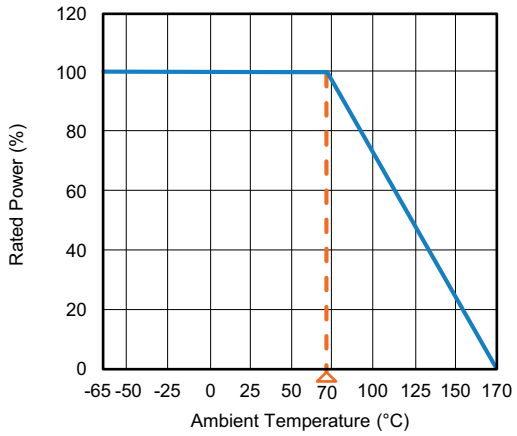



| a | b | d | e | f | l |
|---|---|---|---|---|---|
| 0.143 (3.63) | 0.210 (5.33) | 0.026 (0.66) | 0.105 (2.67) | Ø 0.020 (0.50) | 0.024 (0.61) |

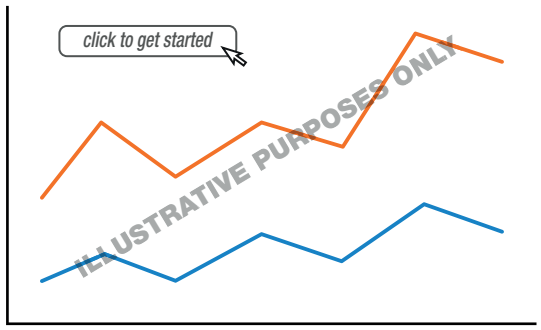
**Note**

- 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

## DERATING




## PULSE CAPABILITY




www.vishay.com/resistors/power-metal-strip-calculator

## PERFORMANCE

| TEST | CONDITIONS OF TEST | TEST LIMITS |
|---|---|---|
| Thermal shock | -55 °C to +150 °C, 2000 cycles, 15 min at each extreme | ± 0.5 % |
| Short time overload | Refer to link for short time overload performance and pulse capability; www.vishay.com/resistors/power-metal-strip-calculator/ | ± 1.0 % |
| Low temperature operation | -65 °C for 24 h | ± 0.5 % |
| High temperature exposure | 2000 h at +170 °C | ± 1.0 % |
| Bias humidity | +85 °C, 85 % RH, 10 % bias, 1000 h | ± 0.5 % |
| Mechanical shock | 100 *g*'s for 6 ms, 5 pulses | ± 0.5 % |
| Vibration | Frequency varied 10 Hz to 2000 Hz in 1 min, 3 directions, 12 h | ± 0.5 % |
| Load life | 2000 h at 70 °C, 1.5 h "ON", 0.5 h "OFF" | ± 1.0 % |
| Resistance to solder heat | +260 °C solder, 10 s to 12 s dwell, 25 mm/s emergence | ± 0.5 % |
| Moisture resistance | MIL-STD-202, method 106, 0 % power, 7b not required | ± 0.5 % |

## PACKAGING

| MODEL | REEL | | | |
|---|---|---|---|---|
| | TAPE WIDTH | DIAMETER | PIECES/REEL | CODE |
| WSHM2818 | 16 mm/embossed plastic | 330 mm / 13" | 3500 | EA |

**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 | www.vishay.com/videos/resistors/power-metal-strip174-resistor-short-time-overload-product-demo |

# Disclaimer

ALL PRODUCT, PRODUCT SPECIFICATIONS AND DATA ARE SUBJECT TO CHANGE WITHOUT NOTICE TO IMPROVE RELIABILITY, FUNCTION OR DESIGN OR OTHERWISE.

Vishay Intertechnology, Inc., its affiliates, agents, and employees, and all persons acting on its or their behalf (collectively, “Vishay”), disclaim any and all liability for any errors, inaccuracies or incompleteness contained in any datasheet or in any other disclosure relating to any product.

Vishay makes no warranty, representation or guarantee regarding the suitability of the products for any particular purpose or the continuing production of any product. To the maximum extent permitted by applicable law, Vishay disclaims (i) any and all liability arising out of the application or use of any product, (ii) any and all liability, including without limitation special, consequential or incidental damages, and (iii) any and all implied warranties, including warranties of fitness for particular purpose, non-infringement and merchantability.

Statements regarding the suitability of products for certain types of applications are based on Vishay’s knowledge of typical requirements that are often placed on Vishay products in generic applications. Such statements are not binding statements about the suitability of products for a particular application. It is the customer’s responsibility to validate that a particular product with the properties described in the product specification is suitable for use in a particular application. Parameters provided in datasheets and / or specifications may vary in different applications and performance may vary over time. All operating parameters, including typical parameters, must be validated for each customer application by the customer’s technical experts. Product specifications do not expand or otherwise modify Vishay’s terms and conditions of purchase, including but not limited to the warranty expressed therein.

Except as expressly indicated in writing, Vishay products are not designed for use in medical, life-saving, or life-sustaining applications or for any other application in which the failure of the Vishay product could result in personal injury or death. Customers using or selling Vishay products not expressly indicated for use in such applications do so at their own risk. Please contact authorized Vishay personnel to obtain written terms and conditions regarding products designed for such applications.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted by this document or by any conduct of Vishay. Product names and markings noted herein may be trademarks of their respective owners.

# X-ON Electronics

Largest Supplier of Electrical and Electronic Components

***Click to view similar products for*** Current Sense Resistors - SMD ***category:***

***Click to view products by*** Vishay ***manufacturer:***

Other Similar products are found below :

CRL0603-FW-R700ELF 65709-330JE PF2512FKF7W0R007L PR2512FKF7W0R003L PR2512FKF7W0R005L PF2512FKF7W0R006L PF2512FKF7W0R033L CD2015FC-0.10-1% PR2512FKF7W0R004L RC1005F124CS RL73K3AR56JTDF RL7520WT-R001-F RL7520WT-R009-G RL7520WT-R020-F RLP73N1ER43JTD LRC-LR2512LF-01-R820J WR06X104JGLJ TL2BR01F 65709-330 SP1R12J RL7520WT-R039-G PF1206FRF7W0R02L RL7520WT-R002-F RL7520WT-R047-F KRL1632E-C-R200-F-T5 KRL1632E-C-R200-F-T1 Y14880R02000B9R RLP73M1ER051FTDF RLP73M2AR051FTDF RLP73M2AR075FTDF RLP73K2A1R0FTDF RLP73M1JR051FTDF RLP73N1JR47FTDF SR731ERTTP5R10F SR731ERTTP100J SR731ERTTP6R80F SR731ERTTP4R70F SR731ERTTP2R20F SR731ERTTP3R90F SR731ERTTP1R00F SR731ERTTP10R0F SR731ERTTP2R00F SR731ERTTP8R20F SR731ERTTP3R9J SR731ERTTP8R2J SR731ERTTP2R0J SR731ERTTP4R7J SR731ERTTP9R1J SR731ERTTP1R0J SR731ERTTP2R2J