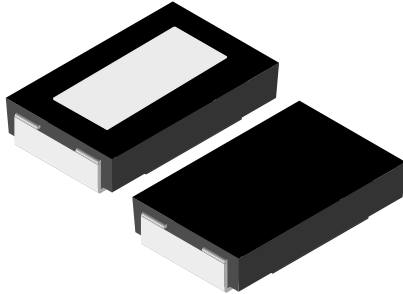




**THE DATASHEET OF  
WSR58L000FEA**



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



### LINKS TO ADDITIONAL RESOURCES



3D Models



Design Tools



Calculators

### FEATURES

- Molded high temperature encapsulation
- 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 (down to 0.001 Ω)
- Sulfur resistance by construction that is unaffected by high sulfur environments
- Solid metal nickel-chrome or manganese-copper alloy resistive element with low TCR (< 20 ppm/°C)
- Very low inductance 0.5 nH to 5 nH
- Low thermal EMF (< 3 μV/°C)
- Integral heat sink not utilized for resistance values less than 0.0075 Ω
- AEC-Q200 qualified <sup>(1)</sup>
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)

AUTOMOTIVE GRADE



RoHS\* Available

HALOGEN FREE Available

GREEN (5-2008) Available

### Notes

- \* This datasheet provides information about parts that are RoHS-compliant and/or parts that are non-RoHS-compliant. For example, parts with lead (Pb) terminations are not RoHS-compliant. Please see the information/tables in this datasheet for details
- <sup>(1)</sup> Flame retardance test may not be applicable to some resistor technologies

### STANDARD ELECTRICAL SPECIFICATIONS

| GLOBAL MODEL | SIZE | POWER RATING<br>$P_{70\text{ }^\circ\text{C}}$<br>W | RESISTANCE VALUE RANGE<br>Ω |              | WEIGHT<br>(typical)<br>g/1000 pieces |
|--------------|------|---|-----------------------------|--------------|--------------------------------------|
|              |      |   | TOL. ± 0.5 %                | TOL. ± 1.0 % |                                      |
| WSR5         | 4527 | 5.0 <sup>(1)</sup>                                  | 0.01 to 0.3                 | 0.001 to 0.3 | 476                                  |

### Notes

- Qualified to AEC-Q200 rev. D
- Part marking: DALE, model, value, tolerance, date code
- <sup>(1)</sup> The WSR5 is rated at 5 W with terminal temperature maintained ≤ 120 °C

### GLOBAL PART NUMBER INFORMATION

Global Part Numbering Example: **WSR5R0100FEA** (preferred part numbering format)  
(visit [www.vishay.net](http://www.vishay.net) Vishay Dale parts numbering manual for all options)

W S R 5 R 0 1 0 0 F E A

GLOBAL MODEL  
**WSR5**

RESISTANCE VALUE <sup>(1)</sup>  
L = mΩ\*  
R = decimal  
**5L000** = 0.005 Ω  
**R0100** = 0.01 Ω  
\* use "L" for resistance values < 0.01 Ω

TOLERANCE CODE  
D = ± 0.5 %  
F = ± 1.0 %  
J = ± 5.0 %

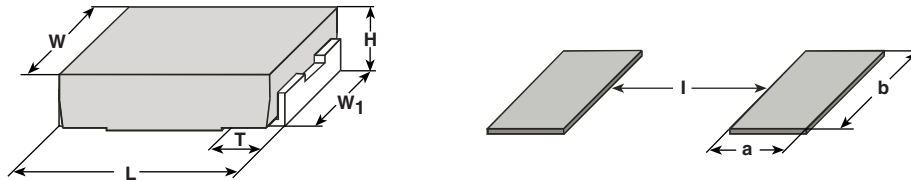
PACKAGING CODE <sup>(2)</sup>  
EA = lead (Pb)-free, tape / reel  
EK = lead (Pb)-free, bulk  
TA = tin / lead, tape / reel (R86)  
BA = tin / lead, bulk (B43)

SPECIAL <sup>(3)</sup>  
(dash number)  
(up to 2 digits)  
from **1** to **99** as applicable

### Notes

- <sup>(1)</sup> WSR marking ([www.vishay.com/doc?30327](http://www.vishay.com/doc?30327))
- <sup>(2)</sup> 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
- <sup>(3)</sup> Follow link for customization capabilities: [www.vishay.com/doc?48163](http://www.vishay.com/doc?48163)

| TECHNICAL SPECIFICATIONS                                |                 |                               |
|---|-----------------|-------------------------------|
| PARAMETER   | UNIT            | WSR5 RESISTOR CHARACTERISTICS |
| Temperature coefficient measured from -55 °C to +150 °C | ppm/°C          | ± 75 for 0.01 Ω to 0.3 Ω      |
|   |                 | ± 110 for 0.005 Ω to 0.0099 Ω |
|   |                 | ± 300 for 0.004 Ω to 0.0049 Ω |
|   |                 | ± 450 for 0.003 Ω to 0.0039 Ω |
|   |                 | ± 600 for 0.002 Ω to 0.0029 Ω |
| ± 750 for 0.001 Ω to 0.0019 Ω                           |                 |                               |
| Element TCR   | ppm/°C          | < 20                          |
| Dielectric withstanding voltage                         | V <sub>AC</sub> | > 500                         |
| Insulation resistance                                   | Ω               | > 10 <sup>9</sup>             |
| Operating temperature range                             | °C              | -65 to +275                   |
| Maximum working voltage                                 | V               | (P × R) <sup>1/2</sup>        |

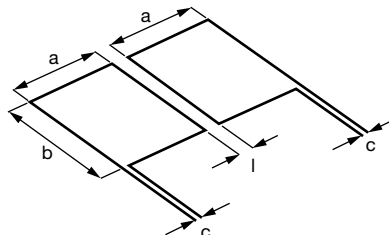
**DIMENSIONS** in inches (millimeters)

**Notes**

- 3D models available: [www.vishay.com/doc?30342](http://www.vishay.com/doc?30342)
- Surface mount solder profile recommendations: [www.vishay.com/doc?31052](http://www.vishay.com/doc?31052)

| MODEL | DIMENSIONS                       |                                 |                                 |                                 |                                 | SOLDER PAD DIMENSIONS |                 |                 |
|-------|----------------------------------|---------------------------------|---------------------------------|---------------------------------|---------------------------------|-----------------------|-----------------|-----------------|
|       | L                                | H                               | T                               | W                               | W <sub>1</sub>                  | a                     | b               | l               |
| WSR5  | 0.455 ± 0.032<br>(11.56 ± 0.813) | 0.095 ± 0.005<br>(2.41 ± 0.127) | 0.100 ± 0.010<br>(2.54 ± 0.254) | 0.275 ± 0.005<br>(6.98 ± 0.127) | 0.215 ± 0.005<br>(5.46 ± 0.127) | 0.155<br>(3.94)       | 0.230<br>(5.84) | 0.205<br>(5.21) |

**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

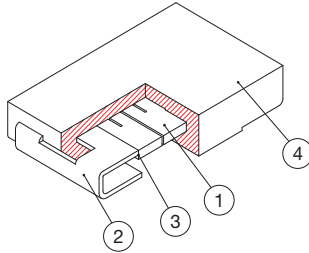
**TYPICAL SENSING LAYOUT**


| a               | b               | c               | l               |
|-----------------|-----------------|-----------------|-----------------|
| 0.155<br>(3.94) | 0.230<br>(5.84) | 0.020<br>(0.51) | 0.205<br>(5.21) |

## CONSTRUCTION

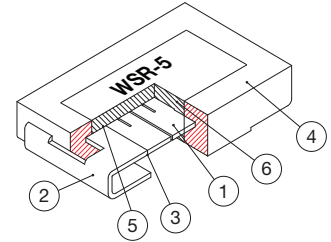
### All Resistance Values

- ① Resistive element
- ② Plated copper terminal
- ③ Terminal / element weld
- ④ High temperature LCP mold compound

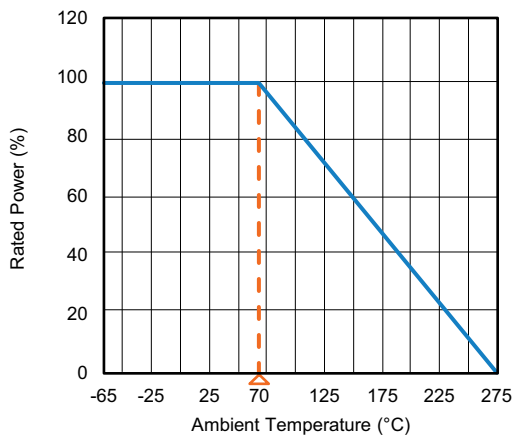


### ≥ 0.0075 W Includes Heat Spreader

- ⑤ Thermally conductive adhesive
- ⑥ Heat spreader



## DERATING



## PULSE CAPABILITY



[www.vishay.com/en/resistors/joulewizard/](http://www.vishay.com/en/resistors/joulewizard/)

| PERFORMANCES              |  |             |
|---------------------------|--|-------------|
| TEST                      | CONDITIONS OF TEST   | TEST LIMITS |
| Thermal shock             | -55 °C to +150 °C, 1000 cycles, 15 min at each extreme         | ± 0.5 %     |
| Short time overload       | 3 x rated power for 5 s  | ± 2.0 %     |
| Low temperature storage   | -65 °C for 24 h  | ± 0.5 %     |
| High temperature exposure | 1000 h at + 275 °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                 | 1000 h at 70 °C  | ± 2.0 %     |
| Resistance to solder heat | 260 ± 3 °C 10 s to 12 s dwell, 25 mm/s emergence               | ± 0.5 %     |
| Moisture resistance       | MIL-STD-202, method 106, 0 % power, 7a and 7b not required     | ± 0.5 %     |



| PACKAGING (1) |                          |              |             |      |
|---------------|--------------------------|--------------|-------------|------|
| MODEL         | REEL                     |              |             |      |
|               | TAPE WIDTH               | DIAMETER     | PIECES/REEL | CODE |
| WSR5          | 24 mm / embossed plastic | 330 mm / 13" | 1500        | EA   |

Notes

- Embossed carrier tape per EIA-481
- (1) Additional packaging details at [www.vishay.com/doc?20051](http://www.vishay.com/doc?20051)

| LINKS TO RELATED DOCUMENTS                                |  |
|---|--|
| <b>SELECTOR GUIDE</b>                                     |  |
| Overview of Automotive Grade Products                     | <a href="http://www.vishay.com/doc?49924">www.vishay.com/doc?49924</a> |
| <b>TECHNICAL NOTES</b>                                    |  |
| SMD Current Sense: AEC-Q200 vs. Vishay Qualification      | <a href="http://www.vishay.com/doc?30416">www.vishay.com/doc?30416</a> |
| MIL-PRF vs. AEC-Q200: Do You Know What You Are Getting?   | <a href="http://www.vishay.com/doc?11000">www.vishay.com/doc?11000</a> |
| <b>WHITE PAPER</b>  |  |
| Thermal Management for Surface-Mount Devices              | <a href="http://www.vishay.com/doc?30380">www.vishay.com/doc?30380</a> |
| Temperature Coefficient of Resistance for Current Sensing | <a href="http://www.vishay.com/doc?30405">www.vishay.com/doc?30405</a> |



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