

# Wirewound Resistors, Precision Power, Surface Mount



## FEATURES

- All welded construction
- Molded encapsulation
- Wraparound terminations
- Excellent stability at different environmental conditions
- High power ratings (up to 3 W)
- Superior surge capability
- Available in non-inductive styles with Ayrton-Perry winding (WSN in lieu of WSC, maximum resistance is one-half WSC range)
- AEC-Q200 qualified available <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

### Note

- <sup>(1)</sup> Flame retardance test may not be applicable to some resistor technologies.

| STANDARD ELECTRICAL SPECIFICATIONS |                  |      |                                       |                           |                    |                                |                              |
|------------------------------------|------------------|------|---------------------------------------|---------------------------|--------------------|--------------------------------|------------------------------|
| GLOBAL MODEL                       | HISTORICAL MODEL | SIZE | POWER RATING $P_{70^\circ\text{C}}$ W | RESISTANCE RANGE $\Omega$ | TOLERANCE $\pm \%$ | WEIGHT (typical) g/1000 pieces | ENCAPSULATION                |
| WSC01/2                            | WSC-1/2          | 2012 | 0.5                                   | 0.1 to 4.99               | 0.5, 1, 5          | 90                             | Epoxy                        |
| WSC0001 <sup>(3)</sup>             | WSC-1            | 2515 | 1                                     | 0.1 to 2.77K              | 0.5, 1, 5          | 165                            | Thermoplastic <sup>(2)</sup> |
| WSC2515                            | WSC2515          | 2515 | 1                                     | 0.1 to 2.5K               | 0.5, 1, 5          | 165                            | Thermoplastic                |
| WSC0002                            | WSC-2            | 4527 | 2                                     | 0.1 to 4.92K              | 0.5, 1, 5          | 760                            | Thermoplastic <sup>(2)</sup> |
| WSC4527                            | WSC4527          | 4527 | 2                                     | 0.1 to 4.92K              | 0.5, 1, 5          | 760                            | Thermoplastic                |
| WSC6927                            | WSC6927          | 6927 | 3                                     | 0.1 to 8K                 | 0.5, 1, 5          | 1675                           | Thermoplastic                |

### Notes

- Part marking: 1/2 W - DALE, value; 1 W - model, value, tolerance, date code; 2 W and 3 W - DALE, model, value, tolerance, date code.
- <sup>(2)</sup> As of 1/1/2010, the WSC0001 and WSC0002 are molded with thermoplastic in lieu of epoxy. Reference PCN-DR-002-2009 and PCN-DR-003-2009
- <sup>(3)</sup> As of February 19, 2016, the WSC0001 was obsoleted by PCN-DR-013-2015; the WSC2515 is a drop-in replacement. You may contact your sales representative or submit an inquiry via [ww2bresistors@vishay.com](mailto:ww2bresistors@vishay.com) for supporting information.

| TECHNICAL SPECIFICATIONS        |                 |                                                                                    |                                                                                                                                                                       |                                                                                                                        |                                                                                                                                                                   |
|---------------------------------|-----------------|------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| PARAMETER                       | UNIT            | WSC01/2                                                                            | WSC2515                                                                                                                                                               | WSC0002                                                                                                                | WSC4527/WSC6927                                                                                                                                                   |
| Temperature Coefficient         | ppm/°C          | $\pm 50 = 1.0 \Omega$ to 4.99 $\Omega$ ;<br>$\pm 90 = 0.1 \Omega$ to 0.99 $\Omega$ | $\pm 20 = 26.51 \Omega$ and above;<br>$\pm 50 = 1.0 \Omega$ to 26.5 $\Omega$ ;<br>$\pm 90 = 0.31 \Omega$ to 0.99 $\Omega$ ;<br>$\pm 150 = 0.1 \Omega$ to 0.3 $\Omega$ | $\pm 20 = 10.0 \Omega$ and above;<br>$\pm 50 = 1.0 \Omega$ to 9.9 $\Omega$ ;<br>$\pm 90 = 0.1 \Omega$ to 0.99 $\Omega$ | $\pm 20 = 10 \Omega$ and above;<br>$\pm 50 = 1.0 \Omega$ to 9.9 $\Omega$ ;<br>$\pm 90 = 0.31 \Omega$ to 0.99 $\Omega$ ;<br>$\pm 150 = 0.1 \Omega$ to 0.3 $\Omega$ |
| Dielectric Withstanding Voltage | V <sub>AC</sub> | > 500                                                                              |                                                                                                                                                                       |                                                                                                                        |                                                                                                                                                                   |
| Insulation Resistance           | $\Omega$        | > 10 <sup>9</sup>                                                                  |                                                                                                                                                                       |                                                                                                                        |                                                                                                                                                                   |
| Operating Temperature Range     | °C              | -65 to +175                                                                        | -65 to +275                                                                                                                                                           |                                                                                                                        |                                                                                                                                                                   |
| Maximum Working Voltage         | V               | $(P \times R)^{1/2}$                                                               |                                                                                                                                                                       |                                                                                                                        |                                                                                                                                                                   |

| GLOBAL PART NUMBER INFORMATION                                                                                                                               |                                      |                                                                                |                                                                                                                     |                                                                                                                                    |                                                           |   |   |   |   |   |   |   |   |   |  |  |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|--------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------|---|---|---|---|---|---|---|---|---|--|--|
| Global Part Numbering example: WSC2515R7000FEA (visit <a href="http://www.vishay.net">www.vishay.net</a> Vishay Dale parts numbering manual for all options) |                                      |                                                                                |                                                                                                                     |                                                                                                                                    |                                                           |   |   |   |   |   |   |   |   |   |  |  |
| W                                                                                                                                                            | S                                    | C                                                                              | 2                                                                                                                   | 5                                                                                                                                  | 1                                                         | 5 | R | 7 | 0 | 0 | 0 | F | E | A |  |  |
| GLOBAL MODEL                                                                                                                                                 | SIZE                                 | VALUE                                                                          | TOLERANCE                                                                                                           | PACKAGING                                                                                                                          | SPECIAL                                                   |   |   |   |   |   |   |   |   |   |  |  |
| WSC<br>WSN                                                                                                                                                   | 01/2<br>2515<br>0002<br>4527<br>6927 | R = decimal<br>K = thousand<br>R7000 = 0.70 $\Omega$<br>1K500 = 1.5 k $\Omega$ | D = $\pm 0.5 \%$<br>F = $\pm 1.0 \%$<br>G = $\pm 2.0 \%$<br>H = $\pm 3.0 \%$<br>J = $\pm 5.0 \%$<br>K = $\pm 10 \%$ | EA = lead (Pb)-free, tape / reel<br>EK = lead (Pb)-free, bulk<br>TA = tin / lead, tape / reel (R86)<br>BA = tin / lead, bulk (B43) | (dash number) (up to 2 digits) from 1 to 99 as applicable |   |   |   |   |   |   |   |   |   |  |  |
| Historical Part Numbering example: WSC-2 0.7 $\Omega$ 1% R86                                                                                                 |                                      |                                                                                |                                                                                                                     |                                                                                                                                    |                                                           |   |   |   |   |   |   |   |   |   |  |  |
| WSC-2                                                                                                                                                        | 0.7 $\Omega$                         | 1%                                                                             | R86                                                                                                                 |                                                                                                                                    |                                                           |   |   |   |   |   |   |   |   |   |  |  |
| HISTORICAL MODEL                                                                                                                                             | RESISTANCE VALUE                     | TOLERANCE                                                                      | PACKAGING                                                                                                           |                                                                                                                                    |                                                           |   |   |   |   |   |   |   |   |   |  |  |

### Note

- 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.

**DIMENSIONS** in inches (millimeters)


| GLOBAL MODEL | DIMENSIONS                       |                                 |                                 |                                 |                                 | SOLDER PAD DIMENSIONS |              |               |
|--------------|----------------------------------|---------------------------------|---------------------------------|---------------------------------|---------------------------------|-----------------------|--------------|---------------|
|              | L                                | H                               | T                               | W                               | W <sub>1</sub>                  | a                     | b            | L             |
| WSC01/2      | 0.200 ± 0.020<br>(5.08 ± 0.508)  | 0.096 ± 0.015<br>(2.44 ± 0.381) | 0.040 ± 0.010<br>(1.02 ± 0.254) | 0.125 ± 0.005<br>(3.18 ± 0.127) | 0.050 ± 0.010<br>(1.27 ± 0.254) | 0.085 (2.16)          | 0.070 (1.78) | 0.080 (2.03)  |
| WSC2515      | 0.250 ± 0.020<br>(6.35 ± 0.508)  | 0.110 ± 0.015<br>(2.79 ± 0.381) | 0.045 ± 0.010<br>(1.14 ± 0.254) | 0.150 ± 0.005<br>(3.81 ± 0.127) | 0.098 ± 0.005<br>(2.49 ± 0.127) | 0.090 (2.29)          | 0.115 (2.92) | 0.120 (3.05)  |
| WSC0002      | 0.455 ± 0.020<br>(11.56 ± 0.508) | 0.167 ± 0.010<br>(4.24 ± 0.254) | 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 (3.94)          | 0.230 (5.84) | 0.205 (5.21)  |
| WSC4527      | 0.455 ± 0.020<br>(11.56 ± 0.508) | 0.167 ± 0.010<br>(4.24 ± 0.254) | 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 (3.94)          | 0.230 (5.84) | 0.205 (5.21)  |
| WSC6927      | 0.690 ± 0.032<br>(17.53 ± 0.813) | 0.280 ± 0.015<br>(7.11 ± 0.381) | 0.100 ± 0.010<br>(2.54 ± 0.254) | 0.275 ± 0.005<br>(6.98 ± 0.127) | 0.215 ± 0.015<br>(5.46 ± 0.381) | 0.155 (3.94)          | 0.235 (5.97) | 0.470 (11.94) |

**TEMPERATURE RISE**

**DERATING**

**Note**

<sup>(1)</sup> As of 1/1/2010, WSC0002 will be molded with thermoplastic and have the higher 275 °C temperature derating.

| PERFORMANCE               |                                                              |                       |
|---------------------------|--------------------------------------------------------------|-----------------------|
| TEST                      | CONDITIONS OF TEST                                           | TEST LIMITS           |
| Thermal Shock             | -55 °C to +150 °C, 1000 cycles, 15 min at each extreme       | ± (0.5 % + 0.05 Ω) ΔR |
| Short Time Overload       | 5 x rated power for 5 s                                      | ± (0.2 % + 0.05 Ω) ΔR |
| Low Temperature Storage   | -65 °C for 24 h                                              | ± (0.2 % + 0.05 Ω) ΔR |
| High Temperature Exposure | 1000 h at + 275 °C (+175 °C for WSC01/2)                     | ± (0.5 % + 0.05 Ω) ΔR |
| Bias Humidity             | +85 °C, 85 % RH, 10 % bias, 1000 h                           | ± (0.2 % + 0.05 Ω) ΔR |
| Mechanical Shock          | 100 g's for 6 ms, 5 pulses                                   | ± (0.1 % + 0.05 Ω) ΔR |
| Vibration                 | Frequency varied 10 Hz to 500 Hz in 1 min, 3 directions, 9 h | ± (0.1 % + 0.05 Ω) ΔR |
| Load Life                 | 1000 h at rated power, +70 °C, 1.5 h "ON", 0.5 h "OFF"       | ± (1.0 % + 0.05 Ω) ΔR |
| Resistance to Solder Heat | +260 °C solder, 10 s to 12 s dwell, 25 mm/s emergence        | ± (0.5 % + 0.05Ω) ΔR  |

| PACKAGING       |                        |            |             |       |
|-----------------|------------------------|------------|-------------|-------|
| MODEL           | REEL                   |            |             |       |
|                 | TAPE WIDTH             | DIAMETER   | PIECES/REEL | CODE  |
| WSC01/2         | 12 mm/embossed plastic | 330 mm/13" | 2000        | EA/TA |
| WSC2515         | 16 mm/embossed plastic | 330 mm/13" | 2000        | EA/TA |
| WSC0002/WSC4527 | 24 mm/embossed plastic | 330 mm/13" | 1200        | EA/TA |
| WSC6927         | 32 mm/embossed plastic | 330 mm/13" | 725         | EA/TA |

**Note**

- Embossed Carrier Tape per EIA-481.



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