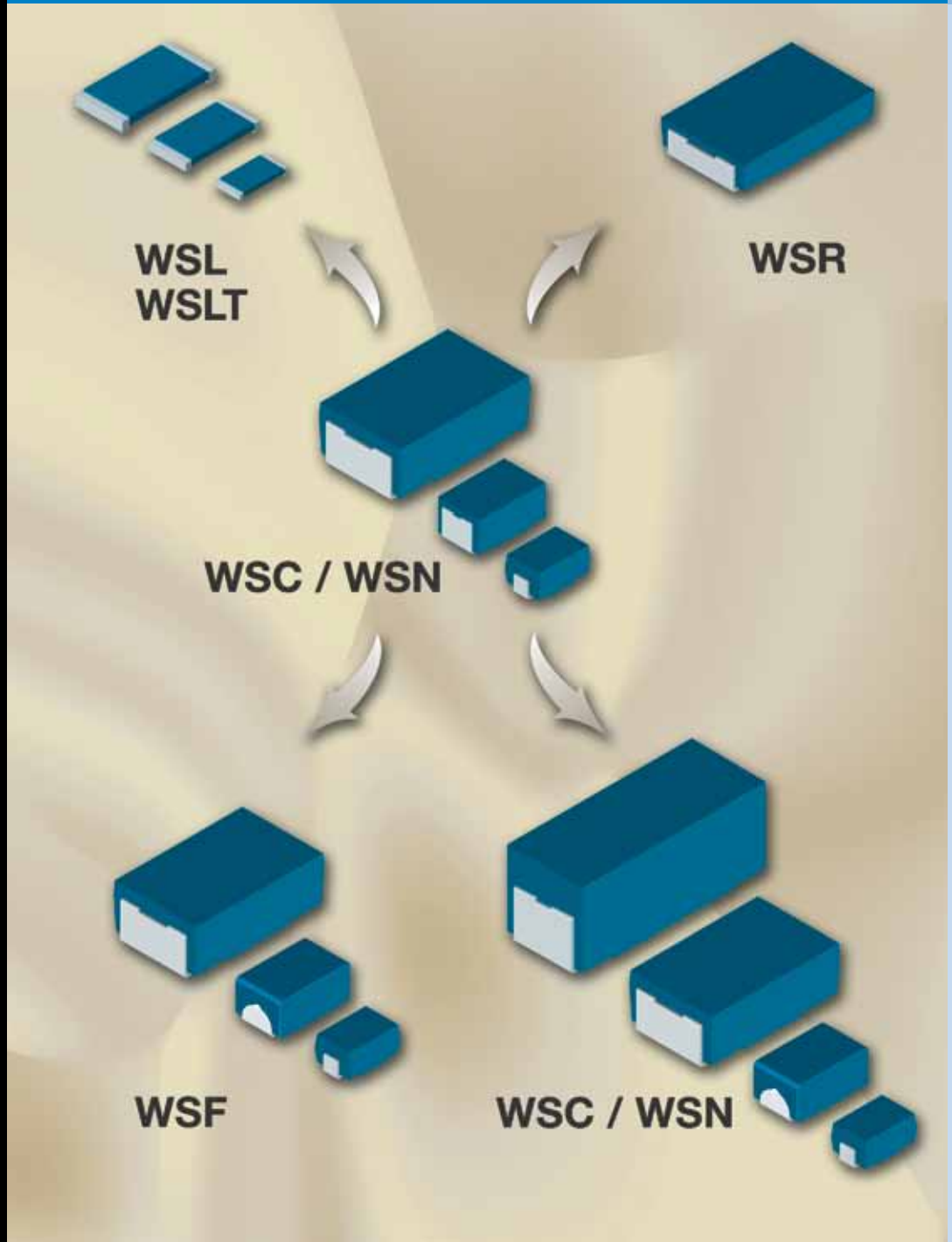




# WSC/WSN WIREWOUND SURFACE-MOUNT RESISTORS

Time to Make the Switch











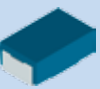




# SURFACE-MOUNT RESISTORS

## Power Metal Strip®/Wirewound/Metal Film Resistors

Vishay offers many technologies that cover broad resistance ranges and wattages. There have been many advancements since the release of the original wirewound WSC and the following tables show the overlapping products that are available (grouped by wattage rating).





Global Model	Power Rating	Resistance Range	RTC (ppm/ °C)	Tolerance	Dimensions	Applications
<a href="#">WSL1206...18</a> 	0.5 W	0.007 Ω to 0.2 Ω*	± 75	± 0.5 %, ± 1.0 %	L = 0.126 in [3.20 mm] W = 0.063 in [1.60 mm] H = 0.025 in [0.64 mm]	<ul style="list-style-type: none"> <li>• Disc drive motor controls</li> <li>• DC/DC converters</li> <li>• Li-Ion battery management</li> <li>• VRMs in notebook PCs</li> </ul>
<a href="#">WSL2010</a> 	0.5 W	0.007 Ω to 0.5 Ω*	± 75	± 0.5 %, ± 1.0 %	L = 0.200 in [5.08 mm] W = 0.100 in [2.54 mm] H = 0.025 in [0.64 mm]	<ul style="list-style-type: none"> <li>• Instrumentation</li> <li>• DC/DC converters</li> </ul>
<a href="#">WSC01/2</a> <a href="#">WSN01/2</a> 	0.5 W	0.1 Ω to 0.99 Ω 1.0 Ω to 4.99 Ω	± 90 ± 50	± 0.5 %, ± 1.0 %, ± 5.0 %	L = 0.200 in [5.08 mm] W = 0.125 in [3.18 mm] H = 0.096 in [2.44 mm]	<ul style="list-style-type: none"> <li>• Automotive controls (Body electronics and powertrain)</li> <li>• Networking/line cards</li> </ul>
<a href="#">WSF2012</a> 	0.5 W	5.0 Ω to 1.43 kΩ	± 100 ± 50 ± 25	± 0.5 %, ± 1.0 %, ± 5.0 %	L = 0.200 in [5.08 mm] W = 0.125 in [3.18 mm] H = 0.096 in [2.44 mm]	<ul style="list-style-type: none"> <li>• Li-Ion battery management</li> <li>• DC/DC converters</li> <li>• VRMs in notebook PCs</li> <li>• Disc drive motor controls</li> <li>• VRMs in notebook/ PCs</li> <li>• Automotive controls (Body electronics and powertrain)</li> </ul>
<a href="#">WSLT2010...18</a> 	1.0 W	0.01 Ω to 0.50 Ω*	± 75	± 0.5 %, ± 1.0 %	L = 0.200 in [5.08 mm] W = 0.100 in [2.54 mm] H = 0.025 in [0.64 mm]	<ul style="list-style-type: none"> <li>• Automotive controls (Engine control modules)</li> <li>• Instrumentation</li> <li>• Voltage divider circuits</li> </ul>
<a href="#">WSLT2512</a> 	1.0 W	0.01 Ω to 0.50 Ω*	± 75	± 0.5 %, ± 1.0 %	L = 0.250 in [6.35 mm] W = 0.125 in [3.18 mm] H = 0.025 in [0.64 mm]	<ul style="list-style-type: none"> <li>• Automotive controls (Body electronics and powertrain)</li> <li>• Networking/line cards</li> </ul>
<a href="#">WSC0001</a> <a href="#">WSN0001</a> 	1.0 W	0.1 Ω to 0.99 Ω 1.0 Ω to 26.50 Ω 26.51 Ω to 2.77 kΩ	± 90 ± 50 ± 20	± 0.5 %, ± 1.0 %, ± 5.0 %	L = 0.250 in [6.35 mm] W = 0.150 in [3.81 mm] H = 0.110 in [2.79 mm]	<ul style="list-style-type: none"> <li>• Automotive controls (Body electronics and powertrain)</li> <li>• Networking/line cards</li> </ul>
<a href="#">WSC2515</a> <a href="#">WSN2515</a> 	1.0 W	0.1 Ω to 0.99 Ω 1.0 Ω to 26.50 Ω 26.51 Ω to 2.5 kΩ	± 90 ± 50 ± 20	± 0.5 %, ± 1.0 %, ± 5.0 %	L = 0.250 in [6.35 mm] W = 0.150 in [3.81 mm] H = 0.110 in [2.79 mm]	<ul style="list-style-type: none"> <li>• DC/DC converter in switching power supplies</li> <li>• VRMs in notebook/ PCs</li> <li>• Instrumentation</li> <li>• Automotive controls (Body electronics and powertrain)</li> </ul>
<a href="#">WSF2515</a> 	1.0 W	10 Ω to 10 kΩ	± 100 ± 50 ± 25	± 0.5 %, ± 1.0 %, ± 5.0 %	L = 0.250 in [6.35 mm] W = 0.150 in [3.81 mm] H = 0.110 in [2.79 mm]	<ul style="list-style-type: none"> <li>• Automotive controls (Engine control modules)</li> <li>• Instrumentation</li> <li>• Voltage divider circuits</li> <li>• Networking/line cards</li> </ul>
<a href="#">WSR2</a> 	2.0 W	0.01 Ω to 1.0 Ω*	± 75	± 0.5 %, ± 1.0 %	L = 0.455 in [11.56 mm] W = 0.275 in [6.98 mm] H = 0.095 in [2.41 mm]	<ul style="list-style-type: none"> <li>• Automotive controls (Engine control modules)</li> <li>• Instrumentation</li> <li>• Voltage divider circuits</li> <li>• Networking/line cards</li> </ul>
<a href="#">WSC0002</a> <a href="#">WSN0002</a> 	2.0 W	0.1 Ω to 0.99 Ω 1.0 Ω to 9.99 Ω 10 Ω to 4.92 kΩ	± 90 ± 50 ± 20	± 0.5 %, ± 1.0 %, ± 5.0 %	L = 0.445 in [11.30 mm] W = 0.275 in [6.98 mm] H = 0.162 in [4.11 mm]	<ul style="list-style-type: none"> <li>• Automotive controls (Engine control modules)</li> <li>• Instrumentation</li> <li>• Voltage divider circuits</li> <li>• Networking/line cards</li> </ul>

\* For full resistance value range, reference <http://www.vishay.com/doc?49049>



# SURFACE-MOUNT RESISTORS

## Power Metal Strip®/Wirewound/Metal Film Resistors

Global Model	Power Rating	Resistance Range	RTC (ppm/ °C)	Tolerance	Dimensions	Applications
<a href="#">WSC4527</a> <a href="#">WSN4527</a> 	2.0 W	0.1 Ω to 0.30 Ω 0.31 Ω to 0.99 Ω 1.0 Ω to 9.99 Ω 10 Ω to 4.92 kΩ	± 150 ± 90 ± 50 ± 20	± 0.5 %, ± 1.0 %, ± 5.0 %	L = 0.455 in [11.56 mm] W = 0.275 in [6.98 mm] H = 0.167 in [4.24 mm]	<ul style="list-style-type: none"> <li>Automotive controls (Engine control modules)</li> <li>Instrumentation</li> <li>Voltage divider circuits</li> <li>Networking/line cards</li> </ul>
<a href="#">WSF4527</a> 	2.0 W	10 Ω to 100 kΩ	± 100 ± 50 ± 25	± 0.5 %, ± 1.0 %, ± 5.0 %	L = 0.455 in [11.56 mm] W = 0.275 in [6.98 mm] H = 0.167 in [4.24 mm]	
<a href="#">WSR3</a> 	3.0 W	0.01 Ω to 0.2 Ω*	± 75	± 0.5 %, ± 1.0 %	L = 0.455 in [11.56 mm] W = 0.275 in [6.98 mm] H = 0.095 in [2.41 mm]	<ul style="list-style-type: none"> <li>DC/DC converter in switching power supplies</li> <li>VRMs in notebook/ PCs</li> <li>Automotive controls (Body electronics and powertrain)</li> </ul>
<a href="#">WSC6927</a> <a href="#">WSN6927</a> 	3.0 W	0.1 Ω to 0.30 Ω 0.31 Ω to 0.99 Ω 1.0 Ω to 9.99 Ω 10 Ω to 8 kΩ	± 150 ± 90 ± 50 ± 20	± 0.5 %, ± 1.0 %, ± 5.0 %	L = 0.690 in [17.53 mm] W = 0.275 in [6.98 mm] H = 0.280 in [7.11 mm]	<ul style="list-style-type: none"> <li>Automotive controls (Engine control modules)</li> <li>Instrumentation</li> <li>Voltage divider circuits</li> <li>Satellite receivers</li> </ul>

\* For full resistance value range, reference <http://www.vishay.com/doc?49049>

Performance Characteristics						
Test	Conditions of Test	Test Limits				
		WSL/WSLT	WSR2	WSR3	WSC/WSN	WSF
<b>Thermal Shock</b>	- 55 °C to + 150 °C, 1000 cycles	± (0.5 % + 0.0005 Ω) ΔR	± (0.5 % + 0.0005 Ω) ΔR	± (0.5 % + 0.0005 Ω) ΔR	± (0.5 % + 0.05 Ω) ΔR	± (1.0 % + 0.05 Ω) ΔR
<b>Short Time Overload</b>	5 x rated power for 5 seconds (4 x for WSR3)	± (0.5 % + 0.0005 Ω) ΔR	± (0.5 % + 0.0005 Ω) ΔR	± (2.0 % + 0.0005 Ω) ΔR	± (0.2 % + 0.05 Ω) ΔR	± (0.5 % + 0.05 Ω) ΔR
<b>Low Temperature Storage</b>	- 65 °C for 24 h	± (0.5 % + 0.0005 Ω) ΔR	± (0.5 % + 0.0005 Ω) ΔR	± (0.5 % + 0.0005 Ω) ΔR	± (0.2 % + 0.05 Ω) ΔR	± (0.5 % + 0.05 Ω) ΔR
<b>High Temperature Exposure</b>	1000 hrs. at + 275 °C (+ 175 °C for WSL, WSC01/2, and WSF)	± (1.0 % + 0.0005 Ω) ΔR (2.0 % for WLT2010...18)	± (1.0 % + 0.0005 Ω) ΔR	± (1.0 % + 0.0005 Ω) ΔR	± (0.5 % + 0.05 Ω) ΔR	± (1.0 % + 0.05 Ω) ΔR
<b>Bias Humidity</b>	+ 85 °C, 85 % RH, 10 % bias, 1000 h	± (0.5 % + 0.0005 Ω) ΔR	± (0.5 % + 0.0005 Ω) ΔR	± (0.5 % + 0.0005 Ω) ΔR	± (0.2 % + 0.05 Ω) ΔR	± (0.5 % + 0.05 Ω) ΔR
<b>Mechanical Shock</b>	100 g for 11 milliseconds, 5 pulses	± (0.5 % + 0.0005 Ω) ΔR	± (0.5 % + 0.0005 Ω) ΔR	± (0.5 % + 0.0005 Ω) ΔR	± (0.1 % + 0.05 Ω) ΔR	± (0.5 % + 0.05 Ω) ΔR
<b>Vibration</b>	10 to 500 Hz in one min, 3 directions, 9 h	± (0.5 % + 0.0005 Ω) ΔR	± (0.5 % + 0.0005 Ω) ΔR	± (0.5 % + 0.0005 Ω) ΔR	± (0.1 % + 0.05 Ω) ΔR	± (0.5 % + 0.05 Ω) ΔR
<b>Load Life</b>	1000 hrs. at rated power, + 70 °C, 1.5 h "ON", 0.5 h "OFF"	± (1.0 % + 0.0005 Ω) ΔR	± (1.0 % + 0.0005 Ω) ΔR	± (2.0 % + 0.0005 Ω) ΔR	± (1.0 % + 0.05 Ω) ΔR	± (1.0 % + 0.05 Ω) ΔR
<b>Resistance to Solder Heat</b>	+ 260 °C solder, 10-12 second dwell, 25 mm/second emergence	± (0.5 % + 0.0005 Ω) ΔR	± (0.5 % + 0.0005 Ω) ΔR	± (0.5 % + 0.0005 Ω) ΔR	± (0.5 % + 0.05 Ω) ΔR	± (0.5 % + 0.05 Ω) ΔR
<b>Moisture Resistance</b>	MIL-STD-202, method 106, 0 % power	± (0.5 % + 0.0005 Ω) ΔR (1.0 % for WSLT)	± (0.5 % + 0.0005 Ω) ΔR	± (0.5 % + 0.0005 Ω) ΔR	± (0.5 % + 0.05 Ω) ΔR	± (0.5 % + 0.05 Ω) ΔR

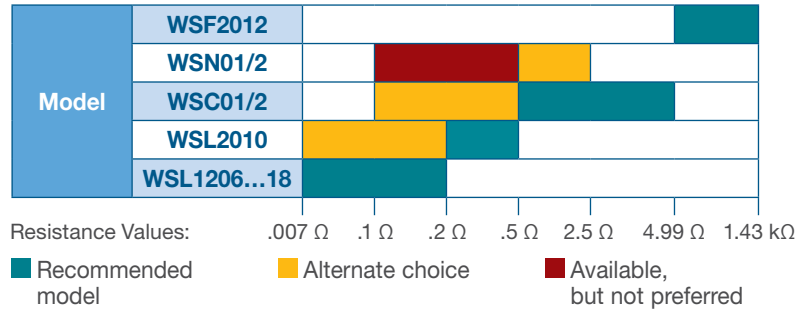


# SURFACE-MOUNT RESISTORS

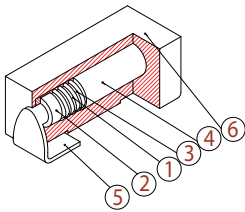
1/2 Watt

- WSC01/2 and WSN01/2 are the original 1/2 Watt wirewound SMD resistors
- It is recommended to convert to the latest technologies as highlighted on this page

WSL = low value, Power Metal Strip®  
 WSC = mid value, wirewound  
 WSN = mid value, wirewound, non-inductive  
 WSF = high value, metal film

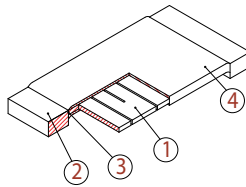


## WSC01/2 WSN01/2



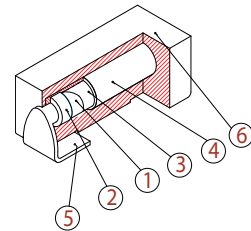
- 1) Ceramic core
- 2) Resistor end cap
- 3) Resistance wire
- 4) Subassembly coating
- 5) Plated terminal
- 6) Epoxy mold with ink print

## WSL1206...18 WSL2010



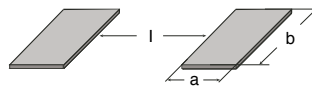
- 1) Resistive element
- 2) Plated terminal
- 3) Terminal/element weld
- 4) Silicone coating with ink print

## WSF2012



- 1) Ceramic core
- 2) Resistor end cap
- 3) Resistance element
- 4) Subassembly coating
- 5) Plated terminal
- 6) Epoxy mold with ink print

## Solder Pad Layout



Model	Solder Pad Dimensions in Inches [Millimeters]			Technology Selection Criteria					
	a	b	l	Smallest Footprint	Lowest Inductance	Pulse Handling	RTC	Lead Time	Cost
<a href="#">WSC01/2</a>	0.085 [2.16]	0.070 [1.78]	0.080 [2.03]	Good	Good	Best	Better	Better	Good
<a href="#">WSN01/2</a>	0.085 [2.16]	0.070 [1.78]	0.080 [2.03]	Good	Better	Better	Better	Good	Good
<a href="#">WSL1206...18</a>	0.050 [1.27]	0.070 [1.78]	0.055 [1.40]	Best	Best	Better	Best	Best	Better
<a href="#">WSL2010</a>	0.055 [1.40]	0.120 [3.05]	0.130 [3.30]	Better	Best	Best	Best	Best	Best
<a href="#">WSF2012</a>	0.085 [2.16]	0.070 [1.78]	0.080 [2.03]	Good	Better	Good	Good	Better	Better

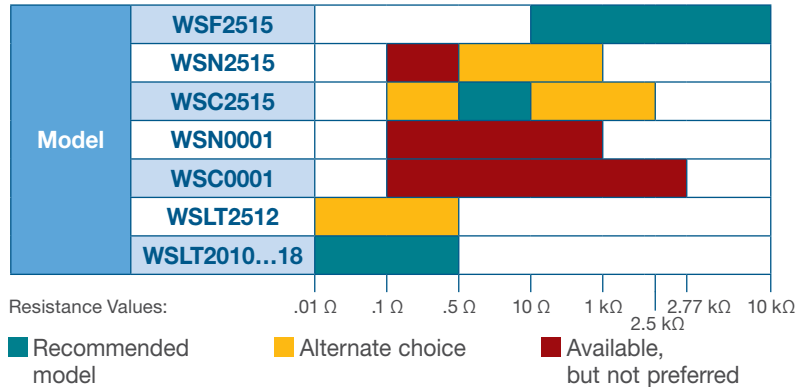


# SURFACE-MOUNT RESISTORS

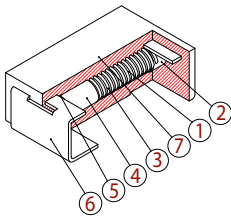
1 Watt

- WSC0001 and WSN0001 are the original 1 Watt wirewound SMD resistors
- It is recommended to convert to the latest technologies as highlighted on this page

WSL = low value, Power Metal Strip®  
 WSC = mid value, wirewound  
 WSN = mid value, wirewound, non-inductive  
 WSF = high value, metal film

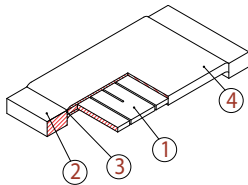


## WSC0001 WSN0001



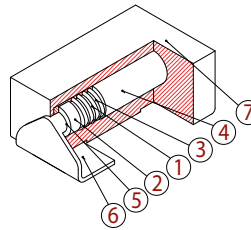
- 1) Ceramic core
- 2) Resistor end cap
- 3) Resistance wire
- 4) Subassembly coating
- 5) Connection - cap to leadframe terminal
- 6) Plated leadframe terminal
- 7) LCP mold with laser print

## WSLT2010...18 WSLT2512



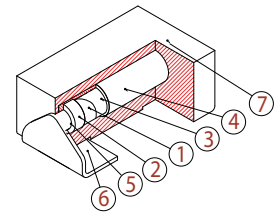
- 1) Resistive element
- 2) Plated terminal
- 3) Terminal/element weld
- 4) Silicone coating with ink print

## WSC2515 WSN2515



- 1) Ceramic core
- 2) Resistor end cap
- 3) Resistance element
- 4) Subassembly coating
- 5) Connection - cap to terminal
- 6) Plated terminal
- 7) LCP mold with laser print

## WSF2515



- 1) Ceramic core
- 2) Resistor end cap
- 3) Resistance element
- 4) Subassembly coating
- 5) Connection - cap to terminal
- 6) Plated terminal
- 7) LCP mold with laser print

Model	Solder Pad Dimensions in Inches [Millimeters]			Technology Selection Criteria					
	a	b	l	Smallest Footprint	Lowest Inductance	Pulse Handling	RTC	Lead Time	Cost
<a href="#">WSC0001</a>	0.090 [2.29]	0.115 [2.92]	0.120 [3.05]	Good	Good	Best	Better	Good	Good
<a href="#">WSN0001</a>	0.090 [2.29]	0.115 [2.92]	0.120 [3.05]	Good	Better	Better	Better	Good	Good
<a href="#">WSC2515</a>	0.090 [2.29]	0.115 [2.92]	0.120 [3.05]	Good	Good	Best	Better	Better	Better
<a href="#">WSN2515</a>	0.090 [2.29]	0.115 [2.92]	0.120 [3.05]	Good	Better	Better	Better	Good	Good
<a href="#">WSLT2010...18</a>	0.055 [1.40]	0.120 [3.05]	0.130 [3.30]	Best	Best	Better	Best	Best	Best
<a href="#">WSLT2512</a>	0.065 [1.65]	0.145 [3.68]	0.160 [4.06]	Better	Best	Best	Best	Best	Best
<a href="#">WSF2515</a>	0.090 [2.29]	0.115 [2.92]	0.120 [3.05]	Good	Better	Good	Good	Better	Better



# SURFACE-MOUNT RESISTORS

## 2 Watt

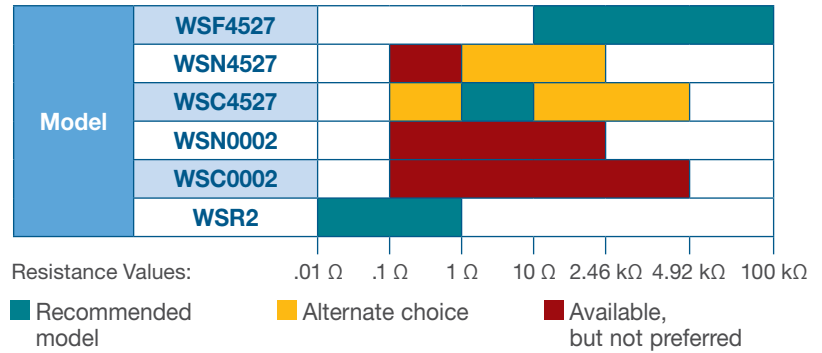
- WSC0002 and WSN0002 are the original 2 Watt wirewound SMD resistors
- It is recommended to convert to the latest technologies as highlighted on this page

WSR = low value, Power Metal Strip®

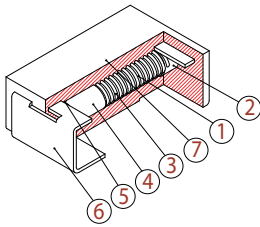
WSC = mid value, wirewound

WSN = mid value, wirewound, non-inductive

WSF = high value, metal film

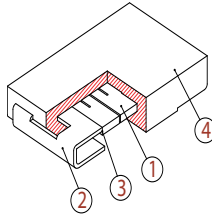


### WSC0002 WSN0002



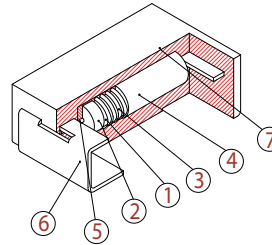
- 1) Ceramic core
- 2) Resistor end cap
- 3) Resistance wire
- 4) Subassembly coating
- 5) Connection - cap to leadframe terminal
- 6) Plated leadframe terminal
- 7) LCP mold with laser print

### WSR2



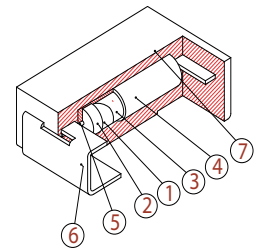
- 1) Resistive element
- 2) Plated terminal
- 3) Terminal/element weld
- 4) LCP mold with laser print

### WSC4527 WSN4527



- 1) Ceramic core
- 2) Resistor end cap
- 3) Resistance wire
- 4) Subassembly coating
- 5) Connection - cap to axial lead, axial lead to leadframe terminal
- 6) Plated terminal
- 7) LCP mold with laser print

### WSF4527



- 1) Ceramic core
- 2) Resistor end cap
- 3) Resistance element
- 4) Subassembly coating
- 5) Connection - cap to axial lead, axial lead to leadframe terminal
- 6) Plated terminal
- 7) LCP mold with laser print

Model	Solder Pad Dimensions in Inches [Millimeters]			Technology Selection Criteria					
	a	b	l	Smallest Footprint	Lowest Inductance	Pulse Handling	RTC	Lead Time	Cost
<a href="#">WSC0002</a>	0.155 [3.94]	0.230 [5.84]	0.205 [5.21]	Good	Good	Best	Better	Good	Good
<a href="#">WSN0002</a>	0.155 [3.94]	0.230 [5.84]	0.205 [5.21]	Good	Better	Better	Better	Good	Good
<a href="#">WSC4527</a>	0.155 [3.94]	0.230 [5.84]	0.205 [5.21]	Good	Good	Better	Better	Better	Better
<a href="#">WSN4527</a>	0.155 [3.94]	0.230 [5.84]	0.205 [5.21]	Good	Better	Better	Better	Good	Good
<a href="#">WSR2</a>	0.155 [3.94]	0.230 [5.84]	0.205 [5.21]	Best	Best	Best	Best	Best	Best
<a href="#">WSF4527</a>	0.155 [3.94]	0.230 [5.94]	0.205 [5.21]	Good	Better	Good	Good	Better	Better



# SURFACE-MOUNT RESISTORS

## 3 Watt

- WSC6927 and WSN6927 are the original 3 Watt wirewound SMD resistors
- It is recommended to convert to the WSR3 for 0.2 Ω and below

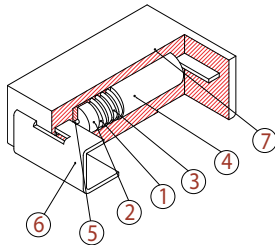
WSR = low value, Power Metal Strip®  
 WSC = mid value, wirewound  
 WSN = mid value, wirewound, non-inductive

Model	WSN6927				
	WSC6927				
	WSR3				

Resistance Values: .01 Ω .1 Ω .2 Ω 4 kΩ 8 kΩ

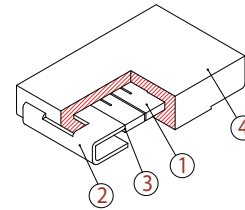
■ Recommended model     
 ■ Alternate choice     
 ■ Available, but not preferred

### WSC6927 WSN6927



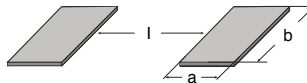
- 1) Ceramic core
- 2) Resistor end cap
- 3) Resistance wire
- 4) Subassembly coating
- 5) Connections - cap to axial lead, axial lead to leadframe terminal
- 6) Plated leadframe terminal
- 7) LCP mold with ink print

### WSR3



- 1) Resistive element
- 2) Plated terminal
- 3) Terminal/element weld
- 4) LCP mold with laser print

### Solder Pad Layout



Model	Solder Pad Dimensions in Inches [Millimeters]			Technology Selection Criteria					
	a	b	l	Smallest Footprint	Lowest Inductance	Pulse Handling	RTC	Lead Time	Cost
<a href="#">WSC6927</a>	0.155 [3.94]	0.235 [5.97]	0.470 [11.94]	Good	Good	Good	Good	Better	Better
<a href="#">WSN6927</a>	0.155 [3.94]	0.235 [5.97]	0.470 [11.94]	Good	Better	Good	Good	Good	Good
<a href="#">WSR3</a>	0.155 [3.94]	0.230 [5.84]	0.205 [5.21]	Best	Best	Best	Best	Best	Best

This document is subject to change without notice. THE PRODUCTS DESCRIBED HEREIN AND THIS DOCUMENT ARE SUBJECT TO SPECIFIC DISCLAIMERS, SET FORTH AT [www.vishay.com/doc?91000](http://www.vishay.com/doc?91000)

## SEMICONDUCTORS:

Rectifiers • High-Power Diodes and Thyristors • Small-Signal Diodes • Zener and Suppressor Diodes  
• FETs • Optoelectronics • ICs • Modules

## PASSIVE COMPONENTS:

Resistive Products • Magnetics • Capacitors



One of the World's Largest Manufacturers of  
**Discrete Semiconductors and Passive Components**

## WORLDWIDE SALES CONTACTS

### THE AMERICAS

#### UNITED STATES

VISHAY AMERICAS  
ONE GREENWICH PLACE  
SHELTON, CT 06484  
UNITED STATES  
PH: +1-402-563-6866  
FAX: +1-402-563-6296

### ASIA

#### SINGAPORE

VISHAY INTERTECHNOLOGY ASIA PTE LTD.  
37A TAMPINES STREET 92 #07-00  
SINGAPORE 528886  
PH: +65-6788-6668  
FAX: +65-6788-0988

#### P.R. CHINA

VISHAY CHINA CO., LTD.  
15D, SUN TONG INFOPORT PLAZA  
55 HUAI HAI WEST ROAD  
SHANGHAI 200030  
P.R. CHINA  
PH: +86-21-5258 5000  
FAX: +86-21-5258 7979

#### JAPAN

VISHAY JAPAN CO., LTD.  
SHIBUYA PRESTIGE BLDG. 4F  
3-12-22, SHIBUYA  
SHIBUYA-KU  
TOKYO 150-0002  
JAPAN  
PH: +81-3-5466-7150  
FAX: +81-3-5466-7160

### EUROPE

#### GERMANY

VISHAY ELECTRONIC GMBH  
GEHEIMRAT-ROSENTHAL-STR. 100  
95100 SELB  
GERMANY  
PH: +49-9287-71-0  
FAX: +49-9287-70435

#### FRANCE

VISHAY S.A.  
199, BLVD DE LA MADELEINE  
06003 NICE, CEDEX 1  
FRANCE  
PH: +33-4-9337-2727  
FAX: +33-4-9337-2726

#### UNITED KINGDOM

VISHAY LTD.  
SUITE 6C, TOWER HOUSE  
ST. CATHERINE'S COURT  
SUNDERLAND ENTERPRISE PARK  
SUNDERLAND SR5 3XJ  
UNITED KINGDOM  
PH: +44-191-516-8584  
FAX: +44-191-549-9556

Build **Vishay**  
into your **Design**

[www.vishay.com](http://www.vishay.com)

VMN-PL0010-1103