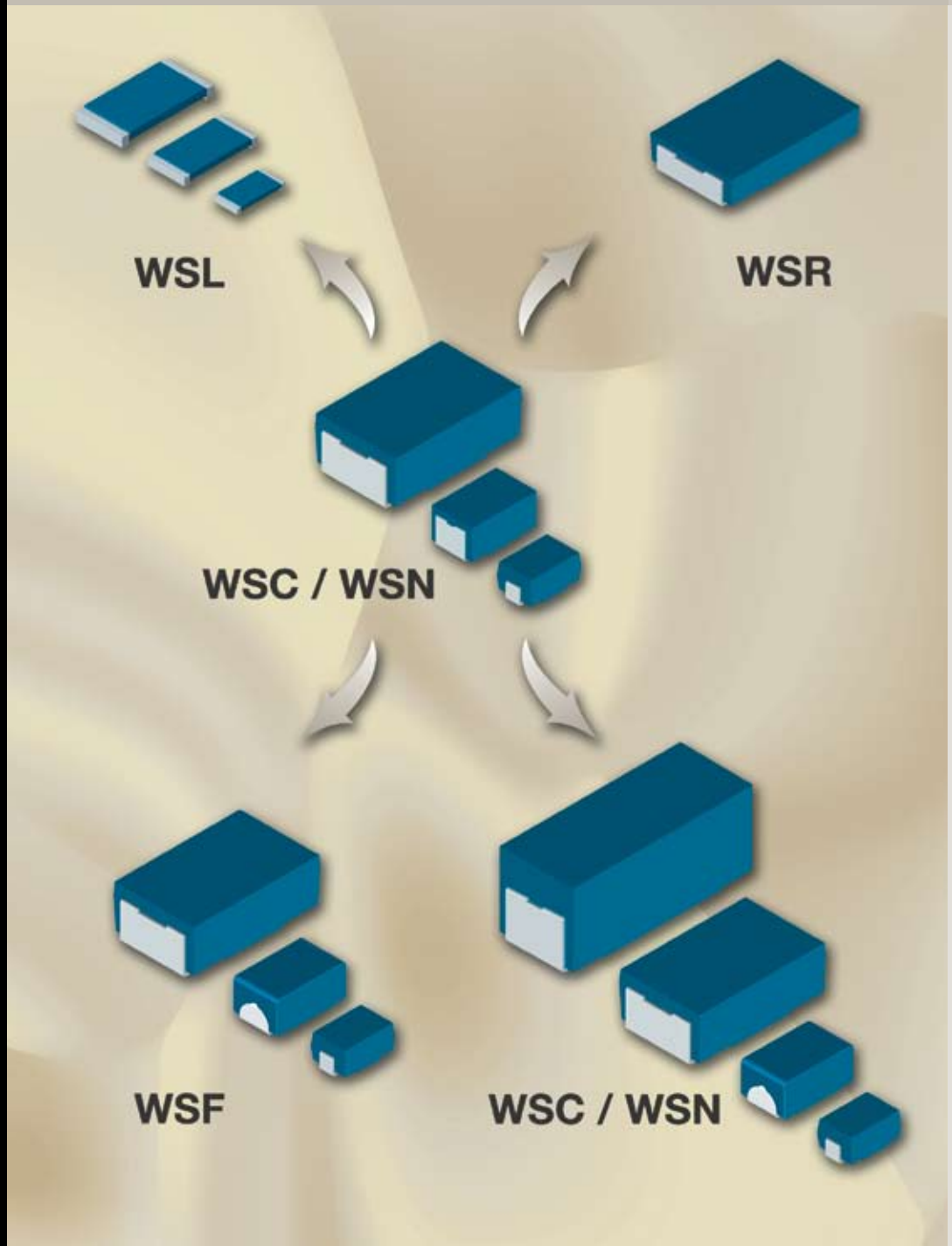




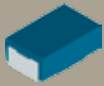

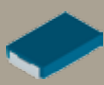

VISHAY INTERTECHNOLOGY, INC.

# WSC/WSN WIREWOUND SURFACE MOUNT RESISTORS

Time to Make the Switch



Power Metal Strip® / Wirewound / Metal Film Resistors

Global Model	Power Rating	Resistance Range	RTC (ppm/ °C)	Tolerance	Dimensions	Applications
 <b>WCS4527</b> <b>WSN4527</b>	2.0 W	0.1 Ω - 0.30 Ω 0.31 Ω - 0.99 Ω 1.0 Ω - 9.99 Ω 10 Ω - 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>
 <b>WSF4527</b>	2.0 W	10 Ω - 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]	<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>
 <b>WSR3</b>	3.0 W	0.01 Ω - 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>Automotive controls (Engine control modules)</li> <li>Instrumentation</li> <li>Voltage divider circuits</li> <li>Satellite receivers</li> </ul>
 <b>WSC6927</b> <b>WSN6927</b>	3.0 W	0.1 Ω - 0.30 Ω 0.31 Ω - 0.99 Ω 1.0 Ω - 9.99 Ω 10 Ω - 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	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	± (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 hrs.	± (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, WSC0001, WSC0002, and WSF)	± (1.0% + 0.0005 Ω) ΔR	± (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 hrs.	± (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 hrs.	± (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 hrs. "ON", 0.5 hrs. "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	± (0.5% + 0.0005 Ω) ΔR	± (0.5% + 0.0005 Ω) ΔR	± (0.5% + 0.05 Ω) ΔR	± (0.5% + 0.05 Ω) ΔR



# 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
<b>WSL1206-18</b> 	0.5 W	0.007 Ω - 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>
<b>WSL2010</b> 	0.5 W	0.007 Ω - 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>
<b>WSC01/2</b> <b>WSN01/2</b> 	0.5 W	0.1 Ω - 0.99 Ω 1.0 Ω - 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>
<b>WSF2012</b> 	0.5 W	5.0 Ω - 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>
<b>WSL2010-18</b> 	1.0 W	0.007 Ω - 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>• Automotive controls (Engine control modules)</li> <li>• Instrumentation</li> <li>• Voltage divider circuits</li> </ul>
<b>WSL2512</b> 	1.0 W	0.007 Ω - 0.5 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>
<b>WSC0001</b> <b>WSN0001</b> 	1.0 W	0.1 Ω - 0.99 Ω 1.0 Ω - 26.50 Ω 26.51 Ω - 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>• 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>
<b>WSC2515</b> <b>WSN2515</b> 	1.0 W	0.1 Ω - 0.99 Ω 1.0 Ω - 26.50 Ω 26.51 Ω - 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>
<b>WSF2515</b> 	1.0 W	26.5 Ω - 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>• 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>
<b>WSR2</b> 	2.0 W	0.01 Ω - 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>
<b>WSC0002</b> <b>WSN0002</b> 	2.0 W	0.1 Ω - 0.99 Ω 1.0 Ω - 9.99 Ω 10 Ω - 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>

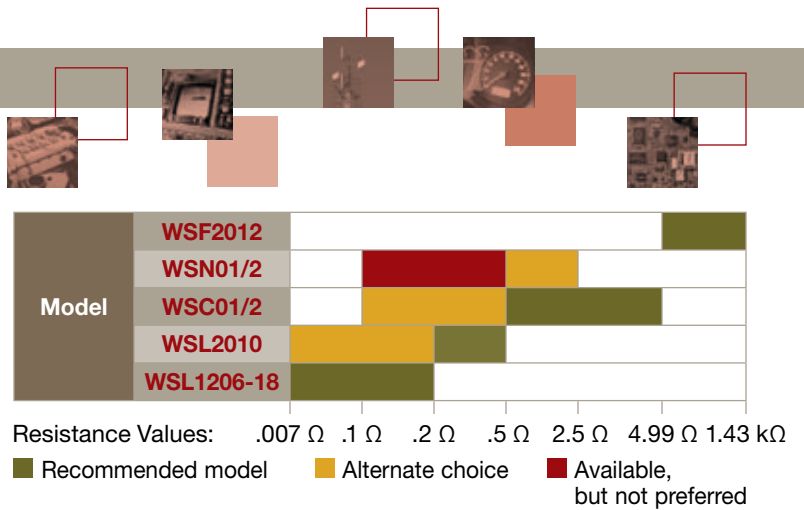
\* For full resistance value range, reference <http://www.vishay.com/doc?49049>



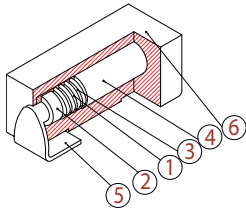
# 1/2 Watt

- WSC/WSN01/2 are the original 1/2 Watt Wirewound SMD
- It is recommended to convert to the latest technologies as highlighted on this page

WSL = low value, Power Metal Strip®  
 WSC/WSN = mid value, Wirewound  
 WSF = high value, Metal Film

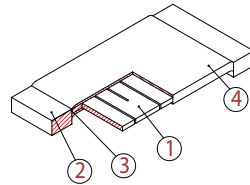


## WSC01/2 WSN01/2



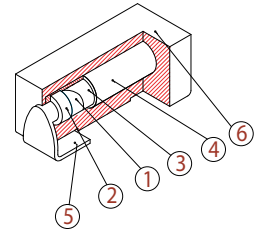
- 1) Ceramic core
- 2) Resistor end cap
- 3) Resistance wire
- 4) Subassembly coating
- 5) Plated terminal
- 6) Epoxy mold with ink print

## WSL1206-18 WSL2010

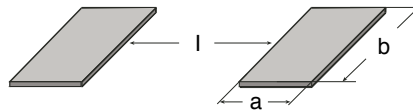


- 1) Resistive element
- 2) Plated terminal
- 3) Terminal/element weld
- 4) Silicone coating with ink print

## WSF2012



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

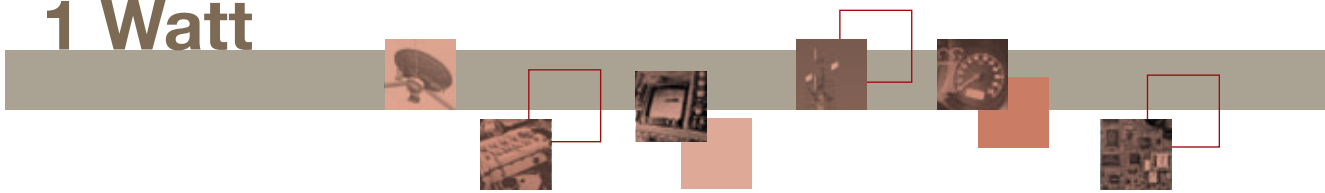


Solder Pad Layout

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

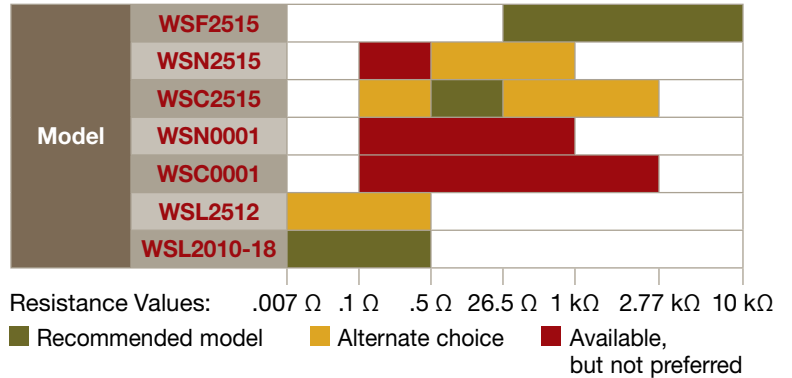


# 1 Watt

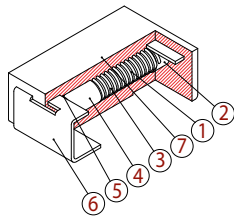


- WSC/WSN0001 are the original 1 Watt Wirewound SMD
- It is recommended to convert to the latest technologies as highlighted on this page

WSL = low value, Power Metal Strip®  
 WSC/WSN = mid value, Wirewound  
 WSF = high value, Metal Film

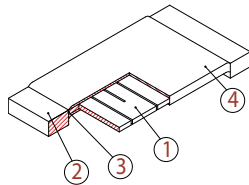


## WSC0001 WSN0001



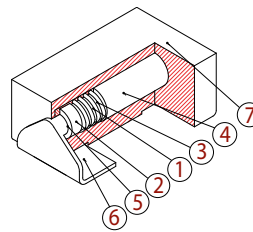
- 1) Ceramic core
- 2) Resistor end cap
- 3) Resistance wire
- 4) Subassembly coating
- 5) Connection - cap to leadframe terminal
- 6) Plated leadframe terminal
- 7) Epoxy mold with ink print

## WSL2010-18 WSL2512



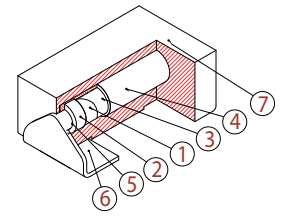
- 1) Resistive element
- 2) Plated terminal
- 3) Terminal/element weld
- 4) Silicone coating with ink print

## WSC2515 WSN2515



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

## WSF2515

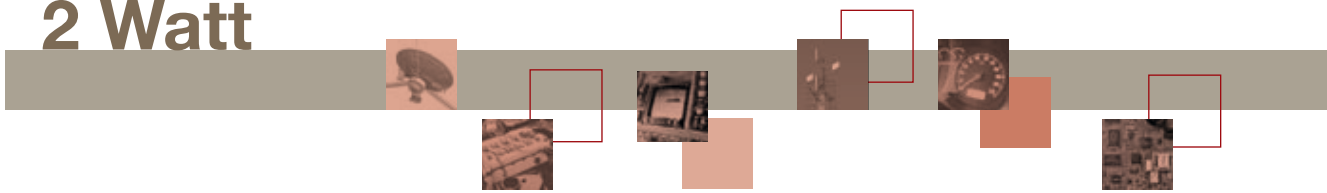


- 1) Ceramic core
- 2) Resistor end cap
- 3) Resistance element
- 4) Subassembly coating
- 5) Connection - cap to terminal
- 6) Plated terminal
- 7) LCP mold with laser print

Model	Solder Pad Dimensions in Inches [Millimeters]			Technology Selection Criteria					
	a	b	l	Smallest Footprint	Lowest Inductance	Pulse Handling	RTC	Lead Time	Cost
WSC0001	0.090 [2.29]	0.115 [2.92]	0.120 [3.05]	Good	Good	Best	Better	Good	Good
WSN0001	0.090 [2.29]	0.115 [2.92]	0.120 [3.05]	Good	Better	Better	Better	Good	Good
WSC2515	0.090 [2.29]	0.115 [2.92]	0.120 [3.05]	Good	Good	Best	Better	Better	Better
WSN2515	0.090 [2.29]	0.115 [2.92]	0.120 [3.05]	Good	Better	Better	Better	Good	Good
WSL2010-18	0.055 [1.40]	0.120 [3.05]	0.130 [3.30]	Best	Best	Better	Best	Best	Best
WSL2512	0.065 [1.65]	0.145 [3.68]	0.160 [4.06]	Better	Best	Best	Best	Best	Best
WSF2515	0.090 [2.29]	0.115 [2.92]	0.120 [3.05]	Good	Better	Good	Good	Better	Better

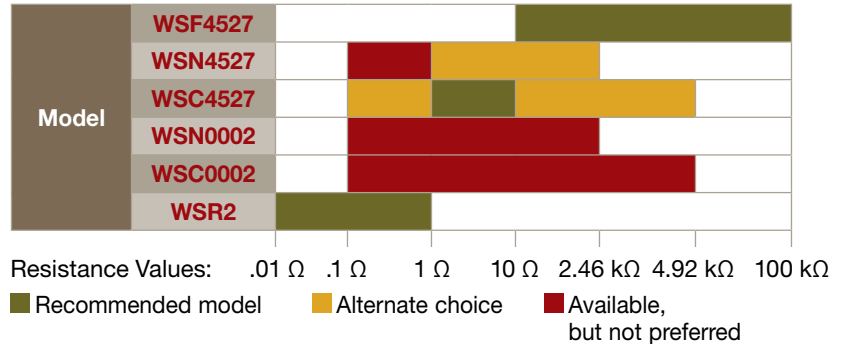


# 2 Watt

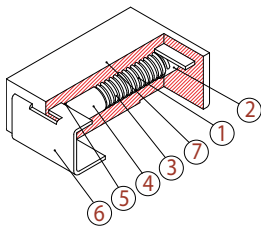


- WSC/WSN0002 are the original 2 Watt Wirewound SMD
- It is recommended to convert to the latest technologies as highlighted on this page

WSL/WSR = low value, Power Metal Strip®  
 WSC/WSN = mid value, Wirewound  
 WSF = high value, Metal Film

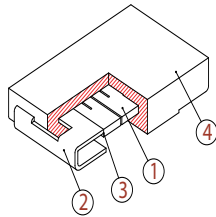


## WSC0002 WSN0002



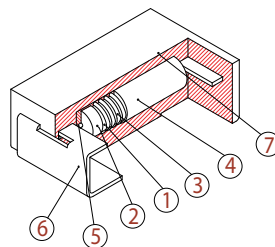
- 1) Ceramic core
- 2) Resistor end cap
- 3) Resistance wire
- 4) Subassembly coating
- 5) Connection - cap to leadframe terminal
- 6) Plated leadframe terminal
- 7) Epoxy mold with ink print

## WSR2



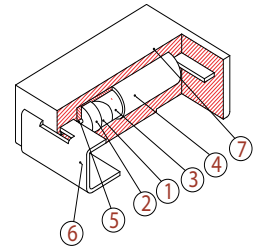
- 1) Resistive element
- 2) Plated terminal
- 3) Terminal/element weld
- 4) LCP mold with laser print

## WSC4527 WSN4527



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

## WSF4527



- 1) Ceramic core
- 2) Resistor end cap
- 3) Resistance element
- 4) Subassembly coating
- 5) Connections – cap to axial lead, axial lead to leadframe terminal
- 6) Plated leadframe 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
WSC0002	0.155 [3.94]	0.230 [5.84]	0.205 [5.21]	Good	Good	Best	Better	Good	Good
WSN0002	0.155 [3.94]	0.230 [5.84]	0.205 [5.21]	Good	Better	Better	Better	Good	Good
WSC4527	0.155 [3.94]	0.230 [5.84]	0.205 [5.21]	Good	Good	Better	Better	Better	Better
WSN4527	0.155 [3.94]	0.230 [5.84]	0.205 [5.21]	Good	Better	Better	Better	Good	Good
WSR2	0.155 [3.94]	0.230 [5.84]	0.205 [5.21]	Best	Best	Best	Best	Best	Best
WSF4527	0.155 [3.94]	0.230 [5.94]	0.205 [5.21]	Good	Better	Good	Good	Better	Better







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