

# Metal Film Resistors, Power, Surface Mount


**Note**

\* 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.

**FEATURES**

- Molded encapsulation
- Wraparound compliant terminations eliminate risk of solder fillet cracking
- Solderable terminations
- Excellent stability at different environmental conditions
- High power ratings (up to 2 W)
- 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)


**Note**

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

STANDARD ELECTRICAL SPECIFICATIONS						
GLOBAL MODEL	SIZE INCH	POWER RATING $P_{70^\circ\text{C}}$ W	TOLERANCE $\pm$ %	RESISTANCE RANGE $\Omega$	TEMPERATURE COEFFICIENT <sup>(4)</sup> $\pm$ ppm/ $^\circ\text{C}$	ENCAPSULATION
WSF2012	2012	0.5	0.5, 1, 5	5.0 to 1.43K <sup>(2)</sup>	100	Epoxy
WSF2515	2515	1.0	0.5, 1, 5	10 to 10K	100	Thermoplastic
WSF4527	4527	2.0 <sup>(3)</sup>	0.5, 1, 5	10 to 100K	100	Thermoplastic

TECHNICAL SPECIFICATIONS				
PARAMETER	UNIT	WSF2012	WSF2515	WSF4527
Dielectric withstanding voltage	$V_{AC}$	> 500	> 500	> 500
Insulation resistance	$\Omega$	> $10^9$		
Operating temperature range	$^\circ\text{C}$	- 65/+ 175	- 65/+ 175	- 65/+ 150
Maximum working voltage	V	$(P \times R)^{1/2}$	$(P \times R)^{1/2}$	$(P \times R)^{1/2}$ <sup>(3)</sup>
Weight/1000 pieces (typical)	g	90	165	760

**Notes**

- Part marking: 1/2 W - DALE, value; 1 W - model, value, tolerance, date code; 2 W - DALE, model, value, tolerance, date code.
- <sup>(2)</sup> E96 values only.
- <sup>(3)</sup> Resistance values above 31.25 k $\Omega$  are limited to 250 V maximum working voltage.
- <sup>(4)</sup>  $\pm$  50 ppm/ $^\circ\text{C}$  and  $\pm$  25 ppm/ $^\circ\text{C}$  available.

GLOBAL PART NUMBER INFORMATION					
Global Part Numbering example: <b>WSF25151K500JKTA</b> (preferred numbering format)					
W	S	F	2	5	1
5	1	K	5	0	0
J	K	T	A		
GLOBAL MODEL	VALUE	TOLERANCE	TCR	PACKAGING	SPECIAL
WSF2012 WSF2515 WSF4527	R = Decimal K = Thousand 100R0 = 100 $\Omega$ 1K000 = 1 k $\Omega$	D = $\pm$ 0.5 % F = $\pm$ 1.0 % G = $\pm$ 2.0 % H = $\pm$ 3.0 % J = $\pm$ 5.0 % K = $\pm$ 10 %	E = $\pm$ 25 ppm/ $^\circ\text{C}$ H = $\pm$ 50 ppm/ $^\circ\text{C}$ K = $\pm$ 100 ppm/ $^\circ\text{C}$	EA = Lead (Pb)-free, tape/reel EK = Lead (Pb)-free, bulk TA = Tin/lead, tape/reel (R86) BA = Tin/lead, tape/reel, bulk (B43)	(Dash number) (Up to 2 digits) From 1 to 99 as applicable
Historical Part Numbering example: <b>WSF2515 1.5 kW 5% 100 ppm/<math>^\circ\text{C}</math> R86</b> (will continue to be accepted for tin/lead product only)					
WSF2515	1.5 k $\Omega$	5 %	100 ppm/ $^\circ\text{C}$	R86	
HISTORICAL MODEL	RESISTANCE VALUE	TOLERANCE CODE	TEMPERATURE COEFFICIENT	PACKAGING	

**DIMENSIONS**


MODEL	DIMENSIONS in inches (millimeters)				
	L	H	T	W	W <sub>1</sub>
WSF2012	0.200 ± 0.020 (5.08 ± 0.508)	0.096 ± 0.015 (2.44 ± 0.381)	0.040 ± 0.010 (1.02 ± 0.254)	0.125 ± 0.005 (3.18 ± 0.127)	0.050 ± 0.005 (1.27 ± 0.127)
WSF2515	0.250 ± 0.020 (6.35 ± 0.508)	0.110 ± 0.015 (2.79 ± 0.381)	0.045 ± 0.010 (1.14 ± 0.254)	0.150 ± 0.005 (3.81 ± 0.127)	0.098 ± 0.005 (2.49 ± 0.127)
WSF4527	0.455 ± 0.020 (11.56 ± 0.508)	0.167 ± 0.010 (4.24 ± 0.254)	0.100 ± 0.010 (2.54 ± 0.254)	0.275 ± 0.005 (6.98 ± 0.127)	0.215 ± 0.005 (5.46 ± 0.127)

MODEL	SOLDER PAD DIMENSIONS in inches (millimeters)		
	a	b	l
WSF2012	0.085 (2.16)	0.070 (1.78)	0.080 (2.03)
WSF2515	0.090 (2.29)	0.115 (2.92)	0.120 (3.05)
WSF4527	0.155 (3.94)	0.230 (5.94)	0.205 (5.21)



PERFORMANCE		
TEST	CONDITIONS OF TEST	TEST LIMITS
Thermal shock	-55 °C to +150 °C, 1000 cycles, 15 min at each extreme	± (1.0 % + 0.05 Ω) ΔR
Short time overload	5 x rated power for 5 s	± (0.5 % + 0.05 Ω) ΔR
Low temperature storage	-65 °C for 24 h	± (0.5 % + 0.05 Ω) ΔR
High temperature exposure	1000 h at +175 °C (150 °C for WSF4527)	± (1.0 % + 0.05 Ω) ΔR
Bias humidity	+85 °C, 85 % RH, 10 % Bias, 1000 h	± (0.5 % + 0.05 Ω) ΔR
Moisture resistance	MIL-STD-202 method 106, 0 % power, 7a and 7b not required	± (0.5 % + 0.05 Ω) ΔR
Mechanical shock	100 g's for 6 ms, 5 pulses	± (0.5 % + 0.05 Ω) ΔR
Vibration	Frequency varied 10 Hz to 500 Hz in one min, 3 directions, 9 h	± (0.5 % + 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 % + 0.05 Ω) ΔR

PACKAGING				
MODEL	REEL			
	TAPE WIDTH	DIAMETER	PIECES/REEL	CODE
WSF2012	12 mm/embossed plastic	330 mm/13"	2000	EA/TA
WSF2515	16 mm/embossed plastic	330 mm/13"	2000	EA/TA
WSF4527	24 mm/embossed plastic	330 mm/13"	1200	EA/TA

**Note**

- Embossed Carrier Tape per EIA-481.



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