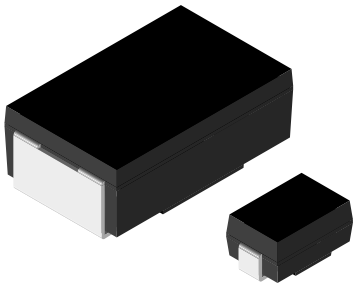
Metal Film Resistors, Power, Surface Mount



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 (1)
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

Note

(1) Flame retardance test may not be applicable to some resistor technologies.

AUTOMOTIVE GRADE Available

Pb-free Available

e3

RoHS* Available

HALOGEN FREE Available

GREEN (5-2008) Available

STANDARD ELECTRICAL SPECIFICATIONS

GLOBAL MODEL	SIZE INCH	POWER RATING $P_{70\,°C}$ W	TOLERANCE ± %	RESISTANCE RANGE Ω	TEMPERATURE COEFFICIENT (4) ± ppm/°C	ENCAPSULATION
WSF2012	2012	0.5	0.5, 1, 5	5.0 to 1.43K (2)	100	Epoxy
WSF2515	2515	1.0	0.5, 1, 5	10 to 10K	100	Thermoplastic
WSF4527	4527	2.0 (3)	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	Ω	> 10^9		
Operating temperature range	°C	- 65/+ 175	- 65/+ 175	- 65/+ 150
Maximum working voltage	V	$(P \times R)^{1/2}$	$(P \times R)^{1/2}$	$(P \times R)^{1/2}$ (3)
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.

(2) E96 values only.
(3) Resistance values above 31.25 kΩ are limited to 250 V maximum working voltage.
(4) ± 50 ppm/°C and ± 25 ppm/°C available.

GLOBAL PART NUMBER INFORMATION

Global Part Numbering example: WSF25151K500JKTA (preferred numbering format)

W	S	F	2	5	1	5	1	K	5	0	0	J	K	T	A		

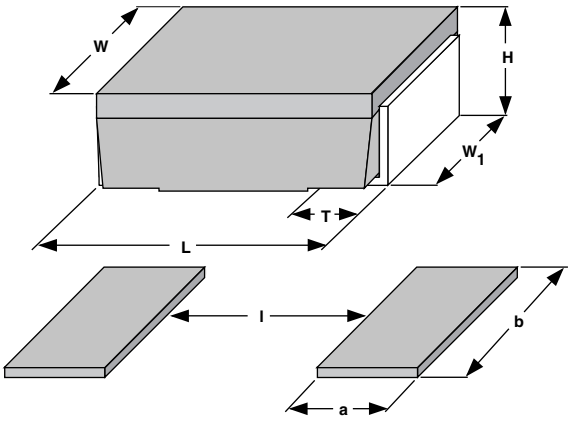
GLOBAL MODEL	VALUE	TOLERANCE	TCR	PACKAGING	SPECIAL
WSF2012 **WSF2515** **WSF4527**	**R** = Decimal **K** = Thousand **100R0** = 100 Ω **1K000** = 1 kΩ	**D** = ± 0.5 % **F** = ± 1.0 % **G** = ± 2.0 % **H** = ± 3.0 % **J** = ± 5.0 % **K** = ± 10 %	**E** = ± 25 ppm/°C **H** = ± 50 ppm/°C **K** = ± 100 ppm/°C	**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: WSF2515 1.5 kW 5 % 100 ppm/°C R86 (will continue to be accepted for tin/lead product only)

WSF2515	1.5 kΩ	5 %	100 ppm/°C	R86
HISTORICAL MODEL	RESISTANCE VALUE	TOLERANCE CODE	TEMPERATURE COEFFICIENT	PACKAGING

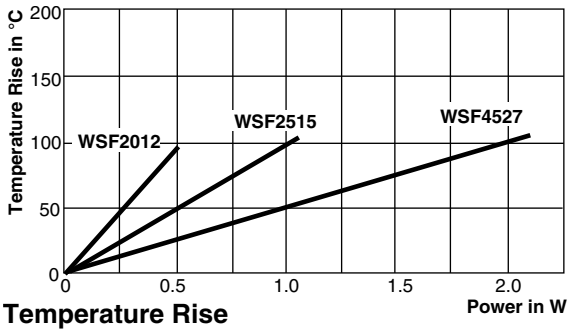
For technical questions, contact: ww2bresistors@vishay.com

DIMENSIONS

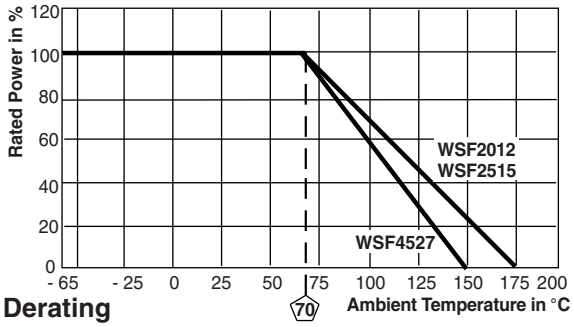


MODEL	DIMENSIONS in inches (millimeters)				
	L	H	T	W	W_1
WSF2012	0.200 ± 0.020 (5.08 ± 0.508)	0.096 ± 0.015 (2.44 ± 0.381)	0.040 ± 0.010 (1.02 ± 0.254)	0.125 ± 0.005 (3.18 ± 0.127)	0.050 ± 0.005 (1.27 ± 0.127)
WSF2515	0.250 ± 0.020 (6.35 ± 0.508)	0.110 ± 0.015 (2.79 ± 0.381)	0.045 ± 0.010 (1.14 ± 0.254)	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)



Temperature Rise



Derating

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) Δ*R*
Short time overload	5 x rated power for 5 s	± (0.5 % + 0.05 Ω) Δ*R*
Low temperature storage	-65 °C for 24 h	± (0.5 % + 0.05 Ω) Δ*R*
High temperature exposure	1000 h at +175 °C (150 °C for WSF4527)	± (1.0 % + 0.05 Ω) Δ*R*
Bias humidity	+85 °C, 85 % RH, 10 % Bias, 1000 h	± (0.5 % + 0.05 Ω) Δ*R*
Moisture resistance	MIL-STD-202 method 106, 0 % power, 7a and 7b not required	± (0.5 % + 0.05 Ω) Δ*R*
Mechanical shock	100 *g*'s for 6 ms, 5 pulses	± (0.5 % + 0.05 Ω) Δ*R*
Vibration	Frequency varied 10 Hz to 500 Hz in one min, 3 directions, 9 h	± (0.5 % + 0.05 Ω) Δ*R*
Load life	1000 h at rated power, +70 °C, 1.5 h "ON", 0.5 h "OFF"	± (1.0 % + 0.05 Ω) Δ*R*
Resistance to solder heat	+260 °C solder, 10 s to 12 s dwell, 25 mm/s emergence	± (0.5 % + 0.05 Ω) Δ*R*

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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