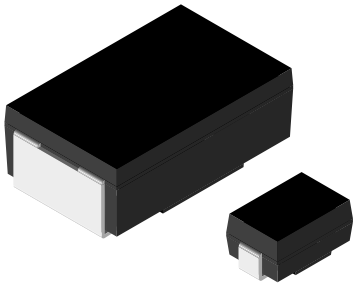
Metal Film Resistors, Power, Surface Mount



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 (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 (2) ± ppm/°C	ENCAPSULATION
WSF2012	2012	0.5	0.5, 1, 5	5.0 to 1.43K (1)	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

Notes

- WSF2012 has been obsoleted; PTN-DR-00013-2018 Rev. 0 - July 20, 2018. WSF2515 and WSF4527 sizes are **not** affected

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

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	$(P \times R)^{1/2}$	$(P \times R)^{1/2}$	$(P \times R)^{1/2}$ (1)
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

(1) Resistance values above 31.25 kΩ are limited to 250 V maximum working voltage

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
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

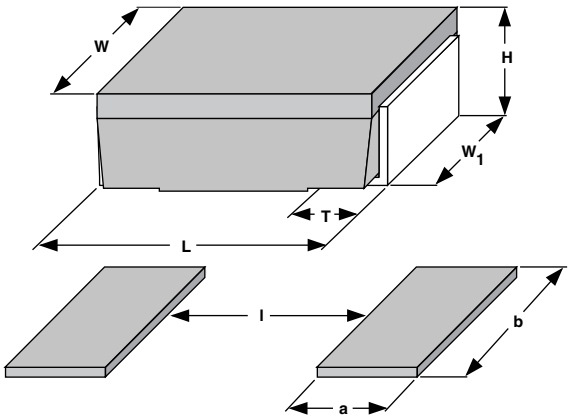
Historical Part Numbering example: WSF2515 1.5 kΩ 5 % 100 ppm/°C R86 (will continue to be accepted for tin/lead product only)

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

Note

- WSF2012 has been obsoleted; PTN-DR-00013-2018 Rev. 0 - July 20, 2018. WSF2515 and WSF4527 sizes are **not** affected

DIMENSIONS



MODEL	DIMENSIONS in inches (millimeters)				
	L	H	T	W	W_1
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)

Note

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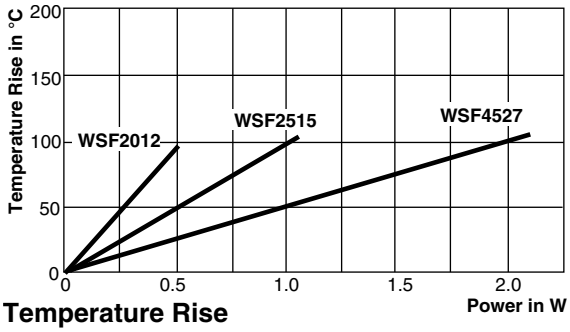
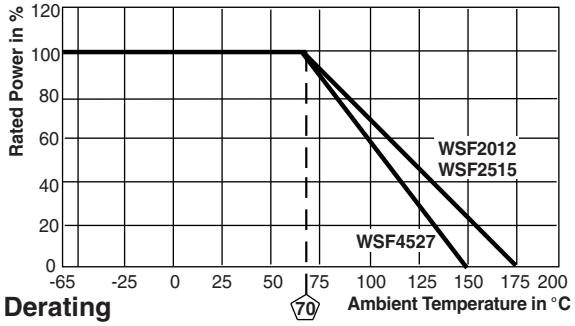


Temperature Rise



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**
WSF2515	16 mm / embossed plastic	330 mm / 13"	2000	EA/TA
WSF4527	24 mm / embossed plastic	330 mm / 13"	1200	EA/TA

Notes

- Embossed carrier tape per EIA-481
- WSF2012 has been obsoleted; PTN-DR-00013-2018 Rev. 0 - July 20, 2018. WSF2515 and WSF4527 sizes are **not** affected
- Additional packaging details at www.vishay.com/doc?20051

PRODUCT SUMMARY										
SERIES	SIZE / DEVICE STYLE	TCR (± ppm/°C)	TOLERANCE (± %)	RESISTANCE (Ω)		E-SERIES	POWER RATING (W)	TEMP. (°C)	MAX. VOLTAGE (V)	AUTO.
				MIN.	MAX.					
WSF2012	2012	100	0.5	5	1.43K	E96	0.5	-65 to +175	$(P \times R)^{1/2}$	AGP
WSF2515	2515	100	0.5	10	10K	E96	1	-65 to +175	$(P \times R)^{1/2}$	AGP
WSF4527	4527	100	0.5	10	100K	E96	2	-65 to +150	$(P \times R)^{1/2}$	AGP

TAGS	
TYPE	PARAMETER
Mounting technology	SMD
Technology	Metal film
Applications	Automotive, high temperature
Characteristics	-

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