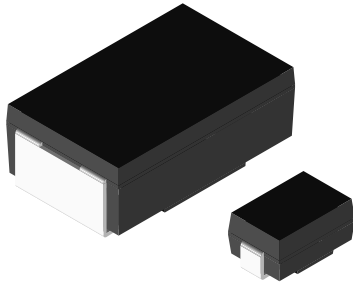




# Metal Film Resistors, High Precision, High Stability, Surface Mount



### FEATURES

- Extremely low temperature coefficient of resistance
- Molded encapsulation
- Wraparound compliant terminations eliminate the risk of solder fillet cracking
- Solderable terminations
- Excellent stability at different environmental conditions
- For axial-leaded product, see Vishay Dale's PTF datasheet ([www.vishay.com/doc?31019](http://www.vishay.com/doc?31019))
- Material categorization: For definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)



RoHS\* COMPLIANT

### Note

\* Lead (Pb)-containing terminations are not RoHS-compliant. Exemptions may apply.

STANDARD ELECTRICAL SPECIFICATIONS							
GLOBAL MODEL	SIZE INCH	POWER RATING $P_{85^\circ\text{C}}$ W	MAXIMUM WORKING VOLTAGE $V_{DC}$ (1)	TEMPERATURE COEFFICIENT $\pm$ ppm/ $^\circ\text{C}$	TOLERANCE $\pm$ %	RESISTANCE RANGE $\Omega$	ENCAPSULATION
PSF2012	2012	0.125	200	5, 10, 15, 25	0.01, 0.02, 0.05, 0.1, 0.25, 0.5, 1	15 to 100K	Epoxy
PSF4527	4527	0.25	300	5, 10, 15, 25	0.01, 0.02, 0.05, 0.1, 0.25, 0.5, 1	15 to 500K	Thermoplastic

### Notes

- Marking: Print-marked-model, value, tolerance, TC, date code.
- DSCC has created a drawing to support the need for a precision 2012-sized product. Vishay Dale is listed as a resource on this drawing as follows:.

DSCC DRAWING NUMBER	VISHAY DALE MODEL	POWER RATING $P_{85^\circ\text{C}}$ W	RESISTANCE RANGE $\Omega$	TOLERANCE $\pm$ %	TEMPERATURE COEFFICIENT $\pm$ ppm/ $^\circ\text{C}$	MAX. WORKING VOLTAGE $V_{DC}$ (1)
02001	PSF2012..1	0.125	15 to 100 K	0.01, 0.02, 0.05, 0.1, 0.25, 0.5, 1	5, 10	200

• This drawing can be reviewed at: [www.landandmaritime.dla.mil/Programs/MilSpec/ListDwgs.aspx?DocTYPE=DSCCdwg](http://www.landandmaritime.dla.mil/Programs/MilSpec/ListDwgs.aspx?DocTYPE=DSCCdwg).

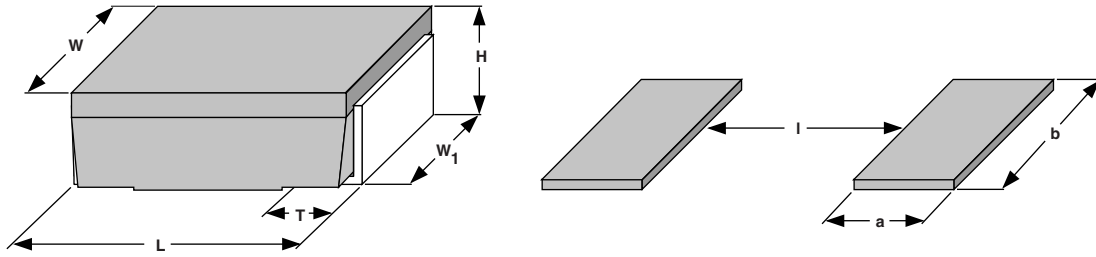
(1) Continuous working voltage shall be  $\sqrt{P \times R}$  or maximum working voltage, whichever is less.

TECHNICAL SPECIFICATIONS			
PARAMETER	UNIT	PSF2012	PSF4527
Rated dissipation at 85 $^\circ\text{C}$	W	0.125	0.25
Limiting element voltage	$V_{\Xi}$	200	300
Insulation voltage (1 min)	$V_{\text{eff}}$		> 500
Thermal resistance	K/W	< 1300	< 520
Insulation resistance	$\Omega$		$\geq 10^{11}$
Category temperature range	$^\circ\text{C}$		- 55 to + 150
Failure rate	$10^{-9}/\text{h}$		< 1
Weight/1000 pieces (typical)	g	90	760

GLOBAL PART NUMBER INFORMATION																	
New Global Part Numbering: PSF201220K50BYTA (preferred part number format)																	
P	S	F	2	0	1	2	2	0	K	5	0	B	Y	T	A		
GLOBAL MODEL	RESISTANCE VALUE	TOLERANCE CODE	TEMP. COEFFICIENT	PACKAGING	SPECIAL												
PSF2012 PSF4527	R = $\Omega$ K = k $\Omega$ 15R00 = 15 $\Omega$ 1K000 = 1 k $\Omega$ 500K0 = 500 k $\Omega$	T = $\pm$ 0.01 % Q = $\pm$ 0.02 % A = $\pm$ 0.05 % B = $\pm$ 0.1 % C = $\pm$ 0.25 % D = $\pm$ 0.5 % F = $\pm$ 1 %	Z = $\pm$ 5 ppm/ $^\circ\text{C}$ Y = $\pm$ 10 ppm/ $^\circ\text{C}$ X = $\pm$ 15 ppm/ $^\circ\text{C}$ E = $\pm$ 25 ppm/ $^\circ\text{C}$ 0 = Special	EK = Lead (Pb)-free, bulk EA = Lead (Pb)-free, T/R BA = Tin/lead, bulk TA = Tin/lead, T/R (full)	Blank = Standard (Dash number) (Up to 2 digits) From 1 to 99 as applicable												

### Note

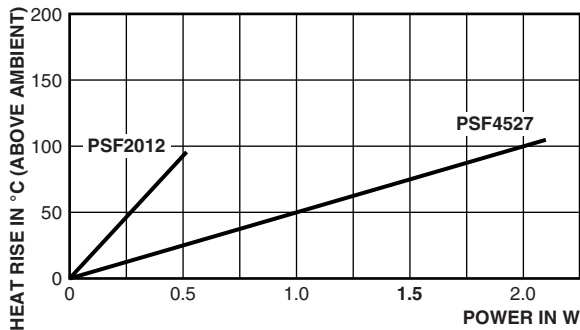
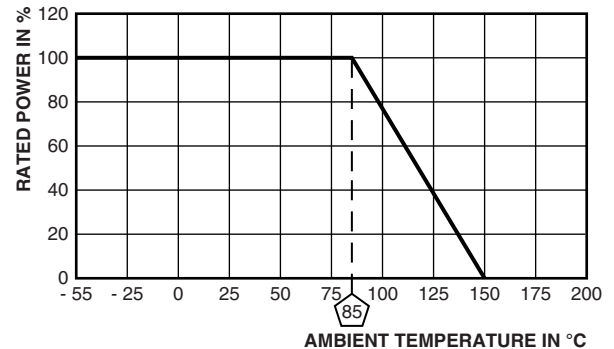
- For additional information on packaging, refer to the Surface Mount Resistor Packaging document ([www.vishay.com/doc?31543](http://www.vishay.com/doc?31543)).

**DIMENSIONS** in inches (millimeters)


MODEL	L	H	T	W	W <sub>1</sub>
PSF2012	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)
PSF4527	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)

**SOLDER PAD DIMENSIONS** in inches (millimeters)

MODEL	A	B	L
PSF2012	0.085 (2.16)	0.070 (1.78)	0.080 (2.03)
PSF4527	0.155 (3.94)	0.230 (5.94)	0.205 (5.21)

**THERMAL RESISTANCE**

**DERATING**

**MATERIAL SPECIFICATIONS**

<b>Element</b>	Precision deposited nickel chrome alloy with controlled annealing
<b>Encapsulation</b>	Molded epoxy on the 2012 and molded thermoplastic on the 4527
<b>Core</b>	Fire-cleaned high purity ceramic
<b>Termination</b>	Standard leadframe material is solder-coated copper on the 2012 and solder-coated bronze on the 4527

**PACKAGING**

MODEL	REEL				
	TAPE WIDTH	DIAMETER	PIECES/REEL	PACKAGING CODE	
				LEAD (Pb)-FREE	LEAD (Pb)-BEARING
PSF2012	12 mm/embossed plastic	330 mm/13"	2000	EA	TA
PSF4527	24 mm/embossed plastic	330 mm/13"	1200	EA	TA

**Note**

- Embossed carrier tape per EIA-481.



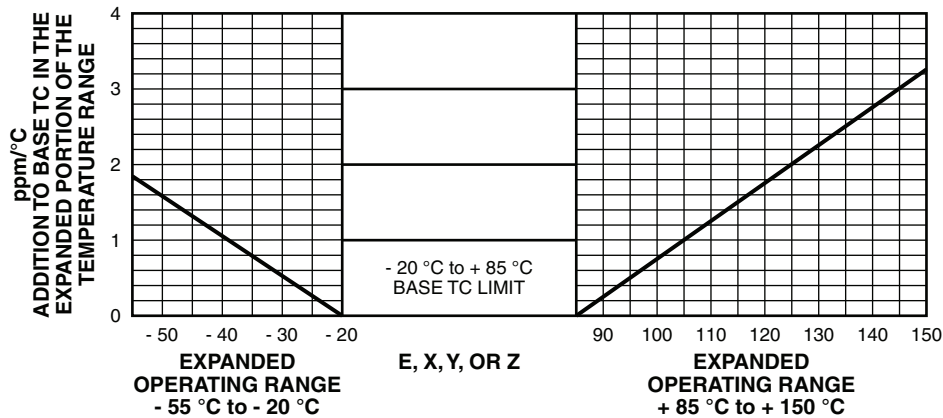
TEMPERATURE COEFFICIENT OF RESISTANCE

Temperature coefficient (TC) of resistance is normally stated as the maximum amount of resistance change from the original + 25 °C value as the ambient temperature increases or decreases. This is most commonly expressed in parts per million per degree centigrade (ppm/°C).

The resistance curve over the operating temperature range is usually a non-linear curve within predictable maximum limits. PSF resistors have a very uniform resistance temperature characteristic when measured over the operating range of - 20 °C to + 85 °C. The standard temperature coefficients available are

E = ± 25 ppm/°C, X = ± 15 ppm/°C, Y = ± 10 ppm/°C, and Z = ± 5 ppm/°C.

Some applications of the PSF require operation beyond the specifications of - 20 °C to + 85 °C. The change in temperature coefficient of resistance is very small (less than ± 0.05 ppm/°C) over the expanded temperature range of - 55 °C to + 150 °C. Therefore, when operating outside the range of - 20 °C to + 85 °C, the designer can plan for a worst case addition of ± 0.05 ppm/°C for each degree centigrade beyond either - 20 °C or + 85 °C as indicated in the graph. This applies to all four temperature coefficient codes.



Example:

Assume the operating characteristics demand a temperature range from - 55 °C to + 125 °C. This requires a ± 35 °C Δ below - 20 °C and a ± 40 °C Δ above + 85 °C. The extreme Δ being ± 40 °C means that the worst case addition to the specified TC limit of ± 0.05 ppm/°C times ± 40 °C or ± 2 ppm/°C. Therefore, a Z which is characterized by a base TC limit of ± 5 ppm/°C over the temperature range of - 20 °C to + 85 °C will exhibit a maximum temperature coefficient of ± 7 ppm/°C over the expanded portion of the temperature range of - 55 °C to 125 °C.

PERFORMANCE

Table with 3 columns: TEST, CONDITIONS OF TEST, TEST RESULTS (TYPICAL TEST LOTS). Rows include Life, Short time overload, Thermal shock, Low temperature operation, Resistance to bonding exposure, Moisture resistance, Solder mounting integrity, Dielectric withstanding voltage, and Solderability.



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