Features:

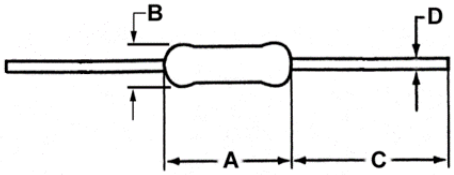
- Lower-cost alternative to carbon comps and wirewounds
- Coating meets UL 94V-0
- Meets solvent test of Mil Standard 202, Method 215
- Cut and formed product is available on select sizes - contact Stackpole
- Higher or lower resistance values may be possible - contact Stackpole
- Flameproof
- 100% RoHS compliant and lead free without exemption
- Halogen free
- REACH compliant

Electrical Specifications

Type/Code	Power Rating (W) @ 70ºC	Maximum Working Voltage (V)(1)	Maximum Overload Voltage (V)	Dielectric Withstanding Voltage (V)	TCR (ppm/ºC)	Ohmic Range(2) (Ω) and Tolerance		
						1%	2%	5%
RSF12	0.5	250	400	350	± 200	0.1 - 150K	0.1 - 75K	0.1 - 510K
RSF1	1	350	600	600	± 200	0.1 - 100K		0.1 - 510K
RSF2	2	350	600	600	± 200	0.1 - 120K		0.1 - 510K
RSF3	3	800	1000	750	± 200	0.1 - 470K	0.1 - 510K	0.1 - 510K
RSF5	5	1000	1000	750	± 200	0.1 - 470K	0.1 - 510K	0.1 - 510K
RSMF12	0.5	250	400	350	± 200	0.1 - 46.4K	0.1 - 47K	0.1 - 470K
RSMF1	1	350	600	500	± 200	0.1 - 75K		0.1 - 470K
RSMF2	2	350	600	500	± 200	0.1 - 100K		0.1 - 470K
RSMF3	3	500	800	600	± 200	0.1 - 118K	0.1 - 120K	0.1 - 470K
RSMF5	5	1000	1000	750	± 200	0.1 - 470K	0.1 - 510K	0.1 - 510K

(1) Lesser of $\sqrt{P*R}$ or maximum working voltage
(2) Contact Stackpole for resistance values outside the specified range

Mechanical Specifications



Type/Code	A Body Length	B Body Diameter	C Lead Length (Bulk)	D Lead Diameter	Lead-Tape Specification	Unit
RSF12	0.35 ± 0.04 9.00 ± 1.00	0.13 ± 0.03 3.20 ± 0.80	1.10 ± 0.12 28.00 ± 3.00	0.03 ± 0.003 0.70 ± 0.08	0.250 6.35	inches mm
RSF1	0.43 ± 0.06 11.00 ± 1.50	0.18 ± 0.04 4.50 ± 1.00	1.10 ± 0.20 28.00 ± 5.00	0.03 ± 0.002 0.80 ± 0.05	0.250 6.35	inches mm
RSF2	0.59 ± 0.06 15.00 ± 1.50	0.22 ± 0.04 5.50 ± 1.00	1.18 ± 0.20 30.00 ± 5.00	0.03 ± 0.004 0.75 ± 0.10	0.250 6.35	inches mm
RSF3	0.69 ± 0.04 17.50 ± 1.00	0.24 ± 0.02 6.00 ± 0.50	1.38 ± 0.12 35.00 ± 3.00	0.03 ± 0.002 0.80 ± 0.05	0.250 6.35	inches mm
RSF5	0.96 ± 0.04 24.50 ± 1.00	0.31 ± 0.02 8.00 ± 0.50	1.38 ± 0.12 35.00 ± 3.00	0.03 ± 0.002 0.80 ± 0.05	0.250 6.35	inches mm
RSMF12	0.24 ± 0.03 6.00 ± 0.80	0.09 ± 0.01 2.30 ± 0.30	1.10 ± 0.12 28.00 ± 3.00	0.02 ± 0.003 0.55 ± 0.07	0.250 6.35	inches mm
RSMF1	0.35 ± 0.04 9.00 ± 1.00	0.13 ± 0.03 3.20 ± 0.80	1.10 ± 0.12 28.00 ± 3.00	0.03 ± 0.003 0.70 ± 0.08	0.250 6.35	inches mm
RSMF2	0.43 ± 0.06 11.00 ± 1.50	0.18 ± 0.04 4.50 ± 1.00	1.18 ± 0.20 30.00 ± 5.00	0.03 ± 0.002 0.80 ± 0.05	0.250 6.35	inches mm
RSMF3	0.59 ± 0.06 15.00 ± 1.50	0.22 ± 0.04 5.50 ± 1.00	1.18 ± 0.20 30.00 ± 5.00	0.03 ± 0.004 0.75 ± 0.10	0.250 6.35	inches mm
RSMF5	0.69 ± 0.04 17.50 ± 1.00	0.24 ± 0.02 6.00 ± 0.50	1.38 ± 0.08 35.00 ± 2.00	0.03 ± 0.002 0.80 ± 0.05	0.250 6.35	inches mm

This specification may be changed at any time without prior notice.
Please confirm technical specifications before you order and/or use.

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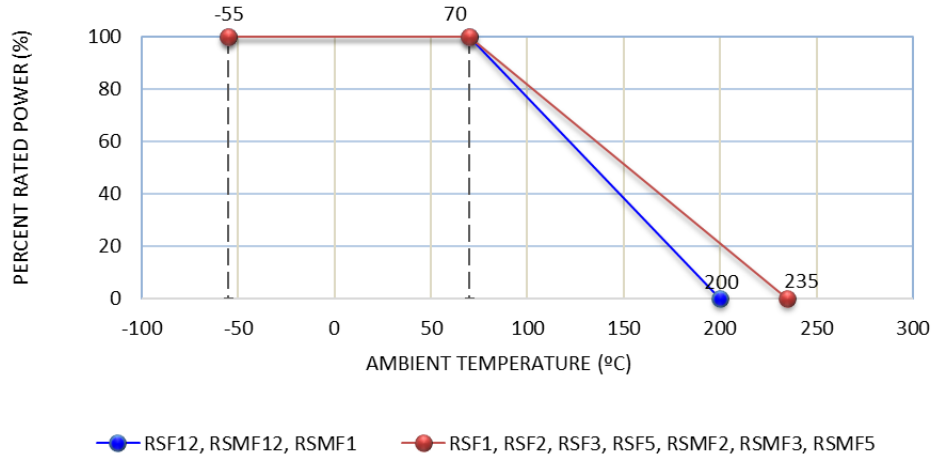
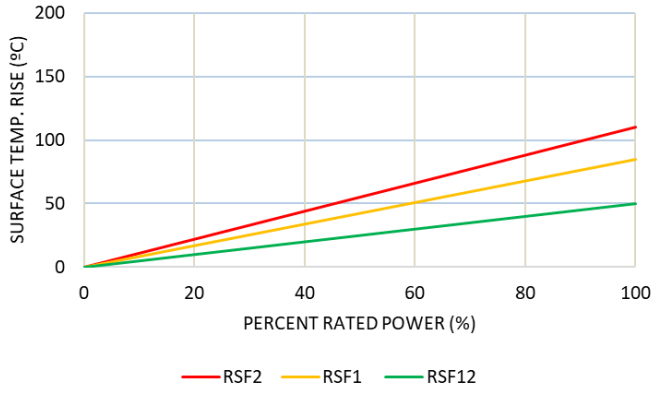
Performance Characteristics			
Test	Test Method	Test Specification	Typical Results
Insulation Resistance	JIS C5201-1, IEC60115-1, 4.6	≥ 1G Ω	≥ 1G Ω
Voltage Proof	JIS C5201-1, IEC60115-1, 4.7	≤ ± (0.5% + 0.05 Ω) No mechanical damage	< ± 0.25%
Short Time Overload	JIS C5201-1, IEC60115-1, 4.13	≤ ± (0.75% + 0.05 Ω)	< ± 0.1%
Resistance to Solder Heat	JIS C5201-1, IEC60115-1, 4.18	≤ ± (2.0% + 0.05 Ω)	< ± 1.0%
Endurance at 70°C	JIS C5201-1, IEC60115-1, 4.25.1	≤± (5.0% + 0.05 Ω)	< ± 2.0%
Robustness of Terminations	JIS C5201-1, IEC60115-1, 4.16	≤ ± (1.0% + 0.05 Ω)	< ± 0.10%
Damp Heat (Steady state)	JIS C5201-1, IEC60115-1, 4.24	≤± (5% + 0.05 Ω)	< ± 1.5%
Rapid Change of Temperature	JIS C5201-1, IEC60115-1, 4.19	≤± (1% + 0.05 Ω)	< ± 0.2%
Resistance to Solvents	JIS C5201-1, IEC60115-1, 4.29	No damage to component or removal of marking	Pass
Intermittent Overload	JIS C5201-1, IEC60115-1, 4.39	≤± (2% + 0.05 Ω)	< ± 0.3%
Accidental Overload (Flame resistance)	JIS C5201-1, IEC60115-1, 4.26	No flaming of gauze	Pass

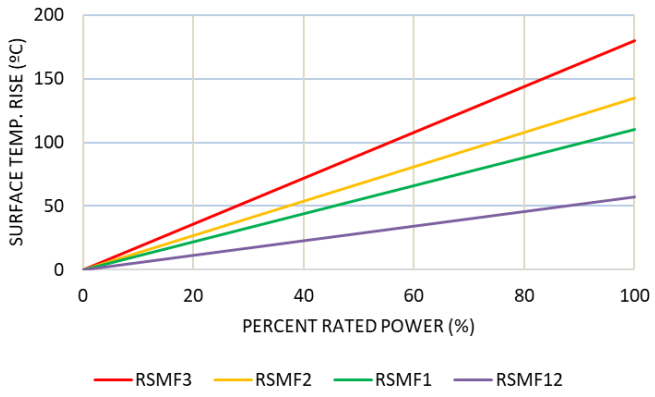
Operating temperature range is -55ºC to +200ºC (RSF12, RSMF12, RSMF1)
-55ºC to +235ºC (all others)

Power Derating Curve:



Surface Temperature Rise:





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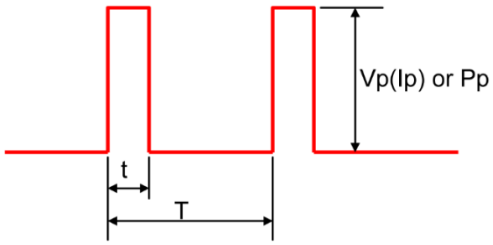
Repetitive Pulse Information:

If repetitive pulses are applied to resistors, pulse wave form must be less than “pulse limiting voltage”, “pulse limiting current” or “pulse limiting wattage” calculated by the formula below.

$$Vp = K\sqrt{P \times R \times T/t}$$
$$Ip = K\sqrt{P/R \times T/t}$$
$$Pp = K^2 \times P \times T/t$$



Where: Vp: Pulse limiting voltage (V)
Ip: Pulse limiting current (A)
Pp: Pulse limiting wattage (W)
P: Power rating (W)
R: Nominal resistance (ohm)
T: Repetitive period (sec)
t: Pulse duration (sec)
K: Coefficient: 0.8
[Vr: Rated Voltage (V), Ir: Rated Current (A)]

Note 1: If T > 10 → T = 10 (sec), T / t > 1000 → T / t = 1000
Note 2: If T > 10 and T / t > 1000, “Pulse Limiting power (Single pulse) is applied
Note 3: If Vp < Vr (Ip < Ir or Pp < P), Vr (Ir, P) is Vp (Ip, Pp)
Note 4: Pulse limiting voltage (current, wattage) is applied at less than rated ambient temperature. If ambient temperature is more than the rated temperature (70 °C), decrease power rating according to “Power Derating Curve”
Note 5: Assure sufficient margin for use period and conditions for “pulse limiting voltage”
Note 6: If the pulse waveform is not square wave, judge after transform the waveform into square wave according to the “Waveform Transformation to Square Wave”.

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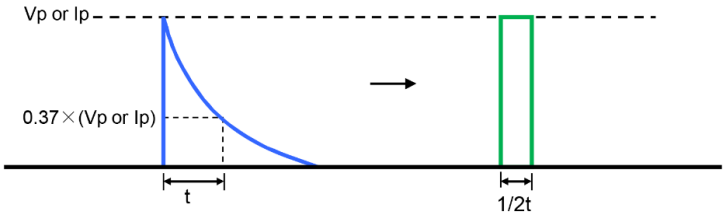
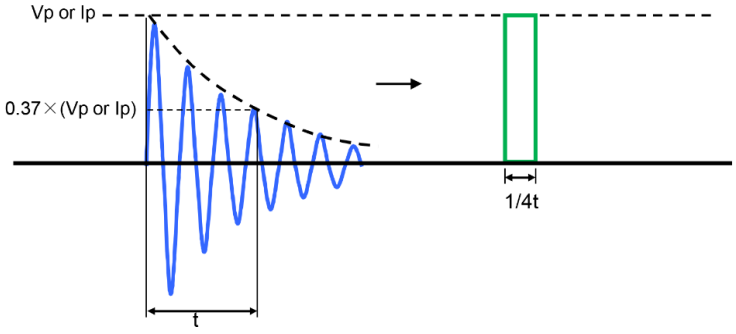
Waveform Transformation to Square Wave

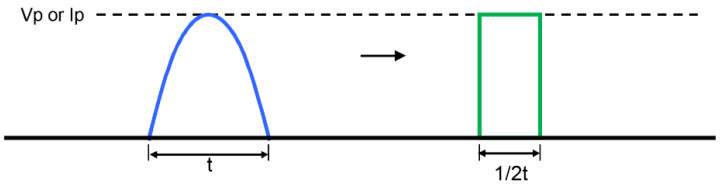
1. Discharge curve wave with time constant “t” → Square wave



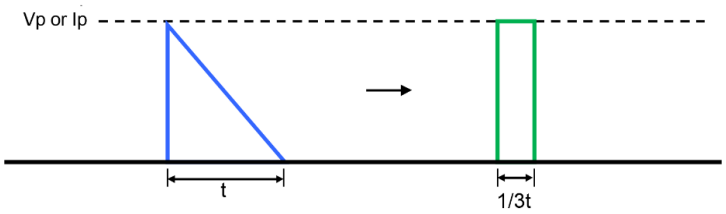
2. Damping oscillation wave with time constant of envelope “t” → Square wave



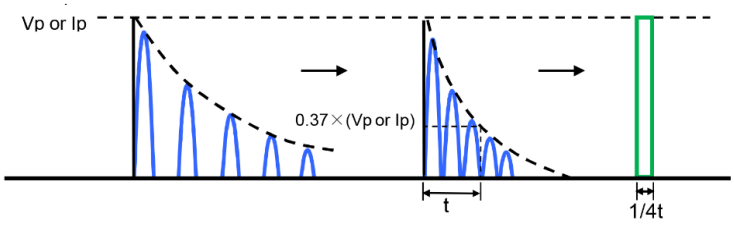
3. Half-wave rectification wave → Square wave



4. Triangular wave → Square wave



5. Special wave → Square wave



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Recommended Solder Profile

This information is intended as a reference for solder profiles for Stackpole resistive components. These profiles should be compatible with most soldering processes. These are only recommendations. Actual numbers will depend on board density, geometry, packages used, etc., especially those cells labeled with "*".

100% Matte Tin / RoHS Compliant Terminations

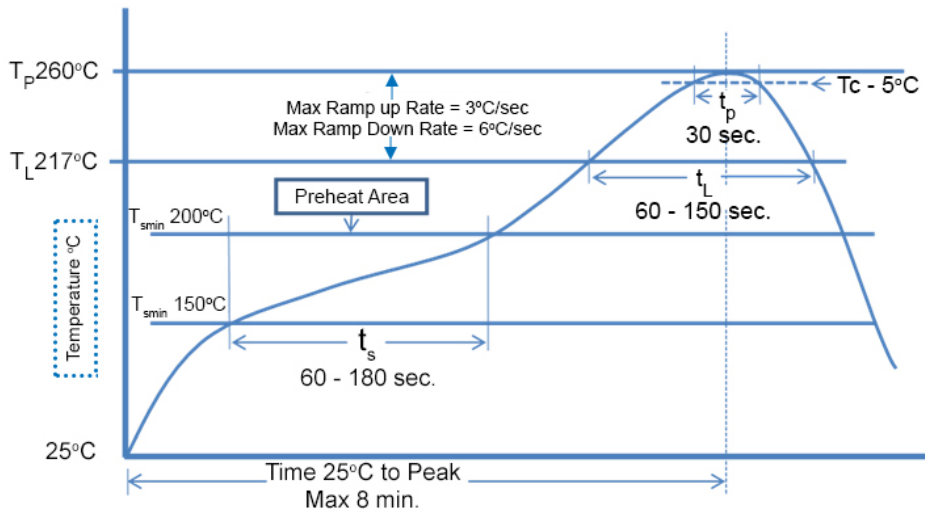
Soldering iron recommended temperatures: 330°C to 350°C with minimum duration.
Maximum number of reflow cycles: 3.

Wave Soldering			
Description	Maximum	Recommended	Minimum
Preheat Time	80 seconds	70 seconds	60 seconds
Temperature Diff.	140°C	120°C	100°C
Solder Temp.	260°C	250°C	240°C
Dwell Time at Max.	10 seconds	5 seconds	*
Ramp DN (°C/sec)	N/A	N/A	N/A

Temperature Diff. = Defference between final preheat stage and soldering stage.

Convection IR Reflow			
Description	Maximum	Recommended	Minimum
Ramp Up (°C/sec)	3°C/sec	2°C/sec	*
Dwell Time > 217°C	150 seconds	90 seconds	60 seconds
Solder Temp.	260°C	245°C	*
Dwell Time at Max.	30 seconds	15 seconds	10 seconds
Ramp DN (°C/sec)	6°C/sec	3°C/sec	*

Recommended Lead Free Resistor Reflow Profile



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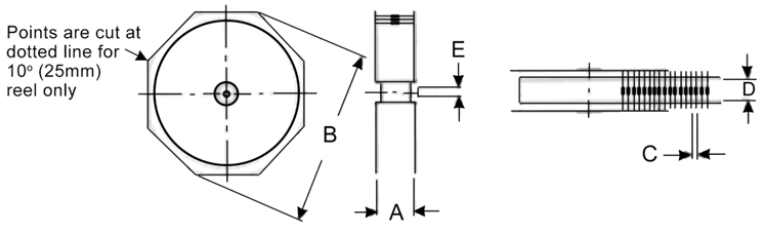
Reel Packaging Specifications

Reeled in accordance with EIA-296-F



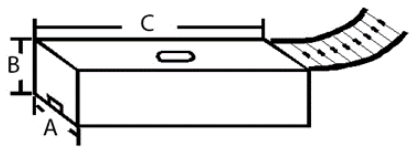
Type/Code	A max[1]	B max	C	D[2]	Tape	Unit
RSF12	2.736 69.50	13.504 343.00	0.197 ± 0.020 5.00 ± 0.50	2.063 ± 0.079 52.40 ± 2.00	0.250 6.35	inches mm
RSF1	2.815 71.50	13.504 343.00	0.197 ± 0.020 5.00 ± 0.50	2.063 ± 0.079 52.40 ± 2.00	0.250 6.35	inches mm
RSF2	3.524 89.50	13.504 343.00	0.394 ± 0.020 10.00 ± 0.50	2.500 ± 0.079 63.50 ± 2.00	0.250 6.35	inches mm
RSF3	3.740 95.00	12.008 305.00	0.394 ± 0.020 10.00 ± 0.50	2.874 ± 0.079 73.00 ± 2.00	0.250 6.35	inches mm
RSF5	4.331 110.00	12.008 305.00	0.394 ± 0.020 10.00 ± 0.50	3.465 ± 0.079 88.00 ± 2.00	0.250 6.35	inches mm
Type/Code	A max[1]	B max	C	D[2]	Tape	Unit
RSMF12	2.618 66.50	13.504 343.00	0.197 ± 0.020 5.00 ± 0.50	2.063 ± 0.079 52.40 ± 2.00	0.250 6.35	inches mm
RSMF1	2.736 69.50	13.504 343.00	0.197 ± 0.020 5.00 ± 0.50	2.063 ± 0.079 52.40 ± 2.00	0.250 6.35	inches mm
RSMF2	2.815 71.50	13.504 343.00	0.197 ± 0.020 5.00 ± 0.50	2.063 ± 0.079 52.40 ± 2.00	0.250 6.35	inches mm
RSMF3	3.524 89.50	13.504 343.00	0.394 ± 0.020 10.00 ± 0.50	2.500 ± 0.079 63.50 ± 2.00	0.250 6.35	inches mm
RSMF5	3.740 95.00	12.008 305.00	0.394 ± 0.020 10.00 ± 0.50	2.874 ± 0.079 73.00 ± 2.00	0.250 6.35	inches mm

Dimension "E": This is a non-critical dimension that does not have a tolerance in the standard.
Range of diameters is from 0.547 inches (13.90 mm) to 1.500 inches (38.10 mm).

(1) Reference value only. The "A" dimension shall be governed by the overall length of the taped component.
The distance between flanges shall be 0.059 inches (1.50 mm) to 0.315 (8.00 mm) greater than the overall component.

(2) The given dimension "D" expresses the standard width spacing. A 26 mm narrow spacing is available as option "N" packaging code.

Ammo Packaging Specifications



Type/Code	Size	A	B	C	Unit
RSF	2	3.346 ± 0.079 85.00 ± 2.00	3.543 ± 0.118 90.00 ± 3.00		inches mm
RSF	1	2.953 ± 0.079 75.00 ± 2.00	2.756 ± 0.118 70.00 ± 3.00		inches mm
RSMF	3	3.346 ± 0.079 85.00 ± 2.00	3.543 ± 0.118 90.00 ± 3.00	10.039 ± 0.197 255.00 ± 5.00	inches mm
RSMF	2	2.953 ± 0.079 75.00 ± 2.00	2.756 ± 0.118 70.00 ± 3.00		inches mm
RSMF	1	2.953 ± 0.079 75.00 ± 2.00	2.756 ± 0.118 70.00 ± 3.00		inches mm

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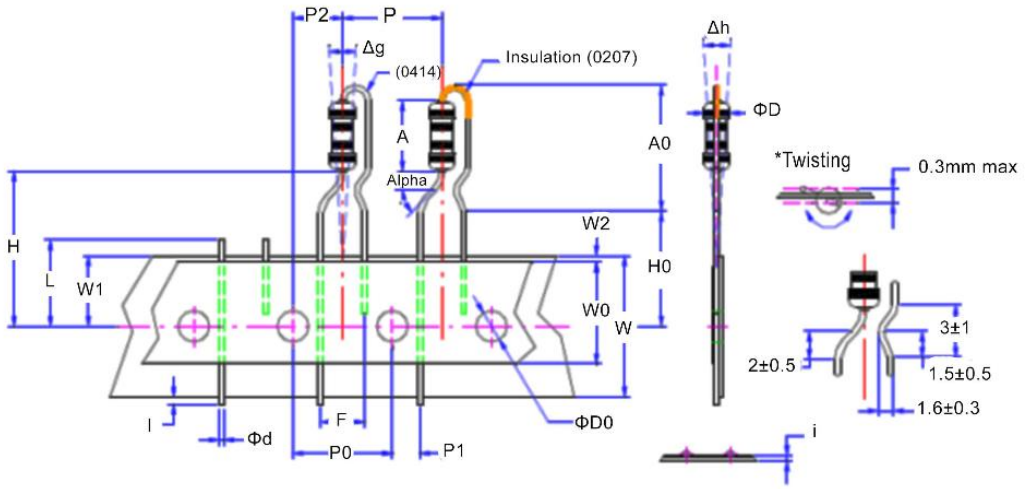
Pana-Sert Packaging Specifications



Symbol	Description	PRSM12	PRSF1 / PRSM2
ØD	Body diameter	0.157 max. 4.00 max.	0.217 max. 5.50 max.
A	Body length	0.394 max. 10.00 max.	0.492 max. 12.50 max.
A0	Mounting height	0.571 max. 14.50 max.	0.709 max. 18.00 max.
Ød	Lead diameter	0.028 ± 0.004 0.70 ± 0.10	0.028 ± 0.004 0.70 ± 0.10
P	Component pitch	0.500 ± 0.039 12.70 ± 1.00	
P0	Feed hole pitch	0.500 ± 0.012 12.70 ± 0.30	
P1	Feed hole center to lead	0.152 ± 0.020 3.85 ± 0.50	
P2	Feed hole center to body	0.250 ± 0.016 6.35 ± 0.40	
F	Lead-lead distance	0.200 +0.24 / -0.008 5.08 +0.60 / -0.20	
Alpha	Performing angle	45° max	
Δh	Component alignment	0.000 ± 0.079 0.00 ± 2.00	
Δg	Component alignment	0.000 ± 0.118 0.00 ± 3.00	
W	Tape width	0.709 +0.039 / -0.031 18.00 +1.00 / -0.80	
W0	Hold down tape width	0.492 min. 12.50 min.	
W1	Hole position	0.354 ± 0.020 9.00 ± 0.50	
W2	Hold down tape position	0.079 +0 / -0.059 2.00 +0 / -1.50	

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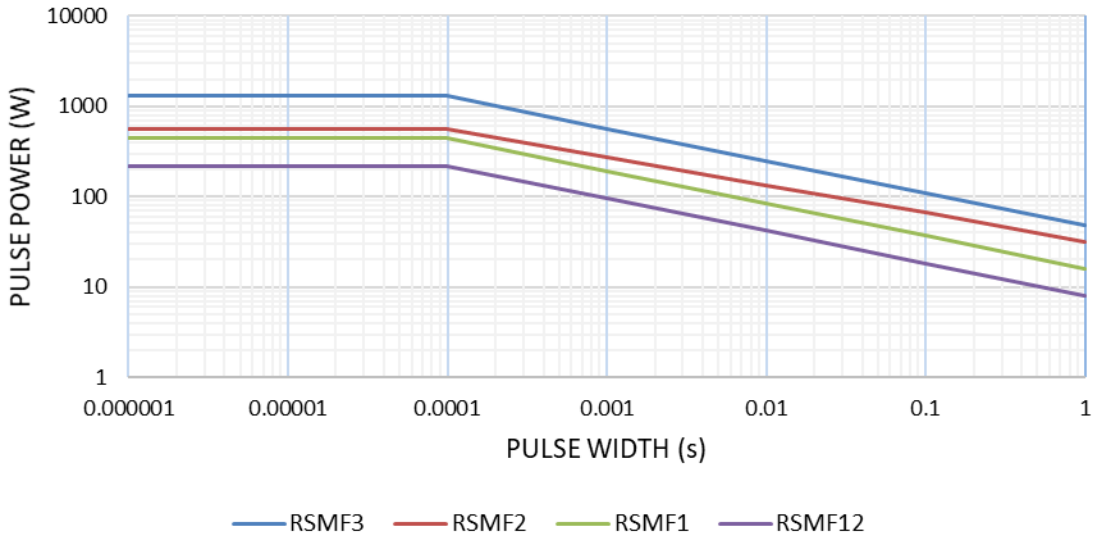
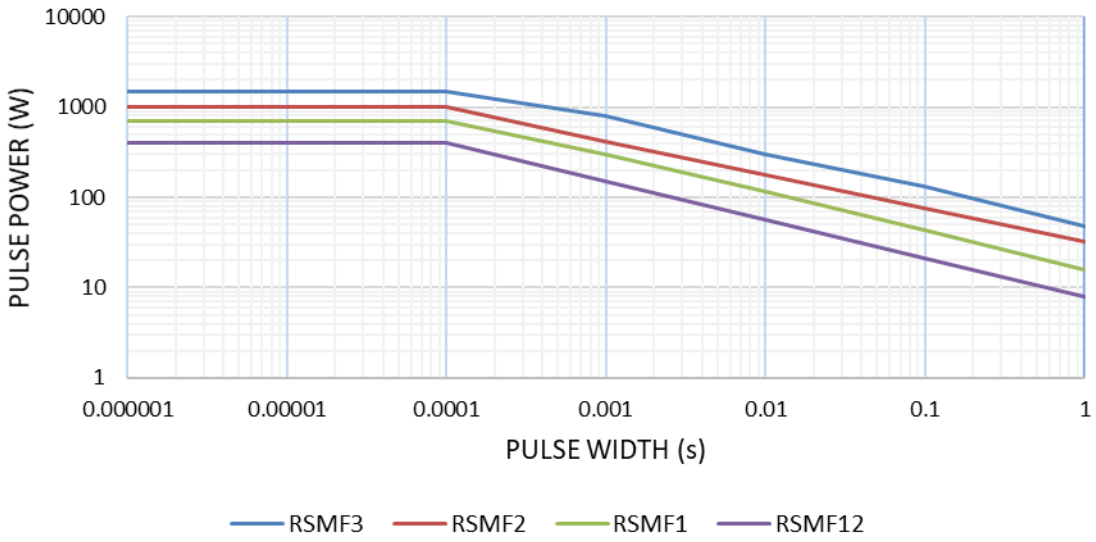
Packaging Specifications – Pana-Sert (cont.)			
Symbol	Description	PRSM12	PRSF1 / PRSM2
H	Distance to tape center	0.748 ± 0.039 19.00 ± 1.00	
H0	Lead wire clinch height	0.630 ± 0.020 16.00 ± 0.50	
I	Lead wire portrait	0.039 max. 1.00 max.	
ØD0	Feed hole diamenter	0.157 ± 0.008 4.00 ± 0.20	
i	Total tape thickness	0.028 max. 0.70 max.	
L	Length of shipped lead	0.433 max. 11.00 max.	

Pulse Limiting Power (one pulse) / RSMF Series ≤ 5Ω



Pulse Limiting Power (one pulse) / RSMF Series > 5Ω



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RoHS Compliance

Stackpole Electronics has joined the worldwide effort to reduce the amount of lead in electronic components and to meet the various regulatory requirements now prevalent, such as the European Union's directive regarding "Restrictions on Hazardous Substances" (RoHS 3). As part of this ongoing program, we periodically update this document with the status regarding the availability of our compliant components. All our standard part numbers are compliant to EU Directive 2011/65/EU of the European Parliament as amended by Directive (EU) 2015/863/EU as regards the list of restricted substances.

RoHS Compliance Status

Standard Product Series	Description	Package / Termination Type	Standard Series RoHS Compliant	Lead-Free Termination Composition	Lead-Free Mfg. Effective Date (Std Product Series)	Lead-Free Effective Date Code (YY/WW)
RSF	General Purpose Metal Oxide Leaded Resistor	Axial	YES	99.3/0.7 Sn/Cu 100% Matte Sn	Apr-05 (Japan) Jan-04 (Taiwan, China)	05/14 04/01
RSMF	Mini-Metal Oxide Leaded Resistor	Axial	YES	99.3/0.7 Sn/Cu 100% Matte Sn	Apr-05 (Japan) Jan-04 (Taiwan, China)	05/14 04/01

"Conflict Metals" Commitment

We at Stackpole Electronics, Inc. are joined with our industry in opposing the use of metals mined in the "conflict region" of the Eastern Democratic Republic of the Congo (DRC) in our products. Recognizing that the supply chain for metals used in the electronics industry is very complex, we work closely with our own suppliers to verify to the extent possible that the materials and products we supply do not contain metals sourced from this conflict region. As such, we are in compliance with the requirements of Dodd-Frank Act regarding Conflict Minerals.

Compliance to "REACH"

We certify that all passive components supplied by Stackpole Electronics, Inc. are SVHC (Substances of Very High Concern) free and compliant with the requirements of EU Directive 1907/2006/EC, "The Registration, Evaluation, Authorization and Restriction of Chemicals", otherwise referred to as REACH. Contact us for complete list of REACH Substance Candidate List.

Environmental Policy

It is the policy of Stackpole Electronics, Inc. (SEI) to protect the environment in all localities in which we operate. We continually strive to improve our effect on the environment. We observe all applicable laws and regulations regarding the protection of our environment and all requests related to the environment to which we have agreed. We are committed to the prevention of all forms of pollution.

How to Order

R	S	F	1	2	J	T	R	4	7	0

Product Series	
RSF	Metal Oxide
RSMF	Mini
PRSF	Panasert
PRSM	Panasert Mini

Power Rating	
Size	W
12	0.5
1	1
2	2
3	3
5	5

Tolerance		
Code	Tol	Value
F	1%	E96
G	2%	E24
J	5%	

Packaging			
Code	Description	Size	Quantity
T	Tape and Reel	RSMF12, PRSM12	5000
		RSF12, RSF1 RSMF1, RSMF2	2500
		PRSF1, PRSM2	2000
		RSF2, RSMF3	1000
		RSF3, RSMF5	1000
T	Tape and Reel	RSF5	500
A	Ammo	RSMF12	5000
		RSF12; RSMF1, PRSM12	2000
		RSF1, RSF2, RSMF2, PRSF1, PRSM2, RSMF3	1000
		RSF3, RSF5, RSMF5	500
B	Bulk	All Sizes	1000

Resistance Value
Four characters with the multiplier used as the decimal holder.
0.22 ohm = R220 33.2 ohm = 33R2 10.2 Kohm = 10K2 1 Mohm = 1M00

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