Features:

- Robust metal oxide film element
- Flameproof design
- Compact size
- Useful in circuits where duty cycles require power resistors
- Tin-plated copper leads
- Cut and formed product is available on select sizes - contact Stackpole for details
- 100% RoHS compliant and lead free without exemption
- Halogen free
- REACH compliant

Electrical Specifications - RSPF

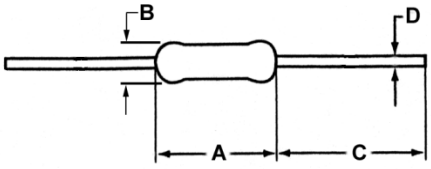
Type / Code	Power Rating (W) @ 70ºC	Maximum Working Voltage (V)[1]	Maximum Overload Voltage (V)	TCR (ppm/ºC)	Ohmic Range (Ω) and Tolerance	
					1%, 2%	5%
RSPF14	0.25	250	500	- 200 ~ + 350	10 - 100K	2.2 - 1M
RSPF12	0.5	400	800			
RSPF1	1	500	1000			
RSPF2	2	500	1000			
RSPF3	3	500	1000			

Electrical Specifications - RSPL

Type / Code	Power Rating (W) @ 70ºC	Maximum Working Voltage (V)[1]	Maximum Overload Voltage (V)	TCR (ppm/ºC)	Ohmic Range (Ω) and Tolerance	
					1%, 2%	5%
RSPL14	0.25	$\sqrt{P*R}$	$\sqrt{P*R}$ x 2.5	- 200 ~ + 350	-	0.1 - 2
RSPL12	0.5					
RSPL1	1					
RSPL2	2					
RSPL3	3					

(1) Lesser of $\sqrt{P*R}$ or maximum working voltage

Mechanical Specifications

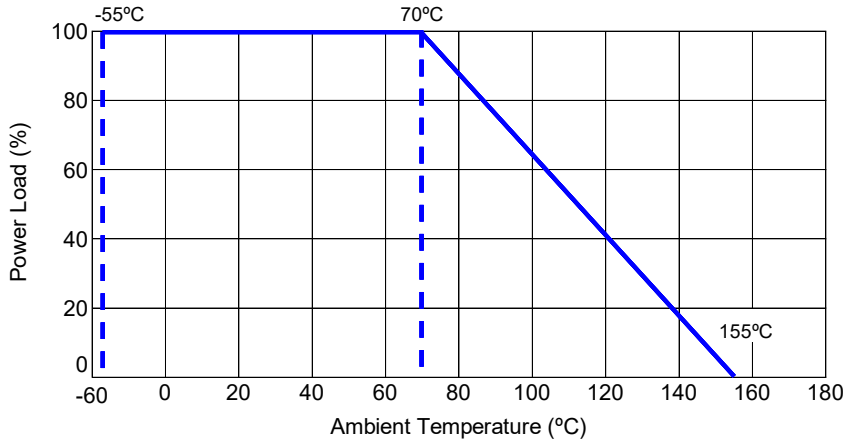


Type / Code	A Body Length	B Body Diameter	C Lead Length (Bulk)	D Lead Diameter	Unit
RSPF14 / RSPL14	0.13 +0.008 / - 3.20 +0.20 / -0	0.07 ± 0.01 1.82 ± 0.20	1.10 ± 0.12 28.00 ± 3.00	0.02 ± 0.002 0.45 ± 0.05	inches mm
RSPF12 / RSPL12	0.24 ± 0.020 6.00 ± 0.50	0.09 ± 0.01 2.30 ± 0.20	1.10 ± 0.12 28.00 ± 3.00	0.02 ± 0.002 0.55 ± 0.05	inches mm
RSPF1 / RSPL1	0.35 ± 0.039 9.00 ± 1.00	0.12 ± 0.02 3.00 ± 0.50	1.10 ± 0.12 28.00 ± 3.00	0.03 ± 0.002 0.70 ± 0.05	inches mm
RSPF2 / RSPL2	0.43 ± 0.039 11.00 ± 1.00	0.16 ± 0.02 4.00 ± 0.50	1.10 ± 0.12 28.00 ± 3.00	0.03 ± 0.002 0.80 ± 0.05	inches mm
RSPF3 / RSPL3	0.59 ± 0.039 15.00 ± 1.00	0.22 ± 0.04 5.50 ± 1.00	1.38 ± 0.12 35.00 ± 3.00	0.03 ± 0.002 0.80 ± 0.05	inches mm

Performance Characteristics	
Test	Test Results
Short Time Overload	± (0.75% + 0.05Ω)
Moisture Resistance	± (5% + 0.05Ω)
Load Life @ 70ºC - 1000 hours	± (5% + 0.05Ω)
Dielectric Withstanding Voltage	± (5% + 0.05Ω)
Resistance to Solvent	Permanent marking no physical damage or deterioration

Operating temperature range is -55ºC to +155ºC

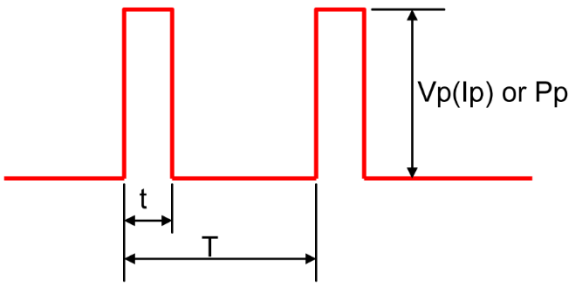
Power Derating Curve:



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.

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

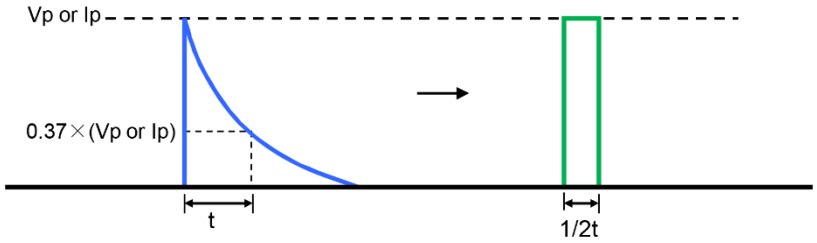


Where: Vp: Pulse limiting voltage (V)
Ip: Pulse limiting current (A)
Pp: Pulse limiting wattage (W)
P: Power rating (W)
R: Nominal resistance (ohm)
T: Repetitive period (sec)
t: Pulse duration (sec)
K: Coefficient: 0.9
[Vr: Rated Voltage (V), Ir: Rated Current (A)]

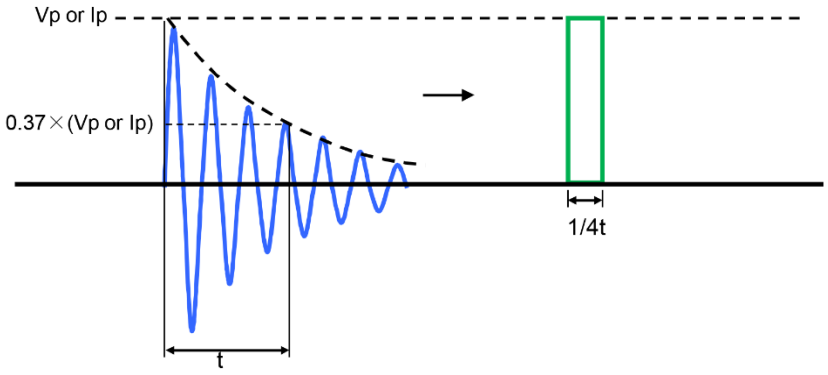
Note 1: If T > 10 → T = 10 (sec), T / t > 1000 → T / t = 1000
Note 2: If T > 10 and T / t > 1000, “Pulse Limiting power (Single pulse) is applied
Note 3: If Vp < Vr (Ip < Ir or Pp < P), Vr (Ir, P) is Vp (Ip, Pp)
Note 4: Pulse limiting voltage (current, wattage) is applied at less than rated ambient temperature. 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”.

Waveform Transformation to Square Wave

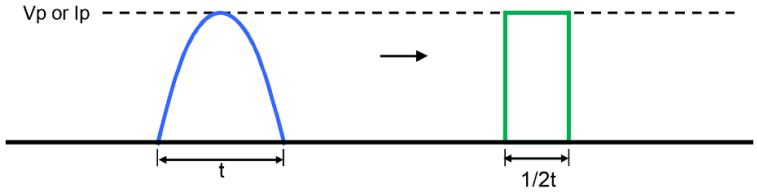
1. Discharge curve wave with time constant "t" → Square wave



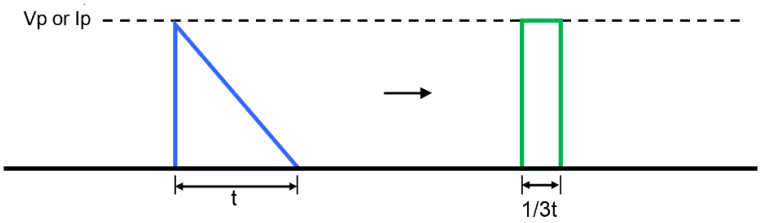
2. Damping oscillation wave with time constant of envelope "t" → Square wave



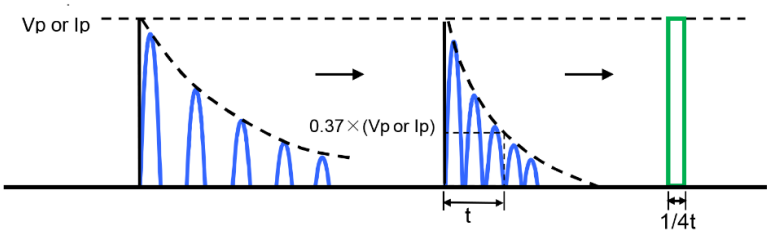
3. Half-wave rectification wave → Square wave



4. Triangular wave → Square wave



5. Special wave → Square wave



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

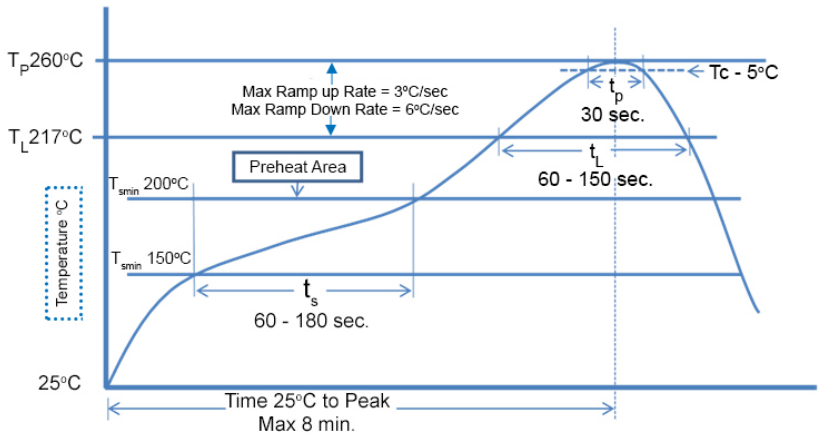
Soldering iron recommended temperatures: 330°C to 350°C with minimum duration.
Maximum number of reflow cycles: 3.

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

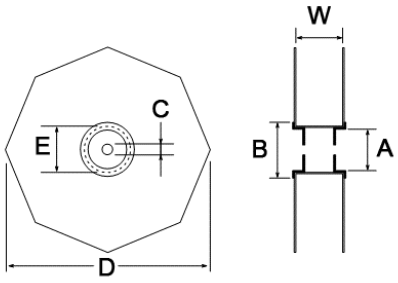
Temperature Diff. = Defference between final preheat stage and soldering stage.

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



Packaging Specifications



Type / Code	A	B	C	D	E	W	Unit
RSPF / RSPL	2.362 ± 0.079 60.00 ± 2.00	3.150 ± 0.079 80.00 ± 2.00	0.591 ± 0.039 15.00 ± 1.00	11.811 ± 0.197 300.00 ± 5.00	2.756 ± 0.079 70.00 ± 2.00	2.756 ± 0.079 70.00 ± 2.00	inches mm

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)
RSPF	Flameproof Power Leaded Resistor	Axial	YES	99.3/0.7 Sn/Cu	Apr-05	05/14
RSPL	Flameproof Power Leaded Resistor Low Resistance	Axial	YES	99.3/0.7 Sn/Cu	Apr-05	05/14

"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

1	2	3	4	5	6	7	8	9	10	11	12
R	S	P	F	1	2	J	B	1	0	R	0

Product Series	
RSPF	Flameproof
RSPL	Low values

Power Rating	
Size	W
14	0.25
12	0.5
1	1
2	2
3	3

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

Packaging			
Code	Description	Size	Quantity
T	Tape and Reel	RSPF14, RSPL14 RSPF12, RSPL12	5000
		RSPF1, RSPL1 RSPF2, RSPL2	2500
		RSPF3, RSPL3	1000
B	Bulk	RSPF14, RSPL14	2000
		RSPF12, RSPL12 RSPF1, RSPL1 RSPF2, RSPL2 RSPF3, RSPL3	1000
A	Ammo	RSPF14, RSPL14	5000
		RSPF12, RSPL12 RSPF1, RSPL1	2000
		RSPF2, RSPL2	1000
		RSPF3, RSPL3	500 (*)

(*) Minimum order quantity of 1000 pieces

Resistance Value
Four characters with the multiplier used as the decimal holder.
2.2 ohm = 2R20 10 Kohm = 10K0 1 Mohm = 1M00