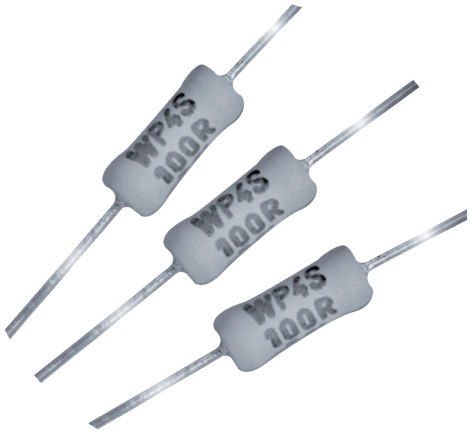
Compact Flameproof Power Wirewound Resistors



WP-S Series

- Small size for power rating
- Enhanced pulse handling capability
- Flameproof protection
- Surface mount ZI-form option
- RoHS compliant with Pb-free terminations

All Pb-free parts comply with EU Directive 2011/65/EU amended by (EU) 2015/863 (RoHS3)

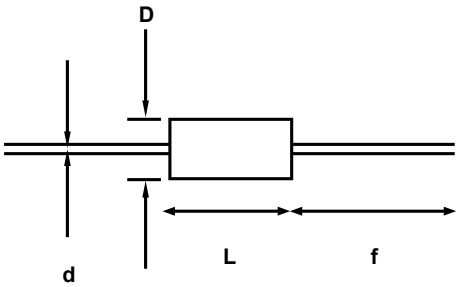
Electrical Data

		WP1S	WP2S / WPP2R	WP25S	WP3S	WP4S	WP5S
Power rating at 25 °C	watts	1	2	2.5	3	4	5
5s overload rating at 25°C	watts	5	10	12.5	15	20	25
Short pulse performance		See Pulse Performance graphs					
Resistance range	ohms	R068 to 430R	R05 to 900R	R05 to 900R	R01 to 2K2	R01 to 10K	R015 to 6K8
Limiting element voltage	volts	50	50	75	100	100	150
TCR	ppm/°C	<1R: 350 ≥1R: 200					
Isolation Voltage	volts	250			350	500	
Resistance Tolerance	%	<20R: 5 ≥20R: 1, 2, 5				<R10: 5 ≥R10: 1, 2, 5	<20R: 5 ≥20R: 1, 2, 5
Standard Values		E24 preferred					
Thermal Impedance	°C/watt	140	110	90	82	62	54
Ambient temperature range	°C	-55 to +200					

Physical Data

Dimensions (mm) & Weight (g)

Type	L max	D max	f min	d nom	PCB mount centres	Min bend radius	Wt. nom
WP1S	6.2	2.8	21.20	0.6	10.20	0.6	0.22
WP2S	9.0	3.6	19.80	0.8	12.70	1.2	0.50
WP25S	12.5	4.5	17.80		18.40		0.50
WP3S	14.5	5.2 (Note 1)	24.55		20.30		1.10
WP4S	13	5.6 (Note 2)	22.75		18.90		1.00
WP5S	16.5	7.0 (Note 3)	23.55		22.86		1.75



Note 1: 5.4 for values ≤0R1 Note 2: 5.8 for values ≤0R1 Note 3: 7.2 for values ≤0R1

Construction

A high purity ceramic substrate is assembled with interference fit end caps to which are welded the terminations. The resistive element is wound on the substrate and welded to the caps. Flameproof silicone cement coating is applied prior to marking with indelible ink. The components are then leadformed if required and packed.

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Terminations

Material:	Hot tin dipped copper wire
Strength:	The terminations meet the requirements of IEC 68.2.21
Solderability:	The terminations meet the requirements of IEC 115-1 Clause 4.17.3.2

Marking

WP1S, WP2S, WPP2R, WP25S and WP3S resistors R10 and above are marked with four or five colour bands in conformance. with IEC62. below R10 are marked with three bands (two digits indicating value in milliohms, and tolerance); there is no multiplier band. WP4S and WP5S resistors are legend marked with type reference, resistance value and tolerance.

Solvent Resistance

The body protection and marking are resistant to all normal industrial cleaning solvents suitable for printed circuits.

Flammability

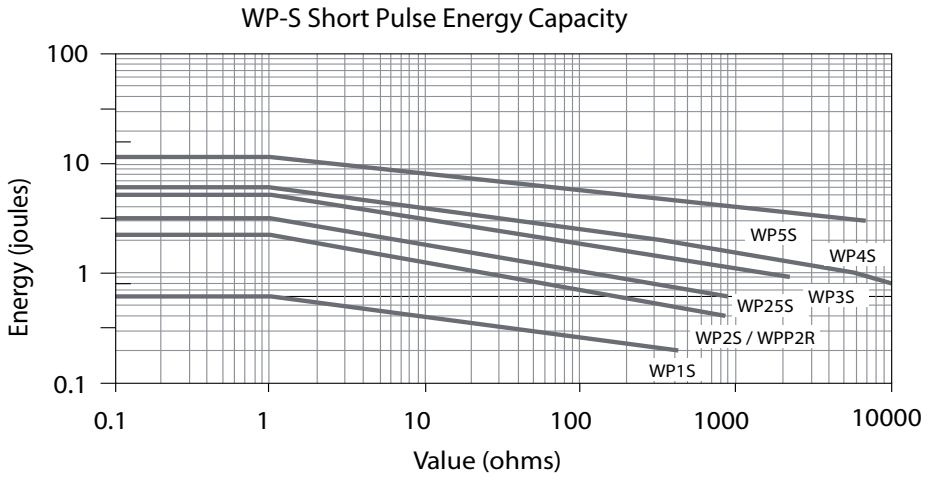
The resistor coating will not burn or emit incandescent particles under any condition of applied temperature or power overload.

Performance Data

		Maximum	Typical Change
Load at rated power: 1000hrs @ 25°C	ΔR%	5 +0.001Ω	3
Dry heat: 1000hrs @ 200°C	ΔR%	5 +0.001Ω	3
Short term overload (5 x Pr for 5s)	ΔR%	5 +0.001Ω	1
Derating from rated power @25°C		Zero at 280°C	
Climatic	ΔR%	5 +0.001Ω	2
Climatic category		55/200/56	
TRC & Vibration	ΔR%	5 +0.001Ω	1
Robustness & solder heat	ΔR%	5 +0.001Ω	1
Long term damp heat (56 days)	ΔR%	5 +0.001Ω	1

Pulse Performance

The pulse energy capacity limits in the graph below relate to pulses below 100ms duration, low mean power dissipation and at 25°C.



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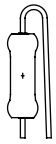
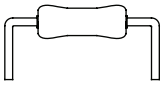
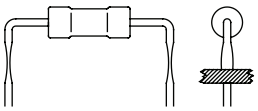
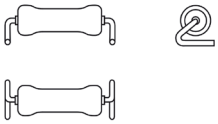
Application Notes

1. If the resistors are to dissipate full rated power, it is recommended that the terminations should not be soldered closer than 4mm from the body.

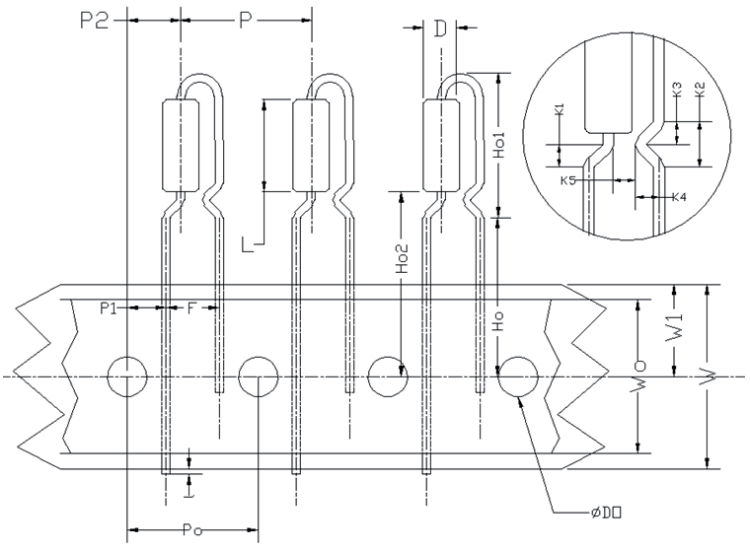
2. Due to operating temperature limits imposed by some PCB materials, derating may be necessary. An estimate of the temperature rise to be expected at the center of the body can be calculated using the thermal impedance figures given under Electrical Data.

3. WP-S resistors can also be supplied with radial, goalpost or lancet pre-formed leads- see https://www.ttelectronics.com/TTElectronics/media/ProductFiles/Resistors/ApplicationNotes/TN008-resistors-Leadform-Capability.pdf. WP2S, WP3S, WP4S and WP5S are also available in an SMD format with ZI formed leads and packed in blister tape- see https://www.ttelectronics.com/TTElectronics/media/ProductFiles/Resistors/Datasheets/ZI-form.pdf.

Hairpin	Goalpost	Lancet	ZI-form
			

Also a 2W and 3W radial taped version is available as shown below

Radial Taped Dimensions (mm)			
Dimension	Notation	WPP2R*	WP3SR
Component body length	L	10.0 Max	14.5 Max
Component body diameter	D	4.0 Max	5.2 Max
Terminal lead diameter	d	0.8 Nom	
Component pitch	P	12.7±0.5	12.7±1.0
Hole pitch	Po	12.7±0.2	12.7±0.3
Component to hole offset	P1	3.85±0.3	3.85±0.7
	P2	5.85±0.5	6.35±1.3
Lead pitch	F	5.0 +0.75 -0.34	5.0±1.0
Width of backing strip	W	18.0±0.3	18.0±1.0
Position of hole	W1	9.0±0.25	9.0±0.5
Diameter of hole	Do	4.0±0.3	
Height to lead form	Ho	16.0±0.3	17.0±1.0
Height from lead form	Ho1	17.0 Max	23.0 Max
Height to resistor	Ho2	18.0 Min	
Width of adhesive tape	W0	15.0±0.5	
Length of protrusion	l	<2.5	
Form dimensions	K1	2.0±0.3	
	K2	3.0±0.5	
	K3	1.5±0.25	
	K4	1.0±0.2	
	K5	--	2.0 Min



*Although body dimensions differ slightly, WPP2R Performance and Electrical Data are identical to those of WP2S

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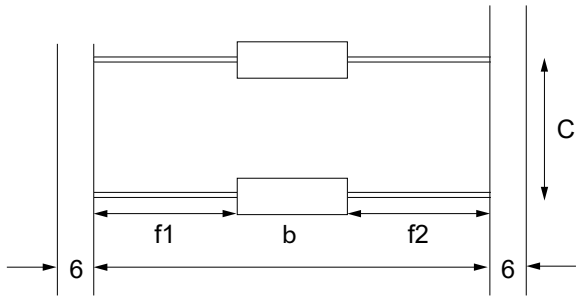
Packaging

The standard packaging for WP-S is taped. The critical dimensions are shown in Figure 1. The component wires will not protrude beyond the outside edge of the tapes. Taped product is then packed into boxes or onto reels; see Ordering Procedure for details. Alternative packaging is available by request. Pre-formed resistors are supplied loose packed in plastic bags or boxes.

Dimensions (mm)	b	c
WP1S	52	5
WP2S	52	5
WP25S	52	5
WP3S	67	10
WP4S	63	10
WP5S	63	10

Figure 1



Body location f1 - f2 ≤ 1.4mm

Ordering Procedure

Example: WP2S-680RJA25 (WP2S, 680 ohms ±5%, Pb-free)

W	P	2	S		-	6	8	0	R	J	A	2	5	
1						2				3	4			

1 Type	2 Value	3 Tolerance	4 Termination & Packing				
WP1S	3/4 characters	F = ±1%	A5	WP1S	Pb-free (RoHS)	Ammo pack	5000/box
WP2S	R = ohms	G = ±2%	A25	WP2S			2500/box
WP25S	K = kilohms	J = ±5%	A15	WP25S			1500/box
WP3S			A1	WP3S, WP4S			1000/box
WP4S			T075	WP5S		Tape & reel	750/reel
WP5S			PB	All sizes	SnPb finish	Packing as for Pb-free	

Example: WPP2R-680RJT15 (WPP2R radially formed & taped, 680 ohms ±5%, Pb-free)

W	P	P	2	R	-	6	8	0	R	J	T	1	5
1				2		3			4	5			

1 Type	2 Leadforming	3 Value	4 Tolerance	5 Packing			
WPP2	R = Radial taped	3/4 characters R = ohms K = kilohms	F = ±1%	T15	WPP2R	Tape & reel	1500/reel
WP3S			G = ±2%	A2	WP3SR	Ammo pack	2000/box
			J = ±5%	T1		Tape & reel	1000/reel

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