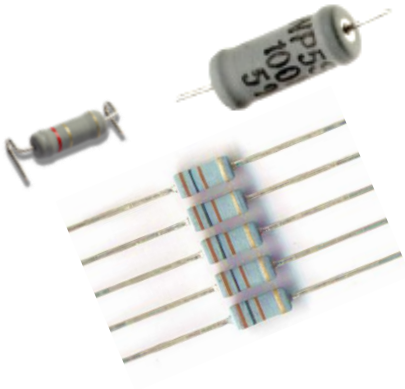
Compact Flameproof Power Wirewound Resistors

WP-S Series



Features:

- Small size for power rating
- Enhanced pulse handling capability
- Flameproof protection
- Surface mount ZI-form option

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

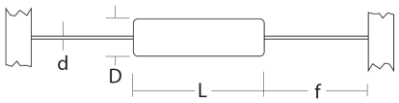
Electrical Data

		WP1S	WP2S / WPP2R	WP25S	WP3S	WP4S	WP5S
Power rating @25°C	W	1	2	2.5	3	4	5
5s overload rating @25°C	W	5	10	12.5	15	20	25
Short pulse performance		See Pulse Performance graphs					
Resistance range	ohms	R068 – 430R	R05 – 900R		R01 – 2K2	R01 – 10K	R015 to 6K8
Limiting element voltage	V	50		75	100		150
TCR	ppm/°C	<1R0: 350, ≥1R0: 200					
Isolation voltage	V	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/W	140	110	90	82	62	54
Ambient temperature range	°C	-55 to 200					

Physical Data

Dimensions in mm and weight in g

Type	L max	D max	f min	d nom	PCB mounting centres	Min. bend radius	Wt. nom
WP1S	6.2	2.8	21.2	0.6	10.2	0.6	0.22
WP2S	9	3.6	19.8	0.8	12.5	1.2	0.5
WP25S	12.5	4.5	17.8		17.5		
WP3S	14.5	5.2 [1]	24.55		20		1.1
WP4S	13	5.6 [2]	22.75		19		1
WP5S	16.5	7 [3]	23.55		22		1.75



Note 1: 5.4 for values ≤R10 Note 2: 5.8 for values ≤R10 Note 3: 7.2 for values ≤R10

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.

Terminations

Terminations are hot tin dipped copper wire. They meet the strength requirements of IEC 60115-1 clause 9.5 and the solderability requirements of IEC 60115-1 clause 11.1.

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Marking

WP1S, WP2S, WPP2R, WP25S and WP3S resistors at values R10 and above are marked with four or five colour bands in conformance with IEC 60062. Values 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.

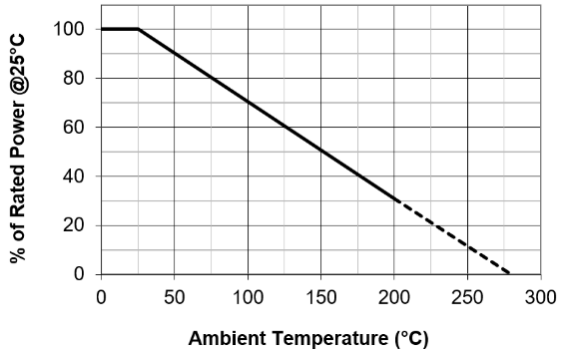
Flammability

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

Performance Data

		Maximum (+R001)	**Typical**
Load at rated power: 1000 hours at 25°C	±ΔR%	5	3
Dry heat: 1000 hours at 200°C	±ΔR%	5	3
Short term overload: 5 x P_r for 5s	±ΔR%	5	1
Climatic	±ΔR%	5	2
Climatic category		55/200/56	
Long term damp heat: 56 days	±ΔR%	5	1
TRC & vibration	±ΔR%	5	1
Robustness & solder heat	±ΔR%	5	1

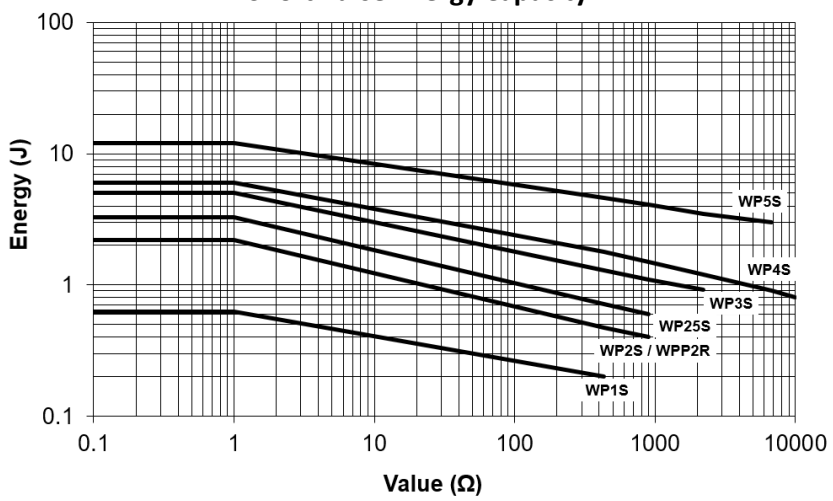
Temperature Derating



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.

Short Pulse Energy Capacity



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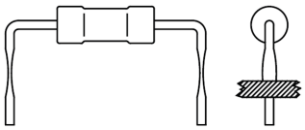
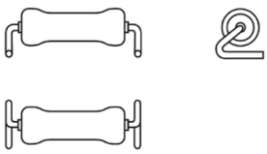
Application Notes

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 centre of the body can be calculated using the thermal impedance figures given under Electrical Data.

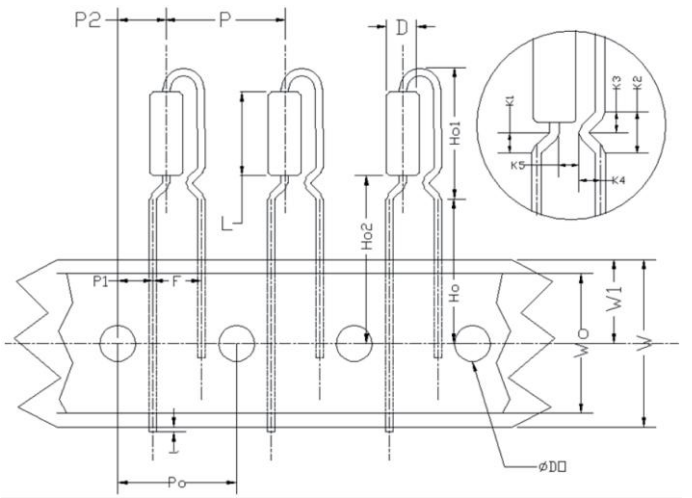
3. WP-S resistors can also be supplied with radial, goalpost or lancet pre-formed leads. For details see: https://www.ttelectronics.com/TTElectronics/media/ProductFiles/Application-Note/TN008-Resistors-Leadform-Capability.pdf.

4. WP2S, WP3S, WP4S & WP5S are also available in an SMD format with ZI formed leads and packed in blister tape. For details see: https://www.ttelectronics.com/TTElectronics/media/ProductFiles/Datasheet/ZI-form.pdf.

Hairpin	Goalpost	Lancet	ZI-form
			

5. A 2W and 3W radial taped version is also available as shown below:

Radial Taped Dimensions in mm			
Dimension	**Notation**	**WPP2R [1]**	**WP3SR**
Component body length	L	10 max	14.5 max
Component body diameter	D	4 max	5.4 max
Terminal lead diameter	d	0.8 nom	
Component pitch	P	12.7 ±0.5	12.7 ±1
Hole pitch	P_0	12.7 ±0.2	12.7 ±0.3
Component to hole offset	P_1	3.85 ±0.3	3.85 ±0.7
	P_2	5.85 ±0.5	6.35 ±1.3
Lead pitch	F	5 +0.75, -0.34	5 ±1
Width of backing strip	W	18 ±0.3	18 ±1
Position of hole	W_1	9 ±0.25	9 ±0.5
Diameter of hole	Do	4 ±0.3	
Height to lead form	Ho	16 ±0.3	17 ±1
Height from lead form	Ho_1	17 max	23 max
Height to resistor	Ho_2	18 min	
Width of adhesive tape	W_0	15 ±0.5	
Length of protrusion	I	<0.25	
Form dimensions	K_1	2 ±0.3	
	K_2	3 ±0.5	
	K_3	1.5 ±0.25	
	K_4	1 ±0.2	
	K_5	-	2 min



Note 1: Although body dimensions differ slightly, WPP2R Performance and Electrical Data are identical to those of WP2S.

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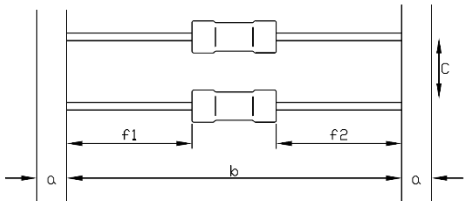
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WP-S Series

Packaging

The standard packaging for WP-S is taped. The critical dimensions are shown below. 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.



Dims in mm	WP1S	WP2S	WP25S	WP3S	WP4S	WP5S
a	6					
b	52			67	63	
c	5			10		
$f_1 - f_2$	≤ 1.4					

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	E24 = 3/4 characters R = ohms K = kilohms	F = ±1%	A5	WP1S	Pb-free finish (RoHS)	Ammo pack	5000/box
WP2S		G = ±2%	A25	WP2S			2500/box
WP25S		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	

Radial Taped 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 Lead forming	3 Value	4 Tolerance	5 Packing			
WPP2	R = radial taped	E24 = 3/4 characters R = ohms K = kilohms	F = ±1%	T15	WPP2R	Tape & reel	1500/reel
WP3S			G = ±2%	A1	WP3SR	Ammo pack	1000/box
			J = ±5%	T1		Tape & reel	1000/reel

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