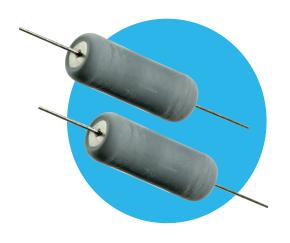
# **Electronics**

# Wirewound High Surge Resistors

#### **WHS Series**

- Enhanced surge & pulse energy capacity
- UL94-V0 flameproof protection
- Radial taped form available
- Surface mount ZI-form option
- Non inductive type available





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

## **Electrical Data**

		WHS2 / WHSP2R	WHS3	WHS5	WHS7	WHS10	WHS10N*	
Power rating at 25°C	watts	2	3	5	7	10		
5s overload rating at 25°C	watts	10	15	25	35	50		
Short pulse performance		See Pulse Performance graphs						
Resistance range	ohms		5R6-100R					
TCR	ppm/°C	±200						
Isolation Voltage	volts	s 250 350 500 700 1000					00	
Resistance Tolerance	%	<20R: 5 ≥20R: 1, 2, 5						
Standard Values		E24 preferred						
Thermal Impedance	°C/watt	110	82	54	35	25		
Ambient temperature range	°C	-55 to +155						

No Limiting Element Voltage applies to this series; the Rated Voltage is V(P.R).

# Physical Data

	Dimensions (mm) & Weight (g)						
Type	L max	D max	f min	d max	PCB mount centres	Min bend radius	Wt. nom
WHS2	9.0	3.6	19.80		12.70		0.50
WHS3	14.5	5.2	24.55	0.91	20.30	1.2	1.10
WHS5	16.5	7.0	23.55	0.81	22.86	1.2	1.75
WHS7	25.0	8.8	28.30		31.40		4.40
WHS10		10.5	26.00	1.01	55.88	1.5	8.80
WHS10N	31.0	11.0	26.00	1.01	33.00	1.5	10.50

#### 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.

<sup>\*</sup>Non inductive (Ayrton Perry) winding

### Wirewound High Surge Resistors

#### **WHS Series**



#### **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

WHS2, WHSP2R and WHS3 resistors are marked with four colour bands in conformance with IEC62.

The larger sizes 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.

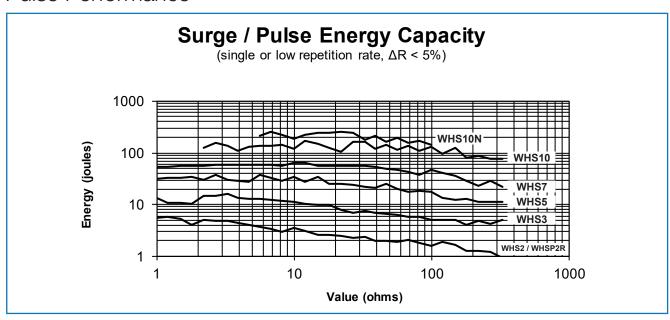
#### **Flammability**

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

## Performance Data

		Maximum	Typical			
Load at rated power: 1000hrs @ 25°C	∆R%	5 +0.001Ω	3			
Dry heat: 1000hrs @ 200°C	∆R%	5 +0.001Ω	3			
Short term overload	<b>∆</b> R%	5 +0.001Ω	1			
Derating from rated power @25°C		Zero at 280°C (See Thermal Performance graph).				
Climatic	∆R%	5 +0.001Ω	2			
Climatic category		55/200/56				
TRC & Vibration	<b>∆</b> R%	5 +0.001Ω	1			
Robustness & solder heat	<b>∆</b> R%	5 +0.001Ω	1			
Long term damp heat (56 days)	<b>∆</b> R%	5 +0.001Ω	1			

## Pulse Performance

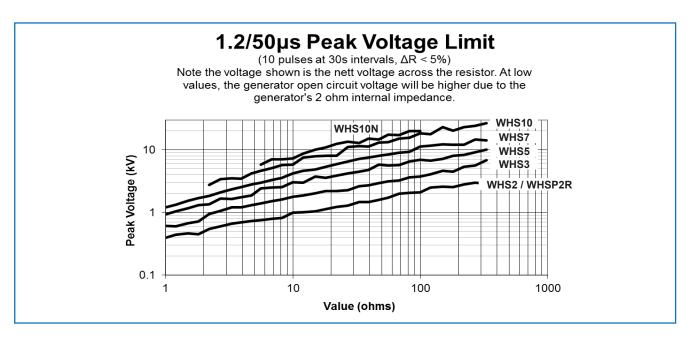


#### General Note

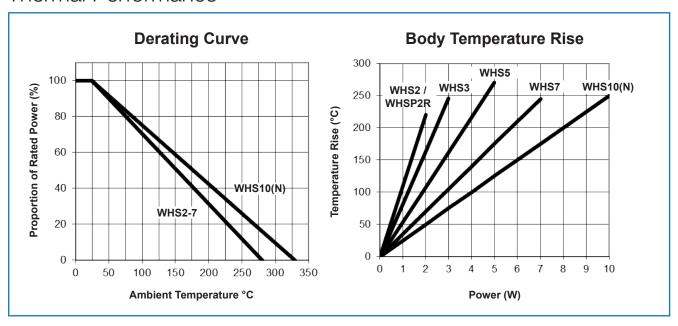
BI Technologies IRC Welwyn

#### **WHS Series**





## Thermal Performance



#### **Application Notes**

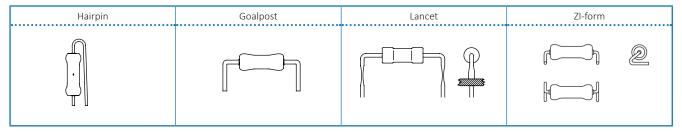
- 1. If the resistors are to dissipate full rated power, it is recommended that the terminations should not be soldered closer than 4mm from the body.
- 2. Due to operating temperature limits imposed by some PCB materials, derating may be necessary. The surface temperature rise at the centre of the body is shown under Thermal Performance.
- 3. WHS2, WHS3, WHS5 resistors can also be supplied with goalpost or lancet pre-formed leads. Hairpin form is available on WHS2 and WHS3 only.

WHS2, WHS3, and WHS5 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/Resistors/Datasheets/ZI-form.pdf.

## Wirewound High Surge Resistors

# **Electronics**

#### **WHS Series**



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

Radial Tape	ed Dimensio	ns (mm)	
Dimension	Notation	WHSP2R*	WHS3R
Component body length	L	10.0 Max	14.5 Max
Component body diameter	D	4.0 Max	5.8 Max
Terminal lead diameter	d	1 8.0	Nom
Component pitch	Р	12.7±0.5	12.7±1.0
Hole pitch	Ро	12.7±0.2	12.7±0.3
Component to hole offset	P1	3.85±0.3	3.85±0.7
component to note onset	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	Но	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	I	<2	.5
	K1	2.0±	:0.3
	K2	3.0±	:0.5
Form dimensions	K3	1.5±	0.25
	K4	1.0±	:0.2
	K5		2.0 Min

 $<sup>^*\</sup> Although\ body\ dimensions\ differ\ slightly,\ WHSP2R\ Performance\ and\ Electrical\ Data\ are\ identical\ to\ those\ of\ WHS2$ 

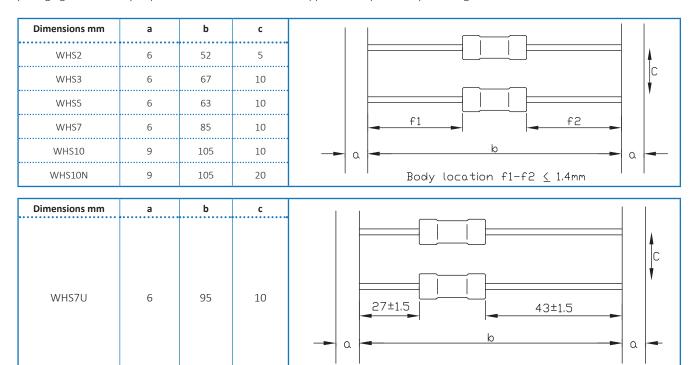
Wirewound High Surge Resistors

#### **WHS Series**



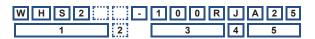
#### **Packaging**

The standard packaging for WHS 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.



# Ordering Procedure

Example: WHS2-100RJA25 (WHS2, 100 ohms ±5%, Pb-free)



1	2	3	4	5				
Type	Variant	Value	Tolerance	Packing				
WHS2	U = unequal	3/4 characters	F = ±1%	A25	WHS2	Ammo pack, 2500/box		
WHS3	lead length	R = ohms	G = ±2%	A1	WHS3	Ammo pack, 1000/box		
WHS5	(WHS7 only)		$J = \pm 5\%$	T075	WHS5	Tape & reel, 750/reel		
WHS7	N = non-	'		T07	WHS7(U)	Tape & reel, 700/reel		
WHS10	inductive			A02	WHS10	Ammo pack, 200/box		
	(WHS10 only)			A01	WHS10N	Ammo pack, 100/box		

Example: WHSP2R-100RJT15 (WHSP2R radially formed & taped, 100 ohms ±5%, Pb-free)



1 Type	2 Leadforming	3 Value	4 Tolerance	5 Packing			
WHSP2	R = Radial taped	3/4 characters R = ohms	F = ±1%	T15	WHSP2R	Tape & reel	1500/reel
WHS3			G = ±2%	A2	MULCOD	Ammo pack	2000/box
	•	J = ±5%	T1	WHS3R	Tape & reel	1000/reel	

#### General Note

## **Mouser Electronics**

**Authorized Distributor** 

Click to View Pricing, Inventory, Delivery & Lifecycle Information:

### TT Electronics:

WHS2-10RJA25 WHS3-1R5JA1 WHS5-47RJT075 WHS5-150RJT075 WHS2-68RJA25 WHS3-2R2JA1 WHS7-220RJT07 WHS2-2R2JA25 WHS7-15RJT07 WHS3-150RJA1 WHS7-4R7JT07 WHS7-100RJT07 WHS5-330RJT075 WHS3-1R0JA1 WHS7-1R5JT07 WHS5-220RJT075 WHS7-6R8JT07 WHS7-150RJT07 WHS3-68RJA1 WHS2-33RJA25 WHS5-1R5JT075 WHS2-100RJA25 WHS3-10RJA1 WHS7-330RJT07 WHS2-1R0JA25 WHS3-100RJA1 WHS2-22RJA25 WHS5-22RJT075 WHS3-4R7JA1 WHS7-10RJT07 WHS2-220RJA25 WHS3-33RJA1 WHS3-15RJA1 WHS5-10RJT075 WHS2-4R7JA25 WHS2-15RJA25 WHS2-1R5JA25 WHS5-68RJT075 WHS2-3R3JA25 WHS5-1R0JT075 WHS5-2R2JT075 WHS5-4R7JT075 WHS3-330RJA1 WHS5-15RJT075 WHS5-100RJT075 WHS7-33RJT07 WHS2-330RJA25 WHS3-220RJA1 WHS3-3R3JA1 WHS5-33RJT075 WHS7-68RJT07 WHS7-3R3JT07 WHS5-3R3JT075 WHS7-2R2JT07 WHS3-6R8JA1 WHS3-47RJA1 WHS3-22RJA1 WHS7-22RJT07 WHS7-47RJT07 WHS7-1R0JT07 WHS5-6R8JT075 WHS2-6R8JA25 WHS2-47RJA25 WHS2-150RJA25 WHS10-4R7JA02 WHS10N-47RJA01 WHS10-330RJA02 WHS10N-10RJA01 WHS10-10RJA02 WHS10-2R2JA02 WHS10N-100RJA01 WHS10-47RJA02 WHS10-100RJA02 WHS10N-22RFA01 WHS10N-56RFA01 WHS10N-10RFA01 WHS201-68RJA25 WHS201-33RJA25 WHS2-1RJA25 WHS3-1RJA1 WHS5-1RJT075 WHS3ZI-6R8JT05 WHS2ZI-47RJT06 WHS5ZI-1R0JT045 WHS3ZI-3R3JT05 WHS3ZI-15RJT05 WHS2ZI-10RJT06 WHS3ZI-220RJT05 WHS5ZI-15RJT045 WHS2ZI-1R0JT06 WHS2ZI-1R5JT06 WHS5ZI-3R3JT045 WHS5ZI-22RJT045 WHS2ZI-150RJT06 WHS3ZI-100RJT05 WHS2ZI-68RJT06 WHS3ZI-2R2JT05 WHS2ZI-3R3JT06 WHS5ZI-220RJT045 WHS3ZI-150RJT05