

# Moulded Surface Mount Wirewound Resistors

## WSM Series

- Flexible Terminations
- All welded construction
- Ideal for automatic pick and place
- Lead free, RoHS compliant construction only
- Contact factory for ohmic values above published ranges



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

## Electrical Data

		WSM1	WSM2	WSM3
Power rating at 70°C	watts	1	2	3
Resistance range	ohms	0R01 to 400R	0R01 to 1K	0R05 to 3K
Limiting element voltage	volts	100		
TCR	ppm/°C	< 1 Ω : 100 ≥ 1 Ω : 20	< 1 Ω : 100 ≥ 1 Ω : 20	≤0.3 Ω 700 ≤0.1 Ω : 200 ≤10R 100 >10R 20
Resistance tolerance	%	*1, 2, 5, 10		
Standard values		E24 preferred		
Ambient temperature range	°C	-55 to 275°C		

\*Note 1% and 5% preferred. WSM1 available at 5% only below 1R0. WSM2 available at 5% only below 0R05.

## Physical Data

Dimensions Inches (mm)						
Type	L max	I Nom	A Max	W Max	H Max	
WSM1	0.310 max (7.9 max)	0.115 max (2.9 max)	0.275 max (7.0 max)	0.165 max (4.2 max)	0.155 max (3.94 max)	
WSM2	0.462 max (11.7 max)	0.137 max (3.5 max)	0.425 max (10.8 max)	0.260 max (6.6 max)	0.195 max (5.0 max)	
WSM3	0.677 max (17.2 max)	0.137 max (3.5 max)	0.64 max (16.3 max)	0.29 max (7.4 max)	0.265 inch (6.7 max)	

## Recommended Pad Sizes

Type	A	B	C	D	
WSM1	0.13 inch (3.3 mm)	0.138 inch (3.5 mm)	0.074 inch (1.9 mm)	0.35 inches (8.9 mm)	
WSM2	0.157 inch (4.0 mm)	0.181 inch (4.6 mm)	0.221 inch (5.6 mm)	0.583 inch (14.8 mm)	
WSM3	0.157 inch (4.0 mm)	0.236 inch (6.2 mm)	0.378 inch (9.6 mm)	0.85 inch (21.6 mm)	

### 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. The unit is then moulded.

### Flammability

The resistor coating is a flame retardant epoxy to UL 94.

### Marking

WSM resistors are legend marked with type value and tolerance.  
WSM1 Resistors are marked with value and tolerance.

### Solvent Resistance

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

### General Note

TT Electronics reserves the right to make changes in product specification without notice or liability.  
All information is subject to TT Electronics' own data and is considered accurate at time of going to print.

WSM Series

## Packing Data

Dimensions (mm)						
	Ao	Bo	Ko	W	P	t
<b>WSM1</b>	4.2	7.62	4.2	16	8	0.36
<b>WSM2</b>	6.75	11.95	5.22	24	12	0.36
<b>WSM3</b>	7.3	18.3	6.7	32	12	0.4

All other dimensions as per EIA481 standard

## Performance Data

		<b>WSM1</b>	<b>WSM2</b>	<b>WSM3</b>
Load at rated power: 1000 hrs @ 70°C	ΔR%	2 ± 0.001Ω	2 ± 0.001Ω	3 ± 0.001Ω
Dry heat 1000 hrs @ 155°C	ΔR%	2 ± 0.001Ω	2 ± 0.001Ω	3 ± 0.001Ω
Short term overload	ΔR%		2 ± 0.001Ω	
Derating from rated power @ 70°C			zero at 275°C	
Moisture	ΔR%	1 ± 0.001Ω	1 ± 0.001Ω	1.5 ± 0.001Ω
Temperature cycling	ΔR%		1 ± 0.001Ω	
Resistance to solder heat	ΔR%		1 ± 0.001Ω	
Isolation voltage	V		1,000	
Insulation resistance	ohms		>1000M	
Substrate bend	ΔR%		0.2 ± 0.001Ω	

Note: The power ratings to be applied depend upon the board used and the ambient temperature.

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## Ordering Procedure

This product has two valid part numbers:

**European (Welwyn) Part Number: WSM3-6K8FI** (WSM3, 6.8 kilohms  $\pm 1\%$ , Pb-free)

W	S	M	3	-	6	K	8	F	I
1		2		3	4				

1 Type	2 Value	3 Tolerance	4 Packing & Termination Finish	
WSM1	E24 = 3/4 characters	F = $\pm 1\%$	I = Standard packing & Pb-free	
WSM2	R = ohms	G = $\pm 2\%$	WSM1	1500/reel (13" 330mm)
WSM3	K = kilohms	J = $\pm 5\%$	WSM2	800/reel (13" 330mm)
		K = $\pm 10\%$	WSM3	750/reel (13" 330mm)

**USA (IRC) Part Number: WSM36801FLFTR** (WSM3, 6.8 kilohms  $\pm 1\%$ , Pb-free)

W	S	M	3	6	8	0	1	F	L	F	T	R
1		2		3	4		5					

1 Type	2 Value	3 Tolerance	4 Termination Finish	5 Packing	
WSM1	3 digits + multiplier	F = $\pm 1\%$	LF = Pb-free	TR = Tape & Reel	
WSM2	R = ohms for values <100 ohms	G = $\pm 2\%$		WSM1	1500/reel (13" 330mm)
WSM3		J = $\pm 5\%$		WSM2	800/reel (13" 330mm)
		K = $\pm 10\%$		WSM3	750/reel (13" 330mm)

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