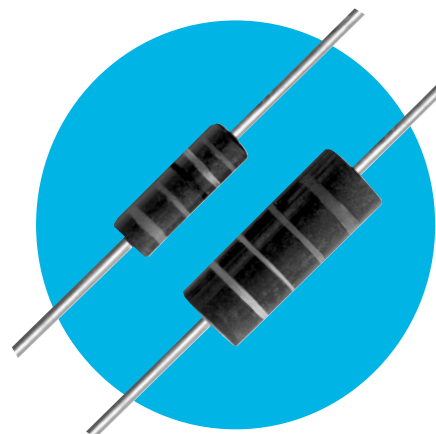



## General-Purpose Failsafe Moulded Wirewound Resistors

### SPH/SPF Series

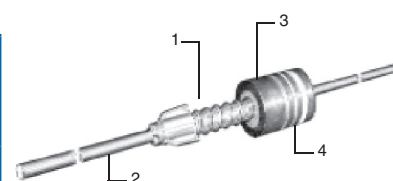
- Drop-in replacement for BWH/BWF
- 2 watt rated with 1 watt dimensions
- $\pm 5\%$ ,  $\pm 10\%$  tolerance
- 0.1 ohm to 2400 ohms
- TCR's as low as  $\pm 150$  ppm/ $^{\circ}\text{C}$  standard (custom TC's available)
- Weldable and solderable leads



 All Pb-free parts comply with EU Directive 2011/65/EU (RoHS2)

### Electrical Data

Type	SPH	SPF
EIA RS-344 Style	CRU2	CRU2
MIL-R-11 Style	RC32/RC42	RC32/RC42
Resistance - Std.	0.1 $\Omega$ to 2400 $\Omega$	0.1 $\Omega$ to 1000 $\Omega$
Tolerance - Std.	$\pm 5\%$ , $\pm 10\%$	$\pm 5\%$ , $\pm 10\%$
Power Rating	2 watt @ 70 $^{\circ}\text{C}$ 1 watt @ 115 $^{\circ}\text{C}$ Derating to 0 @ 160 $^{\circ}\text{C}$	2 watt @ 70 $^{\circ}\text{C}$ 1 watt @ 115 $^{\circ}\text{C}$ Derating to 0 @ 160 $^{\circ}\text{C}$
Max. Continuous Working Voltage	$\sqrt{\text{PR}}$	$\sqrt{\text{PR}}$
Min. Insulation Resistance	Dry 10,000 Meg Wet 100 Meg	10,000 Meg 100 Meg
Min. Dielectric Withstanding Volts (RMS)	ATM 1000V Reduced Pressure 625V	1000V 625V
Hotspot Temperature Rise	145 $^{\circ}\text{C}$ @ 2 watts	145 $^{\circ}\text{C}$ @ 2 watts
Typical Load Life	5%	5%
Current Noise	Negligible	Negligible



(See notes below)

#### 1. Resistive Element

All resistor types have resistance alloy winding on a braided fiberglass substrate. Intermediate silicone coatings are used to enhance processability and to provide protection to the resistive element.

#### 2. Termination

The SPH and SPF resistors are terminated using an alloy coated copper flashed steel lead welded to a cap of the same material. This termination assembly is mechanically crimped, utilizing an improved crimp design, to the resistive element.

#### 3. Encapsulation

The SPH and the SPF are encapsulated utilizing a compression molded phenolic plastic material. The SPF has a flame resistance coating applied over the resistive element to provide flammability protection when destructive overloads may occur.

#### 4. Marking

All products are marked utilizing heat and solvent resistant color code bands consistent with EIA/MIL requirements. The first band is double width to designate wirewound construction. A fifth band, blue in color, is used for flameproof identification.

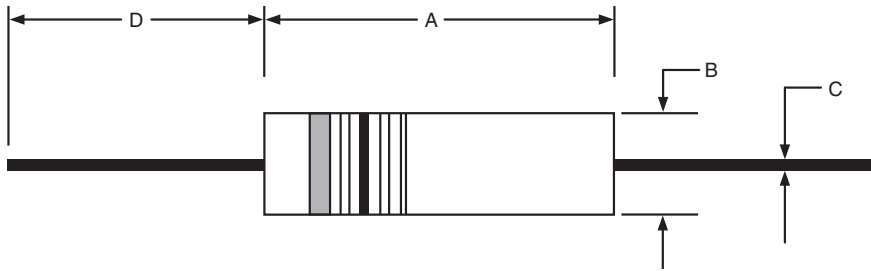
#### General Note

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.

Environmental Data

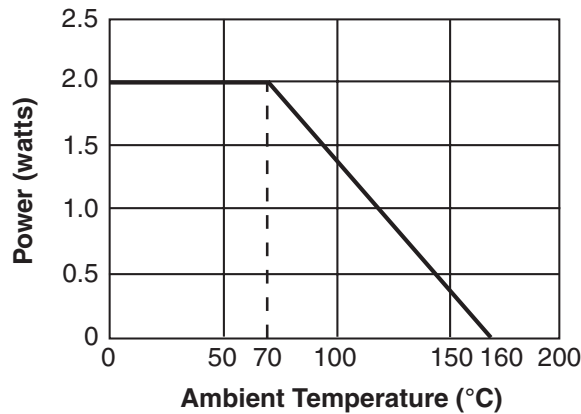
Test	SPH	SPF
Temperature Coefficient (ppm)*	0.1Ω - 0.16Ω ± 1000 0.18Ω - 0.68Ω ± 800 0.75Ω - 2400Ω ± 400	0.10Ω ± 1700 0.11Ω - 0.16Ω ± 1000 0.18Ω - 0.68Ω ± 800 0.75Ω - 1000Ω ± 400
Dielectric Withstanding Voltage (RMS)	1000V	1000V
Momentary Overload	5%	5%
Low Temperature Operation	5%	5%
Temperature Cycle	5%	5%
Humidity	5%	5%
Load Life	5%	5%
Terminal Strength	5%	5%
Resistance to Solder Heat	5%	5%
Solderability	No Failures	No Failures

Physical Data

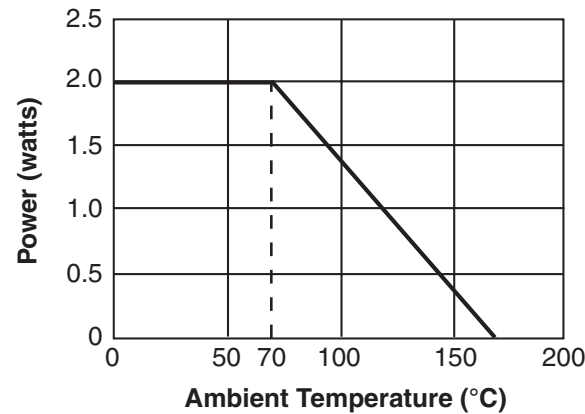
				
Dimensions (Inches and (mm))				
Type	A	B	C	D
SPH	0.562 ± 0.010 (14.3 ± 0.25)	0.225 ± 0.008 (5.72 ± 0.20)	0.032 ± 0.002 (0.813 ± 0.05)	1.50 ± 0.126 (38.1 ± 3.2)
SPF	0.562 ± 0.010 (14.3 ± 0.25)	0.225 ± 0.008 (5.72 ± 0.20)	0.032 ± 0.002 (0.813 ± 0.05)	1.50 ± 0.126 (38.1 ± 3.2)

**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.

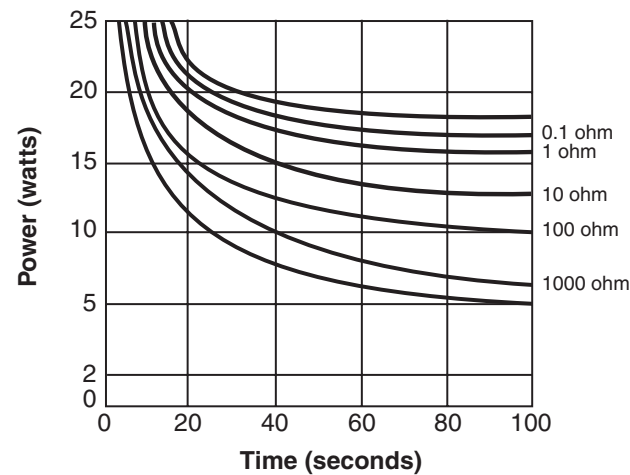
SPH Power Derating Curve



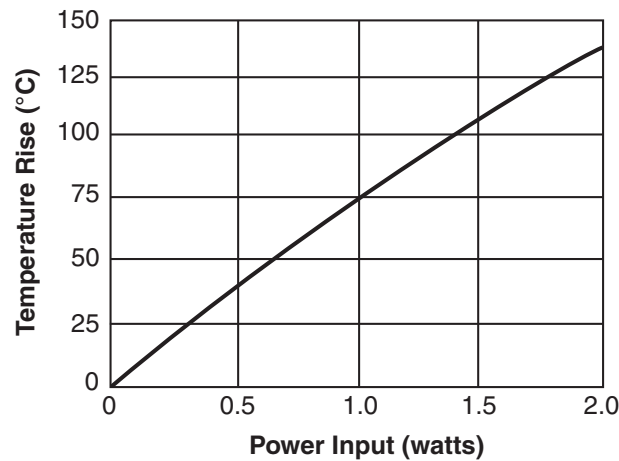
SPF Power Derating Curve



SPF Typical Fusing



SPH and SPF  
Temperature Rise Chart



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.

## Ordering Procedure

This product has two valid part numbers:

**European (Welwyn) Part Number: SPH-150RJI** (SPH, 150 ohms  $\pm 5\%$ , Pb-free)

S	P	H	-	1	5	0	R	J	I
1		2				3	4		

1 Type	2 Value	3 Tolerance	4 Packing & Termination Finish
SPH	R = ohms	J = $\pm 5\%$	I = Standard packing & Pb-free
SPF	K = kilohms	K = $\pm 10\%$	Tape pack 1250/reel

**USA (IRC) Part Number: SPH1500JLF** (SPH, 150 ohms  $\pm 5\%$ , Pb-free)

S	P	H	1	5	0	0	J	L	F
1		2				3	4		

1 Type	2 Value	3 Tolerance	4 Termination Finish	Standard Packing
SPH	3 digits + multiplier	J = $\pm 5\%$	Omit for SnPb	1250/reel
SPF	R = ohms for values <100 ohms	K = $\pm 10\%$	LF = Pb-free	Tape pitch 0.375" (9.5mm) Tape to tape 2.875" (73mm) Leads untrimmed

### 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.

# Mouser Electronics

Authorized Distributor

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

## TT Electronics:

[SPH33R0J](#) [SPHR240J](#) [SPHR200J](#) [SPH10R0J](#) [SPH4R70J](#) [SPH5100J](#) [SPHR270J](#) [SPH22R0J](#) [SPH2R00J](#)  
[SPH1000JTR](#) [SPH1001JTR](#) [SPH10R0JTR](#) [SPH1200JTR](#) [SPH1R00JTR](#) [SPH1R50J](#) [SPH2001JTR](#) [SPH2700JTR](#)  
[SPH3300J](#) [SPH33R0K](#) [SPH4700J](#) [SPH5R10JTR](#) [SPHR050JTR](#) [SPHR100JTR](#) [SPHR220JTR](#) [SPHR300J](#)  
[SPHR330J](#) [SPH2R20J](#) [SPH1R00J](#) [SPH20R0J](#) [SPHR150J](#) [SPHR560J](#) [SPH82R0J](#) [SPHR510J](#) [SPH1001J](#)  
[SPH1000J](#) [SPH7500J](#) [SPH30R0J](#) [SPH 47 5%](#) [SPH56R0J](#) [SPH2000J](#) [SPH2001J](#) [SPH1500J](#) [SPHR470J](#)  
[SPHR390J](#) [SPHR100J](#) [SPH68R0J](#) [SPH8R00J](#) [SPHR910J](#) [SPHR180J](#) [SPH5R60KTR](#) [SPH10R0JLF](#) [SPH82R0JLF](#)  
[SPH2400J](#) [SPHR100JLF](#) [SPHR330JLF](#) [SPH1R00JLF](#) [SPH2R20JLF](#) [SPHR220JTRLF](#) [SPH1501J](#) [W225R60JR](#)  
[W225601JR](#) [W2215R0JR](#) [W22R220JR](#) [W221R00JR](#) [W241502JBLF](#) [W2153R30JALF](#) [W224701JRLF](#)  
[W21R100JALF](#) [SPHR220JLFTR](#) [RBR53L34801BR](#) [RBR55L432RQR](#) [RBR55L10002QR](#) [RBR52L35700TR](#)  
[RBR53L51001BR](#) [RBR54L14R3QR](#) [RBR56L76R8FR](#) [RBR55L18002TR](#) [RBR56L133RBR](#) [RBR53L30901BR](#)  
[RBR54L95301AR](#) [RBR53L21RTR](#) [RBR55L64901BR](#) [RBR54L63R4AR](#) [RBR55L32400AR](#) [RBR55L162RQR](#)  
[RBR53L51100FR](#) [RBR53L27RAR](#) [RBR54L37402QR](#) [RBR55L16001QR](#) [RBR56L41200BR](#) [RBR54L35702BR](#)  
[RBR55L53601AR](#) [RBR54L44202AR](#) [RBR54L34RAR](#) [RBR52L22602TR](#) [RBR55L887RBR](#) [RBR53L24900AR](#)  
[RBR56L19100FR](#) [RBR54L82500TR](#) [RBR56L24000TR](#)