Precision Surface Mount Resistors Wirewound or Metal Film Technologies



FEATURES

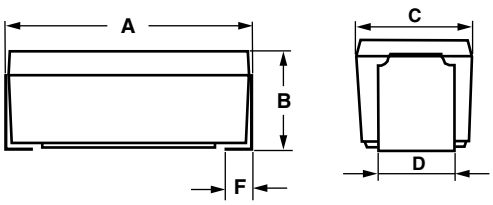
- According to EN 140402-801 (wirewound)
- Wide range of ohmic values (0.04 Ω to 1 MΩ)
- Low temperature coefficient (± 25 ppm/°C available)
- Good electrical insulation
- All welded construction and molded encapsulant
- High power ratings (up to 2.5 W)
- Stability class 0.5
- Pure matte tin termination
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

Pb-free Available

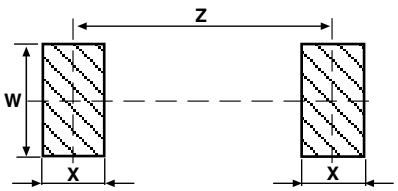
RoHS COMPLIANT

Specially designed for surface mounting, the MSP series uses either wirewound or metal film technology. The molded package ensures mechanical and climatic protection as well as high dielectric insulation. The MSP design is compatible with surface mounting equipment and can withstand wave and reflow soldering techniques.

DIMENSIONS in millimeters



Recommended Soldering Areas



SERIES	A	B	C	D	F	W	X	Z	WEIGHT in g
MSP 1	6.8	3.9	3.8	2.5	1.4	2.7	2.9	6	0.2
MSP 2	11.4	5	7	5	2.2	5.2	4.1	9.4	0.8
MSP 3	14.6	6.6	7	5	2.3	5.2	4.1	12.7	1.5

Note

- General tolerance: ± 0.2 mm

STANDARD ELECTRICAL SPECIFICATIONS

MODEL	RESISTANCE RANGE Ω	RATED POWER $P_{25\,°C}$ W	LIMITING ELEMENT VOLTAGE V	TOLERANCE ± %	TEMPERATURE COEFFICIENT ± ppm/°C
MSP 1 B	0.04 to 2.2K	1	50	0.5, 1, 2, 5	25, 50, 100
MSP 2 B	0.04 to 4.7K	2	120	0.5, 1, 2, 5	25, 50, 100
MSP 3 B	0.04 to 13K	2.5	200	0.5, 1, 2, 5	25, 50, 100
MSP 1 C	10 to 332K	0.5	300	0.5, 1	25, 50
MSP 2 C	10 to 1M	1	350	0.5, 1	25, 50

For technical questions, contact: sferfixedresistors@vishay.com

THIS DOCUMENT IS SUBJECT TO CHANGE WITHOUT NOTICE. THE PRODUCTS DESCRIBED HEREIN AND THIS DOCUMENT ARE SUBJECT TO SPECIFIC DISCLAIMERS, SET FORTH AT www.vishay.com/doc?91000

TECHNICAL SPECIFICATIONS

RESISTIVE TECHNOLOGY		WIREWOUND			METAL FILM	
Vishay Sfernice Series		MSP 1 B	MSP 2 B	MSP 3 B	MSP 1 C	MSP 2 C
Metric Size		0704M	1107M	1607M	0704M	1107M
Rated Dissipation at +25 °C, P_{25}		1 W	2 W	2.5 W	0.5 W	1 W
Ohmic Range in Relation to Tolerance (with Prefered Ohmic Value Series)	± 5 % E24 Series	0.04 to 2.2K	0.04 to 4.7K	0.04 to 13K	-	-
	± 2 % E48 Series	0.1 to 2.2K	0.04 to 4.7K	0.05 to 13K	-	-
	± 1 % E96 Series	0.1 to 2.2K	0.04 to 4.7K	0.05 to 13K	10 to 332K	10 to 1M
	± 0.5 % E96 Series	1.4 to 2.2K	0.4 to 4.7K	0.3 to 13K	10 to 332K	10 to 1M
Limiting Element Voltage, $U_{max.}$ AC/DC		50 V	120 V	200 V	300 V	350 V
Series		MSP 1 B	MSP 2 B	MSP 3 B	MSP 1 C	MSP 2 C
Critical Resistance		-	-	-	180K	122.5K
Temperature Coefficient		CECC 40402-801 -55 °C / +200 °C < 1 Ω ± 100 ppm/°C 1 Ω to < 10 Ω ± 50 ppm/°C ≥ 10 Ω ± 25 ppm/°C			-55 °C / +155 °C 10 Ω to 332 kΩ K3: ± 50 ppm/°C K4: ± 25 ppm/°C > 332 kΩ	
Failure Rate		E6 10^{-6}/h	E6 10^{-6}/h	E0 or A 10^{-4}/h	-	-

MECHANICAL SPECIFICATIONS

RESISTIVE TECHNOLOGY	Wirewound	Metal Film
Encapsulant	Thermoset	
Resistive Element	CuNi or NiCr	NiCr or NiP
Ceramic Substrate	Alumina or Steatite	Alumina
Termination	Electrolytic pure matte tin	

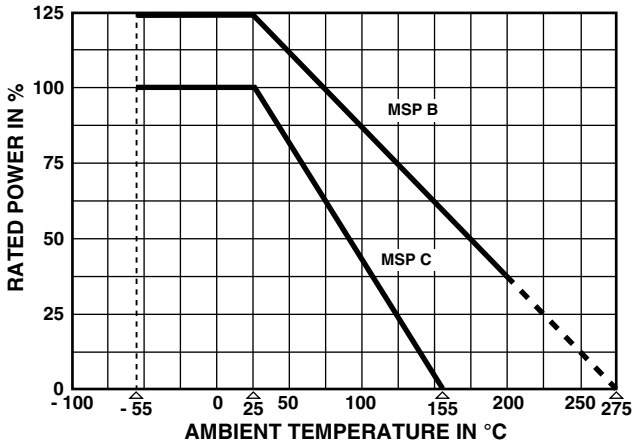
ENVIRONMENTAL SPECIFICATIONS

RESISTIVE TECHNOLOGY	Wirewound	Metal Film
Temperature Range	-55 °C to 275 °C	-55 °C to 155 °C
Climatic Category (LCT/UCT/days)	55/200/56	55/125/10

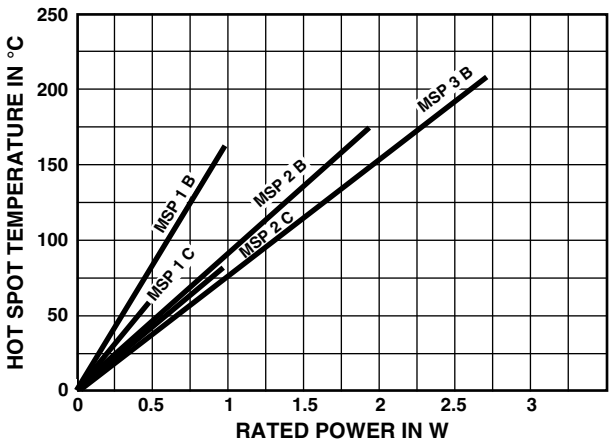
For technical questions, contact: sferfixedresistors@vishay.com
THIS DOCUMENT IS SUBJECT TO CHANGE WITHOUT NOTICE. THE PRODUCTS DESCRIBED HEREIN AND THIS DOCUMENT ARE SUBJECT TO SPECIFIC DISCLAIMERS, SET FORTH AT www.vishay.com/doc?91000

PERFORMANCE				
TESTS	CONDITIONS		REQUIREMENTS	
	Wirewound	Metal Film	Wirewound EN 140402-801	Metal Film
Short Time Overload	IEC 60115-1 5 P_r or U = 2 $U_{max.}$/5 s		± (0.25 % + 0.05 Ω)	± 0.25 %
Load Life	IEC 60115-1 90'/30' cycles 1000 h P_r + 25 °C 8000 h P_r		± (0.5 % + 0.05 Ω) ± (3 % + 0.05 Ω)	± 1 % -
Dielectric w/s Voltage	IEC 60115-1 U_{RMS} = 500 V/60 s		No flashover or breakdown Leakage current < 10 µA	
Rapid Change of Temperature	IEC 60115-1 IEC 60068-2-14 Test Na 5 cycles (30' at LCT/30' at UCT)		± (0.25 % + 0.05 Ω)	± 0.25 %
	-55 °C / +200 °C	-55 °C / +125 °C		
Climatic Sequence	IEC 60115-1		± (0.5 % + 0.05 Ω)	± 0.5 %
	-55 °C / +200 °C	-55 °C / +125 °C		
Humidity (Steady State)	IEC 60115-1 IEC 60068-2-3 Test Ca 95 % HR/40 °C		± (0.5 % + 0.05 Ω)	± 1 %
	56 days	10 days		
Substrate Bending Test	IEC 60115-1 IEC 60068-2-21 Test U_{e3} 2 mm/10 times		± (0.25 % + 0.05 Ω)	± 0.25 %
Shock	IEC 60115-1 IEC 60068-2-27 Test Ea 50 *g*'s/half sine/3 times by direction (i.e. 18 shocks)		± (0.25 % + 0.05 Ω)	n/a
Vibration	IEC 60115-1 IEC 60068-2-6 Test Fc		± (0.25 % + 0.05 Ω)	± 0.25 %
	10 Hz/2000 Hz	10 Hz/500 Hz		
Resistance to Soldering Heat	IEC 60115-1 IEC 60068-2-58 Solder bath 260 °C/10 s		± (0.5 % + 0.05 Ω)	n/a

POWER RATING



TEMPERATURE RISE



SURFACE MOUNTING OF MSP B

Soldering cycle: 2 min at 215 °C or 10 s at 260 °C or with an iron 40 W: 3 s at 350 °C.

Soldering is possible by wave, reflow and vapor phase.

NON INDUCTIVE WINDING FOR MSP B

Non-inductive (Ayrton Perry) winding available.

Please consult Vishay Sfernice.

For technical questions, contact: sferfixedresistors@vishay.com

THIS DOCUMENT IS SUBJECT TO CHANGE WITHOUT NOTICE. THE PRODUCTS DESCRIBED HEREIN AND THIS DOCUMENT ARE SUBJECT TO SPECIFIC DISCLAIMERS, SET FORTH AT www.vishay.com/doc?91000

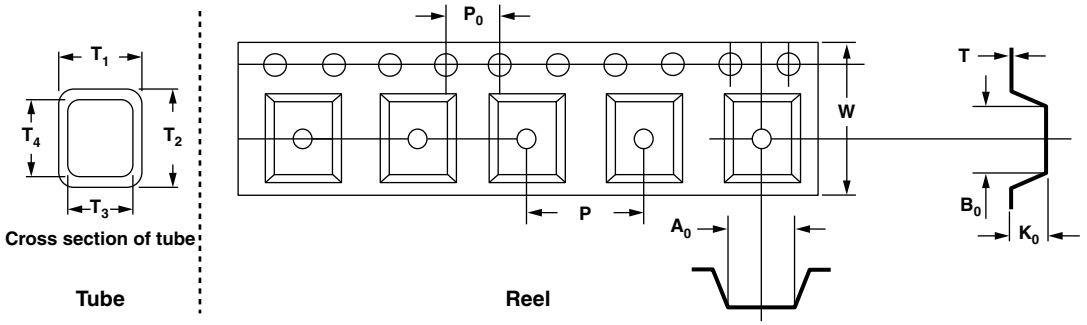
PACKAGING

In bulk (plastic bag of 100 units or multiples)

In tube: MSP1 70 units per tube
MSP2 50 units per tube
MSP3 40 units per tube

In reel of 500 units for MSP1 and MSP2

DIMENSIONS in millimeters - Informative Data



	TUBE PACKAGING					REEL PACKAGING						
	T1	T2	T3	T4	LENGTH	A0	B0	K0	P0	W	T	P
MSP 1	6.6	6.8	4.6	4.8	530	3.9	7.35	4.25	4	12	0.254	8
MSP 2	9.2	8.7	8	7.5	615	7.43	11.91	5.36	4	24	0.368	12
MSP 3						N/A						

MARKING

Vishay Sfernice trademark, ohmic value (in Ω), tolerance (in %), series and style, technology, manufacturing date.

ORDERING INFORMATION

MSP	1	B		48U7	± 1 %	TC	BA100	e3
SERIES	STYLE	TECHNOLOGY B: Wirewound C: Metal Film	NON INDUCTIVE WINDING Optional	OHMIC VALUE	TOLERANCE	Applicable only in "C" technology	PACKAGING	LEAD (Pb)-FREE

SAP PART NUMBERING GUIDELINES

M	S	P		1	B	4	8	R	7	0	F		T	2	0	E	3

GLOBAL MODEL	OPTION	SIZE	OHMIC VALUE	TOL.	TEMP. COEF.	PACKAGING	SPECIAL	RoHS
MSP	**Blank** or **N** (non inductive winding)	**1B** **2B** **3B** **1C** **2C** **B** = wirewound **C** = metal film	The first four digits are significant figures and the last digit specifies the number of zeros to follow. R designates decimal point. **48R70** = 48.7 Ω **48701** = 48 700 Ω **10002** = 100 000 Ω **R0100** = 0.01 Ω **R4700** = 0.47 Ω ...	**B** = 0.1 % **F** = 1 % **G** = 2 % **J** = 5 % **K** = 10 %	**Blank** or applicable only on metal film technologies 1C and 2C: **H** ≥ K3 or **E** ≥ K4	**S14** = bag (100 pieces) **R10** = reel (500 pieces) **T25** = tube (70 pieces) **T17** = tube (40 pieces) **T20** = tube (50 pieces)	As applicable	**E3** = pure tin

For technical questions, contact: sferfixedresistors@vishay.com
THIS DOCUMENT IS SUBJECT TO CHANGE WITHOUT NOTICE. THE PRODUCTS DESCRIBED HEREIN AND THIS DOCUMENT ARE SUBJECT TO SPECIFIC DISCLAIMERS, SET FORTH AT www.vishay.com/doc?91000

Disclaimer

ALL PRODUCT, PRODUCT SPECIFICATIONS AND DATA ARE SUBJECT TO CHANGE WITHOUT NOTICE TO IMPROVE RELIABILITY, FUNCTION OR DESIGN OR OTHERWISE.

Vishay Intertechnology, Inc., its affiliates, agents, and employees, and all persons acting on its or their behalf (collectively, “Vishay”), disclaim any and all liability for any errors, inaccuracies or incompleteness contained in any datasheet or in any other disclosure relating to any product.

Vishay makes no warranty, representation or guarantee regarding the suitability of the products for any particular purpose or the continuing production of any product. To the maximum extent permitted by applicable law, Vishay disclaims (i) any and all liability arising out of the application or use of any product, (ii) any and all liability, including without limitation special, consequential or incidental damages, and (iii) any and all implied warranties, including warranties of fitness for particular purpose, non-infringement and merchantability.

Statements regarding the suitability of products for certain types of applications are based on Vishay's knowledge of typical requirements that are often placed on Vishay products in generic applications. Such statements are not binding statements about the suitability of products for a particular application. It is the customer's responsibility to validate that a particular product with the properties described in the product specification is suitable for use in a particular application. Parameters provided in datasheets and / or specifications may vary in different applications and performance may vary over time. All operating parameters, including typical parameters, must be validated for each customer application by the customer's technical experts. Product specifications do not expand or otherwise modify Vishay's terms and conditions of purchase, including but not limited to the warranty expressed therein.

Hyperlinks included in this datasheet may direct users to third-party websites. These links are provided as a convenience and for informational purposes only. Inclusion of these hyperlinks does not constitute an endorsement or an approval by Vishay of any of the products, services or opinions of the corporation, organization or individual associated with the third-party website. Vishay disclaims any and all liability and bears no responsibility for the accuracy, legality or content of the third-party website or for that of subsequent links.

Except as expressly indicated in writing, Vishay products are not designed for use in medical, life-saving, or life-sustaining applications or for any other application in which the failure of the Vishay product could result in personal injury or death. Customers using or selling Vishay products not expressly indicated for use in such applications do so at their own risk. Please contact authorized Vishay personnel to obtain written terms and conditions regarding products designed for such applications.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted by this document or by any conduct of Vishay. Product names and markings noted herein may be trademarks of their respective owners.

© 2022 VISHAY INTERTECHNOLOGY, INC. ALL RIGHTS RESERVED