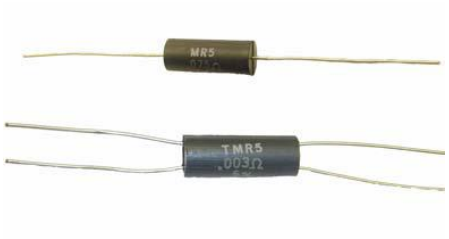
Features:



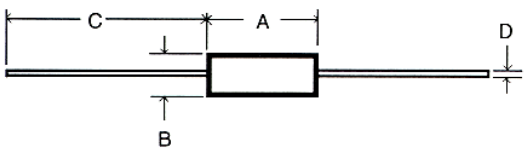
- Metal element resistors
- Tinned copper leads
- Low temperature coefficient
- Molded bodies
- TMR – Kelvin Bridge Test
- MRS high stability version
- Cut and formed product is available on selected sizes - contact Stackpole for details
- 100% RoHS compliant and lead free without exemption
- Halogen free
- REACH compliant

Electrical Specifications

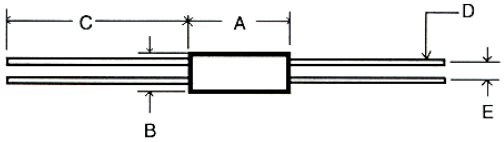
Type/Code	Power Rating (W) @ 70ºC	Short Time Overload	Dielectric Strength	TCR (ppm/ºC)	Ohmic Range (Ω) and Tolerance
					1%, 5%
MR1[2]	1	5 seconds at 5 X rated power	500 VAC	± 50 to ± 400 [1]	0.01 - 0.1
MR3[3]	3				0.005 - 0.2
MR5[4]	5				0.005 - 0.3
MR10[5]	10				0.01 - 0.5
TMR3	3			± 40	0.005 - 0.2
TMR5	5				0.005 - 0.3

(1) TCR is value dependent. Contact Stackpole for specific data.
(2) MR1 values 0.05Ω and below are non-magnetic and non-inductive. MR1 values ≥ 0.06Ω are ribbon element wound on ceramic core.
(3) MR3 values 0.1Ω and below are non-magnetic and non-inductive. MR3 values ≥ 0.15Ω are ribbon element wound on ceramic core.
(4) MR5 values 0.15Ω and below are non-magnetic and non-inductive. MR5 values ≥ 0.15Ω are ribbon element wound on ceramic core.
(5) MR10 all values are ribbon element wound on ceramic core.

Mechanical Specifications



MR



TMR

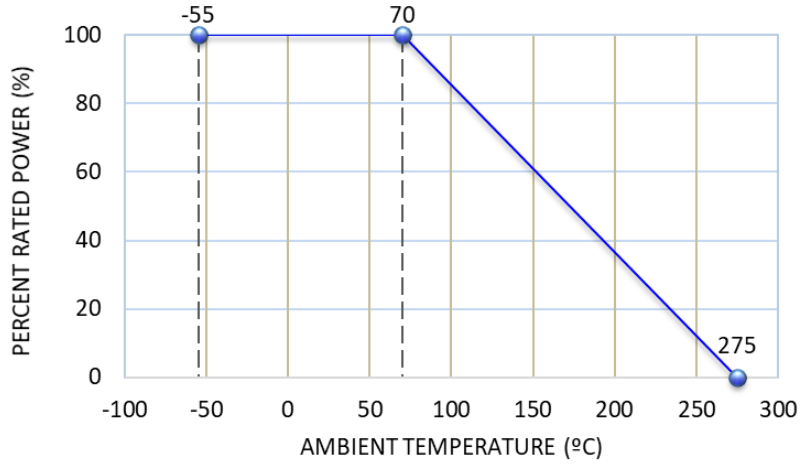
Type/Code	A Body Length	B Body Diameter	C Lead Length (Bulk)[1]	D Lead Diameter	E Lead Spacing (Ref.)	Unit
MR1	0.385 ± 0.015	0.135 ± 0.015	1.375 ± 0.125	0.032 ± 0.002	-	inches
	9.78 ± 0.38	3.43 ± 0.38	34.93 ± 3.18	0.81 ± 0.05		mm
MR3	0.560 ± 0.015	0.205 ± 0.015	1.375 ± 0.125	0.032 ± 0.002		inches
	14.22 ± 0.38	5.21 ± 0.38	34.93 ± 3.18	0.81 ± 0.05		mm
MR5	0.925 ± 0.015	0.330 ± 0.015	1.375 ± 0.125	0.036 ± 0.002		inches
	23.50 ± 0.38	8.38 ± 0.38	34.93 ± 3.18	0.91 ± 0.05		mm
MR10	1.925 ± 0.015	0.475 ± 0.015	1.375 ± 0.125	0.036 ± 0.002		inches
	48.90 ± 0.38	12.07 ± 0.38	34.93 ± 3.18	0.91 ± 0.05		mm
TMR3	0.625 ± 0.015	0.205 ± 0.015	1.375 ± 0.125	0.032 ± 0.002	0.125	inches
	15.88 ± 0.38	5.21 ± 0.38	34.93 ± 3.18	0.81 ± 0.05	3.18	mm
TMR5	0.940 ± 0.015	0.330 ± 0.015	1.375 ± 0.125	0.036 ± 0.002	0.200	inches
	23.88 ± 0.38	8.38 ± 0.38	34.93 ± 3.18	0.91 ± 0.05	5.08	mm

(1) See Packaging Specification for lead length dimension for tape and reel packaged product.

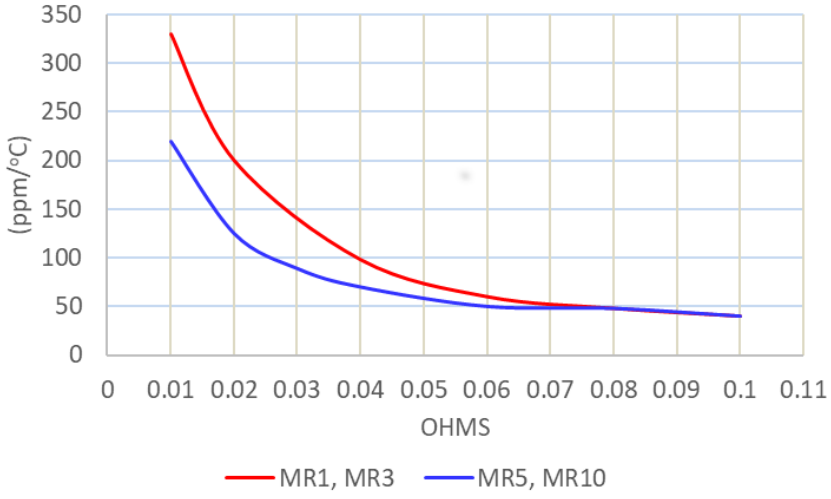
Performance Characteristics	
Test	Test Results
Moisture Resistance	± 5%
Thermal Shock	± 2%
Load Life @ 70ºC - 1000 hours	± 5%
Resistance to Soldering Heat	± 2%
Short Time Overload	± 2%
Dielectric Withstanding Voltage	± 2%

Operating Temperature Range: -55ºC to +275ºC

Power Derating Curve:



TCR X Resistance:



Recommended Solder Profiles

This information is intended as a reference for solder profiles for Stackpole resistive components. These profiles should be compatible with most soldering processes. These are only recommendations. Actual numbers will depend on board density, geometry, packages used, etc., especially those cells labeled with "*".

100% Matte Tin / RoHS Compliant Terminations

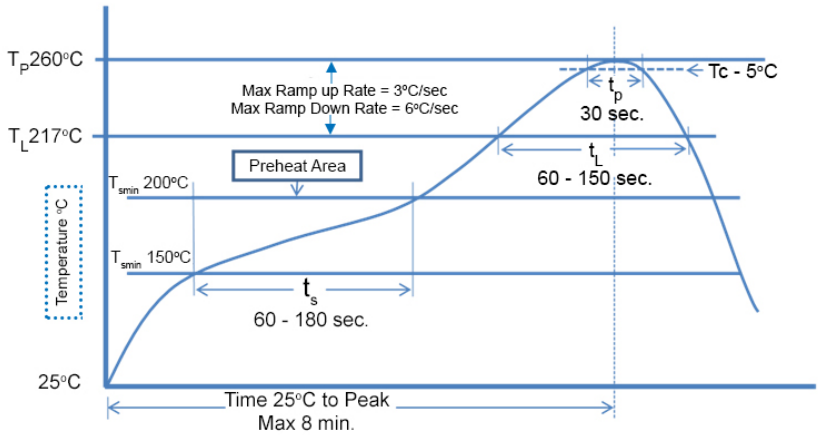
Soldering iron recommended temperatures: 330°C to 350°C with minimum duration.
Maximum number of reflow cycles: 3.

Wave Soldering			
Description	Maximum	Recommended	Minimum
Preheat Time	80 seconds	70 seconds	60 seconds
Temperature Diff.	140°C	120°C	100°C
Solder Temp.	260°C	250°C	240°C
Dwell Time at Max.	10 seconds	5 seconds	*
Ramp DN (°C/sec)	N/A	N/A	N/A

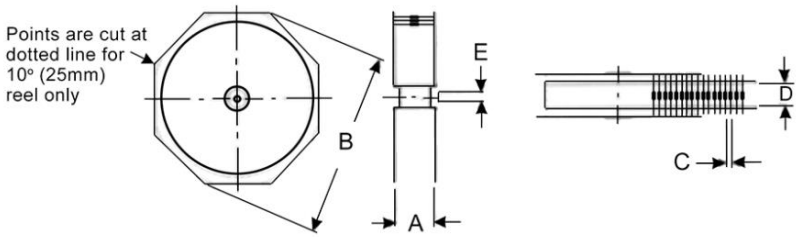
Temperature Diff. = Defference between final preheat stage and soldering stage.

Convection IR Reflow			
Description	Maximum	Recommended	Minimum
Ramp Up (°C/sec)	3°C/sec	2°C/sec	*
Dwell Time > 217°C	150 seconds	90 seconds	60 seconds
Solder Temp.	260°C	245°C	*
Dwell Time at Max.	30 seconds	15 seconds	10 seconds
Ramp DN (°C/sec)	6°C/sec	3°C/sec	*

Recommended Lead Free Resistor Reflow Profile



Packaging Specifications



Series	Code	A max(1)	B max	C	D(2)	Tape	Unit
MR	1	3.311 84.10	13.504 343.00	0.197 ± 0.020 5.00 ± 0.50	2.063 ± 0.079 52.40 ± 2.00	0.250 6.35	inches mm
	3	3.484 88.50	13.504 343.00	0.394 ± 0.020 10.00 ± 0.50	2.063 ± 0.079 52.40 ± 2.00	0.250 6.35	inches mm
	5	3.850 97.80	13.504 343.00	0.394 ± 0.020 10.00 ± 0.50	2.875 ± 0.079 73.03 ± 2.00	0.250 6.35	inches mm
	10	4.764 121.00	13.504 343.00	0.600 ± 0.020 15.24 ± 0.50	4.375 ± 0.079 111.13 ± 2.00	0.250 6.35	inches mm

Dimension "E": This is a non-critical dimension that does not have a tolerance in the standard.
Range of diameters is from 0.547 inches (13.90 mm) to 1.500 inches (38.10 mm).

(1) Reference value only. The "A" dimension shall be governed by the overall length of the taped component.
The distance between flanges shall be 0.059 inches (1.50 mm) to 0.315 (8.00 mm) greater than the overall component.

(2) The given dimension "D" expresses the standard width spacing. A 26 mm narrow spacing is available as option "N" packaging code.

RoHS Compliance

Stackpole Electronics has joined the worldwide effort to reduce the amount of lead in electronic components and to meet the various regulatory requirements now prevalent, such as the European Union's directive regarding "Restrictions on Hazardous Substances" (RoHS 3). As part of this ongoing program, we periodically update this document with the status regarding the availability of our compliant components. All our standard part numbers are compliant to EU Directive 2011/65/EU of the European Parliament as amended by Directive (EU) 2015/863/EU as regards the list of restricted substances.

RoHS Compliance Status

Standard Product Series	Description	Package / Termination Type	Standard Series RoHS Compliant	Lead-Free Termination Composition	Lead-Free Mfg. Effective Date (Std Product Series)	Lead-Free Effective Date Code (YY/WW)
MR	Low Resistance Value Leaded Resistor - Molded 2 Leads	Axial Kelvin	YES	100% Matte Sn	Jan-06	06/01
TMR	Low Resistance Value Leaded Resistor - Molded 4 Leads	Axial Kelvin	YES	100% Matte Sn	Jan-06	06/01

"Conflict Metals" Commitment

We at Stackpole Electronics, Inc. are joined with our industry in opposing the use of metals mined in the "conflict region" of the Eastern Democratic Republic of the Congo (DRC) in our products. Recognizing that the supply chain for metals used in the electronics industry is very complex, we work closely with our own suppliers to verify to the extent possible that the materials and products we supply do not contain metals sourced from this conflict region. As such, we are in compliance with the requirements of Dodd-Frank Act regarding Conflict Minerals.

Compliance to "REACH"

We certify that all passive components supplied by Stackpole Electronics, Inc. are SVHC (Substances of Very High Concern) free and compliant with the requirements of EU Directive 1907/2006/EC, "The Registration, Evaluation, Authorization and Restriction of Chemicals", otherwise referred to as REACH. Contact us for complete list of REACH Substance Candidate List.

Environmental Policy

It is the policy of Stackpole Electronics, Inc. (SEI) to protect the environment in all localities in which we operate. We continually strive to improve our effect on the environment. We observe all applicable laws and regulations regarding the protection of our environment and all requests related to the environment to which we have agreed. We are committed to the prevention of all forms of pollution.

How to Order

1	2	3	4	5	6	7	8	9
M	**R**	**3**	**F**	**T**	**R**	**1**	**0**	**0**

Product Series	
Code	Description
MR	2 Leads
TMR	4 Leads
MRS	High Stability

Power Rating	
Size	W
1	1
3	3
5	5
10	10

Tolerance	
Code	Tol
F	1%
J	5%

Packaging			
Code	Description	Size	Quantity
T	Tape and Reel	MR1	2000
		MRS3	1000
		MR3	750
		MR5	500
		MR10	250
B	Bulk	MR1, MR3, MR5	1000
		MR10	500
		TMR3, TMR5	100

Resistance Value
Four characters with the multiplier used as the decimal holder.
"L" used as multiplier of 10^{-3} for any value under 0.1 ohm.
0.005 ohm = 5L00
0.01 ohm = 10L0
0.2 ohm = R200