MG / MGM / MGE / MGME Series

High Voltage Metal Glaze Resistor

Stackpole Electronics, Inc.
Resistive Product Solutions

Features:

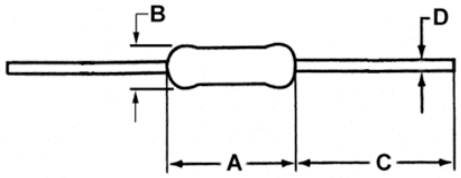
- High voltage capability from 1600 V to 7000 V
- Inexpensive high voltage leaded resistor solution
- High resistance values up to 500 M
- Tolerances as low as 1%; TCRs as low as 50 ppm/ºC
- Flameproof coating (brown) standard
- Epoxy coating (blue) available up to 2 W
- MGE and MGME denote alternate epoxy coating instead of silicone
- RoHS compliant, REACH compliant, and halogen free

Electrical Specifications

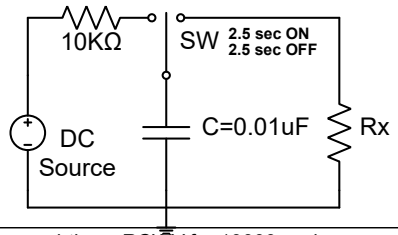
Type/Code	Power Rating (W) @ 70ºC	Maximum Working Voltage (V)	Maximum Overload Voltage (V)	Dielectric Withstanding Voltage (V)		TCR (ppm/ºC) (1)	Ohmic Range (Ω) and Tolerance
				Silicone Coating	Epoxy Coating		1%, 5%, 10%
MG14	0.25	1600	2000	400	500	± 100	100K - 500M
MG12	0.5	3500	4000	500	700		
MG1	1	4500	5000	500	1000		
MG2	2	7000	14000	700	1200		
MGM12	0.5	1700	2500	400	500		
MGM1	1	4000	4500	500	700		
MGM2	2	5000	10000	500	1000		
MGM3	3	7000	14000	700	1200		

(1) ±50 ppm/ºC available for some values and sizes. Contact Stackpole.

Mechanical Specifications

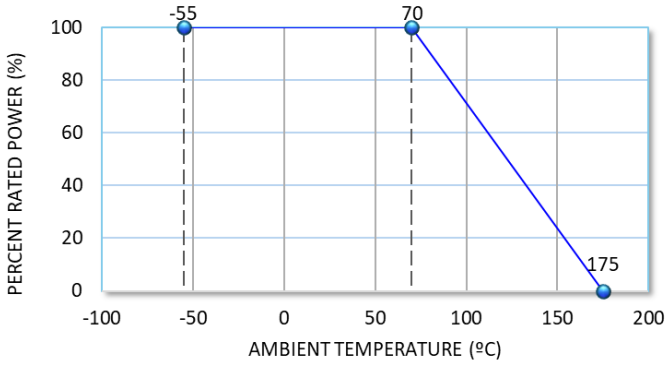


Type/Code	A Body Length	B Body Diameter	C Lead Length (Bulk)	D Lead Diameter	Unit
MG14	0.248 ± 0.020 6.30 ± 0.50	0.091 ± 0.012 2.30 ± 0.30	1.102 ± 0.079 28.00 ± 2.00	0.022 ± 0.001 0.55 ± 0.03	inches mm
MG12	0.354 ± 0.020 9.00 ± 0.50	0.126 ± 0.020 3.20 ± 0.50	1.024 ± 0.079 26.00 ± 2.00	0.026 ± 0.001 0.65 ± 0.03	inches mm
MG1	0.453 ± 0.039 11.50 ± 1.00	0.157 ± 0.020 4.00 ± 0.50	0.945 ± 0.079 24.00 ± 2.00	0.031 ± 0.001 0.78 ± 0.03	inches mm
MG2	0.610 ± 0.039 15.50 ± 1.00	0.197 ± 0.020 5.00 ± 0.50	1.260 ± 0.079 32.00 ± 2.00	0.031 ± 0.001 0.78 ± 0.03	inches mm
MGM12	0.248 ± 0.020 6.30 ± 0.50	0.091 ± 0.012 2.30 ± 0.30	1.102 ± 0.079 28.00 ± 2.00	0.022 ± 0.001 0.55 ± 0.03	inches mm
MGM1	0.354 ± 0.020 9.00 ± 0.50	0.157 ± 0.020 4.00 ± 0.50	1.024 ± 0.079 26.00 ± 2.00	0.026 ± 0.001 0.65 ± 0.03	inches mm
MGM2	0.453 ± 0.039 11.50 ± 1.00	0.177 ± 0.020 4.50 ± 0.50	1.378 ± 0.079 35.00 ± 2.00	0.031 ± 0.001 0.78 ± 0.03	inches mm
MGM3	0.610 ± 0.039 15.50 ± 1.00	0.197 ± 0.020 5.00 ± 0.50	1.260 ± 0.079 32.00 ± 2.00	0.031 ± 0.001 0.78 ± 0.03	inches mm

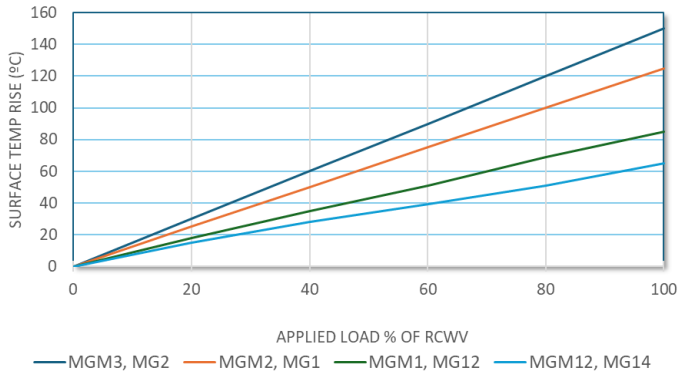
Performance Characteristics		
Test	Test Specification	Test Condition
Temperature Coefficient (TCR)	by type (see Electrical Specification	Resistance value at room temperature
Short Time Overload	±(1% + 0.05Ω)	Rated Voltage x 2.5 or Max. Overload Voltage, whichever is lower, for 5 seconds
Moisture Resistance	±(5% + 0.05Ω)	40 ± 2ºC, 90% ~ 95% R.H., 1000 hours (for epoxy resin) 90 minutes ON and 30 minutes OFF
Load Life	±(3% + 0.05Ω)	1000 hours at rated voltage, 70ºC 90 minutes ON and 30 minutes OFF
Insulation Resistance	±10,000 MΩ over	500 ± 50 V DC during 1 minute, V-Block method
Dielectric Withstanding Voltage	by type (see Electrical Specification	In V-Block for 60 seconds
Resistance to Soldering Heat	±(1% + 0.05Ω)	260 ± 5ºC, 2 seconds ± 1 second
Resistance to Solvent	No abnormality in coatings and markings	IPA for 5 ± 0.5 minutes with ultrasonic
Terminal Strength	Tensile: ≥ 2.5 Kg	Direct load for 10 seconds, in the direction of the terminal leads
Anti-surge Characteristics	±(10% + 0.05Ω)	Discharge Test: 0.01 uf capacitor discharge pulse 10 times (1 pulse / 5 seconds max.) 
Intermittent Overload	±(1% + 0.05Ω)	4 times RCWV for 10000 cycles (1 second ON, 25 seconds OFF)

RCWV (Rated Continuous Working Voltage) = √(P*R)
Operating Temperature Range: -55 to +175ºC

Power Derating Curve:



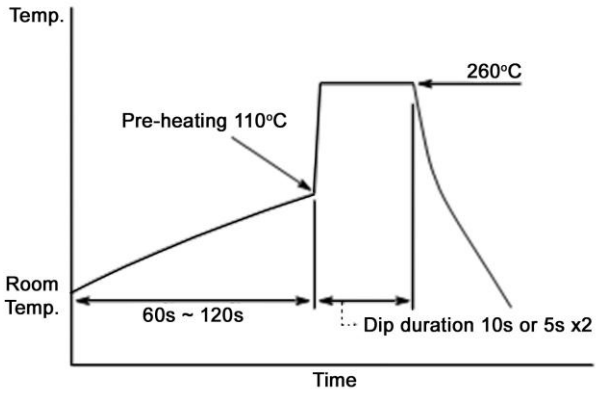
Temperature Rise:



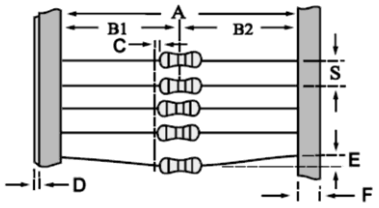
Recommended Soldering Condition

Flow Soldering:
- Pre-heating: 110°C MAX
- Peak temperature/duration: 260°C within 10 seconds (1st, 2nd wave total)
- Temperature profile (see chart on the right)

Iron Soldering:
- 380°C, 5 seconds, once/terminal



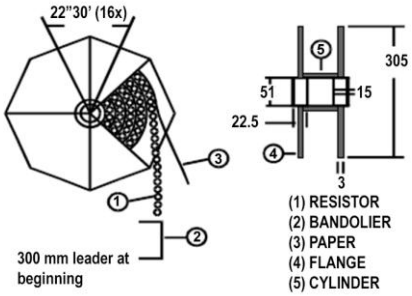
Packaging Specifications



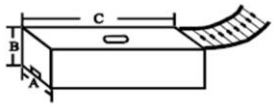
Type/Code	A	B1/B2	C	D	E	F	S	Unit
MG14	2.047 +0.039 /-0.00 52.00 +1.00 /-0.00	0.047 1.20	0.031 max. 0.80 max.	0.020 max. 0.50 max.	0.047 max. 1.20 max.	0.236 ± 0.020 6.00 ± 0.50	0.197 5.00	inches mm
MG12	2.047 +0.039 /-0.00 52.00 +1.00 /-0.00	0.047 1.20	0.031 max. 0.80 max.	0.020 max. 0.50 max.	0.047 max. 1.20 max.	0.236 ± 0.020 6.00 ± 0.50	0.197 5.00	inches mm
MG1	2.874 +0.039 /-0.00 73.00 +1.00 /-0.00	0.059 1.50	0.031 max. 0.80 max.	0.020 max. 0.50 max.	0.047 max. 1.20 max.	0.236 ± 0.020 6.00 ± 0.50	0.197 5.00	inches mm
MG2	2.874 +0.039 /-0.00 73.00 +1.00 /-0.00	0.059 1.50	0.031 max. 0.80 max.	0.020 max. 0.50 max.	0.047 max. 1.20 max.	0.236 ± 0.020 6.00 ± 0.50	0.394 10.00	inches mm
MGM12	2.047 +0.039 /-0.00 52.00 +1.00 /-0.00	0.047 1.20	0.031 max. 0.80 max.	0.020 max. 0.50 max.	0.047 max. 1.20 max.	0.236 ± 0.020 6.00 ± 0.50	0.197 5.00	inches mm
MGM1	2.047 +0.039 /-0.00 52.00 +1.00 /-0.00	0.047 1.20	0.031 max. 0.80 max.	0.020 max. 0.50 max.	0.047 max. 1.20 max.	0.236 ± 0.020 6.00 ± 0.50	0.197 5.00	inches mm
MGM2	2.874 +0.039 /-0.00 73.00 +1.00 /-0.00	0.059 1.50	0.031 max. 0.80 max.	0.020 max. 0.50 max.	0.047 max. 1.20 max.	0.236 ± 0.020 6.00 ± 0.50	0.197 5.00	inches mm
MGM3	2.874 +0.039 /-0.00 73.00 +1.00 /-0.00	0.059 1.50	0.031 max. 0.80 max.	0.020 max. 0.50 max.	0.047 max. 1.20 max.	0.236 ± 0.020 6.00 ± 0.50	0.394 10.00	inches mm

Tape on Reel/Tape on Box Specifications

TAPE ON REEL PACKING



TAPE ON BOX PACKING



Type/Code	Quantity per Reel	Quantity per Box	Tape on Reel	Tape on Box			Unit
			Across Flange (A)	W (A)	H (B)	L (C)	
MG14	5000	5000	2.835 72.00	3.150 80.00	2.953 75.00	10.394 264.00	inches mm
MG12	3000	1000	2.835 72.00	3.150 80.00	1.811 46.00	10.394 264.00	inches mm
MG1	2000	1000	2.835 72.00	3.150 80.00	2.953 75.00	10.394 264.00	inches mm
MG2	1000	1000	3.740 95.00	4.055 103.00	3.780 96.00	10.433 265.00	inches mm
MGM12	5000	5000	2.835 72.00	3.150 80.00	4.134 105.00	10.394 264.00	inches mm
MGM1	3000	1000	2.835 72.00	3.150 80.00	1.811 46.00	10.394 264.00	inches mm
MGM2	2000	1000	3.740 95.00	4.055 103.00	3.228 82.00	10.433 265.00	inches mm
MGM3	1000	1000	3.740 95.00	4.055 103.00	3.780 96.00	10.433 265.00	inches mm

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)
MG	High Voltage Metal Glaze Leaded Resistor	Axial	YES(1)	100% Matte Sn	Jan-06	04/01
MGE	High Voltage Metal Glaze Leaded Resistor (Epoxy Coating)	Axial	YES(1)	100% Matte Sn	Jan-06	04/01
MGM	High Voltage Mini Metal Glaze Leaded Resistor	Axial	YES(1)	100% Matte Sn	Always	Always
MGME	High Voltage Mini Metal Glaze Leaded Resistor (Epoxy Coating)	Axial	YES(1)	100% Matte Sn	Always	Always

Note (1): RoHS compliant by means of exemption 7c-I.

"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

M	G	1	2	J	T	1	0	0	K

Product Series

Code	Description
MG	Standard Size Silicone Coating
MGM	Mini Size Silicone Coating
MGE	Standard Size Epoxy Coating Only up to 2W
MGME	Mini Size Epoxy Coating

Size

Code	W
14	0.25
12	0.5
1	1
2	2
3	3

Tolerance

Code	Tol	Value
F	1%	E24
J	5%	
K	10%	

Packaging

Code	Description	Size	Quantity
T	Tape and Reel	MG14, MGM12	5000
		MG12, MGM1	3000
		MG1, MGM2	2000
		MG2, MGM3	1000
A	Ammo	MG14, MGM12	5000
		MG12, MG1, MG2 MGM1, MGM2, MGM3	1000
B	Bulk	all sizes	1000

Resistance Value

Four characters with the multiplier used as the decimal holder.

1 Kohm = 1K00
1 Mohm = 1M00
1 Gohm = 1G00