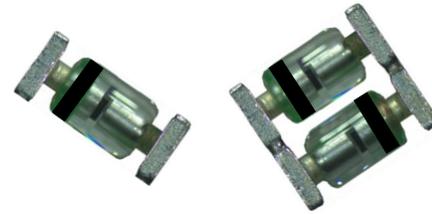


Features

- Available in Surface Mount Package & Axial Lead
- Passivated Chip
- Ultra Low Magnetic Construction
- Non Cavity Design; Available as Anti-Parallel Pair
- Thermally Matched Configuration
- Low Capacitance @ 0 V bias
- Low Conductance @ 0 V bias
- Compatible with Automatic Insertion Equipment
- RoHS* Compliant



MELF Package

Applications

- MRI Receiver Protection
- Body Coil Isolation

Description

The MADP-009989 diode was designed to protect MRI receivers from high RF energy fields including long RF pulses and RF spike pulses present in most MRI machines. This diode acts as a passive protector (limiter) for the MRI receiver. No forward bias voltage is required to turn on the diode. It is self-biased by the RF transmitter pulse power. A switch driver is not needed for this receiver protection application.

Receiver protector diodes appear directly across the input port of the receiver. They are connected in anti-parallel pairs to limit the RF carrier excursion in both polarities. They must, therefore, exhibit extremely low insertion loss, both in the “on” state (high power present) and the “off” state (receiver power present) so as not to decrease the receiver’s sensitivity. This diode is available in two package configurations for flexibility in design.

The MADP-009989 is ideally suited for MRI Receiver Protection and Body Coil Isolation.



Axial Leaded Package

Ordering Information

Part Number	MELF Package Description	Qty. per Reel
MADP-009989-14320T	Single	1000
MADP-009989-14420T	AP Pair	1000
MADP-009989-14340T	Axial	500

* Restrictions on Hazardous Substances, compliant to current RoHS EU directive.

Electrical Specifications: $T_A = +25^\circ\text{C}$

Parameter	Test Conditions	Units	Min.	Typ.	Max.
Forward Voltage ¹	$I_F = 10 \text{ mA}, T_J = 25^\circ\text{C}$ $I_F = 100 \text{ mA}, T_J = 25^\circ\text{C}$	V	—	—	1.0 1.2
Reverse Breakdown Voltage ¹	$I_R = 10 \text{ }\mu\text{A}$	V	75	—	—
Reverse Current ¹	$V_R = 20 \text{ V}, T_J = 25^\circ\text{C}$ $V_R = 50 \text{ V}, T_J = 25^\circ\text{C}$	nA	—	—	50 500
Total Capacitance (Per Diode)	$V_R = 0 \text{ V}, 1 \text{ MHz}$	pF	—	1.2	5.0
Conductance	$V_R = 0 \text{ V}, 64 \text{ MHz}$	μs	—	—	40

1. Short term duration test pulse used to minimize self heating effect. The reverse breakdown voltage is not measured on Anti-Parallel Pair.

Absolute Maximum Ratings^{2,3}

Parameter	Absolute Maximum
Junction Temperature	175°C
Peak Repetitive Reverse Voltage Working Peak Reverse Voltage DC Blocking Voltage	75 V
RMS Reverse Voltage	50 V
Forward Current	150 mA DC
Non-Repetitive Peak Forward Surge Current 8.3 ms Single half sine wave	2.5 A
Operating & Storage Temperature	-65°C to +175°C

2. Exceeding any one or combination of these limits may cause permanent damage to this device.

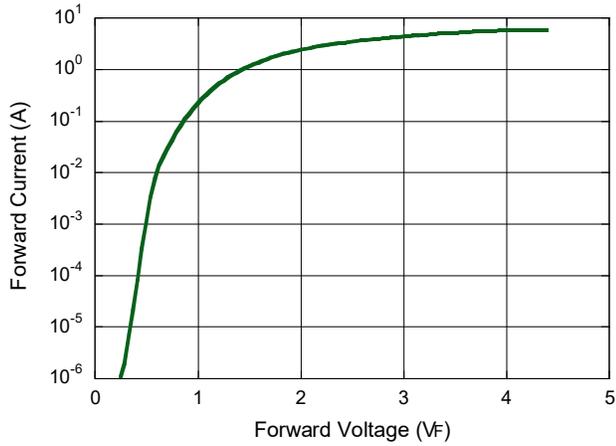
3. MACOM does not recommend sustained operation near these survivability limits.

Thermal Characteristics

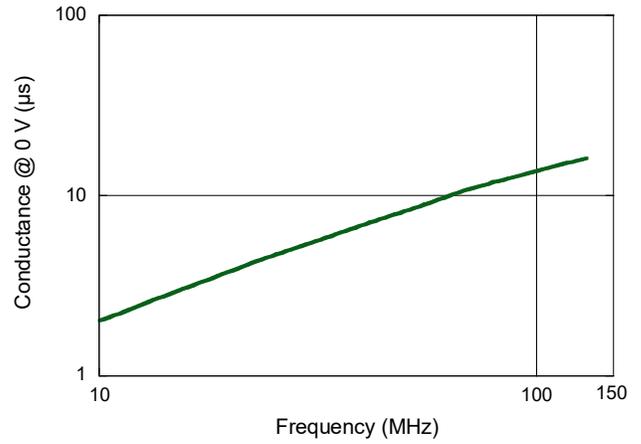
Parameter	Test Conditions	Units
Thermal Resistance	Axial Leaded $R_{\theta_{JL}}$ @ lead length = 3/8 inches Surface Mount (US) $R_{\theta_{JC}}$	150°C/W 40°C/W

Typical Performance Curves

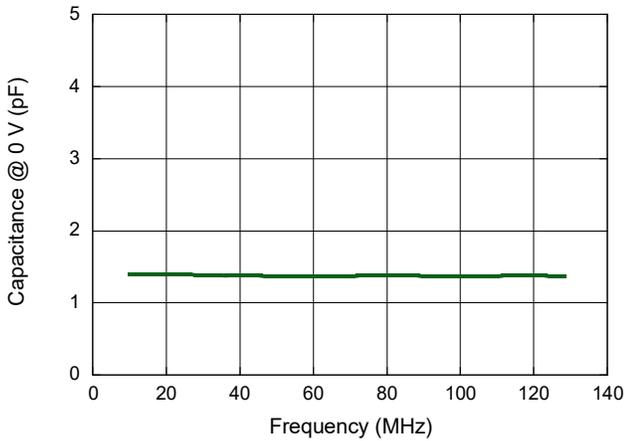
If vs. VF



Conductance vs. Frequency

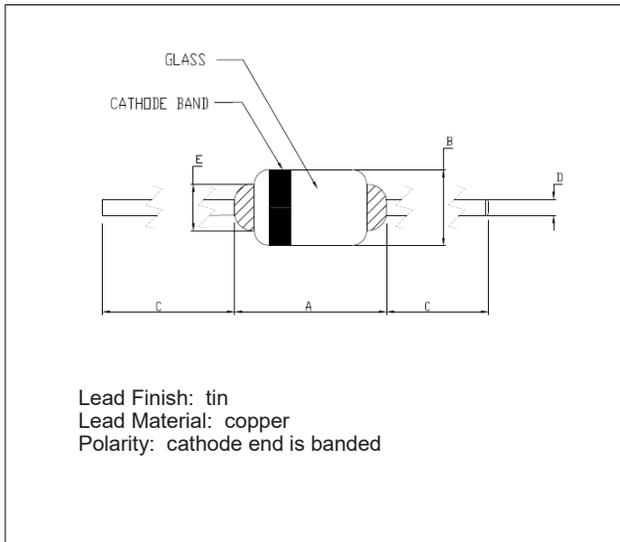


Capacitance vs. Frequency

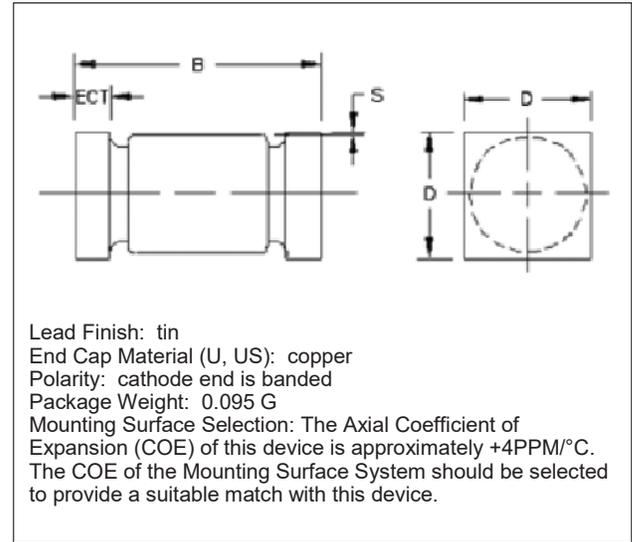


Hermetically Sealed Outline Drawings:

Axial Leaded Glass



Glass MELF



Symbol	Dimensions			
	Inches		Millimeters	
	Min.	Max.	Min.	Max.
A	—	0.200	—	5.08
B	—	0.070	—	1.78
C	0.975	—	24.77	—
D	0.019	0.021	0.48	0.53
E		0.040		

Symbol	Dimensions			
	Inches		Millimeters	
	Min.	Max.	Min.	Max.
D	0.070	0.085	1.78	2.16
B	0.165	0.195	4.19	4.95
ECT	0.019	0.028	0.048	0.71
S	0.003	—	0.08	—

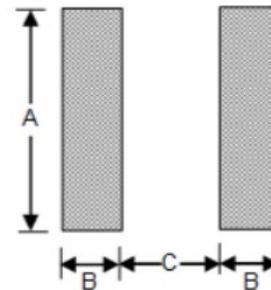
Notes:

1. Dimensions are in inches. Millimeters are given for general information only.
2. Dimension BD shall be measured at the largest diameter.
3. The specified lead diameter applies in the zone between .050 inch (1.27 mm) from the diode body to the end of the lead. Outside of this zone lead shall not exceed BD.
4. In accordance with ASME Y14.5M, diameters are equivalent to Φ x symbology.

Outline (ODS-1442) Hermetically Sealed Glass Anti-Parallel MELF^{4,5}

Lead Finish: Silver/Gold-Tin Eutectic Solder
 End Cap Material (U, US): copper
 Polarity: cathode end is banded, Anti-Parallel
 Package Weight: 0.200 G
 Mounting Surface Selection: The Axial Coefficient of Expansion (COE) of this device is approximately +4PPM/°C. The COE of the Mounting Surface System should be selected to provide a suitable match with this device.

Circuit Pad Layout



Dimension	Inches	mm
A	0.190	4.83
B	0.067	1.70
C	0.120	3.05

- 4. Dimensions are in inches.
- 5. Refer to application note M538 for surface mounting recommendations.

MACOM Technology Solutions Inc. ("MACOM"). All rights reserved.

These materials are provided in connection with MACOM's products as a service to its customers and may be used for informational purposes only. Except as provided in its Terms and Conditions of Sale or any separate agreement, MACOM assumes no liability or responsibility whatsoever, including for (i) errors or omissions in these materials; (ii) failure to update these materials; or (iii) conflicts or incompatibilities arising from future changes to specifications and product descriptions, which MACOM may make at any time, without notice. These materials grant no license, express or implied, to any intellectual property rights.

THESE MATERIALS ARE PROVIDED "AS IS" WITH NO WARRANTY OR LIABILITY, EXPRESS OR IMPLIED, RELATING TO SALE AND/OR USE OF MACOM PRODUCTS INCLUDING FITNESS FOR A PARTICULAR PURPOSE, MERCHANTABILITY, INFRINGEMENT OF INTELLECTUAL PROPERTY RIGHT, ACCURACY OR COMPLETENESS, OR SPECIAL, INDIRECT, INCIDENTAL, OR CONSEQUENTIAL DAMAGES WHICH MAY RESULT FROM USE OF THESE MATERIALS.

MACOM products are not intended for use in medical, lifesaving or life sustaining applications. MACOM customers using or selling MACOM products for use in such applications do so at their own risk and agree to fully indemnify MACOM for any damages resulting from such improper use or sale.