

Features

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



MELF



Axial

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.

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

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

Ordering Information

Part Number	Package Description	Package
MADP-009989-14320T	Melf	1200 piece reel
MADP-009989-14340T	Axial	3500 piece reel

* Restrictions on Hazardous Substances, European Union Directive 2011/65/EU.

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
Storage Temperature	-65°C to +175°C
Operating Temperature	-65°C to +175°C

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

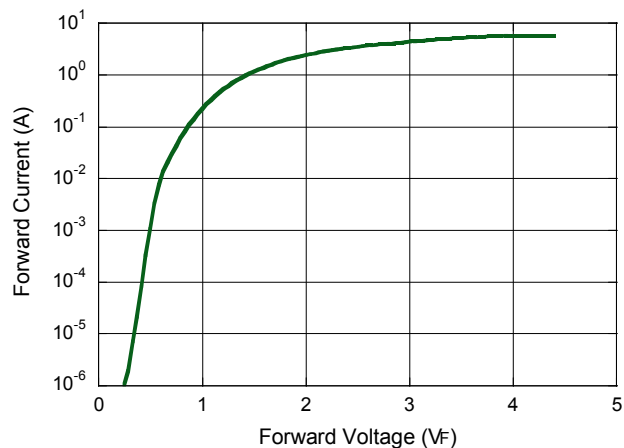
3. MACOM does not recommend sustained operation near these survivability limits.

Thermal Characteristics

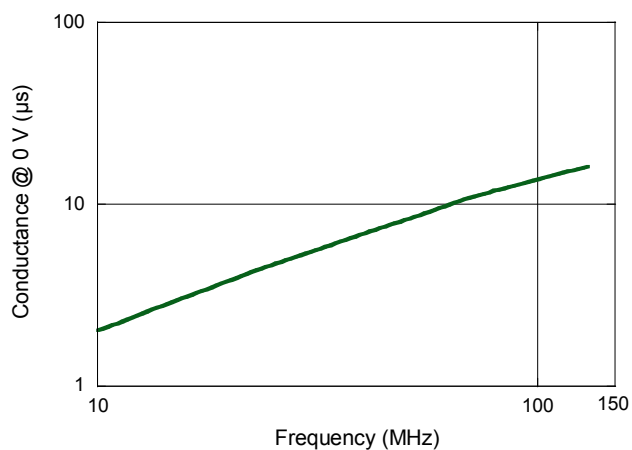
Parameter	Test Conditions	Units
Thermal Resistance	Axial Leaded $R\theta_{JL}$ @ lead length = 3/8 inches Surface Mount (US) $R\theta_{JEC}$	150°C/W 40°C/W

Typical Performance Curves

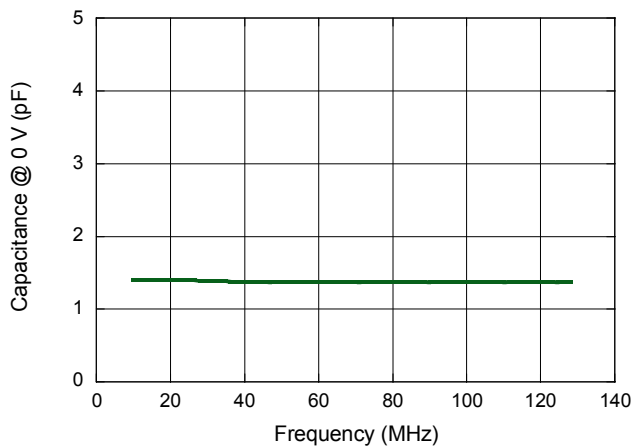
If vs. VF



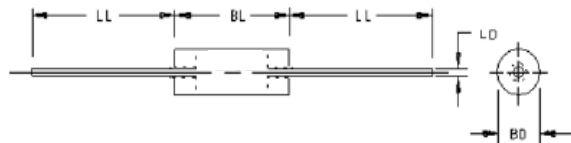
Conductance vs. Frequency



Capacitance vs. Frequency



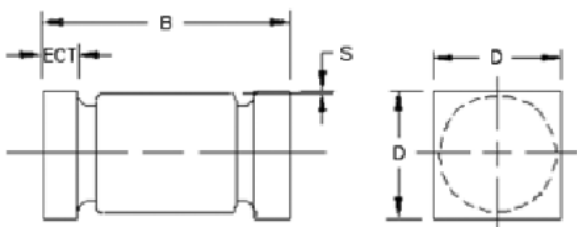
Outline Drawing, Hermetically Sealed Glass Axial Leaded



Symbol	Dimensions				Notes
	Inches		Millimeters		
	Min.	Max.	Min.	Max.	
BD	0.056	0.080	1.420	2.03	2
BL	0.130	0.180	3.300	4.57	—
LD	0.018	0.022	0.046	0.56	3
LL	1.00	1.500	25.400	38.10	—

Lead Finish: tin
 Lead Material: copper
 Polarity: cathode end is banded
 Package Weight: 0.150 G

Outline Drawing, Hermetically Sealed Glass



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	—

Lead Finish: tin
 End Cap Material (U, US): copper
 Polarity: cathode end is banded
 Package Weight: 0.095 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.

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.

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