

## Features

- Non-Magnetic Package for MRI Applications
- Rectangular MELF Ceramic Package
- Hermetically Sealed
- RoHS\* Compliant

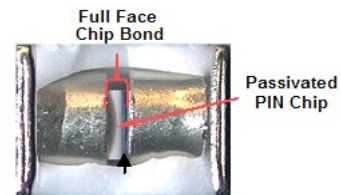
## Applications

- ISM

## Description

The MADP-011143-1072 is a surface mount PIN diode in a non-magnetic Metal Electrode Leadless Faced (MELF) package. This PIN diode is manufactured using MACOM's time proven HIPAX technology. The result is a low inductance ceramic package with no ribbons or wires. The package utilizes a unique non-magnetic plating process that provides for a hermetically sealed component that has extremely low electromagnetic permeability. Incorporated in the package is a glass passivated CERMA chip that is full face bonded on the cathode and anode which maximizes the surface contact area to minimize the electrical and thermal resistances. The chip and package have been comprehensively characterized both electrically and mechanically to ensure repeatable and predictable performance.

The MADP-011034-1072 is designed for circuit protection and the tuning of RF coil designs in MRI applications. When connected in an anti-parallel configuration these PIN diodes provide excellent protection from long RF pulses and transient voltage spikes.



Diode Cross Section

## Designed for Automated Assembly

This easy to use package design makes automatic pick and place, indexing and assembly, extremely easy. The parallel flat surfaces are well suited for most key jaw or vacuum pick-up techniques. All of the solderable surfaces are tin plated and compatible with industry standard reflow and vapor phase soldering processes.

## RoHS

The MADP-011143-1072 is fully RoHS compliant meaning that it contains less than the maximum allowable concentration of 0.1% by weight for lead, PBB, PBDE, and 0.01% of cadmium and hexavalent chromium at raw homogeneous materials level. There is less than 100ppm of mercury and no mercury was intentionally added to the component.

## Ordering Information<sup>1</sup>

Part Number	Package
MADP-011143-10720T	1500 piece 7" reel

1. Reference Application Note M513 for reel size information.

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

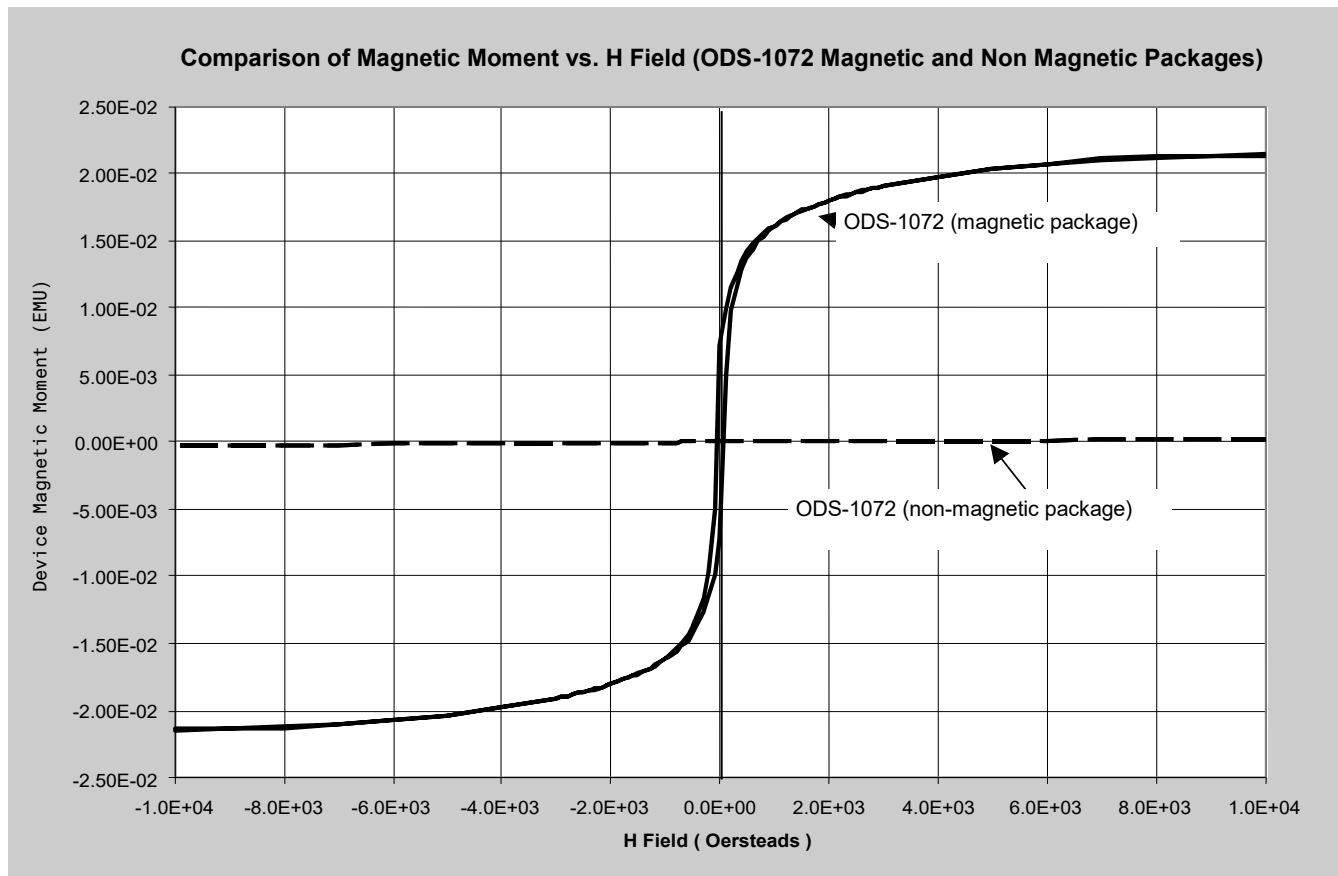
Parameter	Test Conditions	Units	Min.	Typ.	Max.
Voltage Breakdown ( $V_B$ )	10 $\mu\text{A}$	V	500	800	—
Forward Voltage ( $V_F$ )	100 mA	V	—	0.9	1.0
Reverse Leakage Current ( $I_R$ )	$V_R = 500\text{ V}$	nA	—	10	50
Total Capacitance ( $C_T$ )	$V_R = 50\text{ V} / \text{Freq.} = 1\text{ MHz}$	pF	—	1.0	1.5
Parallel Resistance ( $R_P$ )	$V_R = 10\text{ V} / \text{Freq.} = 120\text{ MHz}$	K $\Omega$	200	300	—
Series Resistance ( $R_S$ )	$I_F = 100\text{ mA} / \text{Freq.} = 120\text{ MHz}$ $I_F = 200\text{ mA} / \text{Freq.} = 120\text{ MHz}$	$\Omega$	—	0.20 0.15	0.30 0.25
Lifetime ( $T_L$ )	$I_F = 10\text{ mA} / I_R = -6\text{ mA}$	$\mu\text{s}$	3.5	4	—
I region Thickness	—	$\mu\text{m}$	—	72	—
CW Power Dissipation	Infinite Heatsink	W	—	6.0	—
CW Thermal Resistance	—	$^\circ\text{C/W}$	—	10	—

## Absolute Maximum Ratings<sup>2,3,4,5</sup>

Parameter	Absolute Maximum
Reverse DC & AC Voltage	500 V
D.C. Forward Current	1 A
Peak AC Forward Surge Current (8.3 mS Single Half Sine Wave)	2.5 A
CW Power Dissipation	6 W
Operating Temperature	-55 $^\circ\text{C}$ to +150 $^\circ\text{C}$
Storage Temperature	-65 $^\circ\text{C}$ to +175 $^\circ\text{C}$
Mounting Temperature	+260 $^\circ\text{C}$ for 30 s

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.
4. Values will de-rate over temperature.
5. Infinite Heat Sink, de-rate to 0 W @ +175 $^\circ\text{C}$ , by -40 mW/ $^\circ\text{C}$  from 25 $^\circ\text{C}$  to +175 $^\circ\text{C}$

## Typical Non-Magnetic Performance



Magnetic Property	ODS-1072 Non Magnetic	ODS-1072 Magnetic
Saturation Moment (EMU) @ $H = H_{MAX}$ Oersteads	2.3 x E-4	2.1 x E-2
Remanence Moment (EMU) @ $H = 0$ Oersteads	4.2 x E-8	7.1 x E-3
Coercivity (Oersteads) @ EMU = 0 Moment	1	59.2

## Handling Procedures

Please observe the following precautions to avoid damage:

## Cleanliness and Storage

These devices should be handled and stored in a clean environment. The ends of the device are tin plated for greater solderability. Continuous exposure to high humidity (>80%) for extended periods may cause the surface to oxidize. Caution should be taken when storing devices for long periods.

## Static Sensitivity

These electronic devices are sensitive to electrostatic discharge (ESD) and can be damaged by static electricity. Proper ESD control techniques should be used when handling these HBM Class 0 devices.

## General Handling

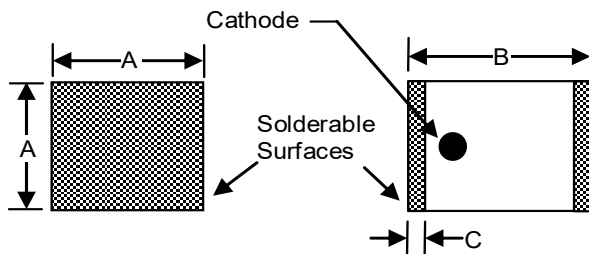
Device can be handled with tweezers or vacuum pickups and are suitable for use with automatic pick-and-place equipment.

## MELF Assembly Recommendations

Devices may be soldered using standard 60Sn/40Pb or RoHS compliant solders. MELF devices are plated bright tin, 300  $\mu\text{m}$  minimum thickness, to ensure an optimum connection.

For recommended Sn/Pb and RoHS soldering profiles See Application Note M538 on the MACOM website.

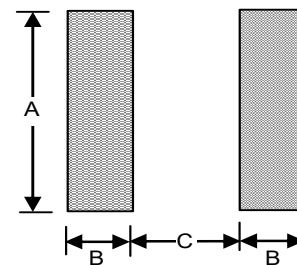
## 1072 Package Dimensions



Size Inches (mm)		
A (sq) Min. / Max.	B Min. / Max.	C Min. / Max.
0.080 / 0.095 (2.032 / 2.413)	0.115 / 0.135 (2.921 / 3.429)	0.008 / 0.030 (0.203 / 0.762)

All tolerances are  $\pm 0.001$ " ( $\pm 0.025$  mm).

## Circuit Pad Layout



Dimension	Size	
	inches	mm
A	0.093	2.36
B	0.050	1.27
C	0.060	1.52

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