MA4P504-1072T

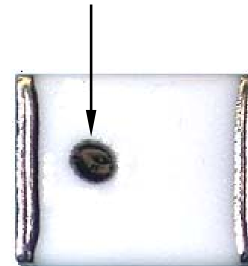
MELF PIN Diode
1 - 4000 MHz

Rev. V2

Features

- High Power Handling
- Low Loss / Low Distortion
- Low Thermal Resistance
- Leadless Low Inductance MELF Package
- Available as a Chip
- Surface Mountable
- RoHS Compliant
- MSL 1

Dot Denotes Cathode



Package Style 1072

Description

M/A-COM Technology Solutions product line of MELF, PIN diodes, encompass a comprehensive range of electrical characteristics. The chip used in the MA4P504-1072T is manufactured using a unique, CERMACHIP, passivation process which provides for a hard glass encapsulation that protects and hermetically seals the active area of the chip. This packaged, CERMACHIP, PIN diode is ideally suited for use in applications where high RF and DC voltages are present.

The chip is enclosed in a rugged, ceramic, Metal Electrode Leadless Faced (MELF), surface mount package that is full face bonded to refractory metal plugs on both the anode and cathode. The result is a low loss PIN diode with low thermal resistance due to its symmetrical thermal paths. MELF PIN diodes are designed specifically for high volume tape and reel assembly. Their user friendly design provides for extremely easy, automatic, pick and place, indexing and assembly. All solderable surfaces are tin plated and are compatible with all industry standard reflow and vapor phase soldering processes.

Absolute Maximum Ratings @ 25°C

Parameter	Absolute Maximum
Forward Voltage[1,2]	1.0 V
Reverse Voltage[1,2]	500V
Operating Temperature	-65°C to +175°C
Storage Temperature	-65°C to +200°C
Mounting Temperature	+260°C for 30 seconds

1. Exceeding these limits may cause permanent damage to the device.
2. Values will de-rate linearly over temperature.

Applications

The MA4P504-1072T MELF packaged PIN diode is suitable for use in a series or shunt configuration where there is a high incident power present. Typical applications include switches as well as attenuators from HF through UHF frequencies.

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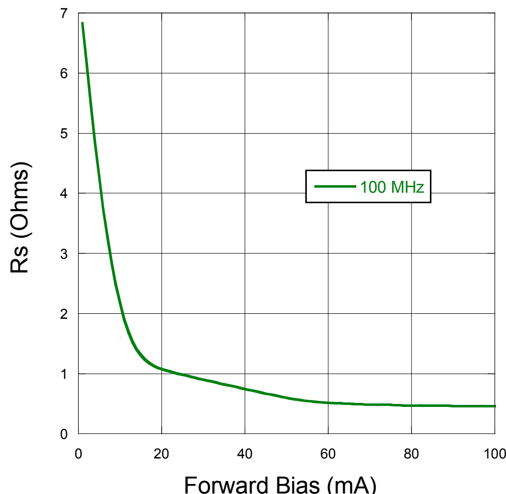
Electrical Specifications @ T_A = +25°C

Parameters	Symbols	Conditions	Units	Min.	Typ.	Max.
Total Capacitance[1]	C_{T100V}	-100 V @ 1 MHz	pF	—	—	0.50
Package Capacitance	C_p	—	pF		0.16	
Series Resistance	R_S	+100 mA @ 100 MHz	Ω	—	—	0.60
Minority Carrier Lifetime	T_L	I_F = +10 mA / I_R = -6 mA	µS	—	1.0	—
Forward Voltage	V_F	+ 50 mA	V	—	—	1.0
Reverse Leakage Current	$-I_R$	-500 V	nA	—	—	| -100 |
Thermal Resistance[2]	θ	—	°C/W	—	16	20
Power Dissipation[2,3]	Pd	—	W		—	7.5
Thermal Resistance[4]	θ	—	°C/W	—	48	51
Power Dissipation[4,5]	Pd	—	W	—	—	2.9
3rd Order Input Intermodulation Distortion	IIP3	Power In = +10dBm Freq. = 1000 MHz Spacing = 1 MHz	dBm	—	>54	—

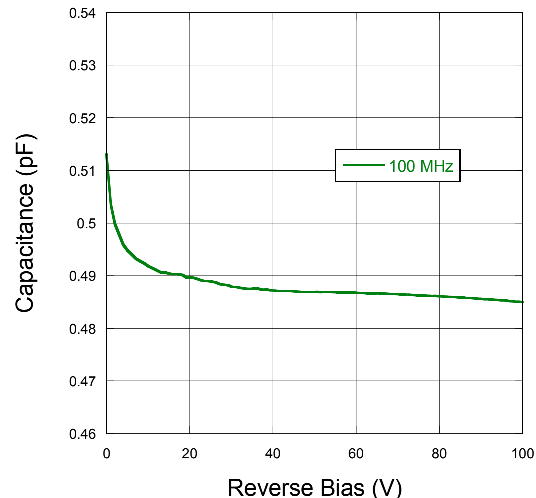
1. Total capacitance Ct = Cj (Chip Junction Capacitance) + Cp (Parasitic Package Capacitance)
2. Diode attached to an infinite heatsink.
3. De-rate linearly by -50 mw/°C to 0W @ +125 °C .
4. Diode in air.
5. De-rate linearly by -19.3 mw/°C to 0W @ +125 °C

Typical DC Performance Curves

Series Resistance vs. Forward Current



Capacitance vs. Reverse Voltage



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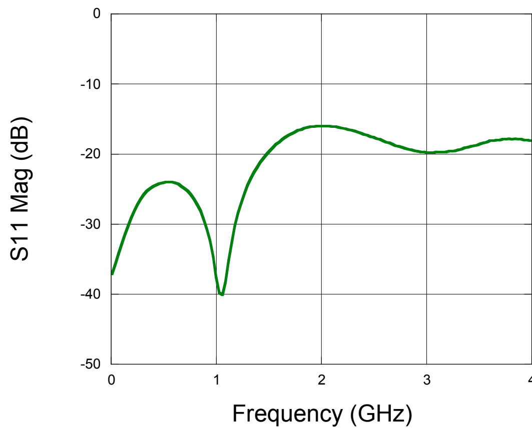
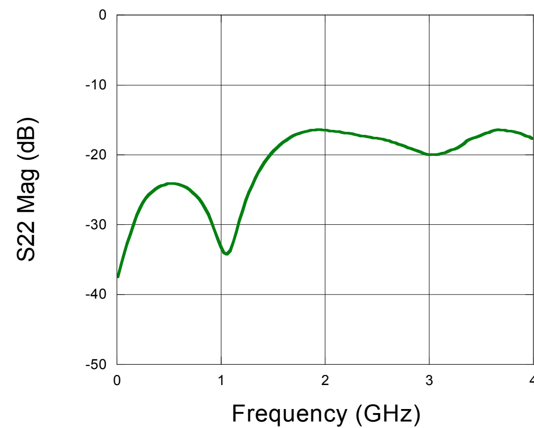
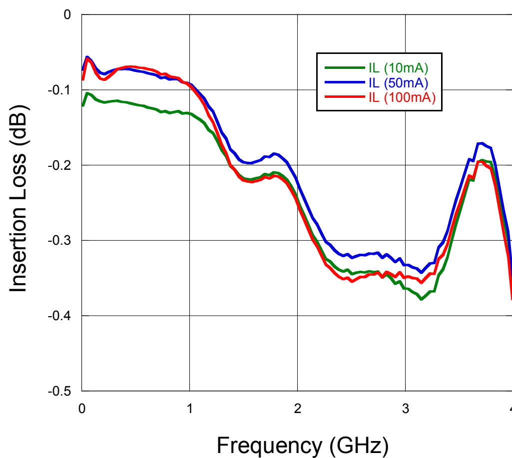
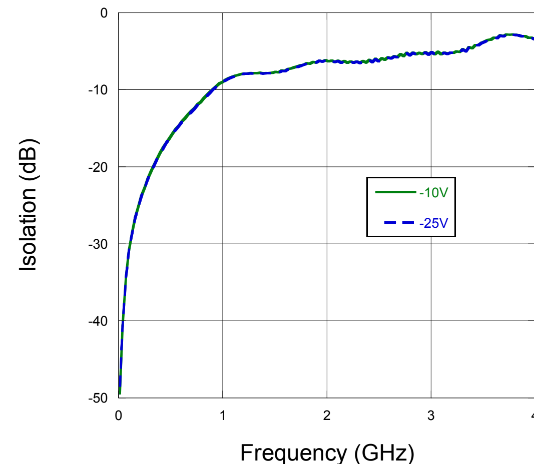
Typical RF Performance Curves (50 – 4000 MHz)

MOUNTED IN A SERIES CONFIGURATION









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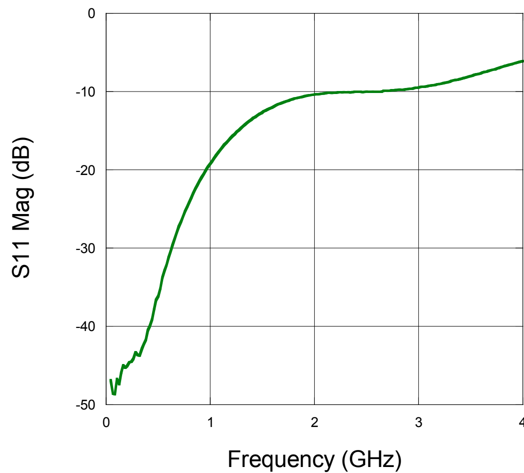
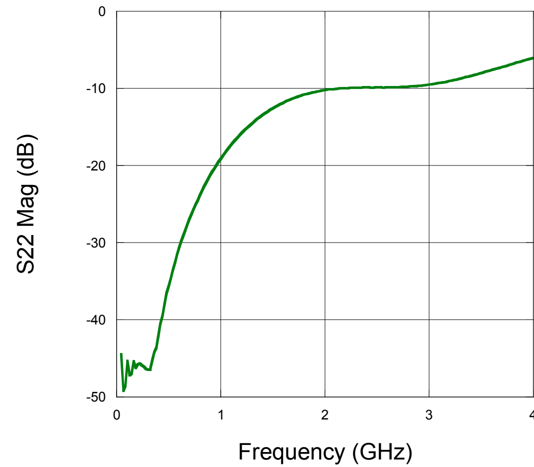
Typical RF Performance Curves (50 – 4000 MHz)

MOUNTED IN A SHUNT CONFIGURATION

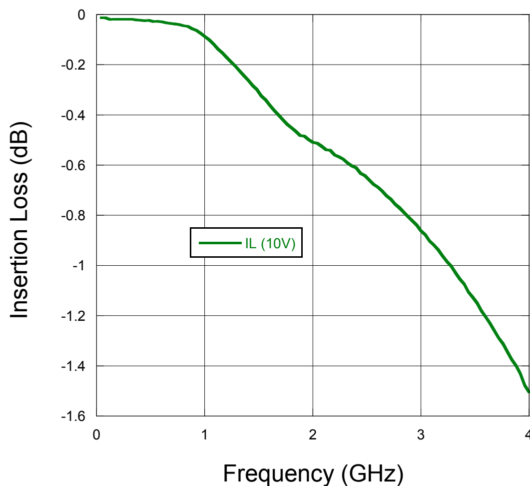
Input Return Loss



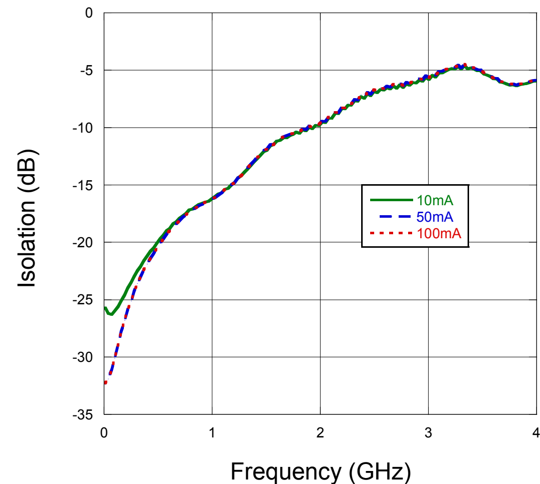
Output Return Loss



Insertion Loss



Isolation



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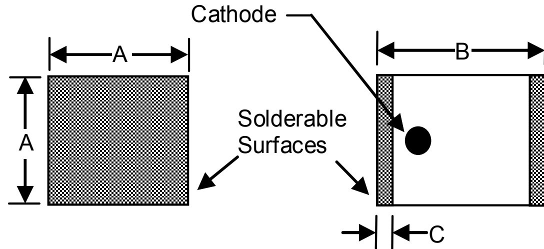
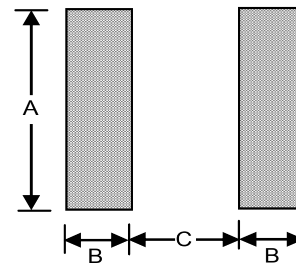
Package Outline (1072 MELF)



Dimension	INCHES		MM	
	MIN.	MAX.	MIN.	MAX.
A	0.080	0.095	2.032	2.413
B	0.115	0.125	2.921	3.175
C	0.008	0.023	0.203	0.584

Circuit Pad Layout

Dimension	Package Style 1072	
	inches	mm
A	0.093	2.36
B	0.050	1.27
C	0.060	1.52



Ordering Information

Part Number	Quantity (7" Reel)	Bulk Devices Per Bag
MA4P504-1072T	1500	N/A

Tape and reel information can be found in Application Note M513 on the M/A-COM website following the link below;

http://www.macomtech.com/Application Notes/pdf/M513.pdf

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Assembly Recommendations

- Devices may be soldered using standard 63/37, Sn/Pb or any RoHS compliant solder. Leads are tin plated to a minimum thickness of 50µm to ensure an optimum connection.
- For recommended Sn/Pb and RoHS soldering profile duration and times See Application Note M538 on the M/A-COM Technology Solutions website.

Handling Procedures

The following precautions should be observed to avoid damaging these devices.

Cleanliness and Storage

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

ESD

These devices are susceptible to ESD and are rated Class 1C.

General Handling

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

Note: Click links below to view datasheets of other MELF packaged PIN diodes and to compare them to the MA4P504-1072.

PACKAGED_PIN_DIODES
and/or
MA4P MELF & HIPAX Series

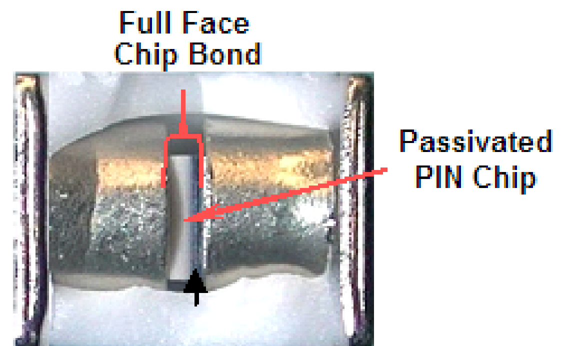
RoHS

The MA4P504-1072 is fully RoHS compliant meaning it contains less than the maximum allowable concentration of 0.1%, by weight, in homogenous materials for lead, hex chrome, mercury, PBB, PBDE, and 0.01% for cadmium.

Mounting Techniques

Solder Attach

Typical wave soldering or reflow techniques may be used to mount MELF packages to circuit boards using Sn63/Pb37 alloy or any RoHS compliant solder. For more information visit the M/A-COM Technology Solutions website and read application note M538.



Diode Cross Section

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