

### Features

- High Power Handling
- Low Loss / Low Distortion
- Leadless Low Inductance MELF Package
- Non-Magnetic
- Surface Mountable
- RoHS Compliant
- MSL 1

### Description

M/A-COM Technology Solutions product line of MELF, PIN diodes, encompass a comprehensive range of electrical characteristics. The chip used in the MADP-000504-10720T 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.

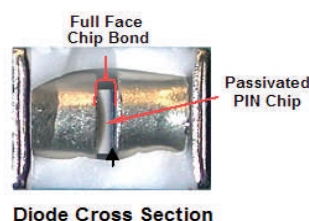
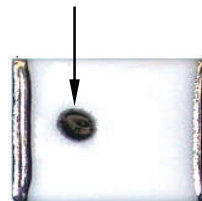
The chip is enclosed in a rugged, ceramic, Metal Electrode Leadless Faced (MELF), surface mount package that is full face bonded to refractory metal plugs on both the anode and cathode. The result is a low loss PIN diode with low thermal resistance due to its symmetrical thermal paths. MELF PIN diodes 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.

### Applications

The MADP-000504-10720T MELF is well suited for use in low loss, low distortion, UHF and VHF high power switching circuits. It is specifically designed to operate in high magnetic fields and to tune or protect RF coils in MRI circuits. This device is designed to meet the most demanding electrical and mechanical environments.

### Package Style 1072

Dot Denotes Cathode



### Absolute Maximum Ratings @ 25°C

Parameter	Absolute Maximum
Forward Voltage <sup>1,2</sup>	1.0 V
Reverse Voltage <sup>1,2</sup>	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.

### Ordering Information

Part Number	Packaging	Quantity
MADP-000504-10720T	Tape and reel	1500 pcs

Tape and reel information can be found in Application Note [M513](#) on the M/A-COM website

## Non Magnetic MELF PIN Diode

V1

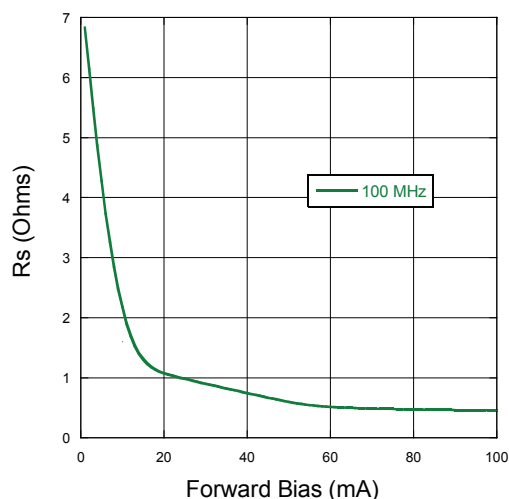
### Electrical Specifications @ $T_A = +25^\circ\text{C}$

Parameters	Symbols	Conditions	Units	Min.	Typ.	Max.
Total Capacitance <sup>1</sup>	$C_{T100V}$	-100 V @ 1 MHz	pF	—	—	0.50
Package Capacitance	$C_p$	—	pF		0.16	
Series Resistance	$R_S$	+100 mA @ 100 MHz	$\Omega$	—	—	0.60
Minority Carrier Lifetime	$T_L$	$I_F = +10 \text{ mA} / I_R = -6 \text{ mA}$	$\mu\text{S}$	—	1.0	—
Forward Voltage	$V_F$	+ 50 mA	V	—	—	1.0
Reverse Leakage Current	$-I_R$	-500 V	nA	—	—	-100
Thermal Resistance <sup>2</sup>	$\theta$	—	$^\circ\text{C/W}$	—	16	20
Power Dissipation <sup>2,3</sup>	$P_d$	—	W	—	—	7.5
Thermal Resistance <sup>4</sup>	$\theta$	—	$^\circ\text{C/W}$	—	48	51
Power Dissipation <sup>4,5</sup>	$P_d$	—	W	—	—	2.9
I Region Thickness	—	—	$\mu\text{m}$		44	
3rd Order Input Intermodulation Distortion	IIP3	Power In = +10dBm Freq. = 1000 MHz Spacing = 1 MHz	dBm	—	>54	—

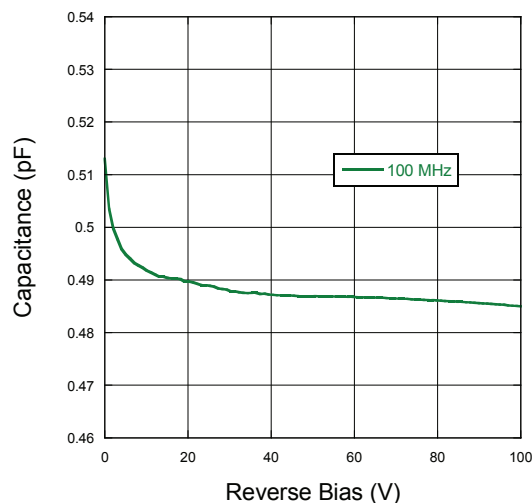
1. Total capacitance  $C_t = C_j$  (Chip Junction Capacitance) +  $C_p$  (Parasitic Package Capacitance)
2. Diode attached to an infinite heatsink.
3. De-rate linearly by -50  $\text{mw}/^\circ\text{C}$  to 0W @ +125  $^\circ\text{C}$ .
4. Diode in air.
5. De-rate linearly by -19.3  $\text{mw}/^\circ\text{C}$  to 0W @ +125  $^\circ\text{C}$

### Typical DC Performance Curves

**Series Resistance vs. Forward Current**



**Capacitance vs. Reverse Voltage**



2

**ADVANCED:** Data Sheets contain information regarding a product M/A-COM is considering for development. Performance is based on target specifications, simulated results, and/or prototype measurements. Commitment to develop is not guaranteed.

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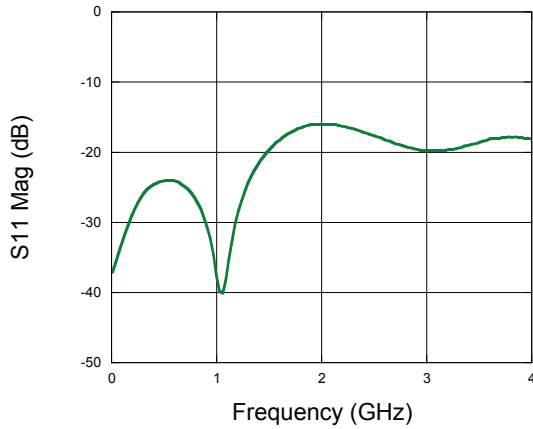
Visit [www.macom.com](http://www.macom.com) for additional data sheets and product information.

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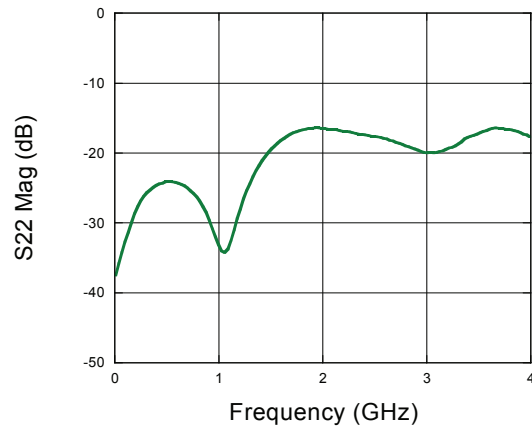
### Typical RF Performance Curves (50 – 4000 MHz)

#### MOUNTED IN A SERIES CONFIGURATION

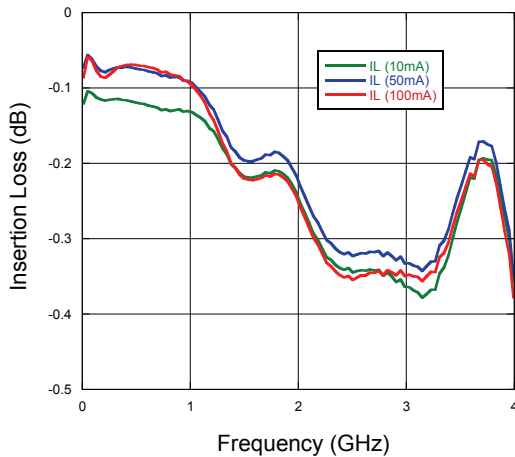
**Input Return Loss**



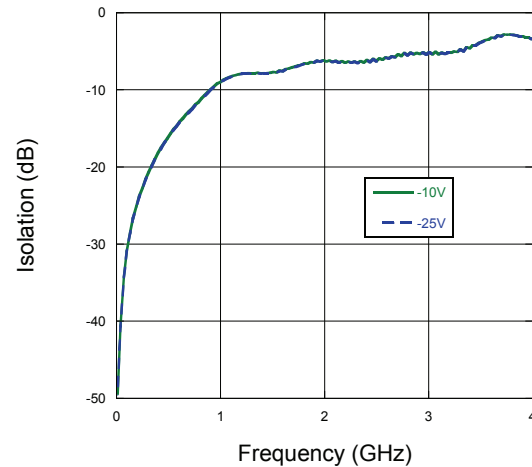
**Output Return Loss**



**Insertion Loss**



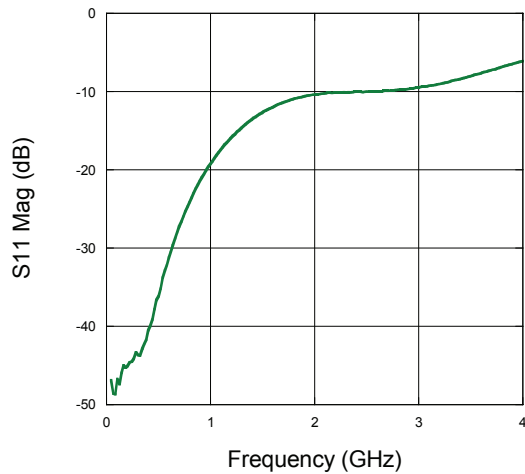
**Isolation**



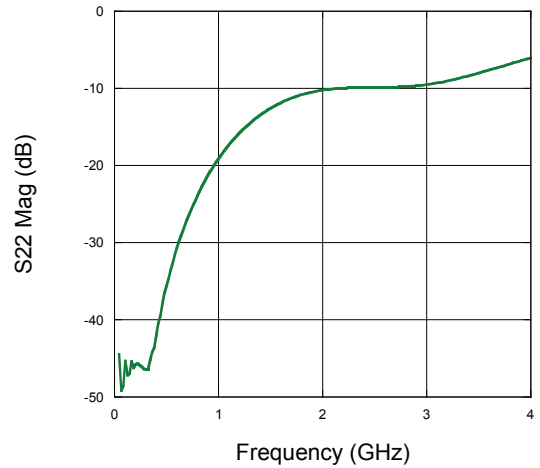
## Typical RF Performance Curves (50 – 4000 MHz)

### MOUNTED IN A SHUNT CONFIGURATION

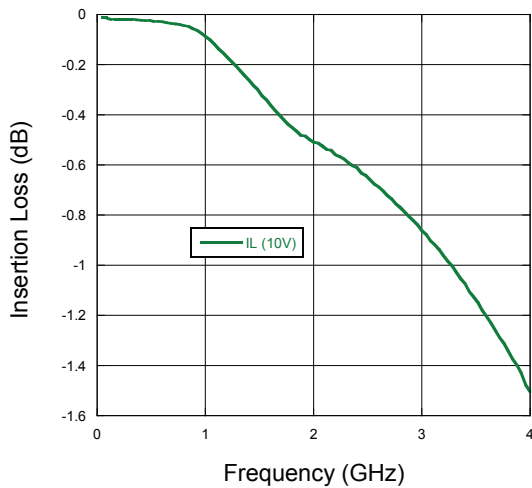
**Input Return Loss**



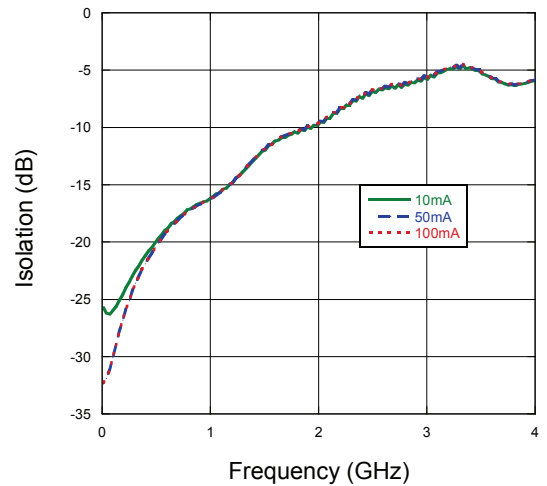
**Output Return Loss**



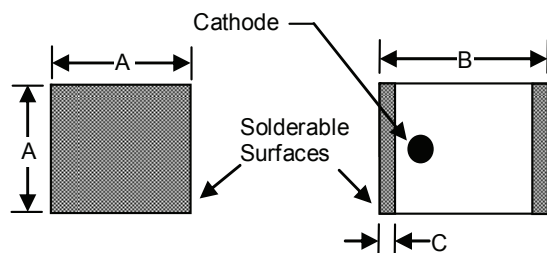
**Insertion Loss**



**Isolation**



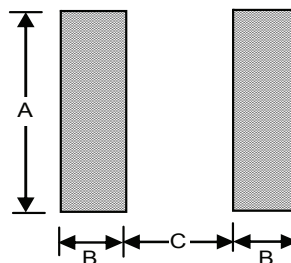
### Package Outline (1072 MELF )



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



### Assembly Recommendations

- Devices may be soldered using standard Sn63/Pb37 or any RoHS compliant solder. Leads are bright tin plated to a minimum thickness of 50µm to ensure an optimum connection.
- For recommended Sn/Pb and RoHS soldering time/temperature profiles. 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.

### RoHS

The MADP-000504-10720T 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. Alloys such as Sn63/Pb37 or any RoHS compliant solder may be used. For more information visit the M/A-COM Tech website and refer to application note [M538](#).

**Note:** Click links below to view datasheets of other MELF and packaged PIN diodes.

[PACKAGED PIN DIODES](#)  
and/or  
[MA4P MELF & HIPAX Series](#)