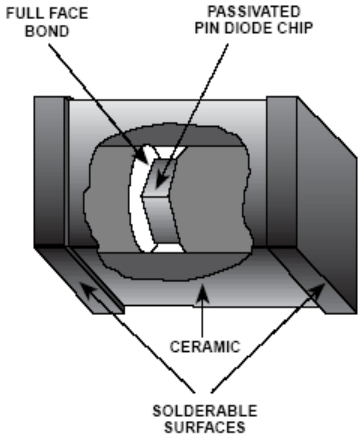
MA4P7446F-1091T

Non Magnetic SMQ MELF PIN Diode

V3

Features

- Non-Magnetic Package Suitable for MRI Applications
- Rectangular MELF SMQ Ceramic Package
- Hermetically Sealed
- Low Rs for Low Series Loss
- Long τ_L for Lower Intermodulation Distortion
- Low C_j for High Series Isolation
- High Average Incident Power Handling
- RoHS Compliant



Description

The MA4P7446F-1091T is a surface mountable PIN diode in a non-magnetic, **M**etal **E**lectrode **L**eadless **F**aced (MELF) package. The device incorporates M/A-COM Technology Solutions time proven HIPAX technology to produce a low inductance ceramic package with no ribbons or whisker wires. Incorporated in the package is a hard glass passivated, CERMACHIP™ PIN chip that is full face bonded on both the cathode and anode to maximize surface area for the lowest electrical and thermal resistance. The package utilizes a non-magnetic plating process that provides for a package with extremely low permeability. The MA4P7446F-1091T has been comprehensively characterized both electrically and mechanically to ensure repeatable and predictable performance. The non-magnetic MA4P7446F-1091T is the electrical equivalent of its magnetic counterpart the MA4P4006F-1091T.

Applications

This diode is well suited for use in low loss, low distortion, high power switching circuits and can be used in high magnetic field environments at HF through UHF frequencies. The low thermal resistance of this device provides excellent performance at high RF power incident levels, up to 500 watts CW. This device is designed to meet the most demanding electrical and mechanical MRI environments.

Designed for Automated Assembly

These SMQ PIN diodes are designed for high volume tape and reel assembly. The rectangular package design provides for highly efficient automatic pick and place assembly techniques. The parallel flat surfaces are suitable for key jaw or vacuum pickup techniques. All solderable surfaces are tin plated and compatible with industry standard reflow and vapor phase soldering methods.

Absolute Maximum Ratings[1] @ 25°C

Parameter	Absolute Maximum
Operating Temperature	-65°C to +125°C
Storage Temperature	-65°C to +150°C
Diode Junction Temperature	+175 °C Continuous
Diode Mounting Temperature	+235°C for 10 seconds
RF C.W. Incident Power	+ 57dBm C.W.
Forward D.C. Current	+500 mA
Reverse D.C. Voltage @ -10 uA	- 600V

1. Exceeding these limits may cause permanent damage.

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Electrical Specifications @ $T_{AMBIENT}$ = +25°C

Parameter	Symbol	Condition	Unit Value
Forward Voltage	V_F	I_F = +100mA	1.0 V_{DC} (Max.)
Reverse Voltage	V_R	I_R = -1µA	600V_{DC} (Min.)
Total Capacitance	C_T	-100V @ 1MHz	2.2pF (Max.)
Series Resistance	R_S	+100mA @ 100MHz	0.5Ω (Max)
Parallel Resistance	R_P	-10V @ 100MHz	10KΩ (Min.)
Carrier Lifetime	t_L	I_F = +6mA , I_R = -10mA (50% - 90% Voltage)	19µs (Typ.)
I-Region Length	µM	——	175µM (Typ.)
C.W. Thermal Resistance	θ	I_{HIGH} = 1A, I_{LOW} = 10mA, T = 1mS	6°C/W (Max.)
Power Dissipation in Free Air	W	I_F = +100mA	8W (Max.)
Power Dissipation	P_{DISS}	I_F = +100mA	25W (Max.)

Environmental Capability

MELF devices are appropriate for use in industrial and military applications and can be screened to meet the environmental requirements of MIL-STD-750, MIL-STD-202 as well as other military standards. The table below lists some of the MIL-STD 750 tests the device is designed to meet.

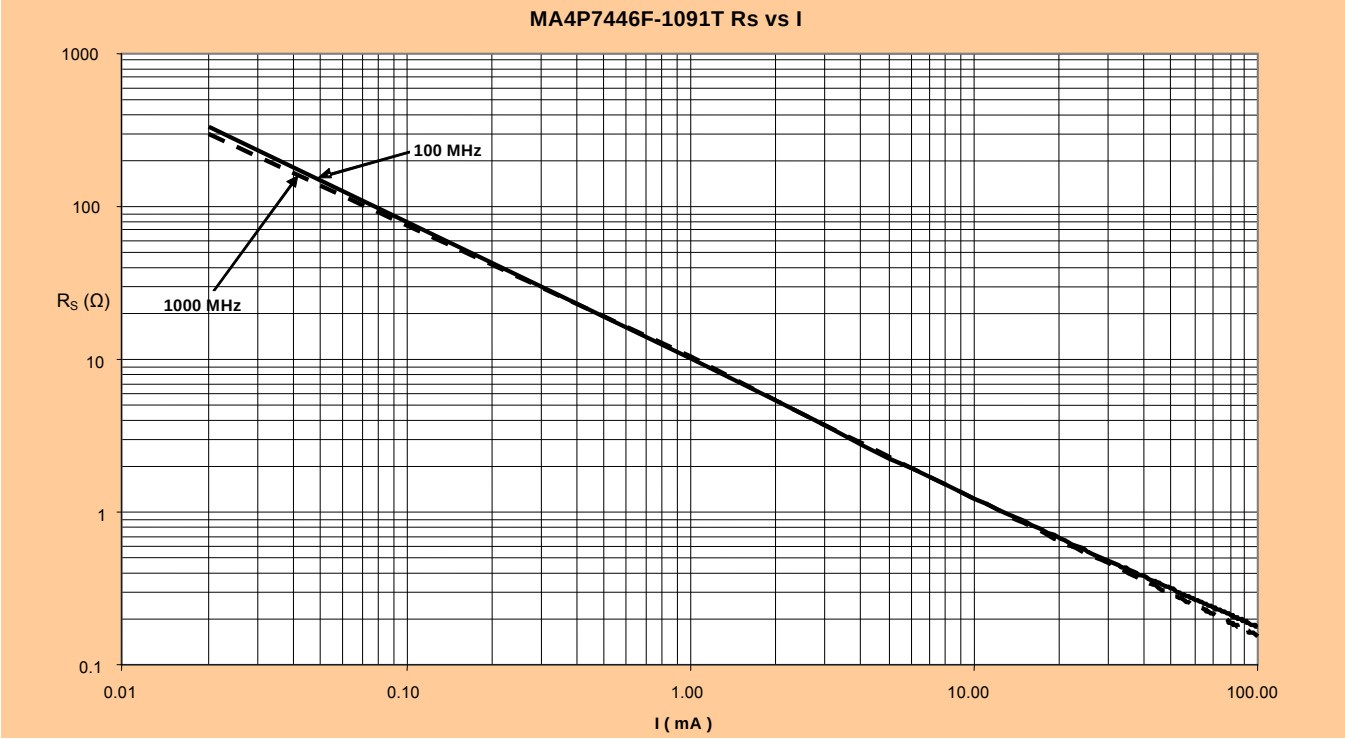
MIL-STD-750		
Test	**Method**	**Description**
High Temperature Storage	1031	+150°C, for 340 Hours
Temperature Shock	1051	-65°C to +150°C, 20 Cycles
HTRB	1038	80% of rated V_B, +150°C, for 96 Hours
Moisture Resistance	1021	No Initial Conditioning, 85% RH, +85°C
Gross Leak	1071 Cond. E	Dye Penetrant Visual
Vibration Fatigue	2046	20,000G's, 60Hz, x, y, z axis
Solderability	2026	Test Temperature = +245°C

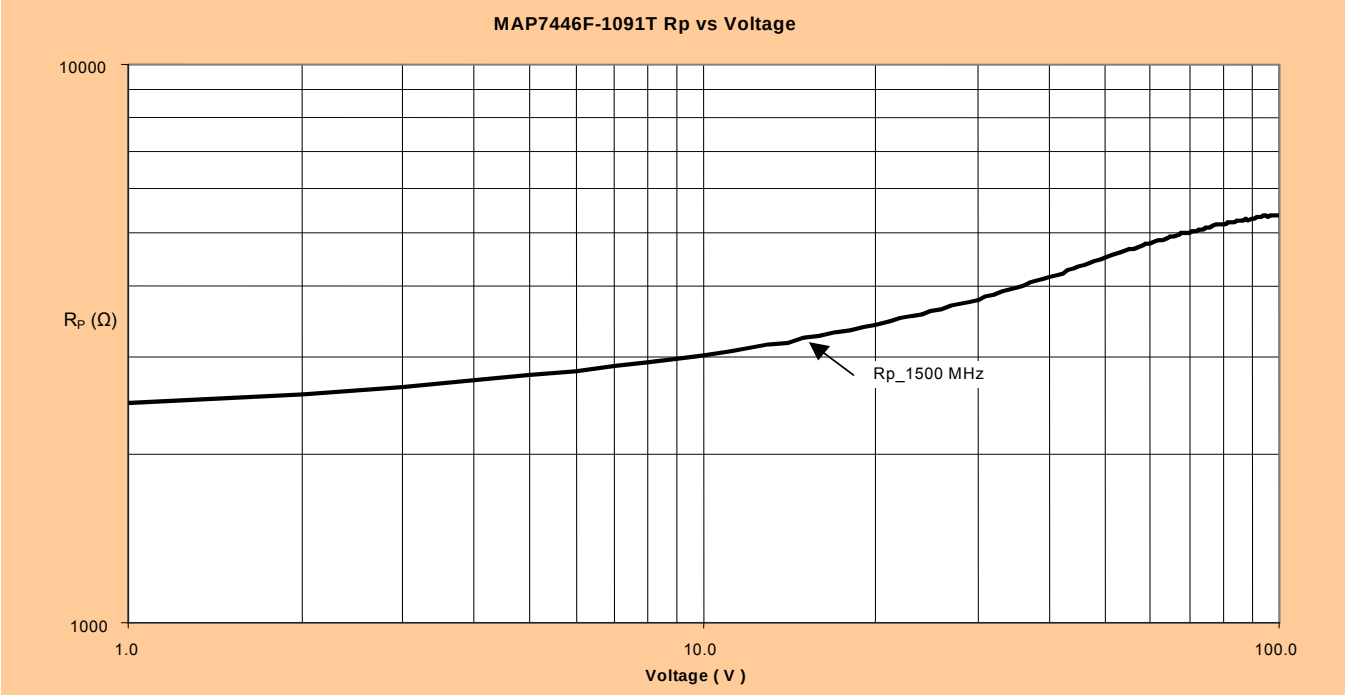
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Typical Electrical Performance @ +25°C



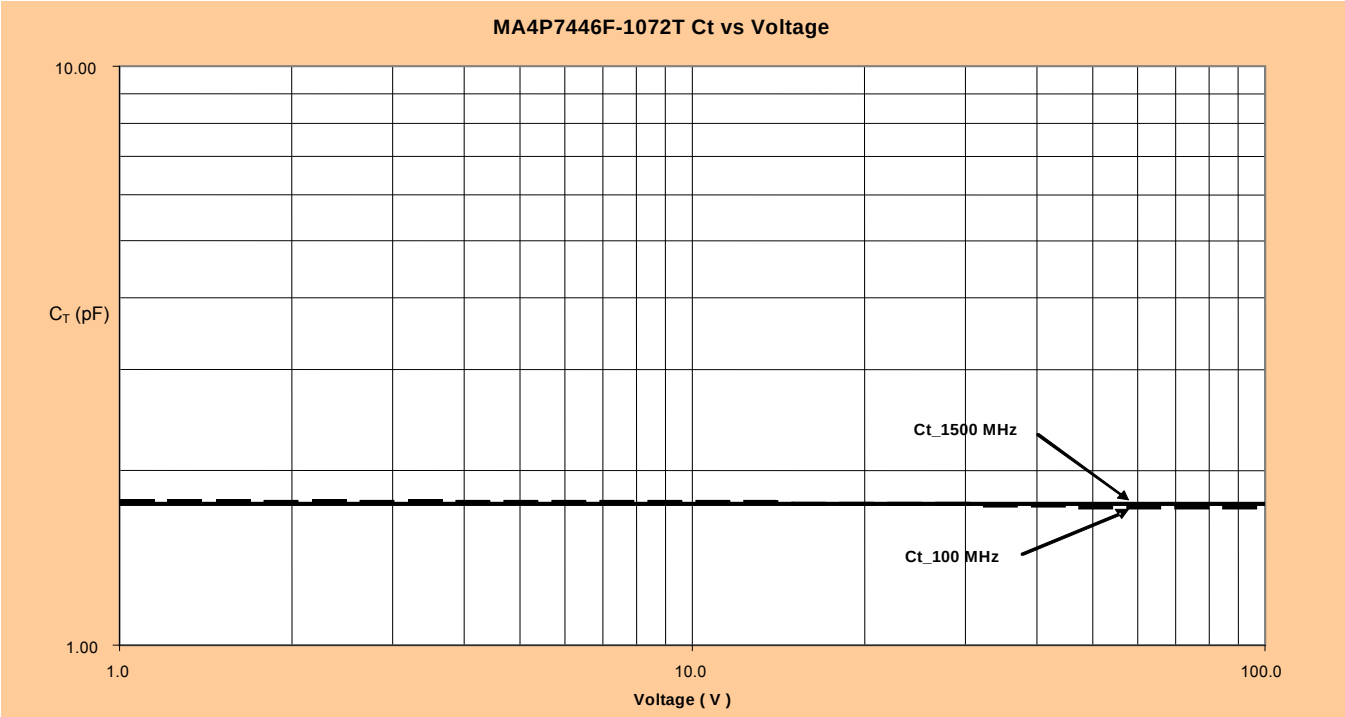


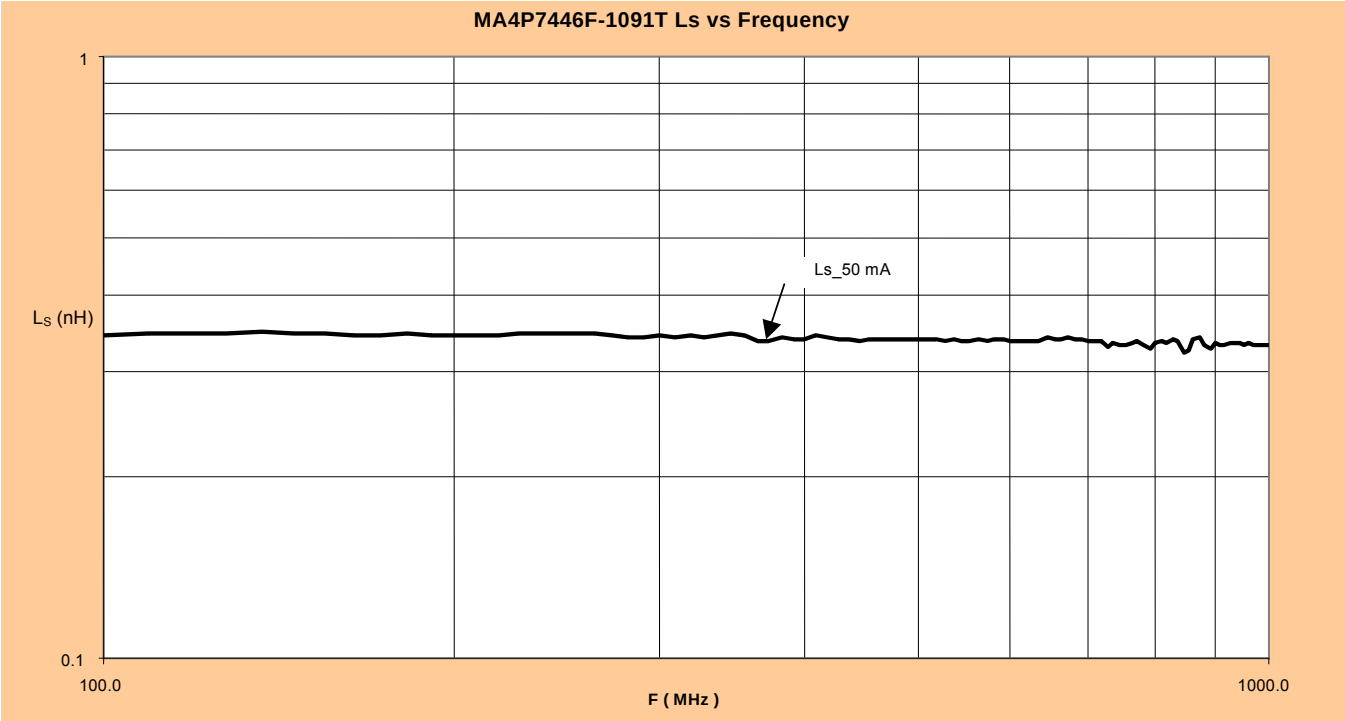
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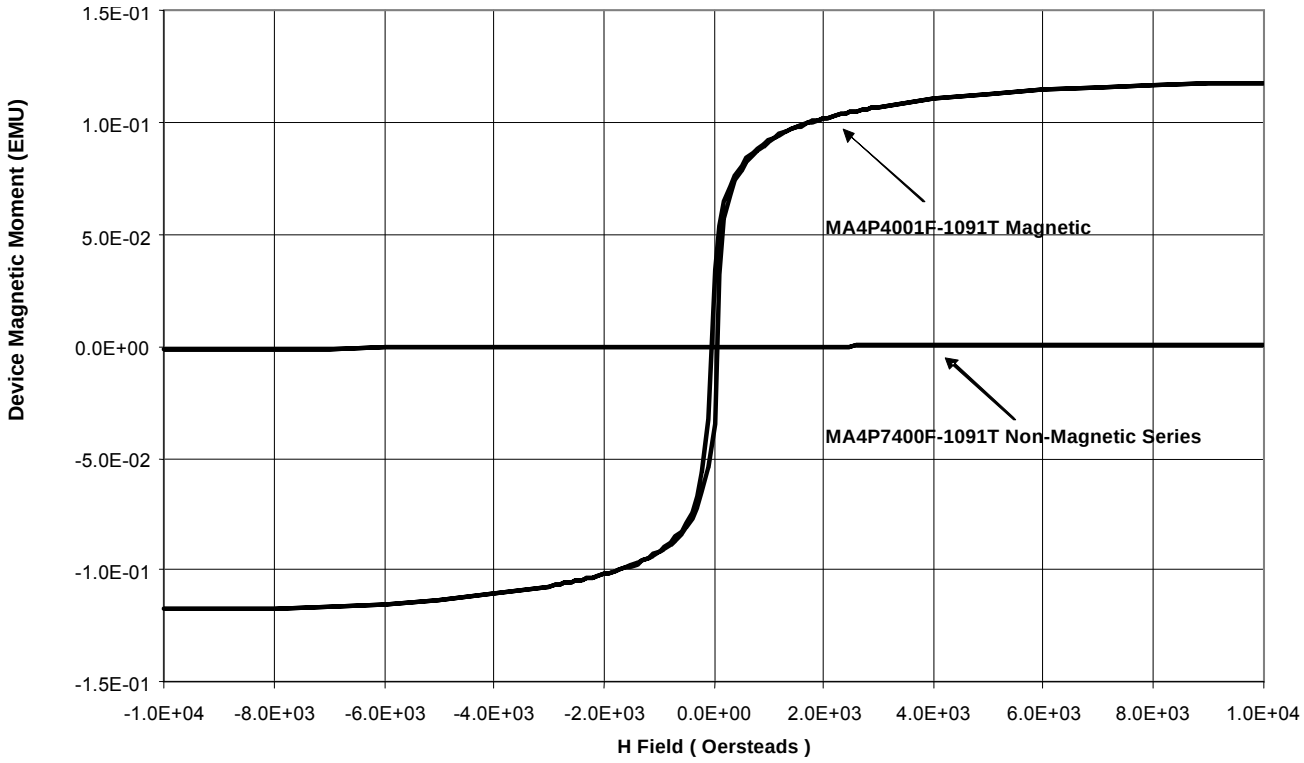
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Typical Magnetic vs. Non-Magnetic Performance

Magnetic Moment for MA4P7400F-1091T Non-Magnetic Series vs. MA4P4000F-1091T Series



Typical Magnetic Properties of Non-Magnetic MA4P7400F-1091T Series vs. Conventional MA4P4000F-1091T Magnetic Series

Magnetic Property	MA4P7400F-1091T Series Value	MA4P4000-1091T Series Value
Saturation Moment (EMU) @ H = H_{MAX} Oersteads	1.0 x E-3	1.2 x E-1
Remanance Moment (EMU) @ H = 0 Oersteads	1.5 x E-6	3.4 x E-2
Coercivity (Oersteads) @ EMU = 0 Moment	3.0	51.3

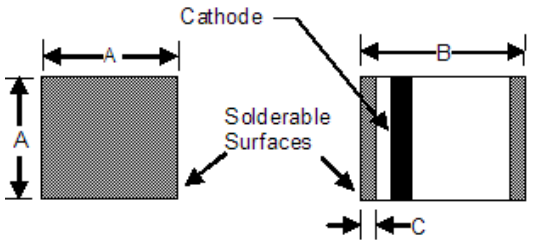
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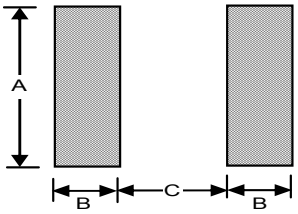
Mechanical Information

1091 MELF Surface Mount Package



Case Style	Dimensions in Inches (*mm*)		
1091	A Square Min / Max	B Min / Max	C Min / Max
	0.138 / 0.155 (3.50/ 3.94)	0.180 / 0.200 (4.57/ 5.08)	0.008 / 0.030 (.203 / .762)

Circuit Pad Layout for MELF Diodes



Dimension	Package Style 1091	
	inches	mm
A	0.150	3.81
B	0.050	1.27
C	0.100	2.54

MELF Assembly Recommendations

- Devices may be soldered using standard 60Sn/40Pb or RoHS compliant solders. Axial leads and solderable surfaces of MELF devices are tin plated 50 μM thick to ensure an optimum connection.
- For recommended Sn/Pb and RoHS soldering profiles See Application Note M538 on the M/A-COM website.

Ordering Information

Part Number	Package	Quantity
MA4P7446F-1091T	Tape and Reel	500pcs/Reel

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