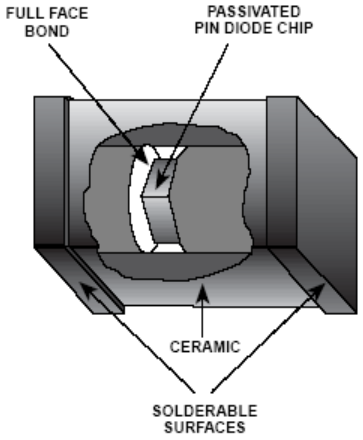
MA4P7446F-1091T

Non Magnetic SMQ HIPAX PIN Diode
RoHS Compliant

Rev. 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



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's 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 diode 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 counterparts the MA4P4002F-1091T and MA4P4006F-1091T .

Applications

The diodes are well suited for use in low loss, low distortion, and high power switching circuits applicable for high magnetic field environments from 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 rigorous electrical and mechanical requirements of 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 solder able surfaces are tin plated and compatible with 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	- 650V

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 = -10µA	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	. 10kW (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

HIPAX devices are applicable 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 +125°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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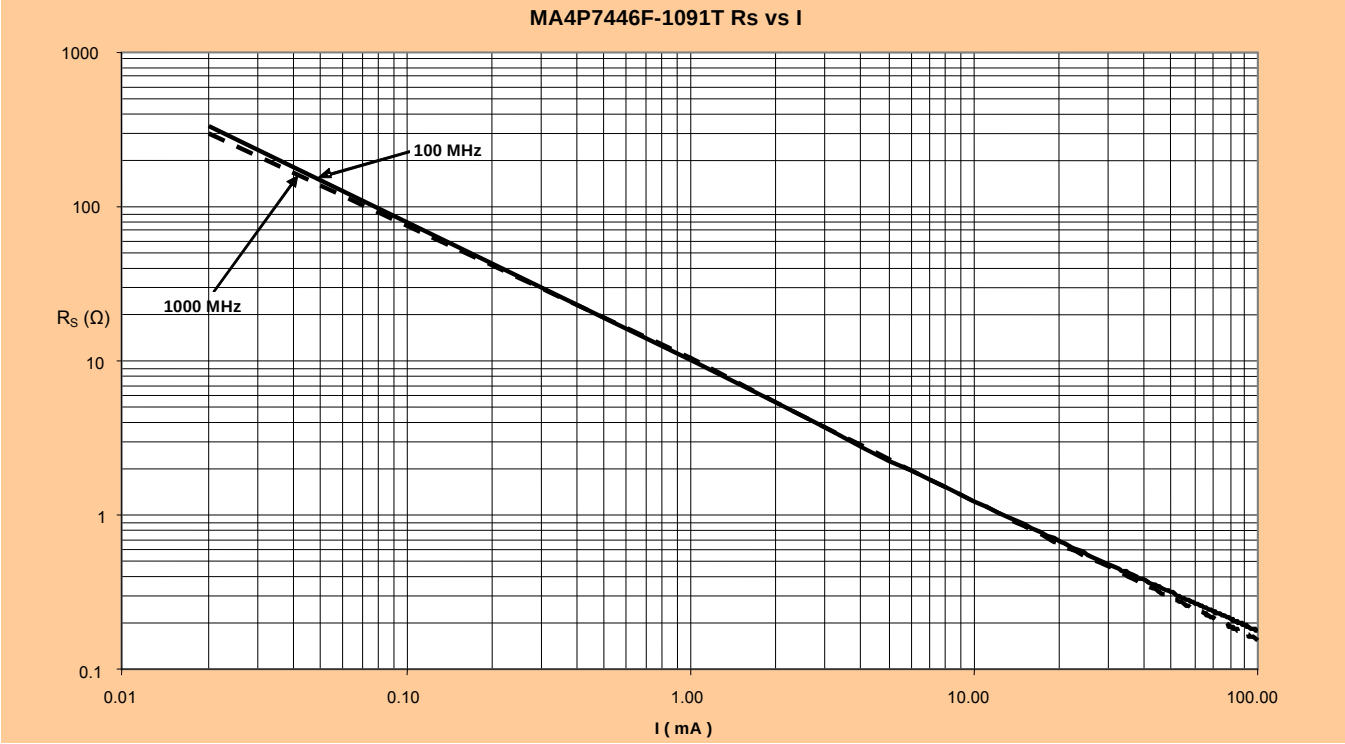
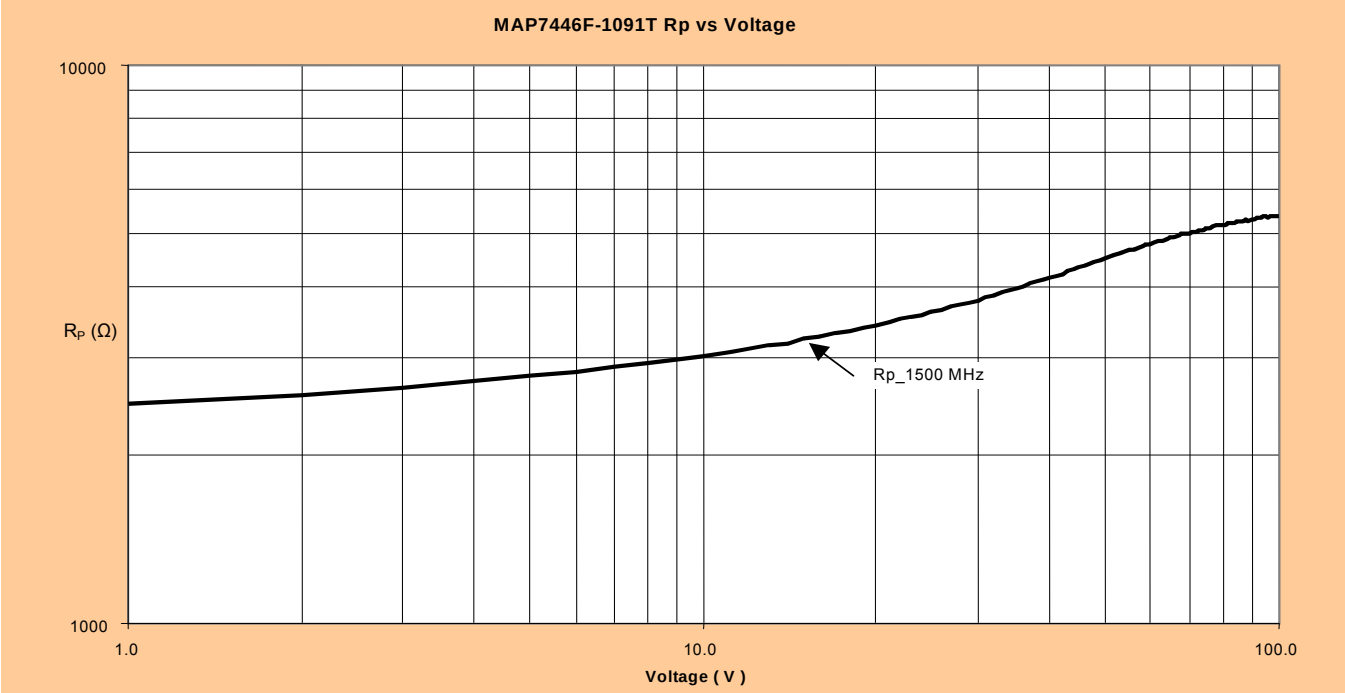
Typical Electrical Performance @ +25˚C





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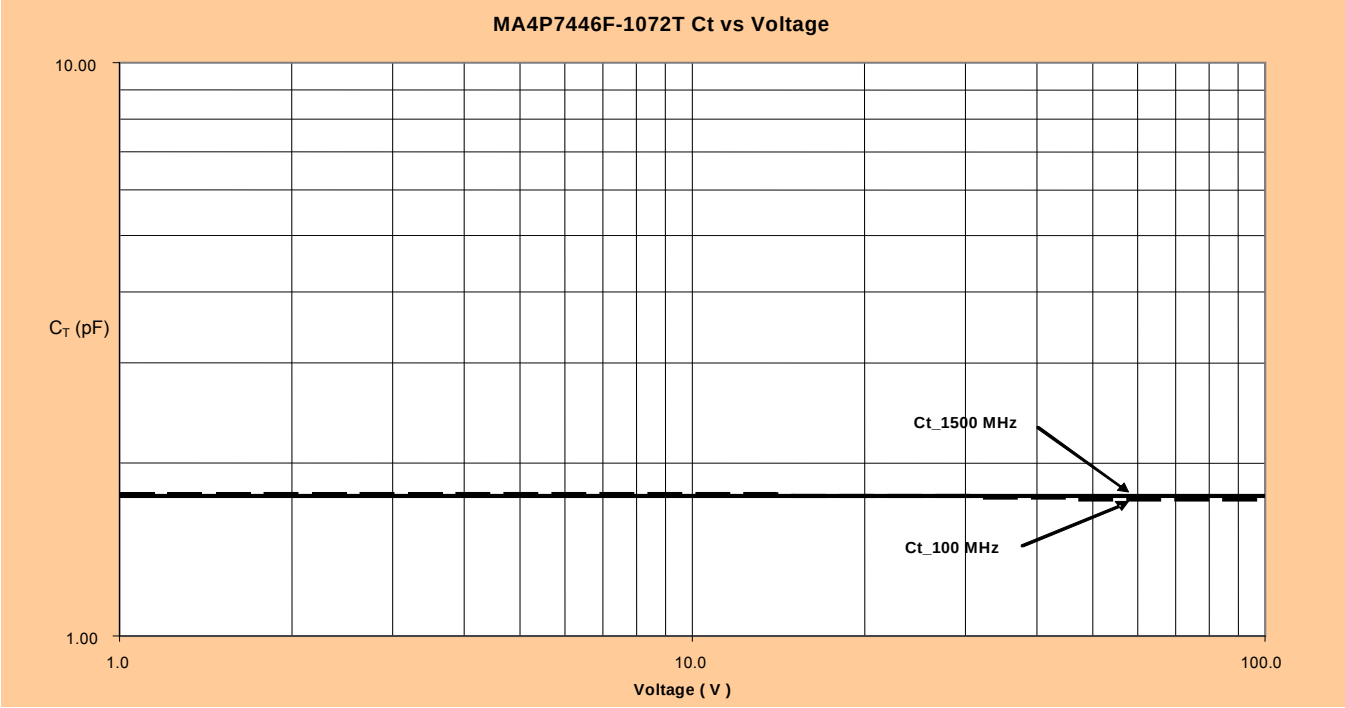

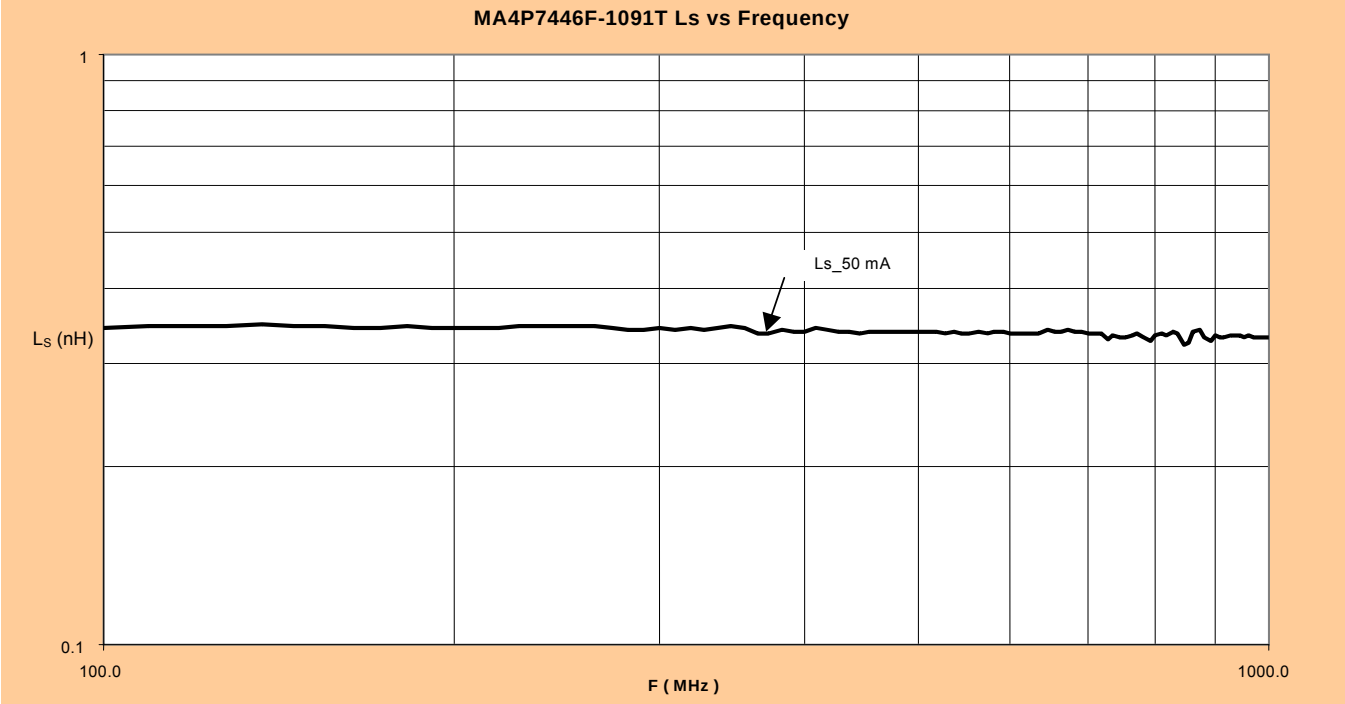

Mechanical Outline

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

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Typical Non-Magnetic Performance

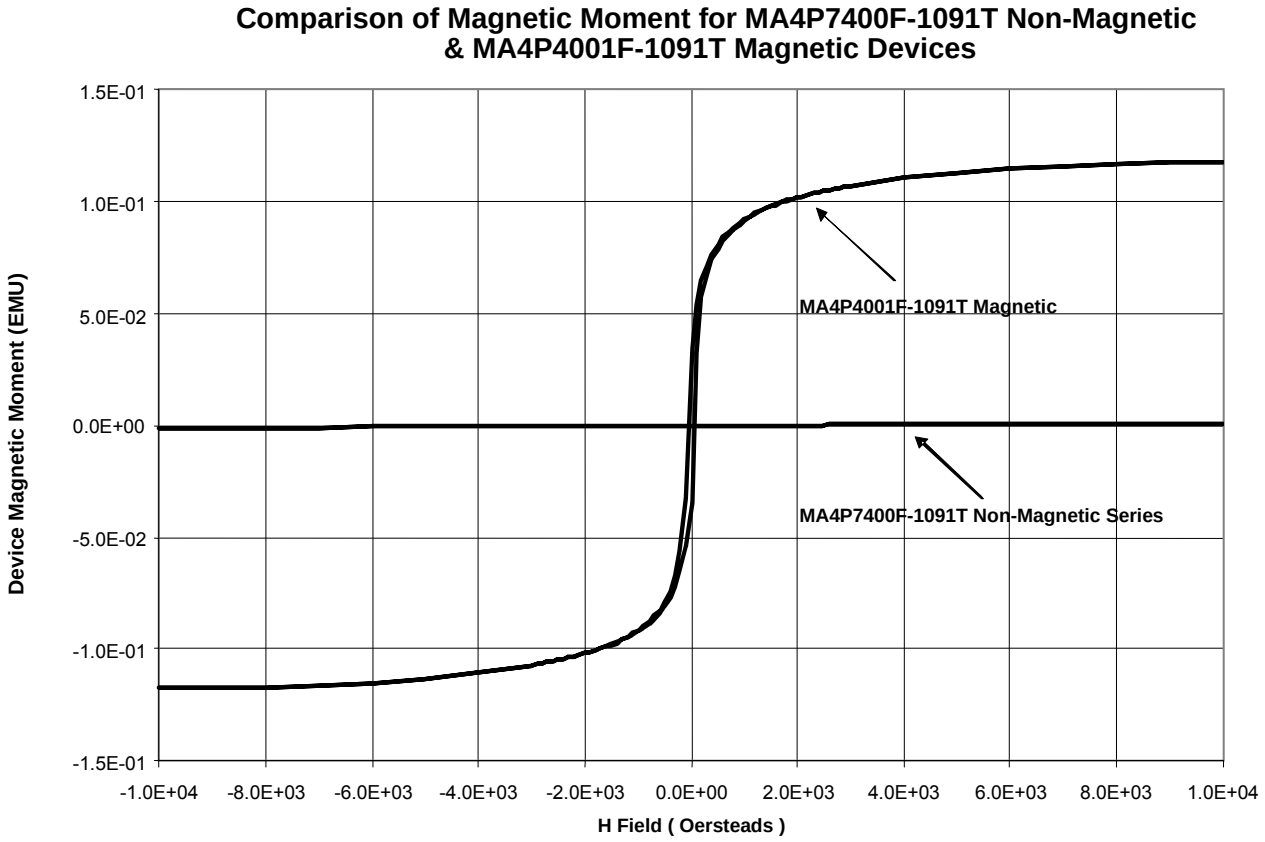

Table 1 - Typical Magnetic Properties of Non-Magnetic MA4P7446F-1091T Device Vs. Conventional MA4P4001F-1091T Magnetic Device

Magnetic Property	MA4P7446F-1091T Value	MA4P4001-1091T 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

Part Number	Package
MA4P7446F-1091T	Tape and Reel

Ordering Information

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