MA4P7441F-1091T

Non Magnetic SMQ HIPAX PIN Diode

Rev. V2

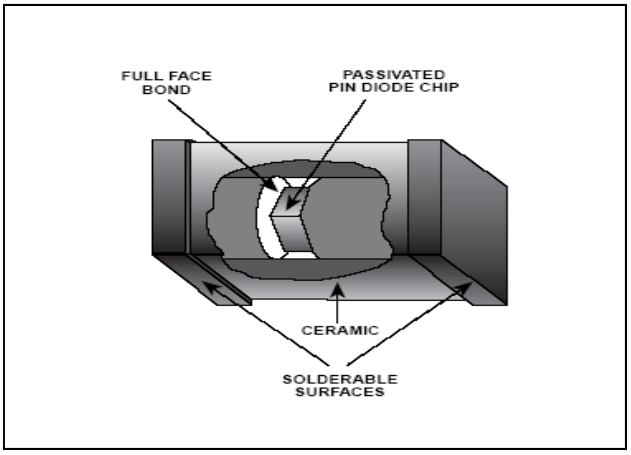
Features

- Non-Magnetic Package Suitable for MRI Applications
- Rectangular MELF SMQ Ceramic Package
- Hermetically Sealed
- Lower Rs for Lower Series Loss
- Longer τ_L for Lower Intermodulation Distortion
- Lower Cj for Higher Series Isolation
- Higher Average Incident Power Handling Capability

Description and Applications

The MA4P7441F-1091T is a surface mountable PIN diode in a Non-Magnetic (patent pending) Metal Electrode Leadless Faced (MELF) package. The device incorporates M/A-COM's proven HIPAX technology to produce a low inductance ceramic package with no ribbons or whisker wires. The package utilizes M/A-COM's new non- magnetic plating process to provide an extremely low permeability, hermetically sealed package. Incorporated in the package is a passivated PIN diode that is full face bonded on both the cathode and anode of the chip to maximize surface area for lower electrical and thermal resistance. The MA4P7441F-1091T has been comprehensively characterized both electrically and mechanically to ensure repeatable and predictable performance. This MA4P7441F-1091T Non-Magnetic device is similar in electrical performance to the MA4P4001F-1091T Magnetic part number.

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 lower thermal resistance of this device provides excellent higher average performance at RF power incident levels up to 200 watts CW. This device is designed to meet the most rigorous electrical and mechanical requirements of MRI testing 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.

ADVANCED: Data Sheets contain information regarding a product M/A-COM Technology Solutions is considering for development. Performance is based on target specifications, simulated results, and/or prototype measurements. Commitment to develop is not guaranteed.
PRELIMINARY: Data Sheets contain information regarding a product M/A-COM Technology Solutions has under development. Performance is based on engineering tests. Specifications are typical. Mechanical outline has been fixed. Engineering samples and/or test data may be available. Commitment to produce in volume is not guaranteed.

• **North America** Tel: 800.366.2266 • **Europe** Tel: +353.21.244.6400
• **India** Tel: +91.80.43537383 • **China** Tel: +86.21.2407.1588
Visit www.macomtech.com for additional data sheets and product information.

M/A-COM Technology Solutions Inc. and its affiliates reserve the right to make changes to the product(s) or information contained herein without notice.

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	20,000 G's, 60 Hz, x, y, z axis
Solderability	2026	Test Temperature = +245 °C

Ordering Information

Part Number	Package
MA4P7441F-1091T	Tape and Reel

ADVANCED: Data Sheets contain information regarding a product M/A-COM Technology Solutions is considering for development. Performance is based on target specifications, simulated results, and/or prototype measurements. Commitment to develop is not guaranteed.
PRELIMINARY: Data Sheets contain information regarding a product M/A-COM Technology Solutions has under development. Performance is based on engineering tests. Specifications are typical. Mechanical outline has been fixed. Engineering samples and/or test data may be available. Commitment to produce in volume is not guaranteed.

• **North America** Tel: 800.366.2266 • **Europe** Tel: +353.21.244.6400
• **India** Tel: +91.80.43537383 • **China** Tel: +86.21.2407.1588
Visit www.macomtech.com for additional data sheets and product information.

M/A-COM Technology Solutions Inc. and its affiliates reserve the right to make changes to the product(s) or information contained herein without notice.

Electrical Specifications @ +25 °C

Parameter	Symbol	Condition	Unit Value
Forward Voltage (Maximum)	V_F	I_F = +100 mA	1.0 V_{DC}
Voltage Rating (Minimum)	V_R	Ir = -10 uA	l –100 l V_{DC}
Total Capacitance (Maximum)	C_T	-100 V @ 100 MHz	2.2 pF
Series Resistance (Maximum)	R_S	+100 mA @ 100 MHz	0.5 Ohms
Parallel Resistance (Minimum)	R_P	-10 V @ 100 MHz	10 K Ω
Carrier Lifetime (Nominal)	τ_L	+6 mA / -10 mA @ (50% - 90% Voltage)	18 *u*s
I-Region Length (Nominal)	μm	-	175 μm
C.W. Thermal Resistance (Maximum)	θ	I_H = 1A, I_L = 10 mA, T = 1 mS	5 °C/W
Power Dissipation in Free Air (Maximum)	W	I_F = +100 mA	9 W
Power Dissipation with Diode Case at Tambient (Maximum)	P_D	I_F = +100 mA	30 W

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	+ 53 dBm C.W.
Forward D.C. Current	+ 500 mA
Reverse D.C. Voltage @ -10 uA	l - 150 V l

1. Exceeding these limits may cause permanent damage.

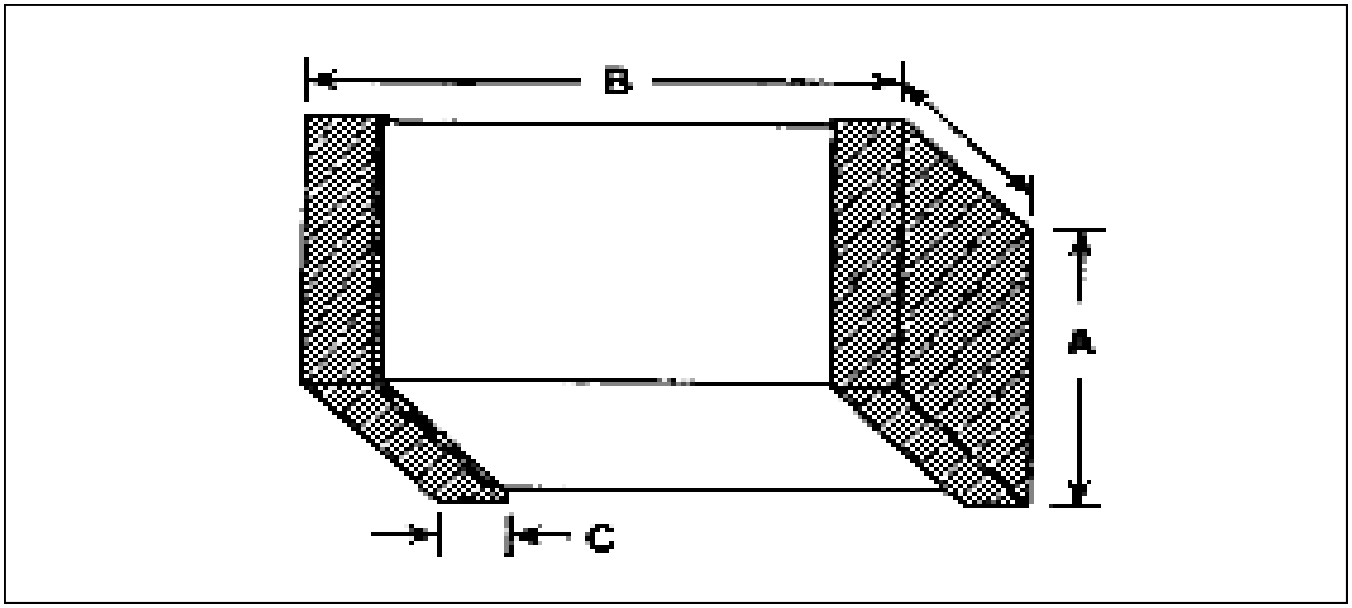
ADVANCED: Data Sheets contain information regarding a product M/A-COM Technology Solutions is considering for development. Performance is based on target specifications, simulated results, and/or prototype measurements. Commitment to develop is not guaranteed.
PRELIMINARY: Data Sheets contain information regarding a product M/A-COM Technology Solutions has under development. Performance is based on engineering tests. Specifications are typical. Mechanical outline has been fixed. Engineering samples and/or test data may be available. Commitment to produce in volume is not guaranteed.

• **North America** Tel: 800.366.2266 • **Europe** Tel: +353.21.244.6400
• **India** Tel: +91.80.43537383 • **China** Tel: +86.21.2407.1588
Visit www.macomtech.com for additional data sheets and product information.

M/A-COM Technology Solutions Inc. and its affiliates reserve the right to make changes to the product(s) or information contained herein without notice.

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)



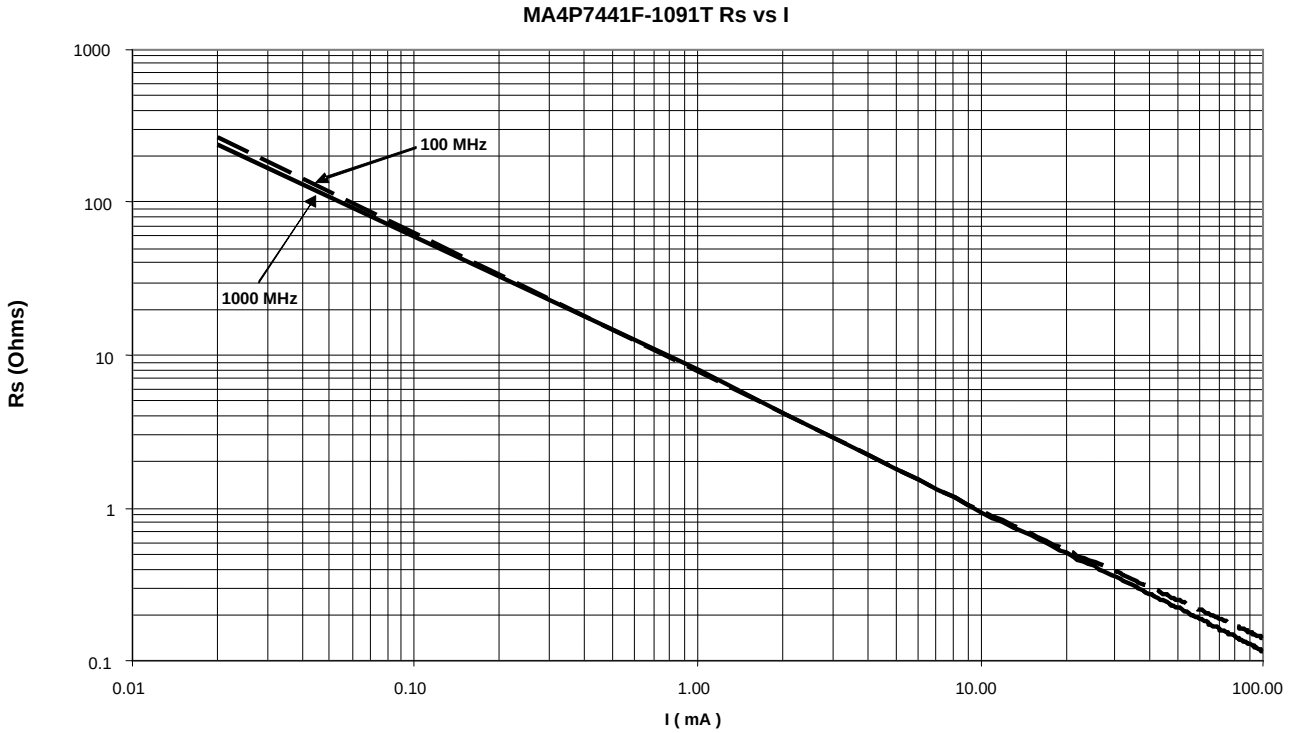
ADVANCED: Data Sheets contain information regarding a product M/A-COM Technology Solutions is considering for development. Performance is based on target specifications, simulated results, and/or prototype measurements. Commitment to develop is not guaranteed.
PRELIMINARY: Data Sheets contain information regarding a product M/A-COM Technology Solutions has under development. Performance is based on engineering tests. Specifications are typical. Mechanical outline has been fixed. Engineering samples and/or test data may be available. Commitment to produce in volume is not guaranteed.

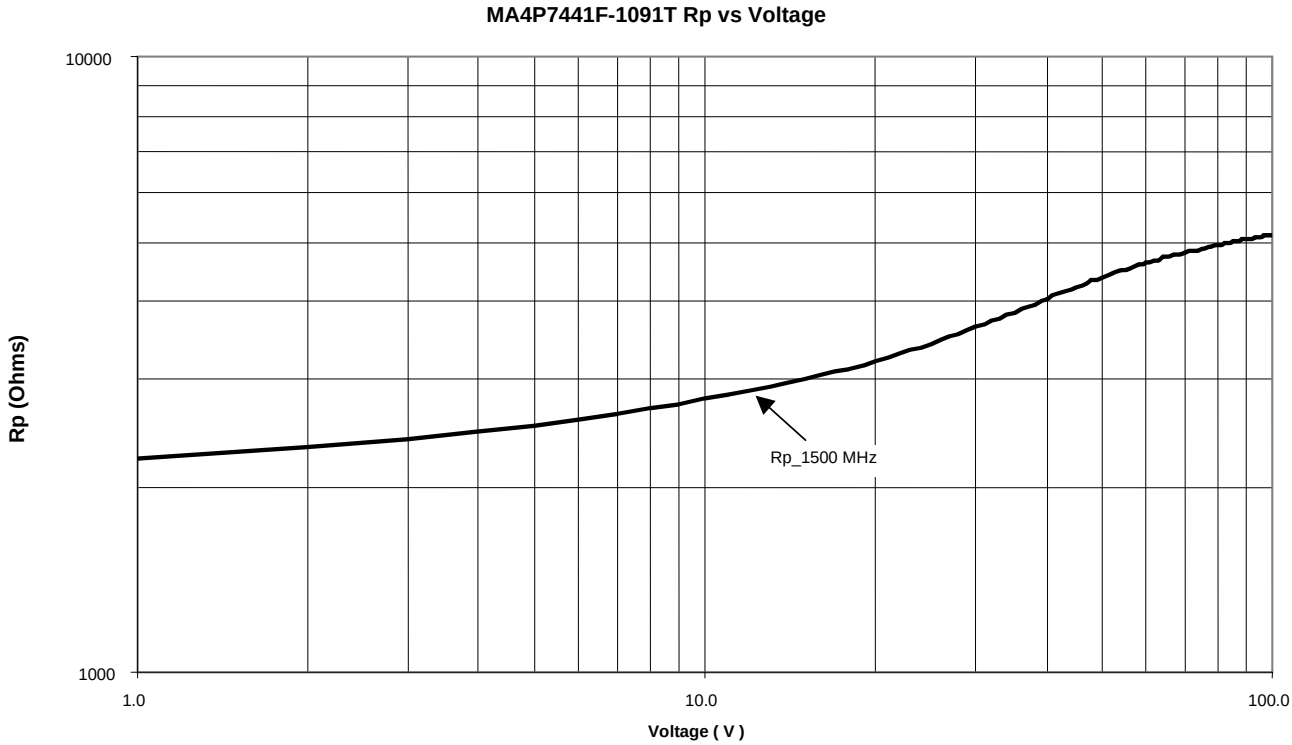
- **North America** Tel: 800.366.2266
- **Europe** Tel: +353.21.244.6400
- **India** Tel: +91.80.43537383
- **China** Tel: +86.21.2407.1588

Visit www.macomtech.com for additional data sheets and product information.

M/A-COM Technology Solutions Inc. and its affiliates reserve the right to make changes to the product(s) or information contained herein without notice.

Typical Electrical Performance





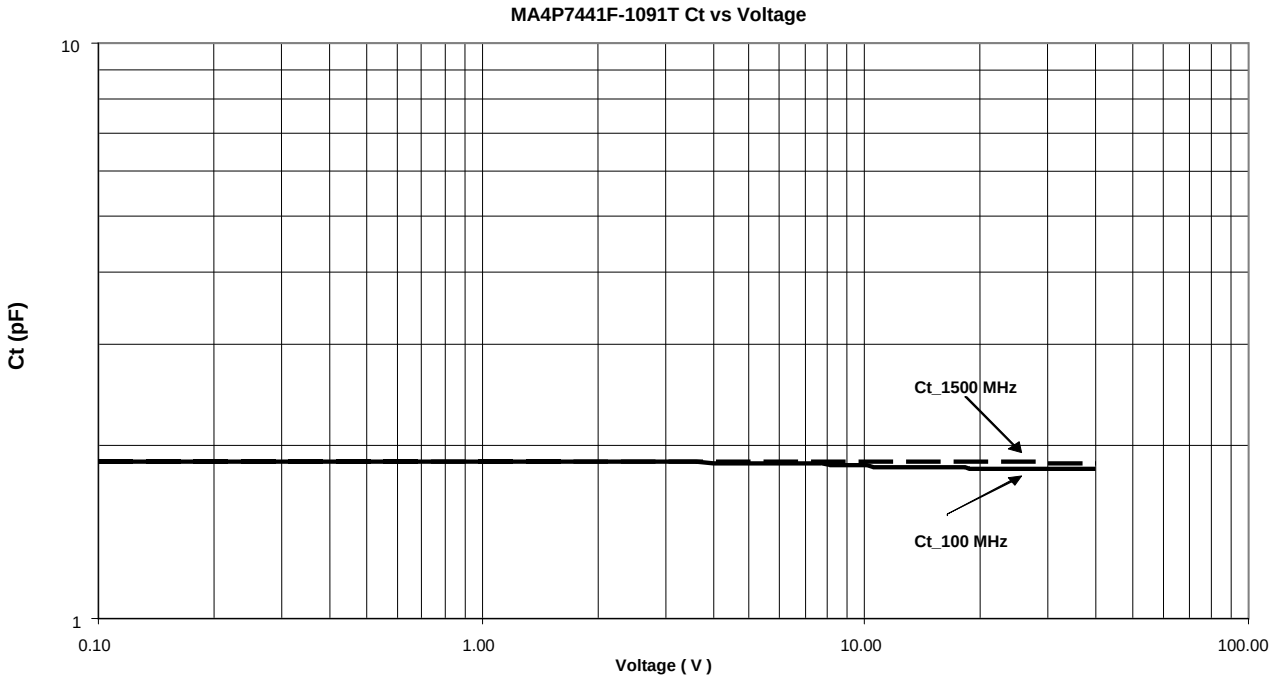
ADVANCED: Data Sheets contain information regarding a product M/A-COM Technology Solutions is considering for development. Performance is based on target specifications, simulated results, and/or prototype measurements. Commitment to develop is not guaranteed.
PRELIMINARY: Data Sheets contain information regarding a product M/A-COM Technology Solutions has under development. Performance is based on engineering tests. Specifications are typical. Mechanical outline has been fixed. Engineering samples and/or test data may be available. Commitment to produce in volume is not guaranteed.

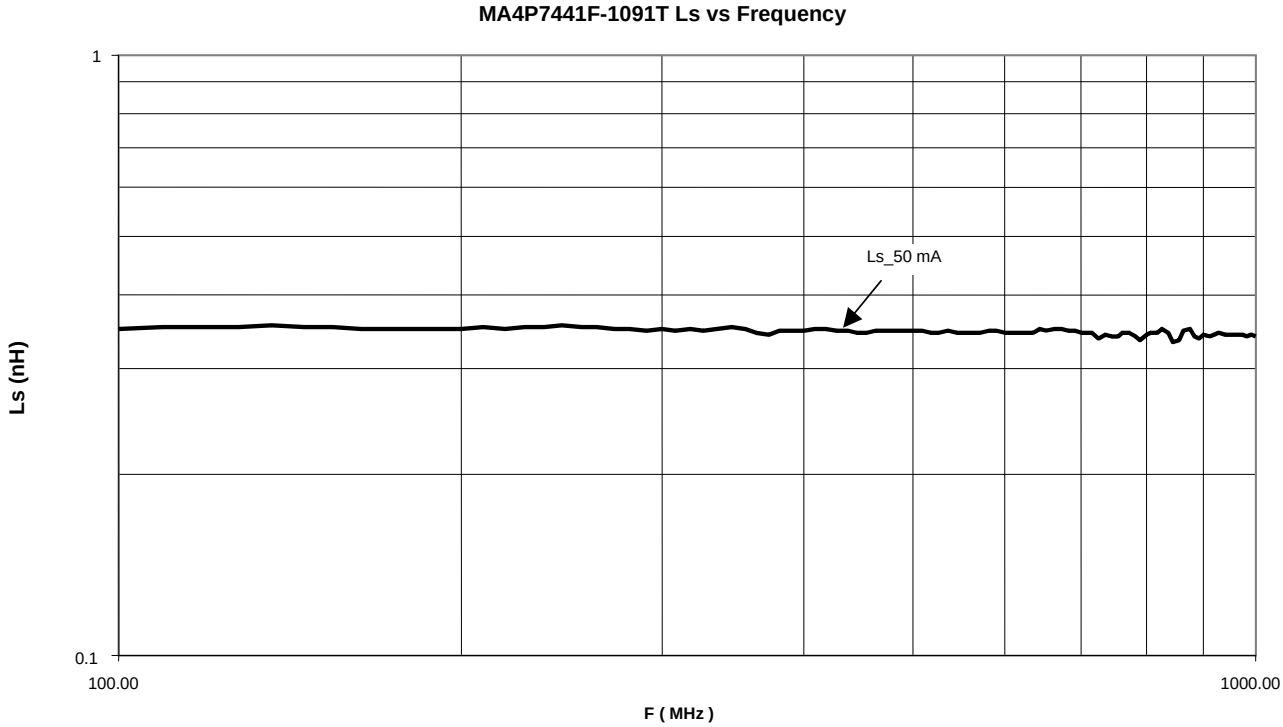
- **North America** Tel: 800.366.2266
- **Europe** Tel: +353.21.244.6400
- **India** Tel: +91.80.43537383
- **China** Tel: +86.21.2407.1588

Visit www.macomtech.com for additional data sheets and product information.

M/A-COM Technology Solutions Inc. and its affiliates reserve the right to make changes to the product(s) or information contained herein without notice.

Typical Electrical Performance





ADVANCED: Data Sheets contain information regarding a product M/A-COM Technology Solutions is considering for development. Performance is based on target specifications, simulated results, and/or prototype measurements. Commitment to develop is not guaranteed.
PRELIMINARY: Data Sheets contain information regarding a product M/A-COM Technology Solutions has under development. Performance is based on engineering tests. Specifications are typical. Mechanical outline has been fixed. Engineering samples and/or test data may be available. Commitment to produce in volume is not guaranteed.

- **North America** Tel: 800.366.2266
- **Europe** Tel: +353.21.244.6400
- **India** Tel: +91.80.43537383
- **China** Tel: +86.21.2407.1588

Visit www.macomtech.com for additional data sheets and product information.

M/A-COM Technology Solutions Inc. and its affiliates reserve the right to make changes to the product(s) or information contained herein without notice.

Typical Non-Magnetic Performance

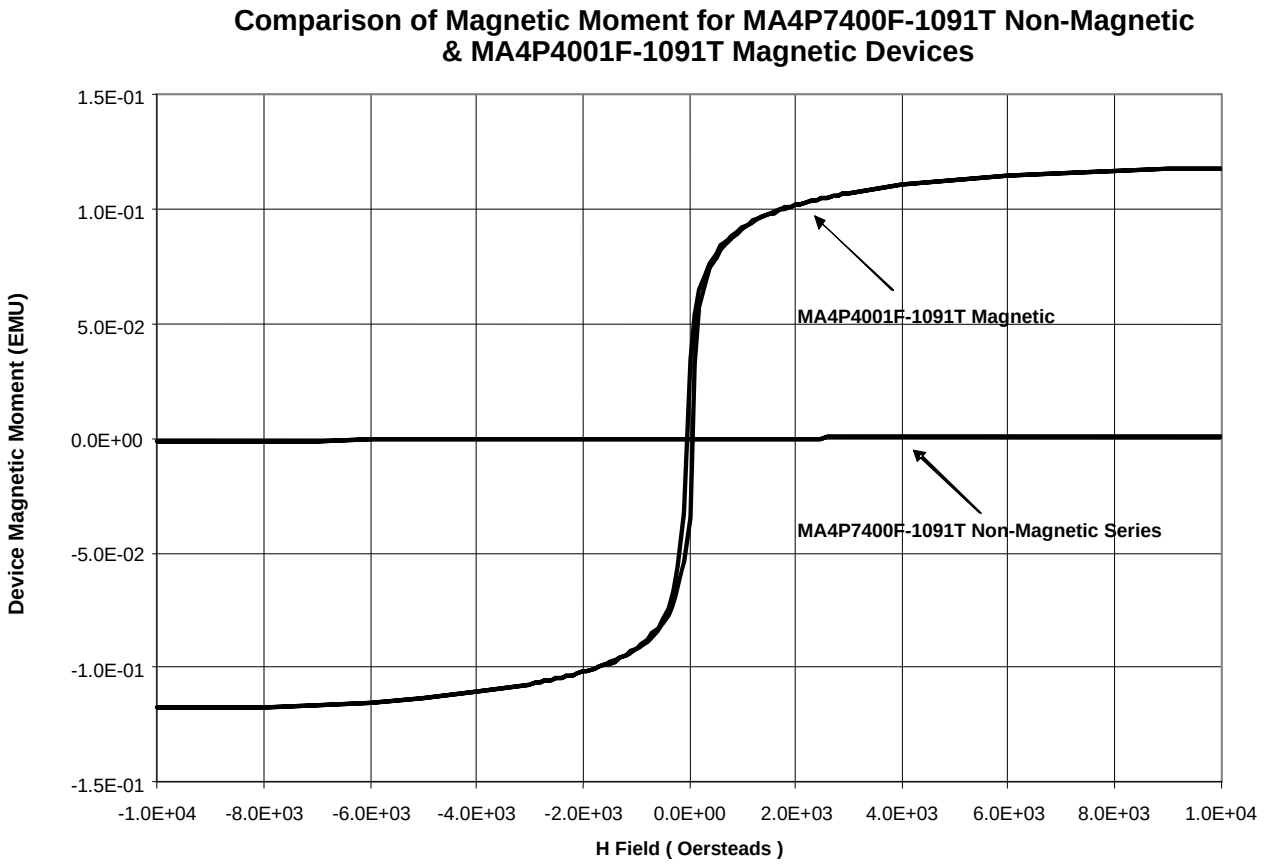


Table 1 - Typical Magnetic Properties of Non-Magnetic MA4P7441F-1091T Device Vs. Conventional MA4P4001F-1091T Magnetic Device

Magnetic Property	MA4P7441F-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

ADVANCED: Data Sheets contain information regarding a product M/A-COM Technology Solutions is considering for development. Performance is based on target specifications, simulated results, and/or prototype measurements. Commitment to develop is not guaranteed.
PRELIMINARY: Data Sheets contain information regarding a product M/A-COM Technology Solutions has under development. Performance is based on engineering tests. Specifications are typical. Mechanical outline has been fixed. Engineering samples and/or test data may be available. Commitment to produce in volume is not guaranteed.

- **North America** Tel: 800.366.2266
- **Europe** Tel: +353.21.244.6400
- **India** Tel: +91.80.43537383
- **China** Tel: +86.21.2407.1588

Visit www.macomtech.com for additional data sheets and product information.

M/A-COM Technology Solutions Inc. and its affiliates reserve the right to make changes to the product(s) or information contained herein without notice.