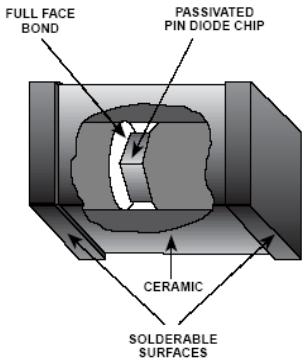
MA4P7470F-1072T

Non Magnetic MELF PIN Diode

Rev. V2

Features

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



Description and Applications

The MA4P7470F-1072T 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. The package utilizes M/A-COM Technology Solutions new non-magnetic plating process to provide a hermetically sealed package with extremely low permeability. Incorporated within the package is a glass passivated PIN chip that is full face bonded on both the cathode and anode to maximize surface area for low electrical and thermal resistance. The low thermal resistance provides excellent performance at high incident power levels of up to 200 watts CW. The MA4P7470F-1072T has been comprehensively characterized both electrically and mechanically to ensure repeatable and predictable performance. The MA4P7470F-1072T is a non-magnetic device which has similar electrical performance to its magnetic counterpart the MA4P7417F-1072T. The diode is well suited for use in low loss, low distortion, high power switching circuits. It was designed to be used in a high magnetic field environment from HF through UHF frequencies. This device is designed to meet the most rigorous electrical and mechanical requirements of MRI environments.

Designed for Automated Assembly

MELF PIN diodes are designed for high volume tape and reel assembly. The rectangular package design is excellent for automatic pick and place assembly methods. 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
Chip Junction Temperature	+175°C Continuous
Diode Mounting Temperature	+265°C for 10 seconds
RF C.W. Incident Power	+53dBm C.W.
Forward D.C. Current	+150 mA
Reverse D.C. Voltage @ -10uA	- 800V

1. Exceeding any of these limits may cause permanent damage.

- **North America** Tel: 800.366.2266 / Fax: 978.366.2266
- **Europe** Tel: 44.1908.574.200 / Fax: 44.1908.574.300
- **Asia/Pacific** Tel: 81.44.844.8296 / Fax: 81.44.844.8298

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Electrical Specifications @ +25 °C

Parameter	Symbol	Condition	Unit Value
Maximum Forward Voltage	V_F	I_F = +100mA	1.0V_{DC}
Minimum Reverse Voltage[1]	V_R	Ir = -10uA	I – 800 I V_{DC}
Maximum Total Capacitance	C_T	-100V @ 100MHz	0.7pF
Maximum Series Resistance	R_S	+100mA @ 100MHz	0.8 Ω
Minimum Parallel Resistance	R_P	-10V @ 100MHz	50K Ω
Nominal Carrier Lifetime	τ_L	+6mA / -10mA @ (50% - 90% Voltage)	6.5 µs
Nominal I-Region Length	µm	-	140 µm
Maximum Thermal Resistance	θ	I_H = 1A, I_L = 10mA, T = 1mS	13°C/W
Maximum Power Dissipation in Free Air	W	I_F = +100mA	4W
Maximum Power Dissipation with heatsink	P_D	I_F = +100mA	12W

Note:
1. The minimum specified V_R (Reverse Voltage) is sourced and the resultant reverse leakage current, Ir, is measured to be <10µA

Environmental Screening Capability

MELF devices may be used in industrial or 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_R, +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

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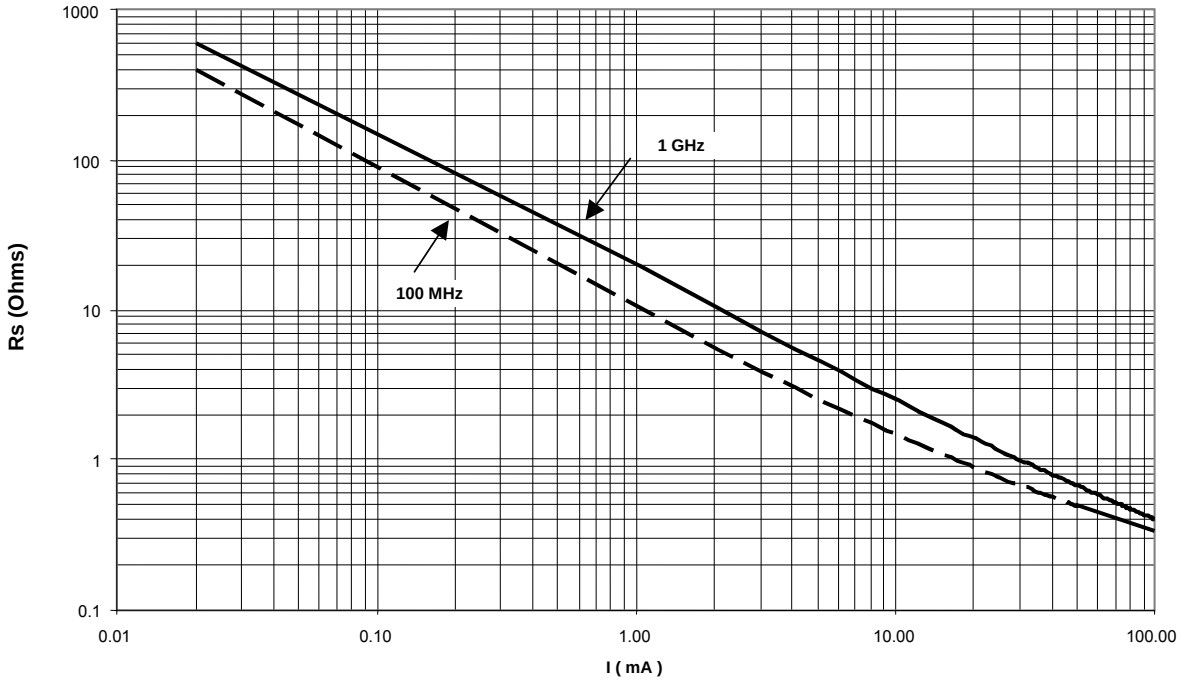
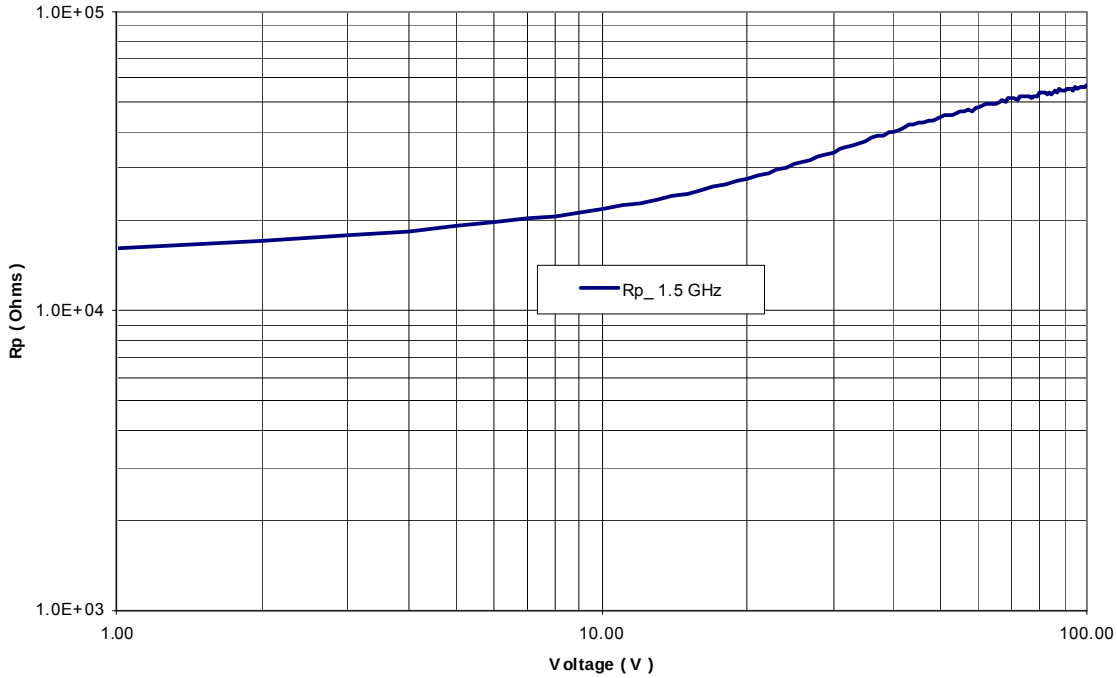
Typical Electrical Performance

MA4P7470F-1072T Rs vs I



MA4P7470F-1072T Rp vs Voltage



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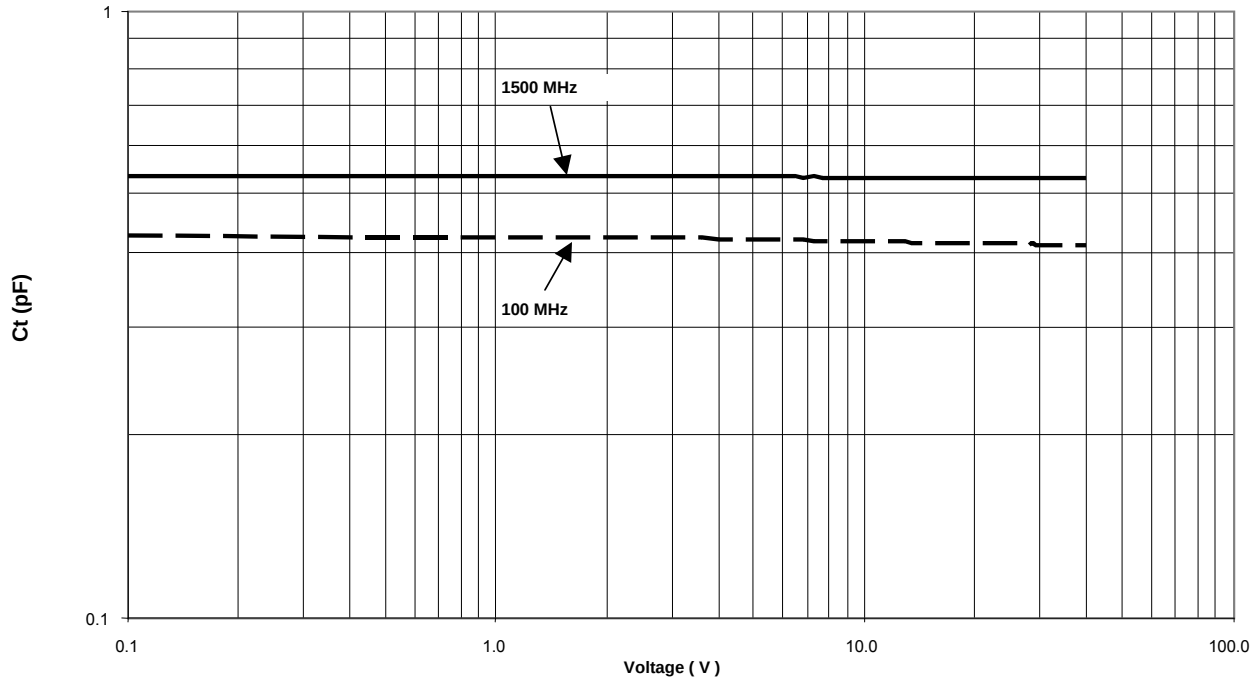
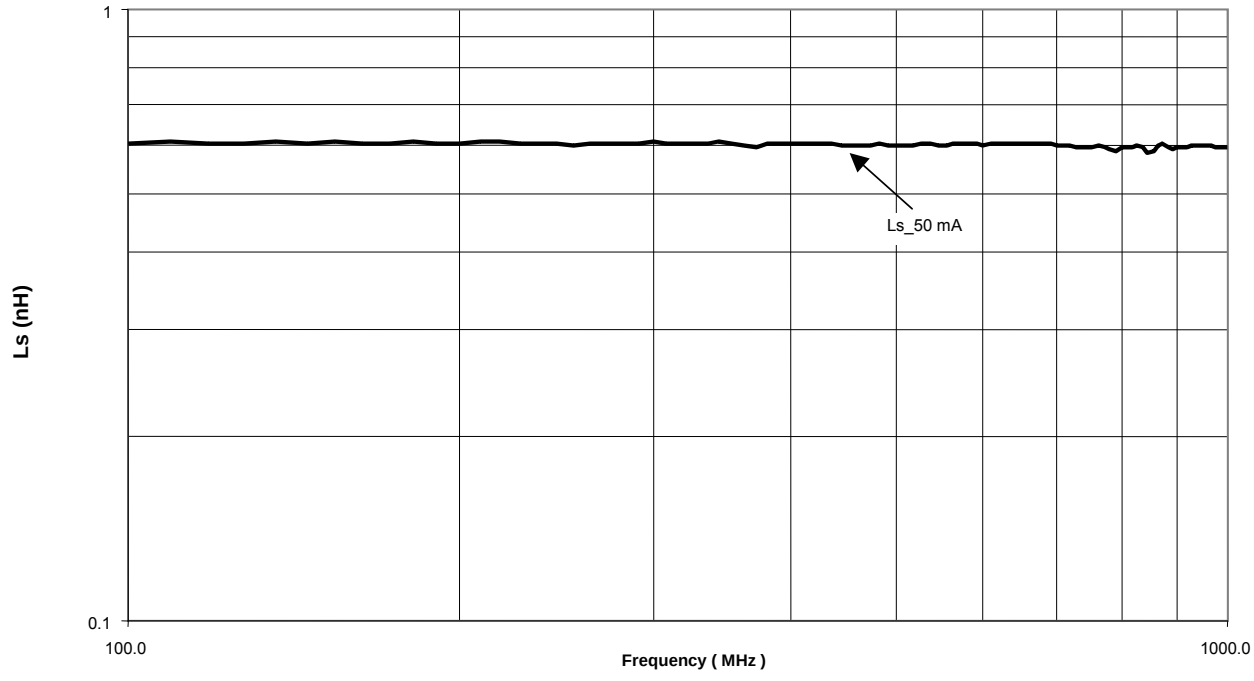
Typical Electrical Performance

MA4P7470F-1072T Ct vs Voltage



MA4P7470F-1072T Ls vs Frequency



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Typical Non-Magnetic Performance

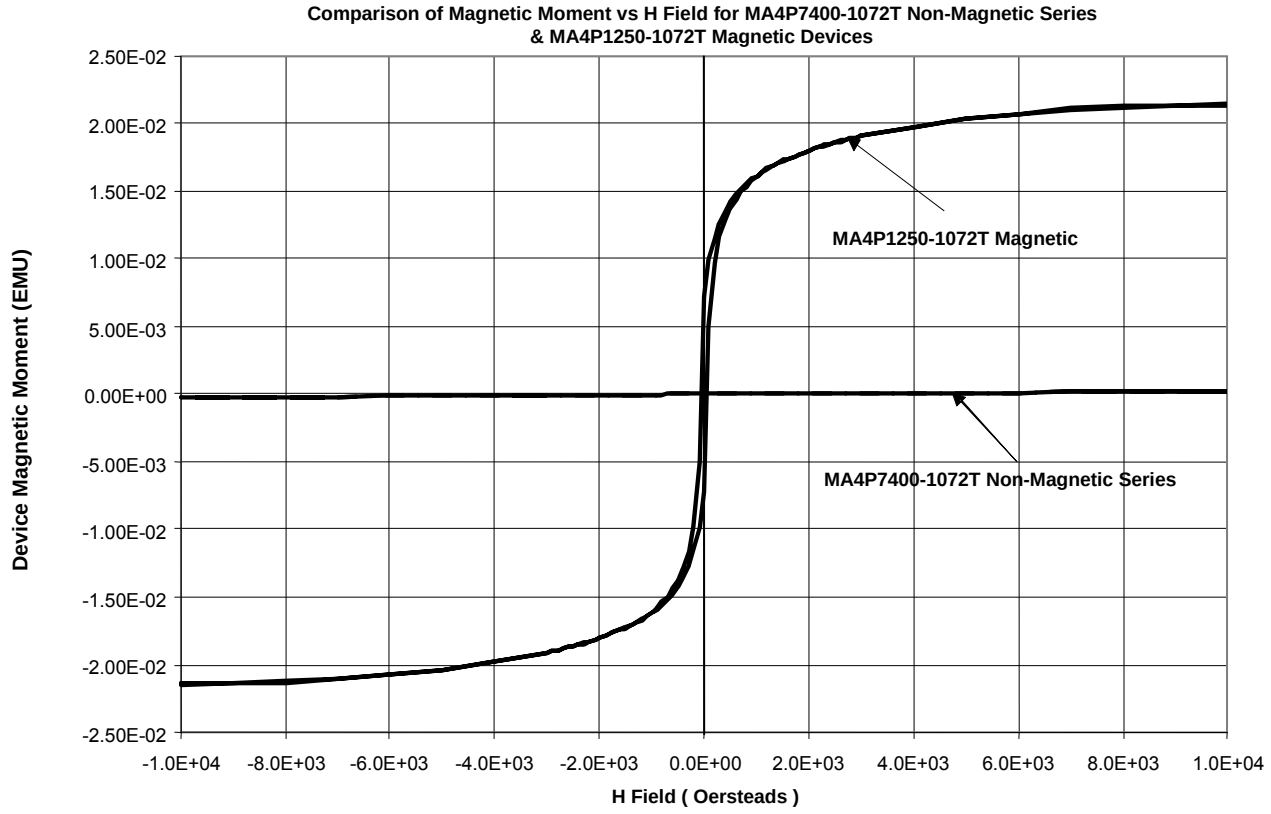

Table 1 - Typical Magnetic Properties of Non-Magnetic MA4P7470F-1072T Device vs. A Conventional Magnetic MA4P1250-1072T Device

Magnetic Property	MA4P7470F-1072T Value	MA4P1250-1072T Value
Saturation Moment (EMU) @ H = H_{MAX} Oersteads	2.3 x E^{-4}	2.1 x E^{-2}
Remanance Moment (EMU) @ H = 0 Oersteads	4.2 x E^{-8}	7.1 x E^{-3}
Coercivity (Oersteads) @ EMU = 0 Moment	1	59.2

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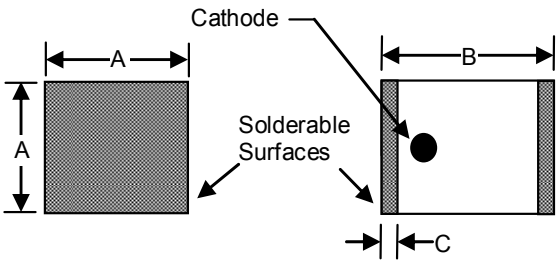
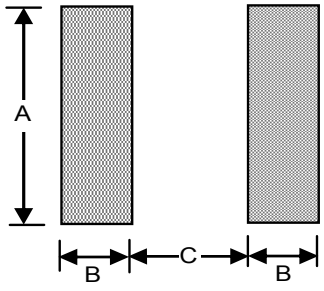
1072 Package Dimensions

Dimension	INCHES		MM	
	MIN.	MAX.	MIN.	MAX.
A	0.080	0.095	2.032	2.413
B	0.115	0.135	2.921	3.429
C	0.008	0.030	0.203	0.762

1072 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	Package
MA4P7470F-1072T	Tape and Reel

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