

Features

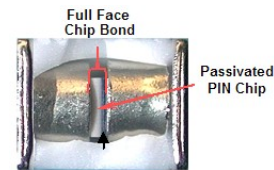
- ◆ RoHS Compliant
- ◆ Rectangular MELF SMQ Ceramic Package
- ◆ Low R_s for Low Series Loss
- ◆ Long τ_L for Low Intermodulation Distortion
- ◆ Low C_j for High Series Isolation
- ◆ High Average Incident Power Handling

Description and Applications

The MA4P7418-10720T is a surface mount PIN diode in a Metal Electrode Leadless Faced (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 fully passivated PIN diode chip that is full face bonded on both the cathode and anode to maximize the surface contact area for low electrical and thermal resistance. The MA4P7418-10720T has been comprehensively characterized both electrically and mechanically to ensure repeatable and predictable performance. The diode is well suited for use in low loss, low distortion, high power switching circuits. The low thermal resistance of this device provides excellent high 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.



1072



Diode Cross Section

Designed for Automated Assembly

SMQ MELF PIN diodes are designed for high volume tape and reel assembly. The rectangular package design provides a highly efficient means for 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 reflow and vapor phase soldering methods.

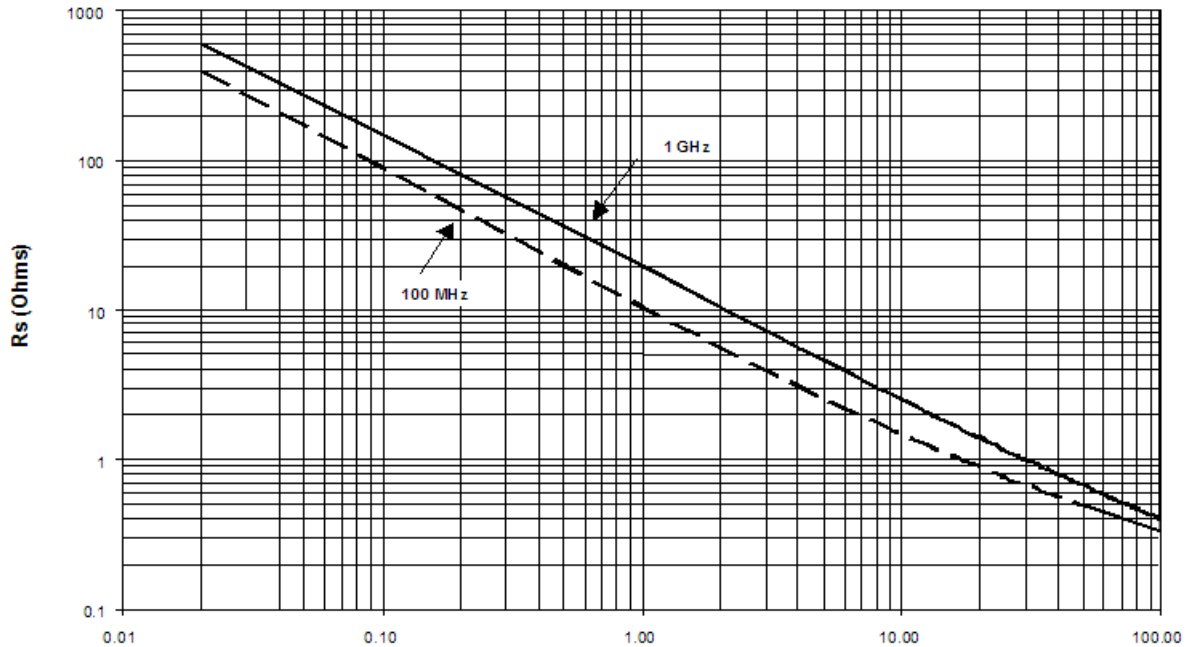
Absolute Maximum Ratings¹ @ +25°C

| Parameter | Absolute Maximum |
|--|-----------------------|
| Operating Temperature | -65°C to +125°C |
| Storage Temperature | -65°C to +200°C |
| Diode Junction Temperature | +175°C |
| Diode Mounting Temperature | +265°C for 10 seconds |
| C.W. Thermal Resistance (Θ_{jc}) Using Infinite Heat Sink | 13 °C/W |
| Power Dissipation @ +25°C De-rate linearly by to 0W @ +175C by -76.6 mW/°C Using Infinite Heat Sink | 11.5 W |
| Forward D.C. Current | +150mA |
| Reverse D.C. Voltage | -1100V |

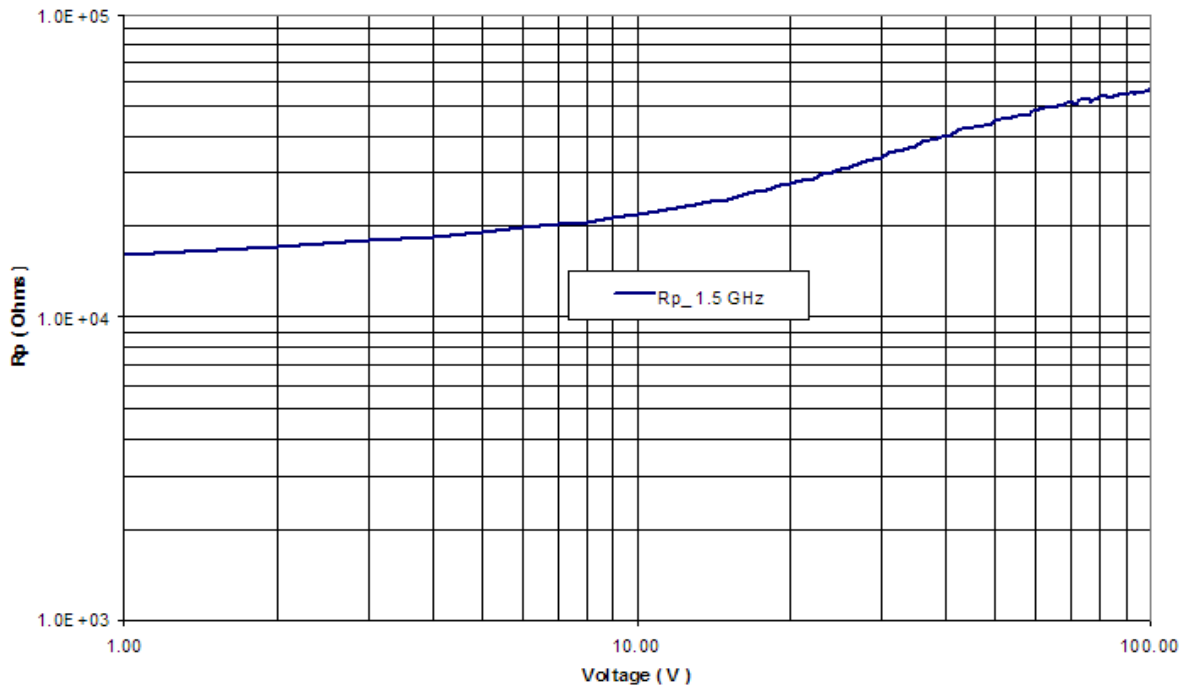
1. Exceeding any of these limits may cause permanent damage.

Typical Electrical Performance @ +25°C

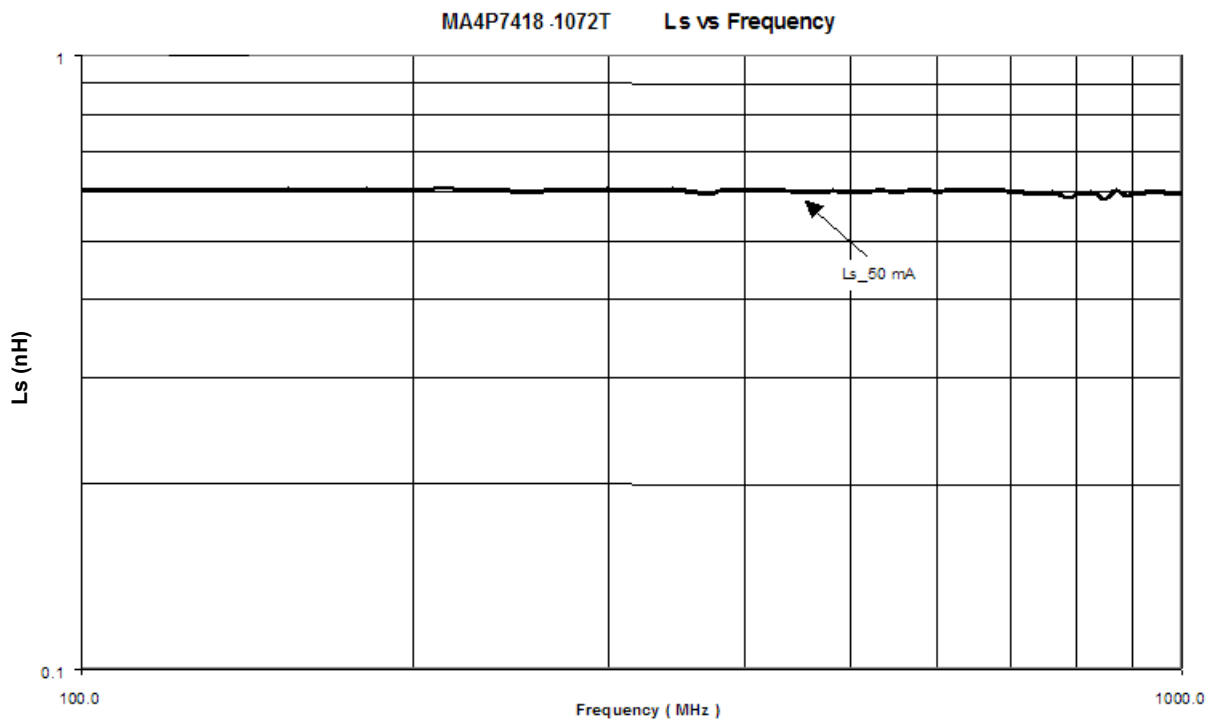
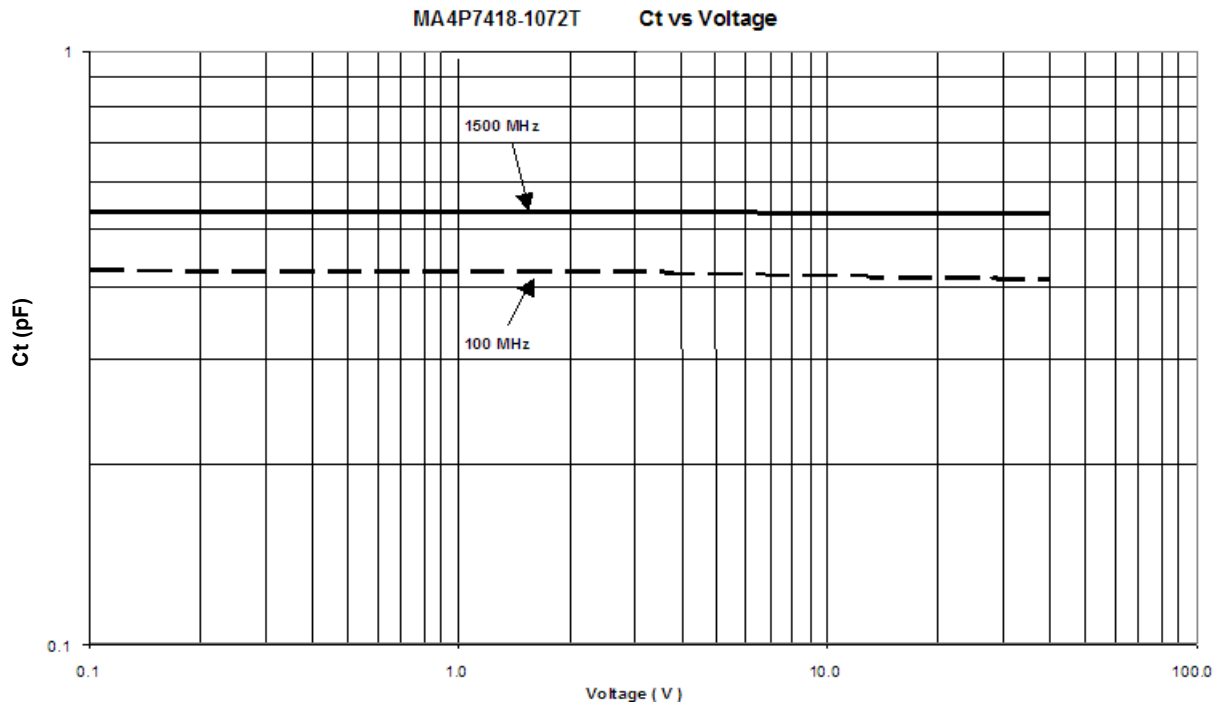
MA4P7418-1072T Rs vs I



MA4P7418-1072T Rp vs Voltage



Typical Electrical Performance @ +25°C



SMQ MELF PIN Diode

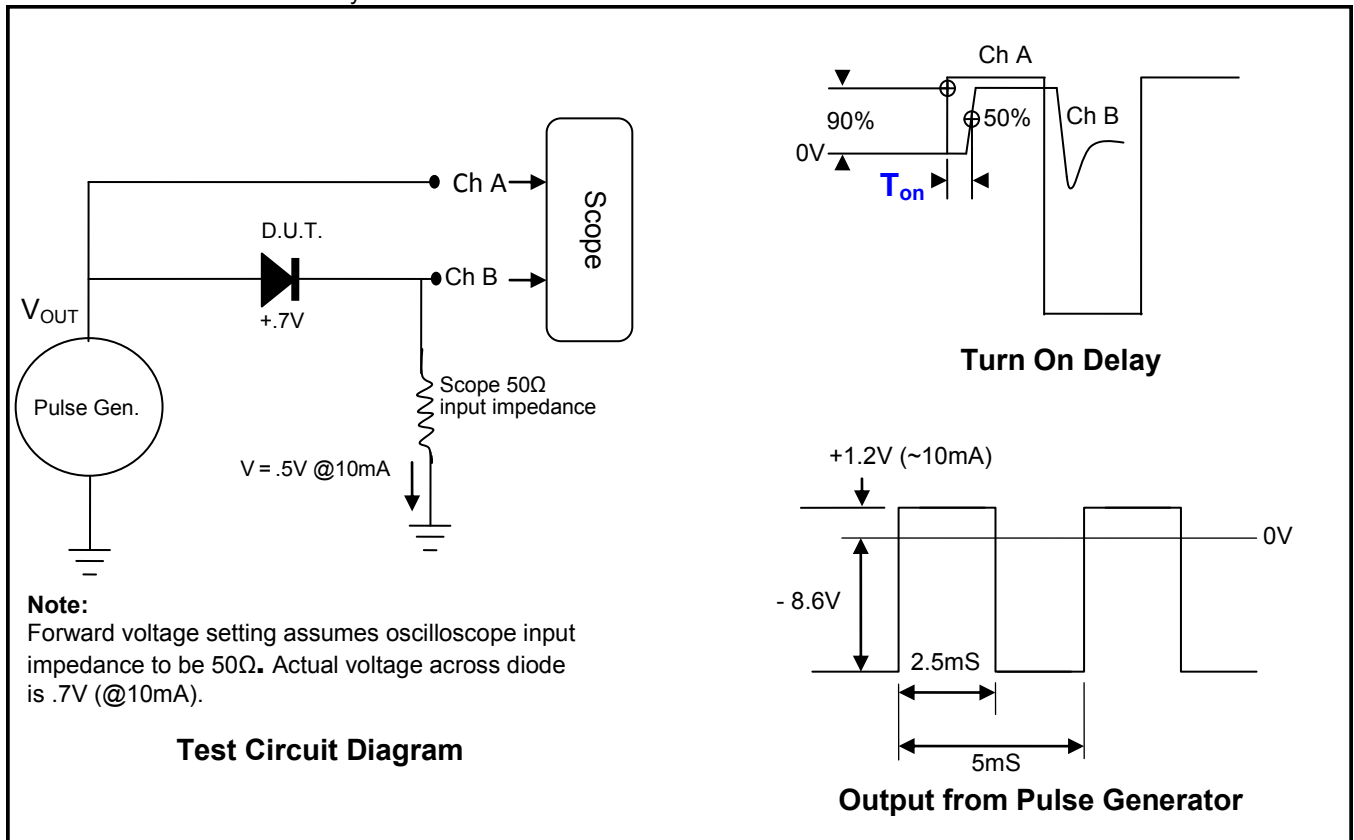
Rev. V4

Electrical Specifications @ +25 °C

| Parameter | Symbol | Condition | Unit Value |
|--|---------------|--|----------------------|
| Forward Voltage (Maximum) | V_F | $I_F = +100\text{mA}$ | $1.0 V_{DC}$ |
| Voltage Rating (Minimum) ¹ | V_R | $I_r = -10\mu\text{A}$ | $ -1100 V_{DC}$ |
| Total Capacitance (Maximum) | C_T | $-100\text{V @ } 100\text{MHz}$ | 0.8pF |
| Series Resistance (Maximum) | R_S | $+100\text{mA @ } 100\text{MHz}$ | 1.2 Ohms |
| Parallel Resistance (Minimum) | R_P | $-10\text{V @ } 100\text{MHz}$ | $50\text{K } \Omega$ |
| Carrier Lifetime (Nominal) | τ_L | $+6\text{mA} / -10\text{mA} (50\% - 90\% \text{ Voltage})$ | $7 \mu\text{s}$ |
| Turn on Delay, T_{ON} (Maximum) ² | T_{ON} | $50\% \text{ Control Voltage} - 90\% \text{ Output Voltage}$ | $2.5 \mu\text{s}$ |
| I-Region Length (Nominal) | μm | - | $140 \mu\text{m}$ |
| C.W. Thermal Resistance (Maximum) | θ_{jc} | $I_H = 1\text{A}, I_L = 10\text{mA}, T = 1\text{mS}$ | 13°C/W |
| Power Dissipation in Free Air (Maximum) | W | $I_F = +100\text{mA}$ | 4W |
| Power Dissipation with IHS (Maximum) | P_D | $I_F = +100\text{mA}$ | 11.5W |

Note:

- V_R (Reverse Voltage) is sourced and the resultant reverse leakage current, I_r , is measured to be $<10\mu\text{A}$.
- See below for turn on delay measurement

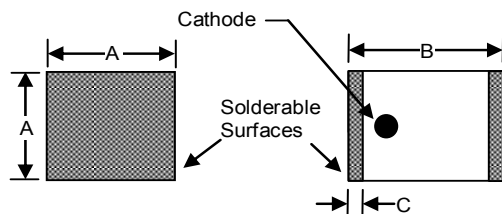


Environmental Capability

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_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 |

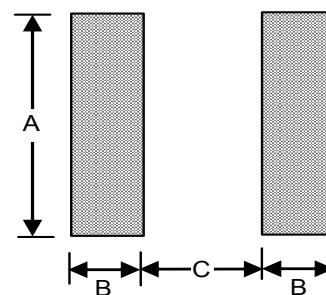
1072 MELF Surface Mount Package



| 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 |

Circuit Pad Layout for 1072 MELF

| Dimension | inches | mm |
|-----------|--------|------|
| A | 0.093 | 2.36 |
| B | 0.050 | 1.27 |
| C | 0.060 | 1.52 |



Ordering Information

| Part Number | Package | Quantity |
|----------------|---------------|----------|
| MA4P7418-1072T | Tape and reel | 1500ps |

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