

Features

- ◆ Low Series Resistance
- ◆ Low Capacitance
- ◆ Millimeter Wave Switching & Cutoff Frequency
- ◆ 3 Nanosecond Switching Speed
- ◆ Can be Driven by a Buffered +5V TTL
- ◆ Silicon Nitride Passivation
- ◆ Polyimide Scratch Protection
- ◆ RoHS Compliant

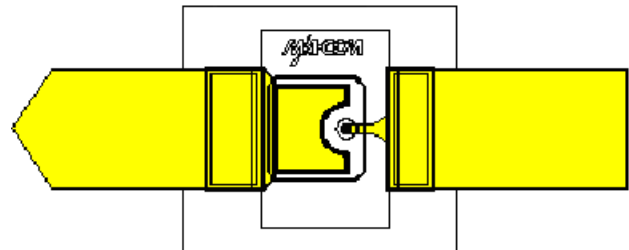
Description

M/A-COM's MA4GP905 is a Gallium-Arsenide, beam-lead PIN diode. These devices are fabricated on a OMCVD epitaxial wafer using a process designed for high device uniformity and extremely low parasitics. The diode exhibits low series resistance, 3Ω, low capacitance, 25fF, and an extremely fast switching speed of 3nS. They are fully passivated with silicon nitride and have an additional layer of a polymer for scratch protection. The protective coating prevents damage to the junction and the anode air bridges during handling and assembly.

Applications

The ultra low capacitance of the MA4GP905 device makes it ideally suited for use through W-band. The low RC product and low profile of the beamlead PIN diode allows for use in microwave and millimeter wave switch designs, where low insertion loss and high isolation are required. The operating bias conditions of +20mA for the low loss state, and 0v, for the isolation state permits the use of a simple +5V TTL gate driver. These GaAs, beamlead diodes, can be used in switching arrays on radar systems, high speed ECM circuits, optical switching networks, instrumentation, and other wideband multi-throw switch assemblies.

MA4GP905



Absolute Maximum Ratings @ T_{AMB} = 25°C (unless otherwise specified)

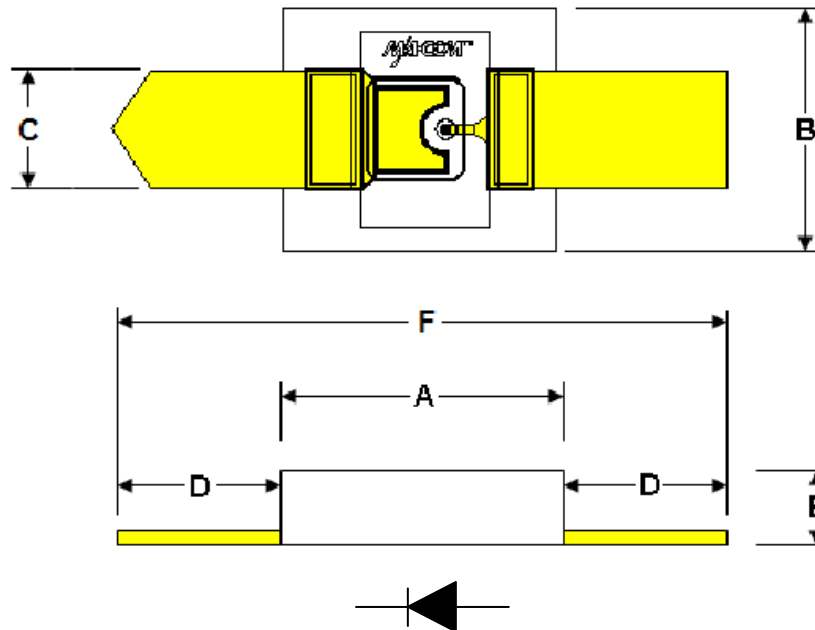
| Parameter | Absolute Maximum |
|-----------------------|-----------------------|
| Reverse Voltage | -50V |
| Operating Temperature | -65°C to +125°C |
| Storage Temperature | -65°C to +150°C |
| Junction Temperature | +175°C |
| Forward DC Current | 40 mA |
| C.W. Incident Power | +20 dBm |
| Mounting Temperature | +235°C for 10 seconds |

Electrical Specifications at $T_{AMB} = 25^{\circ}C$

| Test Conditions | Parameters | Units | Min | Typical | Max. |
|--|------------|-------|-----|---------|------|
| Total Capacitance @ 0V/10 GHz ¹ | Ct | fF | – | 25 | 30 |
| Forward Resistance @ +20mA/10 GHz ² | Rs | Ohms | – | 3.0 | 4.9 |
| Forward Voltage at +10mA | Vf | Volts | 1.2 | 1.36 | 1.5 |
| Leakage Current at –50 V | Ir | nA | – | 50 | 300 |
| Switching Time ³ | TL | nS | – | 2 | 10 |

Notes:

1. Capacitance is determined by measuring the isolation of a single series diode in a 50Ω line at 10GHz.
2. Forward series resistance is determined by measuring the insertion loss of a single series diode in a 50Ω line at 10GHz.
3. Switching speed is measured between 10% and 90% of applied RF in a series mounted switch. Driver delay not included



| DIM | mils | | MM | |
|-----|------|------|-------|-------|
| | MIN. | MAX. | MIN. | MAX. |
| A | 9.0 | 1.2 | 0.229 | 0.305 |
| B | 7.0 | 10.0 | 0.178 | 0.254 |
| C | 4.9 | 5.7 | 0.125 | 0.145 |
| D | 6.3 | 7.9 | 0.160 | 0.201 |
| E | 2.9 | 3.9 | 0.077 | 0.099 |
| F | 24.2 | 25.4 | 0.615 | 0.645 |

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Handling and Assembly Procedures

The following precautions should be observed to avoid damaging these devices.

Cleanliness

These devices should be handled in a clean environment.

Static Sensitivity

Aluminum Gallium Arsenide PIN diodes are Class 1 ESD sensitive and can be damaged by static electricity. Proper ESD techniques should be used when handling these devices.

General Handling

These devices have a polymer layer which provides scratch protection for the junction area and the anode air bridge. Beam lead devices must, however, be handled with extreme care since the leads may easily be distorted or broken by the normal pressures exerted when handled with tweezers. A vacuum pencil with a #27 tip is recommended for picking and placing.

Attachment

These devices were designed to be inserted onto hard or soft substrates. Recommended methods of attachment include thermo-compression bonding, parallel-gap welding and electrically conductive silver epoxy.

See Application Note M541 page 8, [Bonding and Handling and Procedures for Chip Diode Devices](#) for more detailed assembly instructions.

Ordering Information

| Part Number | Packaging |
|-------------|-----------|
| MA4GP905 | Gel Pak |