

## GaAs Beamlead PIN Diode

Rev. V4

## Features

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

## Description

M/A-COM Technology Solutions 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. It is fully passivated with silicon nitride and has an additional polymer layer for scratch protection. This protective coating prevents damage to the junction and anode air bridge 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, 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. 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<sub>AMB</sub> = 25°C  
(unless otherwise specified)**

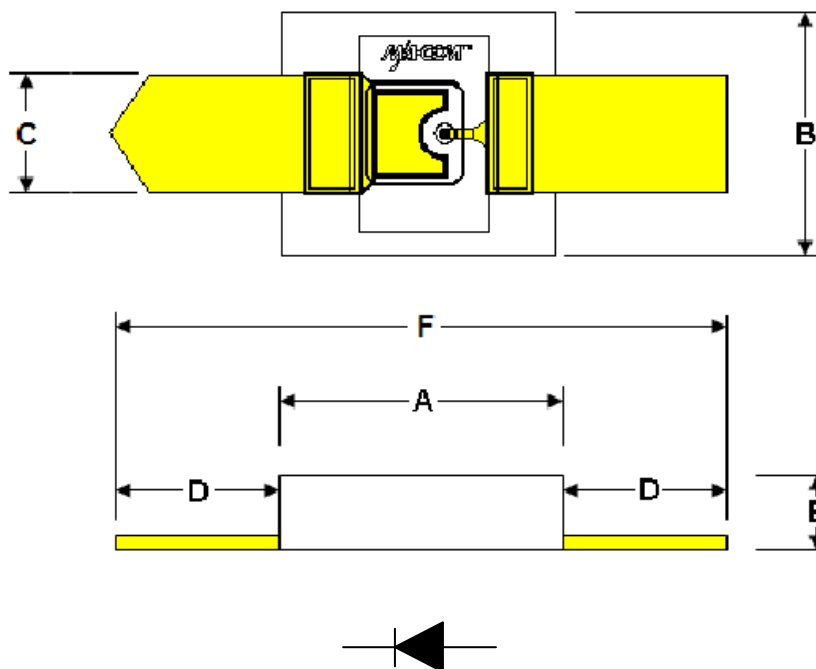
Parameter	Absolute Maximum
Reverse Voltage	-50V
Operating Temperature	-65°C to +125°C
Storage Temperature	-65°C to +150°C
Junction Temperature	+175°C
Forward DC Current	40 mA
C.W. Incident Power	+20 dBm
Mounting Temperature	+235°C for 10 seconds

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

Test Conditions	Parameters	Units	Min	Typical	Max.
Total Capacitance @ 10V/1 MHz	Ct	fF	–	25	30
Forward Resistance @ +20mA/1 GHz	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
Lifetime	$T_L$	nS	–	2	10



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	4.7	5.5	0.120	0.140
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

## 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

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