

## GaAs Beamlead PIN Diode

Rev. V5

### Features

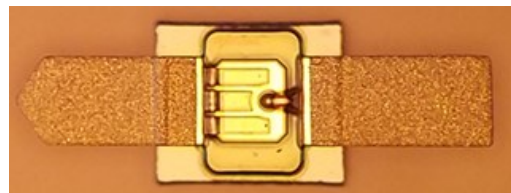
- Low Series Resistance
- Low Capacitance
- Millimeter Wave Switching
- Millimeter Wave Cutoff Frequency
- 3 ns Switching Speed
- Can be Driven by a Buffered +5 V TTL
- Silicon Nitride Passivation
- Polyimide Scratch Protection
- RoHS Compliant

### Description

The 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 of 3  $\Omega$ , low capacitance of 25 fF, and an extremely fast switching speed of 3 ns. 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 +20 mA for the low loss state, and 0 V, for the isolation state permits the use of a simple +5 V 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.



### Ordering Information

Part Number	Packaging
MA4GP905	Gel Pak

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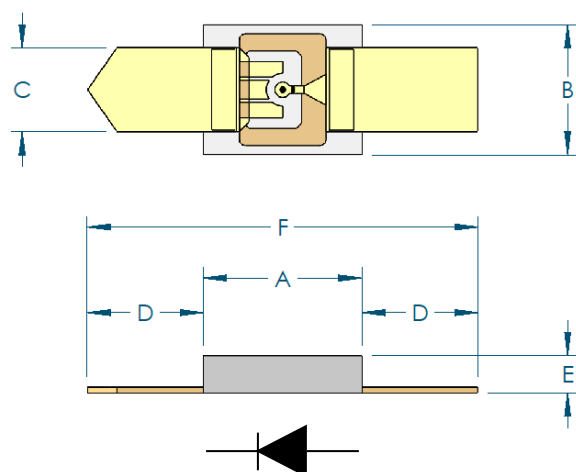
Electrical Specifications:  $T_A = 25^\circ\text{C}$ 

Parameter	Test Conditions	Units	Min.	Typ.	Max.
Total Capacitance ( $C_T$ )	10 V, 1 MHz	fF	—	25	30
Forward Resistance ( $R_S$ )	20 mA, 1 GHz	$\Omega$	—	3.0	4.9
Forward Voltage ( $V_F$ )	10 mA	V	1.2	1.36	1.5
Leakage Current ( $I_R$ )	-50 V	nA	—	50	300
Lifetime ( $T_L$ )	—	ns	—	2	10

Absolute Maximum Ratings:  $T_A = 25^\circ\text{C}$   
(unless otherwise specified)

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

### Outline



Dim.	mils		mm	
	Min.	Max.	Min.	Max.
A	9.0	12.0	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 & 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.

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

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