MA4AGBL912

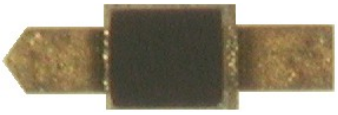
AlGaAs Beamlead PIN Diode

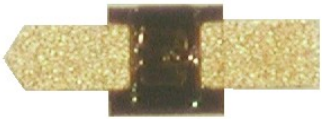
Rev. V5

Features

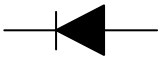
- Low Series Resistance
- Low Capacitance
- 5 Nanosecond Switching Speed
- Can be Driven by a Buffered +5V TTL
- Silicon Nitride Passivation
- Polyimide Scratch Protection
- RoHS Compliant

Topside





Bottom



Description

M/A-COM Technology Solutions MA4AGBLP912 is an Aluminum-Gallium-Arsenide anode enhanced, beam lead PIN diode. AlGaAs anodes, which utilize M/A-COM Tech's patented hetero-junction technology, produce less diode "On" resistance than conventional GaAs or silicon devices. This device is fabricated in a OMCVD system using a process optimized for high device uniformity and extremely low parasitics. The result is a diode with low series resistance, 4Ω, low capacitance, 28fF, and an extremely fast switching speed of 5nS. It is fully passivated with silicon nitride and has an additional polymer coating 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 MA4AGBLP912 device makes it ideally suited for use up to 40GHz when used in a shunt configuration. The low RC product and low profile of the beamlead PIN diode allows for use in microwave switch designs, where low insertion loss and high isolation are required. The operating bias conditions of +10mA for the low loss state, and 0V, for the isolation state permits the use of a simple +5V TTL gate driver. AlGaAs, 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.

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	40mA
C.W. Incident Power	+23dBm
Mounting Temperature	+235°C for 10 seconds

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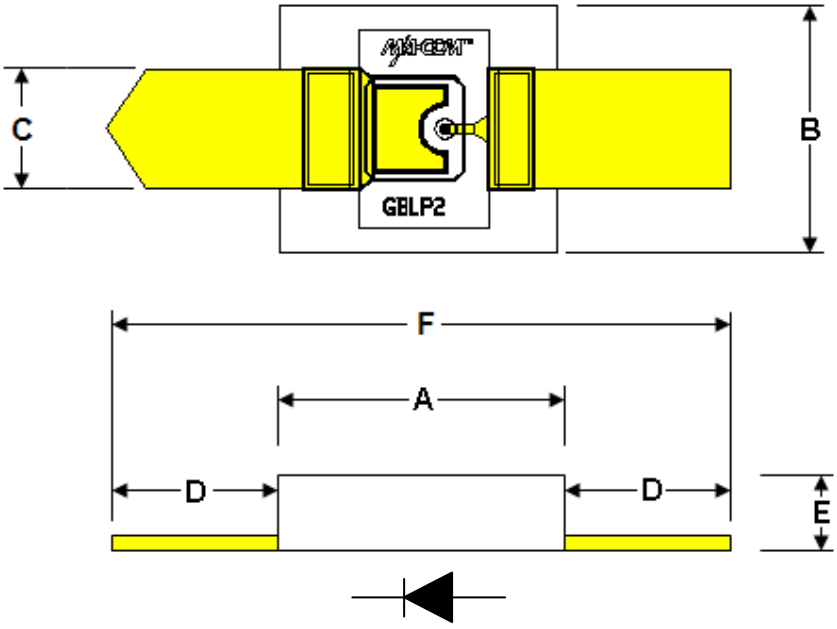
Electrical Specifications at T_{AMB} = 25°C

Test Conditions	Parameters	Units	Min	Typical	Max.
Total Capacitance @ –5V/1 MHz	Ct	fF	–	26	30
Forward Resistance @ +20mA/1 GHz	Rs	Ohms	–	4	4.9
Forward Voltage at +10mA	Vf	Volts	1.2	1.36	1.5
Leakage Current at –40 V	Ir	nA	–	50	300
Minority Carrier Lifetime	TL	nS	–	5	10



DIM	INCHES		MM	
	MIN.	MAX.	MIN.	MAX.
A	0.009	0.013	0.2286	0.3302
B	0.0049	0.0089	0.1245	0.2261
C	0.0037	0.0057	0.0940	0.1448
D	0.0049	0.0089	0.1245	0.2261
E	0.002	0.006	0.0508	0.1524
F	0.0218	0.0278	0.5537	0.70612

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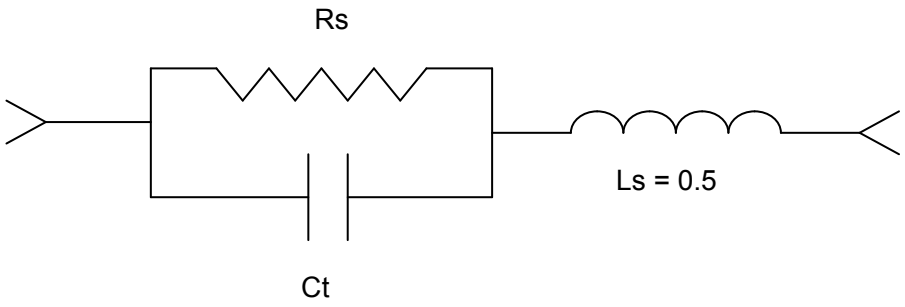
Diode Model



MA4AGBLP912 SPICE Model

Is=1.0E-14 A
Vi=0.0 V
μ_{e-}= 8600 cm^2/V-sec
Wi= 3.0 um
Rr= 10 K Ohms
Cjmin= 0.020 pF
Tau= 10 nsec
Rs(I)= Rc + Rj(I) = 0.10 Ohm + Rj(I)
Cj0= 0.022 pF
Vj= 1.35 V
M= 0.5
Fc= 0.5
Imax= 0.04 A
Kf= 0.0
Af=1.0
wBv= 50 V
wPmax= 100 mW
Ffe= 1.0

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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 0, HBM, 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.

Ordering Information

Part Number	Packaging
MA4AGBLP912	Gel Pak

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