

Features

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

Applications

- Aerospace & Defense
- ISM

Description

The MA4AGBLP912 is an Aluminum-Gallium-Arsenide anode enhanced, beam lead PIN diode. AlGaAs anodes, which utilize MACOM'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, 4 Ω , low capacitance, 28 fF, 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.

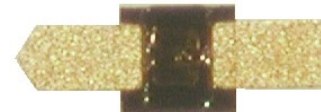
The ultra low capacitance of the MA4AGBLP912 device makes it ideally suited for use up to 40 GHz when used in a shunt configuration. The low RC product and low profile of the beamlead PIN diode allows for use in microwave switch designs, where low insertion loss and high isolation are required. The operating bias conditions of +10 mA for the low loss state, and 0 V, for the isolation state permits the use of a simple +5 V 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.

Ordering Information

Part Number	Package
MA4AGBLP912	Gel Pak



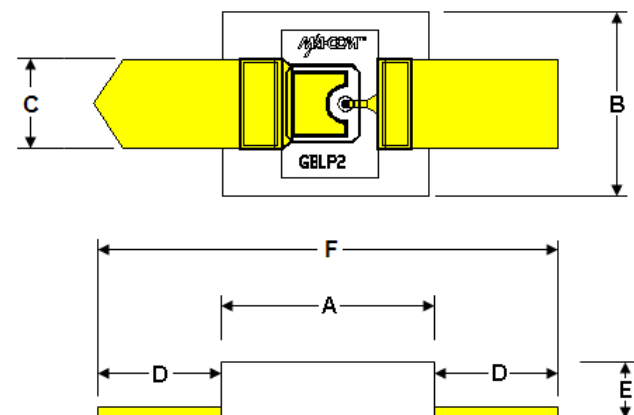
Topside



Bottom



Outline



Outline Dimensions

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

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

Parameter	Test Conditions	Units	Min.	Typ.	Max.
Total Capacitance	-5 V / 1 MHz	fF	–	26	30
Forward Resistance	+20 mA / 1 GHz	Ω	–	4	4.9
Forward Voltage	+10 mA	V	1.2	1.36	1.5
Leakage Current	-40 V	nA	–	50	300
Minority Carrier Lifetime	—	ns	–	5	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	23 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

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.

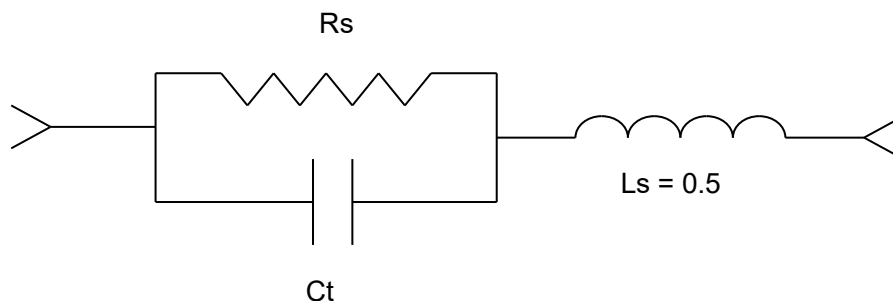
General Handling

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.

Diode Model



MA4AGBLP912 SPICE Model

$I_s = 1.0E-14$ A

$V_i = 0.0$ V

$wBv = 50$ V

$\mu_{e-} = 8600$ cm²/V-sec

$wPmax = 100$ mW

$W_i = 3.0$ μ m

$F_{fe} = 1.0$

$R_r = 10$ K Ohms

$C_{jmin} = 0.020$ pF

$\tau = 10$ nsec

$R_s(I) = R_c + R_j(I) = 0.10$ Ohm + $R_j(I)$

$C_{j0} = 0.022$ pF

$V_j = 1.35$ V

$M = 0.5$

$F_c = 0.5$

$I_{max} = 0.04$ A

$K_f = 0.0$

$A_f = 1.0$