

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

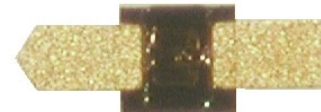
Description

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.



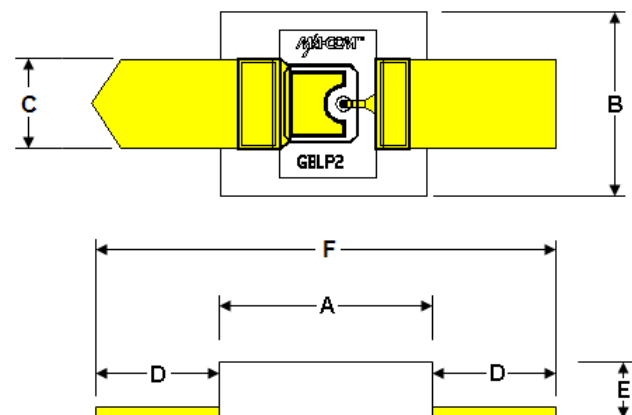
Topside



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

Ordering Information

Part Number	Package
MA4AGBLP912	Gel Pak

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.

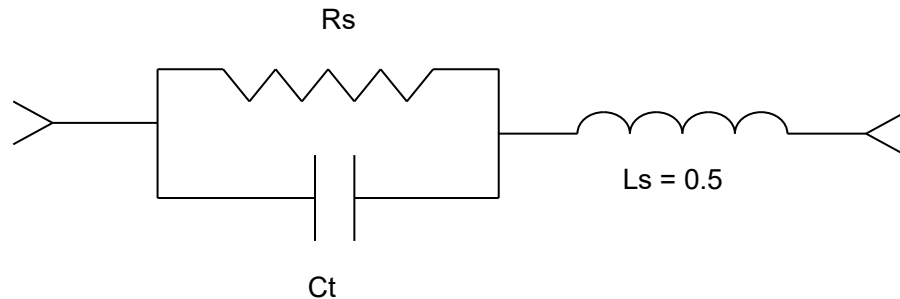
General Handling

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

$K_f = 0.0$

$A_f = 1.0$

MACOM Technology Solutions Inc. ("MACOM"). All rights reserved.

These materials are provided in connection with MACOM's products as a service to its customers and may be used for informational purposes only. Except as provided in its Terms and Conditions of Sale or any separate agreement, MACOM assumes no liability or responsibility whatsoever, including for (i) errors or omissions in these materials; (ii) failure to update these materials; or (iii) conflicts or incompatibilities arising from future changes to specifications and product descriptions, which MACOM may make at any time, without notice. These materials grant no license, express or implied, to any intellectual property rights.

THESE MATERIALS ARE PROVIDED "AS IS" WITH NO WARRANTY OR LIABILITY, EXPRESS OR IMPLIED, RELATING TO SALE AND/OR USE OF MACOM PRODUCTS INCLUDING FITNESS FOR A PARTICULAR PURPOSE, MERCHANTABILITY, INFRINGEMENT OF INTELLECTUAL PROPERTY RIGHT, ACCURACY OR COMPLETENESS, OR SPECIAL, INDIRECT, INCIDENTAL, OR CONSEQUENTIAL DAMAGES WHICH MAY RESULT FROM USE OF THESE MATERIALS.

MACOM products are not intended for use in medical, lifesaving or life sustaining applications. MACOM customers using or selling MACOM products for use in such applications do so at their own risk and agree to fully indemnify MACOM for any damages resulting from such improper use or sale.