GaAs Flip-Chip PIN Diodes

V 5.00

MA4GP907

Features

- Low Series Resistance, 4 Ω
- Ultra Low Capacitance, 25 fF
- High Switching Cutoff Frequency, 40 GHz
- 2 Nanosecond Switching Speed
- Can be Driven by Buffered TTL
- Silicon Nitride Passivation
- Polyimide Scratch Protection

Description

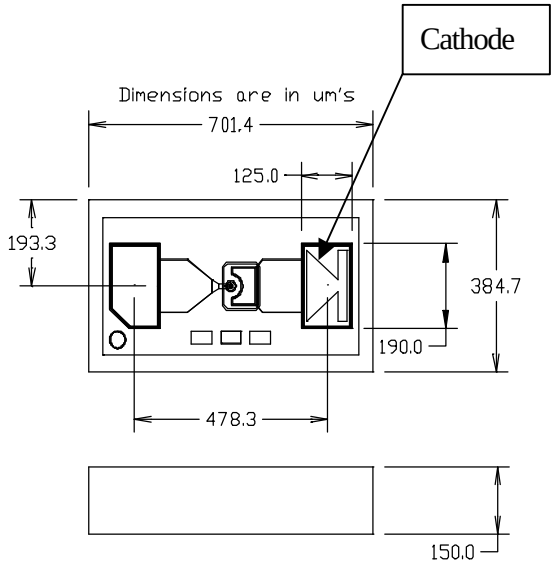
M/A-COM's MA4GP907 is a Gallium Arsenide Flip-Chip PIN diode.These devices are fabricated on OMCVD epitaxial wafers using a process designed for high device uniformity and extremely low parasitics. The diodes exhibit an extremely low RC Product, (0.1 ps) and 2 nS switching characteristics. They are fully passivated with silicon nitride and have an additional layer of a polymer for scratch protection.The protective coatings prevent damage to the junction and the anode airbridge during handling.

Applications

The 25 fF capacitance of the MA4GP907 allows use through mmwave switch and switched phase shifter applications. This diode is designed for use in pulsed or CW applications, where single digit nS switching speed is required. For surface mount assembly, the low capacitance of the MA4GP907 makes it ideal for use in microwave multithrow switch assemblies, where the series capacitance of each “off” port adversely loads the input and affects VSWR.

Package Outline

Top View Is Shown With Diode Junction Up



Ordering Information

Part Number	Packaging
MA4GP907	Die in Carrier
MA4GP907-T	Tape/Reel
MA4GP907-W	Wafer on Frame

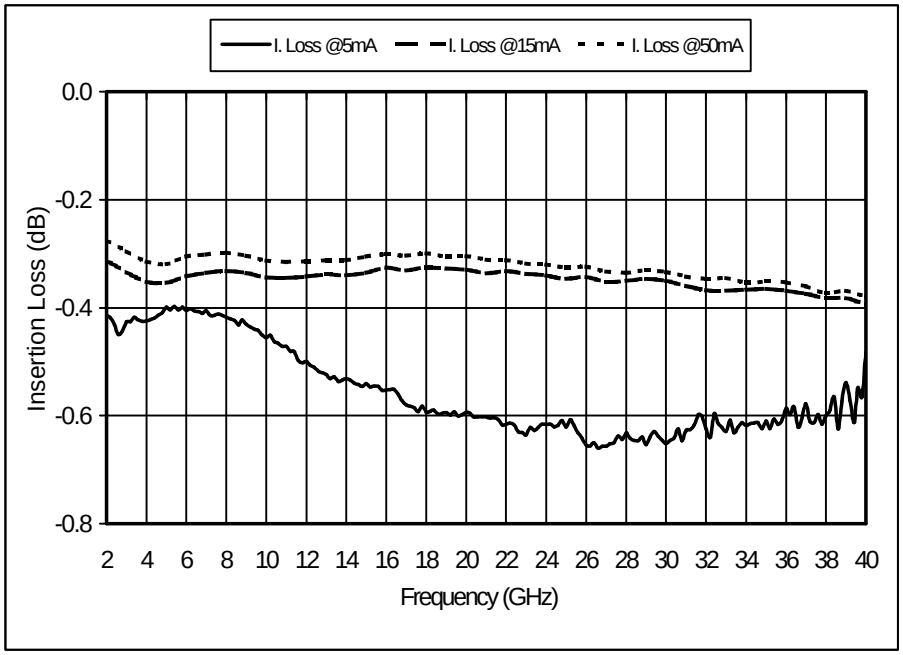
Electrical Specifications and RF Data @T_A = 25 °C

Parameters and Test Conditions	Symbol	Units	1 MHz & DC Specifications			10 GHz Reference Data [1,2]		
			Min.	Typ.	Max.	Min.	Typ.	Max.
Total Capacitance at -10 V	Ct	pF		0.025	0.030		0.025	
Forward Resistance at +10mA	Rs	Ohms					4.2	
Forward Voltage at +10mA	Vf	Volts		1.33	1.45			
Reverse Breakdown Voltage at -10uA[3]	Vb	Volts		-50	-45			
Switching Speed (10 to 90% RF Voltage)[4] & (90 to 10% RF Voltage)[4]	Trise Tfall	nS					2	

Notes:

1. Capacitance is determined by measuring Single Series Diode Isolation in a 50 ohm line at 10 GHz.
2. Forward Series Resistance is determined by measuring Single Series Diode Insertion Loss in a 50 ohm line at 10 GHz.
3. Reverse current will not exceed 10 microamperes at the Maximum Voltage Rating.
4. Switching speed is measured between 10% and 90% or 90% to 10% RF Voltage for a Single Series Mounted Diode. Driver delay is Not included.

Single Series Diode Insertion Loss vs Frequency



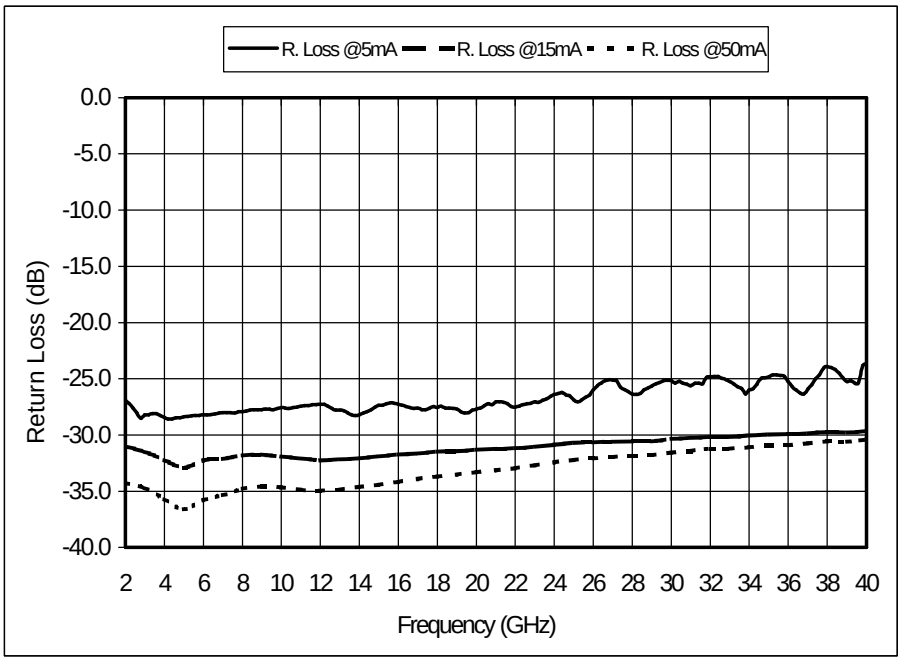
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Visit www.macom.com for additional data sheets and product information.

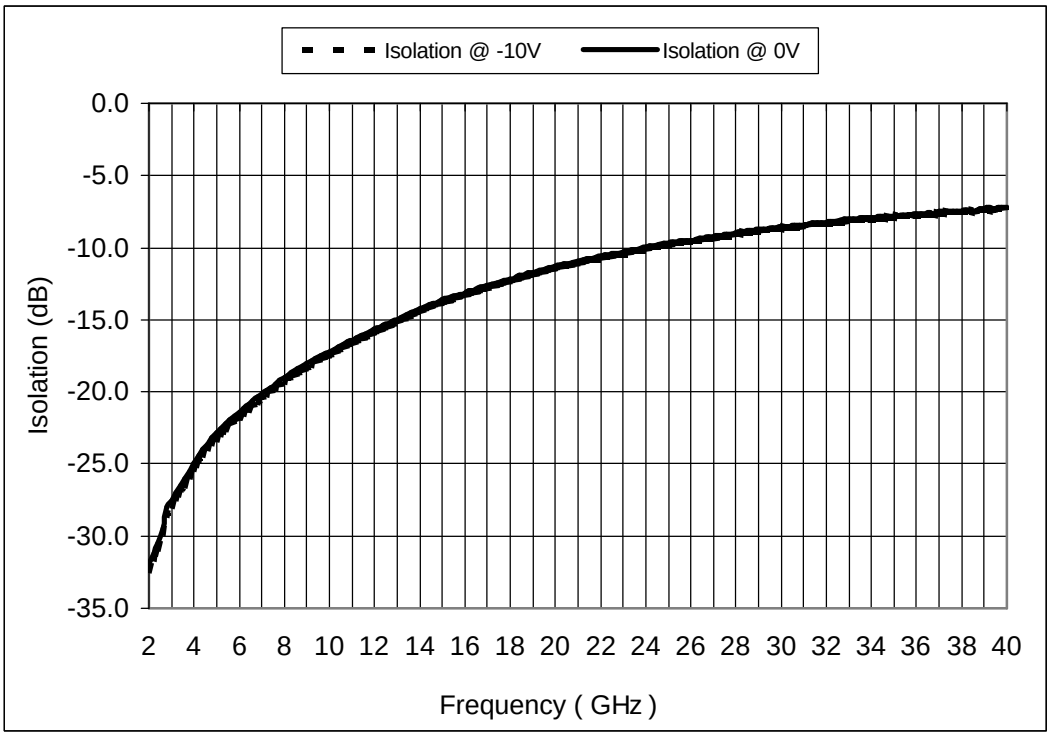
■ **North America:** Tel. (800) 366-2266
■ **Asia/Pacific:** Tel.+81-44-844-8296, Fax +81-44-844-8298
■ **Europe:** Tel. +44 (1344) 869 595, Fax+44 (1344) 300 020

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Single Series Diode Return Loss vs Frequency



Single Series Diode Isolation vs Frequency



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Device Installation Procedures

The following guidelines should be observed to avoid damaging GaAs Flip-Chips.

Cleanliness

These devices should be handled in a clean environment. Do Not attempt to clean die After installation.

Static Sensitivity

Gallium arsenide PIN diodes are ESD sensitive and can be damaged by static electricity. Proper ESD techniques should be used when handling these devices. These devices are rated Class 0, (0-199 V) per HBM MIL-STD-883, method 3015.7 [C = 100pF ±10%, R = 1.5kW ±1%]. Even though tested die pass 50V ESD, they must be handled in a static-free environment.

General Handling

These devices have a polymer layer which provides scratch protection for the junction area and the anode air bridge. Die can be handled with plastic tweezers or picked and placed with a #27 tip vacuum pencil.

Absolute Maximum Ratings[5]

Parameter	Maximum Ratings
Operating Temperature	-65 °C to +125 °C
Storage Temperature	-65 °C to +150 °C
Dissipated RF & DC Power	50 mW
RF C.W. Incident Power	+ 23 dBm C.W.
Mounting Temperature	+300 °C for 10 seconds

5. Exceeding any of these values may result in permanent damage

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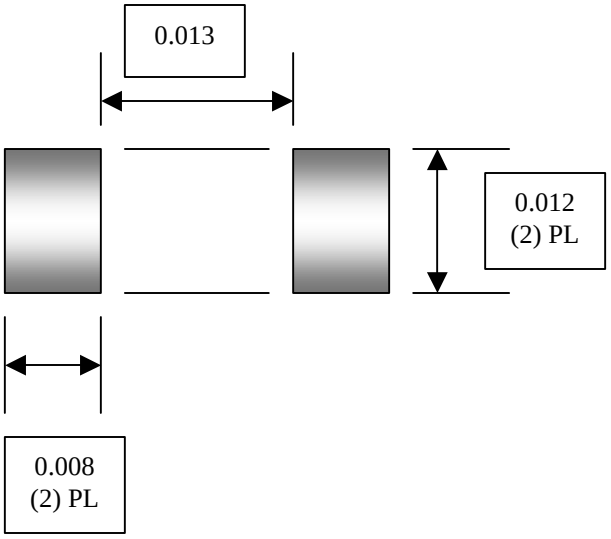
Part Number	Package
MA4GP907	Die in Carrier
MA4GP907-T	Tape and Reel
MA4GP907-W	Wafer on Frame

Assembly Requirements Using Electrically Conductive Ag Epoxy and Solder

These chips are designed to be inserted onto hard or soft substrates with the junction side down. They should be mounted onto silkscreened circuits using Electrically Conductive Ag Epoxy, approximately 1-2 mils in thickness and cured at approximately 90 °C to 150 °C per manufacturer's schedule. For extended cure times > 30 minutes, temperatures must be below 200 °C.

Sn Rich Solders are not recommended due to the Tungsten Metallization scheme beneath the gold contacts. Indalloy or 80 Au/20 Sn Solders are acceptable. Maximum soldering temperature must be < 300 °C for < 10 sec.

Circuit Mounting Dimensions (Inches)



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