

Rev. V4

#### **Features**

- Low Series Resistance
- Low Capacitance
- · High Cutoff Frequency
- Silicon Nitride Passivation
- Polvimide Scratch Protection
- Designed for Easy Circuit Insertion

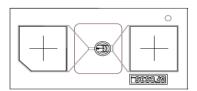
### **Description**

M/A-COM's MA4E1310 is a gallium arsenide flip chip Schottky barrier diode. This diode is fabricated on a OMCVD epitaxial wafer using a process designed for high device uniformity and extremely low parasitics. This device is fully passivated with silicon nitride and has an additional layer of polyimide for scratch protection. The protective coatings prevent damage to the junction during automated or manual handling. The flip chip configuration is suitable for pick and place insertion.

### **Applications**

The high cutoff frequency of this diode allows use through millimeter wave frequencies. Typical applications include single and double balanced mixers in PCN transceivers and radios, police radar detectors, automotive radar detectors, etc. This device can be used through 110 GHz.

#### Case Style ODS-1278



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# **MA4E1310**



## **GaAs Flip Chip Schottky Barrier Diode**

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## Electrical Specifications @ + 25 °C

| Parameters and Test Conditions                | Symbol | Units | MA4E1310 |      |      |
|---|--------|-------|----------|------|------|
|   |        |       | Min.     | Тур. | Max. |
| Junction Capacitance at 0V at 1 MHz           | Cj     | pF    |          | .010 |      |
| Total Capacitance at 0V at 1 MHz <sup>1</sup> | Ct     | pF    | .025     | .040 | .045 |
| Slope Resistance <sup>2</sup>                 | Rd     | Ohms  |          | 7    | 9    |
| Forward Voltage at 1mA                        | Vf1    | Volts | .60      | .70  | .80  |
| Reverse Breakdown Voltage at @ 10uA           | Vbr    | Volts | 4.5      | 7    |      |
| SSB Noise Figure ( Estimated )                | NF     | dB    |          | 6.5  |      |

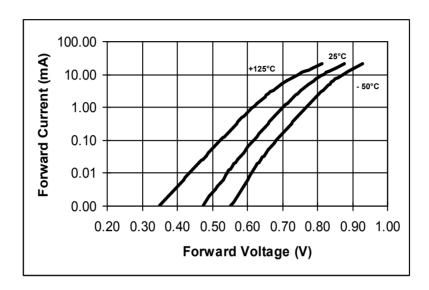
#### Notes:

- 1. Total capacitance is equivalent to the sum of junction capacitance Cj and parasitic capacitance Cp.
- 2. Slope Resistance = (Vf1 Vf2) / (10.5mA 9.5mA)



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## **Forward Current vs Temperature**



## Absolute Maximum Ratings <sup>1</sup>

| Parameter   | Absolute Maximum      |  |  |
|---|-----------------------|--|--|
| Operating Temperature                                       | -65 °C to +125 °C     |  |  |
| Storage Temperature   | -65 °C to +150 °C     |  |  |
| Incident LO Power   | +20 dBm               |  |  |
| Incident RF Power   | +20 dBm .             |  |  |
| Mounting Temperature  | +235°C for 10 seconds |  |  |
| Electrostatic Discharge ( ESD ) Classification <sup>2</sup> | Class 0               |  |  |

- 1. Operation of this device above any one of these parameters may cause permanent damage.
- 2. Human Body Model



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#### **Handling Procedures**

The following precautions should be observed to avoid damaging these chips:

**Cleanliness:** The chips should be handled in a clean environment.

Do not attempt to clean die after installation.

Static Sensitivity: Schottky barrier diodes are ESD sensitive and can be damaged by static

electricity. Proper ESD techniques should be used when handling these devices.

**General Handling:** The protective polymer coating on the active areas of these die provides scratch

protection, particularly for the metal air bridge which contacts the anode. Die can

be handled with tweezers or vacuum pickups and are suitable for use with

automatic pick-and-place equipment.

### **Mounting Techniques**

This device is designed to be inserted onto hard or soft substrates with the junction side down. It can be mounted with conductive epoxy or with a low temperature solder preform.

#### Solder Die Attach:

Solder which does not scavenge gold, such as Indalloy # 2, is recommended. Sn-Pb based solders are not recommended due to solder embrittlement. Do not expose die to a temperature greater than 235°C, or greater than 200°C for longer than 10 seconds. No more than three seconds of scrubbing should be required for attachment.

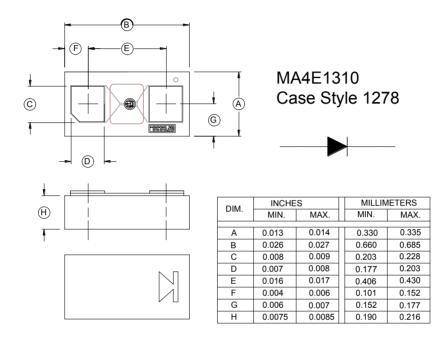
#### Epoxy Die Attach:

Assembly can be preheated to 125 - 150 C. Use a minimum amount of epoxy. Cure epoxy as per manufacturer's schedule. For extended cure times, temperatures should be kept below 200 C.



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### Flip Chip Outline Drawing



## **MA4E1310**



## **GaAs Flip Chip Schottky Barrier Diode**

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