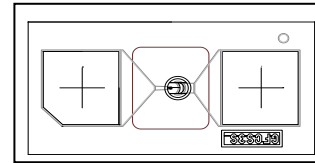


### Features

- Usable Past 80 GHz
- Low Series Resistance
- Low Capacitance
- High Cutoff Frequency
- Silicon Nitride Passivation
- Polyimide Scratch Protection
- Lead Free (RoHS Compliant)
- Designed for Easy Circuit Insertion
- Available in Pocket Tape and Reel
- Can be Mounted with Solder or Conductive Epoxy



MADS-001317- 1500

### Description and Applications

The MADS-001317-1500 single is a gallium arsenide flip chip Schottky barrier diode. This device is fabricated on OMCVD epitaxial material using a process designed for high device uniformity and extremely low parasitics. This diode is fully passivated with silicon nitride and has an additional layer of polyimide for scratch protection. The protective coating prevents damage to the junction during automated or manual handling. The flip chip configuration is suitable for pick and place insertion. This device with can be attached with solder or conductive epoxy. 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, and automotive radar detectors.

### Ordering Information

| Part Number        | Package            |
|--------------------|--------------------|
| MADS-001317-1500AG | 100 piece gel pack |
| MADS-001317-1500AP | 3000 piece reel    |

### Electrical Specifications @ + 25 °C

| Parameters                             | Test Conditions         | Units | Min.  | Typ.  | Max.  |
|--|-------------------------|-------|-------|-------|-------|
| Junction Capacitance ( $C_J$ )         | 0 V, 1 MHz              | pF    | —     | 0.020 | —     |
| Total Capacitance ( $C_T$ )            | 0 V, 1 MHz <sup>1</sup> | pF    | 0.030 | 0.045 | 0.060 |
| Dynamic Resistance ( $R_S$ )           | 9.5 - 10.5 mA           | Ohms  | —     | 4     | 7     |
| Forward Voltage ( $V_{F1}$ )           | 1 mA                    | Volts | 0.60  | 0.70  | 0.80  |
| Reverse Breakdown Voltage ( $V_{BR}$ ) | -10 $\mu$ A             | Volts | 4.5   | 7     | —     |

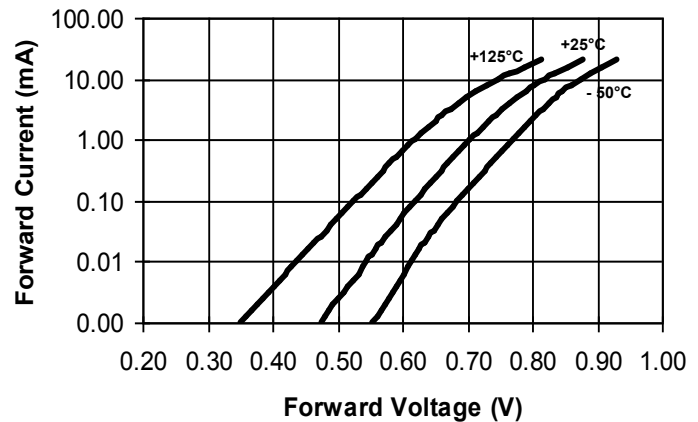
1. Total capacitance is equivalent to the sum of junction capacitance  $C_J$  and parasitic capacitance  $C_p$ .

### Absolute Maximum Ratings<sup>2</sup>

| Parameter                              | Absolute Maximum |
|--|------------------|
| Incident LO Power                      | +20 dBm          |
| Incident RF Power                      | +20 dBm          |
| Operating Temperature                  | -65°C to +125°C  |
| Storage Temperature                    | -65°C to +150°C  |
| Electrostatic Discharge Classification | Class 0, HBM     |

2. Operation of this device above any one of these parameters may cause permanent damage.

Forward Current vs. Temperature



### 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

Die attach for these devices is made simple through the use of surface mount die attach technology. This chip was designed to be inserted onto hard or soft substrates with the junction side down. This chip can be mounted with conductive epoxy or with solder.

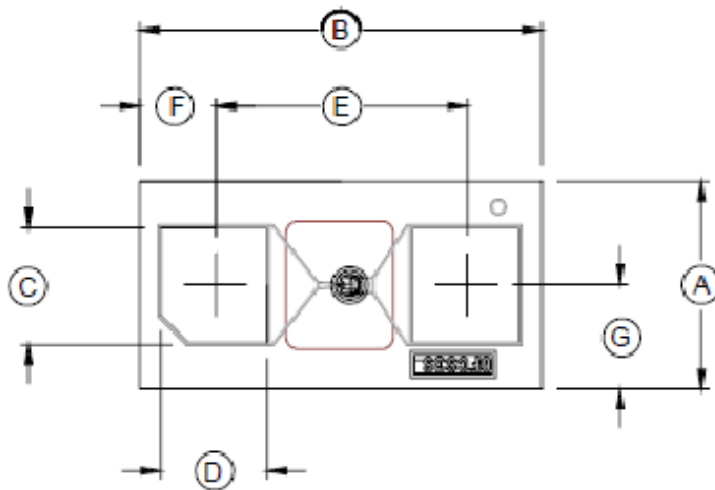
#### Solder Die Attach:

This device can be mounted with Sn63/Pb37 or RoHS compliant solder. Typical reflow profiles are provided on MACOM application note M538 "Surface Mounting Instructions" which can be found on the MACOM website.

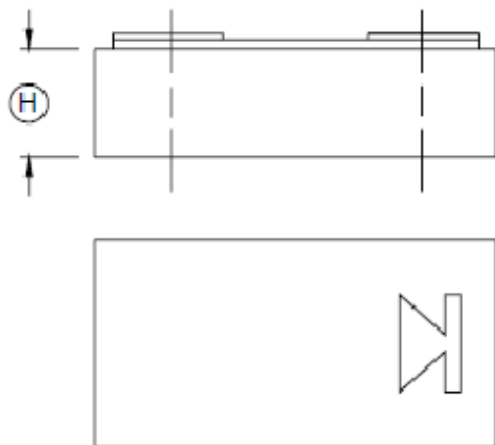
#### Epoxy Die Attach:

This device can also be attached with conductive epoxy. The assembly can be preheated to 125 - 150°C. Use a minimum amount of epoxy. Cure epoxy as per manufacturer's instructions.

### Flip Chip Outline Drawing



Case Style 1500



| DIM. | INCHES |        | MILLIMETERS |       |
|------|--------|--------|-------------|-------|
|      | MIN.   | MAX.   | MIN.        | MAX.  |
| A    | 0.015  | 0.017  | 0.381       | 0.431 |
| B    | 0.029  | 0.031  | 0.736       | 0.787 |
| C    | 0.008  | 0.009  | 0.203       | 0.228 |
| D    | 0.007  | 0.008  | 0.178       | 0.203 |
| E    | 0.016  | 0.017  | 0.406       | 0.431 |
| F    | 0.006  | 0.007  | 0.152       | 0.178 |
| G    | 0.0075 | 0.0085 | 0.190       | 0.216 |
| H    | 0.0075 | 0.0085 | 0.190       | 0.216 |

1. Pad finish is .2 microns of gold over 4 microns of nickel.

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