

Features

- Low Series Resistance
- Low Capacitance
- High Cut-Off Frequency
- Silicon Nitride Passivation
- Multiple Configurations

Description and Applications

The MA4E2037 single diode, MA4E2039 anti-parallel pair and MA4E2040 series tee are gallium arsenide beam lead Schottky barrier diodes. These devices are fabricated on OMCVD epitaxial wafers using a process designed for high device uniformity and extremely low parasitics. The high carrier mobility of gallium arsenide results in lower series resistance than a silicon Schottky with equivalent capacitance, resulting in lower noise figure and conversion loss. The diodes 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 air bridge during handling.

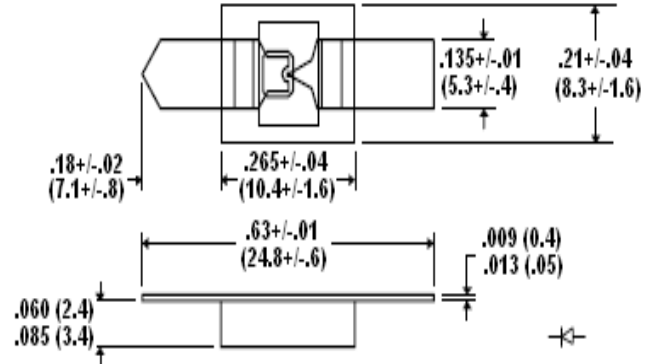
The high cut-off frequency of these diodes allows use through millimeter wave frequencies. Typical applications include single and double balanced mixers in PCN transceivers and radios, automotive radar systems and police radar detectors.

The MA4E2039 anti-parallel pair is designed for use in sub harmonically pumped mixers. Close matching of the diode characteristics in high LO suppression at the RF input.

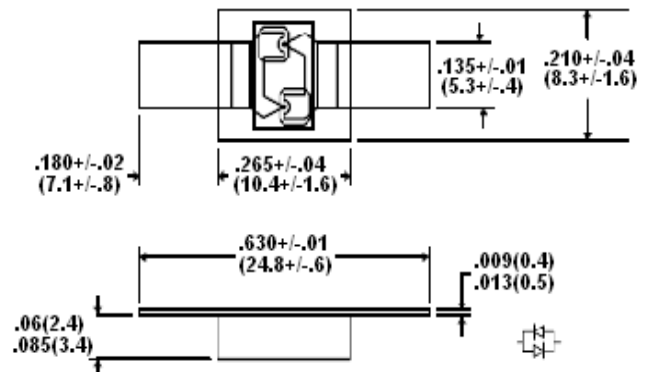
Ordering Information

Part Number	Package
MA4E2037	Gel Pack (100 piece per)
MA4E2039	Gel Pack (100 piece per)
MA4E2040	Gel Pack (100 piece per)

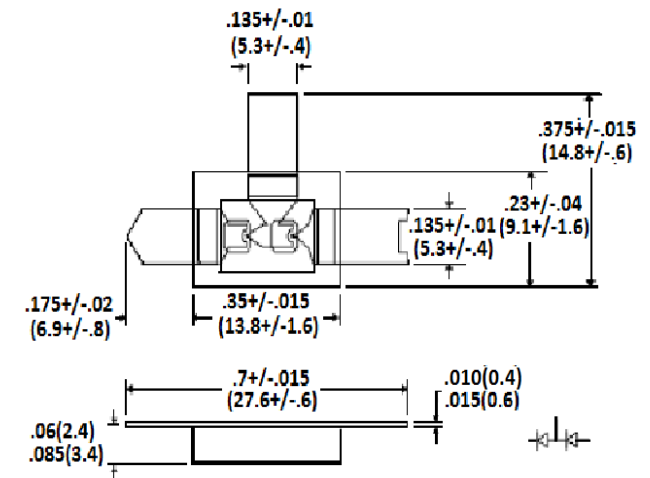
MA4E2037



MA4E2039



MA4E2040



Notes: (Unless otherwise specified)
 Dimensions are in mm (mils).
 Views are with junction side up.

Electrical Specifications: $T_A = +25^\circ\text{C}$ (measured as single diodes)

Parameter & Test Conditions	Units	Min.	Typ.	Max.
MA4E2037				
Junction Capacitance @ 0 V, 1 MHz	pF	—	0.020	—
Total Capacitance @ 0 V, 1 MHz ¹	pF	0.030	0.045	0.060
Junction Capacitance Difference	pF	—	—	—
Series Resistance @ +10 mA ²	Ω	—	4.0	7.0
Forward Voltage @ +1 mA	V	0.60	0.70	0.80
Forward Voltage Difference @ +1 mA	V	—	—	—
Reverse Voltage Breakdown @ -10 μA	V	4.5	7.0	—
MA4E2039				
Junction Capacitance @ 0 V, 1 MHz	pF	—	0.020	—
Total Capacitance @ 0 V, 1 MHz ¹	pF	0.030	0.045	0.060
Junction Capacitance Difference	pF	—	0.005	0.010
Series Resistance @ +10 mA ²	Ω	—	4.0	7.0
Forward Voltage @ +1 mA	V	0.60	0.70	0.80
Forward Voltage Difference @ +1 mA	V	—	0.005	0.010
Reverse Voltage Breakdown @ -10 μA	V	—	—	—
MA4E2040				
Junction Capacitance @ 0 V, 1 MHz ³	pF	—	0.020	—
Total Capacitance @ 0 V, 1 MHz ^{1,3}	pF	0.030	0.045	0.060
Junction Capacitance Difference	pF	—	0.005	0.010
Series Resistance @ +10 mA ²	Ω	—	4.0	7.0
Forward Voltage @ +1 mA	V	0.60	0.70	0.80
Forward Voltage Difference @ +1 mA	V	—	0.005	0.010
Reverse Voltage Breakdown @ -10 μA	V	4.5	7.0	—

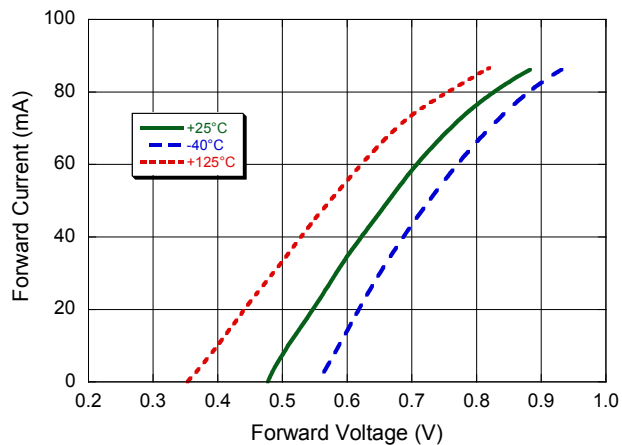
1. Total capacitance is equivalent to the sum of junction capacitance C_j and parasitic capacitance C_p .
2. Series resistance is determined by measuring the dynamic resistance and subtracting the junction resistance of 2.6 Ω .
3. Capacitance for the MA4E2039 and MA4E2040 is per Schottky diode.

Absolute Maximum Ratings^{4,5}

Parameter	Absolute Maximum
Incident Power (LO & RF)	20 dBm
Operating Temperature	-65°C to +125°C
Storage Temperature	-65°C to +150°C
Mounting Temperature	+235°C for 10 seconds

- Exceeding any one or combination of these limits may cause permanent damage to this device.
- MACOM does not recommend sustained operation near these survivability limits.

Forward Current vs. Temperature



Static Sensitivity

These electronic devices are sensitive to electrostatic discharge (ESD) and can be damaged by static electricity. Proper ESD control techniques should be used when handling these HBM Class 0 devices.

Handling Procedures

The protective polymer coating on the active areas of these die provides scratch protection, particularly for the metal air bridge which contacts the anode. Beam lead devices must, however, be handled with care since the leads may be easily distorted or broken by the normal pressures exerted when handled by tweezers. A vacuum pencil with a #27 tip is recommended for picking and placing.

Mounting Techniques

These devices are designed to be inserted onto hard or soft substrates. Recommended methods of attachment include thermo-compression bonding, parallel-gap welding, solder reflow and conductive epoxy. See application note M541:

“Bonding and Handling Procedures for Chip Diode Devices” for detailed instructions.

MACOM Technology Solutions Inc. All rights reserved.

Information in this document is provided in connection with MACOM Technology Solutions Inc ("MACOM") products. These materials are provided by MACOM as a service to its customers and may be used for informational purposes only. Except as provided in MACOM's Terms and Conditions of Sale for such products or in any separate agreement related to this document, MACOM assumes no liability whatsoever. MACOM assumes no responsibility for errors or omissions in these materials. MACOM may make changes to specifications and product descriptions at any time, without notice. MACOM makes no commitment to update the information and shall have no responsibility whatsoever for conflicts or incompatibilities arising from future changes to its specifications and product descriptions. No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted by this document.

THESE MATERIALS ARE PROVIDED "AS IS" WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESS OR IMPLIED, RELATING TO SALE AND/OR USE OF MACOM PRODUCTS INCLUDING LIABILITY OR WARRANTIES RELATING TO FITNESS FOR A PARTICULAR PURPOSE, CONSEQUENTIAL OR INCIDENTAL DAMAGES, MERCHANTABILITY, OR INFRINGEMENT OF ANY PATENT, COPYRIGHT OR OTHER INTELLECTUAL PROPERTY RIGHT. MACOM FURTHER DOES NOT WARRANT THE ACCURACY OR COMPLETENESS OF THE INFORMATION, TEXT, GRAPHICS OR OTHER ITEMS CONTAINED WITHIN THESE MATERIALS. MACOM SHALL NOT BE LIABLE FOR ANY SPECIAL, INDIRECT, INCIDENTAL, OR CONSEQUENTIAL DAMAGES, INCLUDING WITHOUT LIMITATION, LOST REVENUES OR LOST PROFITS, WHICH MAY RESULT FROM THE 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.

Mouser Electronics

Authorized Distributor

Click to View Pricing, Inventory, Delivery & Lifecycle Information:

[MACOM:](#)

[MA4E2039](#) [MA4E2040](#)