

Solderable GaAs Constant Gamma Flip-Chip Varactor Diode

Rev. V2

Features

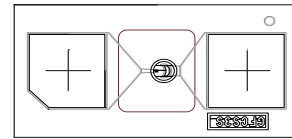
- Constant Gamma for Linear Tuning
- Low Parasitic Capacitance
- High Q
- Silicon Nitride Passivation
- Polyimide Scratch Protection
- Surface Mount Configuration
- Lead Free (RoHS Compliant*)
- Available in Pocket Tape and Reel
- Can withstand 500 Temperature Cycles (-65°C to +150°C), mounted with Sn96.5/Pb3.5 solder without Mechanical Degradation
- Can be Mounted with Solder or Conductive Epoxy

Description

The MAVR-011020-1411 is a gallium arsenide flip chip hyperabrupt varactor diode. This device is fabricated on OMCVD epitaxial wafers 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 coatings prevent damage to the junction during automated or manual handling.

The flip chip configuration is suitable for pick and place insertion.

Flip-Chip Design



Front View (Circuit Side)



Back View (Operator Side)

Ordering Information^{1,2}

Part Number	Package
MAVR-011020-14110P	Pocket Tape
MAVR-011020-14110G	Gel Pack

1. Reference Application Note M513 for reel size information.
2. All sample boards include x loose parts.

Electrical Specifications: $T_A = +25^\circ\text{C}$

Breakdown Voltage @ $I_R = 10 \mu\text{A}$, $V_B = 22 \text{ V}$ Minimum

Reverse Leakage Current @ $V_R = 18 \text{ V}$, $I_R = 100 \text{ nA}$ Maximum

Forward Voltage @ $1 \text{ mA} = 1.15 - 1.25 \text{ V}$

Parameter	Test Conditions	Units	Min.	Typ.	Max.
Total Capacitance	1 MHz, 0 V	pF	0.19	—	0.275
	1 MHz, 4 V		0.065		0.097
	1 MHz, 15 V		0.025		0.048
Q Factor	50 MHz, 4 V	—	—	3000	—
Gamma	2 - 12 V	—	—	0.9	1.1

* Restrictions on Hazardous Substances, European Union Directive 2011/65/EU.

1

MACOM Technology Solutions Inc. (MACOM) and its affiliates reserve the right to make changes to the product(s) or information contained herein without notice. Visit www.macom.com for additional data sheets and product information.

For further information and support please visit:
<https://www.macom.com/support>

DC-0010595

Solderable GaAs Constant Gamma Flip-Chip Varactor Diode

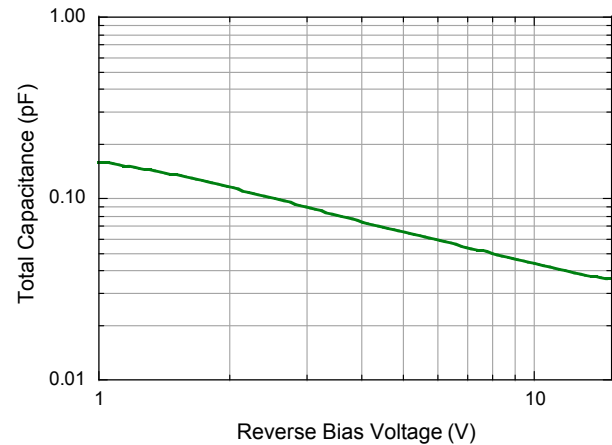
Rev. V2

Absolute Maximum Ratings^{3,4}

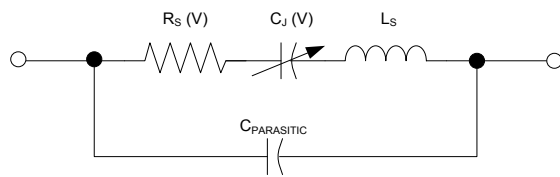
Parameter	Absolute Maximum
Power Dissipation	100 mW
Mounting Temperature	+260°C
Operating Temperature	-40°C to +125°C
Storage Temperature	-65°C to +150°C

- 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.

Performance Curve @ +25°C



Schematic (equivalent circuit)



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 application note M538, "Surface Mounting Instructions" which can be found @ www.macom.com

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.

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.

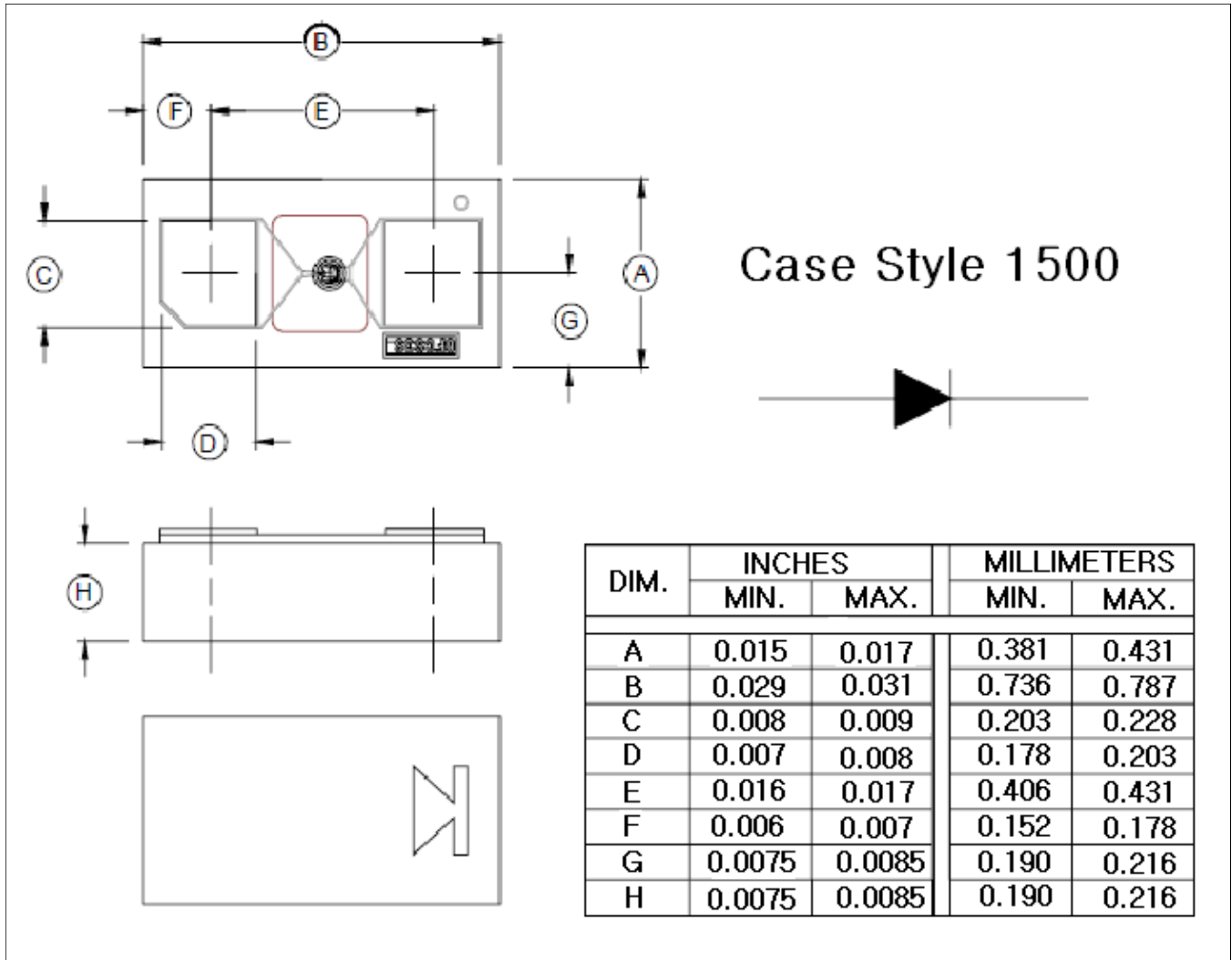
Static Sensitivity

Semiconductor devices 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.

Flip Chip Outline Drawing (Case Style 1500)



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.