

**Solderable GaAs Constant Gamma Flip-Chip  
Varactor Diode**

V3

**Features**

- Usable Past 70GHz
- 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 Deg.C. to +150 Deg.C), mounted with 96.5Sn/3.5Ag solder without Mechanical Degradation.
- Can be Mounted with Solder or Conductive Epoxy.

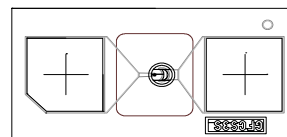
**Absolute Maximum Ratings**<sup>1,2</sup>

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

1. Exceeding any one or combination of these limits may cause permanent damage to this device.
2. M/A-COM does not recommend sustained operation near these survivability limits.

**Description**

M/A-COM Technology Solutions' MAVR-000120-1411 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.

**Chip Layout****Front View (Circuit Side)****Back View (Operator Side)****Ordering Information**

Part Number	Package
MAVR-000120-14110P	Pocket Tape
MAVR-000120-14110G	Gel Pack

1

**ADVANCED:** Data Sheets contain information regarding a product M/A-COM Technology Solutions is considering for development. Performance is based on target specifications, simulated results, and/or prototype measurements. Commitment to develop is not guaranteed.

**PRELIMINARY:** Data Sheets contain information regarding a product M/A-COM Technology Solutions has under development. Performance is based on engineering tests. Specifications are typical. Mechanical outline has been fixed. Engineering samples and/or test data may be available. Commitment to produce in volume is not guaranteed.

• **North America** Tel: 800.366.2266 • **Europe** Tel: +353.21.244.6400  
 • **India** Tel: +91.80.43537383 • **China** Tel: +86.21.2407.1588

Visit [www.macomtech.com](http://www.macomtech.com) for additional data sheets and product information.

M/A-COM Technology Solutions Inc. and its affiliates reserve the right to make changes to the product(s) or information contained herein without notice.

## Solderable GaAs Constant Gamma Flip-Chip Varactor Diode

V3

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

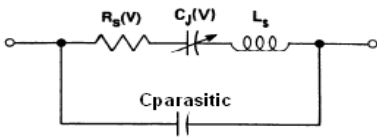
Breakdown Voltage @  $I_R = 10\text{mA}$ ,  $V_b = 20\text{V}$  Minimum

Reverse Leakage Current @  $V_R = 14\text{V}$ ,  $I_R = 100\text{nA}$  Maximum

Part Number	Ct (pF)			Ct (pF)			Ct (pF)			Q Factor (pF)			Gamma (pF)		
	f=1MHZ, $V_R = 0\text{V}$			f=1MHZ, $V_R = 4\text{V}$			f=1MHZ, $V_R = 10\text{V}$			f=50MHZ, $V_R = 4\text{V}$			$V_R = 2\text{-}12\text{V}$		
	Min.	Typ.	Max.	Min.	Typ.	Max.	Min.	Typ.	Max.	Min.	Typ.	Max.	Min.	Typ.	Max.
MAVR-000120-1141		1.1		0.30		0.40	0.14		0.20	3000			0.9		1.1

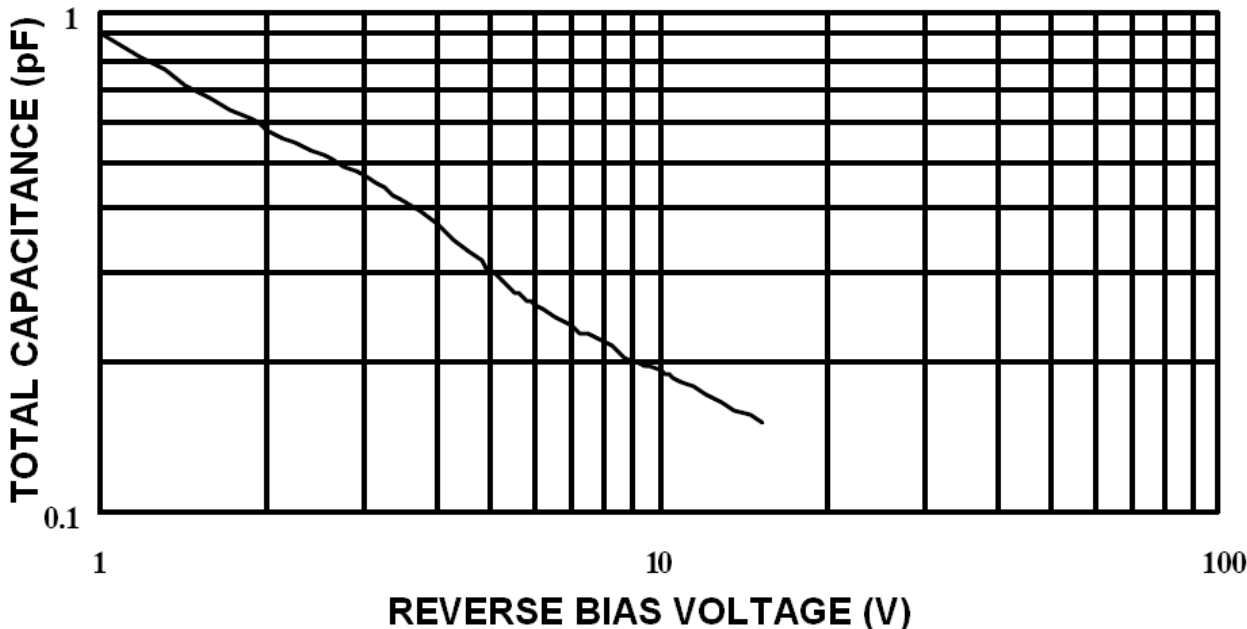
### Schematic

FLIPCHIP TUNING VARACTOR EQUIVALENT CIRCUIT



### TYPICAL PERFORMANCE CURVE @ $+25^\circ\text{C}$

CAPACITANCE VS VOLTAGE  
GAMMA = 1.00 +/- 10% FROM 2 to 12 Volts



\* Specifications are subject to change without prior notification

**ADVANCED:** Data Sheets contain information regarding a product M/A-COM Technology Solutions is considering for development. Performance is based on target specifications, simulated results, and/or prototype measurements. Commitment to develop is not guaranteed.

**PRELIMINARY:** Data Sheets contain information regarding a product M/A-COM Technology Solutions has under development. Performance is based on engineering tests. Specifications are typical. Mechanical outline has been fixed. Engineering samples and/or test data may be available. Commitment to produce in volume is not guaranteed.

• North America Tel: 800.366.2266 • Europe Tel: +353.21.244.6400

• India Tel: +91.80.43537383 • China Tel: +86.21.2407.1588

Visit [www.macomtech.com](http://www.macomtech.com) for additional data sheets and product information.

M/A-COM Technology Solutions Inc. and its affiliates reserve the right to make changes to the product(s) or information contained herein without notice.

**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 M/A-Com application note M538, "Surface Mounting Instructions" which can be found @ [www.macomtech.com](http://www.macomtech.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**

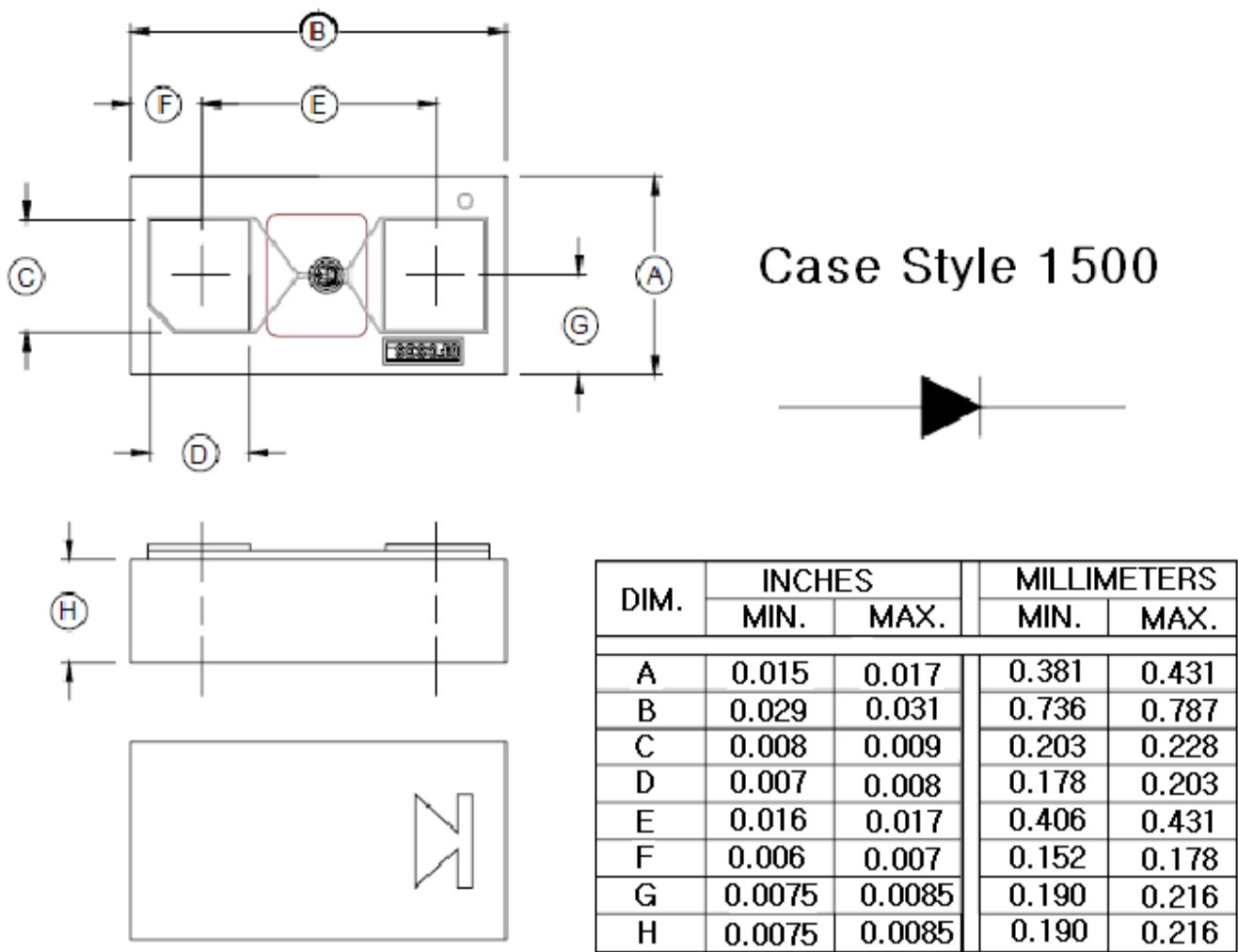
The following precautions should be observed to avoid damaging these chips:

- 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.

Solderable GaAs Constant Gamma Flip-Chip  
Varactor Diode

V3

Flip Chip Outline Drawing



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