MA46H120 Series

GaAs Constant Gamma Flip-Chip Varactor Diode

Features
· Constant Gamma for Linear Tuning
· Low Parasitic Capacitance
· High Q
· Silicon Nitride Passivation
· Polyimide Scratch Protection
· Surface Mount Configuration

Description
M/A-COM’s MA46H120 series is a gallium arsenide flip chip hyperabrupt varactor diode. These devices are fabricated on OMCVD epitaxial wafers using a process designed for high device uniformity and extremely low parasitics. The MA46H120 diodes are fully passivated with silicon nitride and have 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.

Ordering Information

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Package</th>
</tr>
</thead>
<tbody>
<tr>
<td>MA46H120-W</td>
<td>Whole Wafer</td>
</tr>
<tr>
<td>MA46H120</td>
<td>Gel Pack</td>
</tr>
<tr>
<td>MAVR-000120-12030W</td>
<td>Waffle Pack</td>
</tr>
</tbody>
</table>

Absolute Maximum Ratings

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating Temperature</td>
<td>-40°C to +125°C</td>
</tr>
<tr>
<td>Storage Temperature</td>
<td>-65°C to +150°C</td>
</tr>
<tr>
<td>Power Dissipation</td>
<td>100 mW</td>
</tr>
<tr>
<td>Mounting Temperature</td>
<td>+235°C for 10 seconds</td>
</tr>
</tbody>
</table>

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.

Chip Layout

Front View (Circuit Side)

Back View (Operator Side)

Schematic

FLIP CHIP TUNING VARACTOR EQUIVALENT CIRCUIT

Electrical Specifications @ \( T_A = +25 ^\circ C \)

Breakdown Voltage @ \( I_R = 10 \mu A, V_R = 20 V \) Minimum
Reverse Leakage Current @ \( V_R = 14V, I_R = 100 nA \) Maximum

<table>
<thead>
<tr>
<th></th>
<th>( C_T ) (pF)</th>
<th>( C_T ) (pF)</th>
<th>( C_T ) (pF)</th>
<th>( Q ) Factor</th>
<th>( \Gamma )</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>f=1MHz, ( V_R =0V )</td>
<td>f=1MHz, ( V_R =4V )</td>
<td>f=1MHz, ( V_R =10V )</td>
<td>f=50MHz, ( V_R =4V )</td>
<td>( V_R =2-12V )</td>
</tr>
<tr>
<td></td>
<td>Min</td>
<td>Typ</td>
<td>Max</td>
<td>Min</td>
<td>Typ</td>
</tr>
<tr>
<td>MA46H120</td>
<td>1.1</td>
<td>0.30</td>
<td>0.40</td>
<td>0.14</td>
<td>0.20</td>
</tr>
</tbody>
</table>

* Specifications are subject to change without prior notification
MA46H120 Series

GaAs Constant Gamma Flip-Chip Varactor Diode

Rev. V2

TYPICAL PERFORMANCE CURVES @ +25 °C

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

CHIP OUTLINE DRAWING

(ODS-1203)

* Specifications are subject to change without prior notification
Mounting Techniques
These chips were designed to be inserted onto hard or soft substrates with the junction side down. They can be mounted with conductive epoxy or with a low temperature solder preform. The die can also be assembled with the junction side up, and wire or ribbon bonds made to the pads.

Solder Die Attachment
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 dice to a temperature greater than 235°C, or greater than 200°C for longer than 10 seconds. No more than three seconds of scrub should be required for attachment.

Epoxy Die Attachment
Assembly can be preheated to 125 - 150°C. Use a minimum amount of epoxy. Cure epoxy per manufacturer’s schedule. For extended cure times, temperatures must be kept below 200°C.

Handling Procedures
The following precautions should be observed to avoid damaging GaAs Flip-Chips:

Cleanliness
These chips should be handled in a clean environment. Do not attempt to clean die after installation.

Static Sensitivity
Varactor diodes are ESD sensitive and can be damaged by static electricity. Proper ESD techniques should be followed to when handling these devices.

General Handling
The protective polymer coating on the active areas of these dice provides scratch protection, particularly for the metal airbridge which contacts the anode. Dice can be handled with tweezers or vacuum pickups and are suitable for use with automatic pick-and-place equipment.

* Specifications are subject to change without prior notification
GaAs Constant Gamma Flip-Chip Varactor Diode

M/A-COM Technology Solutions Inc. All rights reserved.

Information in this document is provided in connection with M/A-COM 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 estoppelet 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.