MA46H120 Series

GaAs Constant Gamma Flip-Chip Varactor Diode

Rev. V3

Features

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

Description

M/A-COM Technology Solutions' 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.

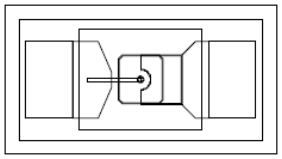
Absolute Maximum Ratings [1,2]

Operating Temperature	-40°C to +125°C
Storage Temperature	-65°C to +150°C
Power Dissipation	100 mW
Mounting Temperature	+235°C for 10 seconds

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)

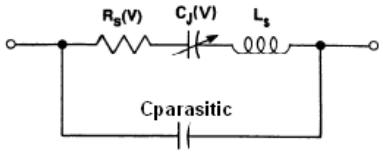


Ordering Information

Part Number	Package
MA46H120-W	Whole Wafer
MA46H120	Gel Pack
MAVR-000120-12030W	Waffle Pack

Schematic

FLIPCHIP TUNING VARACTOR EQUIVALENT CIRCUIT



Electrical Specifications @ T_A = +25 °C

Breakdown Voltage @ I_R = 10μA, V_b = 20 V Minimum
Reverse Leakage Current @ V_R =14V, I_R = 100 nA Maximum

	C_T (pF) f=1MHz, V_R=0V			C_T (pF) f=1MHz, V_R=4V			C_T (pF) f=1MHz, V_R=10V			Q Factor f=50MHz, V_R=4V			Gamma V_R=2-12V		
	Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	Min	Typ	Max
MA46H120		1.1		0.30		0.40	0.14		0.20	3000			0.9		1.1

* Specifications are subject to change without prior notification

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PRELIMINARY: Data Sheets contain information regarding a product MA-COM Technical 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.

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- **Europe** Tel: 44.1908.574.200 / Fax: 44.1908.574.300
- **Asia/Pacific** Tel: 81.44.844.8296 / Fax: 81.44.844.8298

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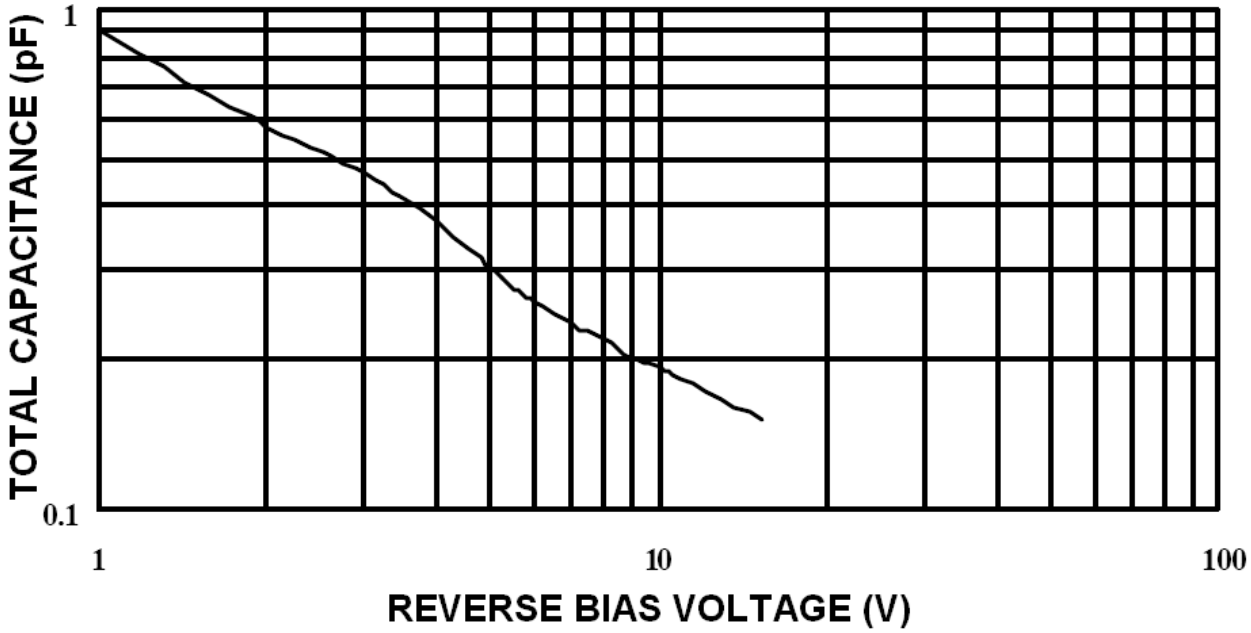
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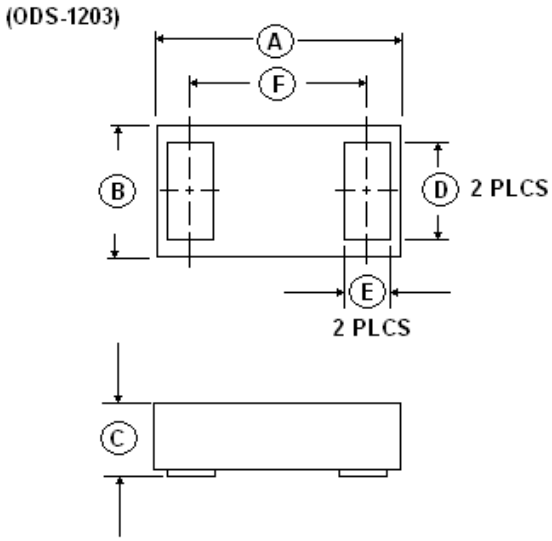
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TYPICAL PERFORMANCE CURVES @ +25 °C

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



CHIP OUTLINE DRAWING



Dimen-sions	INCHES		MM	
	MIN	MAX	MIN	MAX
A	0.025	0.027	0.635	0.686
B	0.012	0.015	0.305	0.381
C	0.006	0.008	0.152	0.203
D	0.007	0.009	0.178	0.229
E	0.004	0.006	0.102	0.152
F	0.018	0.020	0.457	0.508

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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 die 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.

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