MA4FCP305

Flip Chip PIN Diode
RoHS Compliant

Rev. V4

Features

- Low Series Resistance : 1.7Ω
- Low Capacitance : 50fF
- Fast Switching Speed : 20nS
- Silicon Nitride Passivation
- Polyimide Scratch Protection
- Designed for Automated Pick and Place Insertion
- Rugged by Design

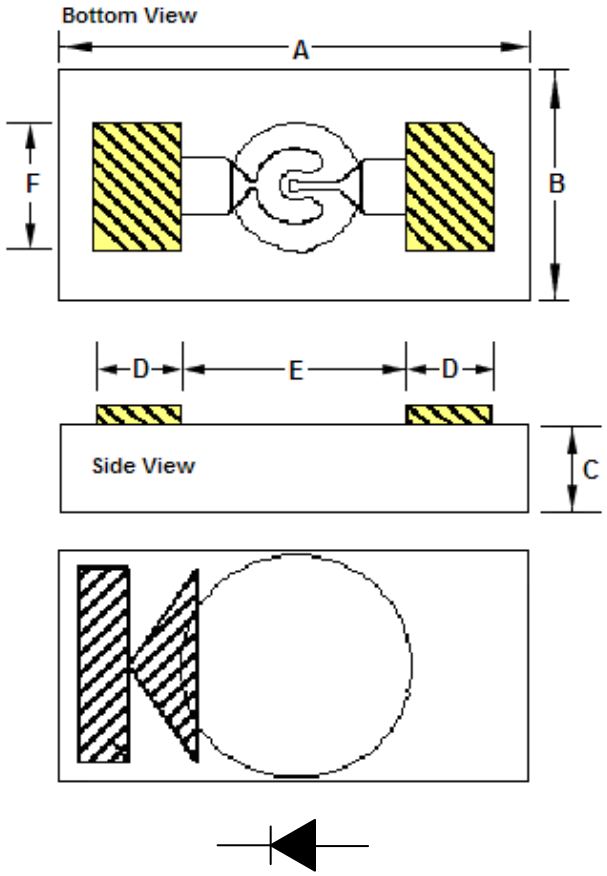
Description

M/A-COM's MA4FCP Series consists of Silicon Flip Chip PIN diodes fabricated with M/A-COM's patented HMIC process. This diode is fabricated on epitaxial wafers using a process designed for repeatable electrical characteristics and extremely low parasitics. This diode is fully passivated with Silicon Nitride and has an additional layer of Polyimide for scratch protection. These protective coatings prevent damage to the junction during automated or manual handling. This flip chip configuration is suitable for pick and place insertion.

Applications

The small 0315 outline and low 0.085 pS RC product, make the device useful for multi-throw switch and switched phase shifter circuits requiring <20nS switching speeds up to 18GHz operating frequency.

1269 Outline



Absolute Maximum Ratings

@ TA = +25°C (unless otherwise specified)

Parameter	Absolute Maximum
Forward Current	100 mA
Reverse Voltage	- 40 V
Operating Temperature	- 55°C to + 150°C
Storage Temperature	- 55°C to + 150°C
Dissipated Power	230 mW
Mounting Temperature	+300°C for 10 seconds

1. Exceeding these limits may cause permanent damage.

Dim.	Inches		Millimeters	
	Min.	Max.	Min.	Max.
A	0.0269	0.0289	0.683	0.733
B	0.0135	0.0155	0.343	0.393
C	0.0040	0.0080	0.102	0.203
D	0.0041	0.0061	0.105	0.155
E	0.0124	0.0144	0.315	0.365
F	0.0069	0.0089	0.175	0.225

1. Backside metal: 0.1 μM thick.
2. Yellow hatched areas indicate backside ohmic gold contacts.

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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.

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- **Europe** Tel: 44.1908.574.200 / Fax: 44.1908.574.300
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Electrical Specifications @ + 25 °C

Parameters @ Conditions	Symbol	Units	Min.	Typ.	Max.
Total Capacitance @ -10V, 1MHz[1]	C_T	pF		0.060	
Total Capacitance @ -10V, 1GHz[1,3]	C_T	pF		0.050	
Series Resistance @ +50mA[2,3], 100MHz	R_S	Ω		1.7	
Series Resistance @ +50mA[2,3], 1GHz	R_S	Ω		2.1	
Forward Voltage @ +100mA	V_F	V		1.05	1.25
Reverse Voltage @ -10mA	V_R	V	-40	-50	
Reverse Current @ -40V	I_R	mA			10
50 – 90 % Lifetime @ + 10mA / - 6mA	TL	ns		25	
Steady State Thermal Resistance[4]	θ	° C/W		640	

1. Total capacitance is equivalent to the sum of junction capacitance Cj and parasitic capacitance, Cp.
2. Series resistance R_S is equivalent to the total diode series resistance including the junction resistance Rj.
3. Rs and Cp measured on an HP4291A with die mounted in an ODS-186 package.
4. Steady-state Thermal Resistance measured with die mounted in an ODS-186 package.

ESD

These devices very susceptible to ESD and are rated Class 0 (0-199V) per HBM MIL-STD-883, method 3015.7 [C = 100pF ±10%, R = 1.5kW ±1%]. Even though tested die pass 100V ESD, they must be handled in a static-free environment.

Specifications Subject to Change Without Notice.

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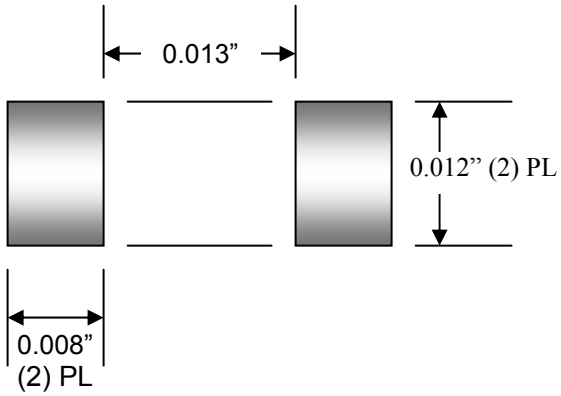
Handling Procedures

All semiconductor chips should be handled with care to avoid damage or contamination from perspiration and skin oils. The use of plastic tipped tweezers or vacuum pickups is strongly recommended for individual components. Bulk handling should insure that abrasion and mechanical shock are minimized.

Bonding Techniques

These devices were designed for insertion onto hard or soft substrates with the junction side down. They can be mounted with electrically conductive epoxy or with a low temperature solder preform. However, Sn rich solders are not recommended due to the tungsten metallization scheme beneath the gold contacts. Indalloy or 80/20, Au/Sn, solders are acceptable. Maximum soldering temperature must be < 300°C for < 10 sec. These chips are designed to be inserted onto hard or soft substrates with the junction side down. They should be mounted onto silkscreened circuits using electrically conductive Ag epoxy, approximately 1-2 mils in thickness and cured at approximately 90°C to 150°C per manufacturer's schedule. For extended cure times, > 30 minutes, temperatures must be below 200 °C. The die can also be assembled with the junction side up, and wire or ribbon bonds made to the pads.

Circuit Mounting Dimensions (Inches)



Ordering Information

The MA4FCP305 flip chip diode may be ordered in either waffle packs, tape and reel or 6” rings mounted on tape per the table below. Tape and reel dimensions are provided in Application Note M513 located on the M/A-COM website @ www.macom.com.

Part Number	Packaging
MA4FCP305	Die in Waffle Pack
MADP-007161-01269T	Tape & Reel
MADP-000305-12690R	Wafer on Tape Frame

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