

## Silicon Flip Chip PIN Diode

Rev. V6

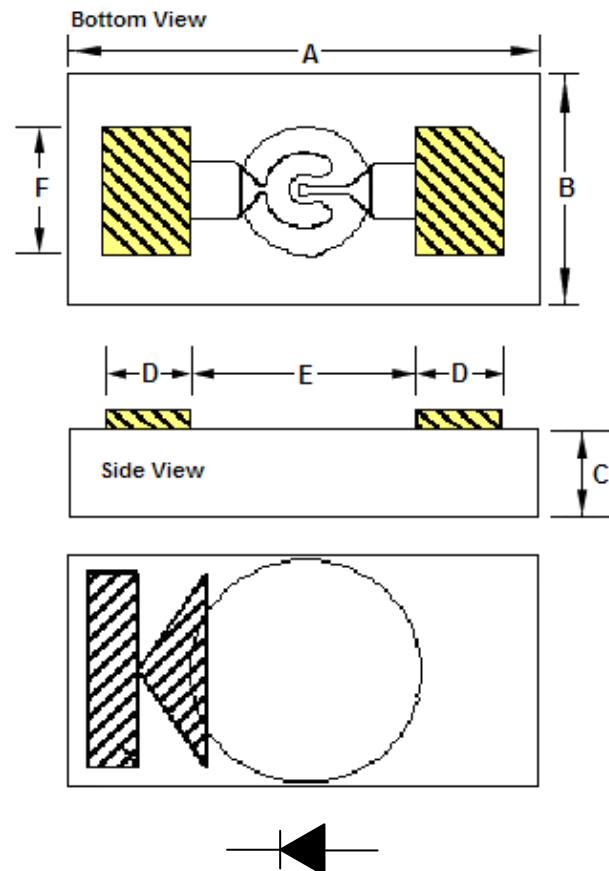
### Features

- 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 Design
- RoHS Compliant

### Description

The MA4FCP305 is a silicon flip chip PIN diode fabricated using MACOM's HMIC process. The epitaxial wafers used to fabricate this flip chip are designed for repeatable electrical characteristics and extremely low parasitics. The diode is fully passivated with silicon nitride and also has an additional layer of polyimide for scratch protection. These protective coatings prevent damage to the junction area during manual or automated handling making it suitable for pick and place insertion.

### 1269 Package Outline



### Absolute Maximum Ratings

@  $T_{AMB} = +25^{\circ}\text{C}$  (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 any of 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. Yellow hatched areas indicate backside ohmic gold contacts.
2. Total backside metal thickness 0.1 μm.

### Electrical Specifications @ + 25 °C

Parameters @ Conditions	Symbol	Units	Min.	Typ.	Max.
Total Capacitance @ -10V, 1MHz <sup>1</sup>	C <sub>T</sub>	pF		0.060	
Total Capacitance @ -10V, 1GHz <sup>1,3</sup>	C <sub>T</sub>	pF		0.050	
Series Resistance @ +50mA <sup>2,3</sup> , 100MHz	R <sub>S</sub>	Ω		1.7	
Series Resistance @ +50mA <sup>2,3</sup> , 1GHz	R <sub>S</sub>	Ω		2.1	
Forward Voltage @ +100mA	V <sub>F</sub>	V		1.05	1.25
Reverse Voltage @ -10μA	V <sub>R</sub>	V	-40	-50	
Reverse Current @ -40V	I <sub>R</sub>	μA			-10
50 – 90 % Lifetime @ + 10mA / - 6mA	T <sub>L</sub>	ns		25	
Steady State Thermal Resistance <sup>4</sup>	θ	° C/W		640	

1. Total capacitance is equivalent to the sum of junction capacitance C<sub>j</sub> and parasitic capacitance, C<sub>p</sub>.
2. Series resistance R<sub>S</sub> is equivalent to the total diode series resistance including the junction resistance R<sub>j</sub>.
3. R<sub>s</sub> and C<sub>p</sub> 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), HBM, per MIL-STD-883, method 3015.7 Although the die are rated Class 0, they must be handled in a dust free, anti-static environment.

Specifications Subject to Change Without Notice.

### Handling Procedures

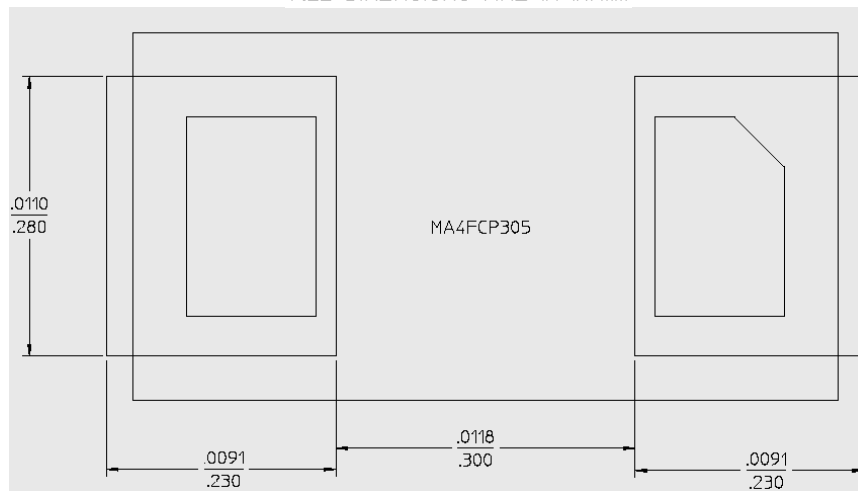
All semiconductor chips should be handled with care to avoid damage or contamination from perspiration and skin oils. The use of plastic tipped tweezers or vacuum pickups is strongly recommended for individual components. Bulk handling should ensure that abrasion and mechanical shock are minimized.

### Bonding Techniques

The MA4FCP305 is designed for insertion onto hard or soft substrates with the junction (gold pad) side down. They can be mounted with electrically conductive epoxy or with a low temperature solder preform. However, tin rich solders will scavenge the gold on the surface of the pad or cause gold embrittlement and are not recommended. Indalloy or 80Au/20Sn, solders should be used instead. Maximum soldering temperature must be < 300°C for < 10 seconds. It is recommended that the chips 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 or contact side up, and wire or ribbon bonds made to the pads.

### PCB Footprint

ALL DIMENSIONS ARE IN in/mm



Part Number	Packaging
MA4FCP305	Die in Waffle Pack
MADP-007161-01269T	Tape & Reel

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