

### Features

- Low Series Resistance: 2.6  $\Omega$
- Low Capacitance: 40 fF
- Fast Switching Speed: 40 ns
- Silicon Nitride Passivation
- Polyimide Scratch Protection
- Designed for Automated Pick and Place Insertion
- Rugged Design
- RoHS Compliant

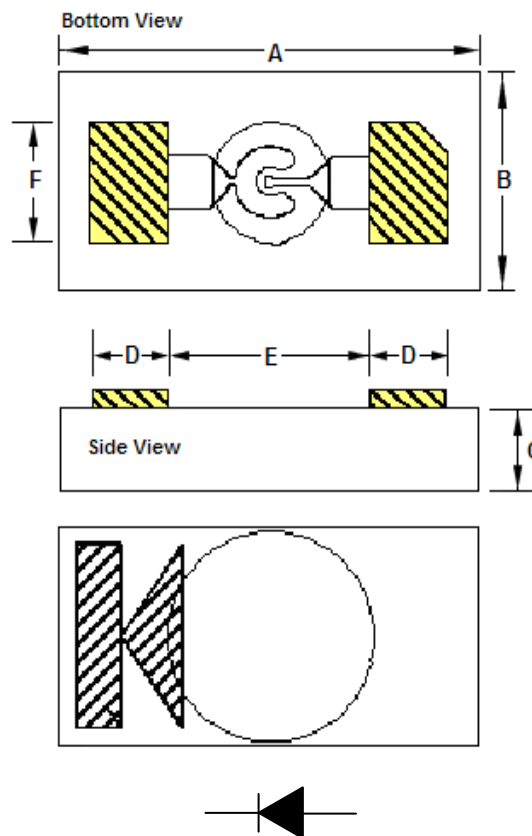
### Description

The MA4FCP300 is a silicon flip chip PIN diode which is fabricated using MACOMs' patented HMIC process. The epitaxial silicon and processes used are designed to produce 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.

### Applications

The small outline and low, 0.12 ps, RC product, make the device useful for multi-throw switch and switched phase shifter circuits requiring <40 ns switching speeds at frequencies up to 18 GHz.

### 1269 Package Outline<sup>2</sup>



2. Yellow hatched areas indicate backside ohmic gold contacts.

### 1269 Package Dimensions<sup>3</sup>

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

3. Total backside metal thickness 0.1  $\mu\text{m}$ .

### Ordering Information<sup>1</sup>

Part Number	Packaging
MA4FCP300	Die in Waffle Pack
MADP-000300-12690P	Tape & Reel

1. Reference Application Note M513 for reel size information.

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

Parameter	Test Conditions	Units	Min.	Typ.	Max.
Total Capacitance <sup>4,6</sup> ( $C_T$ )	-10 V, 1 MHz -10 V, 1 GHz	pF	—	0.040 0.025	0.080 —
Series Resistance <sup>5,6</sup> ( $R_S$ )	50 mA, 100 MHz 50 mA, 1 GHz	$\Omega$	—	2.1 2.6	—
Forward Voltage ( $V_F$ )	100 mA	V	—	1.1	1.5
Reverse Voltage ( $V_R$ )	-10 $\mu\text{A}$	V	-70	-100	—
Reverse Current ( $I_R$ )	-40 V	$\mu\text{A}$	—	—	10
Lifetime ( $T_L$ )	50 - 90%, @ 10 mA / -6 mA	ns	—	140	—
Thermal Resistance <sup>7</sup> ( $\theta$ )	Steady State	$^\circ\text{C/W}$	—	450	—

4. Total capacitance is equivalent to the sum of junction capacitance  $C_J$  and any parasitic capacitances.
5. Series resistance  $R_S$  is equivalent to the total diode series resistance including the junction resistance  $R_J$ .
6.  $R_S$  and  $C_P$  measured on an HP4291A with die mounted in an ODS-186 package.
7. Steady-state Thermal Resistance measured with die mounted in an ODS-186 package.

### Absolute Maximum Ratings<sup>8,9</sup>

Parameter	Absolute Maximum
Forward Current	100 mA
Reverse Voltage	-100 V
Dissipated Power	150 mW
Operating Temperature	-55 $^\circ\text{C}$ to +150 $^\circ\text{C}$
Storage Temperature	-55 $^\circ\text{C}$ to +150 $^\circ\text{C}$
Mounting Temperature	+300 $^\circ\text{C}$ for 10 seconds

8. Exceeding any one or combination of these limits may cause permanent damage to this device.
9. MACOM does not recommend sustained operation near these survivability limits.

### Handling Procedures

Please observe the following precautions to avoid damage:

### Static Sensitivity

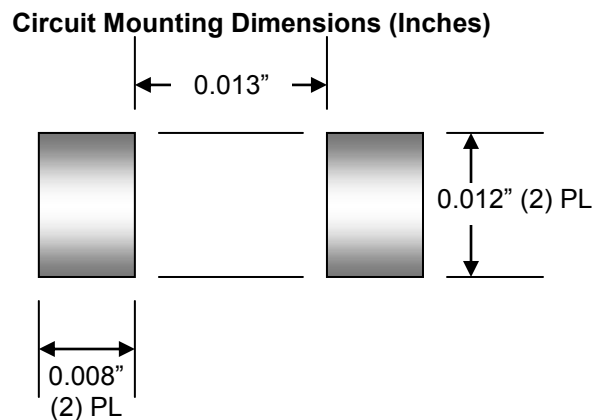
These electronic devices are sensitive to electrostatic discharge (ESD) and can be damaged by static electricity. Proper ESD control techniques should be used when handling these Class 0 (0 - 199 V), HBM, per MIL-STD-883, method 3015.7 devices.

### 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 MA4FCP300 is designed for insertion onto hard or soft substrates with the junction and gold pads facing down. They can be attached with electrically conductive epoxy, 80Au/20Sn eutectic solder or any solder with a low tin content. A tin rich solder should not be used as it will scavenge the gold on the surface of the pad or may cause gold embrittlement. Soldering temperatures should not exceed 300°C for 10 seconds. It is recommended that the chips be mounted onto 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.



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