Silicon Flip Chip PIN Diode

Features

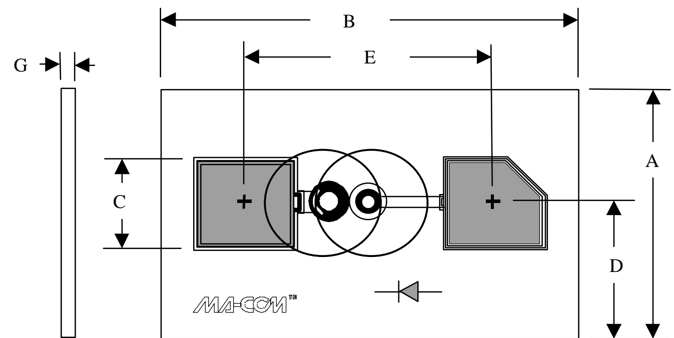
- Low Series Resistance
- Low Capacitance
- High Cut-off Frequency
- Silicon Nitride Passivation
- Polyimide Scratch Protection
- Designed for Automated Pick and Place Insertion
- Rugged by Design
- Surface Mountable

Description

M/A-COM's MA4FCP200 series is a silicon flip chip PIN diode 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.

Case Style

ODS-1264[1, 2, 3]



1. Dimensions are in inches, () are in mm.
2. Unless otherwise noted, tolerance are inches ± .001" (millimeters ± .025 mm).
3. Schematic is for junction side up.

DIM.	INCHES		MILLIMETERS	
	MIN.	MAX.	MIN.	MAX.
A	0.0082	0.0092	0.209	0.233
B	0.0141	0.0151	0.359	0.383
C	0.0035 Typ.		0.090 Typ.	
D	.00038	0.0048	0.097	0.121
E	0.0085	0.0095	0.217	0.240
F	0.0023	0.0033	0.059	0.083
G	0.0048	0.0058	0.123	0.147

Electrical Specifications @ +25°C

Symbol	Parameter	Test Conditions	Units	Min.	Typ.	Max.
C_T	Total Capacitance	-10 Volts, 1 MHz [1]	pF		0.020	0.030
C_T	Total Capacitance	-10 Volts, 1 GHz [1, 3]	pF		0.015	
R_S	Series Resistance	50 mA, 100 MHz [2, 3]	Ω		2.4	
R_S	Series Resistance	50 mA, 1 GHz [2, 3]	Ω		2.8	
V_F	Forward Voltage	100 mA	V		1.25	1.50
V_R	Reverse Voltage	10 µA	V	-70	-100	
I_R	Reverse Current	-70 V	µA			10
$R_{\theta JL}$	Thermal Resistance		°C/W		< 860	
T_L	Lifetime	10 mA / 6 mA	ns		100	

1. Total capacitance is equivalent to the sum of junction capacitance C_j and parasitic capacitance.
2. Series resistance R_S is equivalent to the total diode series resistance including the junction resistance R_j.
3. R_S and C_P measures on an HP4291A with die mounted in an ODS-186 package with conductive silver epoxy.
4. Steady-state $R_{\theta JL}$ measured with die mounted in an ODS-186 package with conductive silver epoxy.

Specifications subject to change without notice.

V 2.0

■ **North America:** Tel. (800) 366-2266, Fax (800) 618-8883
■ **Asia/Pacific:** Tel.+81-44-844-8296, Fax +81-44-844-8298
■ **Europe:** Tel. +44 (1344) 869 595, Fax+44 (1344) 300 020

tyco / Electronics M/A-COM

Visit www.macom.com for additional data sheets and product information.

Handling Procedures

The following precautions should be observed to avoid damaging these devices.

Cleanliness

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

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 = 1.5kΩ ±1%]. Even though tested die pass 100V ESD, they must be handled in a static-free environment.

General Handling

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

Mounting Techniques

These devices were designed for insertion 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 Attach

Solder that 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 scrubbing should be required for attachment.

Epoxy Die Attach

Assembly can be preheated to 125 to 150°C. Use a minimum amount of silver epoxy. Cure epoxy as per manufacturer's schedule. For extended cure times, temperatures should be kept below 200°C.

Applications

These devices are well suited as series diodes in broadband multi-throw switches through 26 GHz. In addition, the exceptional RC product makes them useful as shunt switches at millimeter frequencies. The low parasitic values of L and C make additional circuit tuning unnecessary.

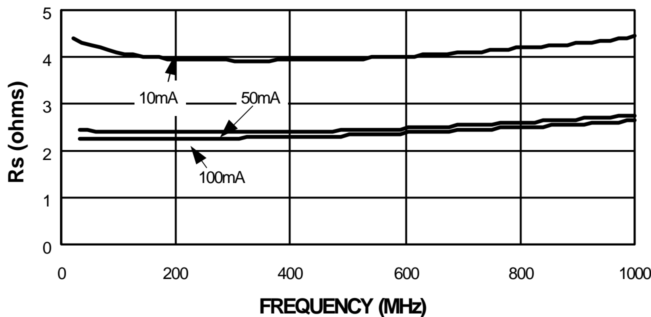
Absolute Maximum Ratings[1]

Parameter	Absolute Maximum
Forward Current[2]	125 mA
Reverse Voltage	-70 V
Operating Temperature	-55°C to +150°C
Storage Temperature	-55°C to +150°C
Dissipated Power[2]	145 mW
Mounting Temperature	+235°C for 10 seconds

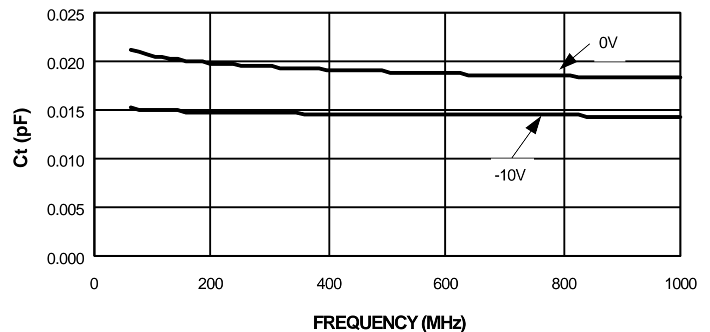
1. Exceeding these limits may cause permanent damage.
2. Steady-state $R_{\theta JL}$ measured with die mounted in an ODS-186 package with conductive silver epoxy..

Typical Performance Curves @ +25°C[1]

Typical Total Resistance R_S vs. Forward Current and Frequency



Typical Total Capacitance C_P vs. Reverse Voltage and Frequency



1. R_S and C_P measures on an HP4291A with die mounted in an ODS-186 package with conductive silver epoxy.

- **North America:** Tel. (800) 366-2266, Fax (800) 618-8883
- **Asia/Pacific:** Tel.+81-44-844-8296, Fax +81-44-844-8298
- **Europe:** Tel. +44 (1344) 869 595, Fax+44 (1344) 300 020

tyco / Electronics M/A-COM

Visit www.macom.com for additional data sheets and product information.