PIN Diode Limiter 50 MHz - 4 GHz

Features

- Low Insertion Loss and Noise Figure
- +40 dBm Peak and +30 dBm CW Power
- +10 dBm P1dB Compression Point
- +16 dBm Flat Leakage
- Lead-Free 1.2 x 1.5 mm 6-Lead PQFN Package
- RoHS Compliant* and 260°C Reflow Compatible

Description

The MADL-011008 is a silicon PIN limiter with small l-region length specifically designed for medium signal applications. The limiter is available in a lead-free 1.2 x 1.5 mm 6-lead PQFN package. The limiter is ideally designed to provide low insertion loss, at zero bias, as well as low flat leakage power with fast signal response/recovery times.

The MADL-011008 PIN limiter is designed for use in passive limiter control circuits to protect sensitive receiver components such as low noise amplifiers (LNA), detectors, and mixers.

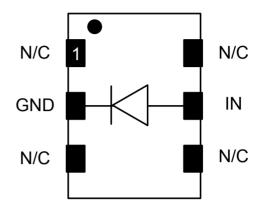
Ordering Information^{1,2}

Part Number	Package		
MADL-011008-141200	Bulk Packaging		
MADL-011008-14120T	Tape and Reel		
MADL-011008-001SMB	Sample Test Board		

1. Reference Application Note M513 for reel size information.

2. All sample boards include 5 loose pieces.

Functional Schematic



Pin Configuration

Pin No.	Pin Name	Description	
1	N/C	No Connection	
2	GND	RF Ground	
3	N/C	No Connection	
4	N/C	No Connection	
5	IN	RF Input	
6	N/C	No Connection	
7 ³	Pad	GND	

3. The exposed pad centered on the package bottom must be connected to RF and DC ground.

Handling Procedures

Please observe the following precautions to avoid damage:

Static Sensitivity

Silicon Integrated Circuits are sensitive to electrostatic discharge (ESD) and can be damaged by static electricity. Proper ESD control techniques should be used when handling these devices.

* Restrictions on Hazardous Substances, European Union Directive 2002/95/EC.

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Electrical Specifications: Freq 2.7 to 3.0 GHz, $T_A = 25^{\circ}C$, $Z_0 = 50 \Omega$

Parameter	Test Conditions	Units	Min.	Тур.	Max.
Insertion Loss	0 dBm	dB	_	0.15	_
Input Return Loss	0 dBm	dB	_	20	_
Output Return Loss	0 dBm	dB		20	_
P1dB	_	dBm		10	_
Peak Incident Power	Pulse Width 1 µSec, Duty Cycle 0.1%	dBm	_	40	_
CW Incident Power		dBm	_	30	_
CW Flat Leakage	Incident Power = +24 dBm	dBm	_	16	_
Recovery Time	To within 1 dB of final insertion loss Peak Incident Power = +30 dBm Pulse Width 1 μSec, Duty Cycle 0.1%	ns		50	_
Spike Leakage	+30 dBm Pin, Pulse Width 1 μSec, Duty Cycle 0.1%	erg	_	0.5	_
IP3	Pin -5 dBm/tone, 10 MHz Spacing	dBm	_	30	_
IP2	Pin -5 dBm/tone	dBm	_	43	_
Forward Voltage	Forward current = 10 mA	V	_	0.9	1.1
Reverse Current	Reverse voltage = 20 volts	μA	—	0.1	100

Absolute Maximum Ratings^{4,5}

Parameter	Absolute Maximum		
Peak Incident Power Pulse Width 1 µSec, Duty Cycle 0.1%	43 dBm		
CW Incident Power	33 dBm		
Operating Temperature	-40°C to +85°C		
Storage Temperature	-65°C to +150°C		

4. Exceeding any one or combination of these limits may cause permanent damage to this device.

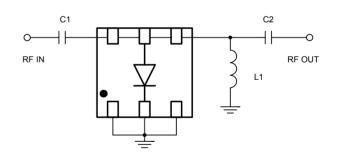
5. M/A-COM Technology Solutions does not recommend sustained operation near these survivability limits.

Parts List

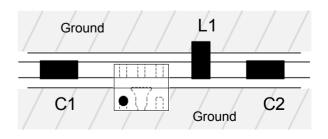
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Component	Value	Package
C1 - C2	68 pF	0402
L1	5.1 nH	0402

Application Schematic



Recommended Board Layout

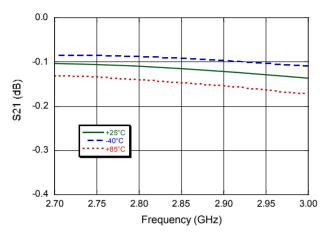


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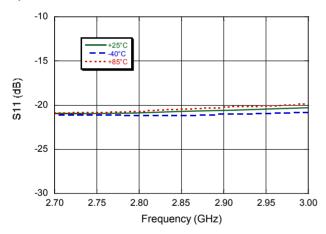
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Typical Performance Curves

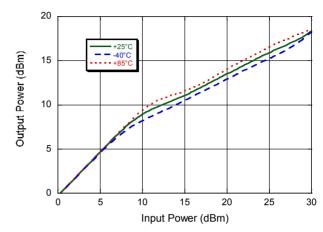
Insertion Loss



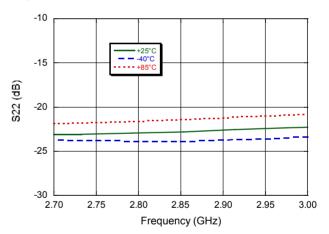
Input Return loss



Pin vs. Pout @ 2.85 GHz



Output Return Loss



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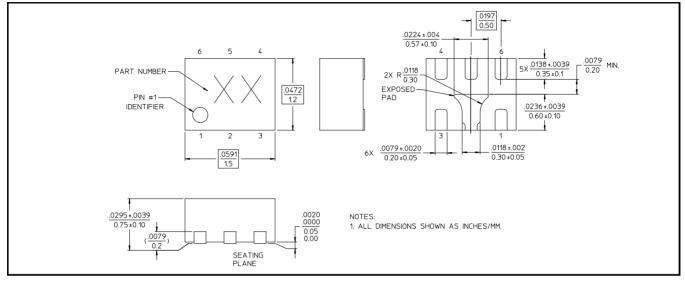
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Lead-Free 1.2 x 1.5 mm 6-Lead PQFN[†]



 Reference Application Note M538 for lead-free solder reflow recommendations. Meets JEDEC moisture sensitivity level 1 requirements. Plating is 100% matte tin over copper.

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