Diode Limiter
2 - 40 GHz

MADL-011126-DIE
Rev. V1

Features

- Peak Power Handling: 10 W
- CW Power Handling: 3.5 W
- Low Insertion Loss: 1.4 dB @ 40 GHz
- Flat Leakage Power: 17 dBm @ 40 GHz
- Die size: 1.77 x 0.97 x 0.10 mm
- Passive Device
- RoHS* Compliant

Applications

- Receiver Protection
- Radar Systems
- Radio Frequency Front-End Modules

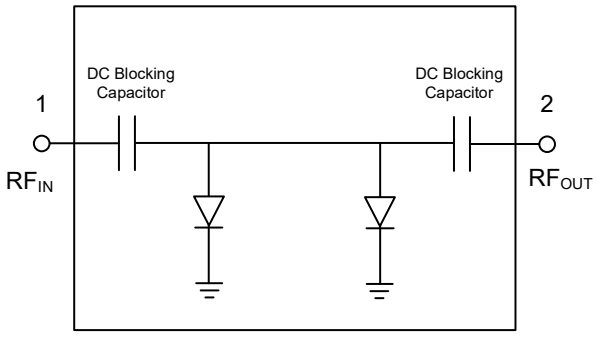
Description

MADL-011126-DIE is a fully integrated diode limiter. It is a passive device, DC decoupled at both input and output RF ports.

The limiter can handle 10 W peak power at 40 GHz with a low flat leakage of 17 dBm.

MADL-011126-DIE is available in die form. It is ideally suited for high frequency, high peak power receiver protection.

Functional Schematic



Pin Configuration

Pin #	Function
1	RF Input
2	RF Output
Backside	Ground[1]

1. The entire exposed pad on the die bottom must be connected to RF, DC and thermal ground.

Ordering Information

Part Number	Package
MADL-011126-DIE	Gel-Pak
MADL-011126-SMB	Sample Board

* Restrictions on Hazardous Substances, compliant to current RoHS EU directive.

Electrical Specifications: T_A = +25°C, Z_0 = 50 Ω

Parameter	Test Conditions	Units	Min.	Typ.	Max.
Insertion Loss	2 GHz 18 GHz 40 GHz	dB	—	0.8 1.2 1.2	—
Input & Output Return Loss	—	dB	—	15	—
CW Power Handling	—	dBm	—	35.5	—
CW Flat Leakage	2 GHz 18 GHz 40 GHz	dBm	—	17 23 17	—
CW P1dB	—	dBm	—	22	—
Pulsed Peak Power Handling	1 µs PW, 1% Duty Cycle	dBm	—	40	—
Spike Leakage Power	1 µs PW, 1% DC, 33 dBm Input 2 GHz 18 GHz 40 GHz	dBm	—	16 12 7	—
Spike Leakage Energy	1 µs PW, 1% DC, 33 dBm Input 18 GHz 26 GHz 40 GHz	ergs	—	8.8e-3 2.4e-3 1.7e-3	—
1 dB Recovery Time	1 µs PW, 1% DC, 33 dBm Input	ns	—	25	—
3 dB Recovery Time	1 µs PW, 1% DC, 33 dBm Input	ns	—	20	—

Absolute Maximum Ratings[4,5]

Parameter	Absolute Maximum
CW Incident Power	36 dBm @ +85°C
Peak Incident Power	40.5 dBm @ +85°C
Junction Temperature[6]	+150°C
Operating Temperature	-40°C to +85°C
Storage Temperature	-55°C to +150°C

4. Exceeding any one or combination of these limits may cause permanent damage to this device.
5. MACOM does not recommend sustained operation near these survivability limits.
6. Operating at nominal conditions with $T_J \leq$ +150°C will ensure MTTF > 1 x 10^6 hours.

Handling Procedures

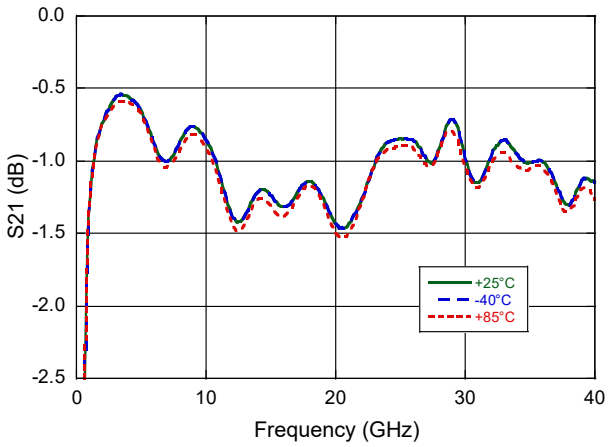
Please observe the following precautions to avoid damage:

Static Sensitivity

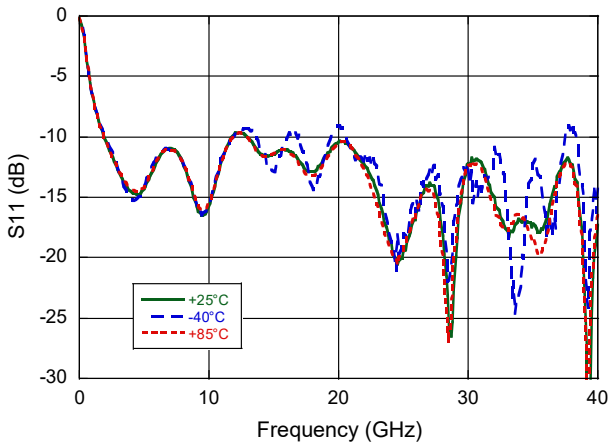
These electronic devices are sensitive to electrostatic discharge (ESD) and can be damaged by static electricity. Proper ESD control techniques should be used when handling these devices.

Typical Small-Signal Performance: Die On-Board: T_A = -40°C, 25°C, 85°C, Z_0 = 50 Ω

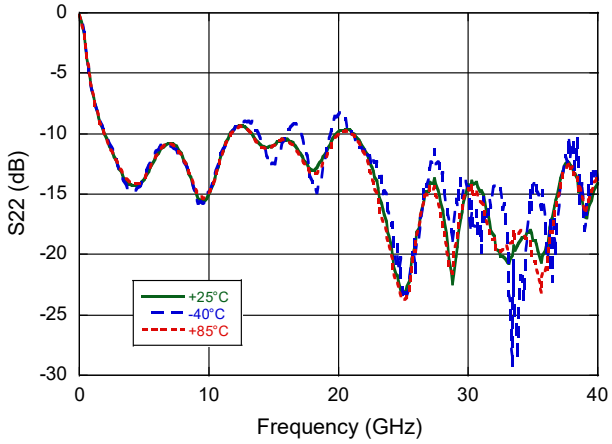
De-embedded Insertion Loss



Input Return Loss

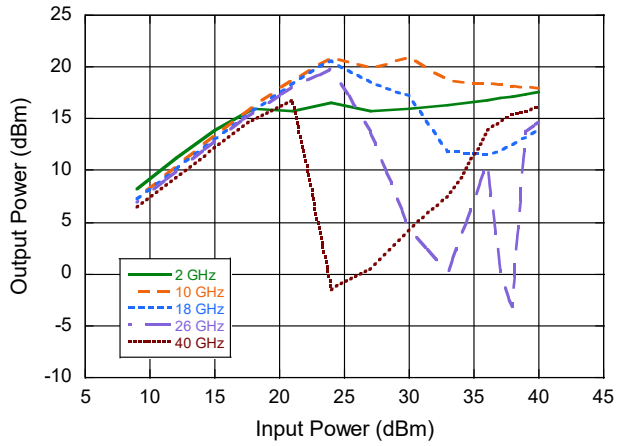


Output Return Loss

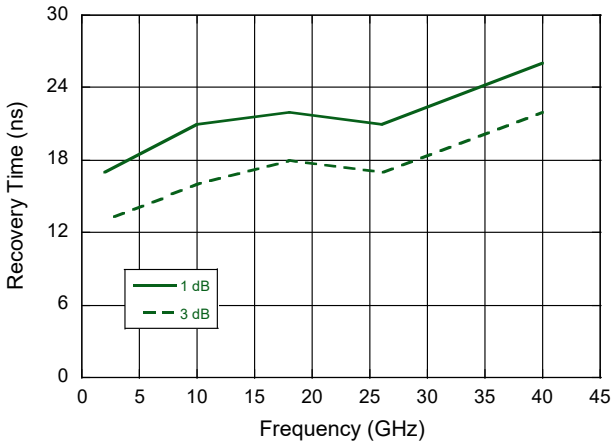


Typical RF Power Performance: Die On-Board: Z_0 = 50 Ω, T_A = 25°C, 1 µs Pulse Width, 1% Duty Cycle

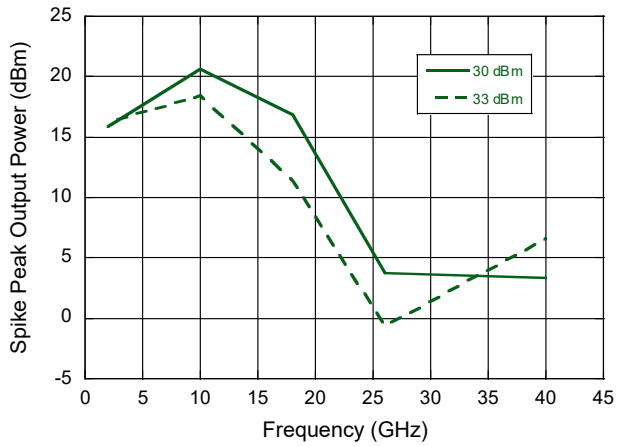
Pulsed Flat Leakage Power over Frequency



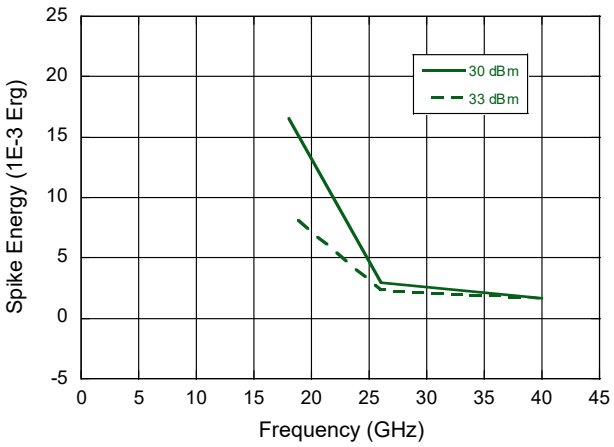
1dB and 3dB Recovery time at 33 dBm Input



Pulsed Spike Peak Power over Input Power

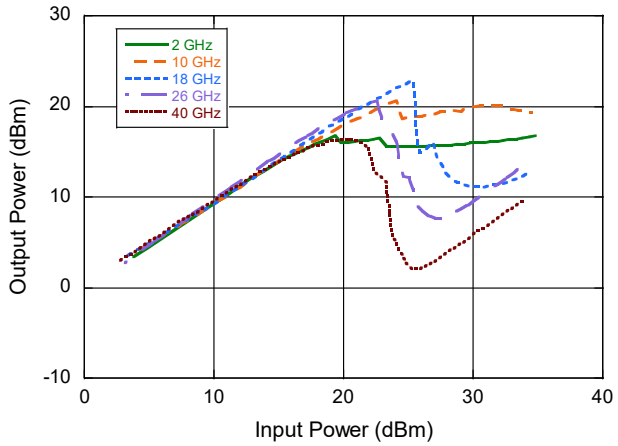


Pulsed Spike Energy Power over Input Power

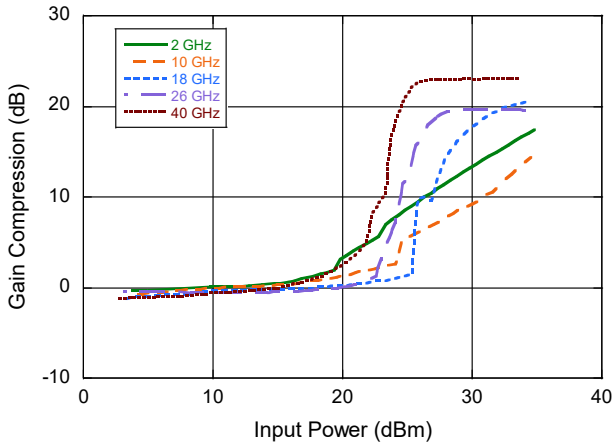


Typical RF Power Performance: Die On-Board: T_A = 25°C, Z_0 = 50 Ω

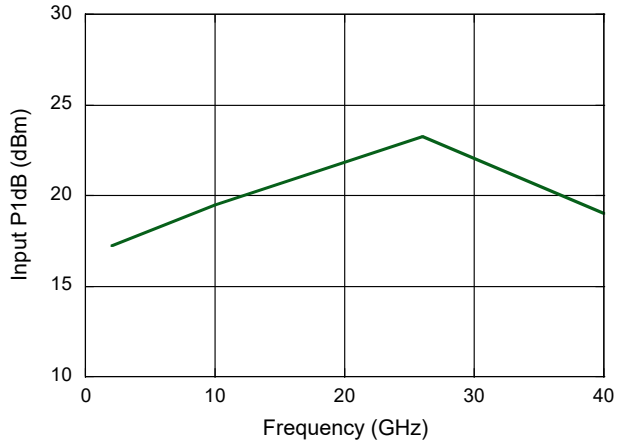
CW Flat leakage De-embedded Power over Frequency



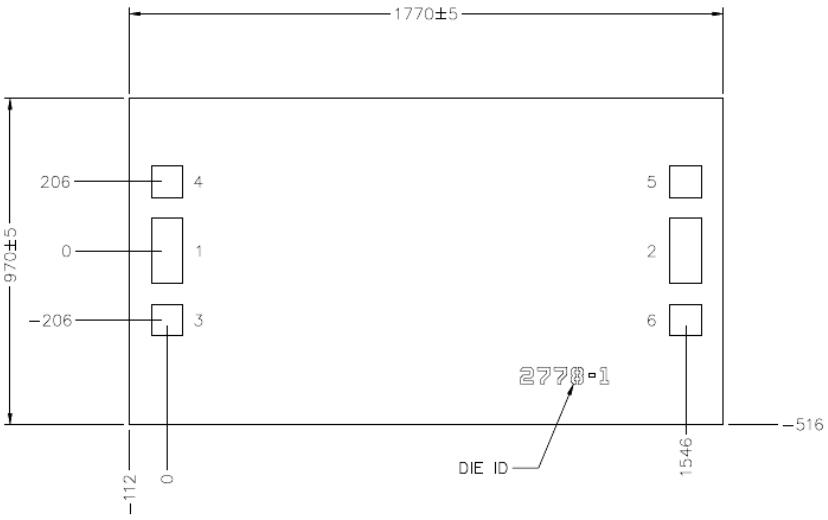
CW Gain Compression over Frequency



CW 1dB Compression Point



Die Outline Drawing



BOND PAD DIM. (μm)		
PAD	X (μm)	Y (μm)
1,2	94	194
3,4,5,6	94	94

NOTES – UNLESS OTHERWISE SPECIFIED:
1. ALL DIMENSIONS SHOWN ARE μm WITH A TOLERANCE OF ±5μm.
2. DIE THICKNESS IS 100 ±10μm
3. BOND PAD/BACKSIDE METALLIZATION: GOLD.
4. DIMENSIONS REFLECT THE FINAL SAWN DIE SIZE.