1. Description

- The M0013 is a limiter fabricated using a highly repetitive GaAs PIN MMIC process. The device operates from 7 to 13GHz, with an insertion loss of less than 0.6dB, input and output return loss of less than -15dB, a power handling capability of 46dBm (Pulse), and a flat leakage of 16dBm.

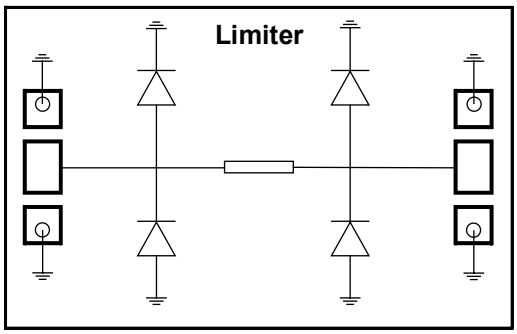


Figure 1. M0013 Functional Block Diagram

2. Applications

- Radio and Radar Receivers

3. Features[1]

- Operating Frequencies: 7-13GHz
- Insertion Loss: -0.6dB
- Input/Output Return Loss: -15dB
- Power Handling Capability: 46dBm
- Flat Leakage: 16dBm
- Die Size: 1.60 x 0.85 x 0.10mm

[1] On-wafer Test

4. Brief Typical Performance

Table 1. Brief Typical Performance

Parameter	7-13GHz	Units
Insertion Loss	-0.6	dB
Input Return Loss	-15	dB
Output Return Loss	-15	dB
Power Handing Capability	46	dBm
Flat Leakage at P_{IN}>20dBm	16	dBm

- Test condition: Input signal Pulsed, Pulse width = 100μs, Duty cycle = 25%

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5. Recommended Operating Conditions

Table 2. Recommended Operating Conditions

Parameter	Min.	Typ.	Max.	Units
Operating Temperature Range	-55	25	125	°C
Operating Frequency	7	-	13	GHz
Maximum Input Power	-	-	46	dBm

6. RF Characteristics (T_C = 25˚C)

Table 3. RF Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Units
Operating Frequencies	Freq	7	-	13	GHz
Insertion Loss	IL		-0.6		dB
Input Return Loss	RLin		-15		dB
Output Return Loss	RLout		-15		dB
Power Handing Capability（Pulse）	Pc		46		dBm
Power Handing Capability（CW）	Pc		43		dBm
Flat Leakage	FL		16		dBm

• Test condition: Input signal Pulsed, Pulse width = 100μs, Duty cycle = 25%

7. Typical Performance Curve

■ Small-signal Characteristics Curve

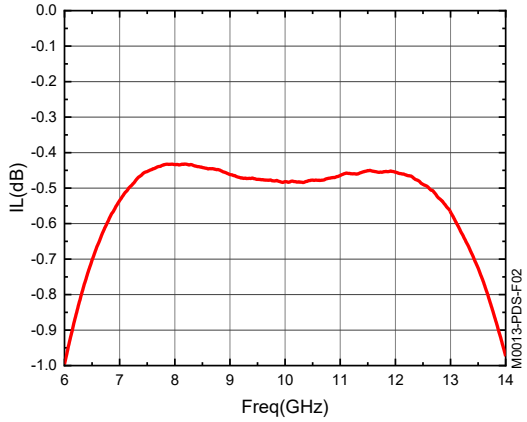


Figure 2. Insertion Loss Characteristics

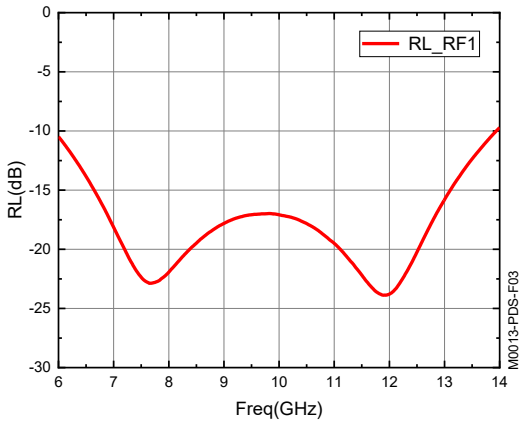


Figure 3. Input Return Loss Characteristics

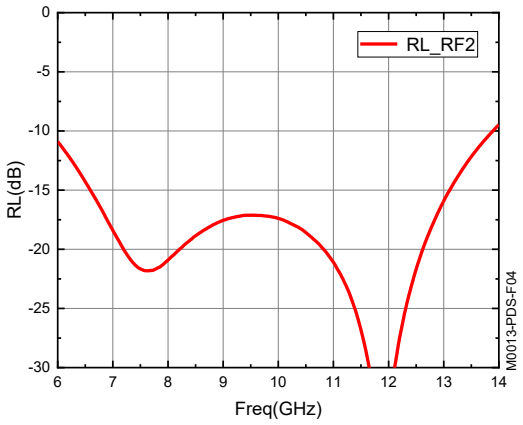


Figure 4. Output Return Loss Characteristics

■ Large-signal Characteristics Curve

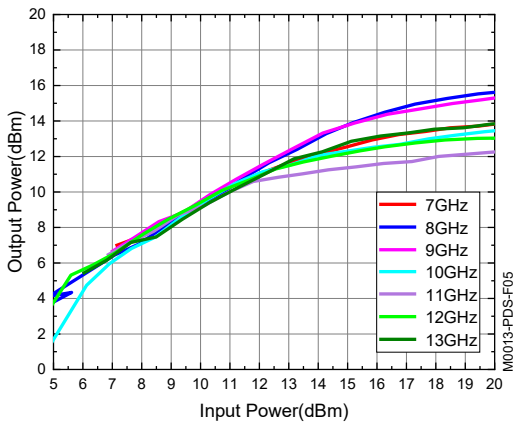


Figure 5. Large Signal Power Characteristics

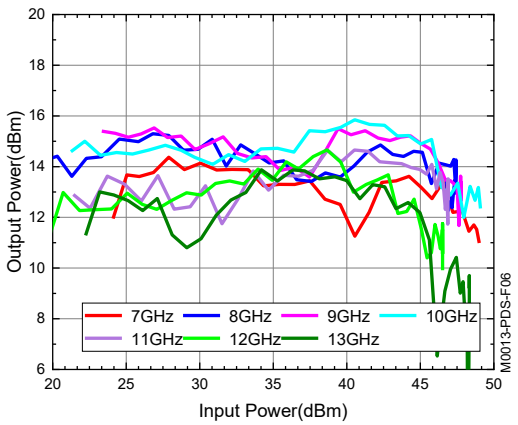
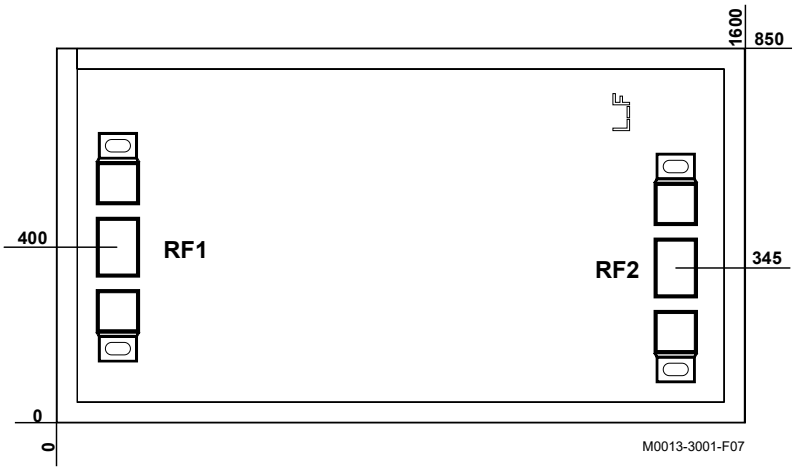


Figure 6. Flat Leakage Characteristics

8. Outline Dimensions



- Dimensions shown in micrometer

Figure 7. M0013 Bare Die

Table 4. Pin Description

Pin	Symbol	Description
1	RF1	RF Input
2	RF2	RF Output

9. Applications Information

■ Assembly Diagram

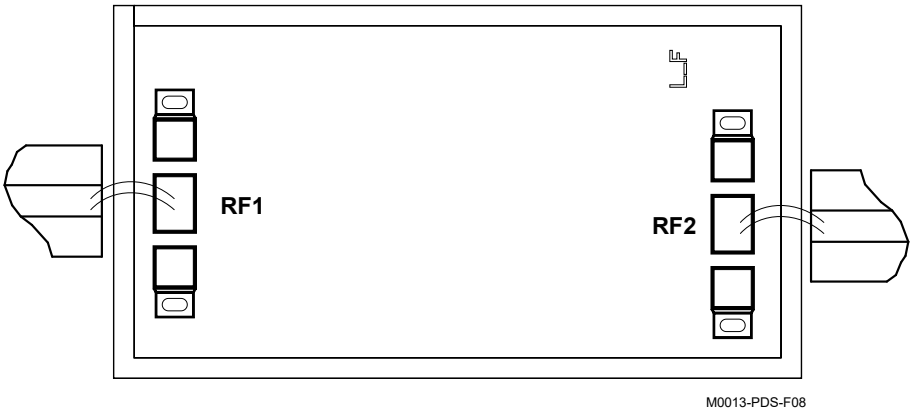


Figure 8. M0013 Application Assembly Diagram

- **Eutectic Die Attach:** It is best to use an 80% Au/20% Sn preform. Do not expose the chip to a temperature greater than 300°C for more than 30sec
- **Wire Bonding:** RF bonds made with 1mil gold wire are recommended for the RF ports. Keep all bonds as short as possible, less than 0.35mm.

10. Handling Precautions

- **Storage**
  All bare dies ship in either Waffle or Gel Pak, which is an ESD protective container, and then sealed in an ESD protective bag. After opening the sealed ESD protective bag, all dies must be stored in a dry nitrogen environment.
- **Cleanliness**
  Handle the dies in a clean environment. Never use liquid cleaning systems to clean the dies.
- **ESD Caution**
  ESD (electrostatic discharge) sensitive device. Charged devices and circuit boards can discharge without detection. Although this product features patented or proprietary protection circuitry, damage may occur on devices subjected to high energy ESD. Therefore proper ESD precautions should be taken to avoid performance degradation or loss of functionality.



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