1. Description

- The M0038 is a limiter fabricated using a highly repetitive GaAs PIN MMIC process. The device operates from 1.9 to 3.5GHz, with an insertion loss of less than 0.4dB, input and output return losses of less than -30dB, a power handling capability of 42dBm (100μs pulse width, 25% duty cycle) and 41dBm (50ms pulse width, 30% duty cycle), and a flat leakage of 15.5dBm. Input and output DC-blocking capacitors are integrated on-chip.

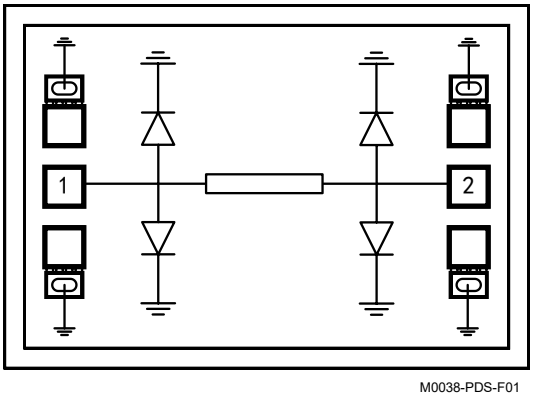


Figure 1. M0038 Functional Block Diagram

2. Applications

- TX/RX Modules

3. Features

- Operating Frequency: 1.9- 3.5GHz
- Insertion Loss: -0.4dB
- Input/Output Return Loss: -35dB / -30dB
- Power Handling Capability:
  42dBm (100μs pulse width, 25% duty cycle)
  41dBm (50ms pulse width, 30% duty cycle)
- Flat Leakage: 15.5dBm
- Die Size: 1.25 x 0.85 x 0.10mm

4. Brief Typical Performance

Table 1. Brief Typical Performance

Parameter	1.9-3.5GHz	Units
Insertion Loss	-0.4	dB
Input Return Loss	-35	dB
Output Return Loss	-30	dB
Power Handing Capability	42（100μs pulse width, 25% duty cycle） 41（50ms pulse width, 30% duty cycle）	dBm
Flat Leakage at P_{IN}>20dBm	15.5	dBm

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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	1.9	-	3.5	GHz
Maximum Input Power (100μs pulse width, 25% duty cycle)	-	-	42	dBm
Maximum Input Power (50ms pulse width, 30% duty cycle)	-	-	41	dBm

6. RF Characteristics (T_C = 25˚C)

Table 3. RF Characteristics[1]

Parameter	Symbol	Min.	Typ.	Max.	Units
Operating Frequency	Freq	1.9	-	3.5	GHz
Insertion Loss	IL		-0.4		dB
Input Return Loss	RL_{IN}		-35		dB
Output Return Loss	RL_{OUT}		-30		dB
Power Handing Capability (100μs pulse width, 25% duty cycle)	Pc		42		dBm
Power Handing Capability (50ms pulse width, 30% duty cycle)	Pc		41		dBm
Flat Leakage	FL		15.5		dBm

[1].Test condition: 100μs pulse width, 25% duty cycle; 50ms pulse width, 30% duty cycle

7. Typical Performance Curve

■ Small-signal Characteristics Curve

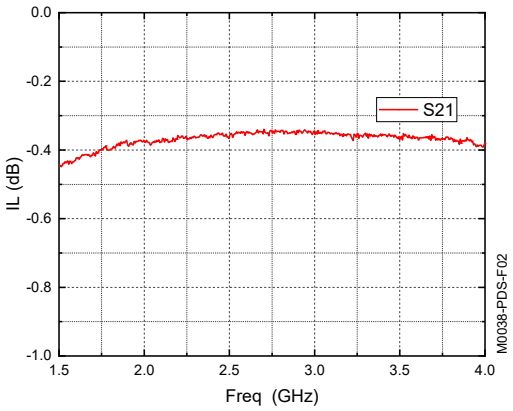


Figure 2. Insertion Loss Characteristics

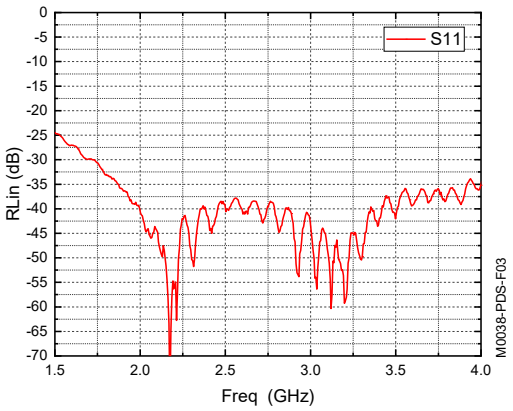


Figure 3. Input Return Loss Characteristics

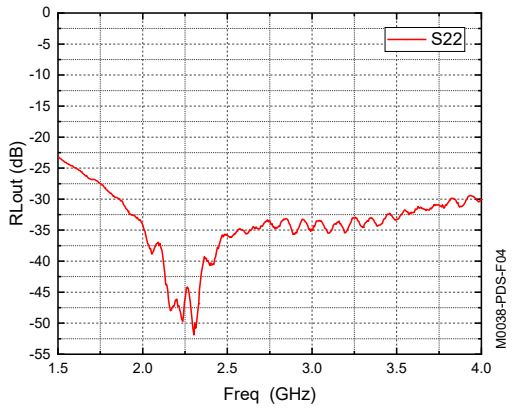


Figure 4. Output Return Loss Characteristics

■ Power Characteristics Curve

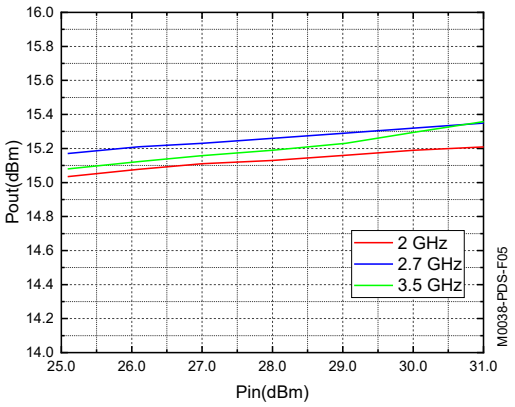
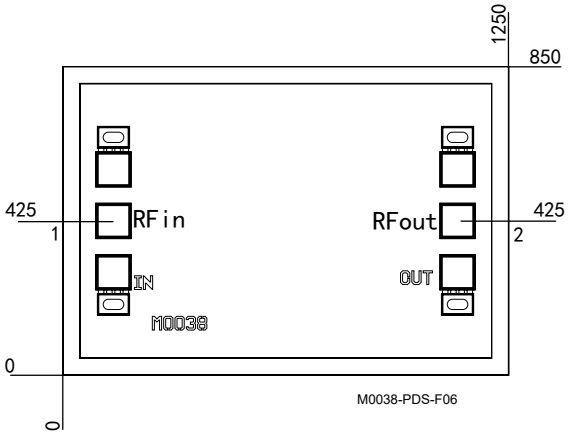


Figure 5. Flat Leakage Characteristic

8. Outline Dimensions



- Dimensions shown in micrometre

Figure 6. M0038 Outline Dimensions

Table 4. Pad Description

Pad	Symbol	Description
1	RF_{IN}	RF Input
2	RF_{OUT}	RF Output

9. Assembly Information

■ **Assembly Diagram**

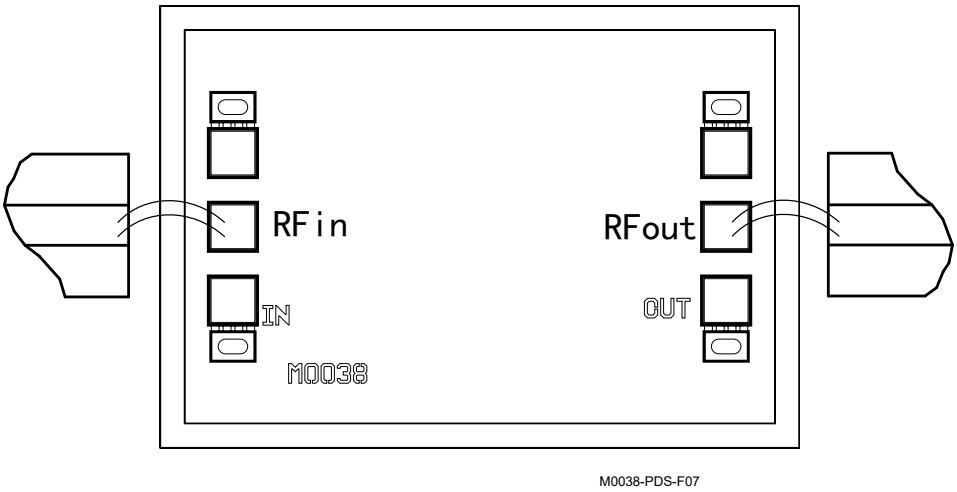


Figure 7. M0038 Assembly Diagram

- **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.



11. Contact Information

For the latest specifications, additional product information, technical support and sales support, please contact:

- **Email:** RF.support@raytrontek.com
- **Web:** www.raytrontek.com

12. Disclaimer

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