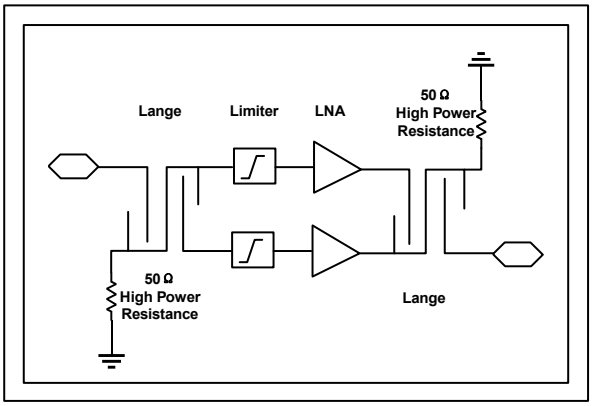
## 1. Description

- The M7115(M) is a balanced limiter low noise amplifier (LNA) MMIC, integrated Lange coupler, limiter and LNA, manufactured with 0.15um GaAs pHEMT process and GaAs PIN process. Within the bandwidth of the 5GHz to 13GHz, the typical noise figure is 1.6dB, the small signal gain is higher than 23dB with a gain flatness below 1dB with a single +5V DC supply, 49.5dBm incident pulsed power is achieved.




M7115(M)-PDS-F01

**Figure 1. M7115(M) Functional Block Diagram**

## 2. Applications

- TX/RX Modules
- Commercial and Military Radar
- Defense

## 3. Features[1]

- Operating Frequency: 5-13GHz
- Gain: 23dB
- Noise Figure (NF): 1.6dB
- Input/Output Return Loss: -11dB
- Output Power at 1dB Compression (OP1dB): 12dBm
- Incident Power: 49.5dBm (10ms pulse width,30% duty cycle)
- Supply Voltage: +5V, $I_D$=55mA
- Die Size: 3.25mm x 2.80mm x 0.10mm

[1] Fixture Test

## 4. Brief Typical Performance

**Table 1. Brief Typical Performance**

| Parameter | 5-13GHz | Units |
|---|---|---|
| Gain | 23 | dB |
| Noise Figure | 1.6 | dB |
| Input / Output Return Loss | -11 | dB |
| Output Power at 1dB Compression | 12 | dBm |
| Incident Power | 49.5 | dBm |

- Test condition: Input signal pulsed, Pulse width = 10ms, Duty cycle = 30%

# Table of Contents


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## 5. Recommended Operating Conditions

### Table 2. Recommended Operating Conditions

| Parameter | Min. | Typ. | Max. | Units |
|---|---|---|---|---|
| Operating Frequency | 5 | - | 13 | GHz |
| Operating Temperature Range | -55 | 25 | 125 | °C |
| Supply Voltage | - | 5 | - | V |

## 6. RF Characteristics ($T_C$ = 25°C)

### Table 3. RF Characteristics[1]

| Parameter | Symbol | Min. | Typ. | Max. | Units |
|---|---|---|---|---|---|
| Gain | G | - | 23 | - | dB |
| Gain Flatness | ΔG | - | ±0.7 | - | dB |
| Noise Figure | NF | - | 1.6 | 2 | dB |
| Input Return Loss | S11 | - | -11 | - | dB |
| Output Return Loss | S22 | - | -12 | - | dB |
| Output Power at 1dB Compression | OP1dB | - | 12 | - | dBm |
| Incident Power | P | - | 49.5 | - | dBm |

[1]. Test condition: Input signal pulsed, Pulse width = 10ms, Duty cycle = 30%

# 7. Typical Performance Curve ($T_C$ = 25˚C)

## ■ Small-signal Characteristics Curve

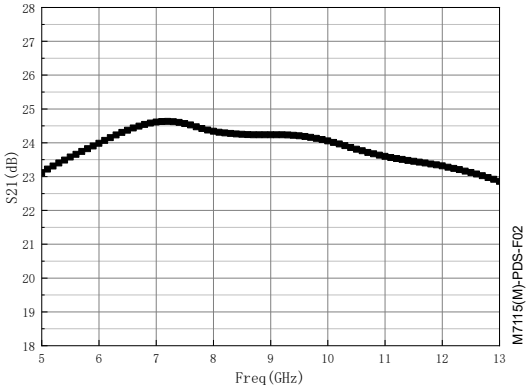



Figure 2. Gain Characteristics

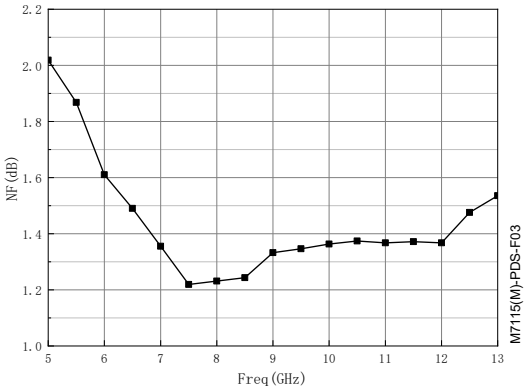



Figure 3. Noise Figure Characteristics

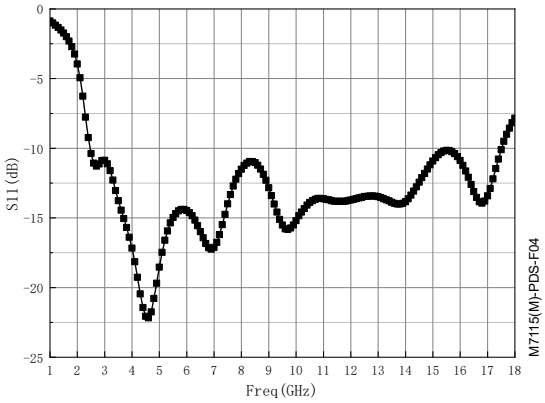



Figure 4. Input Return Loss Characteristics

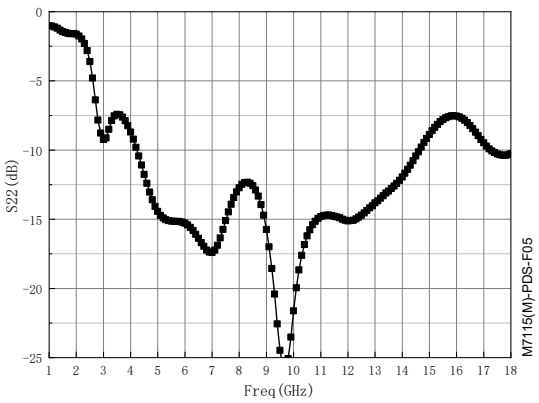



Figure 5. Output Return Loss Characteristics

## ■ Power Characteristic Curve（$V_{DD}$=5V, On-wafer test）

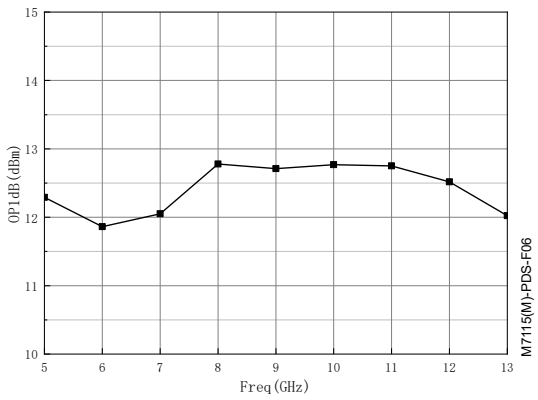
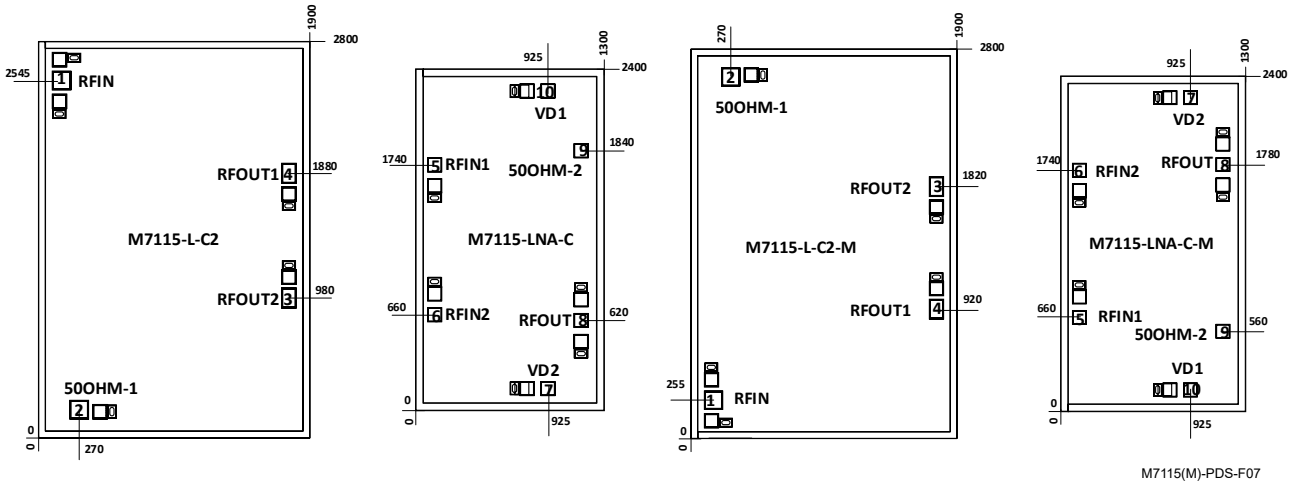



Figure 6. Output 1dB compression point

# 8. Outline Dimensions




- Dimensions shown in micrometre

**Figure 7. M7115(M) Outline Dimensions**

## Table 4. Pad Description

| Pad | Symbol | Description |
|---|---|---|
| 1 | $RF_{IN}$ | RF Input |
| 2/9 | 50Ω-1/50Ω-2 | 50ΩPower Resistor |
| 3/4 | RFOUT1/RFOUT2 | Limiter Output |
| 5/6 | RFIN1/RFIN2 | LNA Input |
| 7/10 | VD1/VD2 | 5V DC Power Supply |
| 8 | $RF_{OUT}$ | RF Output |

# 9. Assembly Information

## ■ Assembly Diagram

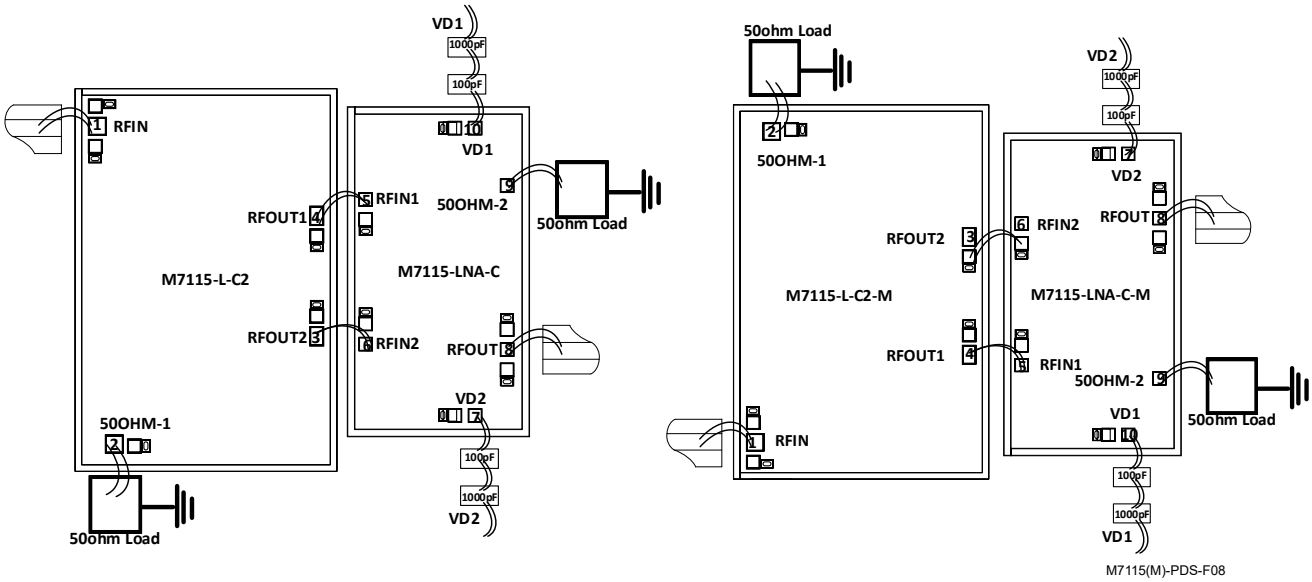



**Figure 8. M7115(M) Assembly Diagram**

- **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:** sales@infiwave.com
- **Web:** www.infiwave.com

## 12. Disclaimer

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