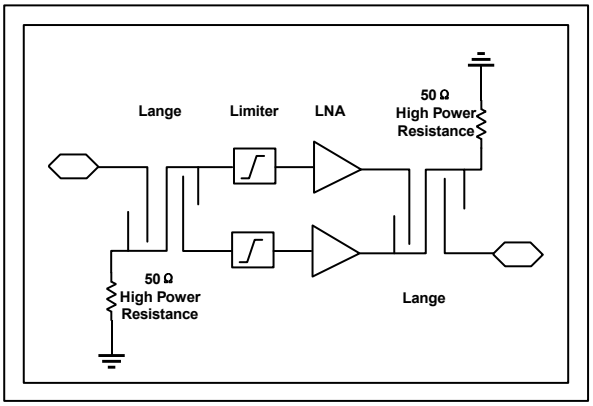
1. Description

- The M7135 is a balanced limiting low noise amplifier (LNA) fabricate on GaAs p-HEMT MMIC, integrated Lange Coupler, Limiter and LNA. It operates over 7-13GHz and achieves 1.6dB noise figure with 22.5dB gain.



M7135-PDS-F01

Figure 1. M7135 Functional Block Diagram

2. Applications

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

3. Features[1]

- Frequency Range: 7-13GHz
- Typical Gain: 22.5dB
- Noise Figure (NF): 1.6dB
- Input/Output Return Loss: -13dB/-15dB
- Output P_{-1dB}: 11dBm
- Power Handling Capability: 43dBm
- Single Positive Supply: +5V (I_{DQ}=45mA)
- Die Size: 2.8 x 2.4 x 0.1mm

1. Fixture Test

4. Brief Typical Performance

Table 1. Brief Typical Performance

Parameter	7-13GHz	Units
Small-Signal Gain	22.5	dB
Noise Figure	1.6	dB
Input/Output Return Loss	-13/-15	dB
Output P_{-1dB}	11	dBm
Power Handling Capability	43	dBm

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

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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
Supply Voltage, V_D	-	5	-	V
Quiescent Current, I_{DQ}	-	45	-	mA

6. RF Characteristics (T_C = 25˚C)

Table 3. RF Characteristics[1]

Parameter	Symbol	Min.	Typ.	Max.	Units
Small-Signal Gain	Gain	-	22.5	-	dB
Gain Flatness	ΔG	-	±0.7	-	dB
Noise Figure	NF	-	1.6	1.7	dB
Input Return Loss	RL_{IN}	-	-13	-	dB
Output Return Loss	RL_{OUT}	-	-15	-	dB
Output Power for 1dB Compression	OP_{-1dB}	-	11	-	dBm
Power Handling Capability	$P_{IN\ MAX}$	-	43	-	dBm

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

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

■ Small-signal Characteristics Curve

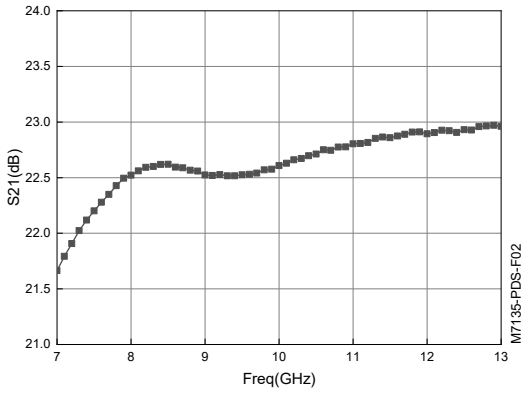


Figure 2. Small-signal Gain Characteristics (On-Wafer)

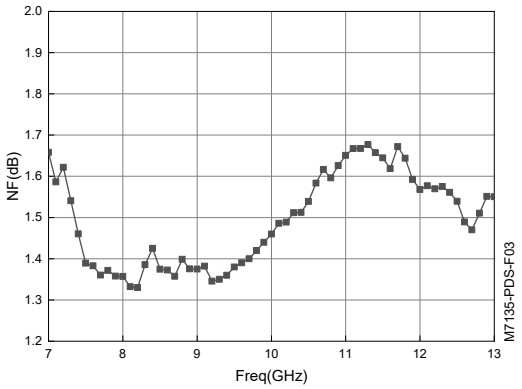


Figure 3. Noise Figure Characteristics (On-Wafer)

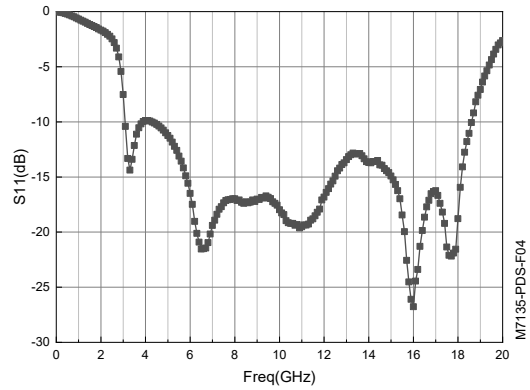


Figure 4. Input Return Loss Characteristics (On-Wafer)

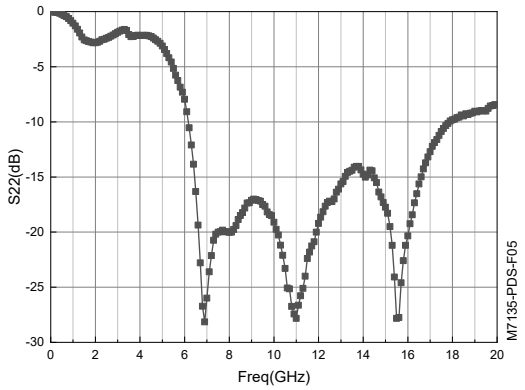


Figure 5. Output Return Loss Characteristics (On-Wafer)

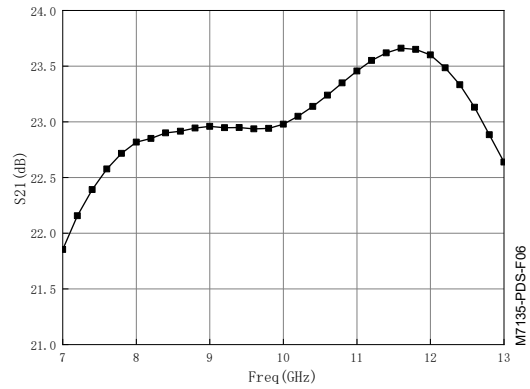


Figure 6. Small-signal Gain Characteristics (Fixture)

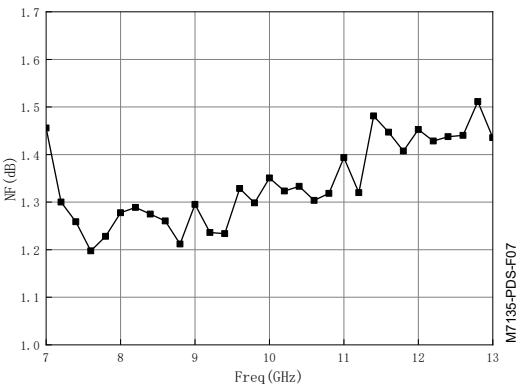


Figure 7. Noise Figure Characteristics (Fixture)

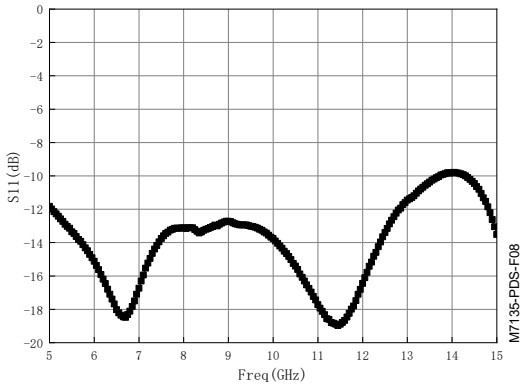


Figure 8. Input Return Loss Characteristics (Fixture)

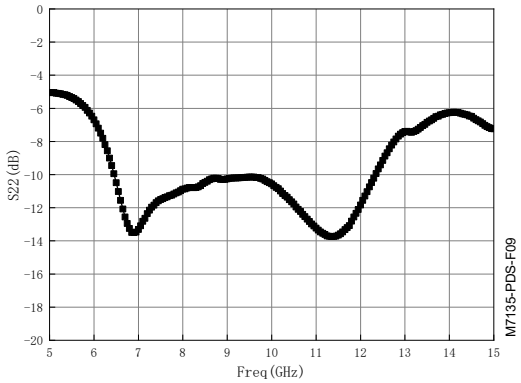


Figure 9. Output Return Loss Characteristics (Fixture)

■ Power Characteristic Curve

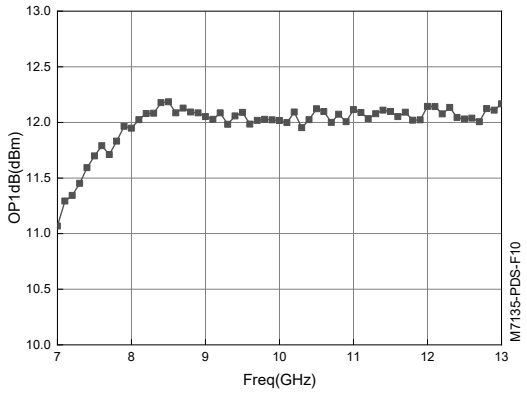
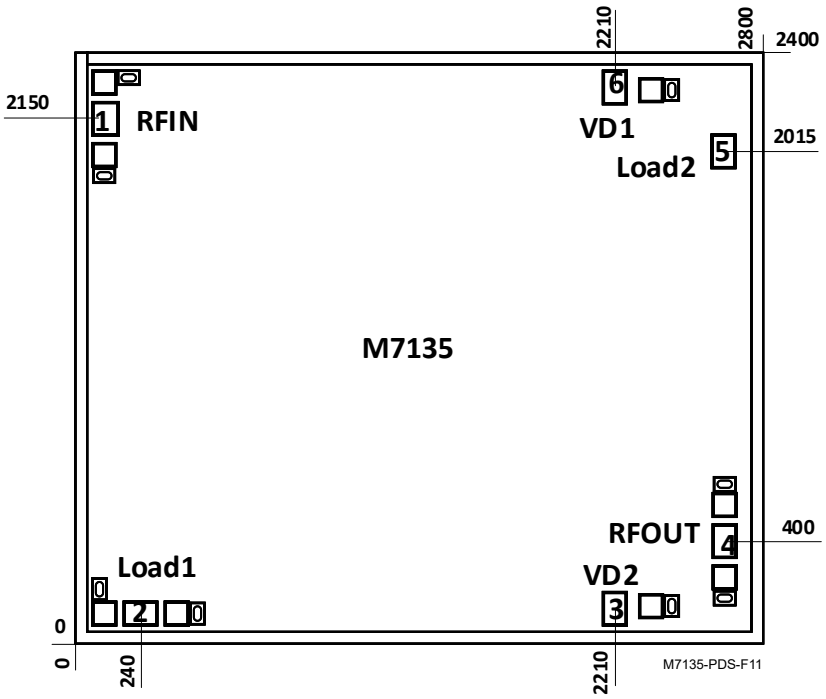


Figure 10. OP-1dB Characteristics (On-Wafer)

8. Outline Dimensions



- Dimensions shown in micrometre

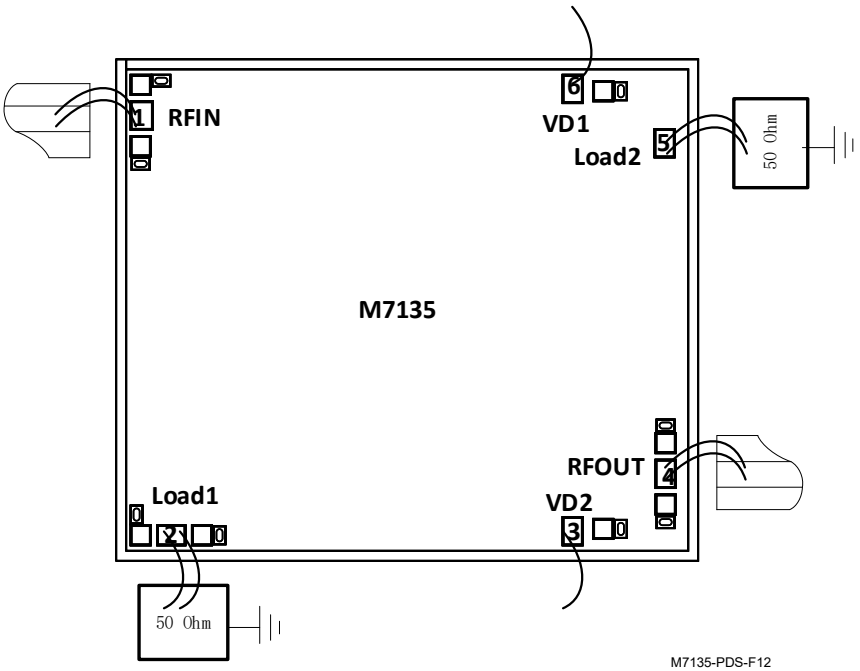
Figure 11. M7135 Outline Dimensions

Table 4. Pad Description

Pad	Symbol	Description
1	RFIN	RF Input
2	Load1	50ohm Power Load
3	VD2	Supply Voltage (VD1/VD2 Arbitrary pad can be selected)
4	RFOUT	RF Output
5	Load2	50ohm Load
6	VD1	Supply Voltage (VD1/VD2 Arbitrary pad can be selected)

9. Assembly Information

■ Assembly Diagram



- For VD1/VD2 arbitrary pad can be selected

Figure 12. M7135 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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