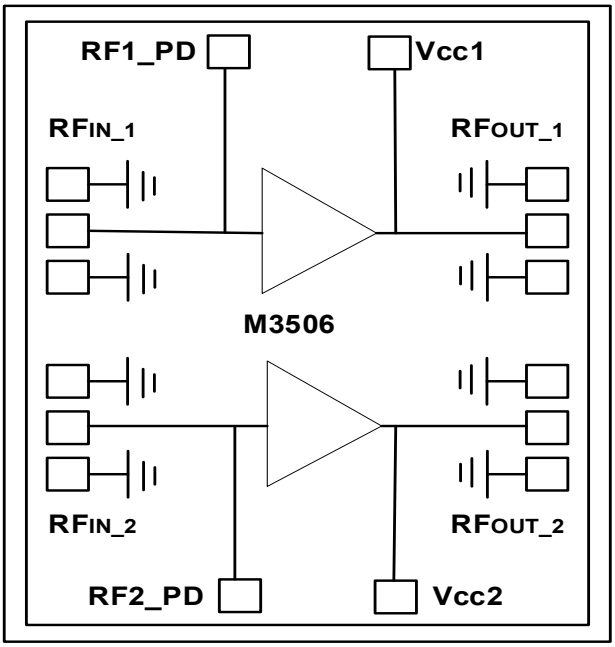
1. Description

- The M3506 is a dual channel low noise amplifier fabricated on GaAs p-HEMT MMIC process. It operates over 7-9.5GHz and provides 22dB gain with 0.8dB noise figure. It can be biased from a single positive supply of 5V. It provides power down mode in each channel.



M3506-PDS-F01

Figure 1. M3506 Functional Block Diagram

2. Applications

- RX Modules

3. Features[1]

- Frequency Range: 7-9.5GHz
- Typical Gain: 22dB
- Noise Figure: 0.8dB
- Input/Output Return Loss: -13dB/-11dB
- Isolation (Channel to Channel): 45dB
- Output P_{-1dB}: 6dBm
- Single Positive Supply: +5V (I_{DQ}=30mA)
- Power Down Control Voltage: 0/+5V
- Die Size: 1.50 x 2.50 x 0.10mm

[1] On-wafer Test

4. Brief Typical Performance

Table 1. Brief Typical Performance

Parameter	7GHz-9.5GHz	Units
Small-Signal Gain	22	dB
Noise Figure	0.8	dB
Input Return Loss	-13	dB
Output Return Loss	-11	dB
Isolation (Channel to Channel)	45	dB
Output P_{-1dB}	6	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
Supply Voltage, V_{CC}	-	5	-	V
Quiescent Current, I_{DQ}	-	30	-	mA
PD Control Voltage, V_{LOW}	-	0	0.5	V
PD Control Voltage, V_{HIGH}	-	5	-	V

6. RF Characteristics (T_C = 25˚C)

Table 3. RF Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Units
Small-Signal Gain	Gain	-	22	-	dB
Noise Figure	NF	-	0.8	-	dB
Input Return Loss	RL_{IN}	-	-13	-	dB
Output Return Loss	RL_{OUT}	-	-11	-	dB
Isolation (Channel to Channel)	ISO	-	45	-	dB
Output Power for 1dB Compression	OP_{-1dB}	-	6	-	dBm

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

■ Small-signal Characteristics Curve

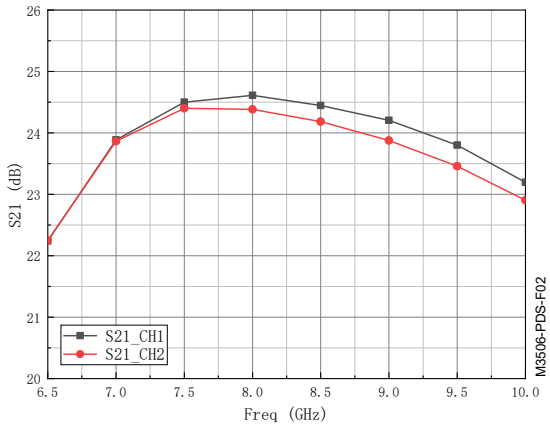


Figure 2. Small-signal Gain Characteristics

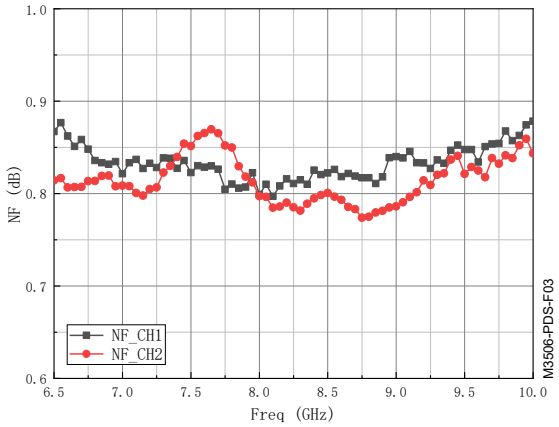


Figure 3. Noise Figure Characteristics

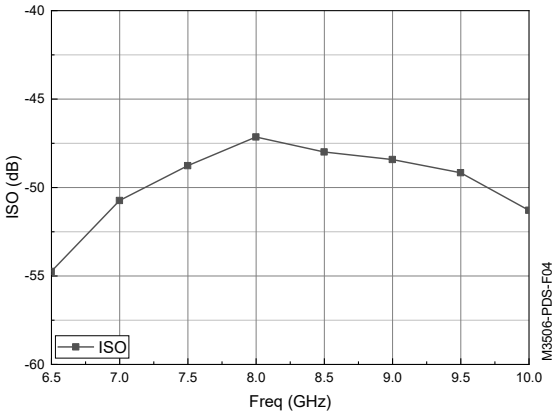


Figure 4. Isolation (Channel to Channel) Characteristics

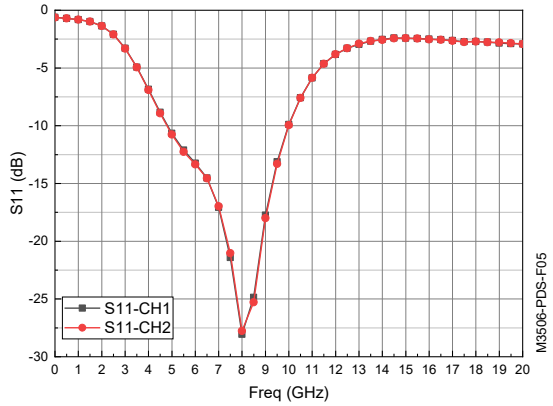


Figure 5. Input Return Loss Characteristics

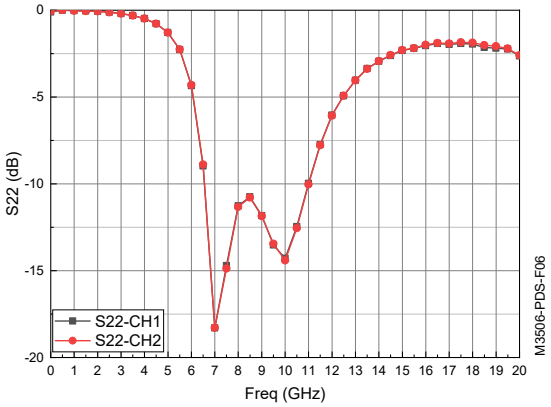


Figure 6. Output Return Loss Characteristics

■ Power Characteristic Curve

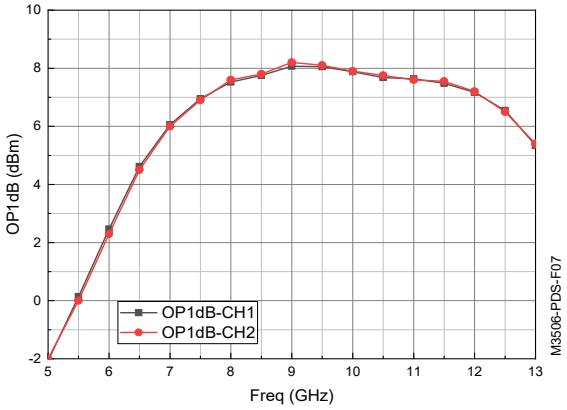
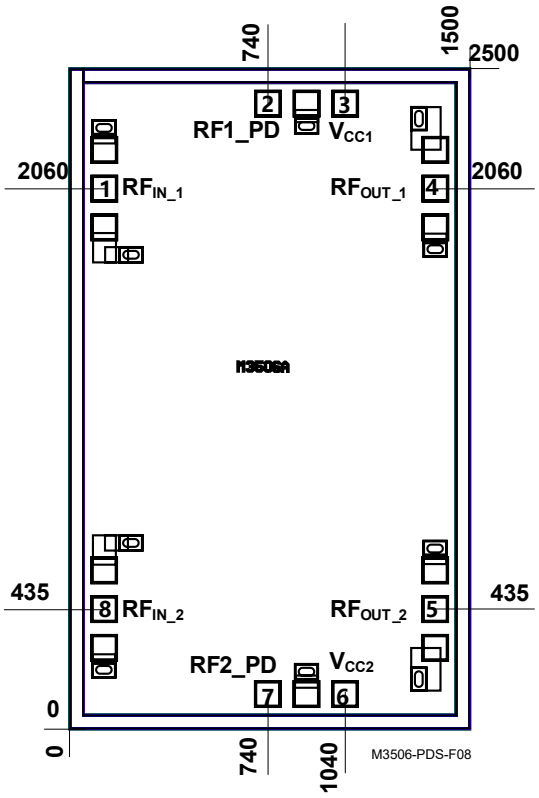


Figure 7. OP-1dB Characteristics

8. Outline Dimensions



• Dimensions shown in micrometre

Figure 8. M3506 Outline Dimensions

Table 4. Pad Description

Pad	Symbol	Description
1	RF_{IN}_1	Channel 1 RF Input
2	RF1_PD	LNA 1 Power Down Control Voltage
3	V_{CC1}	Supply Voltage for LNA1
4	RF_{OUT}_1	Channel 1 RF Output
5	RF_{OUT}_2	Channel 2 RF Output
6	V_{CC2}	Supply Voltage for LNA2
7	RF2_PD	LNA 2 Power Down Control Voltage
8	RF_{IN}_2	Channel 2 RF Input

Table 5. Truth Table

V_{CC1}	V_{CC2}	RF1_PD	RF2_PD	RF1	RF2
+5V	+5V	+5V	+5V	ON	ON
+5V	+5V	0V	+5V	OFF	ON
+5V	+5V	+5V	0V	ON	OFF
+5V	+5V	0V	0V	OFF	OFF

9. Assembly Information

■ Assembly Diagram

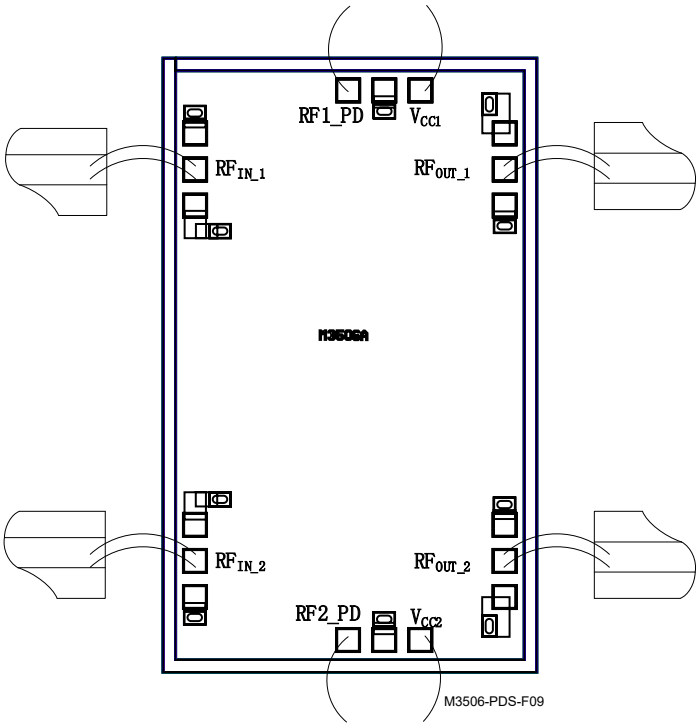


Figure 9. M3506 Assembly Diagram

- **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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