1. Description

- The M3506P is is a dual channel low noise amplifier fabricated on GaAs p-HEMT MMIC process in a 2.5mm x 3.5mm LGA package. It operates over 7-9.5GHz and provides 21dB gain with 1.1dB noise figure. It can be biased from a single positive supply of 5V. It provides power down mode in each channel.



M3506P-PDS-F01

Figure 1. M3506P Package Outline

2. Applications

- RX Modules

3. Features

- Frequency Range: 7-9.5GHz
- Typical Gain: 21dB
- Noise Figure: 1.1dB
- Input/Output Return Loss: -12dB
- Isolation (Channel to Channel): 31dB
- Output P_{-1dB}: 6dBm
- Single Positive Supply: +5V (I_{DQ}=30mA)
- Power Down Control Voltage: 0/+5V
- Package Size: 2.50 x 3.50 x 0.67mm

4. Brief Typical Performance

Table 1. Brief Typical Performance

Parameter	7GHz-9.5GHz	Units
Small-Signal Gain	21	dB
Noise Figure	1.1	dB
Input Return Loss	-15	dB
Output Return Loss	-12	dB
Isolation (Channel to Channel)	31	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	85	°C
Supply Voltage, V_{CC}	-	5	-	V
Quiescent Current, I_{DQ}	-	30	-	mA
Control Voltage, V_{LOW}	-	0	0.5	V
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	-	21	-	dB
Noise Figure	NF	-	1.1	-	dB
Input Return Loss	RL_{IN}	-	-15	-	dB
Output Return Loss	RL_{OUT}	-	-12	-	dB
Isolation (Channel to Channel)	ISO	-	31	-	dB
Output Power for 1dB Compression	OP_{-1dB}	-	6	-	dBm

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

■ Small-signal Characteristics Curve

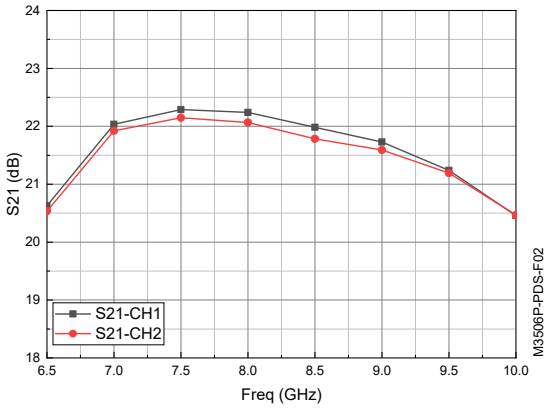


Figure 2. Noise Figure Characteristics

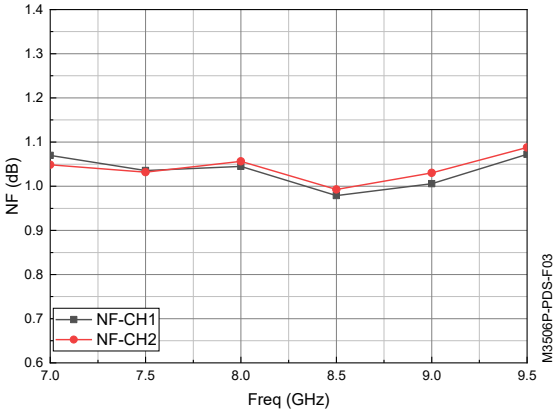


Figure 3. Gain Characteristics

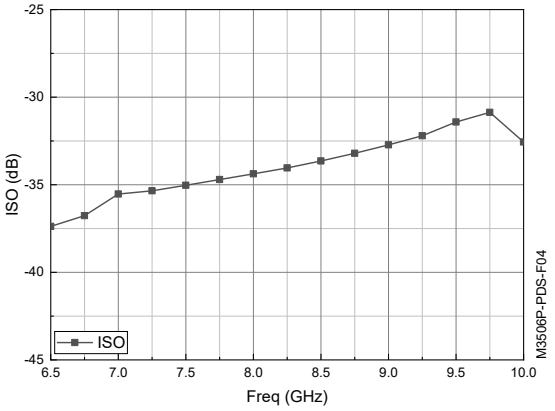


Figure 4. Isolation (Channel to Channel) Characteristics

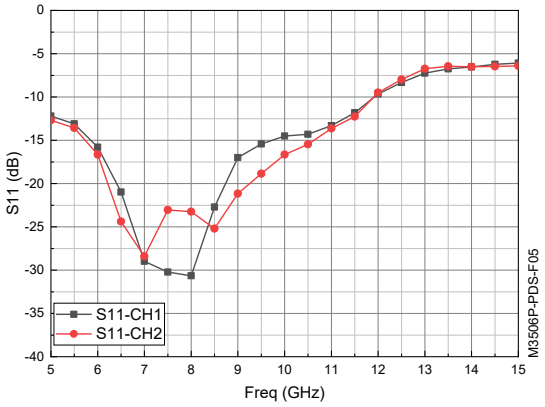


Figure 5. Input Return Loss Characteristics

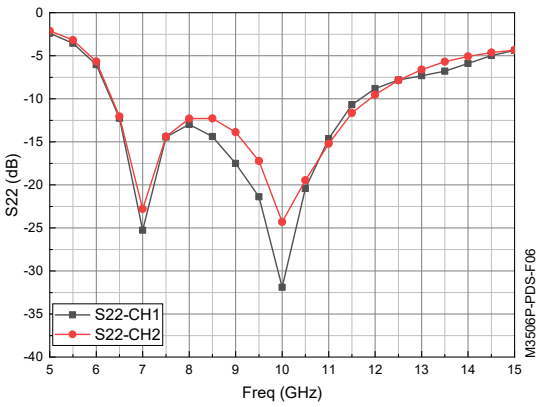


Figure 6. Output Return Loss Characteristics

■ Power Characteristic Curve

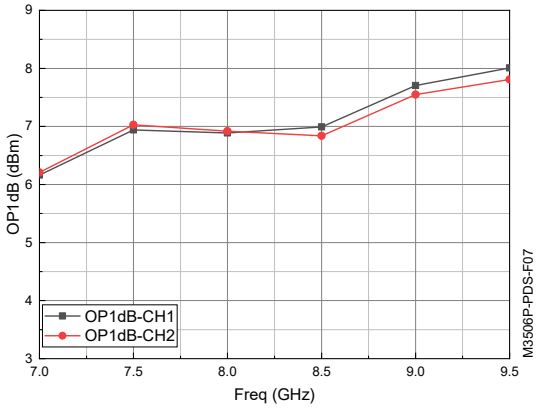
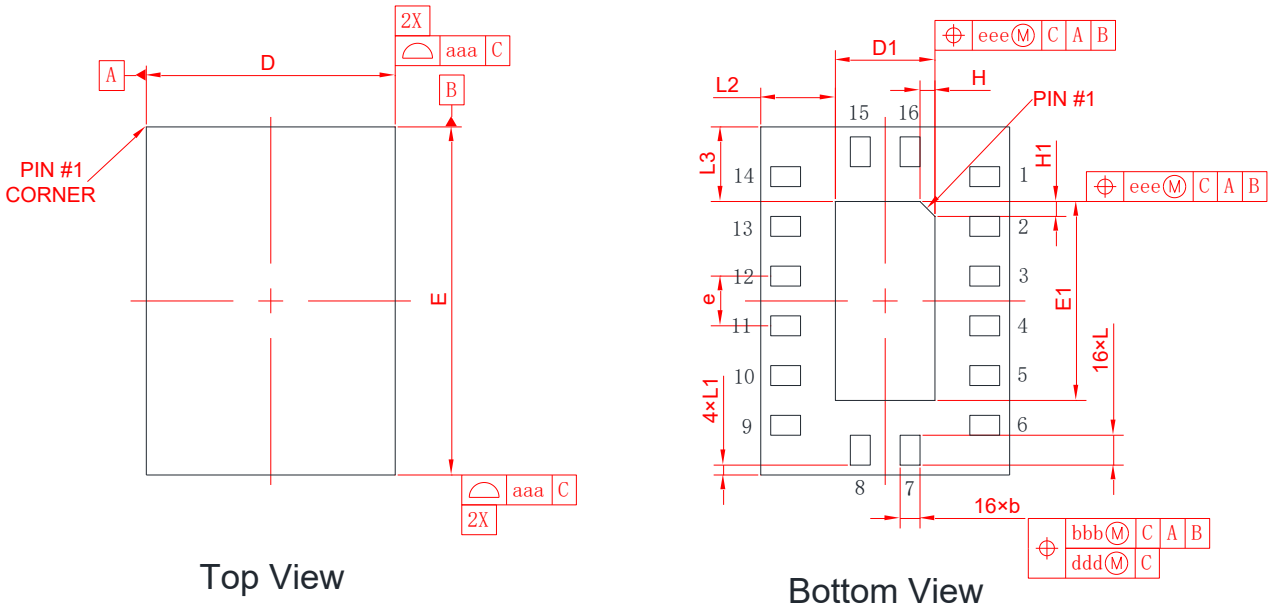
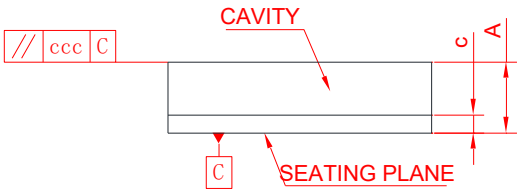


Figure 7. OP-1dB Characteristics

8. Package Outline





symbol	Dimension in mm			Dimension in inch		
	MIN	NOM	MAX	MIN	NOM	MAX
A	0.570	0.670	0.770	0.022	0.026	0.030
c	0.140	0.170	0.200	0.006	0.007	0.008
D	2.400	2.500	2.600	0.094	0.098	0.102
E	3.400	3.500	3.600	0.134	0.138	0.142
D1	0.900	1.000	1.100	0.035	0.039	0.043
E1	1.900	2.000	2.100	0.075	0.079	0.083
H	---	0.150	---	---	0.006	---
H1	---	0.150	---	---	0.006	---
L	0.225	0.300	0.375	0.009	0.012	0.015
L1	0.025	0.100	0.175	0.001	0.004	0.007
L2	0.675	0.750	0.825	0.027	0.030	0.032
L3	0.675	0.750	0.825	0.027	0.030	0.032
e	---	0.500	---	---	0.020	---
b	0.150	0.200	0.250	0.006	0.008	0.010
aaa	0.100			0.004		
bbb	0.150			0.006		
ccc	0.100			0.004		
ddd	0.050			0.002		
eee	0.150			0.006		

M3506P-PDS-F08

- Dimensions shown in micrometre

Figure 8. M3506P Outline Dimensions

Table 4. PIN Description

Pad	Symbol	Description
2	RF_{IN_1}	Channel 1 RF Input
16	RF1_PD	LNA 1 Power Down Control Voltage
15	V_{CC1}	Supply Voltage for LNA1
13	RF_{OUT_1}	Channel 1 RF Output
10	RF_{OUT_2}	Channel 2 RF Output
8	V_{CC2}	Supply Voltage for LNA2
7	RF2_PD	LNA 2 Power Down Control Voltage
5	RF_{IN_2}	Channel 2 RF Input
1,3,4,6,9,11,12,14	GND	GND

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. Application Circuit

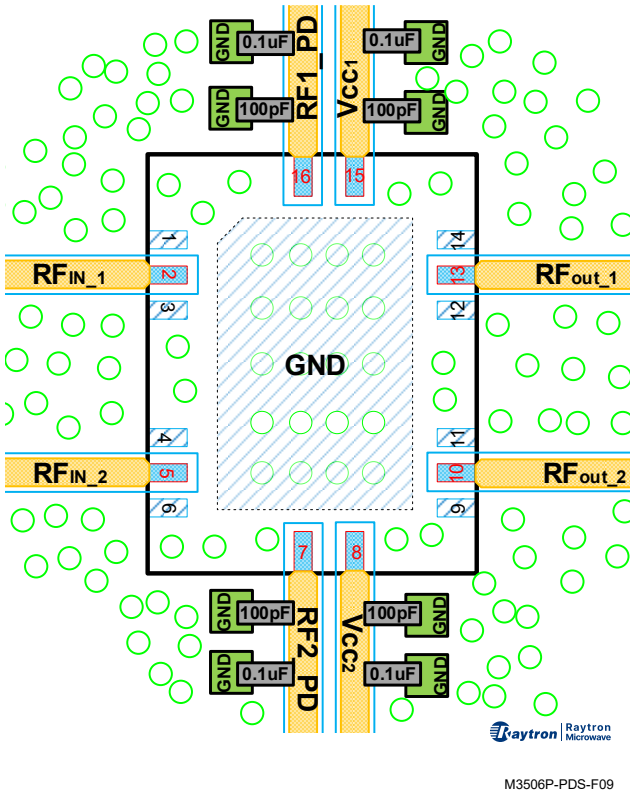


Figure 9. M3506P Application Diagram

10. Recommended Solder Temperature Profile

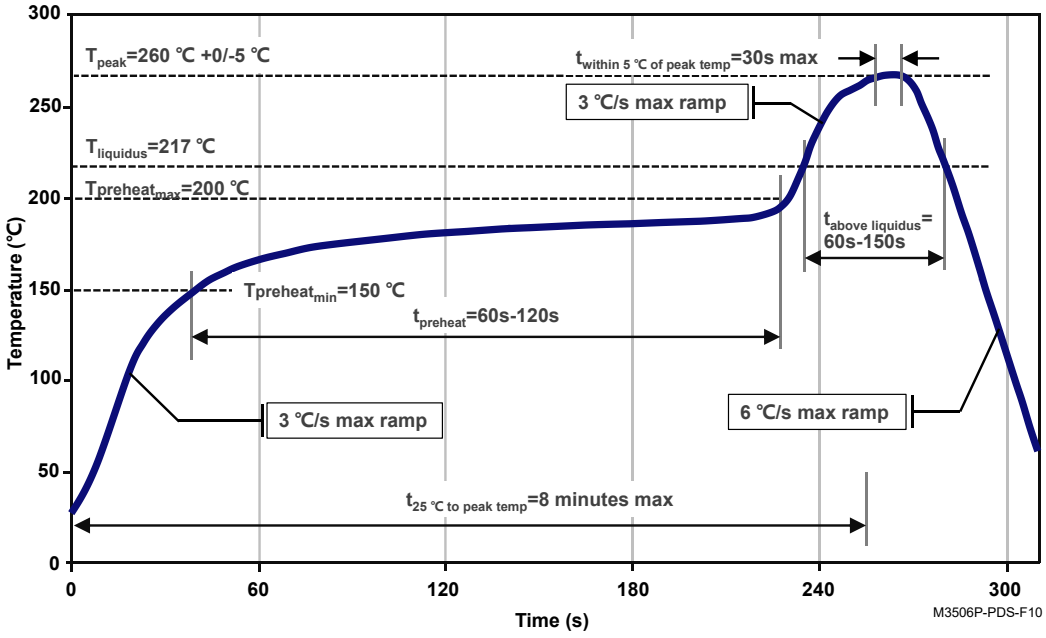


Figure 10. Recommended Solder Temperature Profile

11. Handling Precautions

- **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.



12. 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

13. Disclaimer

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