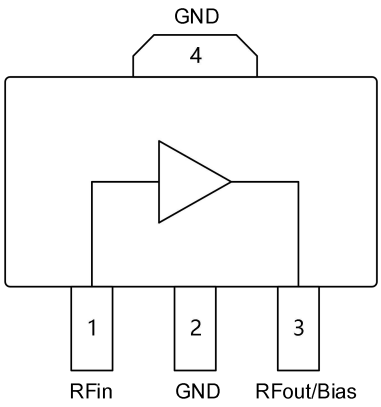
★1.Product Features

- Operating frequency: 1 MHz ~ 4 GHz
- Small-signal gain: 22.7 dB @ 2000 MHz
- Noise figure: 1.2 dB @ 2000 MHz
- Output third-order intercept point: 38.5 dBm @ 800 MHz, 35.9 dBm @ 2000 MHz
- Output 1 dB compression power: 22.6 dBm @ 800 MHz, 23.2 dBm @ 2000 MHz
- Vdd = +5 V, quiescent operating current 130 mA
- Package: SOT89 (plastic)

Applications

- Cellular systems
- PCS
- GSM
- Satellite navigation
- IF amplifiers

Functional Block Diagram



★2.Product Introduction

TF9112UB is a high-linearity low noise amplifier MMIC chip designed based on the GaAs process. The product covers a frequency range of 1 MHz ~ 4 GHz and is internally matched to 50 Ω; the RF input and output ports only require external DC-blocking capacitors. The on-chip active bias network keeps the quiescent current independent of process and temperature. Operating with a single +5 V supply, the product features high reliability, high linearity, low noise and a general-purpose package, making it suitable for systems requiring high dynamic range.

★3.Specifications

+5V Electrical Performance Parameters

Parameter	Min	Typ	Max	Unit	Test Condition
Small-Signal Gain	—	28.6	—	dB	1 MHz
	—	22.7	—	dB	2000 MHz
	—	19.5	—	dB	4000 MHz
Output P1dB	—	22.6	—	dBm	800 MHz
	—	23.2	—	dBm	2000 MHz
Output Third-Order Intercept Point (OIP3)	—	38.5	—	dBm	800 MHz
	—	35.9	—	dBm	2000 MHz

Parameter	Min	Typ	Max	Unit	Test Condition
Noise Figure	—	1.2	—	dB	2000 MHz
Input Return Loss	—	-22.1	—	dB	2000 MHz
Output Return Loss	—	-12.9	—	dB	2000 MHz
Reverse Isolation	—	-30.4	—	dB	2000 MHz
Supply Voltage	—	+5	—	V	—
Quiescent Current	—	130	—	mA	—

★4.Absolute Maximum Ratings and Recommended Operating Conditions

Absolute Maximum Ratings

- Maximum operating voltage (Vdd): +6 V
- Maximum RF input power: +20 dBm

Recommended Operating Conditions

- Supply voltage: +5 V
- Quiescent operating current: 130 mA
- Storage temperature: -65℃ ~ +150℃
- Operating temperature: -40℃ ~ +85℃

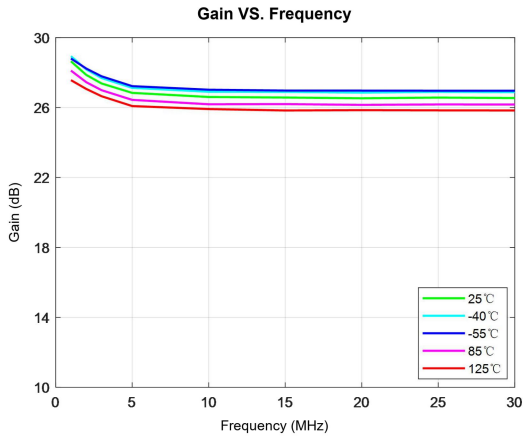
Note: The absolute maximum ratings are the limiting values that the device can withstand; exceeding them may cause permanent damage to the device. Long-term operation under the absolute maximum rating conditions may affect the reliability of the device.

★5.Typical Performance Characteristics (EVB Test Results)

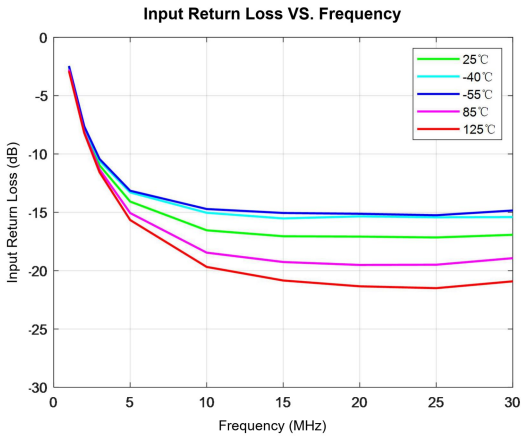
+5 V supply Demo board test results (1 MHz ~ 30 MHz)

Parameter	Typical Value									Unit
Frequency	1	2	3	5	10	15	20	25	30	MHz
Small-Signal Gain	28.6	27.9	27.4	26.8	26.6	26.6	26.5	26.6	26.5	dB
Input Return Loss	-2.5	-7.8	-11.0	-14.1	-16.5	-17.1	-17.1	-17.2	-16.9	dB
Output Return Loss	-5.5	-9.6	-10.5	-9.9	-9.7	-9.7	-9.6	-9.8	-9.6	dB
Reverse Isolation	-36.6	-31.6	-30.5	-30.5	-30.2	-29.7	-30.1	-30.2	-30.2	dB
Noise Figure	—	—	—	—	1.1	1.3	1.1	1.1	1.0	dB
Output P1dB	19.2	19.4	19.5	19.5	19.5	19.5	19.7	19.9	20.0	dBm
Output IP3	33.2	31.3	36.5	36.6	37.2	37.0	36.8	37.2	37.2	dBm
Test conditions: Vdd = +5V, I = 130mA, OIP3 spacing = 1MHz, Pout = 5dBm/tone, R = 0Ω, TA = +25°C (BIAS)										

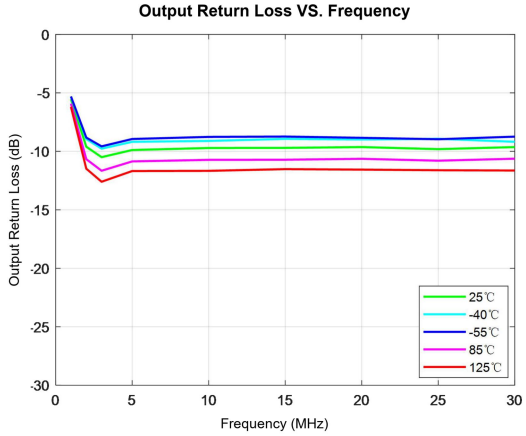
Small-Signal Gain vs. Frequency



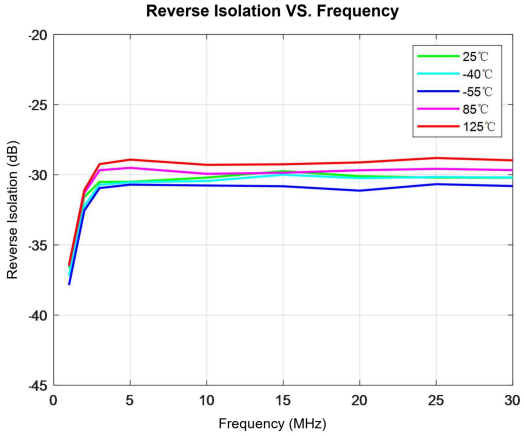
Input Return Loss vs. Frequency



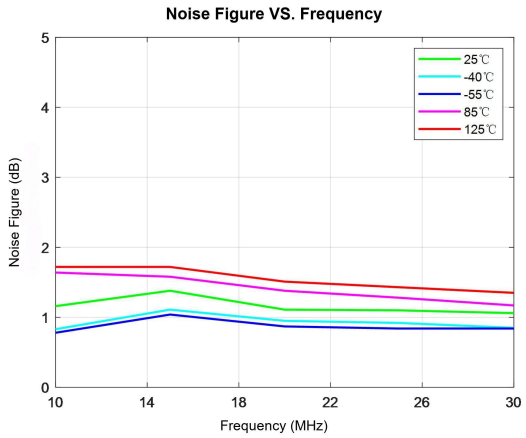
Output Return Loss vs. Frequency



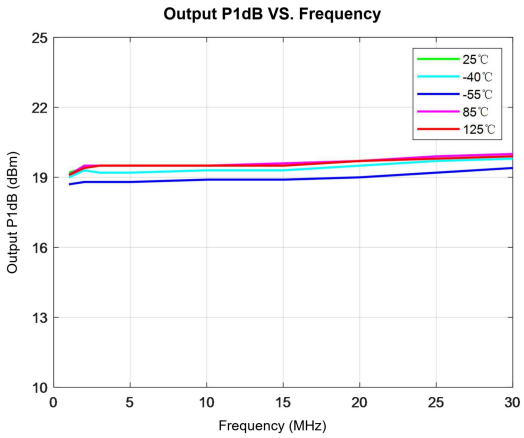
Reverse Isolation vs. Frequency



Noise Figure vs. Frequency

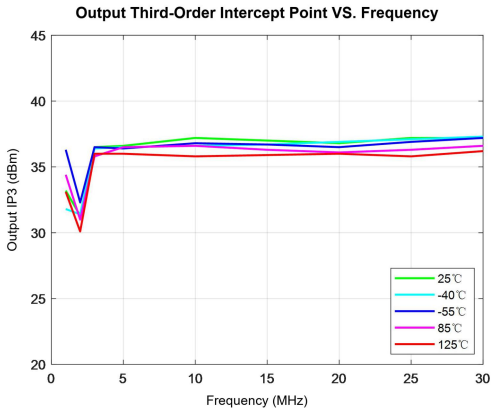


Output P1dB vs. Frequency



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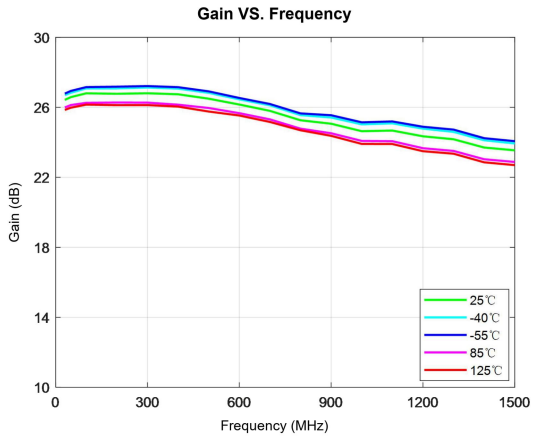
Output IP3 vs. Frequency



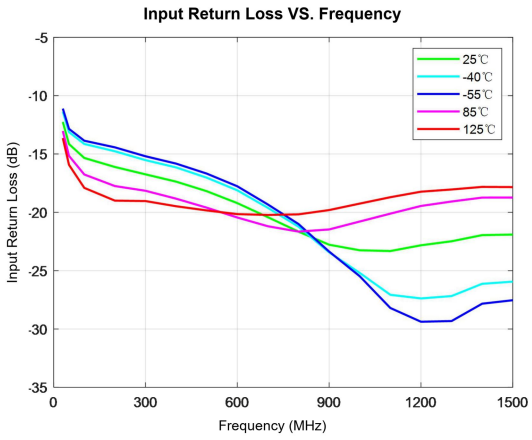
+5 V supply Demo board test results (30 MHz ~ 1500 MHz)

Parameter	Typical Value										Unit
Frequency	30	300	600	800	1000	1100	1200	1300	1400	1500	MHz
Small-Signal Gain	26.5	26.8	26.2	25.3	24.6	24.7	24.3	24.2	23.7	23.5	dB
Input Return Loss	-15.6	-16.7	-32.7	-21.7	-23.3	-23.3	-22.8	-22.5	-22.0	-21.9	dB
Output Return Loss	-9.6	-11.2	-20.7	-15.6	-16.0	-15.5	-14.7	-13.9	-13.1	-12.5	dB
Reverse Isolation	-30.3	-29.8	-29.4	-29.7	-29.9	-30.1	-30.2	-30.4	-30.5	-30.5	dB
Noise Figure	0.9	0.9	1.0	0.9	0.9	0.9	1.0	1.0	1.0	1.0	dB
Output P1dB	20.0	22.6	22.8	22.6	22.2	22.1	22.3	22.5	22.6	22.5	dBm
Output IP3	36.9	39.9	37.9	38.5	37.9	38.2	38.6	38.1	37.2	37.3	dBm
Test conditions: Vdd = +5V, I = 130mA, OIP3 spacing = 1MHz, Pout = 5dBm/tone, R = 0Ω, TA = +25°C (BIAS)											

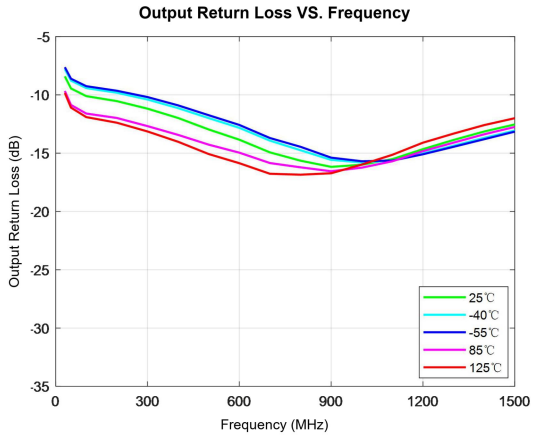
Small-Signal Gain vs. Frequency



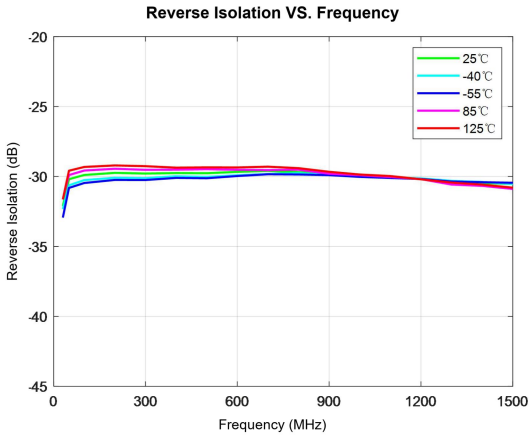
Input Return Loss vs. Frequency



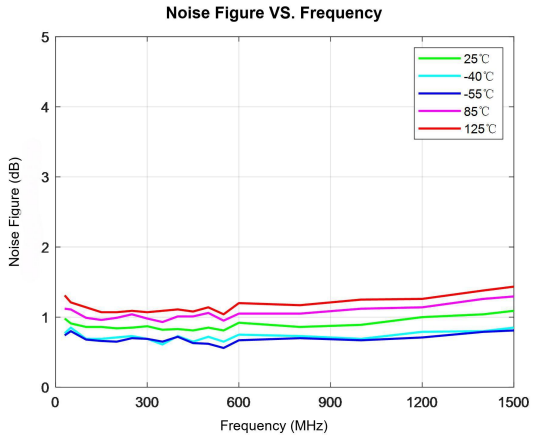
Output Return Loss vs. Frequency



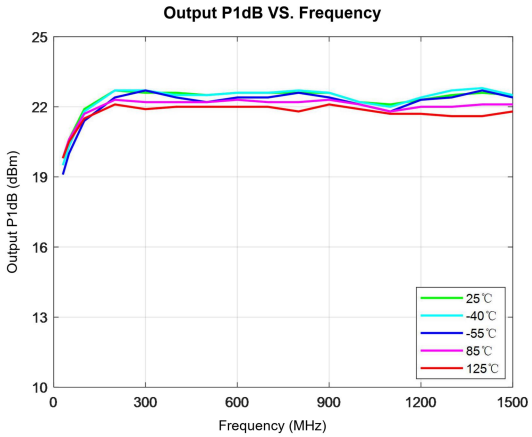
Reverse Isolation vs. Frequency



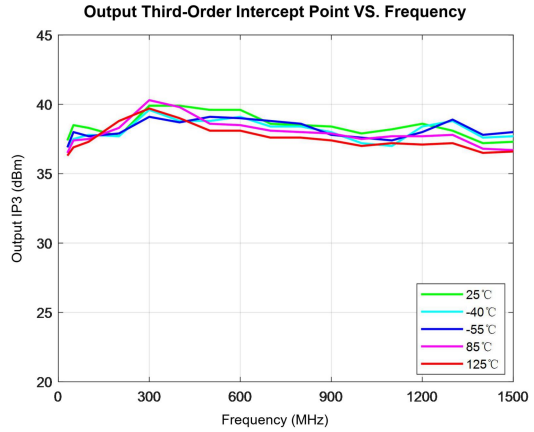
Noise Figure vs. Frequency (30 MHz ~ 1500 MHz)



Output P1dB vs. Frequency (30 MHz ~ 1500 MHz)



Output IP3 vs. Frequency (30 MHz ~ 1500 MHz)

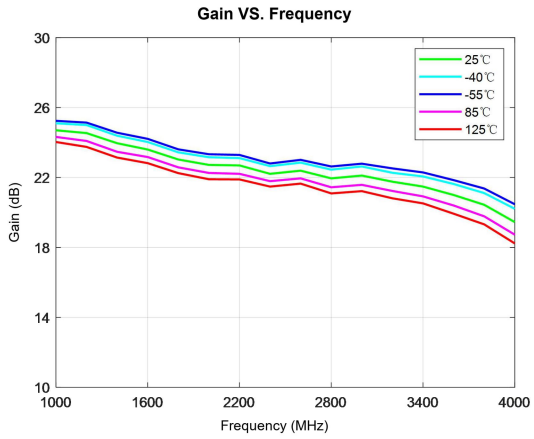


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Address: Building 16, Area C, Entrepreneurship and R&D Park, Xi'an High-tech Industrial Development Zone, China

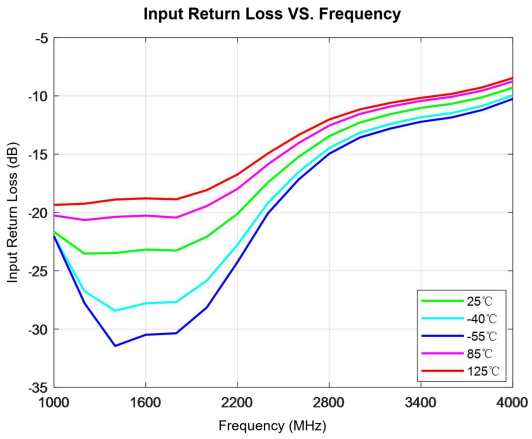
+5 V supply Demo board test results (1000 MHz ~ 4000 MHz)

Parameter	Typical Value										Unit
Frequency	1000	1400	1800	2000	2400	2800	3000	3400	3800	4000	MHz
Small-Signal Gain	24.6	24.0	23.0	22.7	22.2	21.9	22.1	21.5	20.4	19.5	dB
Input Return Loss	-23.3	-23.5	-23.3	-22.1	-17.4	-13.4	-12.3	-11.0	-10.1	-9.3	dB
Output Return Loss	-16.0	-15.3	-13.2	-12.9	-14.0	-17.3	-19.1	-18.9	-17.7	-17.9	dB
Reverse Isolation	-29.9	-30.0	-30.3	-30.4	-30.7	-30.6	-30.8	-30.2	-29.6	-29.5	dB
Noise Figure	0.9	1.0	1.2	1.2	1.2	1.4	1.4	1.6	1.8	1.9	dB
Output P1dB	22.2	22.7	22.9	23.2	22.3	21.1	20.3	18.5	18.1	17.1	dBm
Output IP3	37.9	36.9	36.7	35.9	35.4	33.2	33.2	31.3	30.5	30.5	dBm
Test conditions: Vdd=+5 V, I=130 mA, OIP3 spacing=1 MHz, Pout=5 dBm/tone, RBIAS=0 Ω, TA=+25℃											

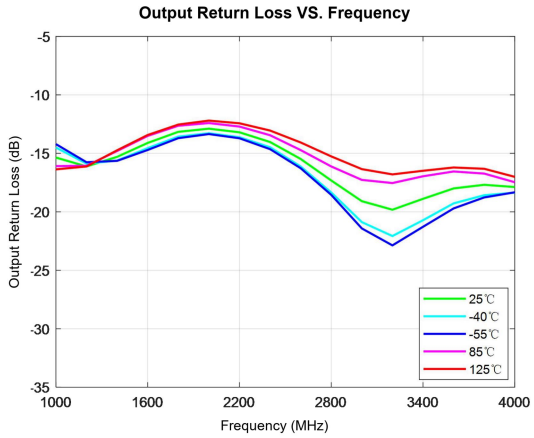
Small-Signal Gain vs. Frequency



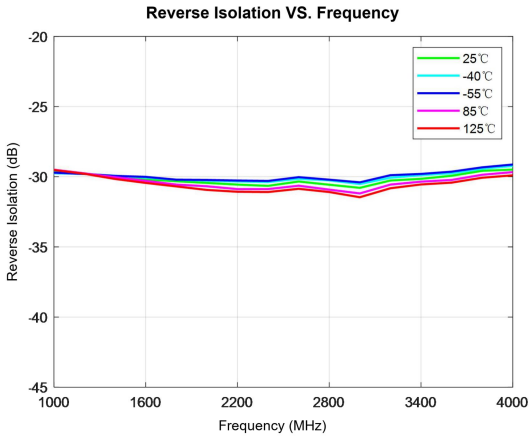
Input Return Loss vs. Frequency



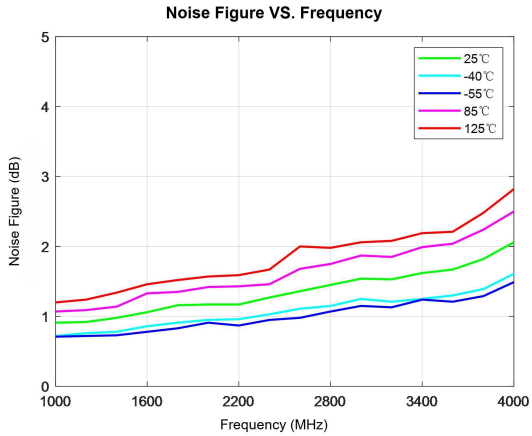
Output Return Loss vs. Frequency



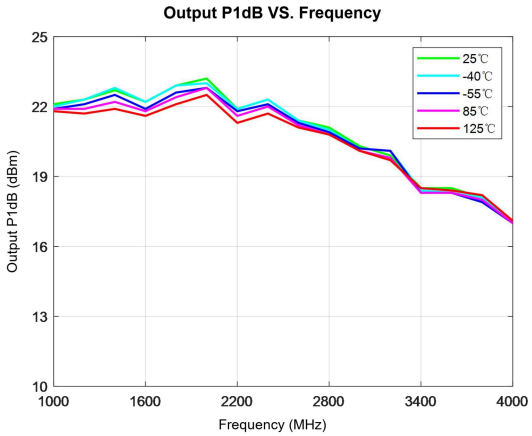
Reverse Isolation vs. Frequency



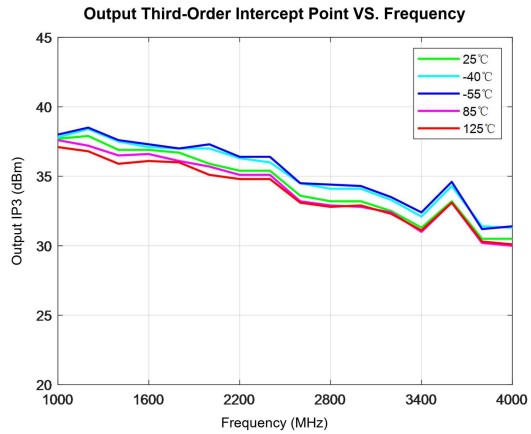
Noise Figure vs. Frequency



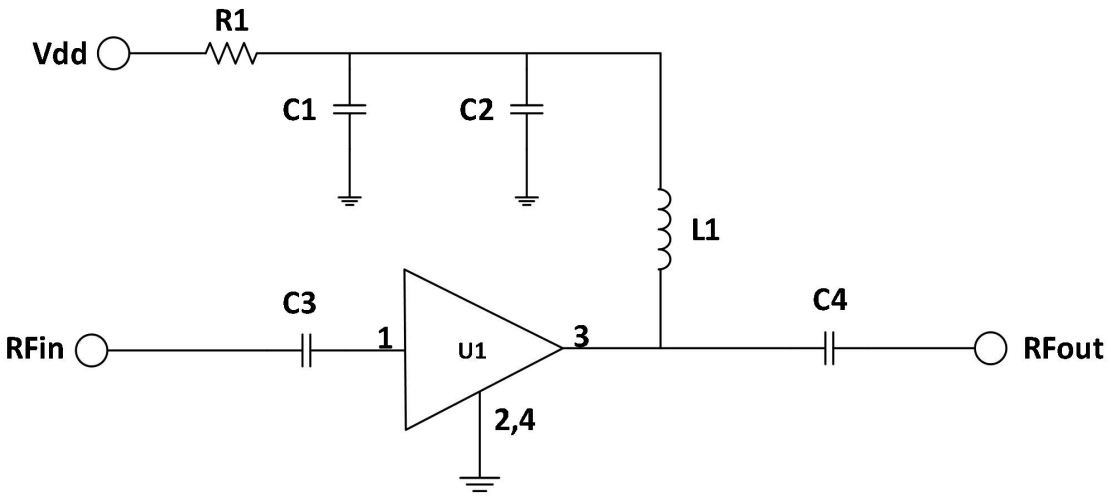
Output P1dB vs. Frequency



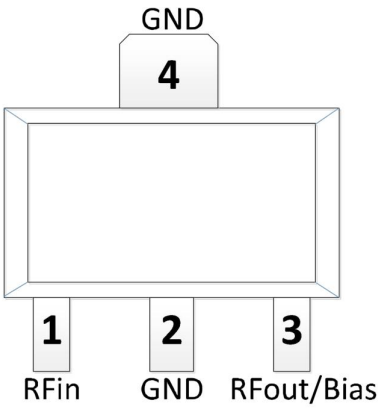
Output IP3 vs. Frequency



★6.Typical Application Circuit



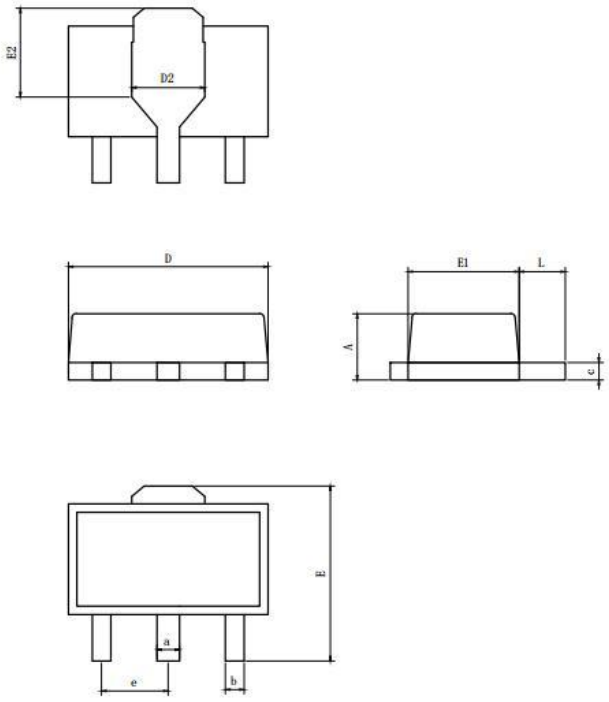
★7.Pin Description



Pinout

Pin Number	Pin Name	Description
1	RFin	RF input pin; DC-coupled and internally matched to 50 Ω, external DC-blocking capacitor required.
2,4	GND	Ground pins; these pins and the package substrate must be connected to RF/DC ground.
3	RFout/Bias	RF output and DC bias supply pin; DC-coupled and internally matched to 50 Ω, external DC-blocking capacitor required.

★8.Package Information



Symbol	Min	Nom	Max
A	1.40	1.50	1.60
b	0.37	0.42	0.45
c	0.38	—	0.42
a	0.45	0.48	0.51
D	4.40	4.50	4.60
E	4.00	4.10	4.20
E1	2.40	2.50	2.60
e	1.50 BSC		
L	0.89	1.045	1.20
D2	1.50	1.60	1.70
E2	2.218	2.318	2.418