

Product Features

Operating Frequency: 4GHz~8GHz

Gain: 22.5dB@6GHz

Noise Figure: 1.32dB@6GHz

Output Power for 1dB Compression:

18.3dBm@6GHz

Output Third-Order Interception:

28.9dBm@6GHz

+3.3V/+5V Single Power Supply

Supply Current:

68mA @ Vdd=5V (Normal Operation Mode)

45mA @ Vdd=5V (Low-power Operation Mode)

36mA @ Vdd=3.3V (Normal Operation Mode)

Package: QFN16 (3mm×3mm)

Applications

Radar and Electronic Countermeasures

Military and Aerospace

Navigation Equipment

Test Instrumentation

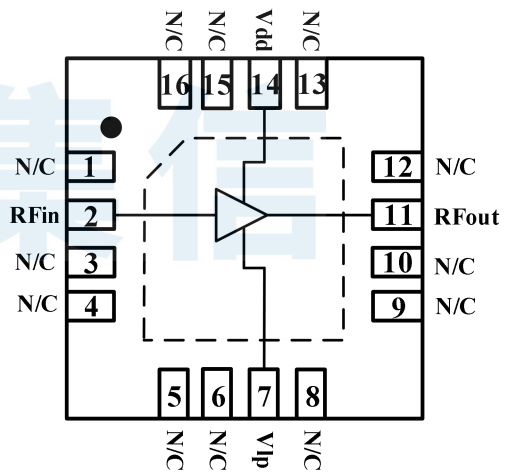
Ordering Information

Part Number	Package	Description
BR9375FDJ	QFN16	4GHz~8GHz Low-Noise Amplifier

General Description

BR9375FDJ is a MMIC low noise amplifier manufactured using GaAs process which operates between 4GHz and 8GHz. The amplifier is powered by a single supply operation of +5V or +3.3V. It has been internally matched to 50 ohms and AC coupled, thereby eliminating the need for external DC blocks and RF port matching. The product has the characteristics of high gain, high flatness, high reliability, low power consumption, low noise and other features, which can be widely used in radar receiving and transmitting systems.

Functional Block Diagram



Electrical Specifications

Parameter	Test Conditions	Normal Mode with 5V (Typ.)	Low-Power Mode with 5V (Typ.)	Normal Mode with 3.3V (Typ.)	Units
Gain	4000MHz	21.9	21.1	20.5	dB
	8000MHz	21.9	21.1	20.1	
Output Power for 1dB Compression	4000MHz	16.9	14.3	12.3	dBm
	8000MHz	18.9	16.1	13.9	
Output Third-Order Interception	4000MHz	30.7	26.3	22.8	dBm
	8000MHz	27.4	27.1	25.4	
Noise Figure	4000MHz	1.46	1.40	1.39	dB
	8000MHz	1.59	1.38	1.46	
Input Return Loss	4000MHz	-26.4	-24.3	-20.4	dB
	8000MHz	-7.4	-6.7	-5.4	
Output Return Loss	4000MHz	-9.1	-9.6	-9.5	dB
	8000MHz	-16.2	-16.9	-19.5	
Reverse Isolation	4000MHz	-54.5	-55.0	-54.0	dB
	8000MHz	-36.3	-36.3	-34.5	
Supply Voltage	-	5	5	3.3	V
Supply Current	-	68	45	36	mA
Test Condition: OIP3 spacing=1MHz, Pout=5dBm/tone, TA=+25°C					

Absolute Maximum Ratings

Maximum Supply Voltage (Vdd): +6V

Maximum RF input Power: +20dBm

Recommended Operating Conditions

Supply Voltage: +3.3V/+5V

Supply Current:

68mA @ Vdd=5V (Normal Operation Mode)

45mA @ Vdd=5V (Low-power Operation Mode)

36mA @ Vdd=3.3V (Normal Operation Mode)

Operating Temperature: -55°C ~ +125°C

Storage Temperature: -65°C ~ +150°C

Note: Operation of the device outside the parameter ranges given absolute-maximum-ratings conditions may cause permanent damage, and exposure to absolute-maximum-ratings conditions for extended periods will affect the reliability.

ESD WARNING

ELECTROSTATIC SENSITIVE DEVICE

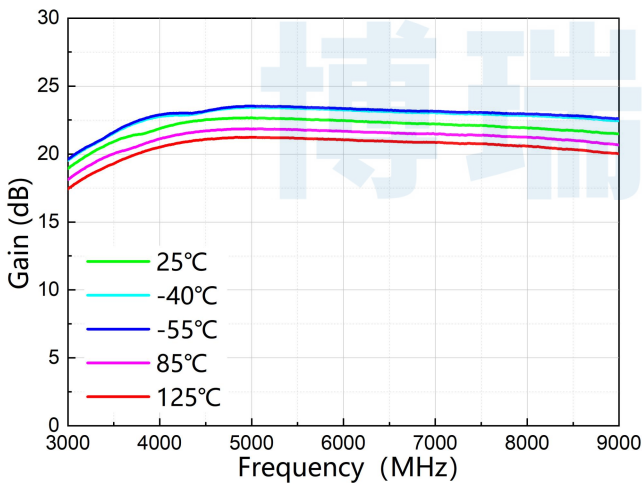
OBSERVE HANDLING PRECAUTIONS

ESD Rating: Class 1A

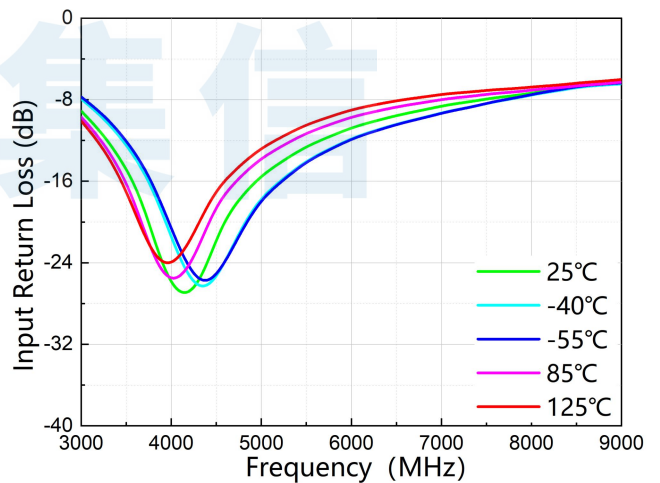
Typical Performance (EVB test results +5V supply voltage in normal operation mode)

Parameter	Typ.									Units
	4000	4500	5000	5500	6000	6500	7000	7500	8000	
Frequency	4000	4500	5000	5500	6000	6500	7000	7500	8000	MHz
Gain	21.9	22.5	22.7	22.6	22.5	22.3	22.2	22.1	21.9	dB
Input Return Loss	-26.4	-21.5	-15.7	-12.7	-10.8	-9.6	-8.7	-8.0	-7.4	dB
Output Return Loss	-9.1	-13.7	-20.4	-22.6	-18.2	-16.1	-15.1	-15.5	-16.2	dB
Reverse Isolation	-54.5	-46.4	-44.3	-43.0	-41.2	-40.8	-38.6	-40.0	-36.3	dB
Output Power for 1dB Compression	16.9	17.4	17.7	18.0	18.3	18.6	18.7	18.8	18.9	dBm
Output Third-Order Interception	30.7	30.5	30.0	29.3	28.9	28.5	28.1	27.6	27.4	dBm
Noise Figure	1.46	1.31	1.27	1.28	1.32	1.32	1.44	1.48	1.59	dB

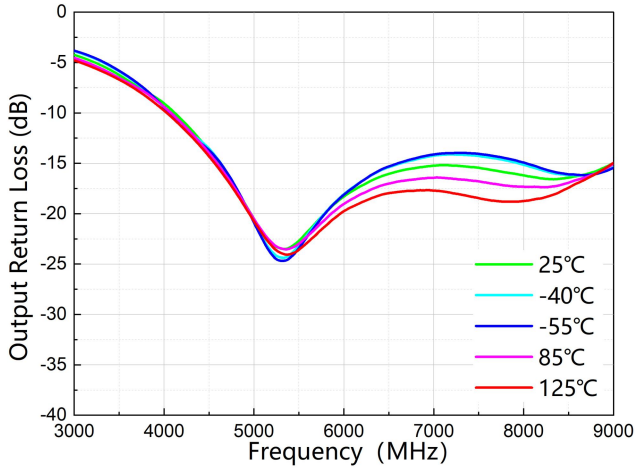
Test Conditions: Vdd=+5V, Idd=68mA, OIP3 spacing=1MHz/Tone, Pout=5dBm/tone, TA=+25°C



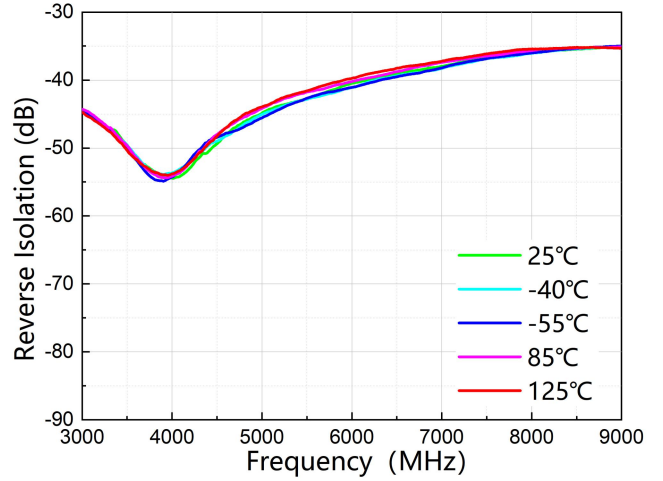
Gain vs. Freq



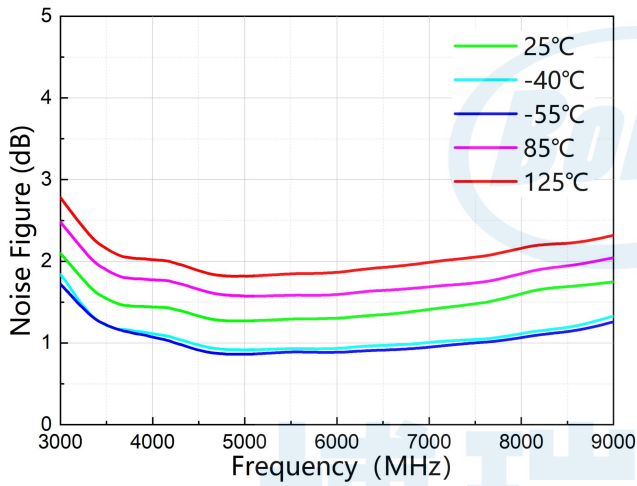
Input Return Loss vs. Freq



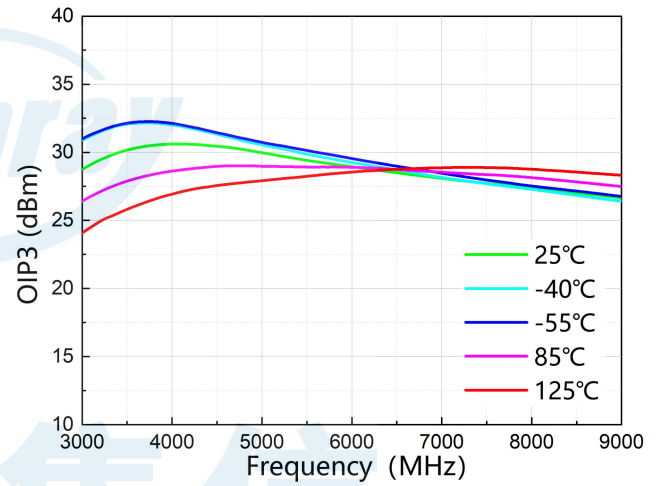
Output Return Loss vs. Freq



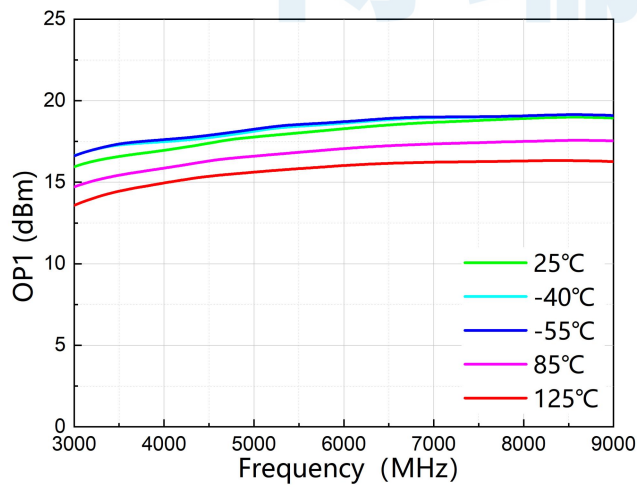
Reverse Isolation vs. Freq



Noise Figure vs. Freq



Output Third-Order Interception vs. Freq

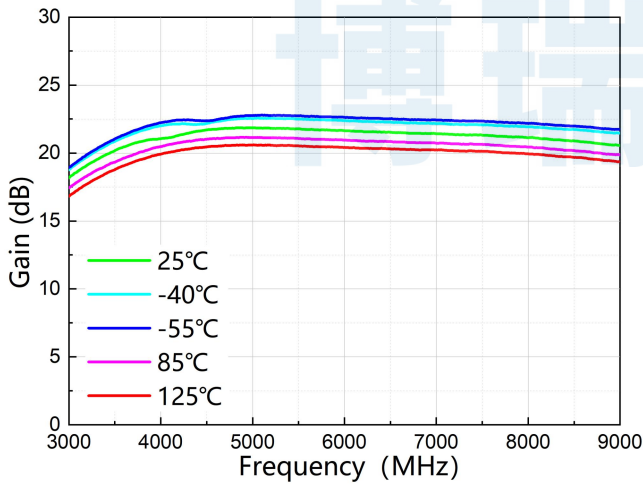


Output Power for 1dB Compression vs. Freq

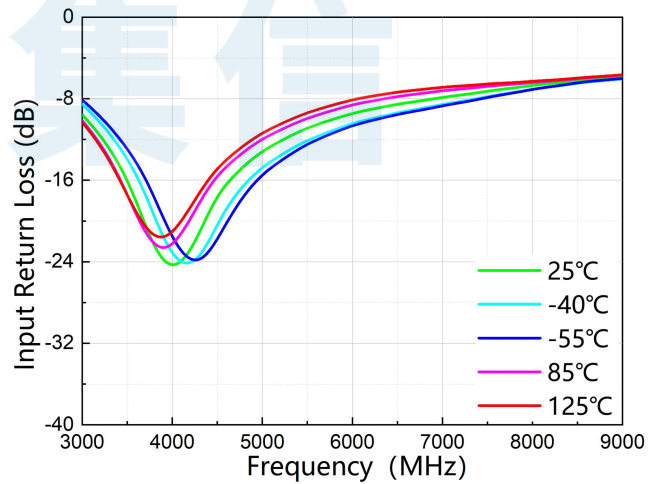
Typical Performance (EVB test results at +5V supply voltage in low-power operation mode)

Parameter	Typ.									Units
	4000	4500	5000	5500	6000	6500	7000	7500	8000	
Frequency	4000	4500	5000	5500	6000	6500	7000	7500	8000	MHz
Gain	21.1	21.7	21.9	21.8	21.6	21.5	21.4	21.3	21.1	dB
Input Return Loss	-24.3	-17.7	-13.3	-11.0	-9.5	-8.6	-7.9	-7.3	-6.7	dB
Output Return Loss	-9.6	-13.7	-20.7	-23.9	-19.1	-16.7	-15.8	-16.1	-16.9	dB
Reverse Isolation	-55.0	-47.3	-44.7	-42.4	-39.7	-37.8	-37.2	-36.4	-36.3	dB
Output Power for 1dB Compression	14.3	14.6	15.1	15.3	15.5	15.7	15.8	15.8	16.1	dBm
Output Third-Order Interception	26.3	26.7	26.9	27.1	27.1	27.2	27.2	27.3	27.1	dBm
Noise Figure	1.40	1.22	1.23	1.18	1.25	1.19	1.32	1.29	1.38	dB

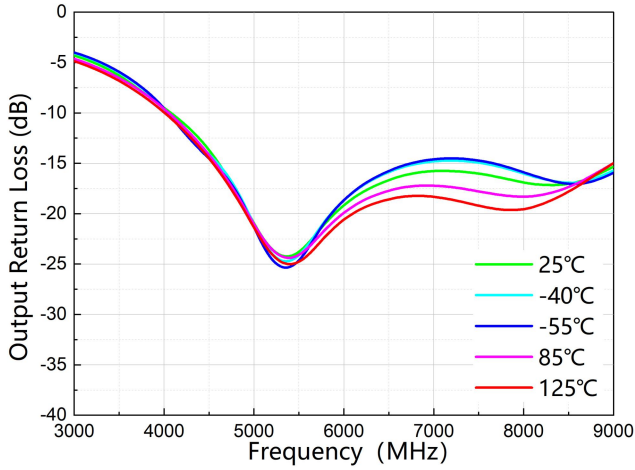
Test Conditions: Vdd=+5V, Idd=45mA, OIP3 spacing=1MHz/Tone, Pout=5dBm/tone, TA=+25°C



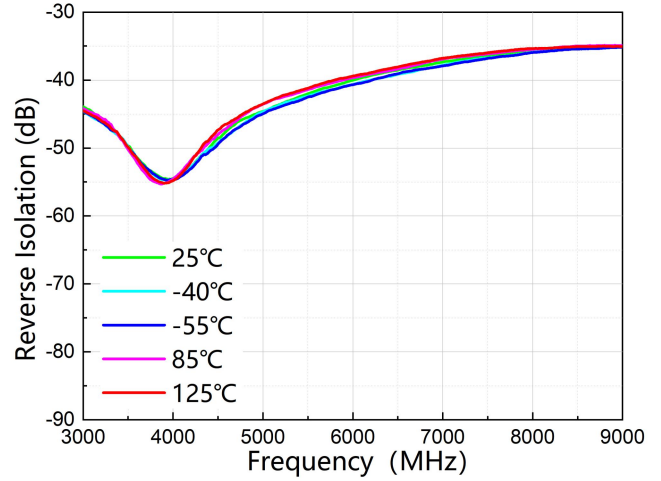
Gain vs. Freq



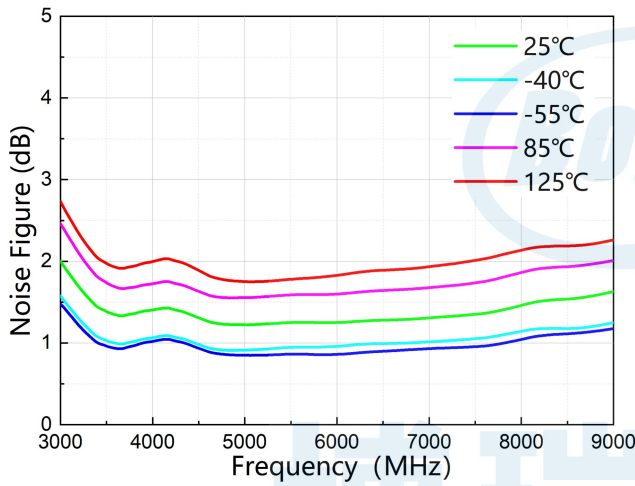
Input Return Loss vs. Freq



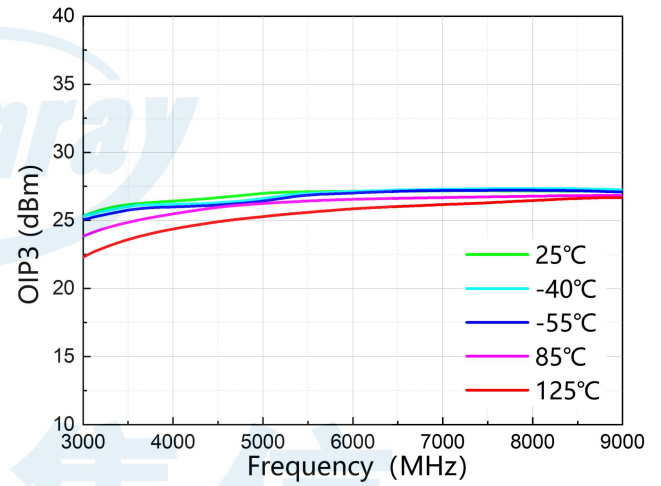
Output Return Loss vs. Freq



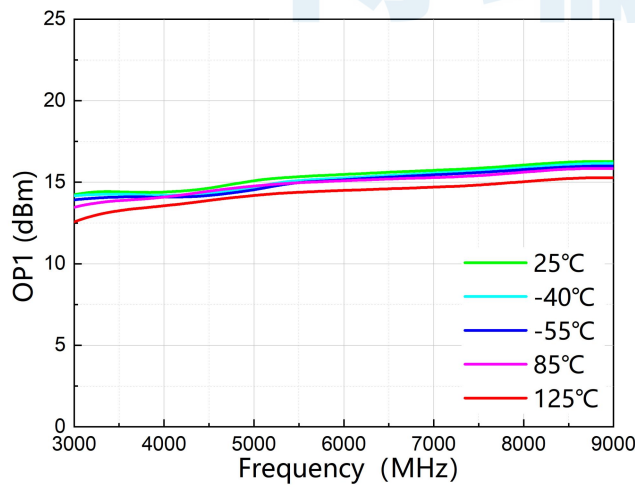
Reverse Isolation vs. Freq



Noise Figure vs. Freq



Output Third-Order Interception vs. Freq

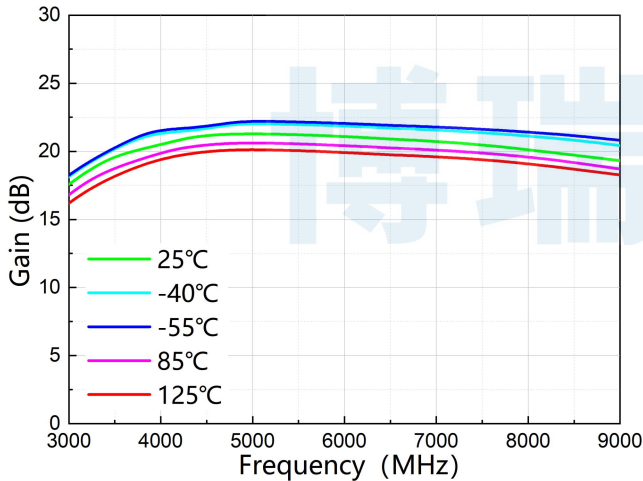


Output Power for 1dB Compression vs. Freq

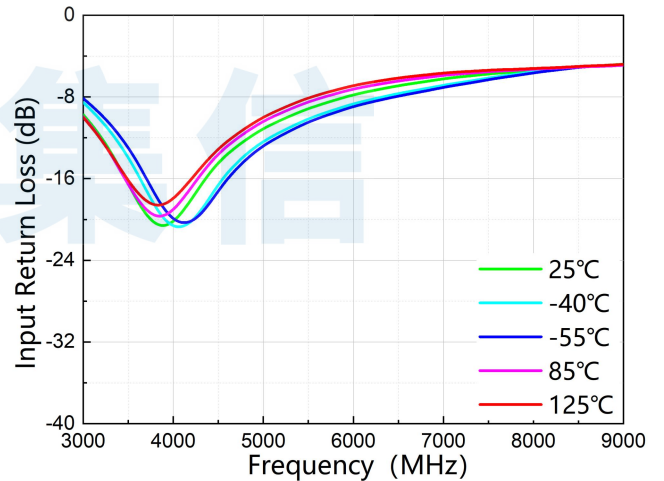
Typical Performance (EVB test results at +3.3V supply voltage in normal operation mode)

Parameter	Typ.									Units
	4000	4500	5000	5500	6000	6500	7000	7500	8000	
Frequency	4000	4500	5000	5500	6000	6500	7000	7500	8000	MHz
Gain	20.5	21.2	21.3	21.3	21.1	20.9	20.7	20.4	20.1	dB
Input Return Loss	-20.4	-14.5	-11.2	-9.2	-7.8	-6.9	-6.3	-5.8	-5.4	dB
Output Return Loss	-9.5	-14.1	-20.6	-23.8	-20.1	-18.3	-18.1	-18.7	-19.8	dB
Reverse Isolation	-54.0	-48.7	-43.0	-40.7	-38.7	-36.8	-35.6	-35.1	-34.5	dB
Output Power for 1dB Compression	12.3	12.6	13.1	13.1	13.4	13.4	13.6	13.5	13.9	dBm
Output Third-Order Interception	22.8	23.8	24.2	24.4	24.8	24.9	25.2	25.2	25.4	dBm
Noise Figure	1.39	1.21	1.18	1.19	1.24	1.22	1.38	1.37	1.46	dB

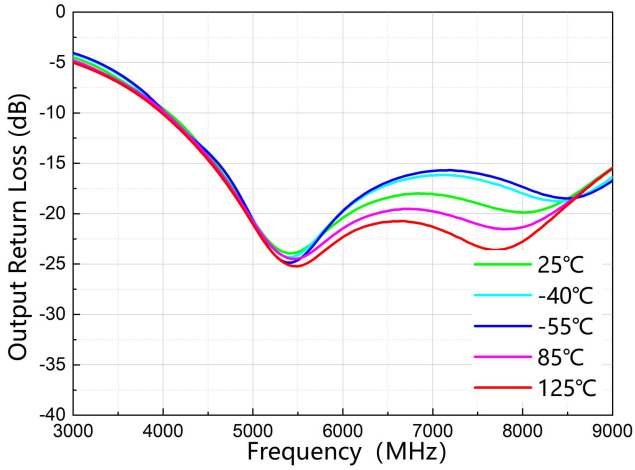
Test Conditions: Vdd=+3.3V, Idd=36mA, OIP3 spacing=1MHz/Tone, Pout=5dBm/tone, TA=+25°C



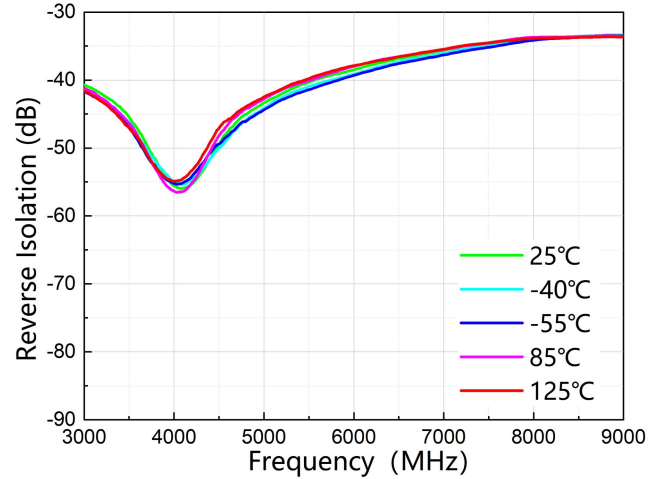
Gain vs. Freq



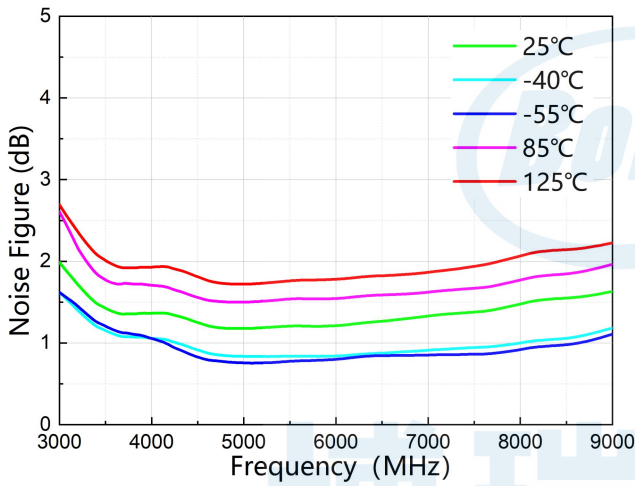
Input Return Loss vs. Freq



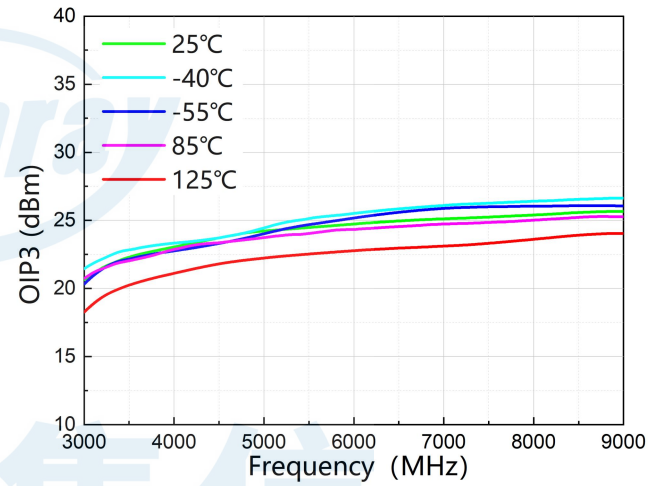
Output Return Loss vs. Freq



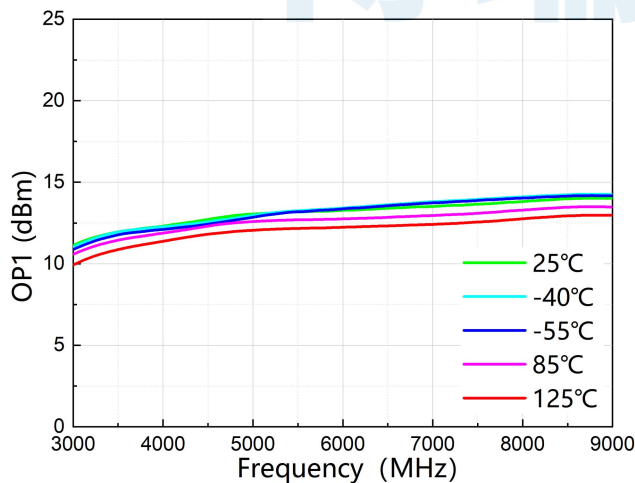
Reverse Isolation vs. Freq



Noise Figure vs. Freq

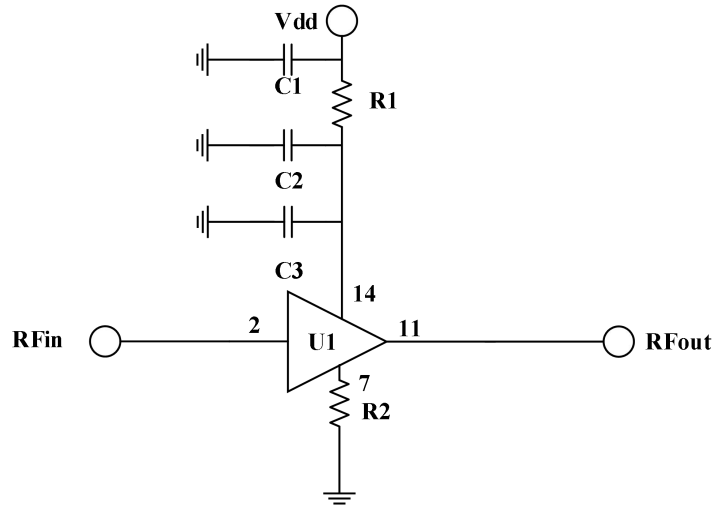


Output Third-Order Interception vs. Freq



Output Power for 1dB Compression vs. Freq

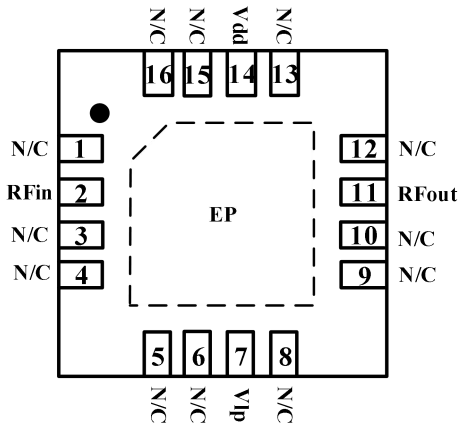
Typical Application Schematic



Bill of Material

Reference Designator	Package Size	Value	P/N
U1	QFN16	4GHz~8GHz Low Noise Amplifier	BR9375FDJ
C1	0603	1uF	GCM188R71C105KA64D
C2	0402	1nF	GCM155R71H102KA37D
C3	0402	100pF	GRM1555C1H101JA01D
R1	0402	0 Ω	RC0402FR-070RL
R2 (Normal operation mode)	/	Idle	/
R2 (Low-Power operation mode)	0402	0 Ω	RC0402FR-070RL

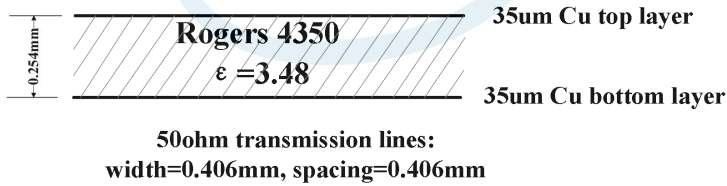
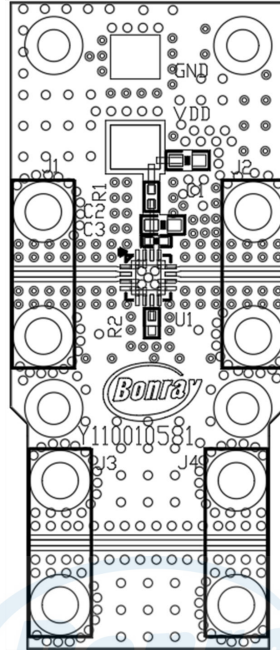
Pin Configuration and Description



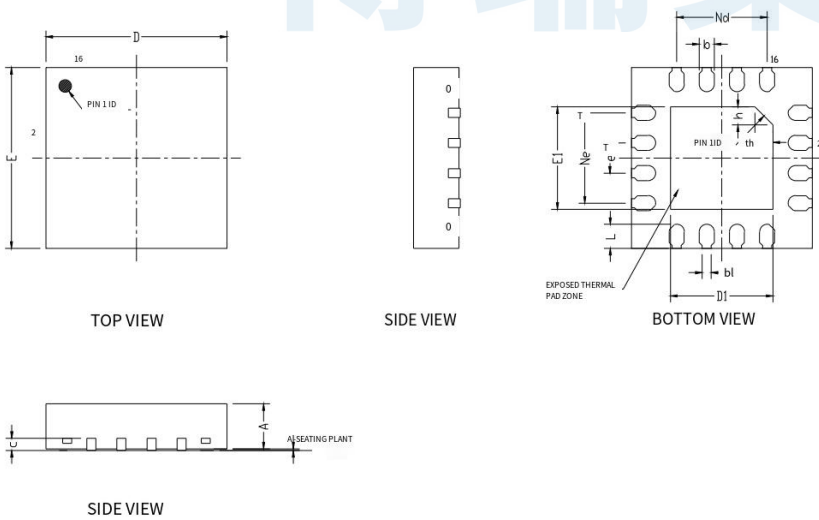
Pin Number	Pin Name	Description
1,3~6,8~10,12,13,15,16	NC	No electrical connection. This pin and package substrate must be connected to RF/DC ground.
2	RFin	RF input pin. No external DC block is required.
7	V _{lp}	Operation modes setting pin; This pin is suspended in normal operation mode and grounded in low-power operation mode.
11	RFout	RF output pin. No external DC block is required.
14	V _{dd}	Power supply pin. External bypass capacitor is required.
-	EP	Exposed pins that must be connected to RF/DC ground.

博瑞集信

PCB Evaluation Board



Package Dimensions (mm)



SYMBOL	MILLIMETER		
	MIN	NOM	MAX
A	0.70	0.75	0.80
A1	—	0.02	0.05
b	0.20	0.25	0.30
b1	0.15REF		
c	0.203REF		
D	2.90	3.00	3.10
D1	1.60	1.70	1.80
e	0.50RSC		
Ne	1.50RSC		
Nd	1.50RSC		
E	2.90	3.00	3.10
E1	1.60	1.70	1.80
L	0.25	0.30	0.35
h	0.25	0.30	0.35