

Product Features

Frequency: 30MHz ~ 4.5GHz

Noise Figure: 1.0dB@2GHz

Gain: 28.9dB@2GHz

Output Third-Order Interception:

32.3dBm@2GHz

Output Power for 1dB Compression:

17.7dBm@2GHz

Vdd=+5V, Quiescent Current: 89mA

Vdd=+5V (Low-power Operation Mode),

Quiescent Current: 59mA

Vdd=+3.3V, Quiescent Current: 52mA

Vdd=+3.3V (Low-power Operation Mode),

Quiescent Current: 35mA

Package: DFN8 (2mm * 2mm)

Apply

Relay / DAS

Mobile Infrastructure

LTE / WCDMA / CDMA / GSM

General Wireless Applications

TDD or FDD Systems

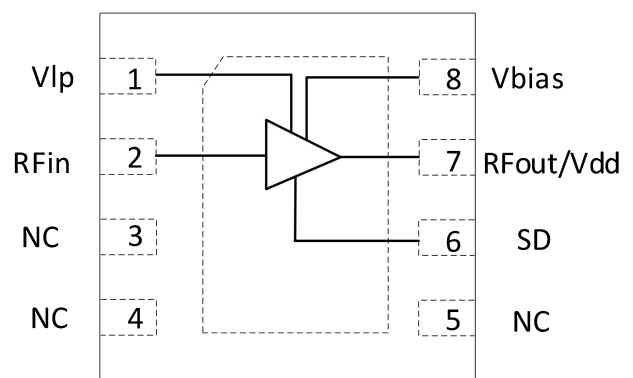
Ordering Information

Part Number	Package	Description
BR9395DAJ	DFN8	30MHz~4.5GHz Low Noise Amplifier

General Description

The BR9395DAJ is a low noise amplifier with an integrated shutdown function, covering a frequency range from 30 MHz to 4.5 GHz. It is internally matched to 50 ohms, requiring only external DC-blocking capacitors at the RF input and output ports. An on-chip active bias network ensures stable quiescent current by compensating for threshold voltage and temperature variations. Operating from a single power supply of +3.3V to +5V, the device incorporates an integrated shutdown bias function, enabling operation in TDD systems. The amplifier offers low noise, high gain flatness, and high linearity across a wide bandwidth, making it suitable for applications demanding high linearity and low noise performance.

Functional Block Diagram



Electrical Specifications (+5V Supply)

Parameters	Test Condition	Min.	Typ.	Max.	Units
Gain	2000MHz	-	28.9	-	dB
	4500MHz	-	26.8	-	
Input Return Loss	2000MHz	-	12.9	-	dB
	4500MHz	-	7.0	-	
Output Return Loss	2000MHz	-	15.2	-	dB
	4500MHz	-	14.6	-	
Reverse Isolation	2000MHz	-	51.5	-	dB
	4500MHz	-	42.9	-	
Output Power@1dB Compression	2000MHz	-	17.7	-	dBm
	4500MHz	-	17.8	-	
Output IP3	2000MHz	-	32.3	-	dBm
	4500MHz	-	34.6	-	
Noise Figure	2000MHz	-	1.0	-	dB
	4500MHz	-	1.3	-	
Supply Voltage	-	-	+5	-	V
Power Switch	ON	0	-	0.6	V
	OFF	1.5	-	Vdd	
Supply Current	ON	-	89	-	mA
	OFF	-	3	-	
Switching Time	LNA ON to OFF	-	22.4	-	ns
	LNA OFF to ON	-	1100	-	
Test Conditions: Vdd=+5V, I=89mA, OIP3 spacing=1MHz, Pout=+5dBm/tone, TA=+25°C					

Absolute Maximum Ratings

Maximum Supply Voltage : +6V

Maximum Input Power: 27dBm

ESD Rating: Class 1B

Recommended Operating Conditions

Supply Voltage: +5V

Supply Current: 89mA

Operating Temperature: -55°C ~ +125°C

Storage Temperature: -65°C ~ +150°C

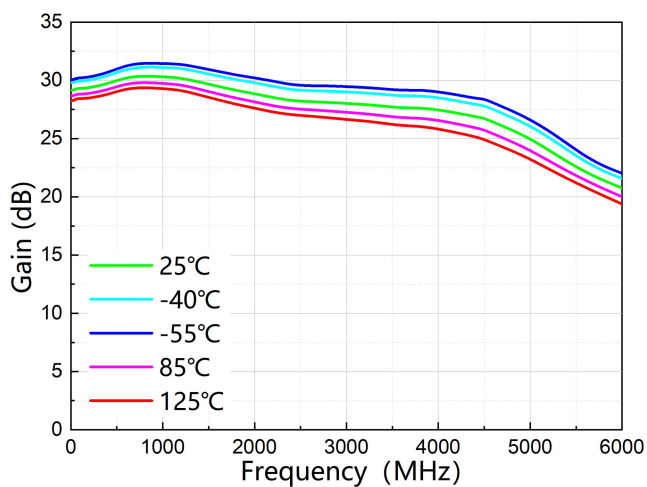
Note: Operation of the device outside the parameter ranges given absolute-maximum-ratings conditions may cause permanent damage, and exposure to absolute-maximum-ratings conditions for extended periods will affect the reliability.

ESD WARNING**ELECTROSTATIC SENSITIVE DEVICE****OBSERVE HANDLING PRECAUTIONS**

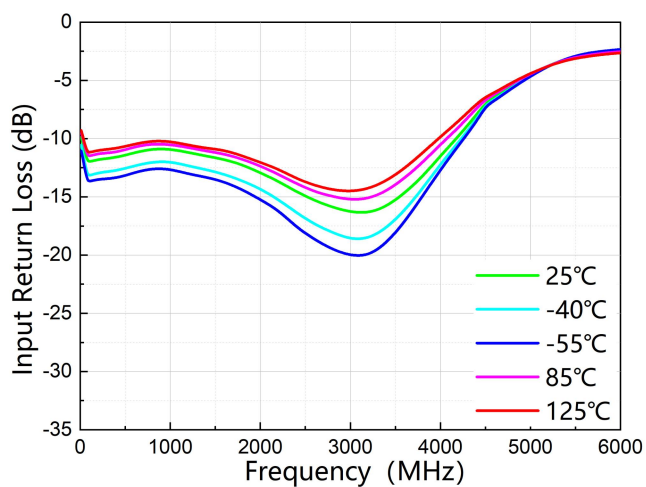
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Parameters	Operation Mode	Typ.										Units
Frequency	LNA Mode	30	100	1000	1400	2000	2400	3000	3400	4000	4500	MHz
Gain	5V	29.2	29.3	30.3	29.9	28.9	28.3	28.0	27.8	27.5	26.8	dB
	5V Low-power	28.4	28.4	29.1	28.6	27.3	26.6	26.4	26.2	25.7	25.1	
	3.3V	28.0	28.1	28.9	28.4	27.3	26.7	26.5	26.2	26.0	25.4	
	3.3V Low-power	26.7	26.7	27.1	26.5	25.2	24.5	24.1	24.0	23.5	23.1	
Input Return Loss	5V	-10.4	-12.0	-10.9	-11.5	-12.9	-14.6	-16.3	-15.8	-11.5	-7.0	dB
	5V Low-power	-10.5	-12.0	-11.3	-11.7	-12.5	-13.6	-15.4	-15.5	-12.7	-8.5	
	3.3V	-9.0	-10.1	-9.6	-10.3	-11.6	-13.0	-14.5	-14.2	-10.7	-6.8	
	3.3V Low-power	-9.0	-10.0	-9.8	-10.4	-11.1	-12.2	-13.6	-13.7	-11.7	-8.4	
Output Return Loss	5V	-15.0	-14.0	-22.2	-18.3	-15.2	-15.3	-17.7	-19.9	-17.8	-14.6	dB
	5V Low-power	-20.5	-20.2	-17.4	-14.3	-12.2	-12.4	-13.4	-14.8	-15.3	-13.6	
	3.3V	-16.1	-15.2	-22.8	-18.1	-15.1	-15.3	-17.6	-19.4	-17.3	-14.2	
	3.3V Low-power	-23.8	-31.6	-15.3	-12.6	-11.0	-11.1	-12.0	-12.7	-13.5	-12.1	
Output Power for 1dB Compression	5V	19.2	18.9	18.6	18.4	17.7	17.1	17.1	17.4	17.4	17.8	dBm
	5V Low-power	14.6	14.4	14.1	13.9	13.1	11.6	10.5	10.4	10.2	10.4	
	3.3V	14.5	14.4	14.9	14.8	14.0	13.3	12.7	13.0	12.9	13.1	
	3.3V Low-power	11.5	11.6	12.9	12.8	11.8	10.4	8.1	7.6	7.2	7.2	
Output Third-Order Interception	5V	27.8	31.9	34.1	33.7	32.3	32.6	32.4	32.5	33.2	34.6	dBm
	5V Low-power	24.4	24.5	23.5	23	22.3	21.1	21.1	20.2	21.2	20.9	
	3.3V	25.9	26.7	26	25.3	24.1	24.1	23.5	23.4	23.9	25.9	
	3.3V Low-power	20.4	20.4	18.8	18.5	17.2	16.8	16.5	16.1	15.7	16.0	
Noise Figure	5V	4.8	2.0	0.9	0.9	1.0	1.0	0.9	1.0	1.0	1.3	dB
	5V Low-power	4.7	2.1	0.9	0.8	1.0	1.0	0.9	1.1	1.1	1.3	
	3.3V	4.6	1.9	0.9	0.9	1.0	1.0	1.0	1.0	1.0	1.3	
	3.3V Low-power	4.6	2.0	0.9	0.8	1.0	1.0	0.9	1.1	1.1	1.3	
Quiescent Current	5V	89										mA
	5V Low-power	59										
	3.3V	52										
	3.3V Low-power	35										
Test Conditions: OIP3 spacing=1MHz, Pout=+5dBm/tone, TA=+25°C												

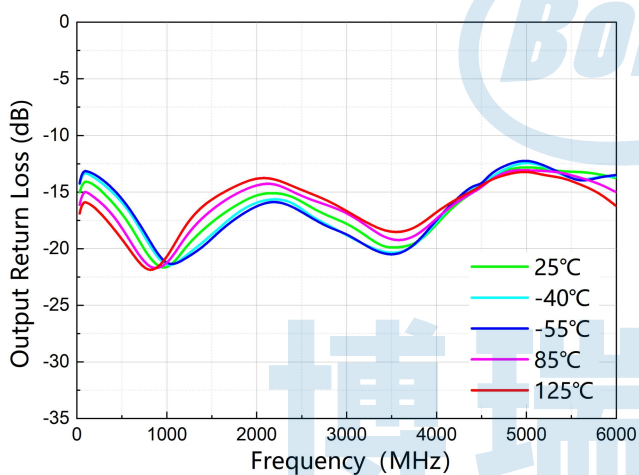
Typical Performance (EVB Test Results +5V Supply)



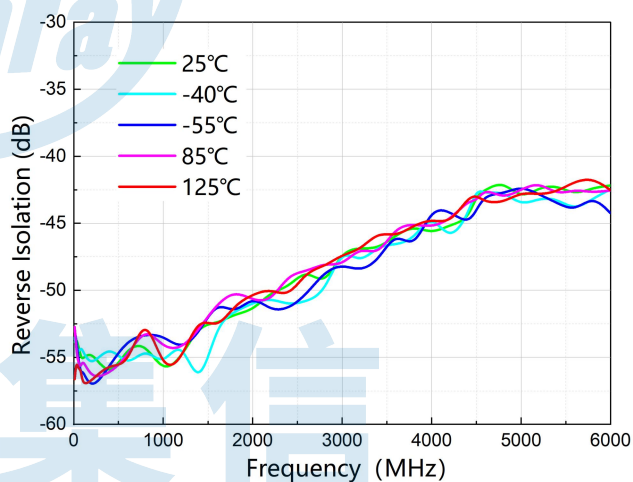
Gain vs. Freq



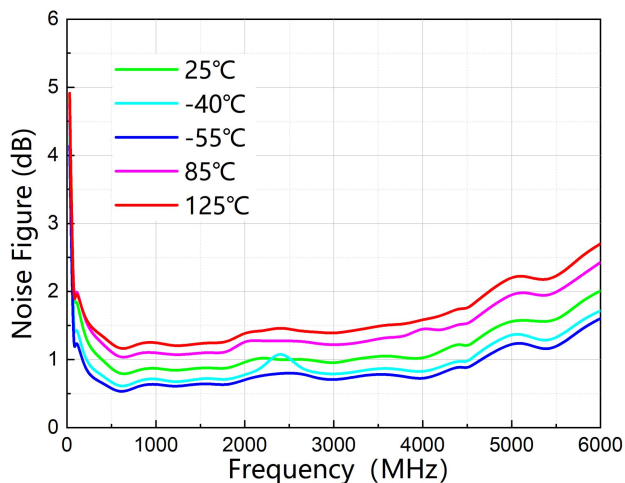
Input Return Loss vs. Freq



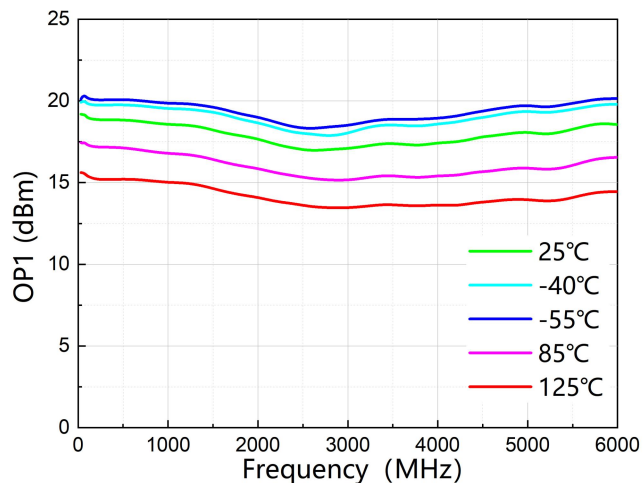
Output Return Loss vs. Freq



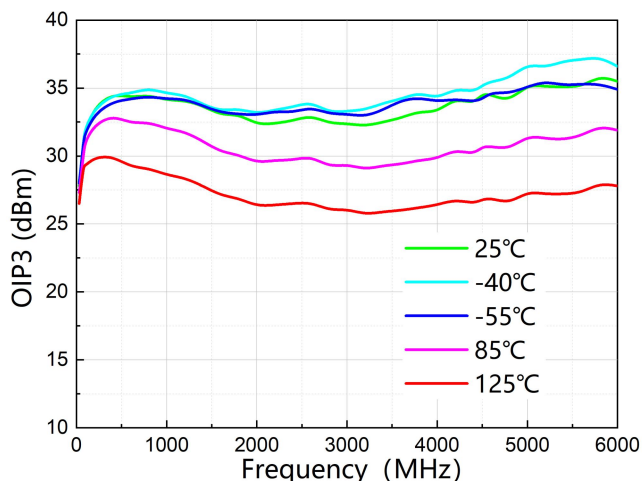
Reverse Isolation vs. Freq



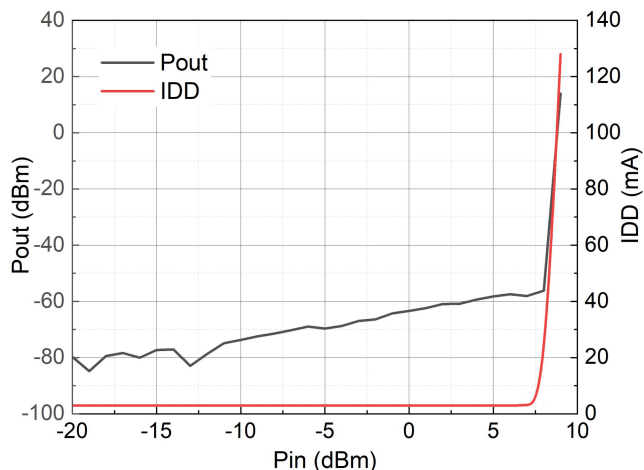
Noise Figure vs. Freq



Output Power for 1dB Compression vs. Freq

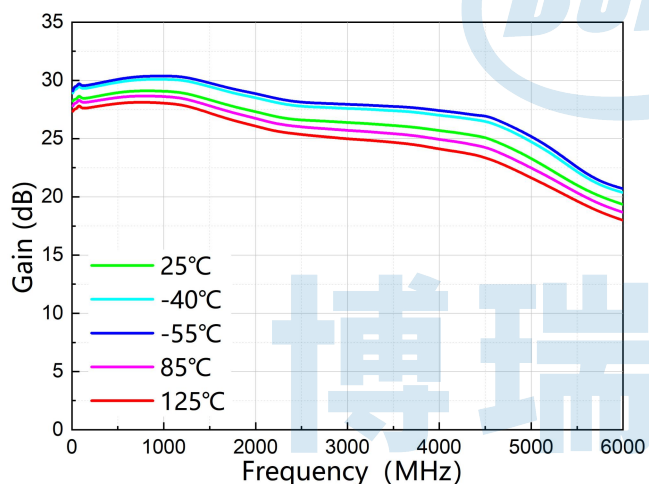


Output Third-Order Interception vs. Freq

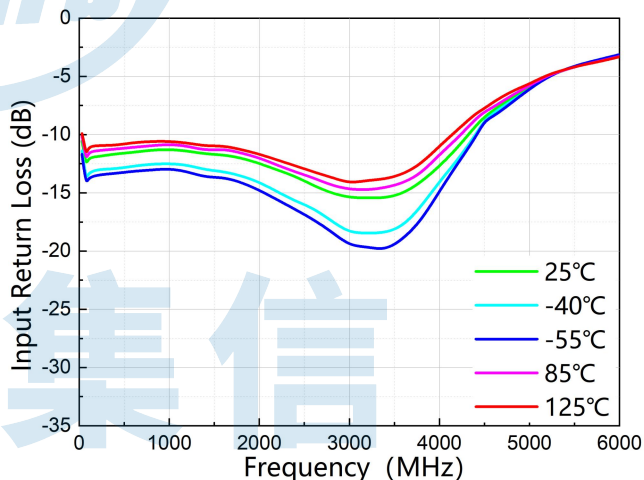


P_{out} and I_{DD} vs. P_{in}
(OFF State, 2GHz)

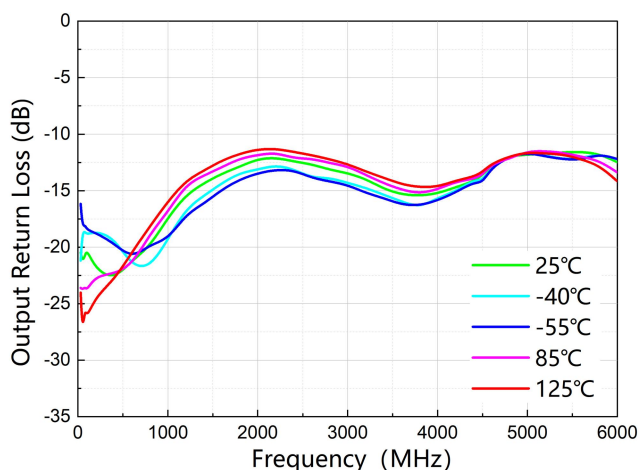
Typical Performance (EVB Test Results at Low-power Operation Mode, +5V Supply)



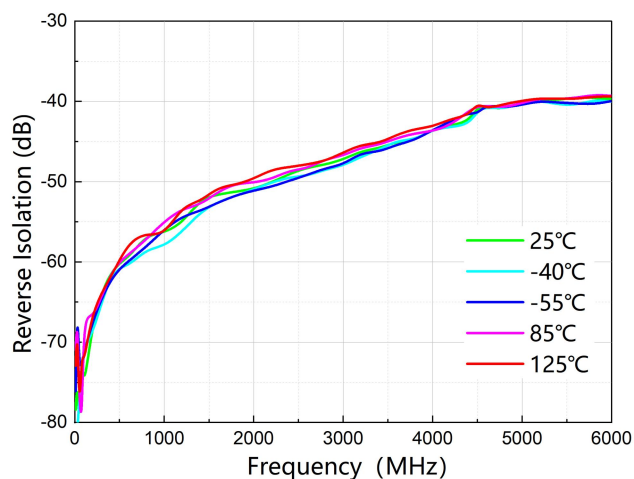
Gain vs. Freq



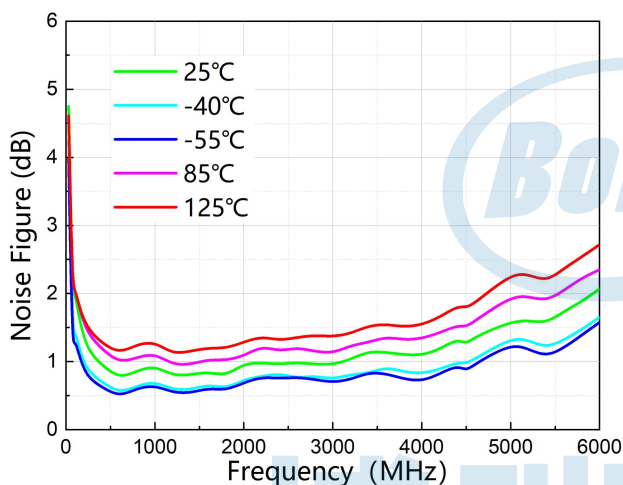
Input Return Loss vs. Freq



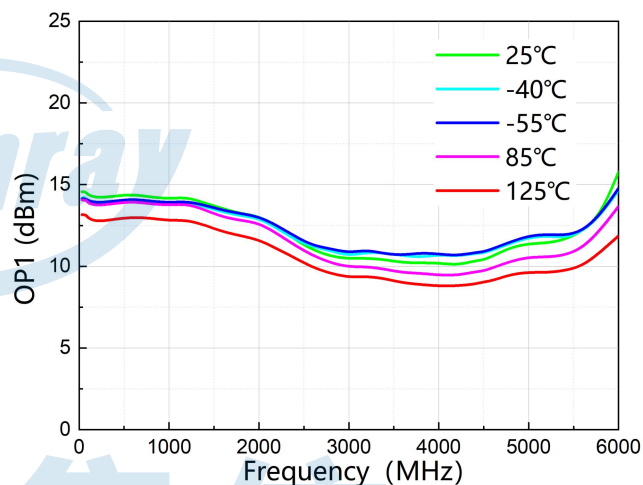
Output Return Loss vs. Freq



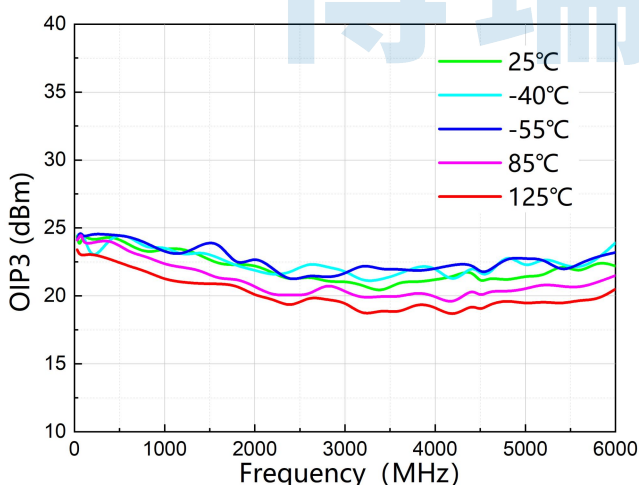
Reverse Isolation vs. Freq



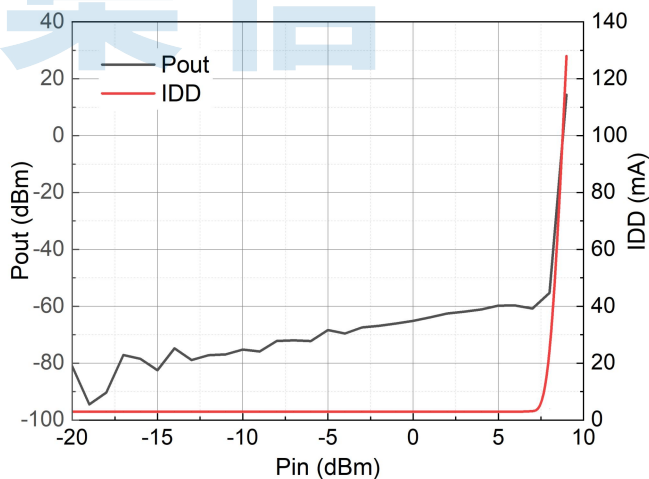
Noise Figure vs. Freq



Output Power for 1dB Compression vs. Freq

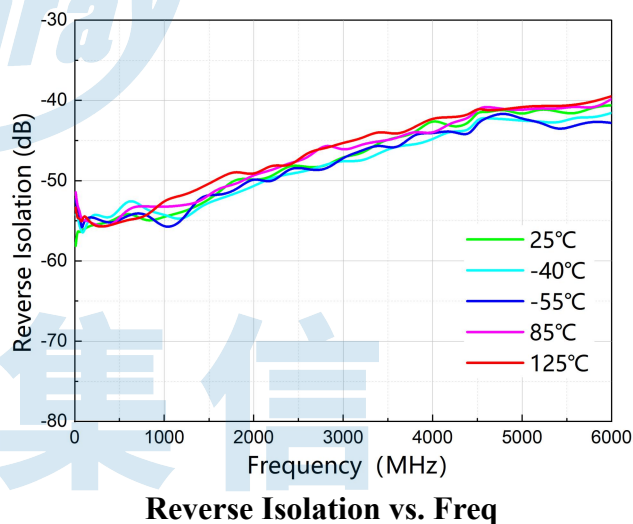
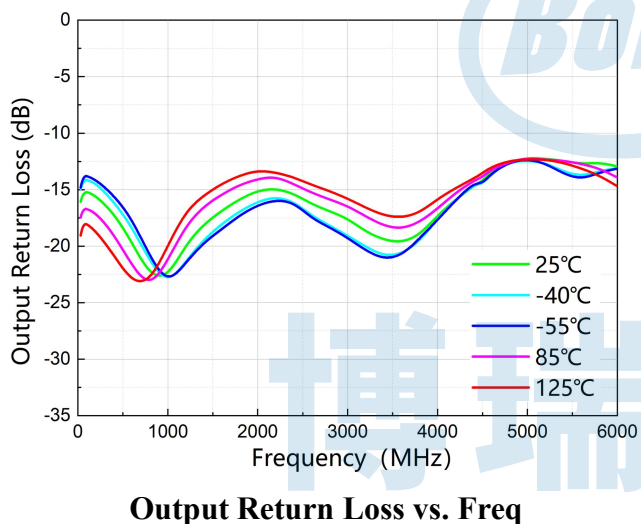
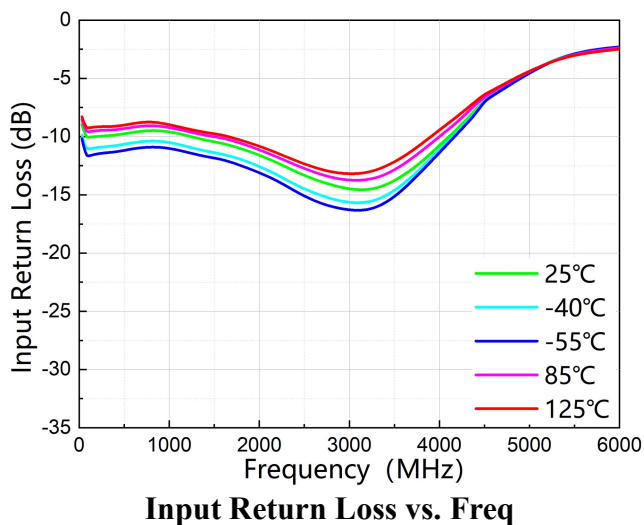
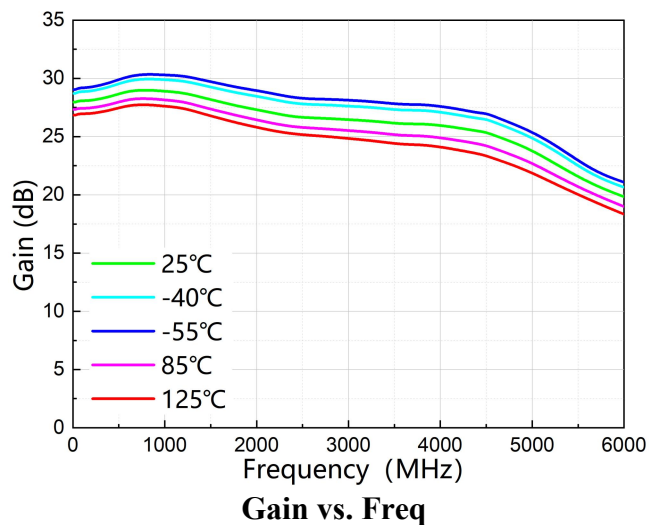


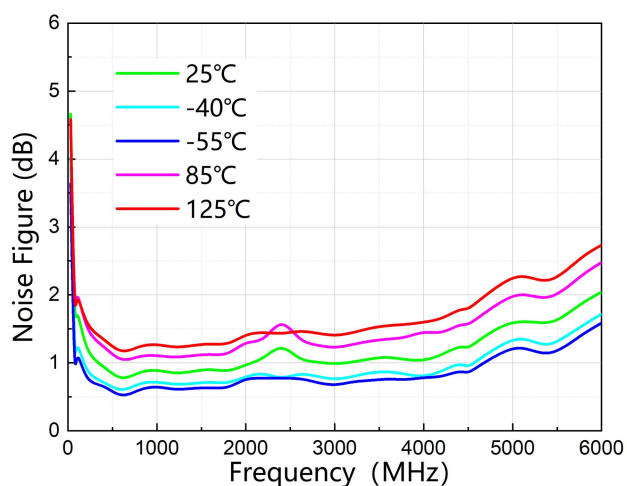
Output Third-Order Interception vs. Freq



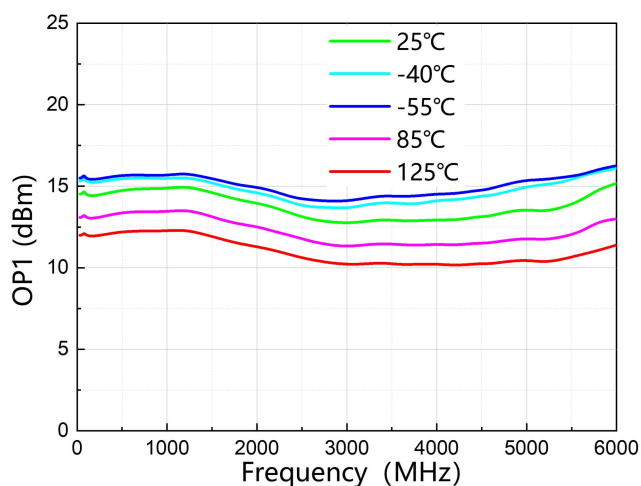
P_{out} and I_{DD} vs. P_{in}
(OFF Sate, 2GHz)

Typical Performance (EVB Test Results +3.3V Supply)

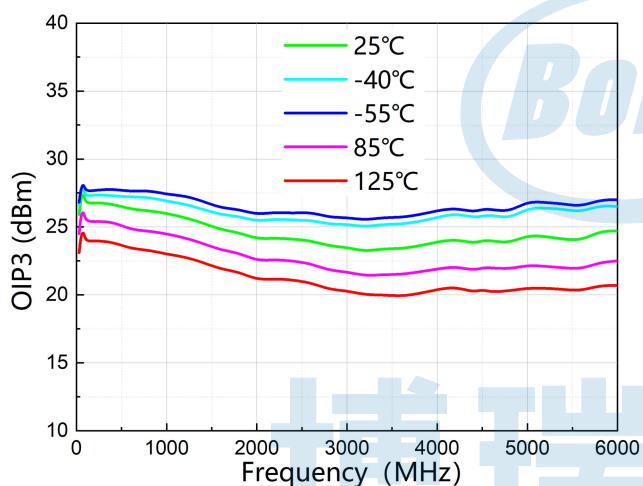




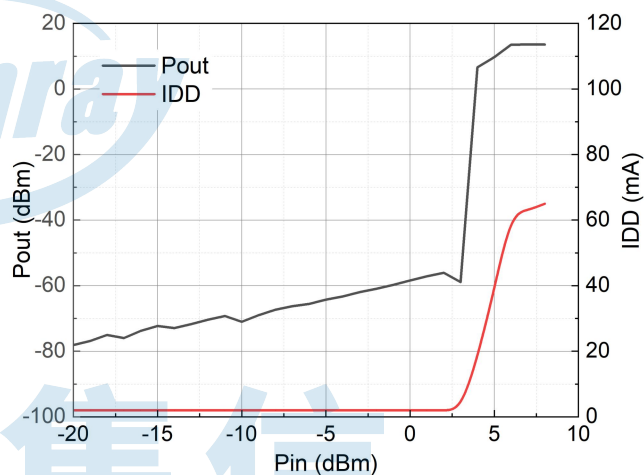
Noise Figure vs. Freq



Output Power for 1dB Compression vs. Freq

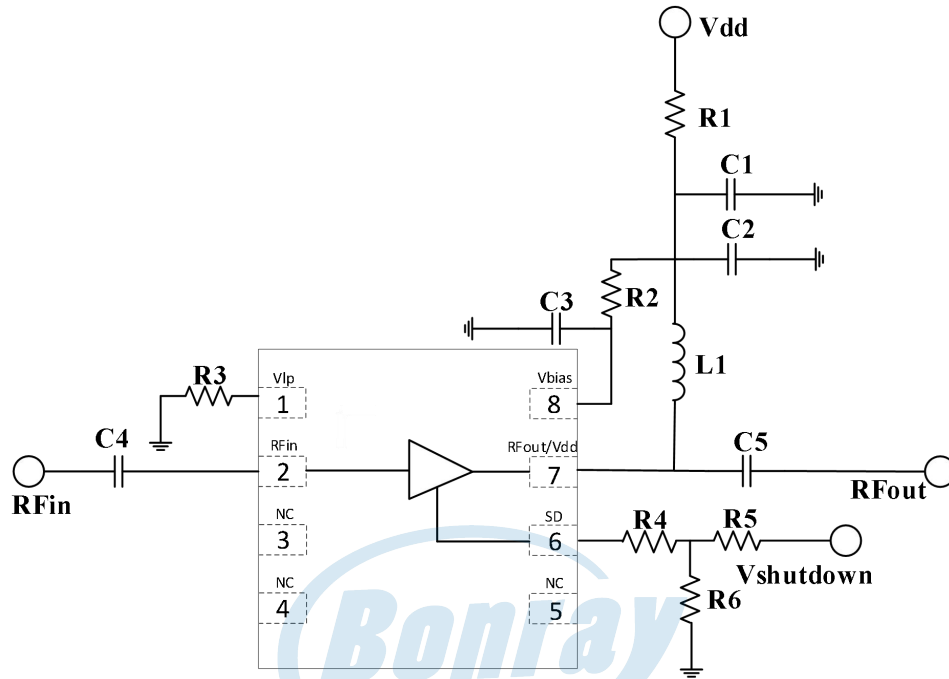


Output Third-Order Interception vs. Freq



P_{out} and I_{DD} vs. P_{in}
(OFF Sate, 2GHz)

Typical Application Schematic

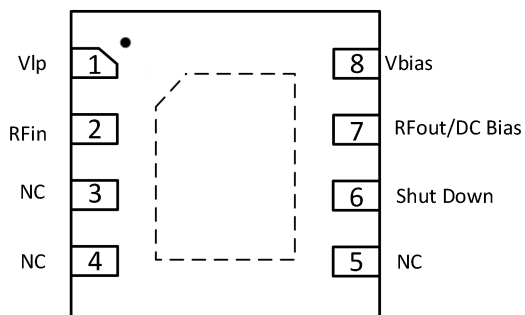


Bill of Material

Designator	Package	Description	Part Number
U1	DFN8	Low Noise Amplifier	BR9395DAJ
L1	1008	1.1uH,±5%,1200mA	1008AF-112XJRB
C1	0603	1uF,16V,±10%	GRM188R61C105KA93D
C2	0402	50V,100pF,±5%	GRM1555C1H101JA01D
C3、C4、C5	0402	50V,1nF,±5%	GRM1555C1H102JA01D
R1、R2	0402	±1%,0Ω,1/16W	RC0402FR-070RL
R3 (Low-power Operation Mode)	0402	±1%,0Ω,1/16W	RC0402FR-070RL
R3	/	Float	/
R4	/	Solder short	/
R5	0402	±5%,1.8KΩ,1/16W	RC0402JR-071K8L
R6	0402	±0.1%,30KΩ,1/16W	RT0402BRE0730KL

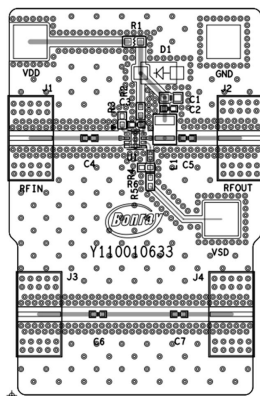
Note: Under normal operation, the R3 designator should be left floating. A 0 Ω resistor can be soldered at this position to switch the device into low-power mode.

Pin Configuration and Description

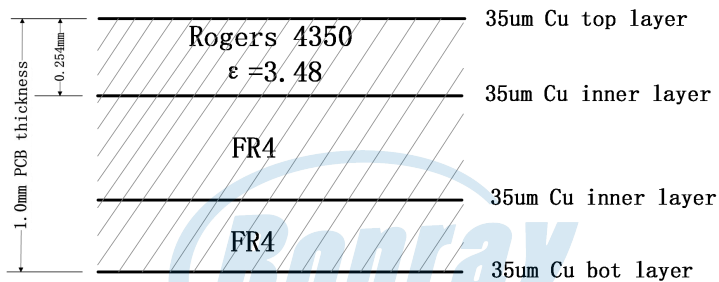


Pin Number	Pin Name	Description
2	RFin	RF input pin. DC-coupled and internally matched to 50 ohms. Only an external DC-blocking capacitor is required.
6	Shut Down	Controls device power state. • Device OFF: Voltage > 1.5V. • Device ON: Voltage < 0.6V.
7	RFout/DC Bias	RF output pin. DC-coupled and internally matched to 50 ohms. Only an external DC-blocking capacitor is required.
1	Vlp	Quiescent bias setting pin. • Normal mode: Leave floating. • Low-power mode: Connect to ground.
3,4,5	NC	No electrical connection. This pin and the package substrate must be connected to the RF/DC ground.
8	Vbias	Amplifier bias supply.
-	EP	Connect to RF/DC ground.

PCB Evaluation Board

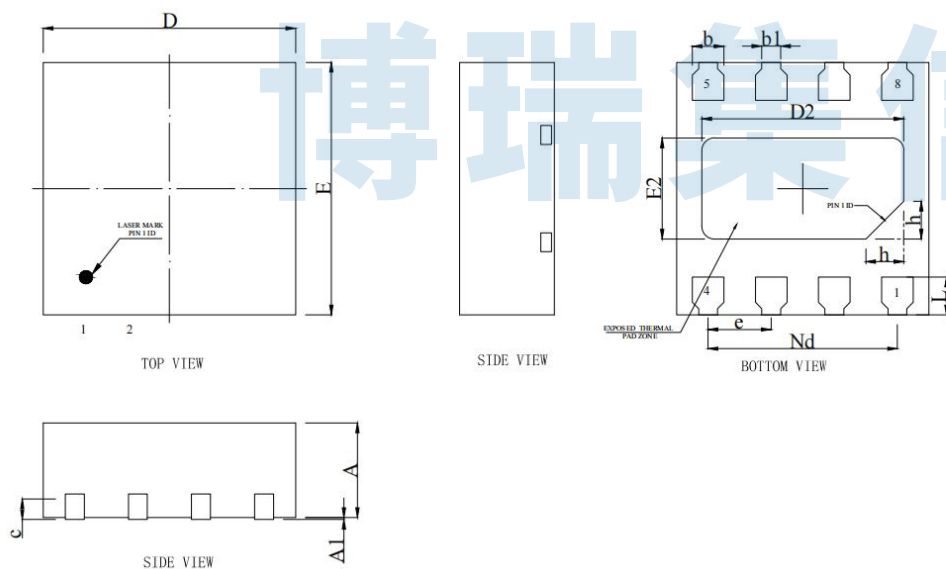


PCB



50 Ω line: width=0.53mm, spacing=0.6mm

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	1.90	2.00	2.10
D2	1.50	1.60	1.70
e	0.50BSC		
Nd	1.50BSC		
E	1.90	2.00	2.10
E2	0.70	0.80	0.90
L	0.20	0.30	0.40
h	0.20	0.30	0.40