

NR0811B2S

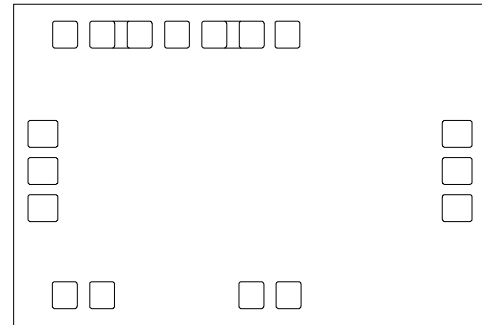
8.0-11 GHz Low Noise Amplifier



Product Features

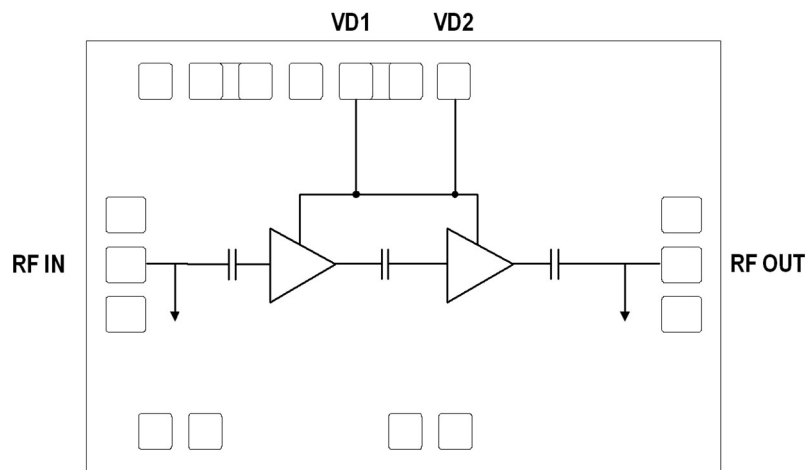
- Frequency band 8.0-11.0 GHz
- Linear gain: 19 dB
- Return Losses: 11 dB
- Noise Figure: 1.2 dB
- Output power @ 1dB comp: 12.2 dBm
- DC bias: $V_D=4\text{ V}$ @ $I_{DQ}=45\text{ mA}$
- $1.9 \times 1.2\text{ mm}^2$ size bare die

Performance is typical at room temperature. Please reference electrical specification table and data plots for more details.



1.9 mm × 1.2 mm bare die

Functional Block Diagram



Description

The NR0811B2S is a fully integrated 2-stage Low Noise Amplifier MMIC designed for radar applications, covering frequency range from 8.0 GHz to 11.0 GHz. The device has NF of 1.2 dB and has 19 dB linear gain with operating drain voltage of 4 V.

Applications

- Defense Radar
- Weather Radar

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Typical Operating Conditions

PARAMETER	SYMBOL	VALUE	UNIT
Drain Voltage	V_D	4	V
Drain Quiescent Current	I_{DQ}	45	mA
Operating Temperature Range		-40 to 85	°C

The circuit is self-biased.

Absolute Maximum Ratings

PARAMETER	SYMBOL	MIN VALUE	MAX VALUE	UNIT
Drain Voltage	V_D	-	8	V
Drain Current	I_{DQ}	-	60	mA

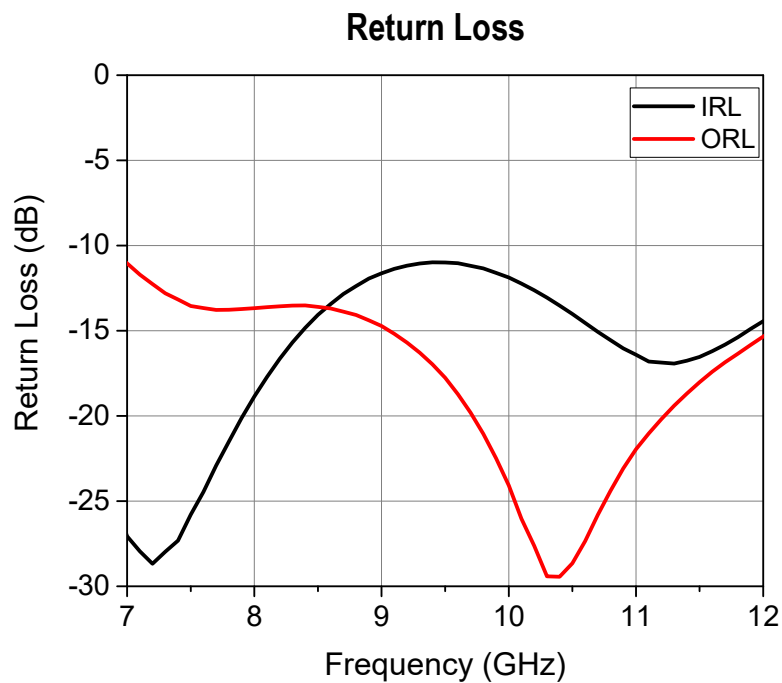
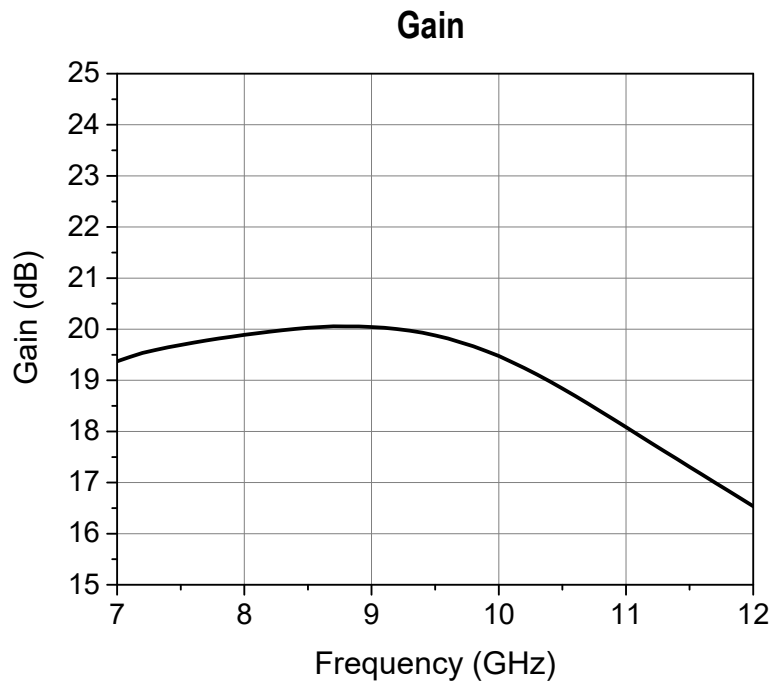
Electrical Specifications

Test conditions unless otherwise noted: $V_D = 4$ V, $I_{DQ} = 45$ mA
Data de-embedded to device reference plane, 25 °C.

PARAMETER	SYMBOL	MIN	TYP	MAX	UNIT
Frequency	f	8.0		11	GHz
Small Signal Gain	G	18.1		20.0	dB
Noise Figure	NF		1.2		dB
Input Return Loss	IRL		12		dB
Output Return Loss	ORL		17		dB
Output P1dB*	P1dB		12.2		dBm
Output TOI @ -25 dBm Pin/Tone	OTOI		22		dBm

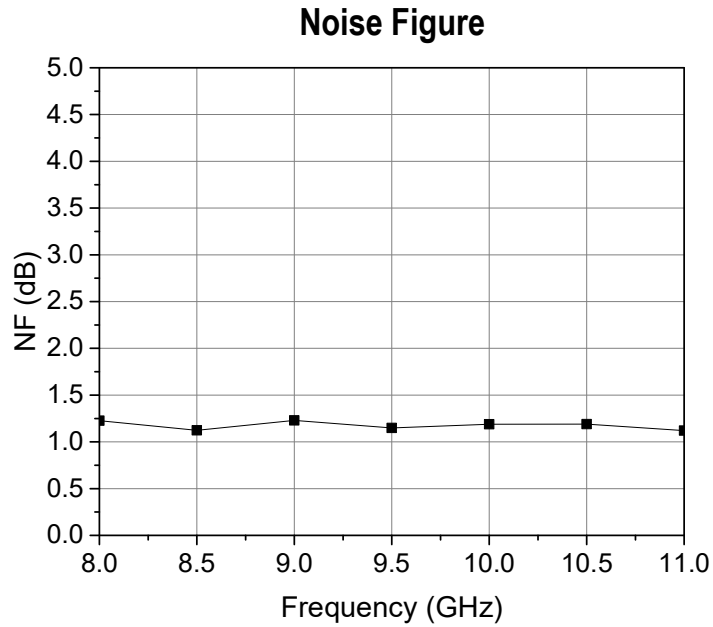
Small Signal Performance

Test Conditions unless otherwise stated: $V_D = 4\text{ V}$, $I_{DQ} = 45\text{ mA}$, $25\text{ }^{\circ}\text{C}$



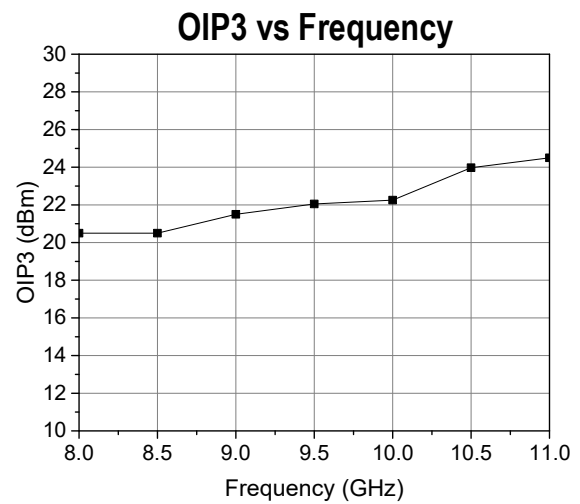
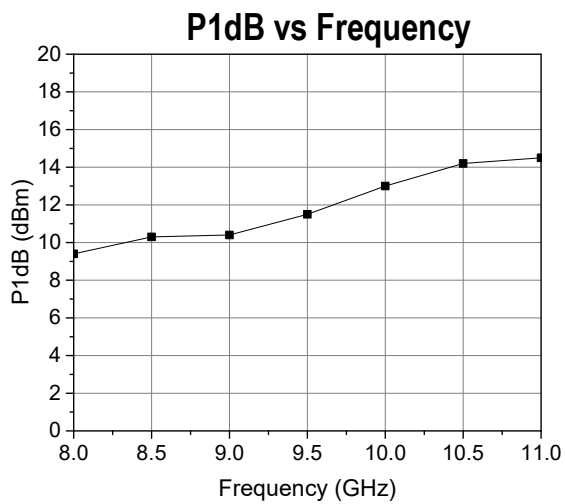
Noise Figure

Test Conditions unless otherwise stated: $V_D = 4\text{ V}$, $I_{DQ} = 45\text{ mA}$, $25\text{ }^{\circ}\text{C}$

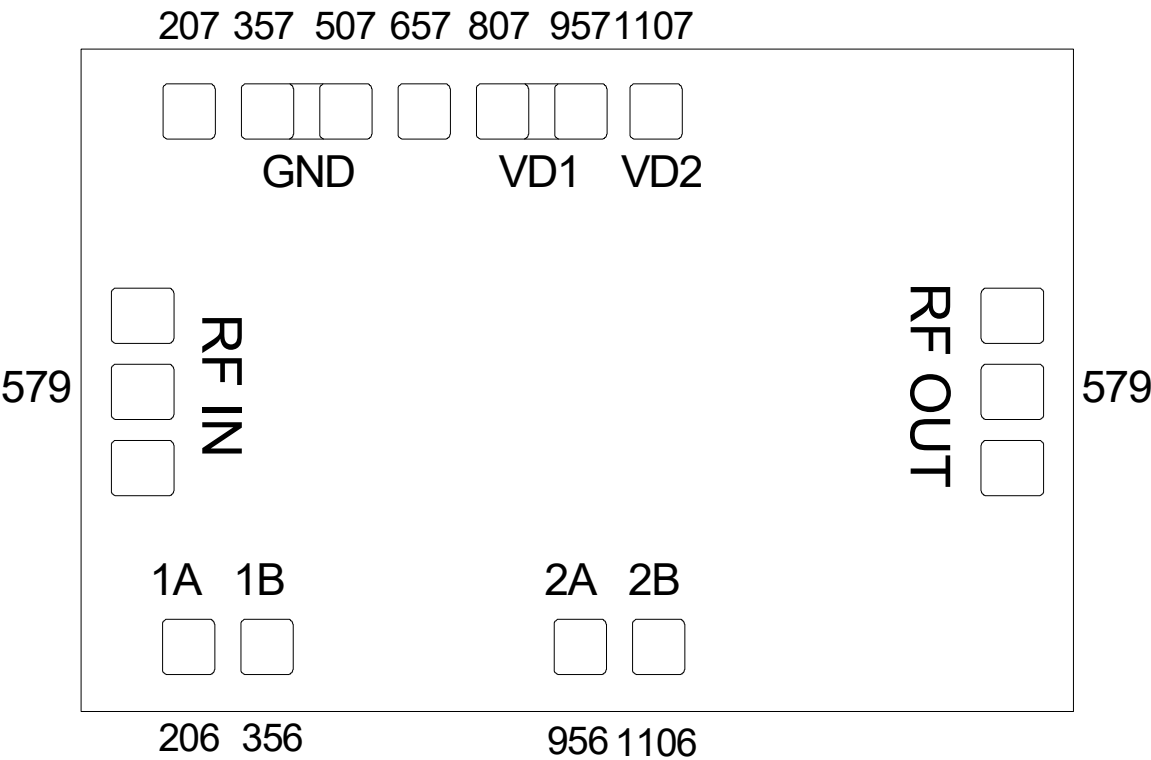


Large Signal Performance

Test Conditions unless otherwise stated: $V_D = 4\text{ V}$, $I_{DQ} = 45\text{ mA}$, CW, $25\text{ }^{\circ}\text{C}$



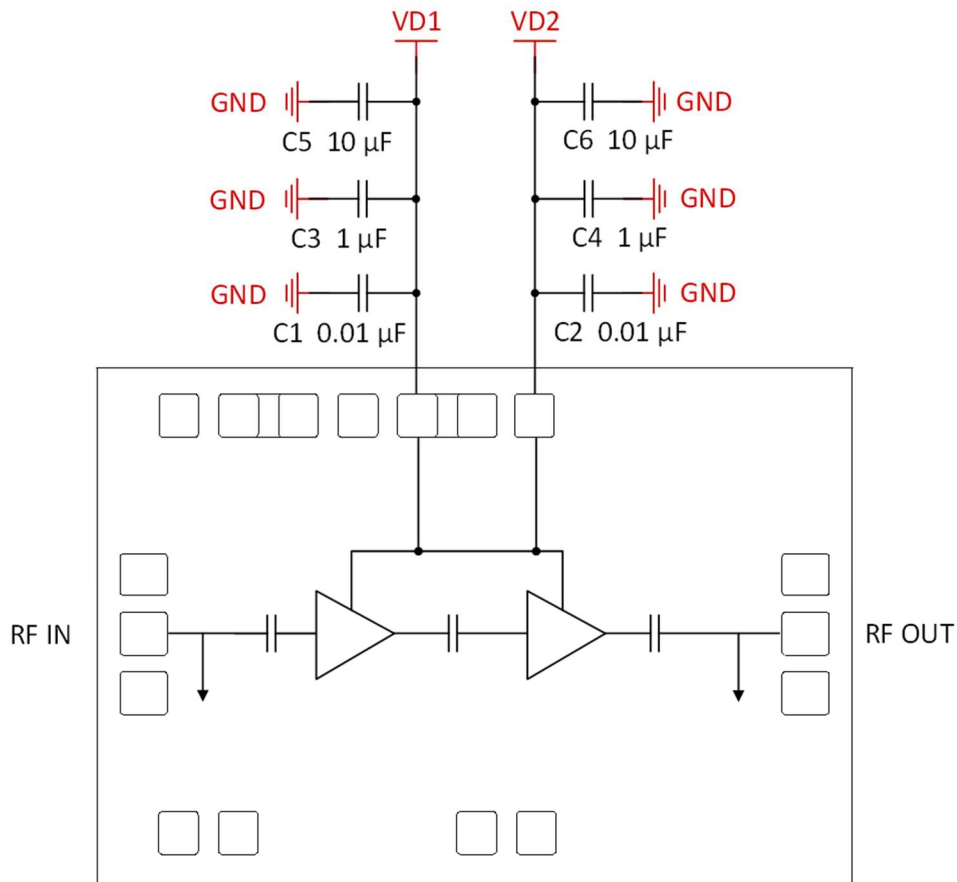
Mechanical Drawing & Pad Description



Three bias standards are recommended as below.

Default	VD=4 V The pads 1A, 1B, 2A, and 2B are non-connected (NC).
Higher gain	VD=4 V, 1A or 1B grounded All the other pads are non-connected (NC).
Higher output power	VD=4 V, 2A or 2B grounded All the other pads are non-connected (NC).

Application Circuit



Bias-up Procedure

1. Set VD current limit to 60 mA, gate current limit to 10 mA
2. Set VD to 4 V
3. Adjust VD to achieve required drain current of 45 mA.
4. Apply RF signal

Bias-down Procedure

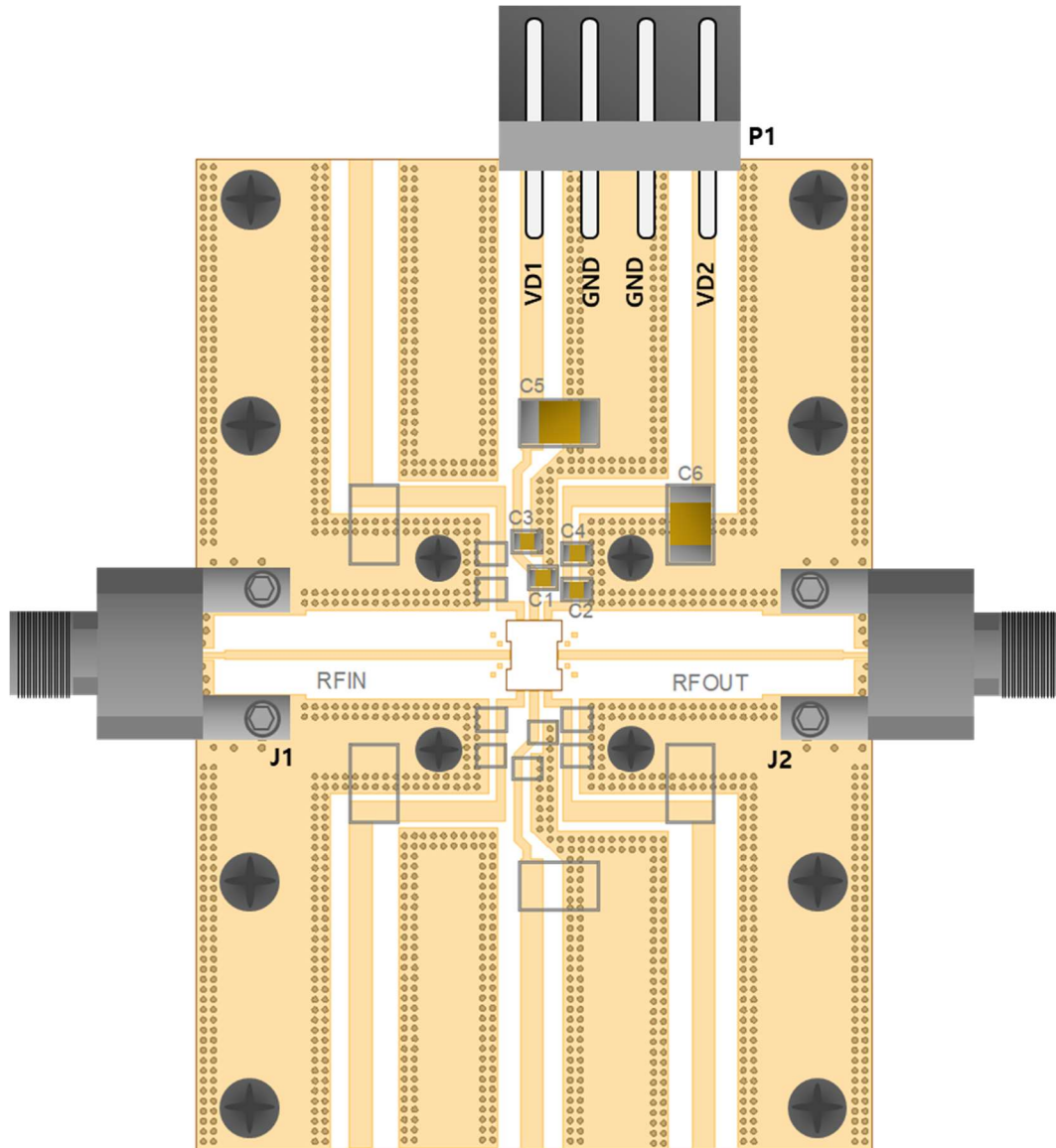
1. Turn off RF signal
2. Turn off drain supply

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NR0811B2S Evaluation Board



RF Layer is 0.008" thick Rogers Corp. RO4003C ($\epsilon_r = 3.35$). Metal layers are 0.5 oz. copper. The microstrip line at the connector interface is optimized for the With-wave end launch connector NE02FS001.

Ref. Des.	Component	Value	Manuf.	Part Number
C1, C2	SMT Cap.	0.01 μ F, 0402 size, 10%, X7R, 50 V	Various	
C3, C4	SMT Cap.	1 μ F, 0402 size, 10%, X7R, 50 V	Various	
C5, C6	SMT Res.	10 μ F, 1206 size, 10%, X5R, 50 V	Various	
J1, J2	RF Connectors		With-wave	NE02FS001

Electrostatic Discharge (ESD) Classifications

PARAMETER	SYMBOL	CLASS	TEST METHODOLOGY
Human body model	HBM	TBD	TBD
Charge device model	CDM	TBD	TBD

For more information, please contact:

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