

Product Features

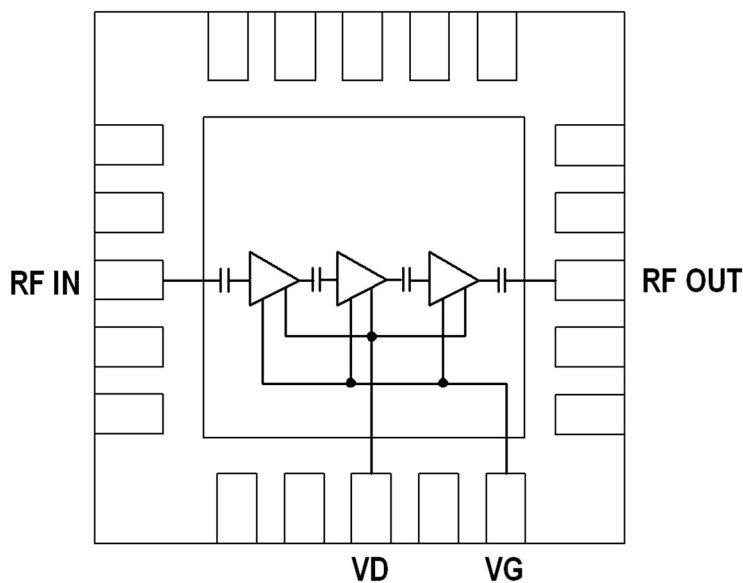
- Frequency band 8.0-11.0 GHz
- Linear gain: 28 dB
- Return Losses: 13 dB
- Noise Figure: 1.2 dB
- Output power @ 1dBcomp: 15 dBm
- DC bias: $V_D=1.8$ Volt @ $I_{DQ}=90$ mA
- 4x4 mm² size QFN package

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



4 mm × 4 mm QFN package

Functional Block Diagram



Description

The NR0811Q3S is a fully integrated 3-stage Low Noise Amplifier MMIC designed for radar applications, covering frequency range from 8.0 GHz to 11.0 GHz. The device has noise figure of 1.2 dB and has 28 dB linear gain with operating drain voltage of 1.8 V.

Applications

- Defense Radar
- Weather Radar

DC Characteristics

PARAMETER	SYMBOL	VALUE	UNIT
Drain Voltage	V_D	1.8	V
Drain Quiescent Current	I_{DQ}	90	mA
Typical Gate Voltage	V_G	-0.7	V
Operating Temperature Range		-40 to 85	°C

1. Electrical specifications are measured at specified test conditions. Specifications are not guaranteed over all recommended operating conditions.

2. Gate voltage shown are typical, can be adjusted to set required drain current.

Absolute Maximum Ratings

PARAMETER	SYMBOL	MIN VALUE	MAX VALUE	UNIT
Drain Voltage	V_D	-	8	V
Drain Current	I_{DQ}	-	97	mA
Gate Voltage	V_G	-3	-	V
Gate Current	I_G		10	mA
Mounting Temperature		-55	150	°C

Operation of this device outside the parameter ranges given above may cause permanent damage. These are stress ratings only, and functional operation of the device at these conditions is not implied. Extended application of Absolute Maximum Rating conditions may reduce device reliability.

Electrical Specifications

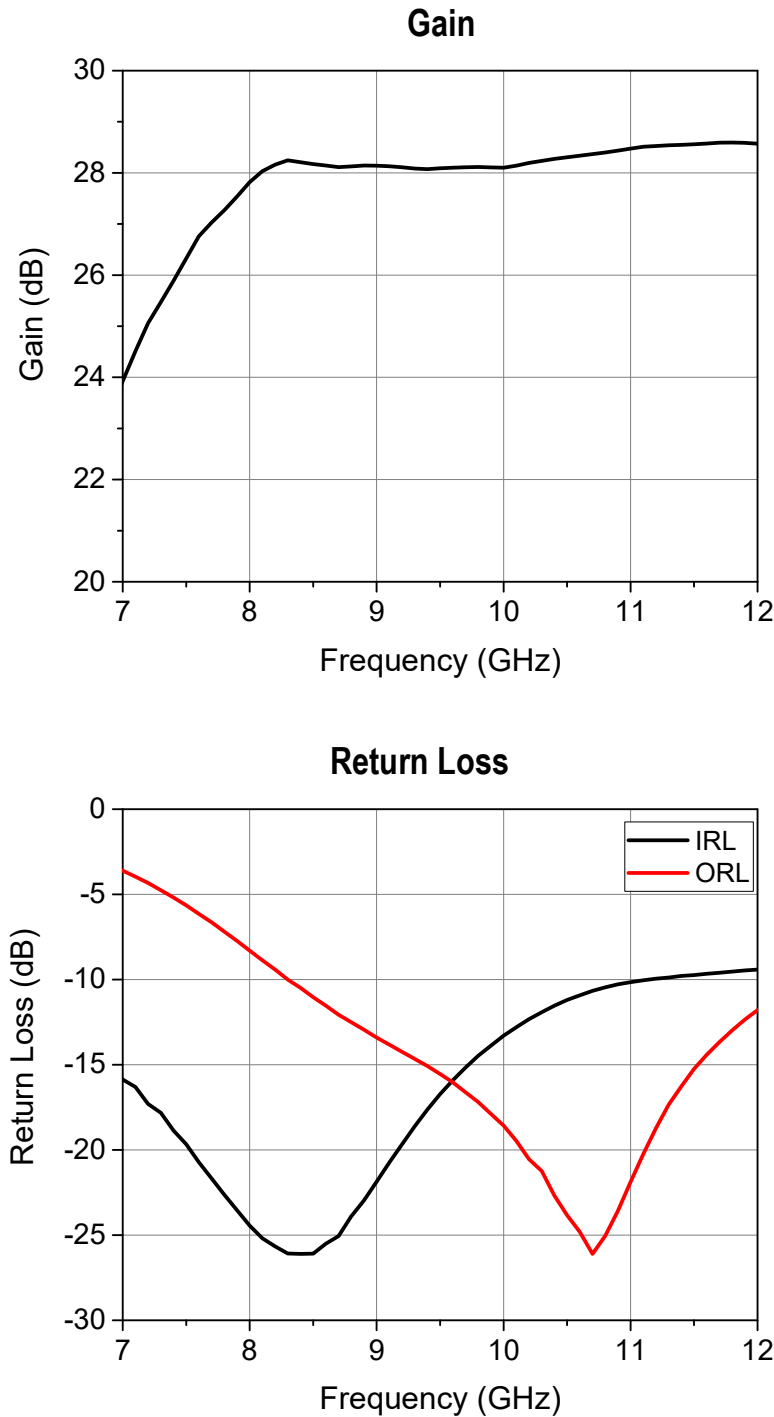
Test conditions unless otherwise noted: $V_D = 1.8$ V, $I_{DQ} = 90$ mA

Data de-embedded to device reference plane, 25 °C.

PARAMETER	SYMBOL	MIN	TYP	MAX	UNIT
Frequency	f	8.0		11.0	GHz
Small Signal Gain	G	27.8		28.5	dB
Input Return Loss	IRL		16		dB
Output Return Loss	ORL		15.5		dB
Noise Figure	NF		1.2		dB
1 dB Power Comp. Point	P1dB		15		dBm
Output TOI @ -25 dBm Pin/Tone	OTOI		20.3		dBm

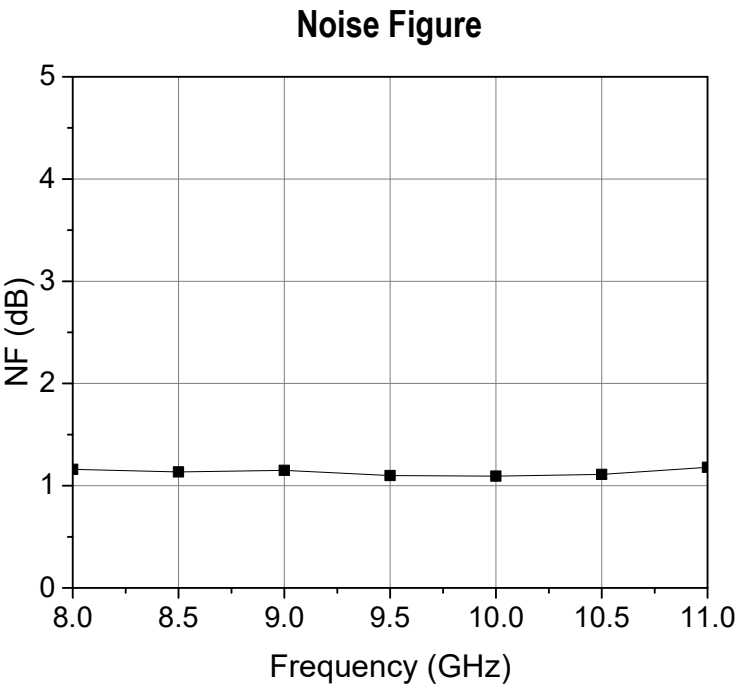
Small Signal Performance

Test Conditions unless otherwise stated: $V_D = 1.8\text{ V}$, $I_{DQ} = 90\text{ mA}$, $25\text{ }^{\circ}\text{C}$



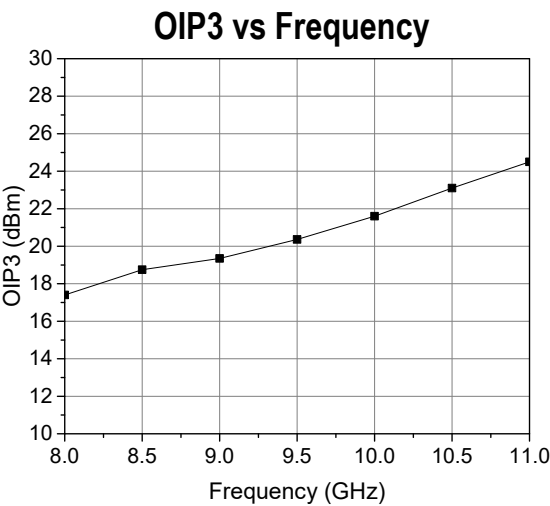
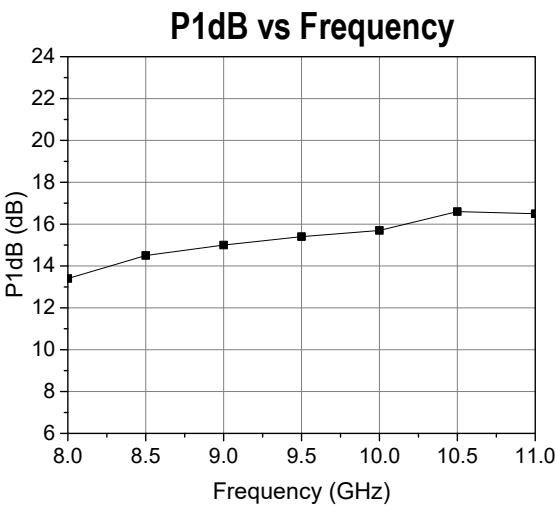
Noise Figure

Test Conditions unless otherwise stated: $V_D = 1.8\text{ V}$, $I_{DQ} = 90\text{ mA}$, $25\text{ }^{\circ}\text{C}$

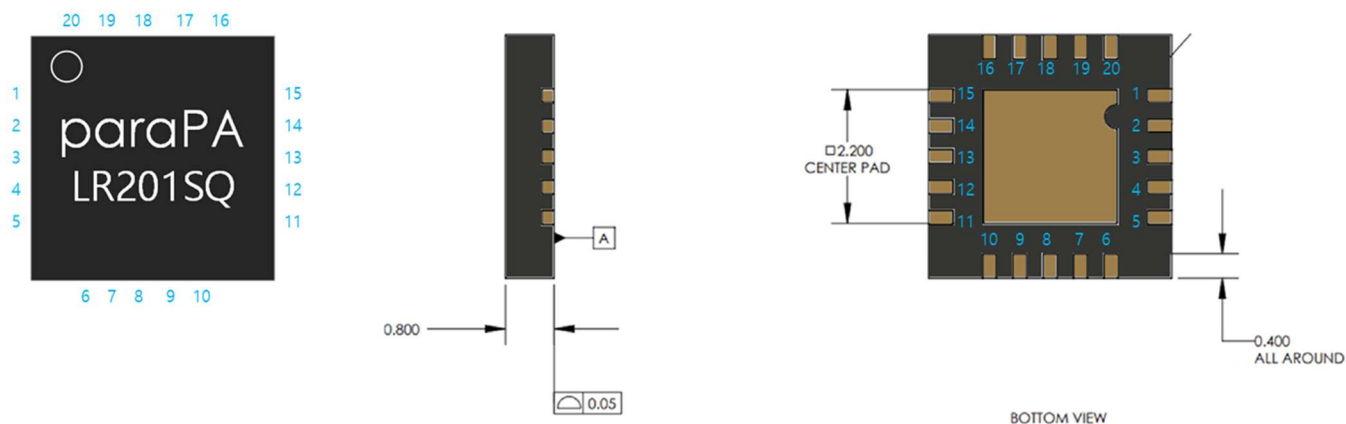


Large Signal Performance

Test Conditions unless otherwise stated: $V_D = 1.8\text{ V}$, $I_{DQ} = 90\text{ mA}$, CW, $25\text{ }^{\circ}\text{C}$

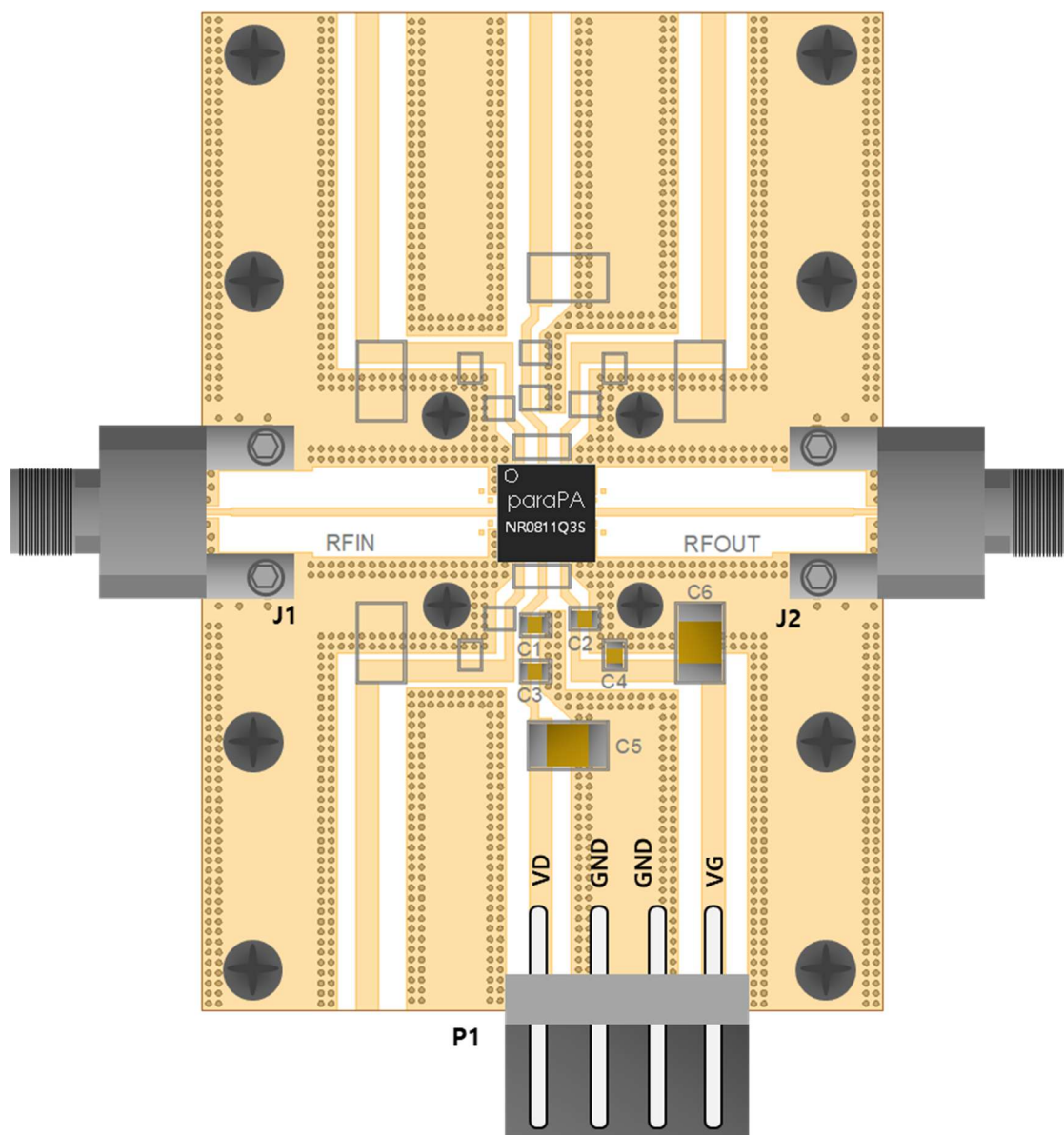


Mechanical Drawing & Pad Description



Pin Number	Label	Description
Bottom Pad	GND	GROUND
3	RFIN	RF input. 50 Ω , DC blocked, pad connected to ground
13	RFOUT	RF output. 50 Ω , DC blocked, pad connected to ground
7	VD	Drain voltage. Bypass network required
9	VG	Gate voltage. Bypass network required
1, 2, 4-6, 8, 10-12, 14-20	N/C	No Internal Connections. Connection to PCB ground recommended

NR0811Q3S 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 uF, 0402 size, 10%, X7R, 50 V	Various	
C3, C4	SMT Cap.	1 uF, 0402 size, 10%, X7R, 50 V	Various	
C5, C6	SMT Res.	10 uF, 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

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