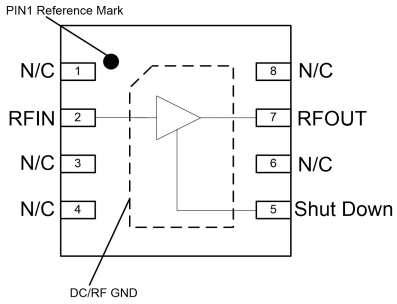
GHLN-9127

High Linearity Low Noise Gain Amplifier , 1 - 6 GHz

Product Introduction

The GHLN-9127 is a high-gain, high-linearity, low-noise gain amplifier in a low-cost QFN2X2 package. At 3.5 GHz, the amplifier provides 21dB gain, +33dBm OIP3 and 1.1dB noise. The amplifier is powered by 5V and has a quiescent current of 80mA. The amplifier can meet the needs of a variety of application scenarios, including small base stations, LTE/WCDMA communication systems, and other wireless communication systems. The GHLN-9127 integrates shutdown bias capability, and all pins are equipped with ESD protection. The product quality level is industrial grade.

Block Diagram



Bottom view

Product Features

- 1 - 6 GHz operating frequency band
- 22dB Gain (3-5GHz)
- 3 2. 5 dBm Output IP3 (3-5GHz)
- 1 8 .5 dBm P1dB (3-5GHz)
- Noise Figure 1. 2 dB (3-5GHz)
- Integrated shutdown function
- 50Ohm input and output
- +5V /80mA
- 2x2 mm 8 Pin DFN plastic package

Electrical performance parameters (TA = +25°C, Vd = +5V, 50Ω system)

Index	Test Conditions	Minimum	Typical Value	Maximum	Unit
Frequency Range		1		6	GHz
Test frequency			3.5		GHz
Small Signal Gain			21		dB
Input return loss			15.0		dB
Output return loss			7.0		dB
P-1			18.5		dBm
OIP3	Pout = + 1 dBm /tone, Δf =1 MHz		32.5		dBm
Noise Figure*	Not deembedded		1.1		dB
Switching speed	50% of VPD to 90% or 10% RF Output		0.1		us
Shutdown control	On state	0		0.8	V
	Off state (Power down)	+ 1.2		VDD	V
Current	On state		65		mA
	Off state (Power down)		5		mA
Thermal resistance	channel to case			65	°C/W

*Noise figure is the test data without de -embedding .

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Standard Circuit

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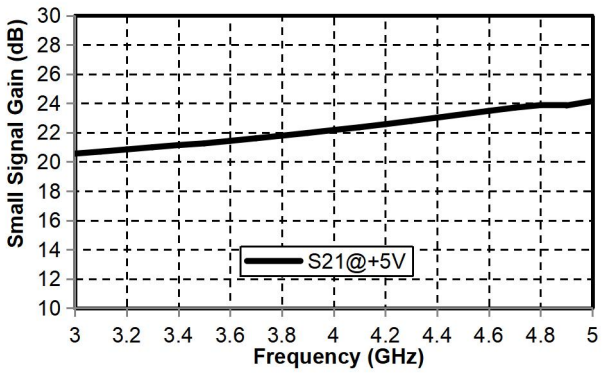
3G-5G electrical performance parameters

Electrical performance parameters (TA = +25°C, Vd = +5V, 50Ω system)							
Index	Test Conditions	Typical Value					Unit
Test frequency		3.0	3.5	4.0	4.5	5.0	GHz
Small Signal Gain		20.5	21.0	22.0	23.0	24.0	dB
Input return loss		16.5	15.5	15.0	14.5	12.5	dB
Output return loss		10.5	7.0	4.5	3.5	3.5	dB
Noise Figure*		1.0	1.1	1.2	1.25	1.3	dB
P-1		18.5	18.5	18.5	19.0	19.5	dBm
OIP3	Pout=+ 1 dBm/tone, Δf =1 MHz	32.0	32.5	32.5	32.0	31.0	dBm
Quiescent Current		80					mA

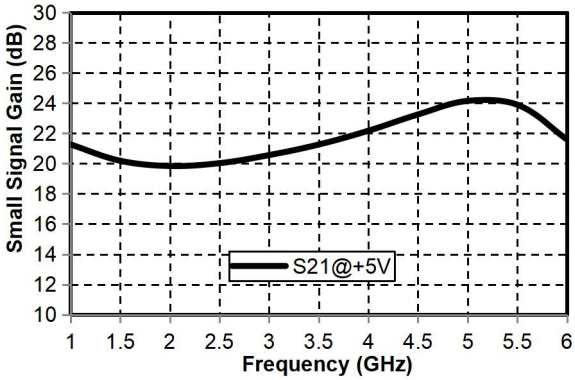
*Noise figure is the data of the un-deembedded test . Noise figure vs. frequency Reverse isolation vs. frequency

Main index test curve

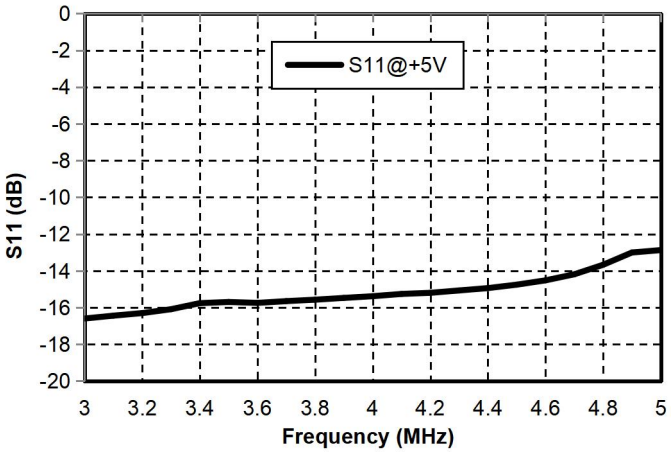
Small Signal Gain vs. Frequency (3-5GHz)



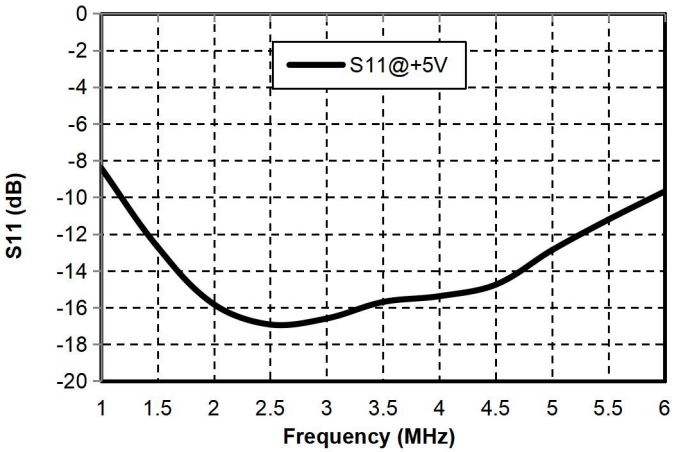
Small Signal Gain vs. Frequency (1-6GHz)



Input Return Loss vs. Frequency (3-5GHz)



Input Return Loss vs. Frequency (1-6GHz)



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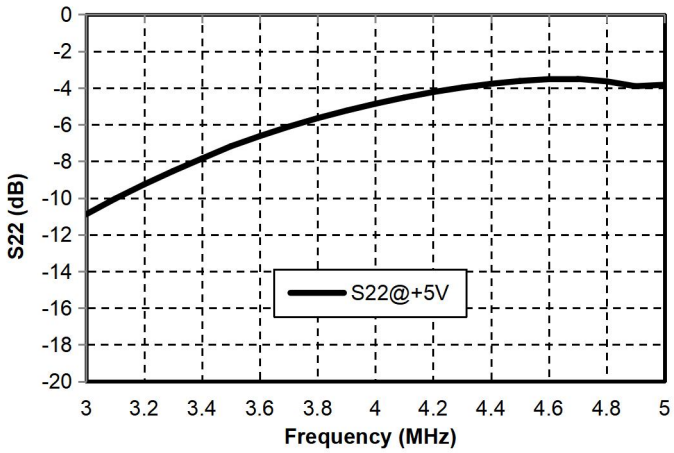
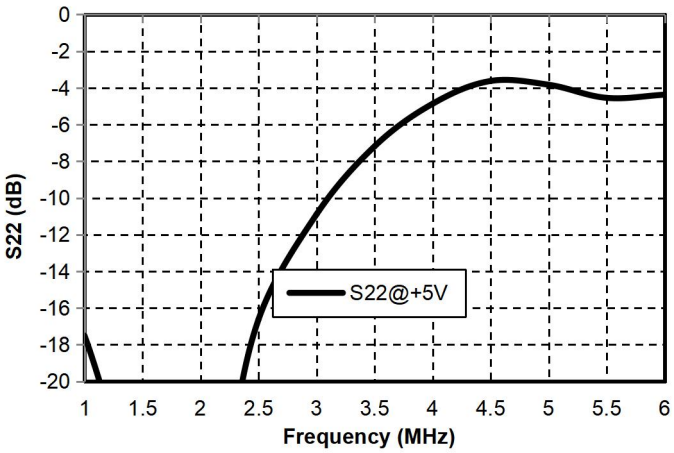
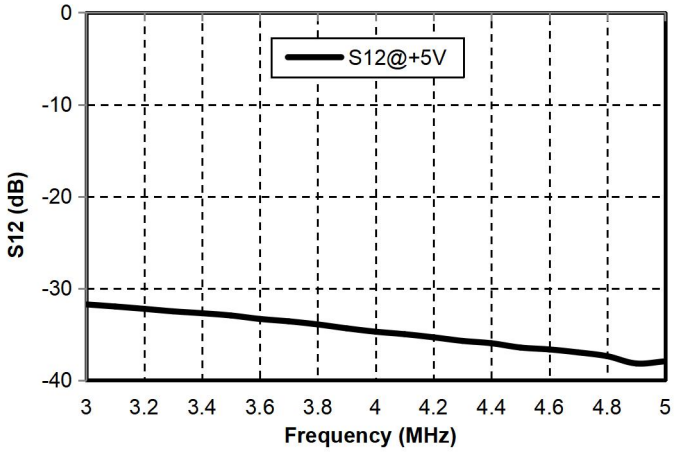
Output Return Loss vs. Frequency (3-5GHz)



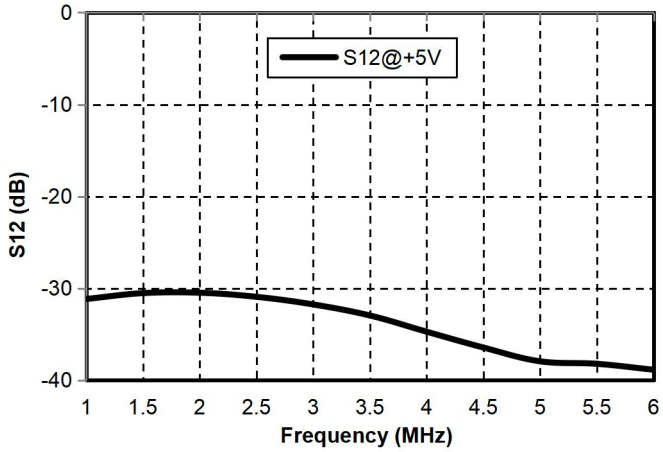
Output Return Loss vs. Frequency (1-6GHz)



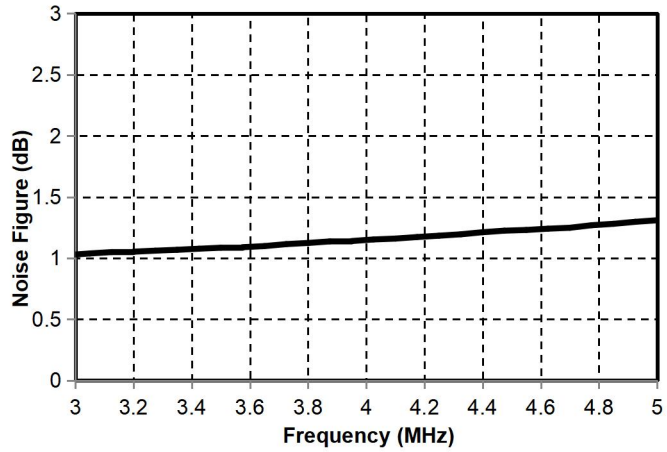
Reverse Isolation vs. Frequency (3-5GHz)



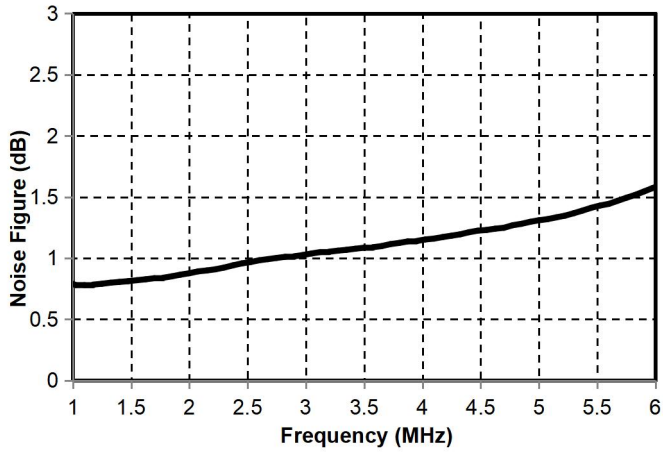
Reverse Isolation vs. Frequency (1-6GHz)



Noise Figure vs. Frequency (3-5GHz)



Noise Figure vs. Frequency (1-6GHz)



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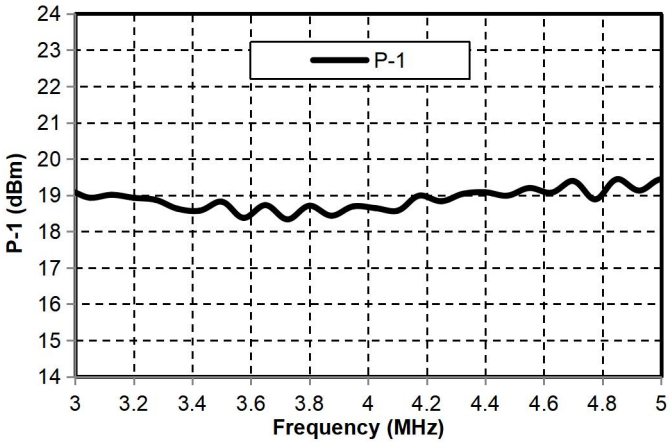
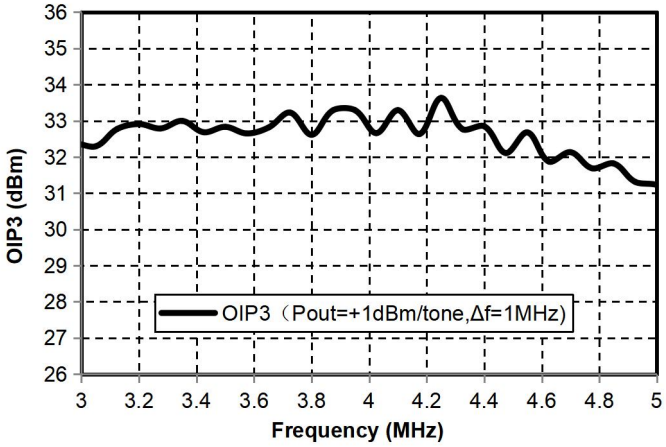
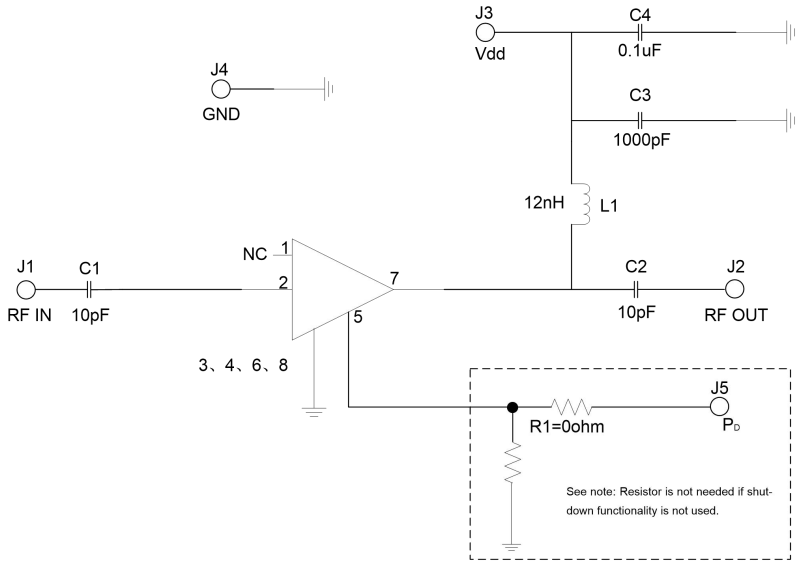
P-1 vs. Frequency (3-5GHz)



OIP3 vs. Frequency (3-5GHz)



1-6GHz recommended circuit diagram:



Ingredients list

Ref. Des.	Value	Description	Manuf.	Part Number
R1, R3	0 Ω	Res, 0 Ω, 0402, 1/10W	various	
R2	220 KΩ	Res, 220 KΩ, 0402, 5%, 1/16W	various	
C1, C2	10 pF	Cap, 10 pF, 0402, 5%, 50V C0G	various	
C3	1000 pF	Cap, 1000 pF, 0402, 10%, 50V X7R	various	
C4	0.1 µF	Cap, 0.1 µF, 0402, 10%, 50V, X5R	various	
L1	12 nH	Ind , 12 nH , 0603, 5%, W/W	Coilcraft	0603HP-12NXGLW
J1, J2	-	Conn, SMA F STRT .062”	Cinch Connectivity	142-0701-851

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Pin Definition

Bonding point number	Function Symbol	Functional Description
2	RF IN	RF input port, impedance 50ohm , requires external DC blocking capacitor
5	Shut Down	Shutdown control port
7	RF OUT / DC Bias	RF output port, impedance 50ohm, amplifier leakage bias, bias the circuit at the output end through external current-choking inductor and bias resistor, external DC blocking capacitor is required
1, 3, 4, 6, 8	NC or GND	No welding required, also grounding possible
Chip bottom	GND	The bottom of the chip needs to be well grounded to RF and DC

Use restriction parameter [2]

Collector voltage: +6V	Input power: +23dBm
Operating temperature: -40 ~ +70 ° C	Storage Temperature: -65 ~ +150°C

【2】 Exceeding any of these maximum limits may cause permanent damage.

Environmental conditions

Parameter	Grade	Standard
ESD – Human Body Model (HBM)	1A	ESDA / JEDEC JS-001-2014
ESD – Charged Device Model (CDM)	C3	ESDA / JEDEC JS-001-2014
MSL – Moisture Sensitivity Level	LEVEL 1	IPC/JEDEC J-STD-020

Precautions for use

- Plastic package material : Low-pressure injection molding plastic that meets ROSH specifications
- Lead frame material: copper alloy
- Lead surface plating: 100% matte tin
- Maximum reflow peak temperature: 260 ℃