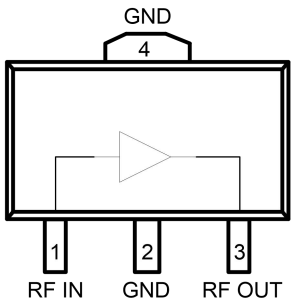


High Linearity Low Noise Gain Amplifier , 50 - 4000MHz

Product Introduction

GHLN- 9028B-S89 is a 50MHz~4GHz ultra-wideband, high linearity, low noise gain block amplifier. This amplifier can meet the needs of a variety of application scenarios, including small base stations, walkie-talkies, LTE/WCDMA communication systems and other wireless communication systems. GHLN-90 28B-S89 uses a standard SOT89 label package, and all pins are equipped with ESD protection. GHLN-90 28B-S89 biases the circuit through an external choke inductor, and a DC blocking capacitor needs to be added to the periphery of the circuit. The product quality level is industrial grade.

Block Diagram	Product Features
 <p style="text-align: center;">Bottom view</p>	<p>Working frequency: 50-4 000MHz Noise figure : 1.9dB@1900MHz Small Signal Gain: 14.2 ± 0.2dB from 0.5-4GHz P-1dB: 20dBm Typ. OIP3 : 3-5.5 dBm Integrated shutdown function 50Ohm input and output +5V /80mA SOT89 plastic package</p>

Electrical performance parameters (TA = +25°C, Vd = +5V, 50Ω system)					
Index	Test Conditions	Minimum	Typical Value	Maximum	Unit
Frequency Range		50		4000	MHz
Test frequency			1900		MHz
Small Signal Gain			14		dB
Input return loss			13.5		dB
Output return loss			18.5		dB
P-1			20		dBm
OIP3	Pout=+4 dBm /tone, Δf =1 MHz		35		dBm
Noise Figure*	Without de-embedding, the estimated evaluation board loss is 0.15dB@1.9G		2.1		dB
Current	On state		80		mA
Thermal resistance	channel to case		40		°C/W

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

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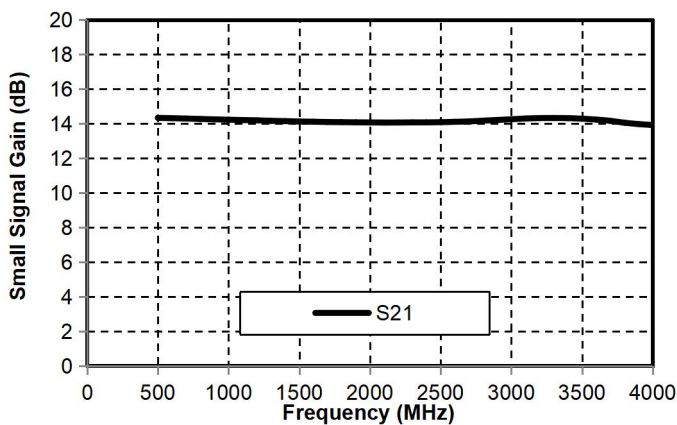
500M-4000M electrical performance parameters:

Electrical performance parameters (TA = +25°C, Vd = +5V, 50Ω system)							
Index	Typical Value						Unit
Test frequency	500	900	1900	2700	3500	4000	MHz
Small Signal Gain	14.4	14.3	14	14.1	14.3	14.0	dB
Input return loss	17.5	16	13.5	18.5	13.5	8.5	dB
Output return loss	12	13.5	18.5	25.5	13	9.5	dB
P-1	20	20	20	20	19.5	18.5	dBm
OIP3*	36.5	36	35	35	37	35	dBm
Noise Figure**	1.9	1.9	2.0	2.5	3.0	3.4	dB

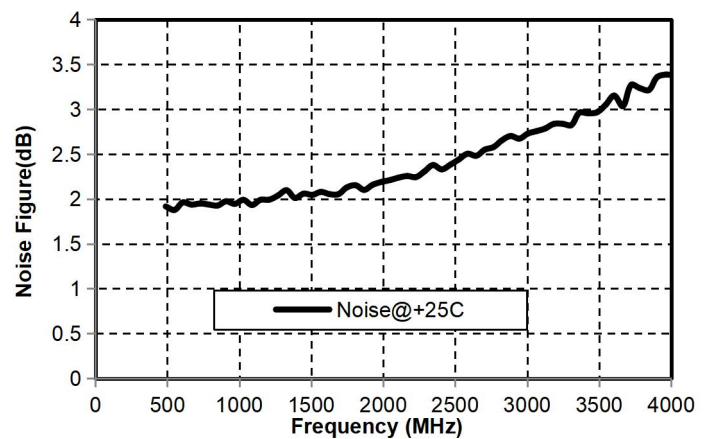
* Pout=+4 dBm /tone, Δf =1 MHz .

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

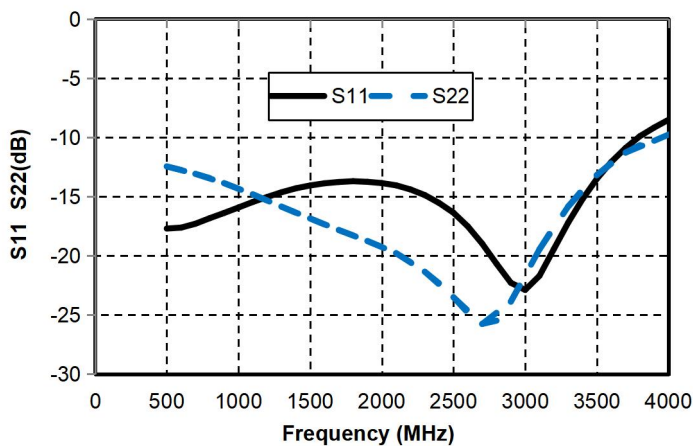
Small Signal Gain vs. Frequency



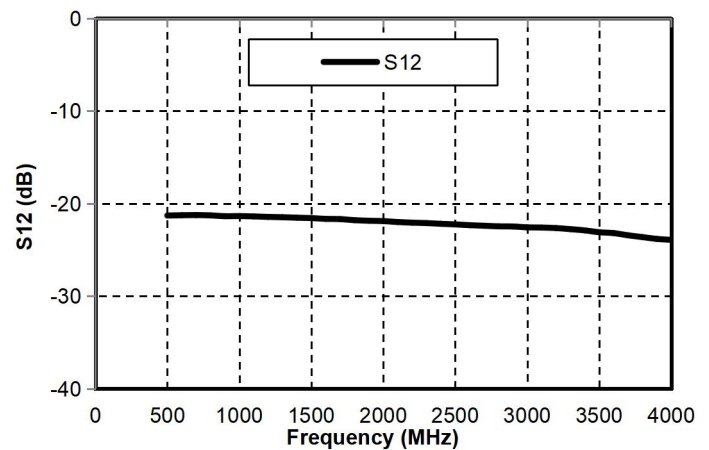
Noise Figure vs. Frequency



Input /Output Return Loss vs. Frequency

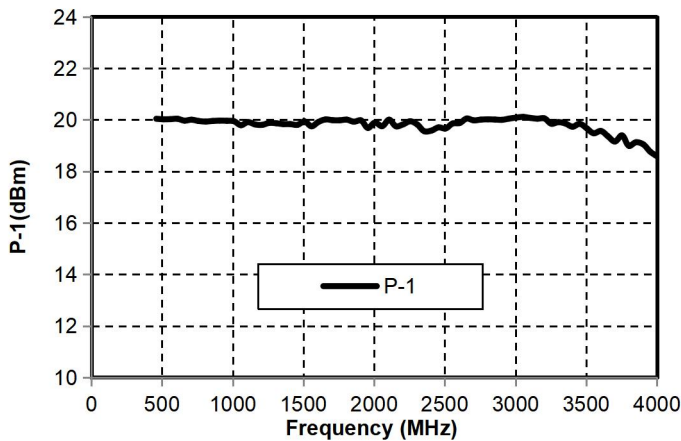


Reverse Isolation vs. Frequency

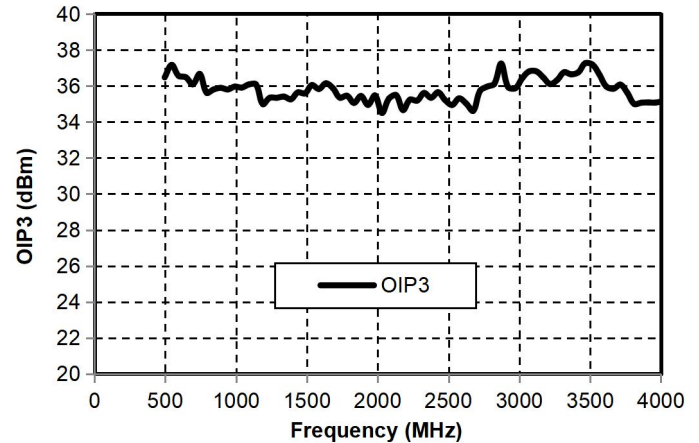


High Linearity Low Noise Gain Amplifier , 50 - 4000MHz

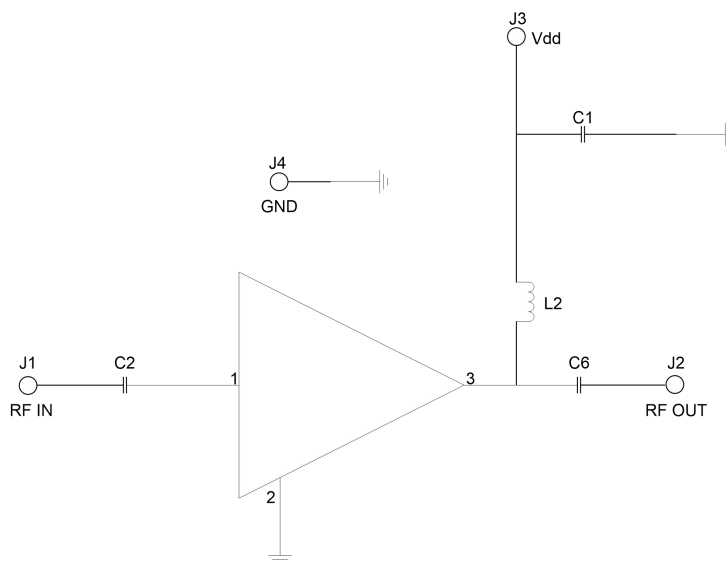
P-1dB vs. Frequency



OIP3 vs. Frequency



500M-4000M recommended circuit diagram



Precautions

- 1、 All resistors and capacitors are packaged in 0603
- 2、 The resistance , capacitance and inductance values need to be adjusted accordingly according to the actual application frequency.

Ingredients list

Raw material	RC Inductance	Describe	Brand
L 2	68nH	Inductor, 0603, 5%	various
C 1	0.01 uF	CAP, 0603, 5%, 50V, X7R	various
C2, C6	100pF	CAP, 0603, 5%, 100V, NPO/COG	various

High Linearity Low Noise Gain Amplifier , 50 - 4000MHz

50M-500M electrical performance parameters

GHLN-9028B-S89 can achieve 50-500 MHz intermediate frequency operation by properly adjusting the bias inductor value and DC capacitor value .

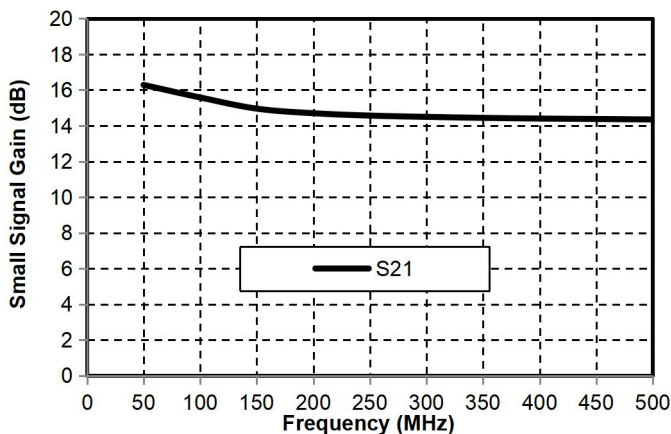
Electrical performance parameters (TA = +25°C, Vd = +5V, 50Ω system)

Index	Typical Value						Unit
	50	100	200	300	400	500	
Test frequency	50	100	200	300	400	500	MHz
Small Signal Gain	16	15.5	14.5	14.5	14.0	14.0	dB
Input return loss	8	14	17.5	18.0	18.0	18.5	dB
Output return loss	13	14	12	12	12	12	dB
P-1	18	19	19	19	19	19	dBm
OIP3*	36	35	35.5	35	35	35	dBm
Noise Figure**	1,9	1.8	1.9	1.9	1.8	1.8	dB

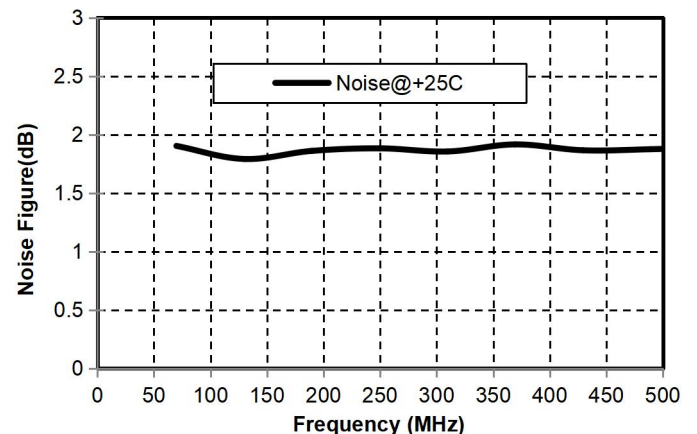
* Pout=+4 dBm /tone, Δf =1 MHz .

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

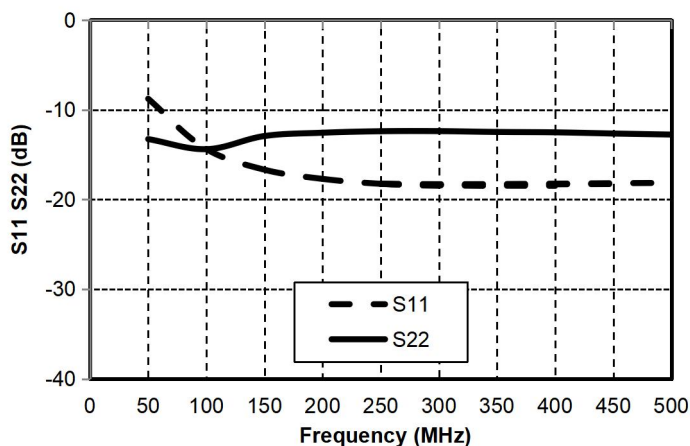
Small Signal Gain vs. Frequency



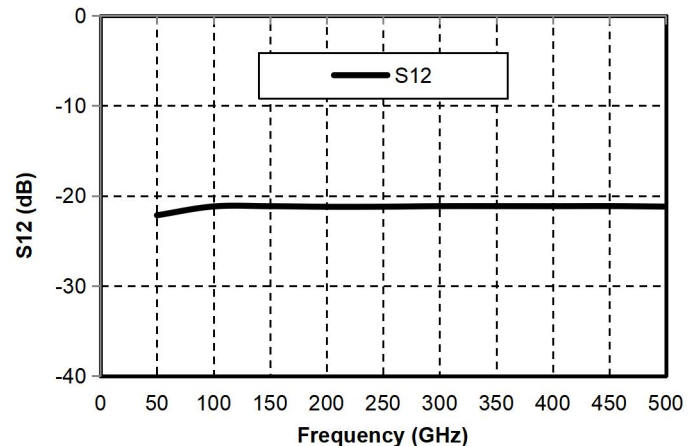
Noise Figure vs. Frequency



Input /Output Return Loss vs. Frequency

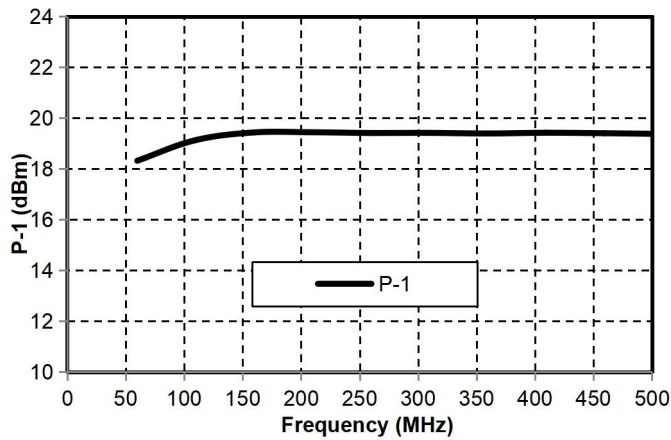


Reverse Isolation vs. Frequency

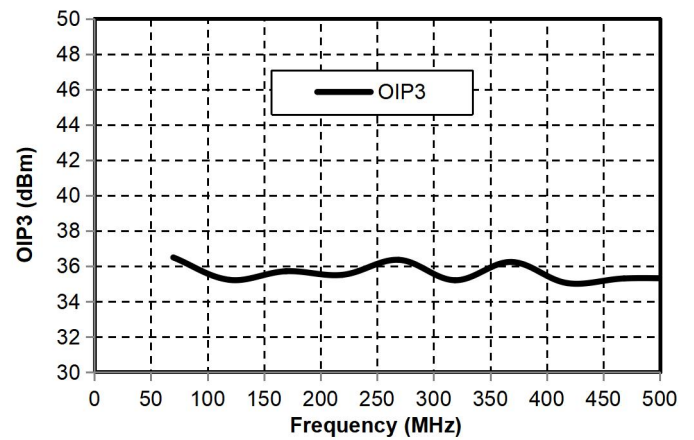


High Linearity Low Noise Gain Amplifier , 50 - 4000MHz

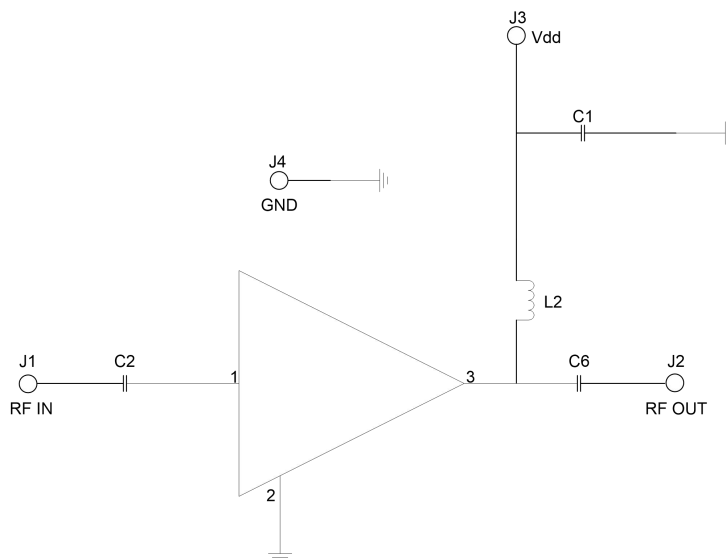
P-1dB vs. Frequency



OIP3 vs. Frequency



50M-500M recommended circuit diagram



Precautions

- 1、 All RC components are in 0402 package . All RC components are in 0603 package.
- 2、 The resistance , capacitance and inductance values need to be adjusted accordingly according to the actual application frequency.

Ingredients list

Raw material	RC Inductance	Describe	Brand
L 2	330 nH	Inductor, 0603, 5%	various
C 1	0.01 uF	CAP, 0603, 5%, 50V, X7R	various
C2, C6	100 0 pF	Cap, 0 6 0 3 , 5%, 50V, X7R	various

High Linearity Low Noise Gain Amplifier , 50 - 4000MHz

Pin Definition		
Bonding point number	Function Symbol	Functional Description
1	RF IN	RF input port, impedance 50ohm , requires external DC blocking capacitor
3	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
2, 4	GND	The bottom of the chip needs to be well grounded to RF and DC

Use restriction parameter ¹

Collector voltage: +7V	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 ROHS specifications
- Lead frame material: Nickel alloy
- Lead surface plating: 100% matte tin
- Maximum reflow peak temperature: 260 °C