Standard Circuit

GHLN-9035

High Linearity, Low Noise Gain Block Chip, 0.05- 4GHz

Performance characteristics

- Working frequency: 50-4000MHz
- Noise figure: 0.6dB@1900MHz
- Small signal gain: 18.5dB @ 1900 MHz
- P-1dB: 22dBm
- OIP3 : 36 dBm
- Integrated shutdown function
- 50Ohm input and output
- +5V /110mA
- Chip size: 0.83 x 1.03 x 0.1 mm

Use restriction parameter [1]	
Collector voltage	+6 V
Input power	+23dBm
Operating Current	120mA
Operating temperature	-55 ~ + 105 °C
Storage temperature	-65 ~ +150°C

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

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			18.5		dB
Input return loss			11		dB
Output return loss			15		dB
P-1			22		dBm
OIP3	Pout=+4dBm/tone, Δf =1MHz		36		dBm
Noise Figure*	Without de-embedding, the estimated evaluation board loss is 0.15dB@1.9G		0.6		dB
Switching speed	Rise Time (10%-90%)		170		ns
	Fall Time (90%-10%)		260		ns
Shutdown control	On state	0		0.8	V
	Off state (Power down)	3		VDD	V
Current	On state		110		mA
	Off state (Power down)		3		mA
Shutdown pin current	VPD ≥ 3V		100		uA

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Thermal resistance	channel to case			50	°C/W

*The noise figure result does not deduct the input loss of the test DEMO board .

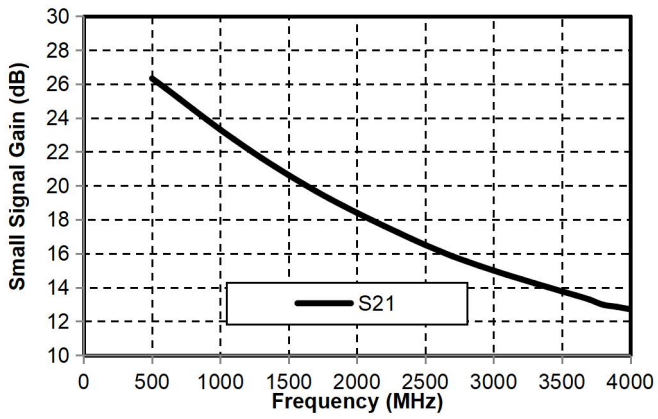
0.05- 4GHz electrical performance parameters

Electrical performance parameters (TA = +25°C, Vd = +5V, Ids = 115mA, 50Ω system)

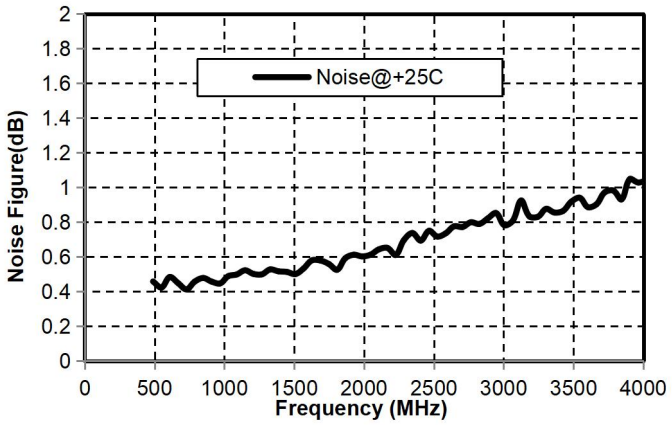
Index	Test Conditions	Typical Value					Unit
Test frequency		900	1900	2600	3600	5000	MHz
Small Signal Gain		23.5	18.5	16	13.5	10.5	dB
Input return loss		12	11	11	9.5	6.5	dB
Output return loss		15.5	15	13	11	11	dB
P-1		22	22	22.5	22.5	20.5	dBm
OIP3	Pout=+4 dBm /tone, Δf =1 MHz	37	36	36.5	35.5	33.5	dBm
Noise Figure*		0.45	0.6	0.8	0.9	1.3	dB

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

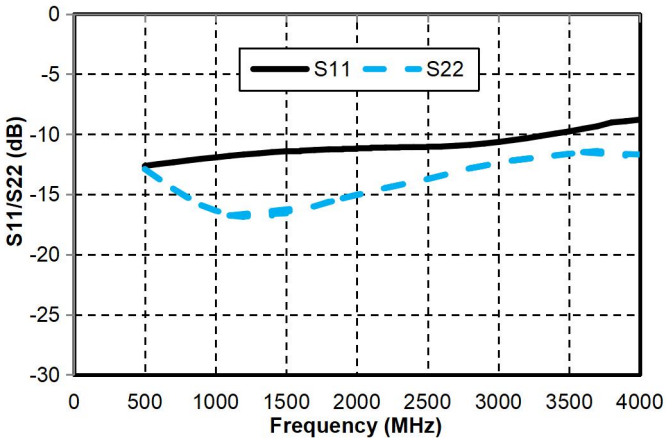
Main index test curve (TA = +25°C , Vcc = + 5V)



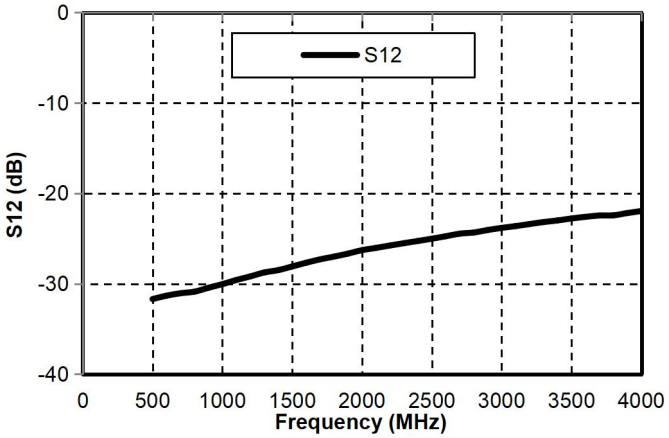
Small Signal Gain vs. Frequency



Noise Figure vs. Frequency

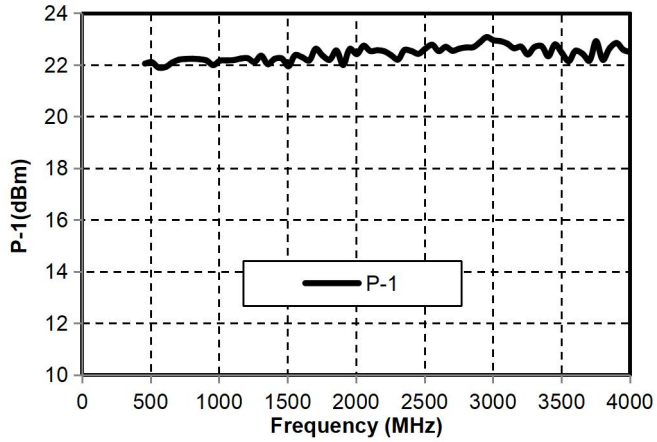


Input /Output Return Loss vs. Frequency

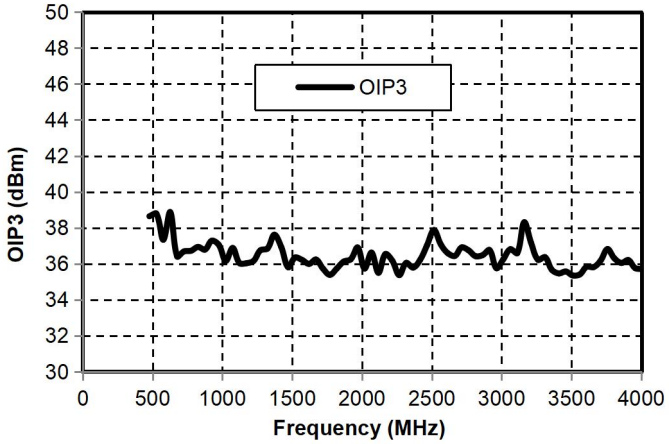


Reverse Isolation vs. Frequency

High Linearity, Low Noise Gain Block Chip, 0.05- 4GHz



P-1dB vs. Frequency



OIP3 vs. Frequency

High Linearity, Low Noise Gain Block Chip, 0.05- 4GHz

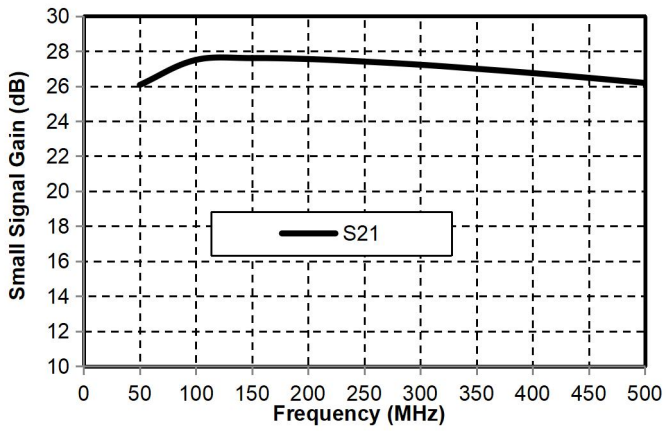
50M-500M electrical performance parameters

GHLN-9035-D can achieve 50-500MHz intermediate frequency operation by properly adjusting the bias inductor value and DC capacitor value .

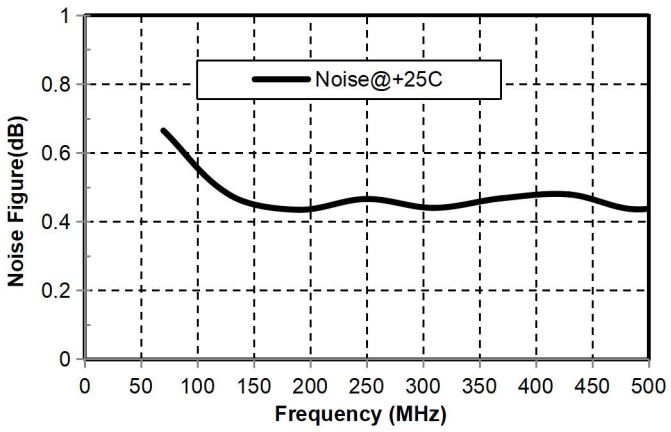
Electrical performance parameters (TA = +25°C, Vd = +5V, Ids = 115mA, 50Ω system)						
Index	Test Conditions	Typical Value				Unit
Test frequency		50	100	200	500	MHz
Small Signal Gain		26	27	27.5	26	dB
Input return loss		3.5	7.5	11.5	12.5	dB
Output return loss		4.5	7.5	9.6	12	dB
P-1		18	20.5	21.5	twenty two	dBm
OIP3	Pout=+4 dBm /tone, Δf =1 MHz	37	37	38	37.5	dBm
Noise Figure*		0.6	0.55	0.45	0.45	dB

*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

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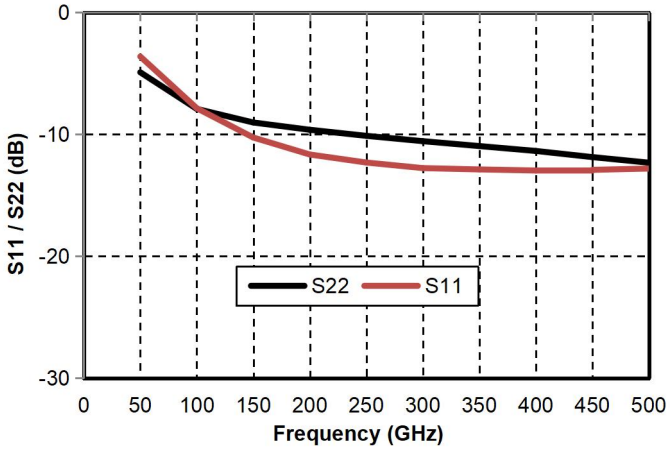
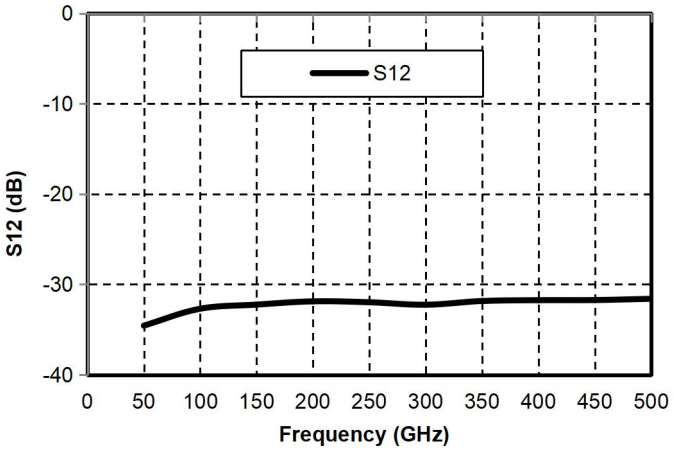
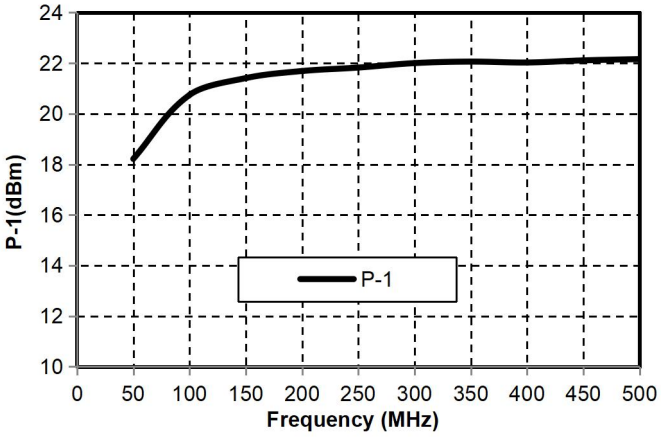
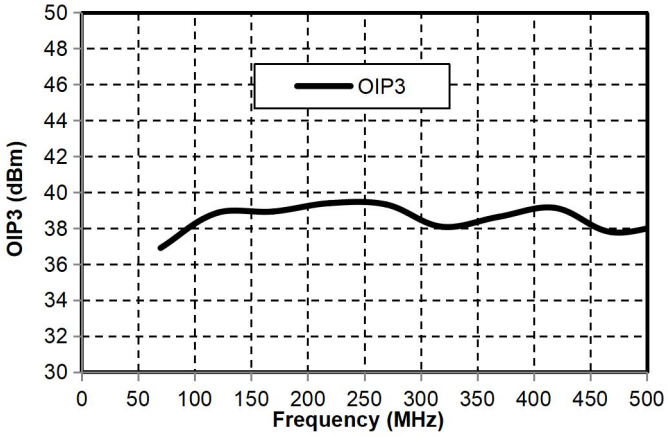




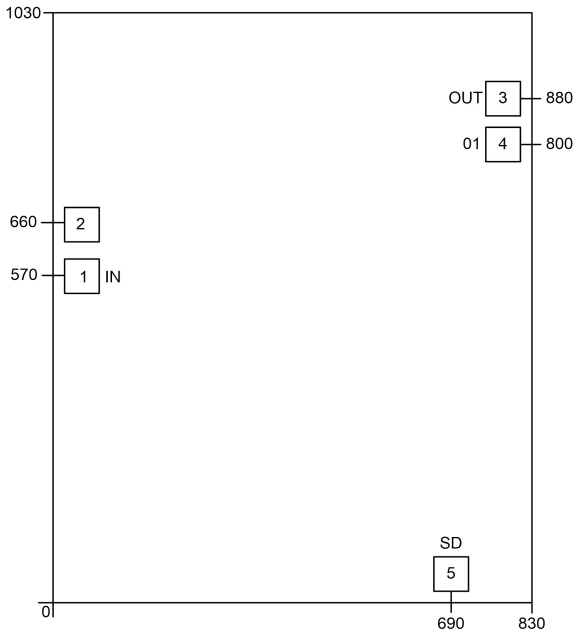
P-1dB vs. Frequency



OIP3 vs. Frequency



Appearance structure



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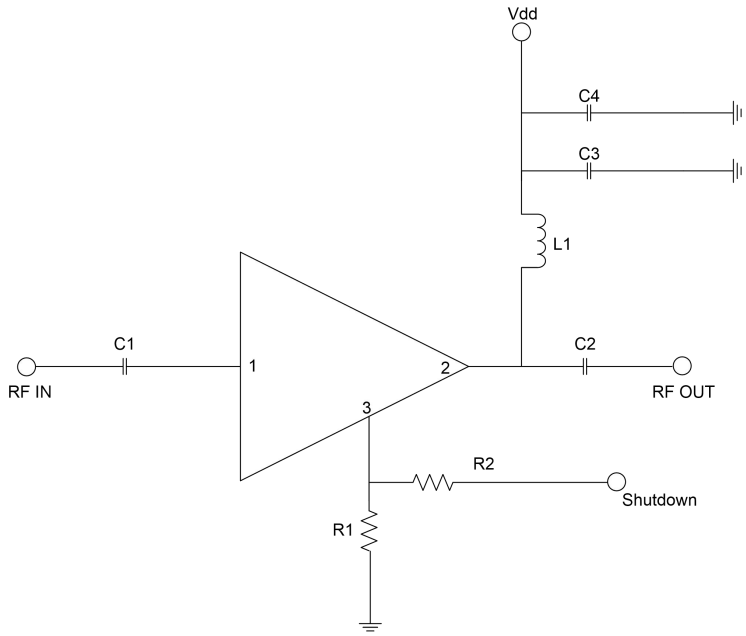
All units in the figure are micrometers.

Bonding point number	Function Symbol	Functional Description
1	RFIN	RF input, external DC blocking capacitor is required.
2	RFOUT	RF output and chip DC bias, bias the circuit at the output end through external choke inductor and bias resistor, and require external DC blocking capacitor.
3	Shutdown	Amplifier RF output shutdown port.
Chip bottom	GND	The bottom of the chip needs to be well grounded to RF and DC.

Recommended circuit diagram



Precautions:

1、 The capacitance values of C1 , C2 and C3 need to be adjusted accordingly according to the actual application frequency.

2、 The inductance of L1 needs to be adjusted accordingly according to the actual application frequency.

3、 If not needed, R1 and R2 can be not installed; when R1 and R2 are not installed, the amplifier is always in working state.

Raw materials list (500M-4000M)

Raw material	RC Inductance	Describe	Brand
R1	10KΩ	Resistor , Chip, 5%, 1/16W	various
R2	33KΩ	Resistor , Chip, 5%, 1/16W	various
L1	68nH	Inductor, 5%, Ceramic	various
C4	1.0uF	Cap . , Chip , 10%,10V, X5R	various
C1, C2, C3	100pF	Cap., Chip, 5% , 50V, NPO/COG	various

Raw materials list (50M-500M)

Raw material	RC Inductance	Describe	Brand
R1	10KΩ	Resistor , Chip, 5%, 1/16W	various
R2	33KΩ	Resistor , Chip, 5%, 1/16W	various
L1	82nH	Inductor, 5%, Ceramic	various
C4	1.0uF	Cap., Chip, 10%, 10V, X5R	various
C1, C2, C3, C4	1000pF	Cap., Chip, 5%, 50V, NPO/COG	various