

# Low Noise Amplifier

## 6 - 18 GHz

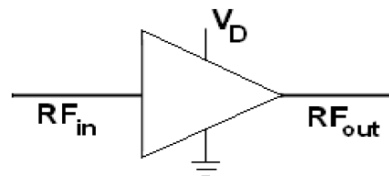


CGY2290SUH/C1

Rev. V1

### Features

- Operating Frequency Range: 6 to 18 GHz
- Noise Figure: 3.3 dB
- Gain: 8.5 dB
- Gain Flatness:  $\pm 0.5$  dB
- P1dB: 12 dBm
- Input Return Loss: 14 dB
- Output Return Loss: 14 dB
- Total Drain Current: 33 mA
- Chip Size: 1400 x 1200  $\mu\text{m}$
- 100% RF Tested, Known Good Die
- Space and MIL-STD Available
- RoHS\* Compliant



### Applications

- Radar
- Telecommunications
- Instrumentation

### Description

The CGY2290SUH/C1 is a high performance GaAs MMIC Low Noise Amplifier operating from 6 GHz up to 18 GHz.

This device has a low noise figure of under 3.3 dB, with 8.5 dB of gain across the operating frequency range. The on-chip matching provides better than 14 dB of Input / Output Return Losses. It is part of a new 6 - 18 GHz chipset that is dedicated to Radar, Telecommunication and Instrumentation applications.

The die is manufactured using ED02AH a 0.18  $\mu\text{m}$  gate length pHEMT process. The MMIC uses gold bonding pads, backside metallization and is fully protected with Silicon Nitride passivation to obtain the highest level of reliability.

This technology has been evaluated for Space applications and is on the European Preferred Parts List of the European Space Agency.

### Ordering Information

Part Number	Package
CGY2290SUH/C1	Die

\* Restrictions on Hazardous Substances, compliant to current RoHS EU directive.

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**Electrical Specifications: Measured On Reference Board,**  
Freq. = 6 - 18 GHz,  $V_{D1} = 5\text{ V}$ ,  $I_D = 30\text{ mA}$ ,  $T_A = +25^\circ\text{C}$

Parameter	Test Conditions	Units	Min.	Typ.	Max.
Gain	—	dB	—	8.5	—
Noise Figure	—	dB	—	3	—
Reverse Isolation	—	dB	—	-16	—
Input Return Loss	—	dB	—	—	15
Output Return Loss	—	dB	—	—	15
P1dB	—	dBm	—	13	—

### Absolute Maximum Ratings<sup>1,2</sup>

Parameter	Absolute Maximum
Input Power	TBD dBm
Voltage	0 to 6 V
Junction Temperature	+150°C
Operating Temperature	-40°C to +85°C
Storage Temperature	-55°C to +150°C

- Exceeding any one or combination of these limits may cause permanent damage to this device.
- MACOM does not recommend sustained operation near these survivability limits.

### Thermal Characteristics

Parameter	Absolute Maximum
Thermal Resistance	TBD

### Handling Procedures

Please observe the following precautions to avoid damage:

### Static Sensitivity

These electronic devices are sensitive to electrostatic discharge (ESD) and can be damaged by static electricity. Proper ESD control techniques should be used when handling these devices.

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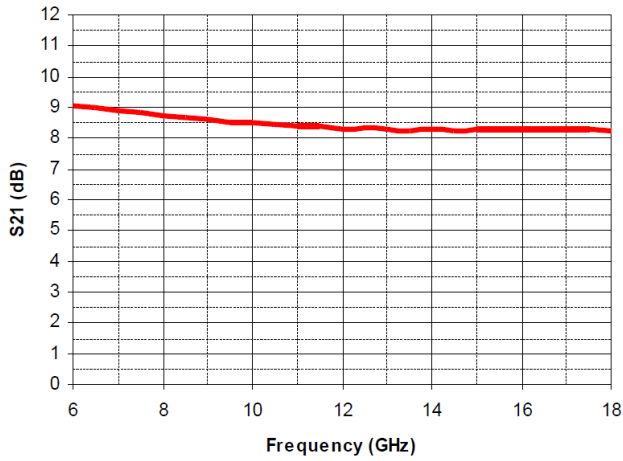


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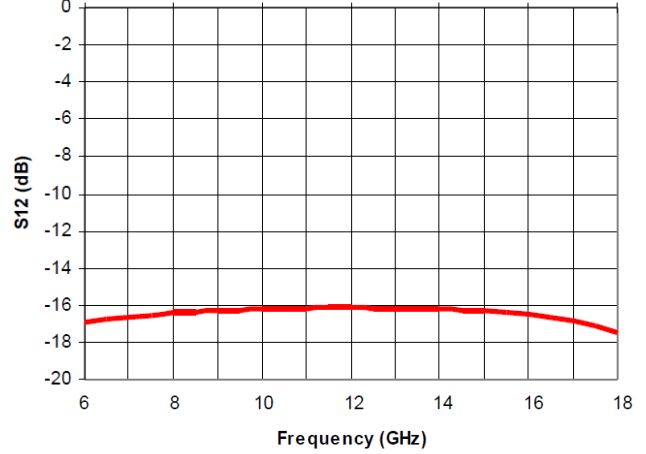
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### Typical Performance Curves: On Wafer Measurements, +25°C

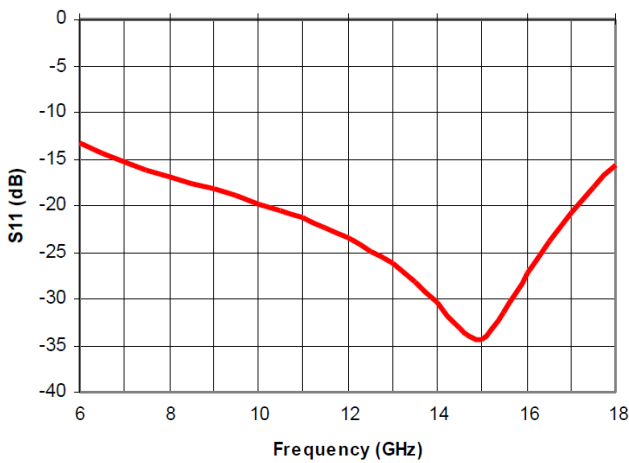
**Gain**



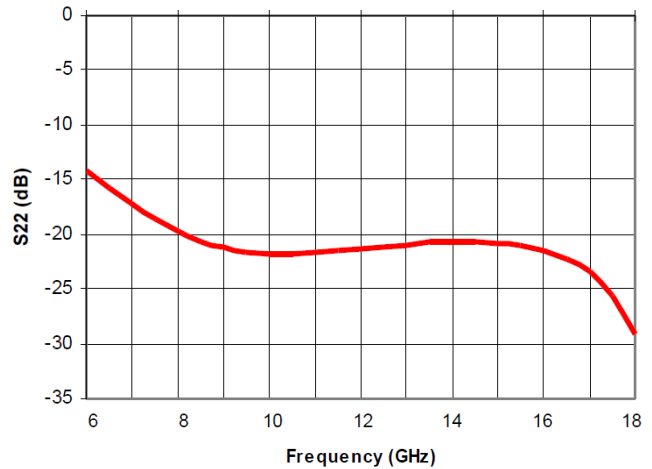
**Reverse Isolation**



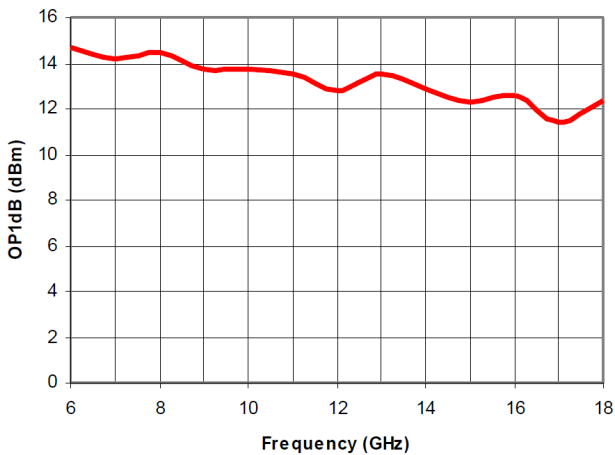
**Input Return Loss**



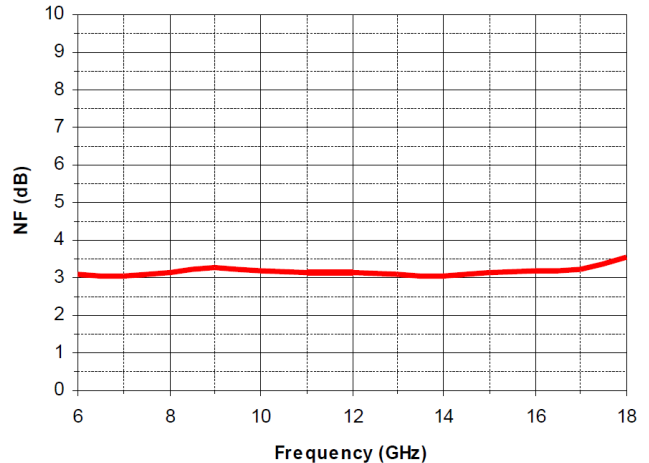
**Output Return Loss**



**Output P1dB**



**Noise Figure**



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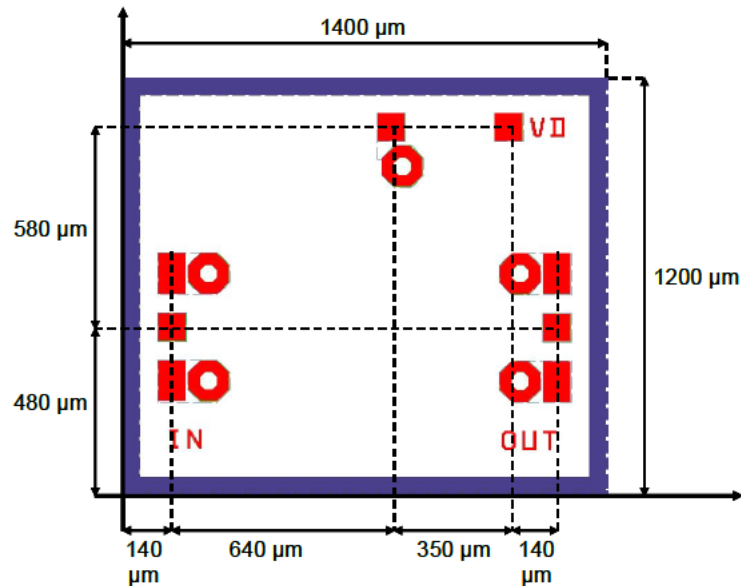
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### Pad Layout

Chip size = 1400 x 1200  $\mu\text{m}$

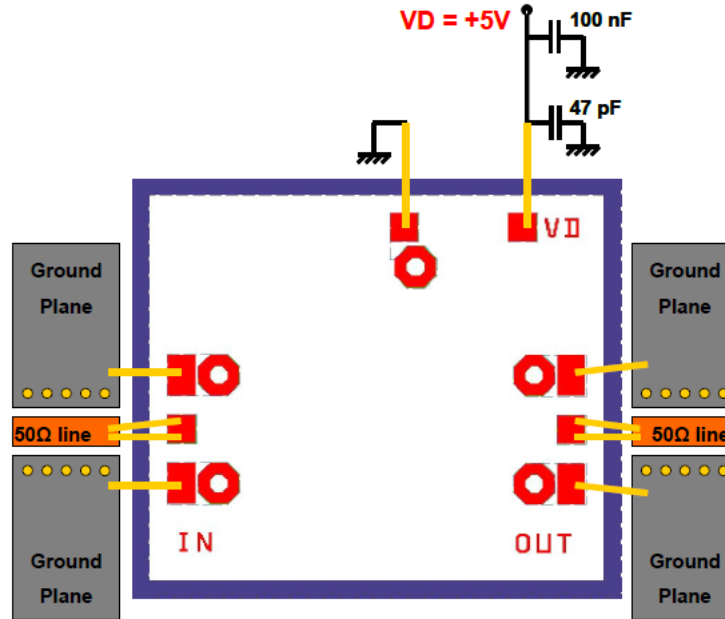
- DC and RF Pads = 80 x 80  $\mu\text{m}$ , top metal = Au
- Chip Thickness 100  $\mu\text{m}$



PAD NAME	SYMBOL	COORDINATES		DESCRIPTION
		X	Y	
GND	GND	140	330	Ground
RFin	RF in	140	480	RF Input Port
GND	GND	140	630	Ground
GND	GND	1260	630	Ground
RFout	RF out	1260	480	RF Output Port
GND	GND	1260	330	Ground
VDD	VDD	1120	1060	Positive supply voltage
GND	GND	780	1060	Ground

**X=0, Y=0 at bottom left corner.**

Bonding Diagram and Assemble Information



The RF interfacing bond wires or ribbon should be kept as short as possible. The RF lines should be 300 μm wide or less to minimize discontinuities associated with the connection to the MMIC bond pads.

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