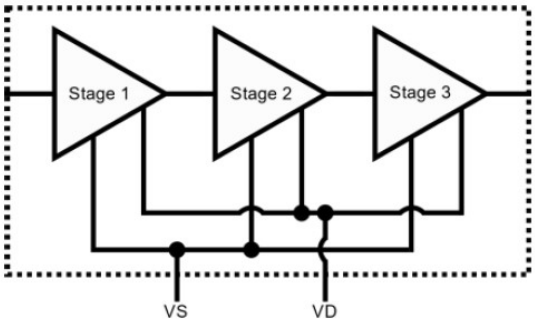
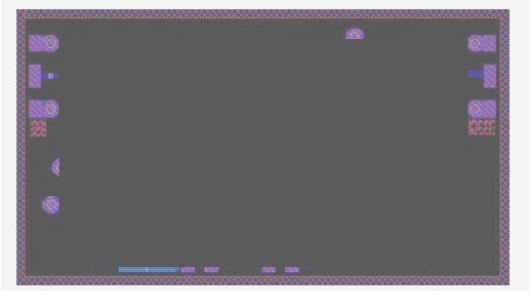
Low Noise Amplifier, Ka-Band
24 - 44 GHz

CGY2260UH/C1
Rev. V1

Features

- Noise Figure: 1.7 dB
- Gain: 25.5 dB
- OIP3: 22 dBm
- Output Power @ P1dB: 6 dBm
- Single Positive & Negative Supply Auto Bias / Temp Controlled:
  - VD = 1.5 V
  - VS = -1.5 V
  - IQtot = 52 mA (78 mW)
- 50 Ω Input & Output Matched
- Chip Size: 3.00 x 1.68 mm
- 100% RF Tested, Known Good Die
- Uses a highly reliable pHEMT MMIC process
- Samples Available
- RoHS* Compliant





Applications

- Radar
- SATCOM
- Telecommunications
- Instrumentation

Description

The CGY2260UH/C1 is a high-performance GaAs low noise amplifier MMIC designed to operate in the Ka-Band.

The die is manufactured using an advanced 70 nm gate length high Indium content mHEMT technology (D007IH).

The MMIC uses gold bonding pads and backside metallization and is fully protected with Silicon Nitride passivation to obtain the highest level of reliability.

Ordering Information

Part Number	Package
CGY2260UH/C1	

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

Electrical Specifications[1]: Measured On Reference Board, Freq. = 24 - 44 GHz, V_{D1} = 1.5 V, VS = -1.5 V, I_D = 50 mA, T_A = +25°C

Parameter	Test Conditions	Units	Min.	Typ.	Max.
Gain	—	dB	—	25.5	—
Noise Figure	24 GHz 29 GHz 34 GHz 39 GHz 44 GHz	dB	—	1.6 1.6 1.8 1.4 2.0	—
Reverse Isolation	Out/In	dB	-50	—	-30
Output P1dB	—	dBm	—	6	—
Input Return Loss	50 Ω Source	dB	—	-11	—
Output Return Loss	50 Ω Load	dB	—	-15	—

1. Measurement reference planes are the INPUT and OUTPUT SMA connectors.

Absolute Maximum Ratings[2,3]

Parameter	Absolute Maximum
Input Power	15 dBm
Negative Voltage	-2 to 0 V
Drain Voltage	0 to +2 V
Junction Temperature	+125°C
Operating Temperature	-40°C to +85°C
Storage Temperature	-55°C to +150°C

2. Exceeding any one or combination of these limits may cause permanent damage to this device.
3. MACOM does not recommend sustained operation near these survivability limits.
4. VD1 Open Circuited

Thermal Characteristics

Parameter	Absolute Maximum
Thermal Resistance	35.26°C/W @ +20°C/W 46.54°C/W @ +85°C/W

Handling Procedures

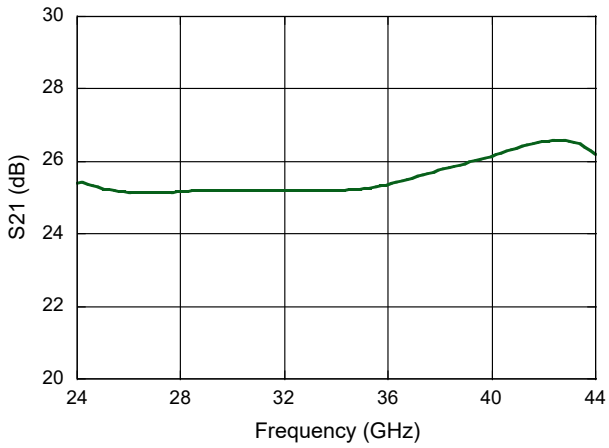
Please observe the following precautions to avoid damage:

Static Sensitivity

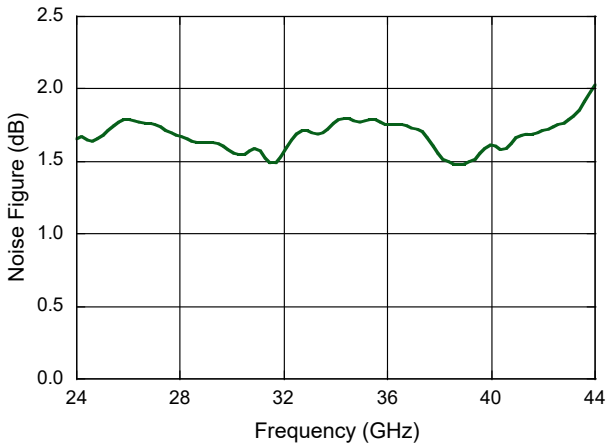
These electronic devices are sensitive to electrostatic discharge (ESD) and can be damaged by static electricity. Proper ESD control techniques should be used when handling these devices.

Typical Performance Curves: On Wafer in Continuous Wave Mode

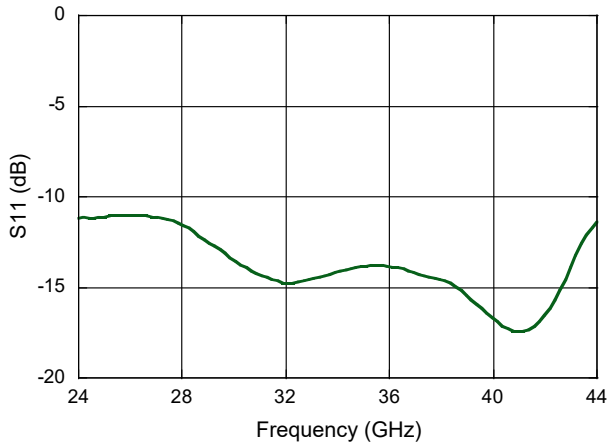
Small Signal Gain



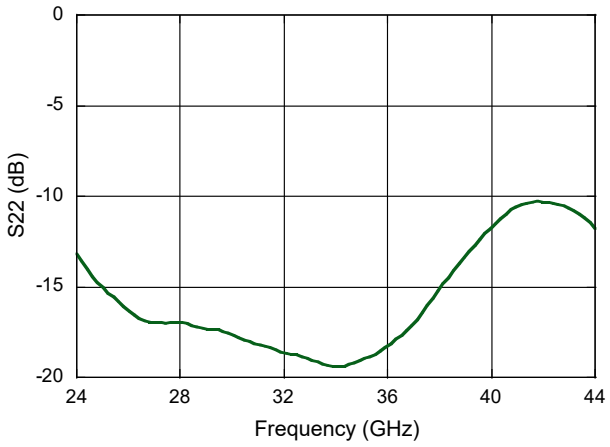
Noise Figure



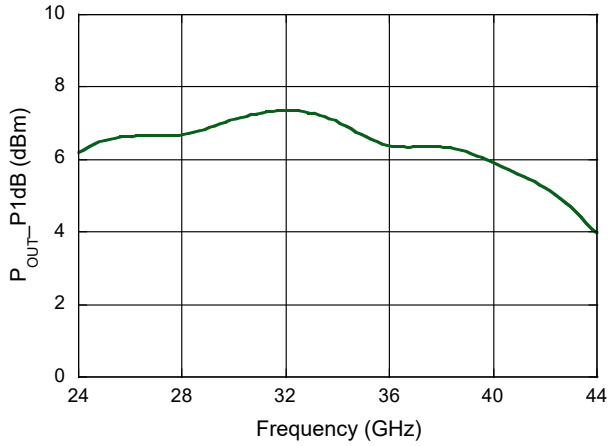
Input Return Loss



Output Return Loss

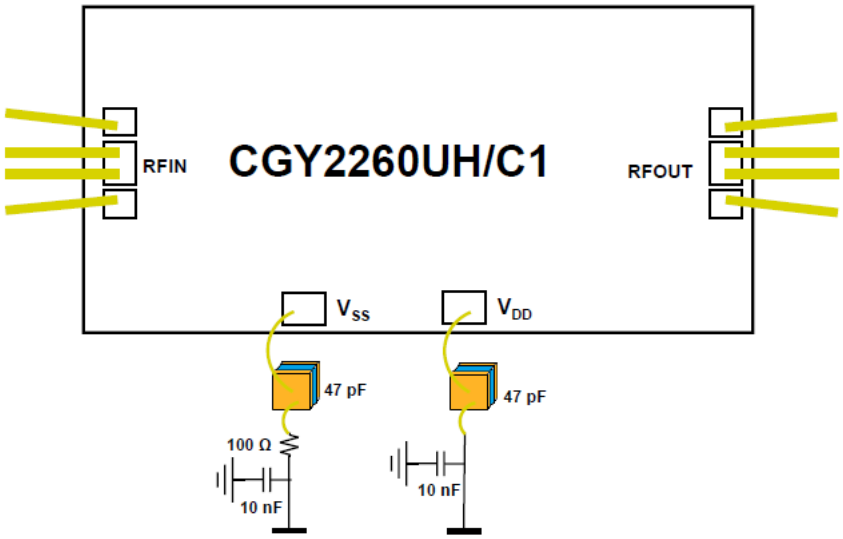


Output Power @ P1dB



Application Schematic

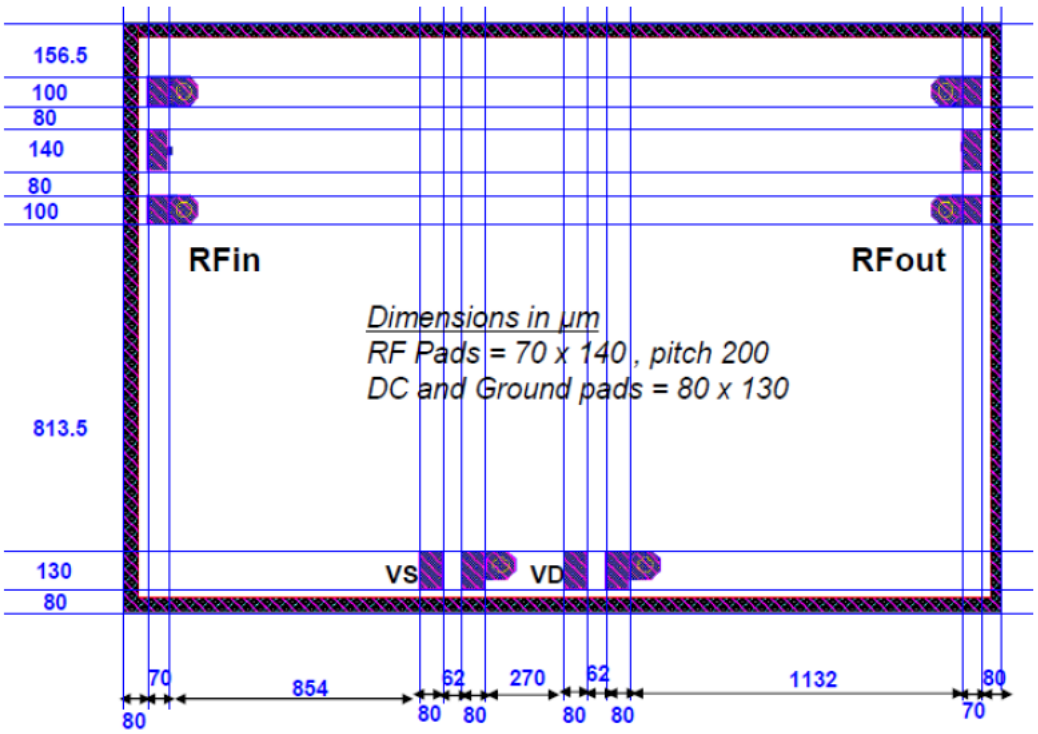
To prevent instability of the customer design it is highly recommended to place small chip capacitors as near as possible to the CGY2260UH/C1 die and to connect them with bonding's as short as possible. Additionally, a 10 nF capacitor can be added on a drain connection. In the gate circuitry, a 100 Ω resistor may be added in series to improve gate isolation and prevent unwanted oscillations. The resistors are introducing some low pass filtering in case of fast power switching using gate control architecture.



Pin Configuration

Component Name	Comment
All 47 pF chip capacitors	Chip capacitor ATC COMPONENTS P/N 118BL470M100TT soldered close to the die with bonding as short as possible
All 100 Ω serial chip resistors	Chip resistor US MICROWAVES RG1421-100-1% soldered close to the 47pF chip capacitor with bonding as short as possible
All 10 nF cms capacitors	MURATA GRT188R71E474KE13D

Pad Layout



Bonding Pad Coordinates

Pads	Coordinates (µm)		Pad Size	Description
	X	Y		
GND	115	1473	70 x 100	(associated with RFOUT pad)
RFIN	115	1273	70 x 140	RFOUT pad
GND	115	1073	70 x 100	(associated with RFOUT pad)
VSS	1044	115	80 x 130	Negative supply voltage
GND	1186	115	80 x 130	Ground
VDD	1536	115	80 x 130	Positive supply voltage
GND	1678	115	80 x 130	Ground
GND	2885	1073	70 x 100	(associated with RFIN pad)
RFOUT	2885	1273	70 x 140	RFIN pad
GND	2885	1473	70 x 100	(associated with RFIN pad)

Origin point of coordinates (0,0) is on the left bottom side.
All dimension in um.