

Low Noise Amplifier, W-Band

1 - 12 GHz



CGY2220UH/C1

Rev. V1

Features

- Operating Frequency Range: 1 to 12 GHz
- Noise Figure: 1.5 dB
- Gain: 36 dB
- 50 Ω Input and Output Matched
- Input Return Loss: 12 dB @ 10 GHz
- Output Return Loss: 10 dB @ 10 GHz
- Power Supply: $I_{DD} = 50$ mA @ $V_{DD} = 1.5$ V
- Circuit Size: 1.5 mm x 1.0 mm
- 100% RF Tested, Known Good Die
- Demonstration Boards Available
- Samples Available
- RoHS* Compliant

Applications

- Radio Systems
- Telecommunications
- Instrumentation

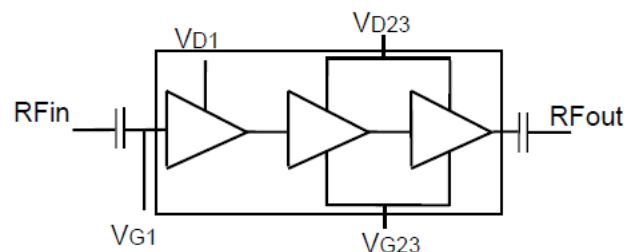
Description

The CGY2220UH/C1 is a high performance GaAs wide band low noise amplifier designed to operate from 1 to 12 GHz with an exceptionally low noise figure of 1.5 dB and very high gain of 36 dB.

The CGY2220UH/C1 is a 3 stages low noise amplifier with low power consumption, the drain voltage is typically 1.5 V and total current consumption 50 mA.

The CGY2220UH/C1 can be used in radio and radar systems, telecommunications and instrumentation.

The die is manufactured using a high performance 70 nm gate length high Indium content MHEMT low noise technology. The MMIC uses gold bonding pads and backside metallization, the die is fully protected with Silicon Nitride passivation to obtain the highest level of reliability.



Ordering Information

Part Number	Package
CGY2220UH/C1	Die

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

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Electrical Specifications: Measured On Reference Board,
Freq. = 1 - 12 GHz, $V_{D1} = V = 3$ V, $I_{D1, D2, D3} = 18$ mA, $T_A = +25^\circ\text{C}$

Parameter	Test Conditions	Units	Min.	Typ.	Max.
Gain	—	dB	—	36	—
Noise Figure	—	dB	—	1.5	—
Input Return Loss	50 Ω , 10 GHz	dB	—	10	—
Output Return Loss	50 Ω	dB	—	12	—

Absolute Maximum Ratings^{1,2}

Parameter	Absolute Maximum
Input Power	3 dBm
Gate Voltage	-1.5 to 0 V
Drain Voltage	0 to +2 V
Drain Current	50 mA
Gate Current	-2 to +2 mA
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

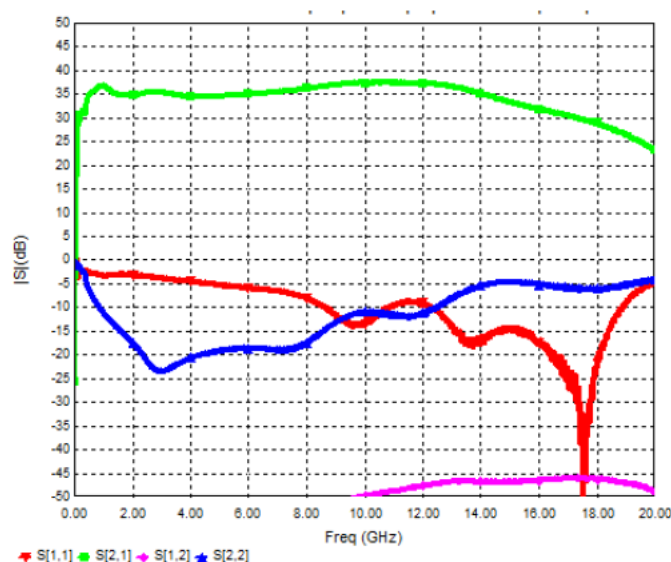
Please observe the following precautions to avoid damage:

Static Sensitivity

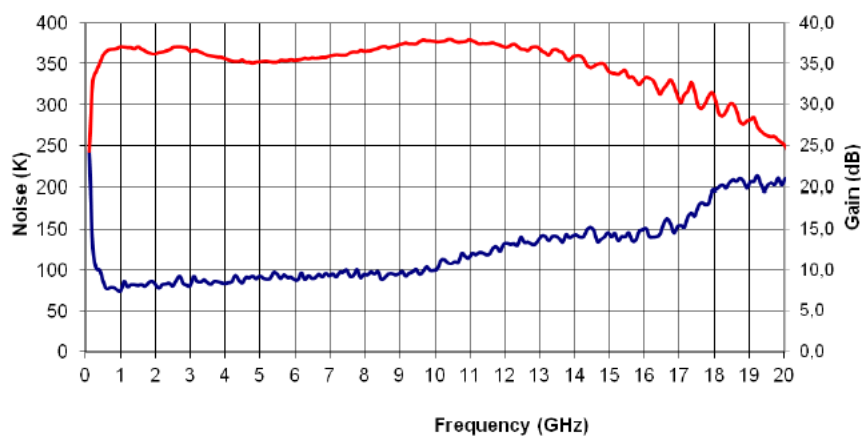
These electronic devices are sensitive to electrostatic discharge (ESD) and can be damaged by static electricity. Proper ESD control techniques should be used when handling these devices.

S-Parameters & Noise Measurements

S-parameters Measurement performed on Carrier at 25°C
VD1=VD23= +1.5V and ID total = 49mA



Noise measurements at 25°C



200K=2.27dB NF 150K=1.8dB NF 120K=1.5dB NF 100K=1.28dB NF

Pad Layout

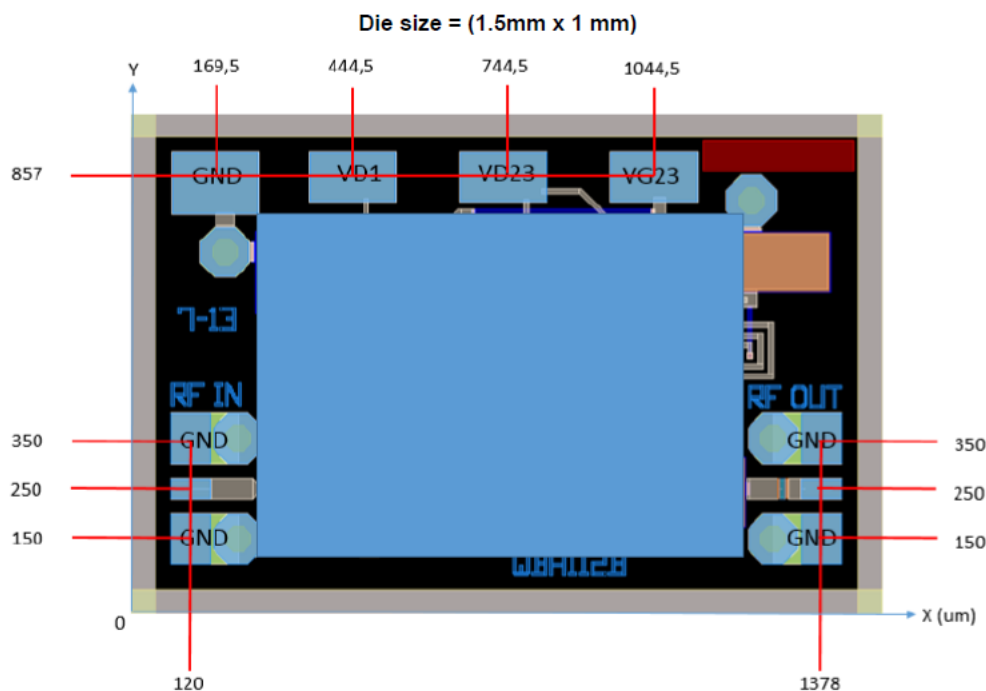


Figure1 : Layout view of CGY2220UH/C1

Pad Name	X (um)	Y (um)
GND	120	150
RFIN / VG1	120	250
GND	120	350
GND	169.5	857
VD1	444.5	857
VD23	744.5	857
VG23	1044.5	857
GND	1378	350
RFOUT	1378	250
GND	1378	150

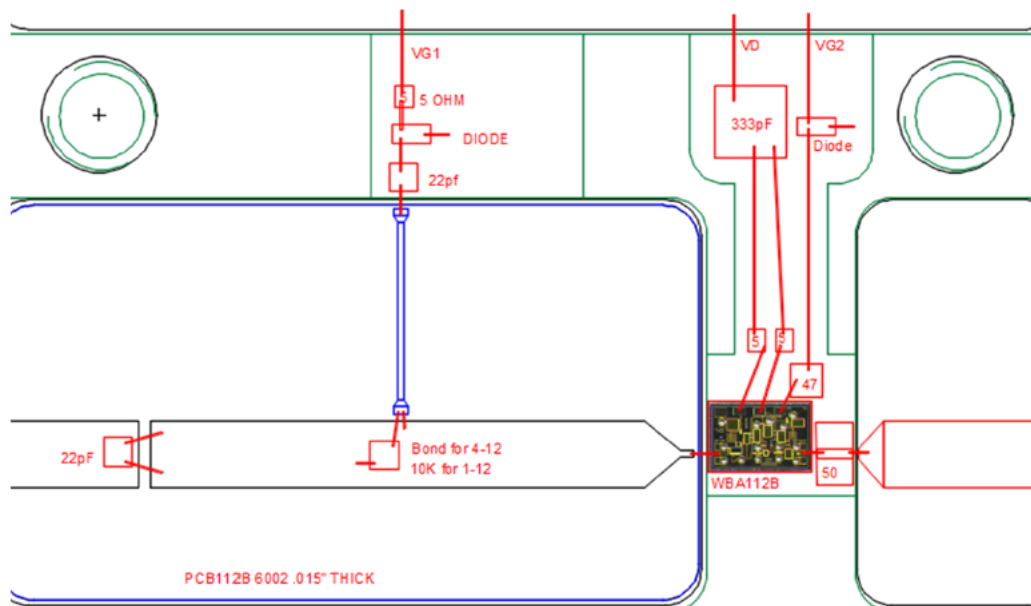
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ASSEMBLY



SOLDERING

To avoid permanent damages or impact on reliability during soldering process, die temperature should never exceed 330°C.

Temperature in excess of 300°C should not be applied to the die longer than 1mn

Toxic fumes will be generated at temperatures higher than 400°C

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