

# PRELIMINARY DATASHEET

## CGY2230UH/C1

### 1-18 GHz Wide band Low Noise Amplifier

#### DESCRIPTION

The CGY2230UH/C1 is a high performance GaAs Wide Band Low Noise amplifier designed to operate from 1 to 18 GHz with an exceptionally low noise figure of 1.5 dB and very high gain of 37 dB.

The CGY2230UH/C1 is a 3 stages Low Noise Amplifier with low power consumption, the drain voltage is typically 1.5V and total current consumption 50 mA.

The CGY2230UH/C1 can be used in radio and radar systems, telecommunications and instrumentation.

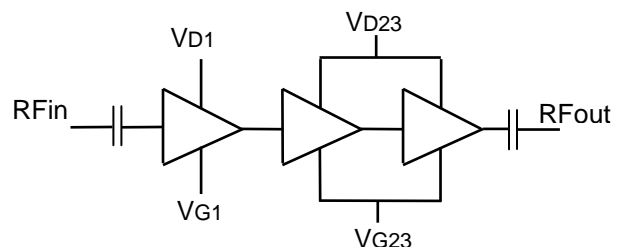
The die is manufactured using OMMIC's High Performance 70 nm gate length high Indium content MHEMT low noise technology. The MMIC uses gold bonding pads and backside metallization, the die is fully protected with Silicon Nitride passivation to obtain the highest level of reliability.

#### APPLICATIONS

- Radio systems
- Telecommunications
- Instrumentation

#### FEATURES

- Operating frequency range : 1 to 18 GHz
- Noise Figure 1.5 dB
- Gain : 37dB
- 50 Ohms input and output matched
- Input Return Loss : 12 dB at 10GHz
- Output Return Loss : 10 dB at 10GHz
- Power Supply :  $I_{DD} = 50$  mA at  $V_{DD} = 1.5$ V
- Delivered as 100 % on-wafer RF tested dies
- Samples and evaluation Boards Available
- Die size = 1.5 x 1 mm
- Device Availability Now
  - Tested, Inspected Known Good Die (KGD)
  - Samples available
  - Demonstration Boards



CGY2230UH/C1 Low Noise Amplifier Block Diagram



## MAXIMUM VALUES

$T_{amb} = + 25 \text{ }^{\circ}\text{C}$ , at Die backside; unless otherwise specified.

Symbol	Parameter	Conditions	MIN.	MAX.	UNIT
$V_{G1}, V_{G23}$	Gate voltage	Vg1 biased a RF input	- 1.5	0	V
$V_{D1}, V_{D23}$	Drain voltage		0	+ 2	V
$I_{D1}$	Drain current			50	mA
$I_{D2}$				50	
$I_{D3}$				50	
$I_{GN}$ (all gates)	Gate Current		- 2	+ 2	mA
$P_{IN}$	RF Input power			+ 3	dBm
$T_{amb}$	Ambient temperature		- 40	+ 85	$^{\circ}\text{C}$
$T_j$	Junction temperature			+ 150	$^{\circ}\text{C}$
$T_{stg}$	Storage temperature		- 55	+ 150	$^{\circ}\text{C}$

Operation of this device outside the parameter ranges given above may cause permanent damage

## THERMAL CHARACTERISTICS

Symbol	Parameter	Value	UNIT
$R_{th(j-amb)}$	Thermal resistance from junction to ambient (DC power at $T_{amb}$ max)	TBD	$^{\circ}\text{C/W}$

## ELECTRICAL CHARACTERISTICS

$T_{amb} = + 25 \text{ }^{\circ}\text{C}$ ,  $I_{D total} = 48\text{mA}$

Symbol	Parameter	Conditions	MIN.	TYP.	MAX.	UNIT
RFin	Input frequency		1		18	GHz
$V_{D1}, V_{D23}$	Drain Supply voltage			+ 1.5		V
$I_{D1} + I_{D23}$	Total supply current		40	55	65	mA
G	Gain			36		dB
NF	Noise Figure	1GHz/10GHz/18GHz	1.28	1.3	1.8	dB
P1dB	1dB compression point			TBD		dBm
Psat	Saturated power			TBD		dBm
$S_{11}$	Input reflection coefficient	50 Ohms – 10 Ghz		-12		dB
$S_{22}$	Output reflection coefficient	50 Ohms		-10		dB

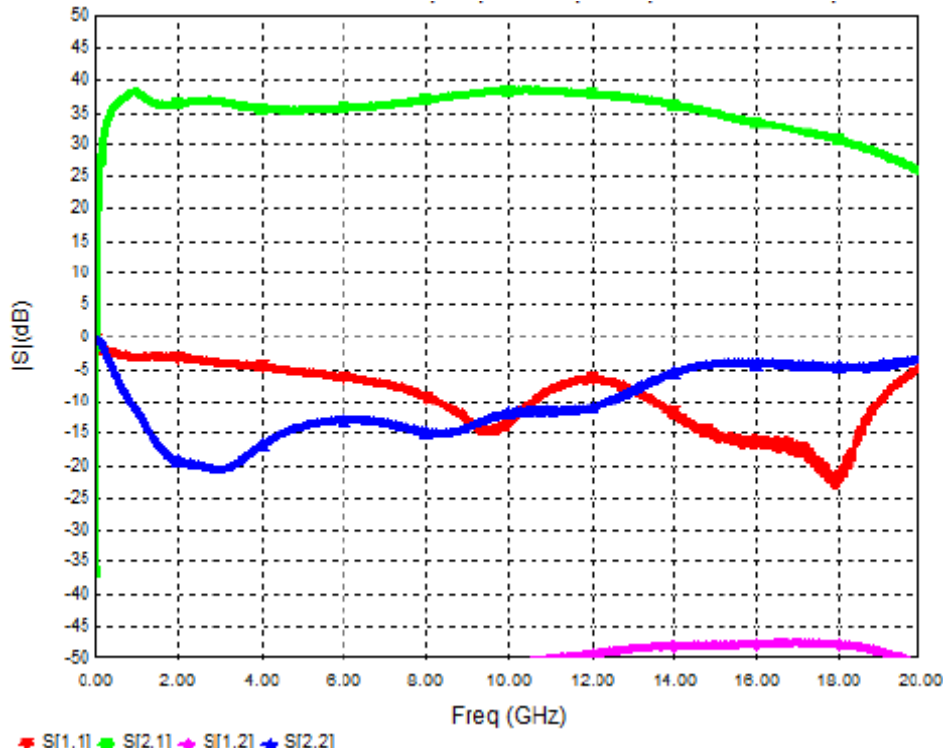
(\*) Measurement reference planes are the INPUT and OUTPUT plans of the CGY2230UH/C1 MMIC.



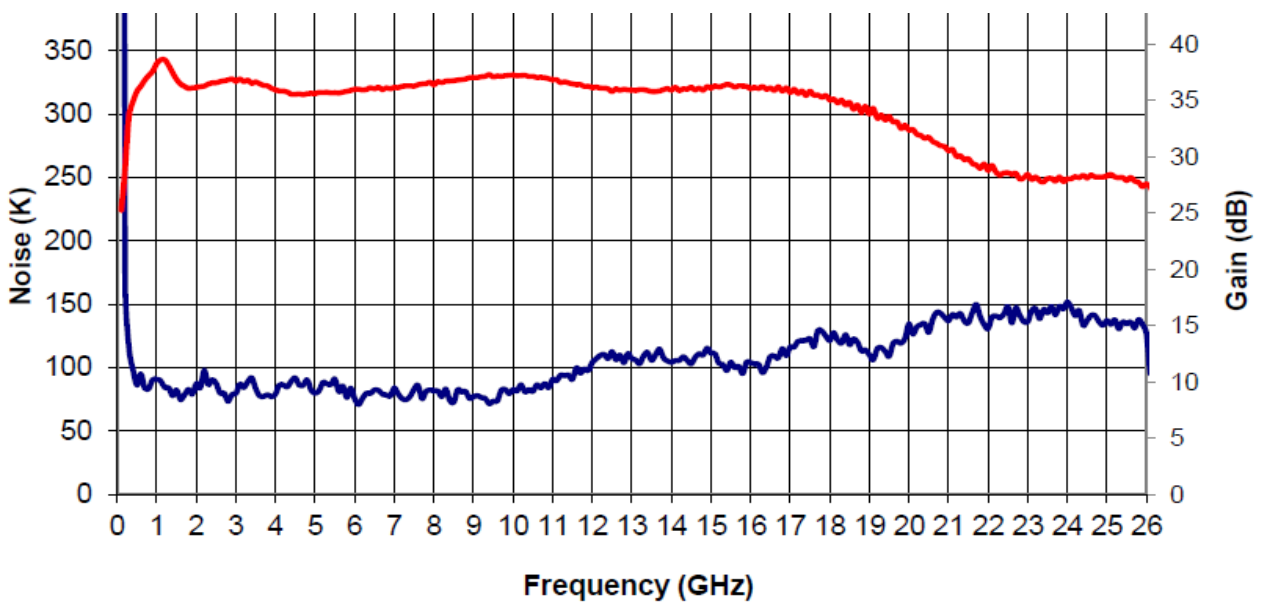
**Caution** : This device is a high performance RF component and can be damaged by inappropriate handling. Standard ESD precautions should be followed. OMMIC document "OM-CI-MV/ 001/ PG" contains more information on the precautions to take.

## S-PARAMETER AND NOISE MEASUREMENTS

S-parameters Measurement performed on Carrier at 25°C  
VD1=VD23= +1.5V and ID total = 48mA



Noise measurements at 25°C



200K=2.27dB NF

150K=1.8dB NF

120K=1.5dB NF

100K=1.28dB NF

**PAD LAYOUT**

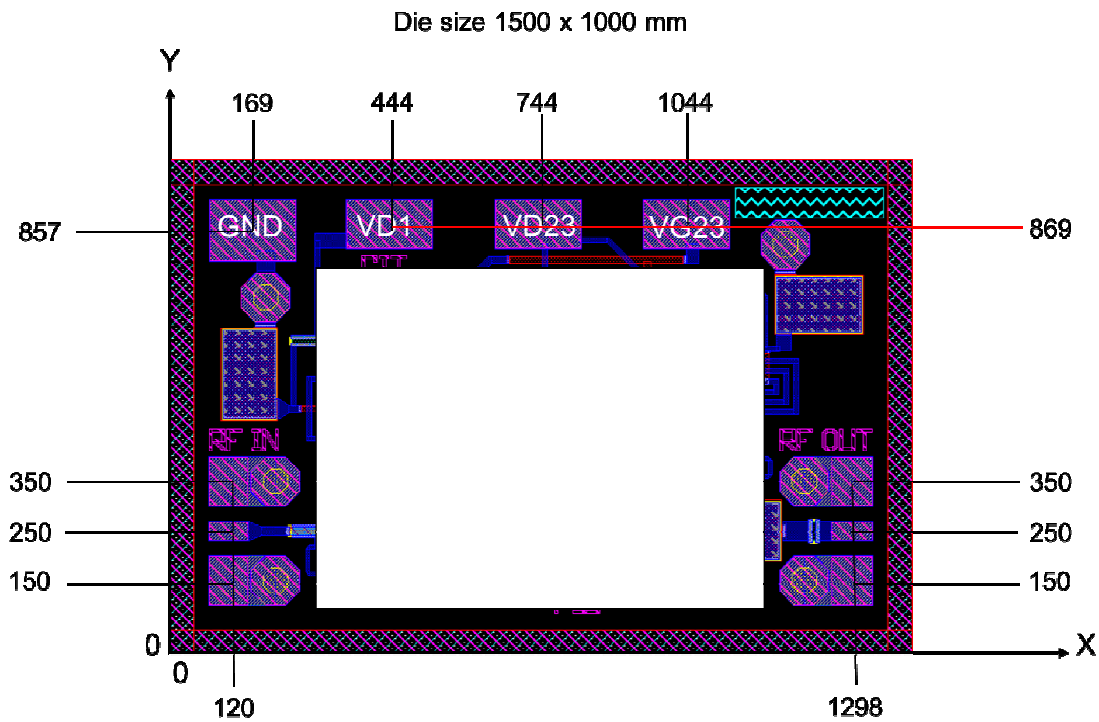


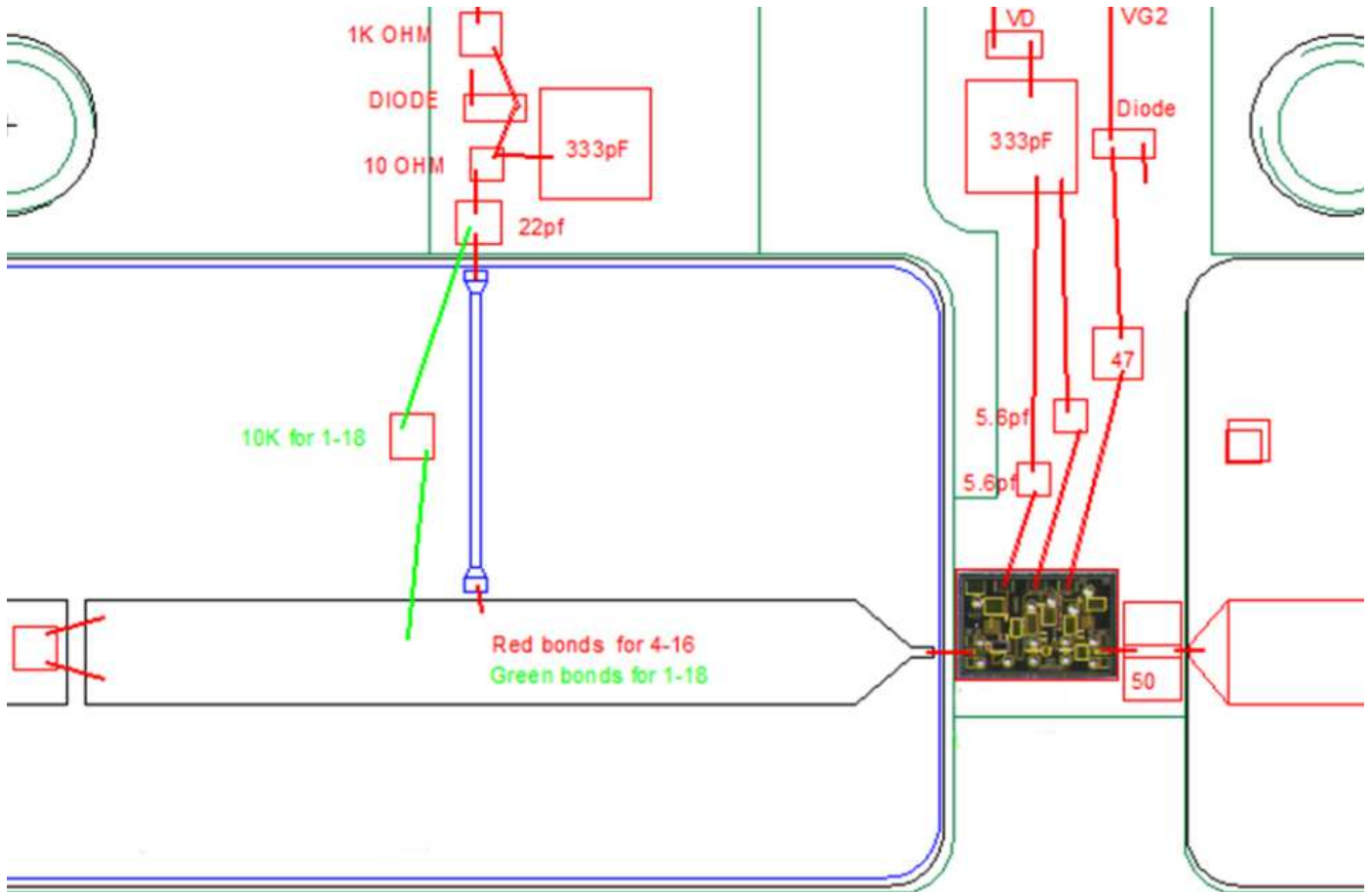
Figure1 : Layout view of CGY2230UH/C1

Pad Name	X (um)	Y (um)
GND	120	150
RFIN / VG1	120	250
GND	120	350
GND	169	857
VD1	444	857
VD23	744	857
VG23	1044	857
GND	1298	350
RFOUT	1298	250
GND	1298	150



**Caution** : This device is a high performance RF component and can be damaged by inappropriate handling. Standard ESD precautions should be followed. OMMIC document “OM-CI-MV/ 001/ PG” contains more information on the precautions to take.

**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

**ORDERING INFORMATION**

Generic type	Package type	Version	Sort Type	Description
CGY2230	UH	C1	-	On-Wafer tested Die



## DEFINITIONS

### Limiting values definition

Limiting values given are in accordance with the Absolute Maximum Rating System (IEC 60134). Stress above one or more of the limiting values may cause permanent damage to the device. These are stress ratings only and operation of the device at these or at any other conditions above those given in the Characteristics sections of the specification is not implied. Exposure to limiting values for extended periods may affect device reliability.

### Application information

Applications that are described herein for any of these products are for illustrative purposes only. OMMIC makes no representation or warranty that such applications will be suitable for the specified use without further testing or modification.

## DISCLAIMERS

### Life support applications

These products are not designed for use in life support appliances, devices, or systems where malfunction of these products can reasonably be expected to result in personal injury. OMMIC's customers using or selling these products for use in such applications do so at their own risk and agree to fully indemnify OMMIC for any damages resulting from such application.

### Right to make changes

OMMIC reserves the right to make changes, without notice, in the products, including circuits, standard cells, and/or software, described or contained herein in order to improve design and/or performance. OMMIC assumes no responsibility or liability for the use of any of these products, conveys no licence or title under any patent, copyright, or mask work right to these products, and makes no representations or warranties that these products are free from patent, copyright, or mask work right infringement, unless otherwise specified.

