

PRELIMINARY DATASHEET

CGY2124UH/C1

X-Band 8-12 GHz Low Noise Amplifier

DESCRIPTION

The CGY2124UH/C1 is a high performance GaAs single supply Low Noise Amplifier MMIC designed to operate in the X band.

The CGY2124UH/C1 has an ultra-low noise figure of 1.1 dB with minimum 32 dB of Gain. The on chip matching provides better than 12 dB of Input and Output Return Loss. It can be used in Radar, Telecommunication and Instrumentation applications.

The die is manufactured using OMMIC's 0.13 μm gate length PHEMT Technology. The MMIC uses gold bonding pads and 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.

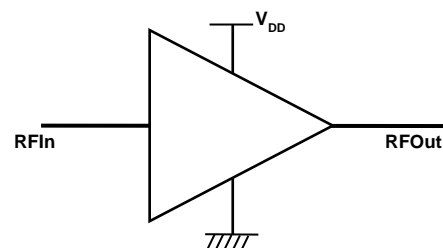
APPLICATIONS

- Radar
- Telecommunications
- Instrumentation



FEATURES

- ▶ Operating Range : 8 GHz to 12 GHz
- ▶ Single supply architecture
- ▶ Noise Figure : 1.1 dB
- ▶ Gain > 32 dB
- ▶ Gain Flatness : +/- 0.8dB
- ▶ Output $P_{1\text{dB}}$: 10 dBm
- ▶ OIP3 : 20dBm
- ▶ Input Return Loss : 12 dB
- ▶ Output Return Loss : 12 dB
- ▶ Power supply : 55 mA @ 5 V
- ▶ Chip size = 2.4 mm x 1.56 mm
- ▶ Device Availability (Q1 2013) :
 - Tested, Inspected Known Good Die (KGD)
 - Demonstration Boards
 - Space and MIL-STD MMICs



CGY2124UH/C1 block diagram

MAXIMUM VALUES
 $T_{amb} = + 25\text{ }^{\circ}\text{C}$

Symbol	Parameter	Conditions	MIN.	MAX.	UNIT
V_{dd}	Drain voltage		0	+ 6	V
I_{dd}	Drain current			100	mA
P_{IN}	RF Input power			+ 10	dBm
T_{amb}	Ambient temperature		- 55	+ 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
 $T_{amb} = + 25\text{ }^{\circ}\text{C}$, $V_{dd} = 5\text{V}$

Symbol	Parameter	Conditions	MIN.	TYP.	MAX.	UNIT
R_{Fin}	Input frequency		8		12	GHz
<i>Performances of the die</i>						
V_{DD}	Drain Supply Voltage			+ 5		V
I_{DD}	Drain Supply Current		45	55		mA
G	Gain		32	33	34	dB
NF	Noise Figure			1.1	1.3	dB
P_{1dB^*}	1dB compression point			10		dBm
OIP3	Output third order intercept point		19	20	21.2	dBm
ISO_{rev}	Reverse Isolation	RF_{OUT}/RF_{IN}	-50	-55		dB
S_{11}	Input reflection coefficient	50 Ohms		-12		dB
S_{22}	Output reflection coefficient	50 Ohms		-12		dB

(*) Measurement reference planes are the INPUT and OUTPUT plans of the CGY2124UH/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-PARAMETERS

Measured at 25°C, VDD = 5V ID = 55mA

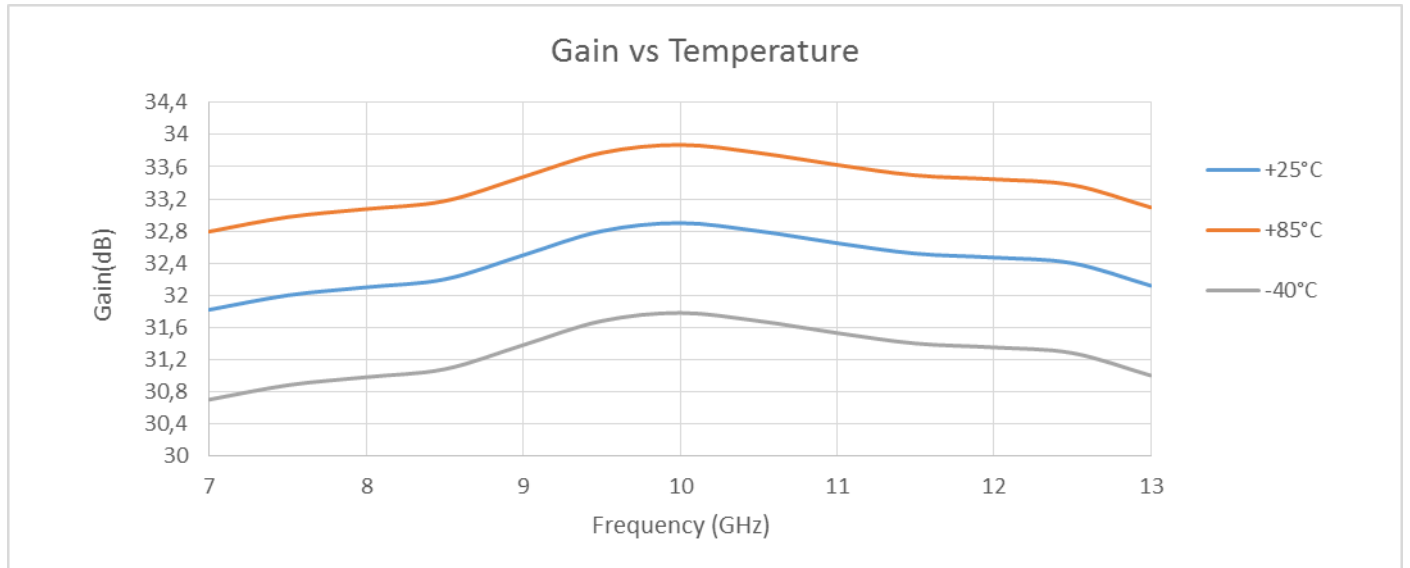


Figure 1 gain wrt frequency

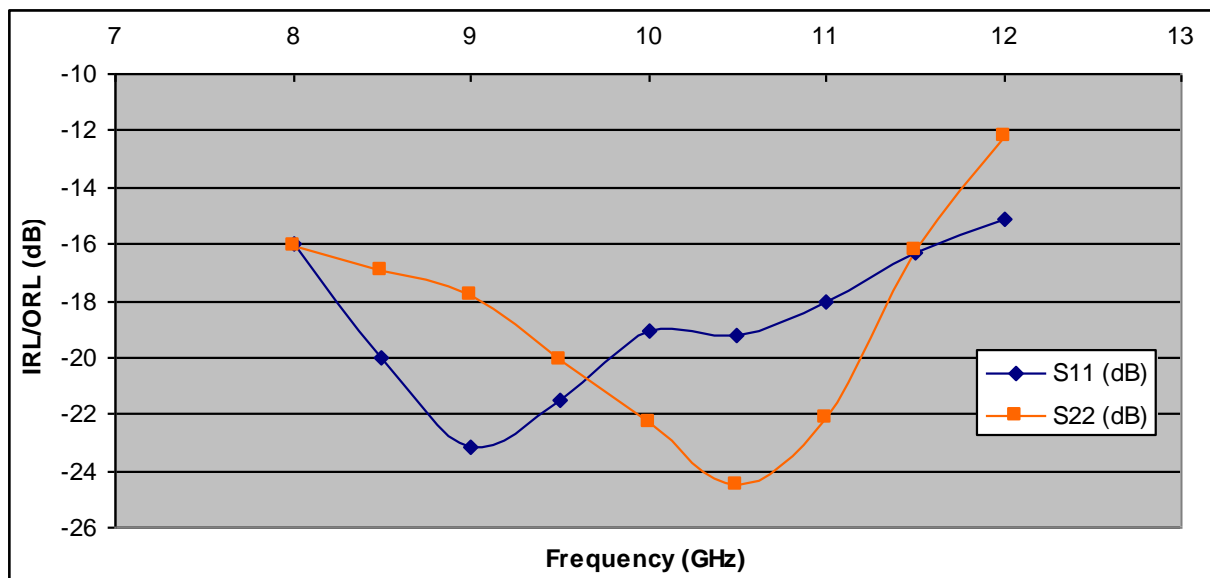
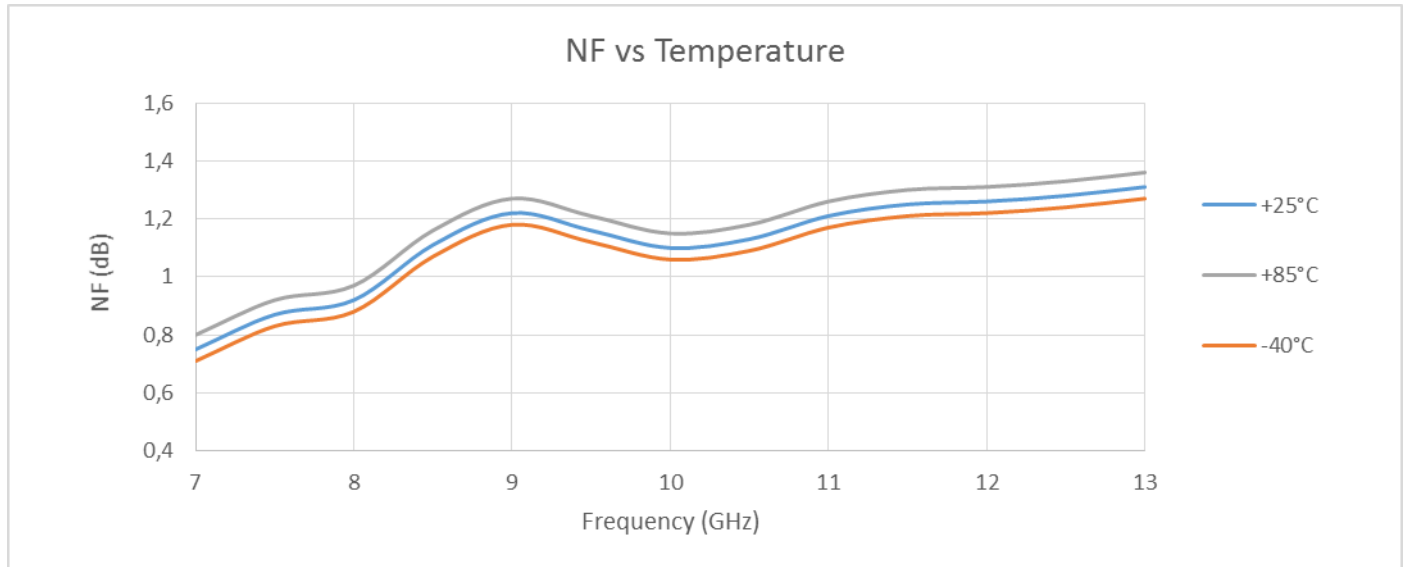


Figure 2 Return loss wrt frequency

NOISE FIGURE

Measured noise figure at 25°C, VDD = 5V, ID = 55mA



APPLICATION SCHEMATIC

To prevent instability of the customer design it is highly recommended to place small chip capacitors as near as possible to the CGY2124UH/C1 die and to connect them with bonding as short as possible. Additionally, a 10nF capacitor can be added on a drain connection to insure low frequency decoupling, the power supply decoupling could be complemented with 1 uF capacitors.

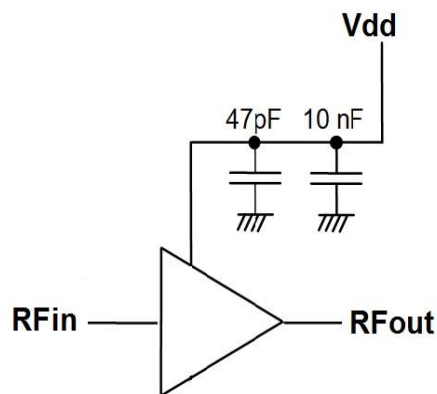
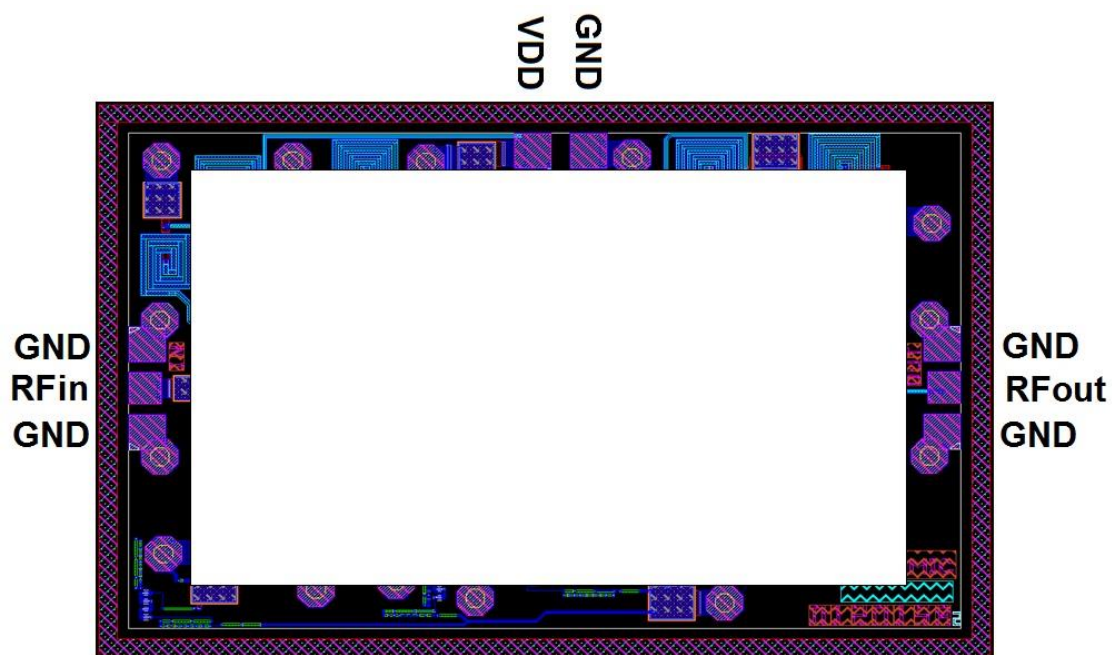


Figure 3 : Application schematics

Component NAME	Value	Type	Comment
47pF capacitor	47pF	Chip	PRESIDIO COMPONENTS P/N SA151BX470M2HX5#013B
10nF capacitor	10nF	Chip	MURATA GM260X7R103M16M100PM520

Components reference

DIE LAYOUT AND PIN CONFIGURATION

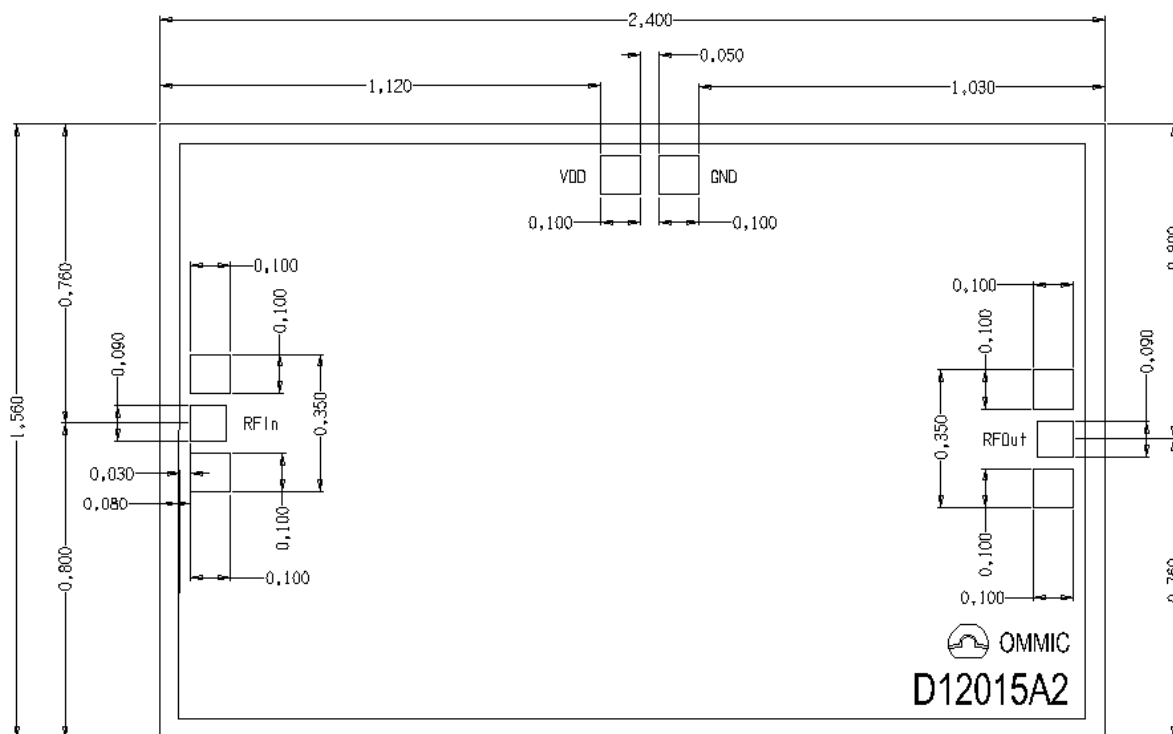


PINOUT

Symbol	Pad	Description
RFOUT	OUT	RF output
RFIN	IN	RF input
VDD	VDD	Single Supply Pad
GND	BACKSIDE	Ground

Note :

In order to ensure good RF performances and stability It is key to connected to the ground the pad available on the backside of the die.

MECHANICAL INFORMATIONS

PAD COORDINATES

SYMBOL	PAD COORDINATES		PAD SIZE	DESCRIPTION
	X	Y		
VDD	1170	1430	100 x 100	
GND	1320	1430	100 x 100	
RF In GND N	130	925	100 x 100	RF In Ground North
RF In	125	800	90 x 90	RF In Signal - spacing to GND pad 30
RF In GND S	130	675	100 x 100	RF In Ground South
RF Out GND N	2270	635	100 x 100	RF Out Ground North
RF Out	2275	760	90 x 90	RF Out Signal - spacing to GND pad 30
RF Out GND S	2270	885	100 x 100	RF Out Ground South

PACKAGE

Type	Description	Terminals	Pitch (mm)	Package size (mm)
DIE	100% RF and DC on-wafer tested	3	-	2.4 x 1.56 x 0.1

ORDERING INFORMATION

Generic type	Package type	Version	Sort Type	Description
CGY2124	UH	C1	-	On-Wafer measured Die

SOLDERING

To avoid permanent damages or impact on reliability during soldering process, die temperature should never exceed 300°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.



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

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