PRELIMINARY DATASHEET

CGY2460UH/C1

40-44 GHz Ultra Low Noise Down Converter

DESCRIPTION

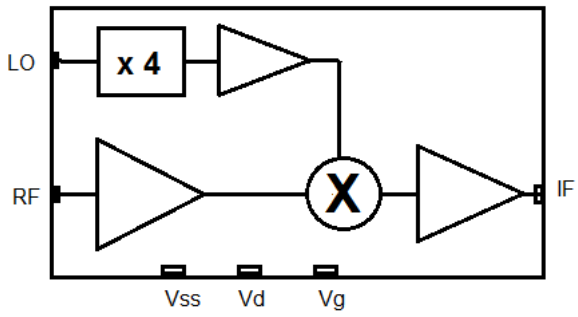
The CGY2460UH/C1 is a high performance GaAs Low Noise Down Convertor MMIC.

The CGY2460UH/C1 has an exceptionally low noise figure of 2.5dB and 33dB of conversion gain at 40-44 GHz frequency band. The on chip matching provides 12 dB of Input Return Loss and Output Return Loss. It can be used in Telecommunication and instrumentation applications.

The die is manufactured using OMMIC's advanced 70nm gate length high indium content MHEMT 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.

FEATURES

- Operating frequency range :
  RF: 40-44GHz, LO: 8.8-9.5GHz, IF: 5-6 GHz
- Noise Figure : 2.5 dB
- Gain : 33dB
- Power Supply : 140 mA at 2.5 V
- Delivered as 100 % on-wafer RF tested dies
- Die size = 4.1 x 2.6 mm
- Device Available
  - Tested, Inspected Known Good Die (KGD)



CGY2460UH/C1 Bloc diagram

APPLICATIONS

- Radio-communications
- Instrumentation

RoHS Compliant

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MAXIMUM VALUES

T_{amb} = + 25 °C, at Die backside; unless otherwise specified.

Symbol	Parameter	MIN	MAX	UNIT
Vg	Gate voltage	- 1	0	V
V_d	Drain voltage	0	2.8	V
T_{amb}	Ambient temperature	- 40	+ 85	° C
T_j	Junction temperature		+ 150	° C
T_{stg}	Storage temperature	- 55	+ 85	° C

Operating outside the parameter ranges given above, may cause permanent damage

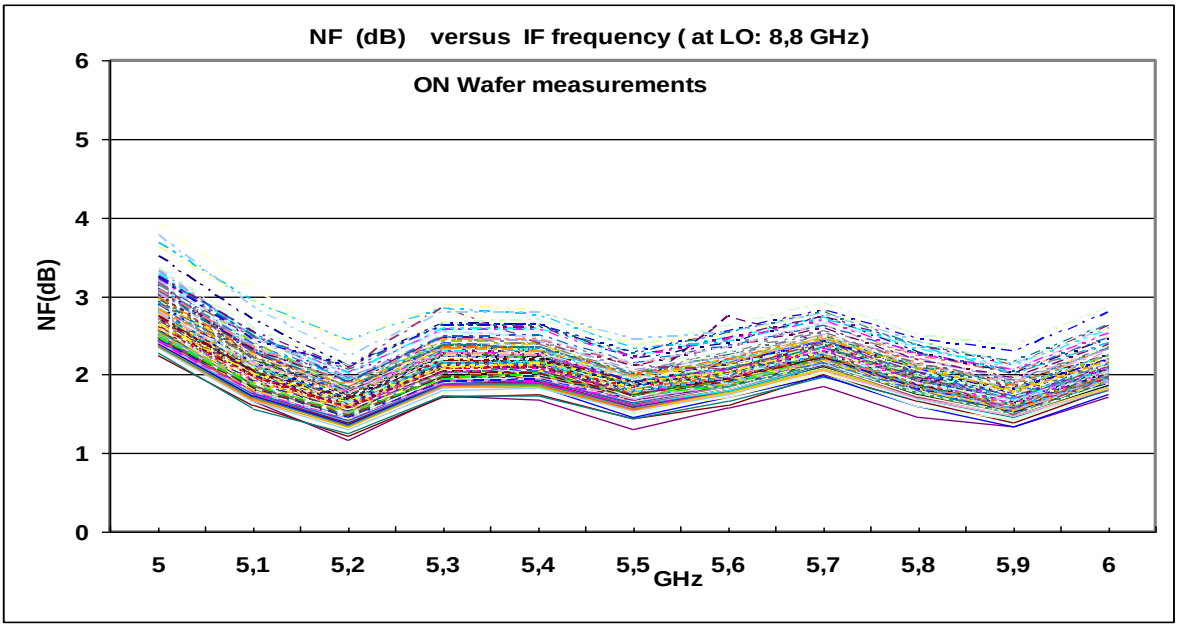
ELECTRICAL CHARACTERISTICS

T_{amb} = + 25 °C, Vd=2.5V, Vg= -0.15V, Vss= -4V.

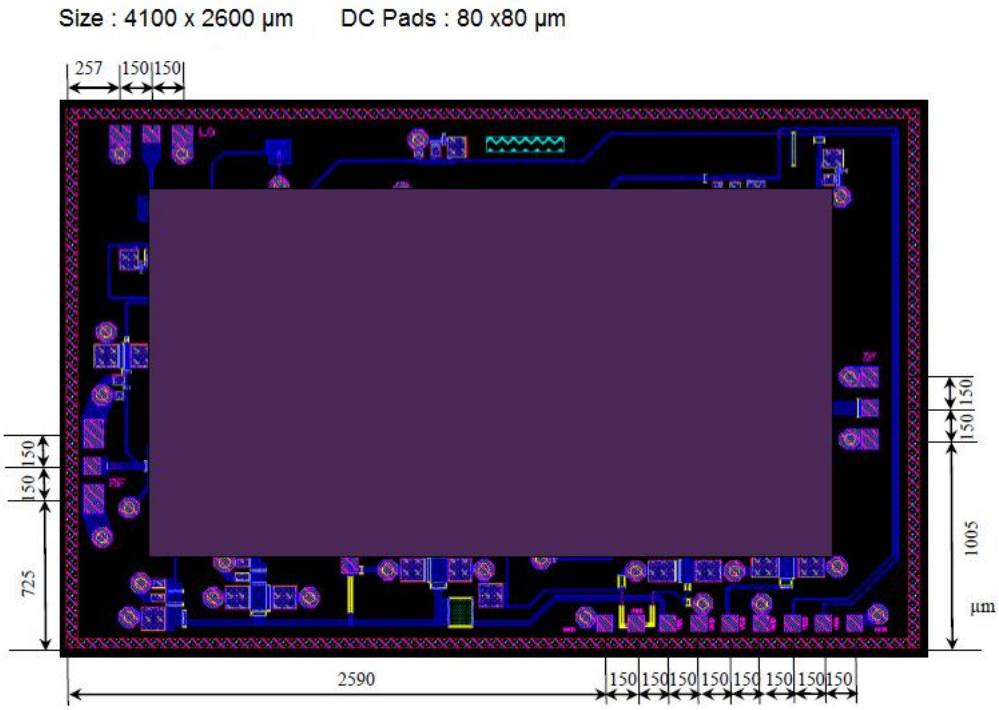
Symbol	Parameter	Min	Typ	Max	Unit
F_RF	RF frequency range	40.5		43.5	GHz
F_LO	LO frequency range	8.8		9.5	GHz
F_IF	IF frequency range	5	5.5	6	GHz
Gc	Conversion Gain	30	33		dB
P1dB	Output P1dB		0		dBm
NF	Noise Figure (IF: 5.1- 6 GHz)		2.5	3.2	dB
P_LO	LO input power		9		dBm
RL_RF	RF Input Return Loss (with bonding wires)		-12		dB
RL_LO	LO Input Return Loss (with bonding wires)		-12		dB
RL_IF	IF Output Return Loss		-12		dB
4LO/RF	Maximum 4LO power on RF port		-35		dBm
4LO/IF	Maximum 4LO power on IF port		-20		dBm
Id	Total Drain bias current @ 2.5V		140		mA
Iss	At Vss = -4V		8		mA

TYPICAL CHARACTERISTICS:

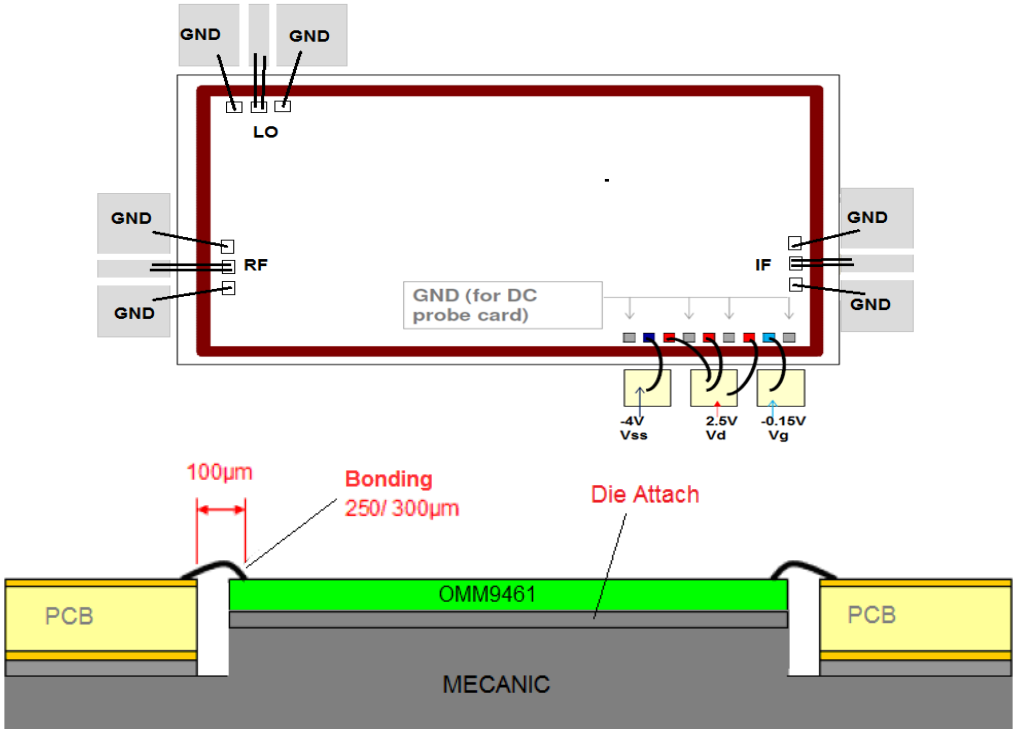
NF (On Wafer Measurements) :



BONDINGS PAD COORDINATES



RECOMMENDED WIRING:



Note :

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

A recommended module layout is proposed below. In the reference design, RF input and output are using coplanar transmission lines, microstrip transmission lines can also be used with similar performances. Due to the very high frequency, all path lengths and physical sizes of components should be minimized.

Both RF input and output bonding inductances should be minimized to give the best performance. Overall wire length should be kept as short as possible to reduce parasitic inductance. Degradation of gain and match will be evident at higher RF input and output inductances. Ribbon bonding technique can also be used.

All others bonding inductances (pads V_D, Vss, V_G,) should be kept as short as possible.

Decoupling chip capacitors 47 pF and Surface Mount Devices capacitors of 100 nF can be used to improve the power supply rejection and prevent unwanted inside and outside bandpath oscillations.

The chip itself has via holes connecting the front side to the back side of the chip. A good RF grounding connection should be maintained between the backside of the chip and system ground. It is key to use an uninterrupted ground plane. AuSn solder or silver conductive epoxy material can be used for capacitors and die attach.

PACKAGE

Type	Description	Package size (mm)
DIE	100% RF and DC on-wafer tested	4.1 x 2.6 x 0.1

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	Remarks
CGY2460	UH	C1	On-wafer measured Die

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.

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

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