

# PRELIMINARY DATASHEET

## CGY2471UH/C1

### 92-96 GHz Passive Down converter Mixer

#### DESCRIPTION

The CGY2471UH is a high performance passive down mixer GaAs MMIC working in the W-Band.

The CGY2471UH passive infradyne mixer has a conversion gain of -10dB and a LO input power of -5dBm. The RF frequency range is 92 to 96GHz, the LO range is 86 to 90GHz and the IF is 5.2 to 5.6 GHz. The LO suppression is 20dBc and the image rejection is 20dBc. The device can be used in Radar, Telecommunication, Instrumentation applications and passive or active imaging.

The die is manufactured using OMMIC's Advanced 70 nm 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.

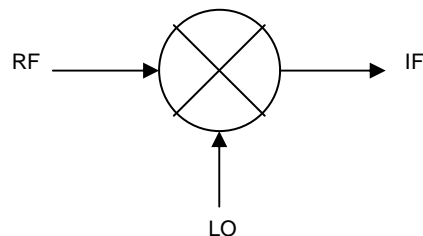
This part is the member of a chipset dedicated to build a transmit and receive radio in this band.

#### APPLICATIONS

- ▶ Radar
- ▶ Telecommunication
- ▶ Instrumentation
- ▶ Passive and Active radar imaging

#### FEATURES

- ▶ RF Frequency Range : 92 to 96 GHz
- ▶ LO Frequency Range : 86 to 90 GHz
- ▶ IF Frequency Range : 5.2 to 5.6 GHz
- ▶ Conversion gain -10dB
- ▶ LO input power 10dBm
- ▶ IF Output power -5dBm
- ▶ LO suppression 20dBc
- ▶ Image rejection 20dBc
- ▶ Output matching > 10dB
- ▶ Device Availability :
  - Tested, Inspected Known Good Die (KGD)
  - Samples Q1 2014



CGY2471UH Block Diagram



## LIMITING VALUES

$T_{amb} = 25\text{ °C}$  unless otherwise noted

Symbol	Parameter	Conditions	MIN.	MAX.	UNIT
$P_{LO}$	Local Oscillator Input Power			20	dBm
$P_{RF}$	RF Input Power			15	dBm
$T_{amb}$	Ambient temperature		-30	+85	°C
$T_j$	Junction temperature			+150	°C
$T_{stg}$	Storage temperature		-55	+150	°C

## CHARACTERISTICS

$T_{amb} = 25\text{ °C}$  – RF Performance measured on wafer.

Symbol	Parameter	Conditions	MIN.	TYP.	MAX.	UNIT
<i>Unless otherwise specified LO Power = 4 to 7 dBm</i>						
LO_RL	LO port return loss			-7		dB
RF_RL	RF port return loss			-16		dB
IF_RL	IF port return loss			-20		dB
$BW_{RF}$	RF Bandwidth		92		96	GHz
$BW_{LO}$	LO Bandwidth		86		90	GHz
$BW_{IF}$	IF Bandwidth		5.2		5.6	GHz
$G_c$	Conversion Gain		-9	-10		dB
ImRej	Image rejection		20		18	dBc
LOsup	LO suppression		20			dBc
ISO <sub>LO-IF</sub>	LO to IF Isolation		10			dB
RFP <sub>1dB</sub>	RF input 1dB Compression Point			5		dBm



**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.

**RF PERFORMANCES MEASUREMENTS**

T<sub>amb</sub> = 25 °C – RF Performance measured on wafer

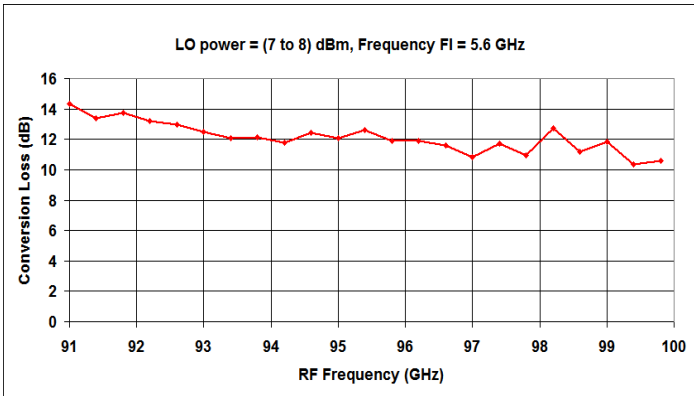


Figure 1 : Conversion loss wrt RF frequency

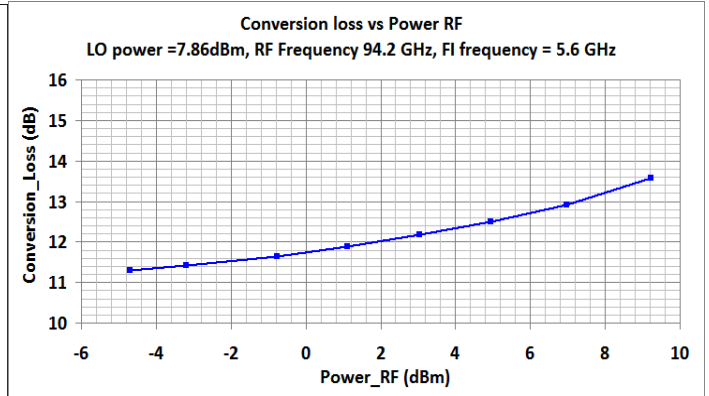


Figure 2: Conversion loss wrt RF power

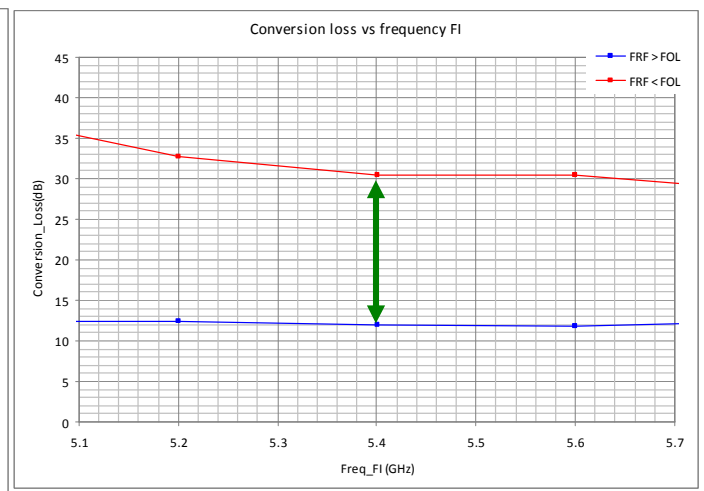
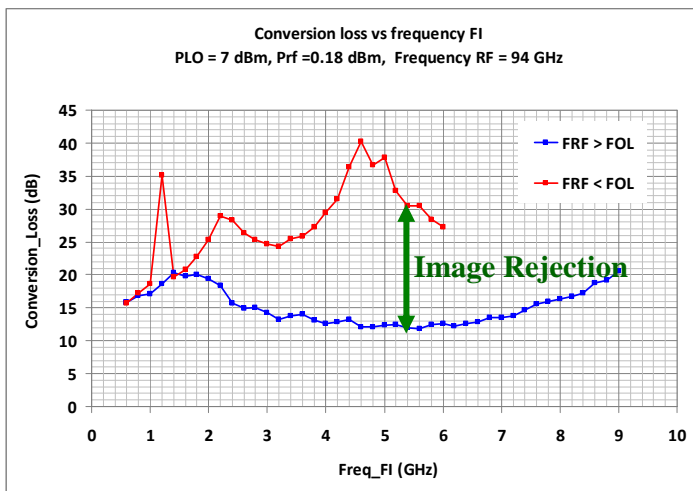


Figure 3 : Conversion loss wrt IF Frequency

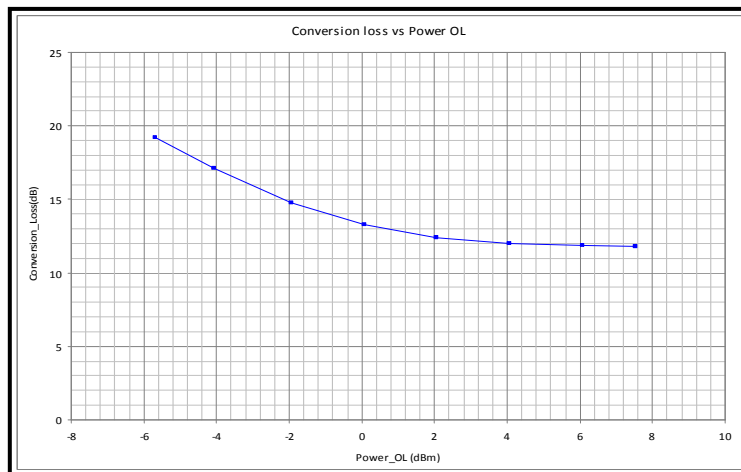
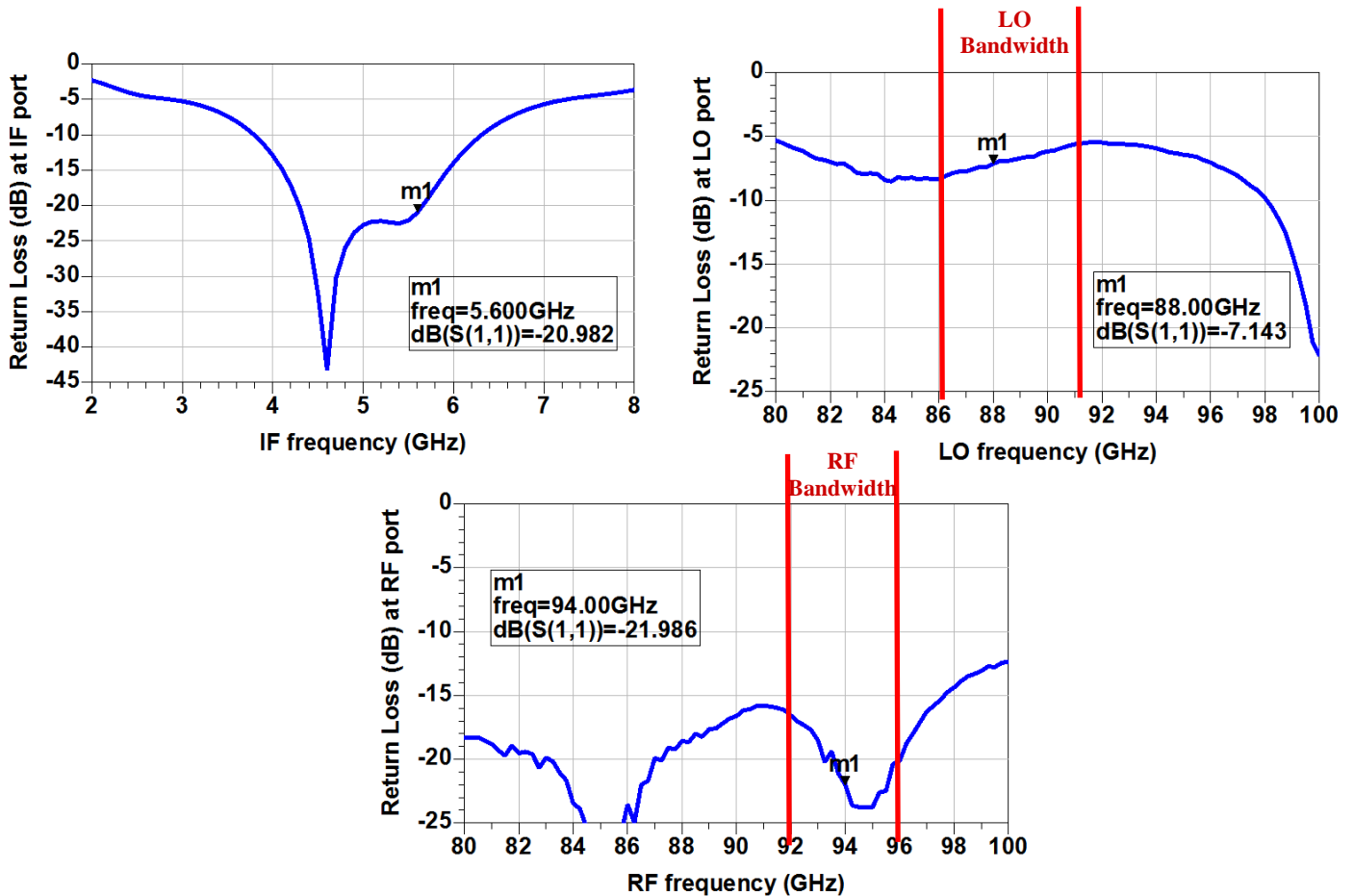


Figure 4: Conversion loss wrt LO power at 94GHz

## RF PERFORMANCES MEASUREMENTS

$T_{amb} = 25\text{ }^{\circ}\text{C}$  – RF Performance measured on wafer  $P_{LO} = 8\text{ dBm}$



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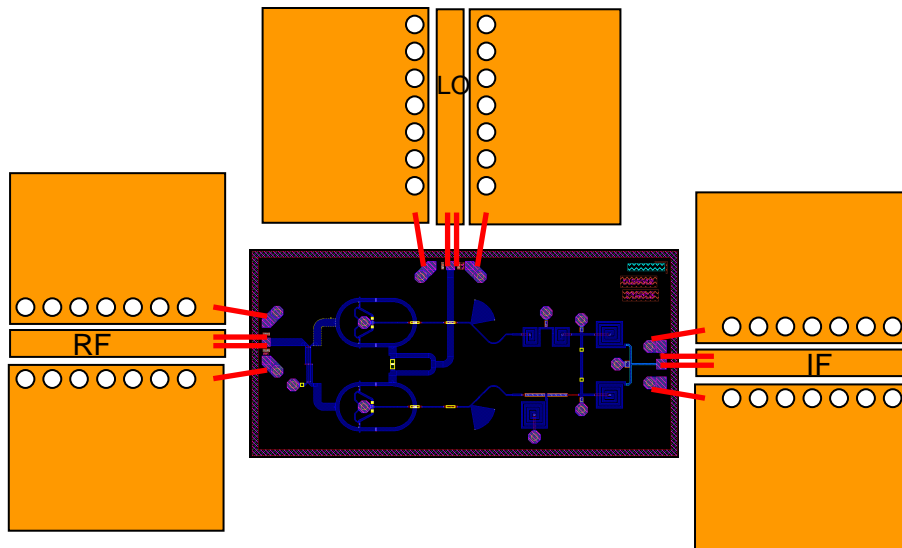
## MOUNTING AND MECHANICAL INFORMATION

### Typical application scheme

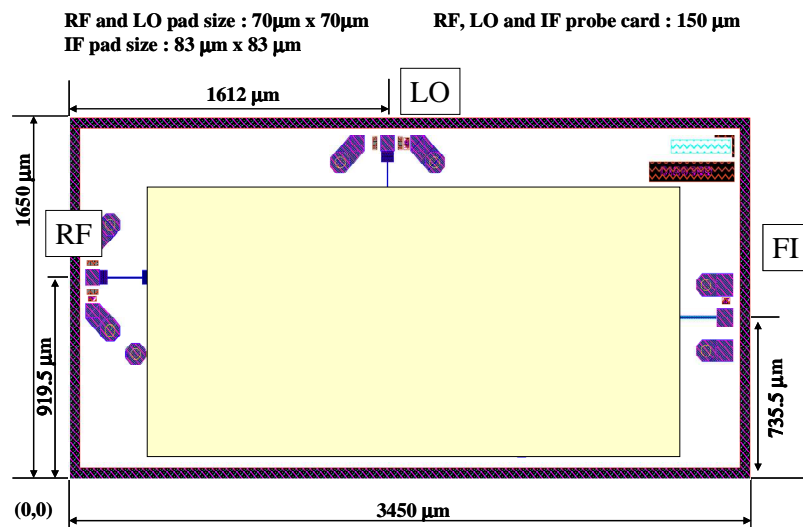
A recommended typical module layout is proposed below. In this figure, RF input and output are using coplanar transmission lines, however, microstrip transmission lines can be used with similar performances. All path lengths and physical sizes of the components should be minimized.

The device have been designed and optimized to support a bonding equivalent to an inductance of 80nH to connect the 50 Ohms coplanar or microstrip transmission lines. In order to minimize inductance, a Ribbon bonding technique can also be used. All others bonding inductances should also be kept as short as possible.

Via holes are available on-chip to connect 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. AuSn or silver conductive epoxy material can be used for die attach.



### Pad Layout



## 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.

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## ORDERING INFORMATION

Generic type	Package type	Version	Description
CGY2471UH	Bare Die	C1	MHEMT Semi-conductor die. External dimensions : 3450 x 1650 $\mu\text{m}$ (Tolerance : $\pm 15 \mu\text{m}$ ). Die thickness: 0.1 mm. Backside material: TiAu