

# PRODUCT DATASHEET

Version 1.0

## CGY2184UH/C1

### 0.1 – 6 GHz Active Mixer

#### DESCRIPTION

The CGY2184UH/C1 is a high performance GaAs based Active Double Balanced Mixer MMIC.

The CGY2184UH/C1 covers the frequency range of 0.1 GHz to 6 GHz, with a conversion gain of typically 18 dB, and uses an active Gilbert Cell Mixer Structure. It can be used in GPS, Telecommunication, Radar, Instrumentation, and EW applications.

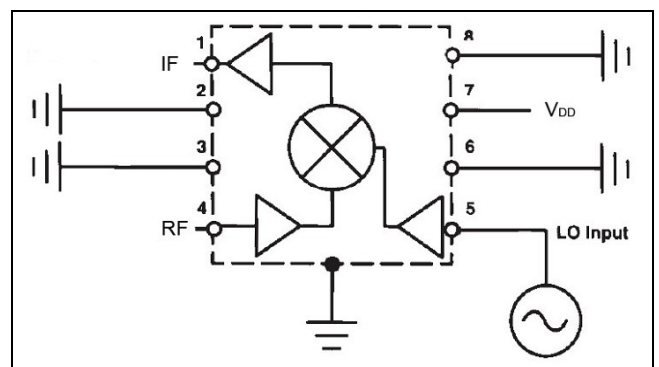
The die is manufactured using OMMIC's 0.18  $\mu\text{m}$  gate length PHEMT Technology ED02AH. The MMIC uses gold bonding pads and backside metallization and is fully protected with Silicon Nitride passivation to obtain the highest level of reliability.

#### APPLICATIONS

- ▶ GPS Systems
- ▶ Radar
- ▶ Telecommunication
- ▶ Instrumentation

#### FEATURES

- ▶ RF and LO Range : 0.1 GHz to 6 GHz
- ▶ IF Range : DC – 3 GHz
- ▶ Conversion Gain : 18 dB
- ▶ RF to IF Leakage : -40 dBc
- ▶ LO to IF Isolation : 40 dB
- ▶ Output  $P_{1\text{dB}}$  : 3 dBm
- ▶ Small Chip Size 1.1 x 1.7 x 0.1 mm
- ▶ Tested, Inspected Known Good Die (KGD)
- ▶ Samples Available
- ▶ Demonstration Boards Available
- ▶ Space and MIL-STD Available



CGY2184UH/C1 Mixer Block Diagram



Revision : 05/12/13

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## LIMITING VALUES

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

Symbol	Parameter	Conditions	MIN.	MAX.	UNIT
$V_D$	Supply Voltage			10	V
$P_{LO}$	Local Oscillator Input Power			5	dBm
$P_{RF}$	RF Input Power			TBD	dBm
$T_{amb}$	Ambient temperature		-30	+85	$^{\circ}\text{C}$
$T_j$	Junction temperature			+150	$^{\circ}\text{C}$
$T_{stg}$	Storage temperature		-55	+150	$^{\circ}\text{C}$

## THERMAL CHARACTERISTICS

Symbol	Parameter	Value	UNIT
$R_{th(j-a)}$	Thermal resistance from junction to ambient ( $T_a = 25\text{ }^{\circ}\text{C}$ )	TBD	$^{\circ}\text{C/W}$

## CHARACTERISTICS

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

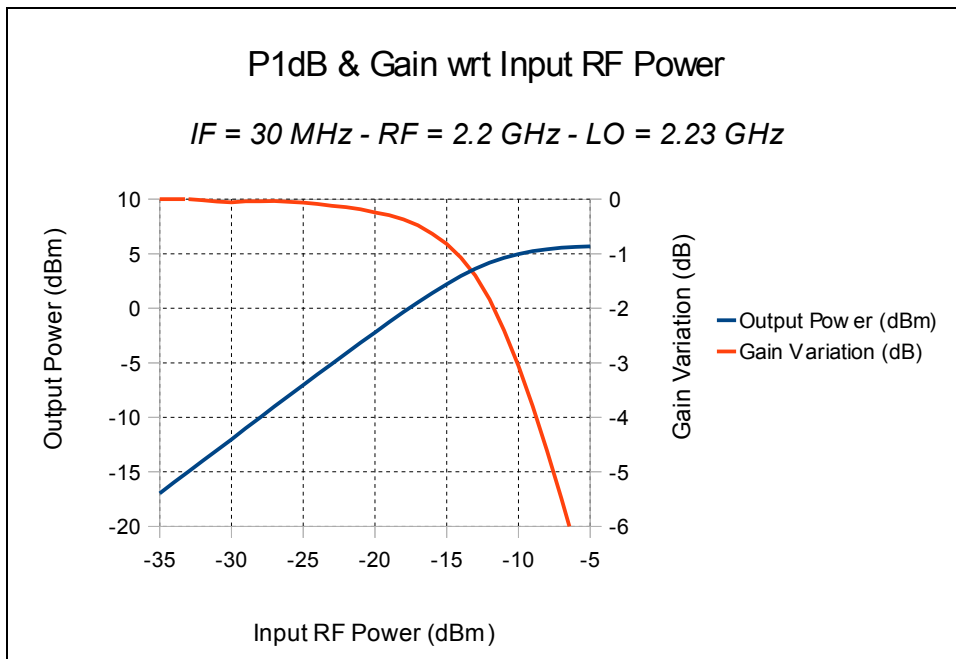
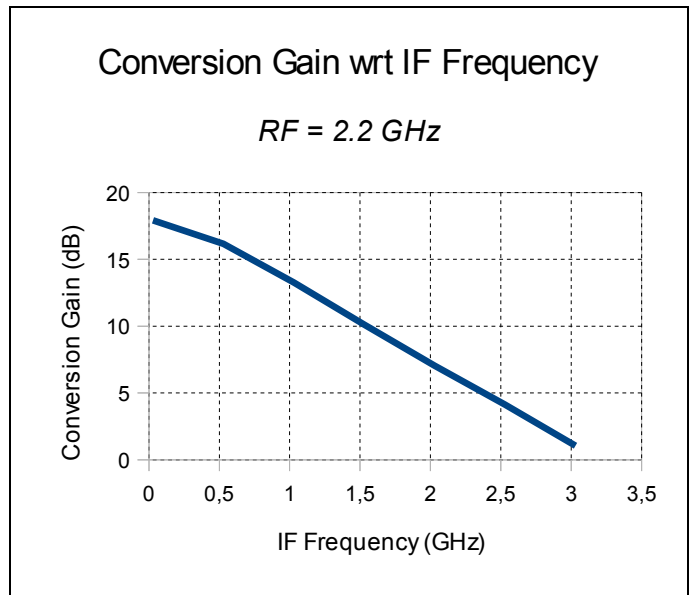
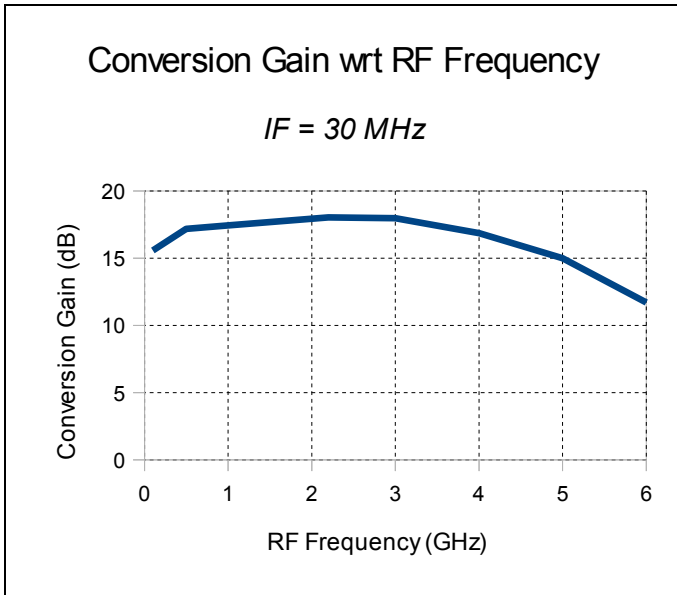
Symbol	Parameter	Conditions	MIN.	TYP.	MAX.	UNIT
<i>Unless otherwise specified LO Power = 0 dBm; IF = 30 MHz; RF = 2.2 GHz; Down Converter Mode</i>						
$V_{DD}$	Supply Voltage			8		V
$I_{DD}$	Supply Current		30	38	45	mA
$BW_{RF}$	RF Bandwidth		0.1		6	GHz
$BW_{LO}$	LO Bandwidth		0.1		6	GHz
$BW_{IF}$	IF Bandwidth		DC		3	GHz
$G_c$	Conversion Gain		15	18	20	dB
NF (SSB)	SSB Noise Figure			10		dB
$ISO_{RF-IF}$	RF to IF Leakage			-40	-35	dBc
$ISO_{LO-IF}$	LO to IF Isolation		30	40		dB
$P_{1dB}$	Output 1dB Compression Point		1	3		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.

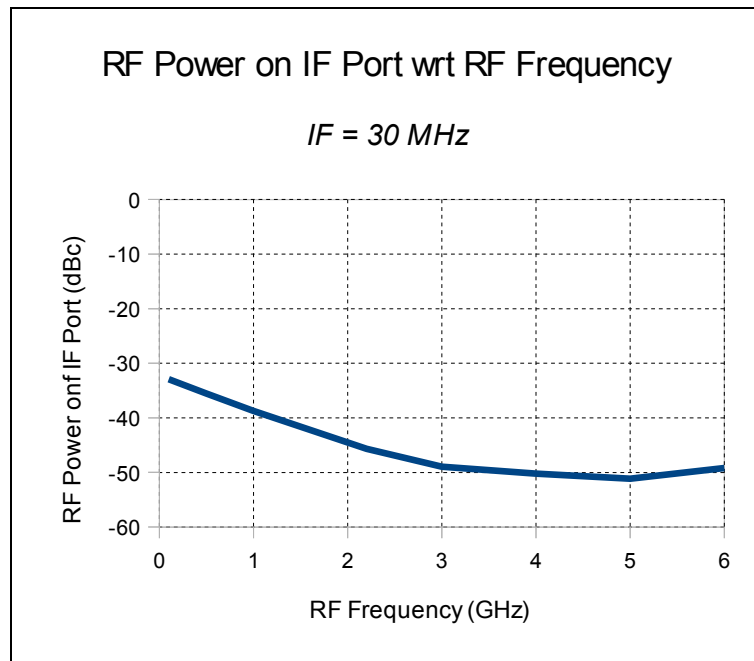
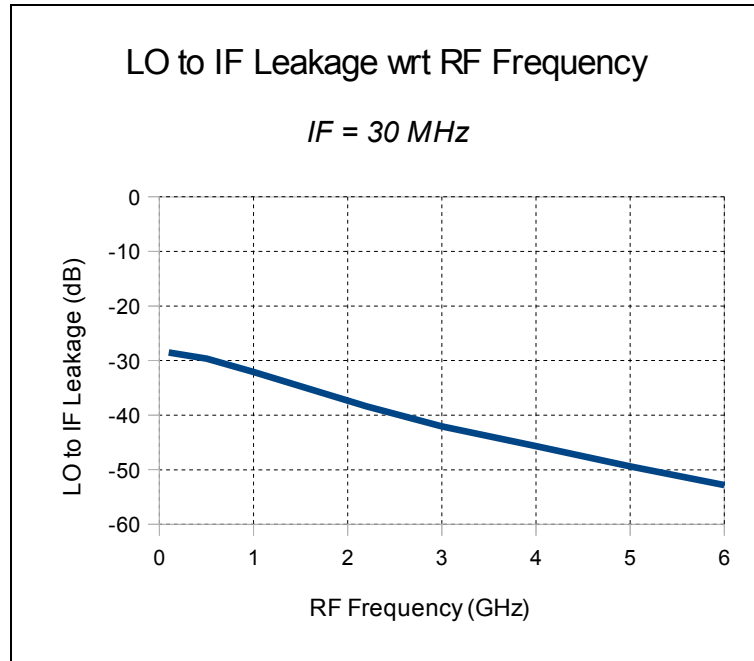
**ON WAFER MEASUREMENTS – CONVERSION GAIN**

T = 25 °C. Calculated with inductance of 0.3 nH to take into account the bonding inductance.



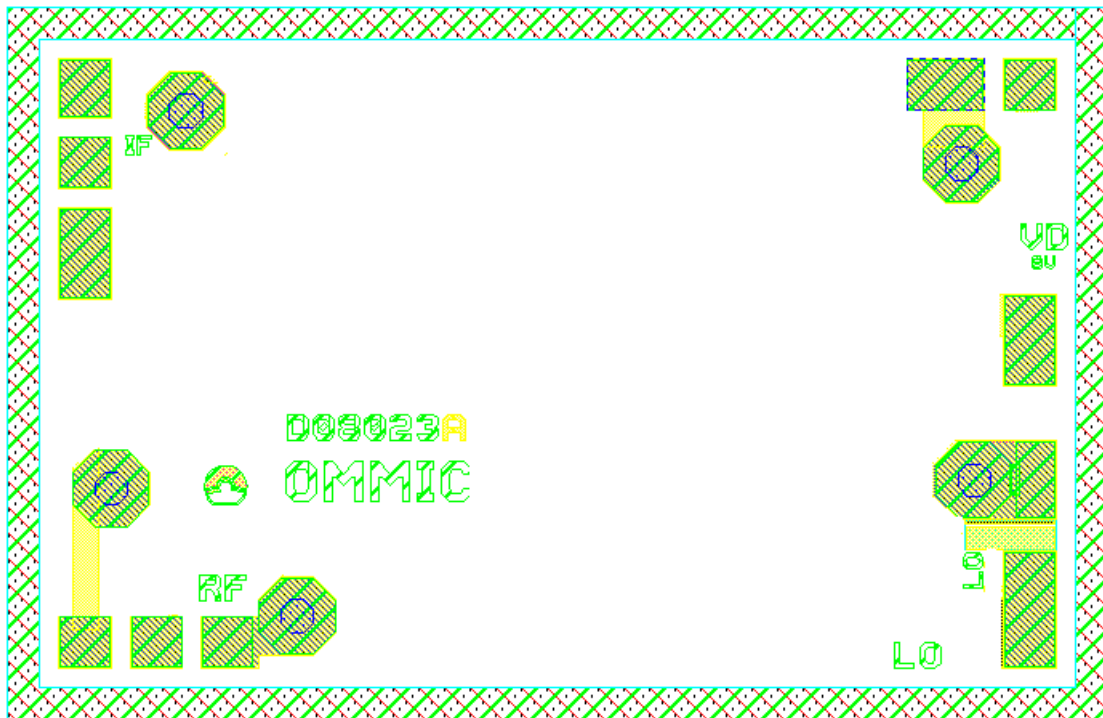
## ON WAFER MEASUREMENTS – LEAKAGES & ISOLATIONS

T = 25 °C. Calculated with inductance of 0.3 nH to take into account the bonding inductance.



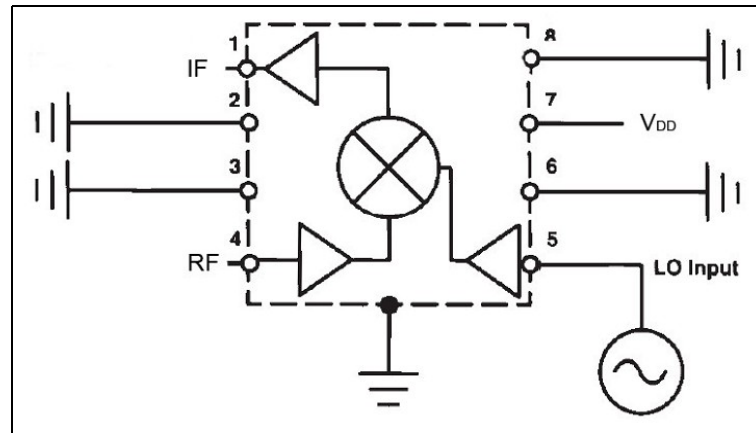
## MECHANICAL INFORMATION

Chip size : 1100  $\mu\text{m}$  x 1700  $\mu\text{m}$  (before wafer sawing)  
Substrate thickness : 100  $\mu\text{m}$   
DC, RF & IF Pads Size : 80 x 80  $\mu\text{m}$   
LO Pad Size : 80 x 180  $\mu\text{m}$



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## BLOCK DIAGRAM



## PAD POSITION

PAD NAME	SYMBOL	COORDINATES		DESCRIPTION
		X	Y	
LO	LO	1575	170	Local Oscillator Input
RF	RF	235	125	RF Input
IF	IF	125	860	IF Output
VD	VD	1575	975	DC Bias

X=0, Y=0 at bottom left corner.

Coordinates correspond to the Centre of the Bonding Pad.

See Mechanical Information for more details.

## BONDING DIAGRAM AND ASSEMBLY INFORMATION

The bonding wires should be gold and be as short as possible. The CGY2184UH/C1 uses through substrate via holes to obtain excellent RF grounding. The backside of the MMIC must be appropriately connected to the system ground.

## ORDERING INFORMATION

Generic type	Package type	Version	Description
CGY2184UH	Bare Die	C1	Active Double Balanced Quad Mixer



## 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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### Life support applications

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