

Active Double Balanced Mixer

0.1 - 6 GHz



CGY2183UH/C1

Rev. V1

Features

- RF and LO Range: 0.1 - 6.0 GHz
- IF Range: DC - 3 GHz
- Conversion Gain: 11 dB
- RF to IF Leakage: -35 dB
- LO to IF Isolation: 35 dB
- Output P1dB: -5 dBm
- Small Chip Size: 1.1 x 1.7 x 0.1 mm
- Tested, Inspected Known Good Die (KGD)
- Evaluation Boards Available
- Space and MIL-STD also Available
- RoHS* Compliant

Applications

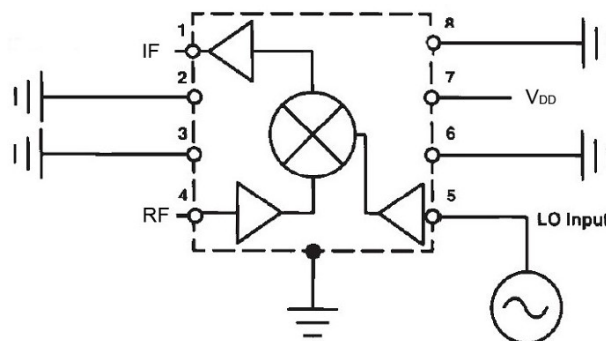
- GPS Systems
- Radar
- Telecommunication
- Instrumentation

Description

The CGY2183UH/C1 is a high performance GaAs pHEMT technology based active double balanced mixer MMIC. This device covers the frequency range of 0.1 GHz to 6 GHz, with a conversion gain of typically 11 dB, and uses an active Gilbert Cell Mixer Structure.

The die is manufactured using 0.18 μm gate length pHEMT Technology ED02AH. The MMIC uses gold bond pads and backside metallization and is fully protected with Silicon Nitride passivation to obtain the highest level of reliability.

Block Diagram



Ordering Information

Part Number	Package
CGY2183UH/C1	Active double balanced quad mixer

* Restrictions on Hazardous Substances, compliant to current RoHS EU directive.

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**Electrical Specifications: Down Converter Mode, Measured on Wafer,
Freq.: RF = 2.2 GHz, IF = 30 MHz, LO Power = -5 dBm**

Parameter	Test Conditions	Units	Min.	Typ.	Max.
Supply Voltage	—	V	—	7	—
Supply Current	—	mA	17	21	25
Conversion Gain	—	dB	9	11	14
SSB Noise Figure	—	dB	—	8	—
Leakage	RF to IF	dBc	—	-35	-30
Isolation	LO to IF	dB	30	35	—
Input P1dB	—	dBm	-7	-5	—

Absolute Maximum Ratings^{1,2}

Parameter	Absolute Maximum
Supply Voltage	9 V
LO Input Power	0 dBm
Junction Temperature	+150°C
Operating Temperature	-30°C to +85°C
Storage Temperature	-55°C to +150°C

1. Exceeding any one or combination of these limits may cause permanent damage to this device.
2. MACOM does not recommend sustained operation near these survivability limits.

Handling Procedures

Please observe the following precautions to avoid damage:

Static Sensitivity

These electronic devices are sensitive to electrostatic discharge (ESD) and can be damaged by static electricity. Proper ESD control techniques should be used when handling these devices.

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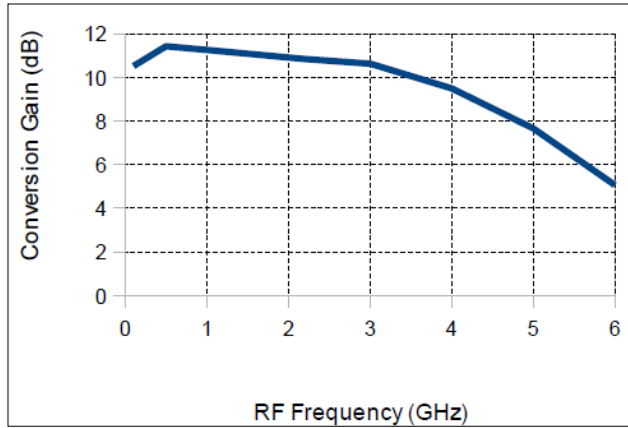
0.1 - 6 GHz



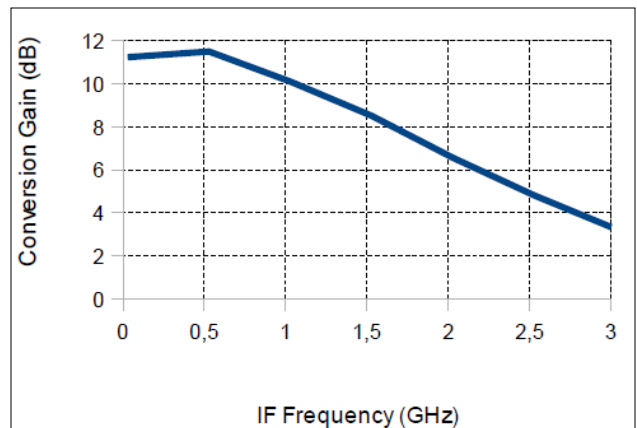
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Typical Performance Curves: Down Conversion Mode

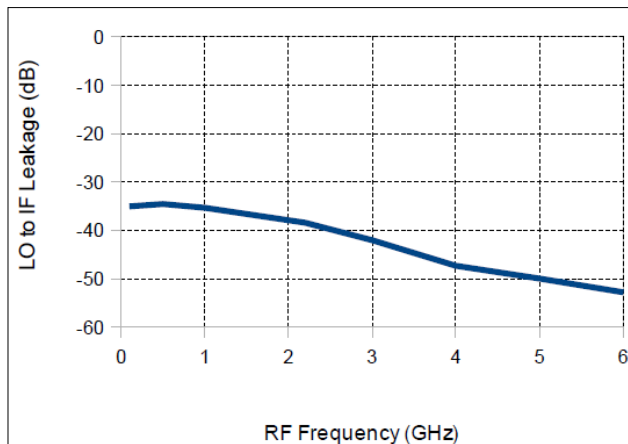
Conversion Gain vs. RF Frequency, IF = 30 MHz



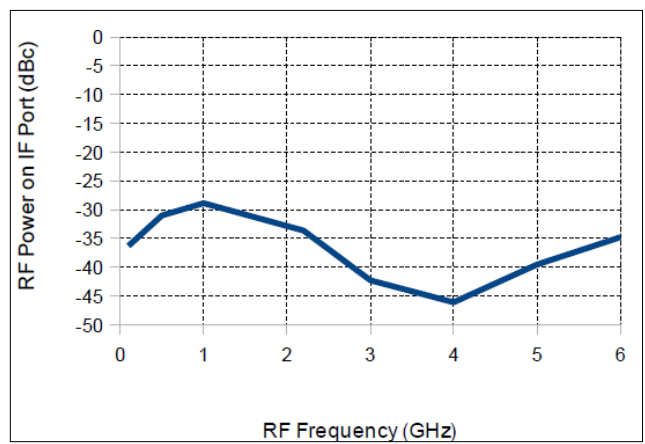
Conversion Gain vs. RF Frequency, RF = 2.2 GHz



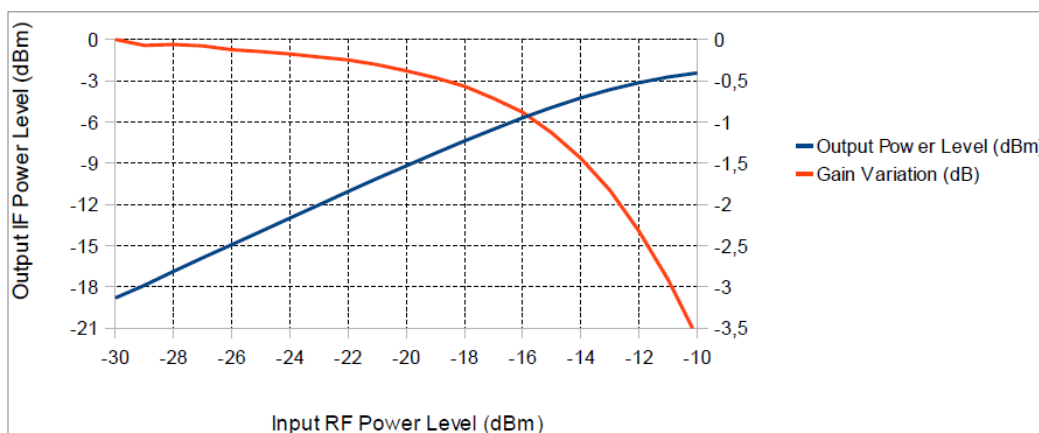
LO to IF Leakage vs. RF Frequency, IF = 30 MHz



RF Power on IF Port vs. RF Frequency, IF = 30 MHz



P1dB & Gain Variation vs. Input RF Power Level,
IF = 30 MHz RF = 2.2 GHz LO = 2.23 GHz



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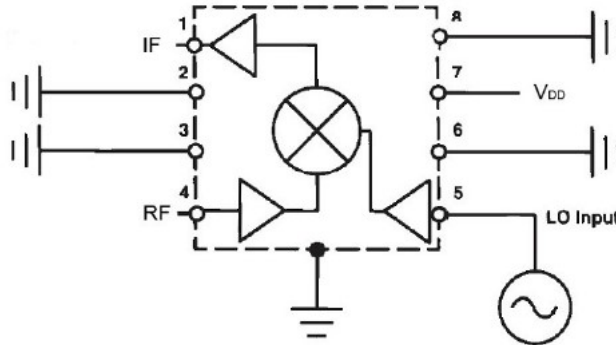
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Block Diagram



Pad Position

Pad Name	Coordinate		Description
	X (μm)	Y (μm)	
LO	1580	180	Local Oscillator Input
RF	120	550	RF Input
IF	120	920	IF Output
VD	1580	980	Supply Voltage

X=0, Y=0 at bottom left corner.
Co-ordinates correspond to the center of the bonding pad.
See Mechanical Information for more details.

Assembly Information

The bonding wires should be gold and be as short as possible. The CGY2183UH/C1 uses through substrate via holes to obtain excellent RF grounding. The backside of the MMIC must be appropriately connected to the system ground.

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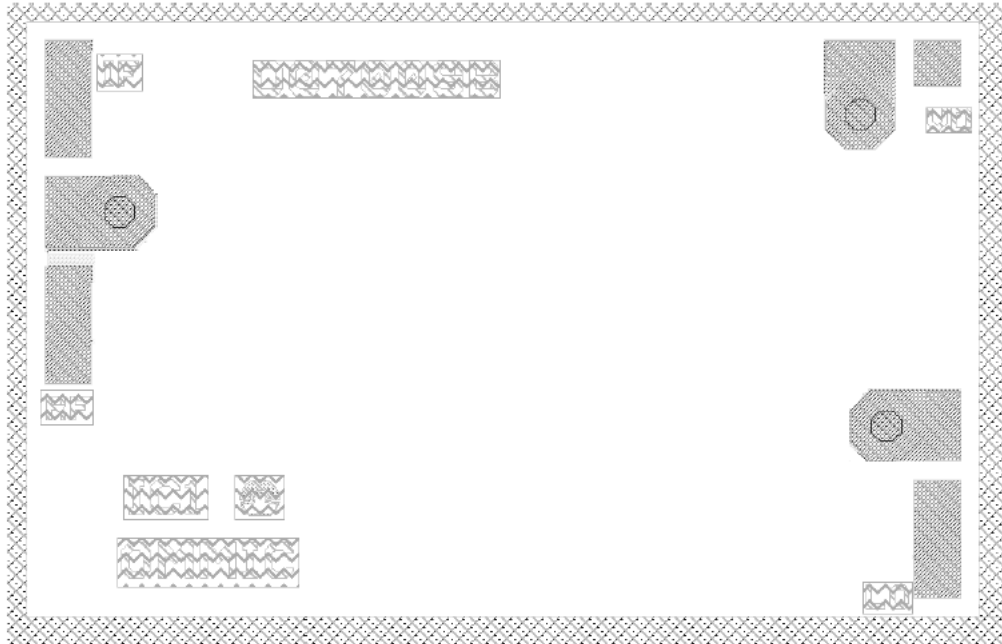
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Mechanical Information



Chip Size: 1100 μm x 1700 μm (before wafer sawing)
Substrate Thickness: 100 μm
RF, IF, & LO: 80 x 200 μm
DC Pads Size: 80 x 80 μm

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