Double Balanced Mixer
0.7 - 3.7 GHz

CGY2180UH/C1
Rev. V1

Features

- RF and LO Range: 0.7 - 3.7 GHz
- IF Range: DC - 1.7 GHz
- Conversion Loss: 7 dB
- LO to RF Isolation: 35 dB
- LO to IF Isolation: 35 dB
- Input P1dB: 12 dBm
- Small Chip Size: 1.5 x 1.5 mm
- Tested, Inspected Known Good Die (KGD)
- Evaluation Boards Available
- Space and MIL-STD also Available
- RoHS* Compliant

Applications

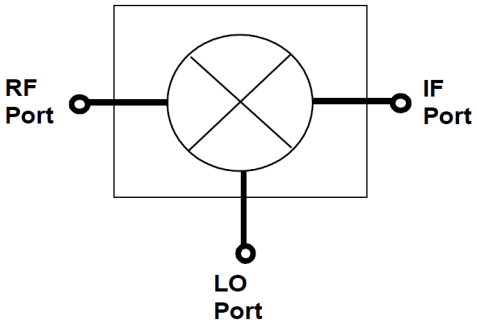
- GPS Systems
- Radar
- Telecommunication
- Instrumentation

Description

The CGY2180UH/C1 is a high performance GaAs pHEMT technology based double balanced mixer MMIC with on chip RF and LO baluns, and covers the frequency range of 0.7 - 3.7 GHz with a conversion loss of 7 dB. On-chip baluns provide excellent rejection of LO to RF and IF paths. High dynamic range is provided by the passive mixer configuration.

The die is manufactured using a 0.18 µm gate length pHEMT technology. The MMIC uses gold bond 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.

Block Diagram



Ordering Information

Part Number	Package
CGY2180UH/C!	Double balanced quad mixer
CGY2180GS/C!	Hermetically sealed double balanced quad mixer

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

Electrical Specifications: Down Converter Mode, measured on Wafer, LO Power = +15 dBm

Parameter	Test Conditions	Units	Min.	Typ.	Max.
LO and RF Frequency	—	GHz	0.7	—	3.7
IF Frequency	—	GHz	DC	—	1.7
Conversion Loss	—	dB	—	7	—
SSB Noise Figure	—	dB	—	7	—
Isolation	LO to RF (Up Converter Mode) LO to IF	dB	—	35 35	—
P1dB	—	dBm	—	12	—

Absolute Maximum Ratings[1,2]

Parameter	Absolute Maximum
Input Power LO RF IF	 17.5 dBm 15.0 dBm 15.0 dBm
Junction Temperature	+150°C
Operating Temperature	-40°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.

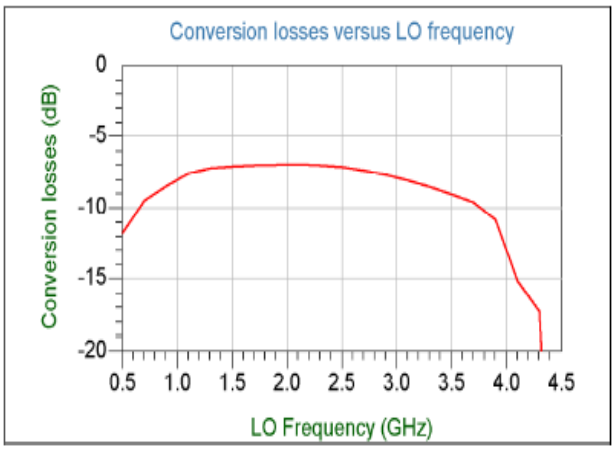
Handling Procedures

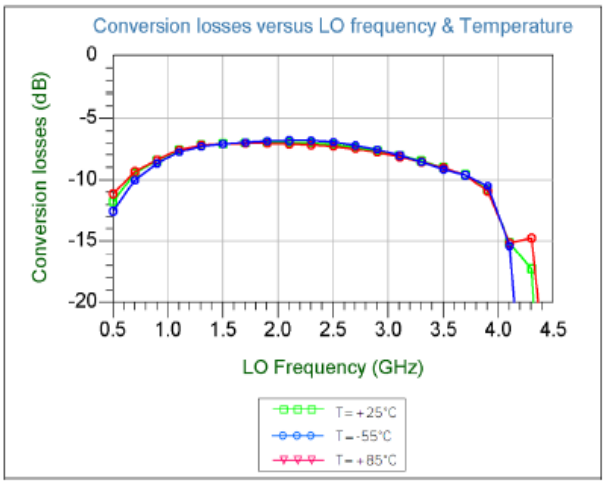
Please observe the following precautions to avoid damage:

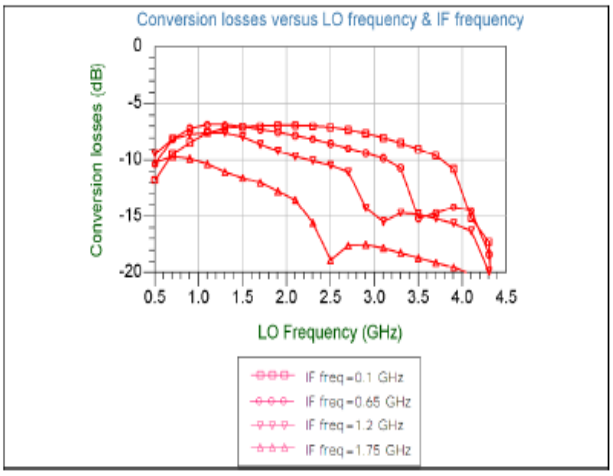
Static Sensitivity

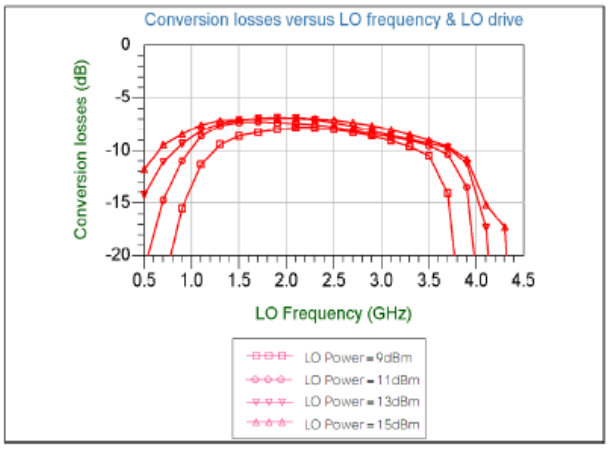
These electronic devices are sensitive to electrostatic discharge (ESD) and can be damaged by static electricity. Proper ESD control techniques should be used when handling these devices.

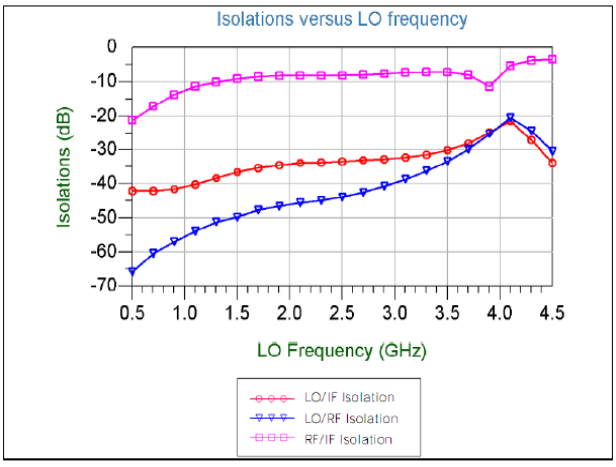
Typical Performance Curves: Down Conversion Mode
LO Power: +15 dBm, RF Power: -15 dBm, IF Frequency: 0.1 GHz



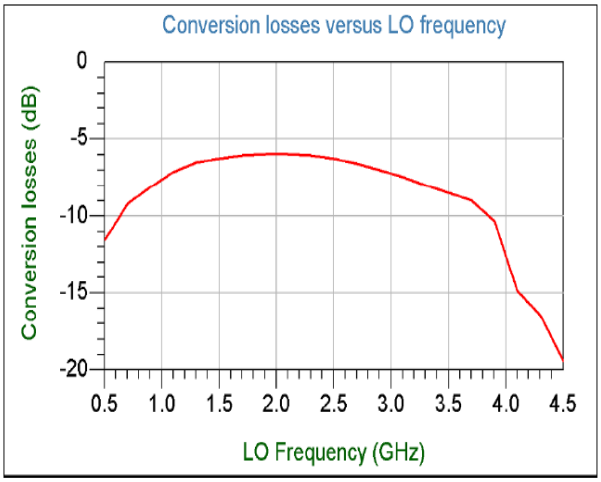


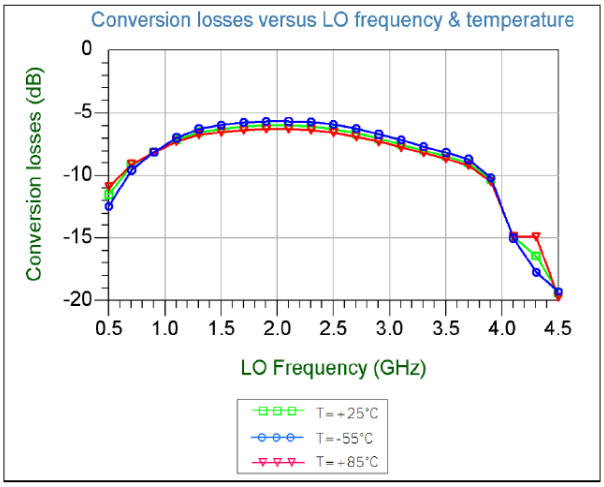


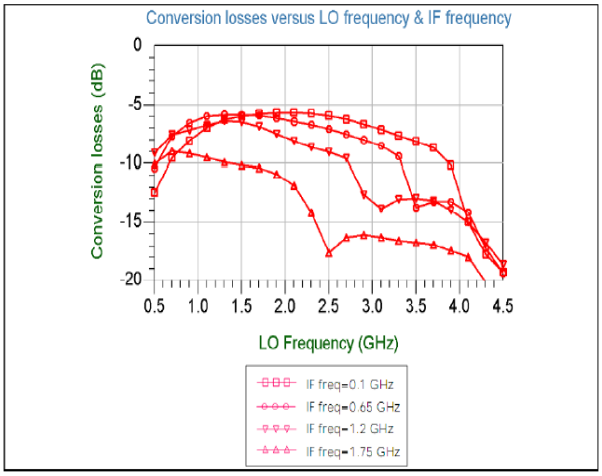


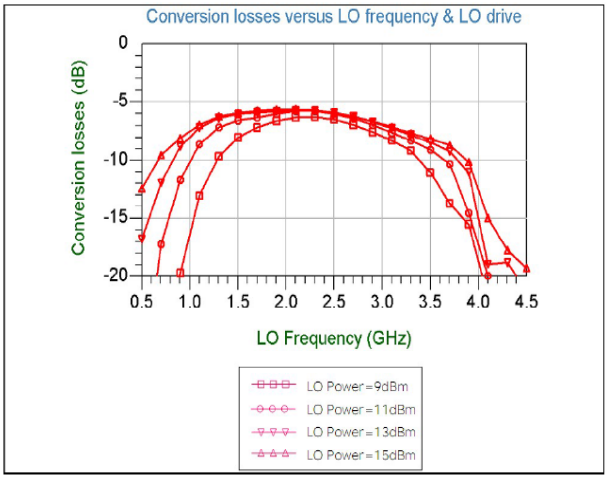


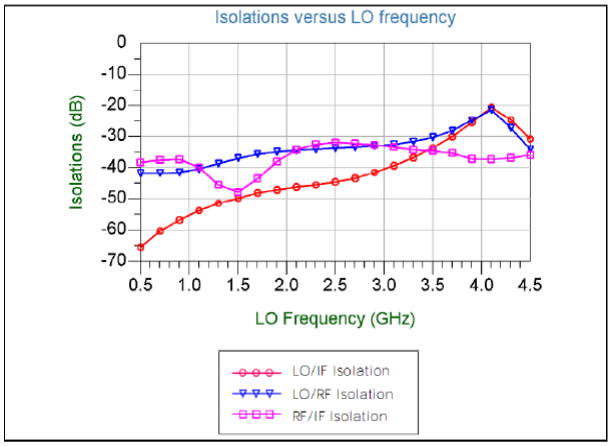
Typical Performance Curves: Up Conversion Mode
LO Power: +15 dBm, IF Power: -15 dBm, IF Frequency: 0.1 GHz





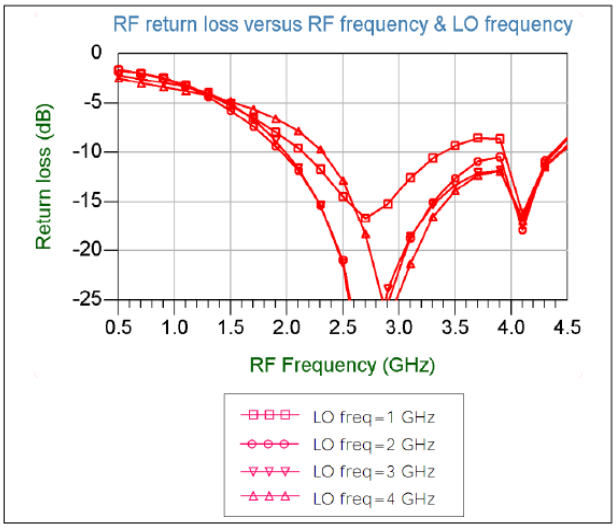




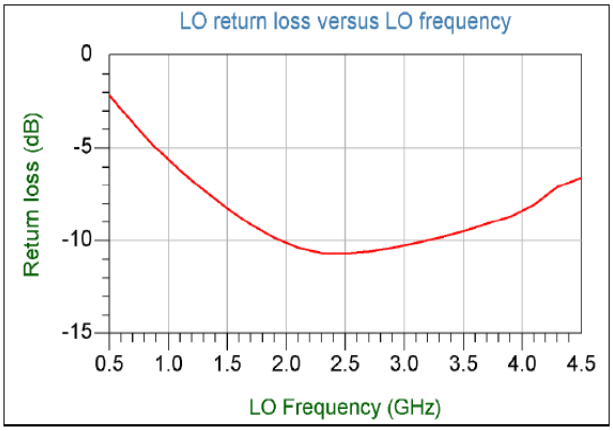


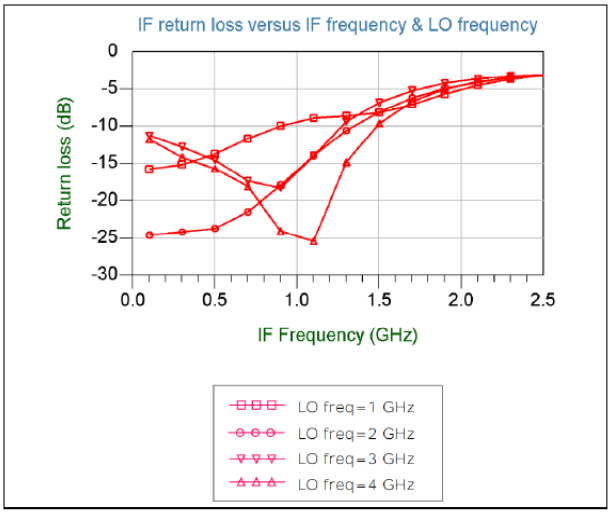
Typical Performance Curves: Up or Down Conversion Mode

LO Power: +15 dBm, RF Power: -40 dBm



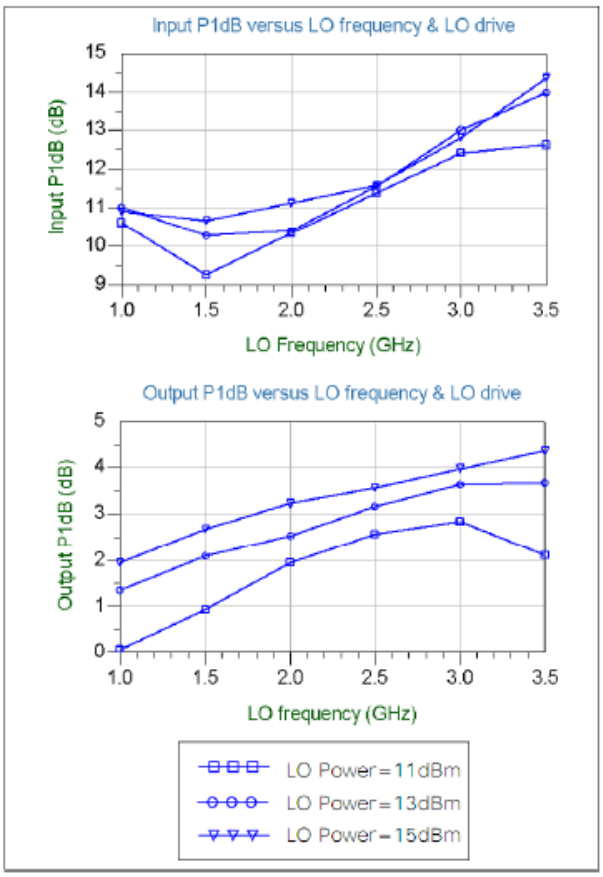
LO Power: +15 dBm, RF Power: -15 dBm,
IF Frequency: 0.1 GHz



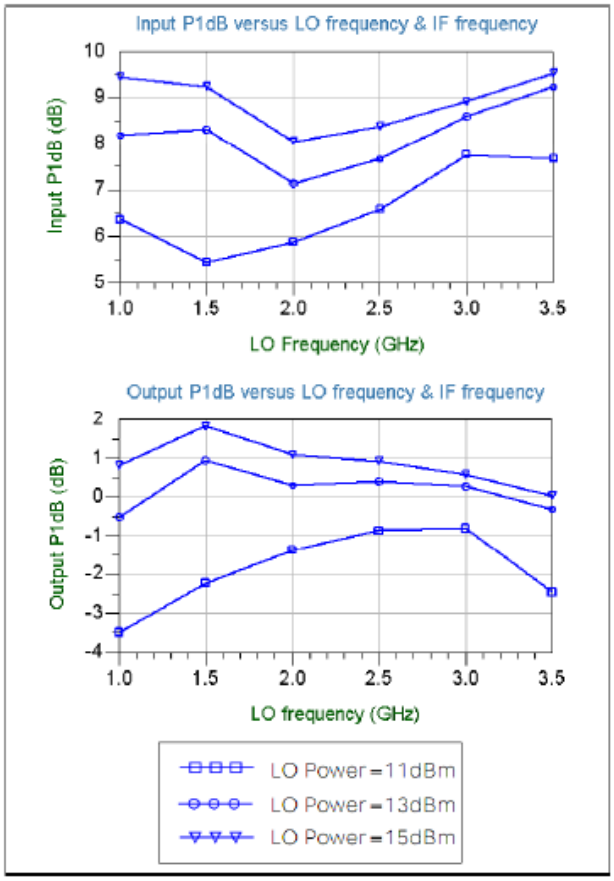


Typical Performance Curves:
IF Frequency: 0.1 GHz

Down Converter Mode

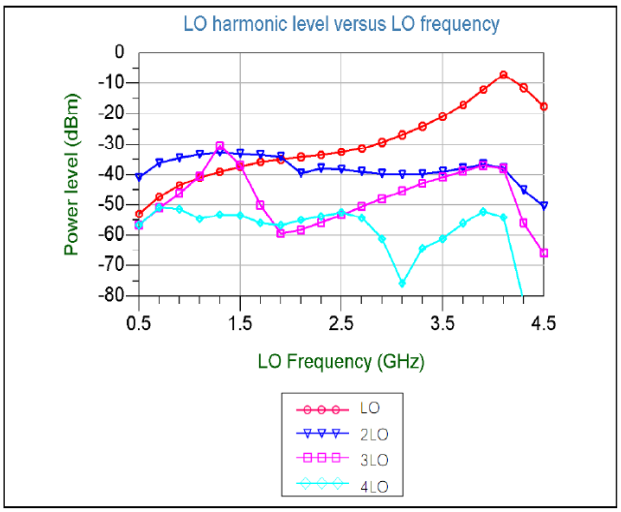


Up Converter Mode

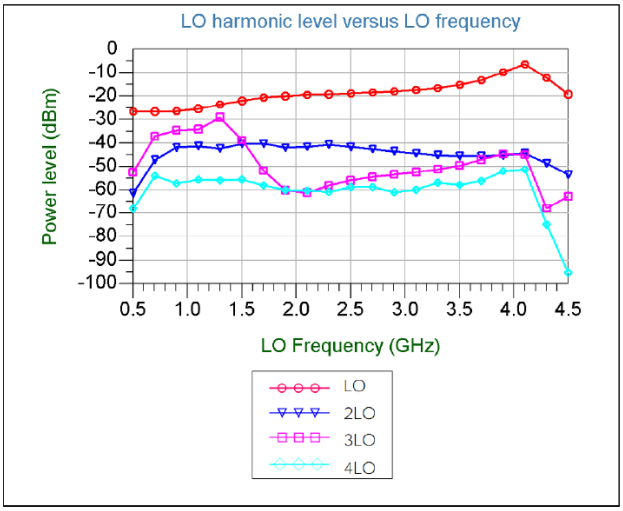


Typical Performance Curves:

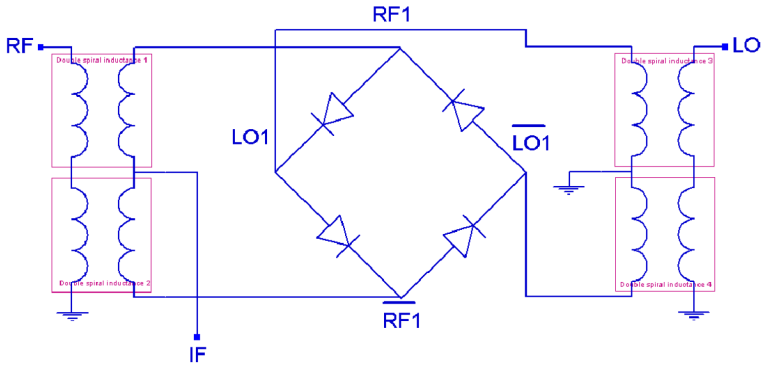
Down Converter Mode
LO Power: +13 dBm, RF Power: -10 dBm
IF Frequency: 0.1 GHz



Up Converter Mode
LO Power: +13 dBm, IF Power: -10 dBm
IF Frequency: 0.1 GHz



Block Diagram



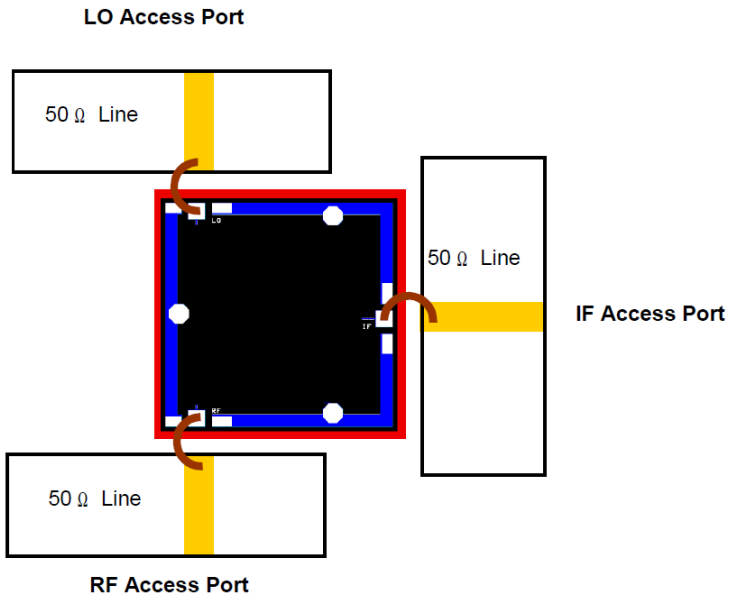
Pad Position

Pad Name	Coordinate		Description
	X (µm)	Y (µm)	
LO	248	1353	Local Oscillator Input
RF	248	112	RF Input
IF	1353	710	IF Output

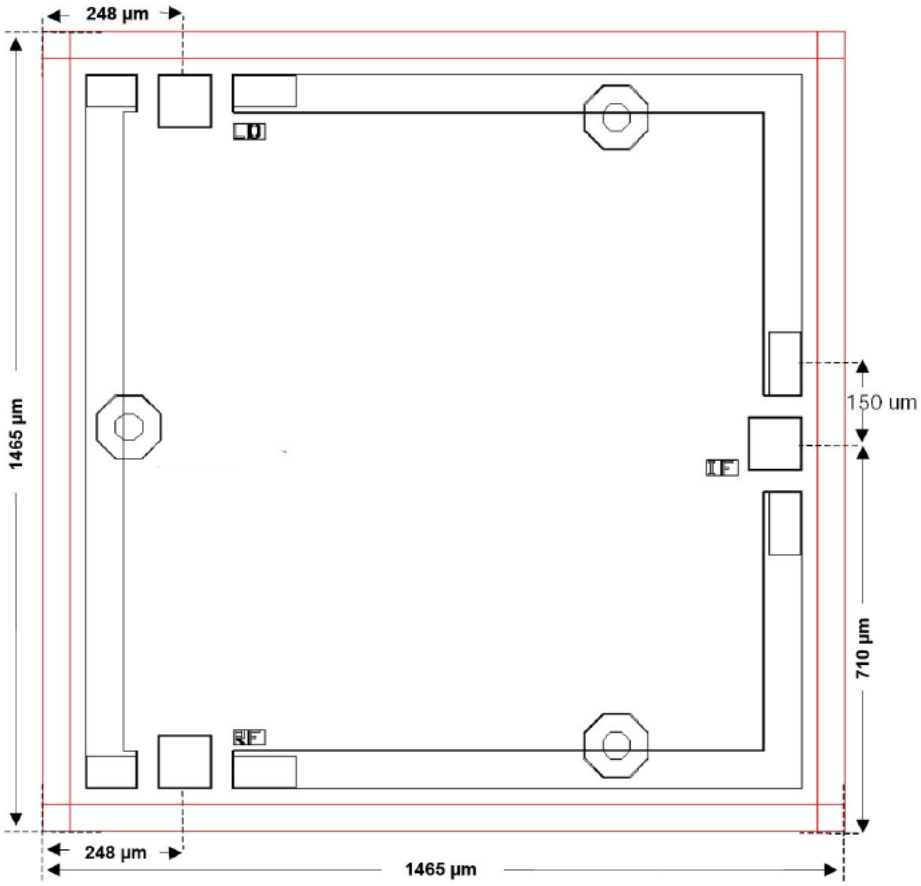
X=0, Y=0 at bottom left corner.
Co-ordinates correspond to the Centre of the Bonding Pad.
See Mechanical Information for more details.

Bonding Diagram & Assembly Information

The bonding wires should be gold and be as short as possible. The CGY2180UH/C1 uses through substrate via holes to obtain excellent RF grounding. The backside of the MMIC must be appropriately connected to the system ground.



Mechanical Information



Chip Size: 1465 µm x 1465 µm (after wafer sawing)
Substrate Thickness: 100 µm
Back-Side Metallization: yes
Use of Via-Holes: yes
RF Pads Size: 100 x 100 µm