PRODUCT DATASHEET

Version 1.0

CGY2180UH/C1

0.7 – 3.7 GHz Double Balanced Mixer

DESCRIPTION

The CGY2180UH is a high performance GaAs based Double Balanced Mixer MMIC with on chip RF and LO baluns.

The CGY2180UH covers the frequency range of 0.7 GHz to 3.7 GHz with a conversion loss of typically 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. This device can be used in GPS, Telecommunication, Radar, EW and Instrumentation applications.

The die is manufactured using OMMIC's 0.18 µm gate length PHEMT 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 technology has been evaluated for Space applications and is on the European Preferred Parts List of the European Space Agency.

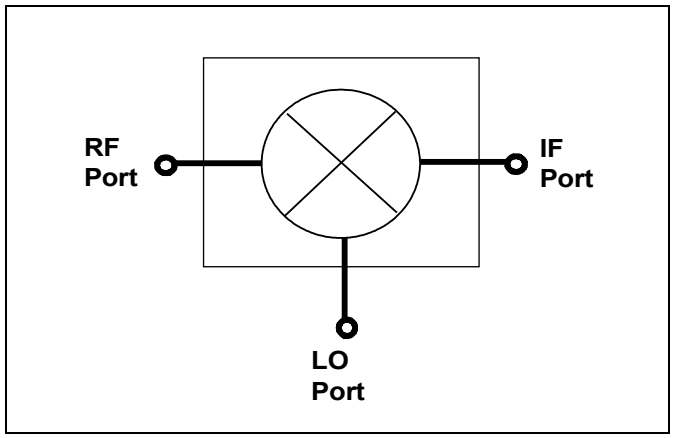
APPLICATIONS

- GPS Systems
- Radar
- Telecommunication
- Instrumentation

RoHS Compliant

FEATURES

- RF and LO Range : 0.7 GHz to 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 mm x 1.5 mm
- Tested, Inspected Known Good Die (KGD)
- Samples available
- Demonstration Boards available
- Space and MIL-STD also available



Block Diagram of the Mixer

Website : www.ommic.com

OMMIC
2, Chemin du Moulin – BP. 11
94 453 Limeil-Brévannes – FRANCE

Email : Information@ommic.com

LIMITING VALUES

T_{amb} = 25 °C unless otherwise noted

Symbol	Parameter	Conditions	MIN.	MAX.	UNIT
P_{LO}	Local Oscillator Input Power			+17.5	dBm
P_{RF}	RF Input Power			+15	dBm
P_{IF}	IF Input Power			+15	dBm
T_{amb}	Ambient temperature		-40	+85	° C
T_j	Junction temperature			+150	° C
T_{stg}	Storage temperature		-55	+150	° C

THERMAL CHARACTERISTICS

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

CHARACTERISTICS

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

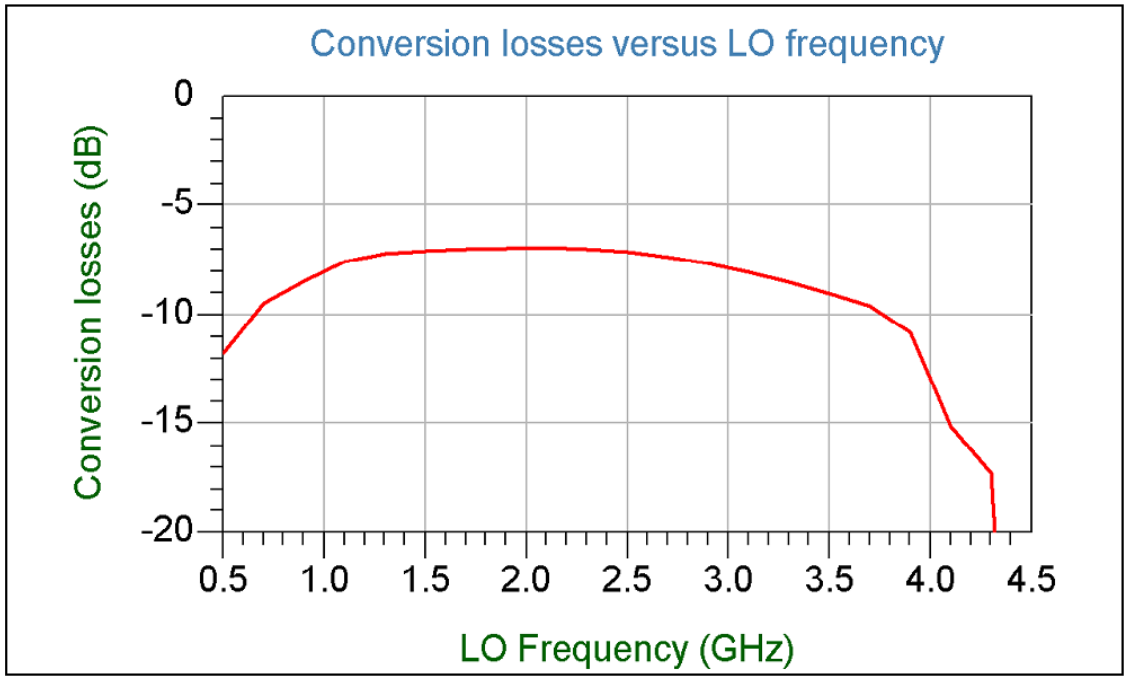
Symbol	Parameter	Conditions	MIN.	TYP.	MAX.	UNIT
Unless otherwise specified LO Power = + 15 dBm; IF = 100 MHz; Down Converter Mode						
BW_{RF}	RF Bandwidth		0.7		3.7	GHz
BW_{LO}	LO Bandwidth		0.7		3.7	GHz
BW_{IF}	IF Bandwidth		DC		1.7	GHz
G_c	Conversion Loss			7	10	dB
NF (SSB)	SSB Noise Figure			7		dB
ISO_{LO-RF}	LO to RF Isolation	Up Converter Mode		35		dB
ISO_{LO-IF}	LO to IF Isolation			35		dB
P_{1dB}	Input 1dB Compression Point			12		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.

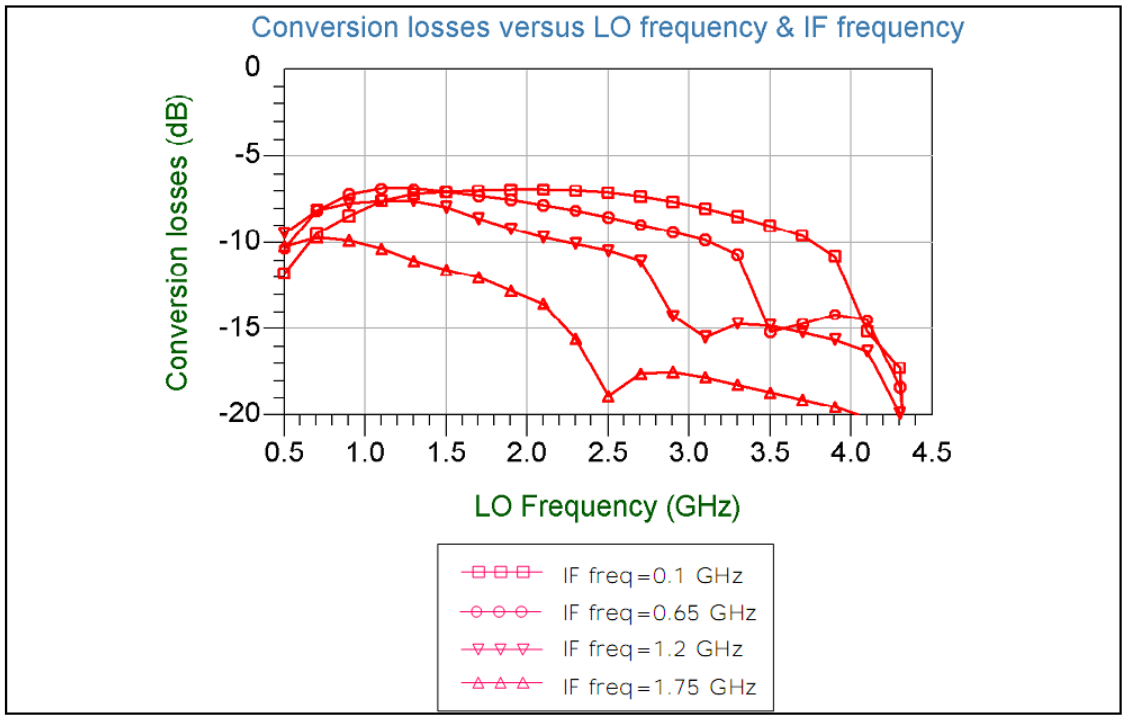
ON WAFER MEASUREMENTS – CONVERSION LOSSES

1 - Down converter Mode :

P_{LO}= 15 dBm
P_{RF}= -15 dBm
F_{IF}=0.1 GHz
NH_{RF}=4
NH_{LO}=8
F_{LO}=sweep

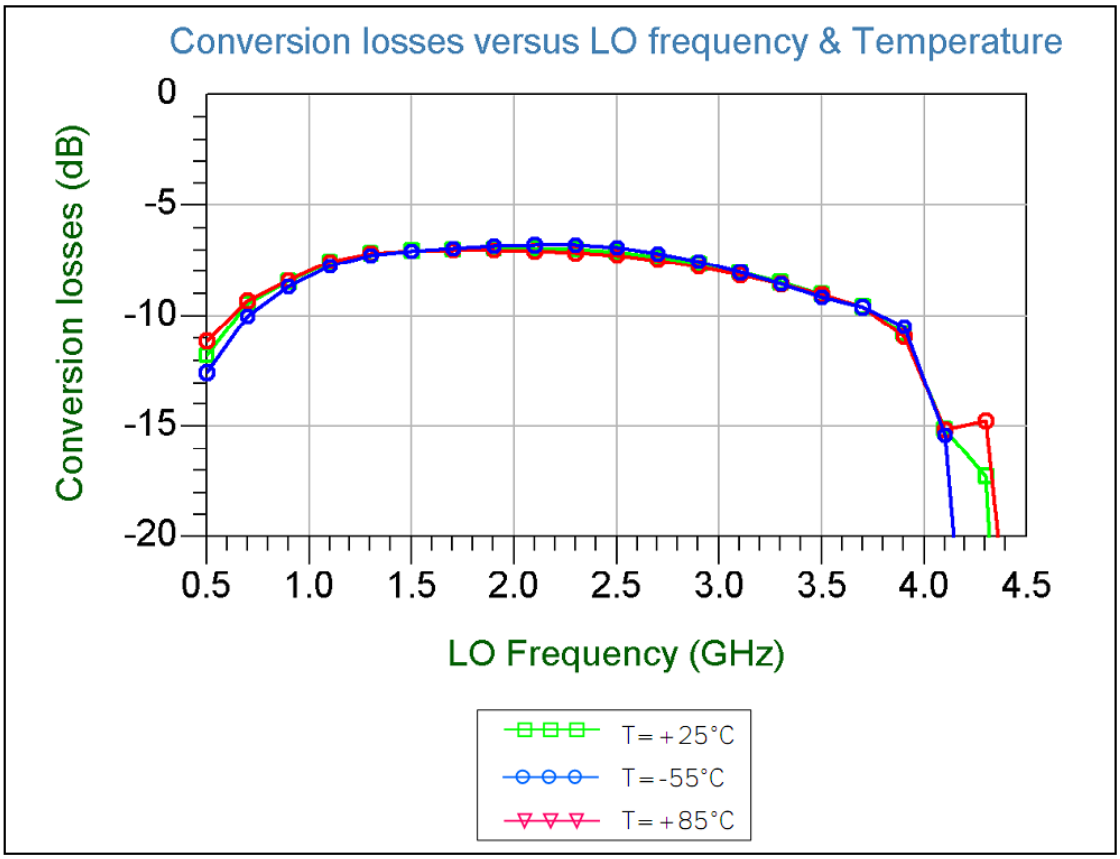


P_{LO}= 15 dBm
P_{RF}= -15 dBm
NH_{RF}=4
NH_{LO}=8
F_{LO}=sweep
F_{IF}= param

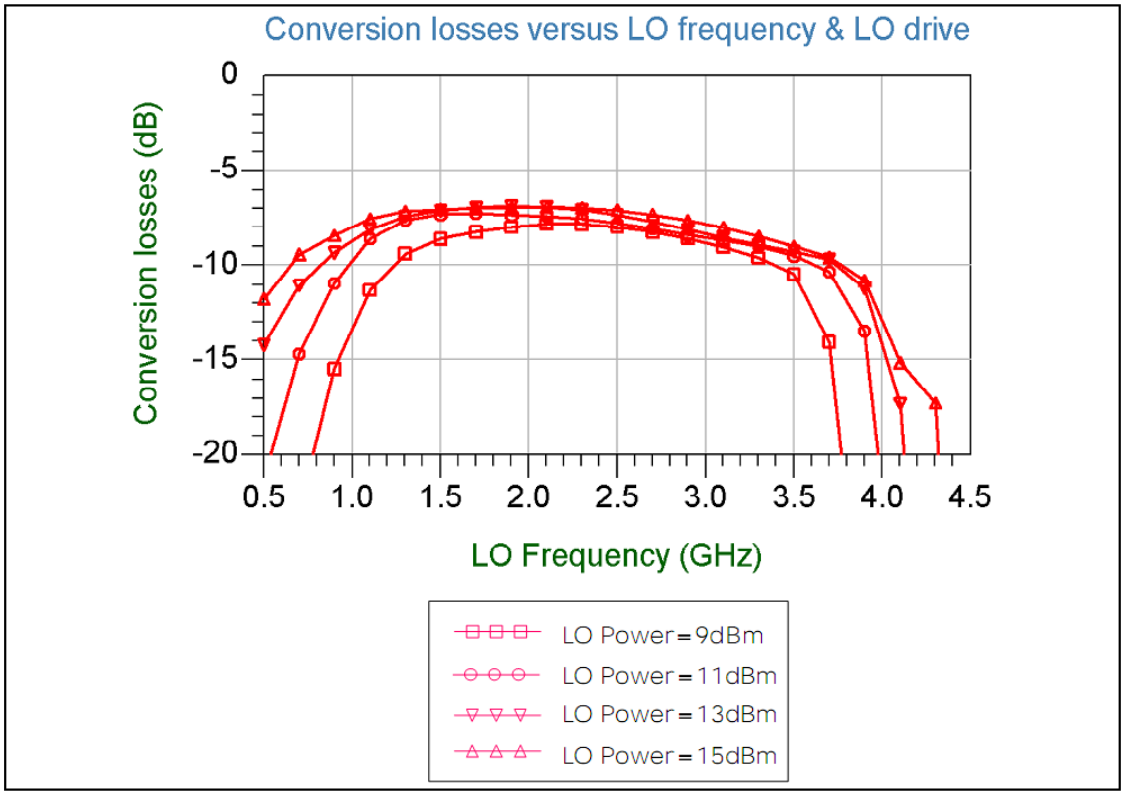


ON WAFER MEASUREMENTS – CONVERSION LOSSES

P_{LO}= 15 dBm
P_{RF}= -15 dBm
F_{IF}=0.1 GHz
NH_{RF}=4
NH_{LO}=8
F_{LO}=sweep
T°=param



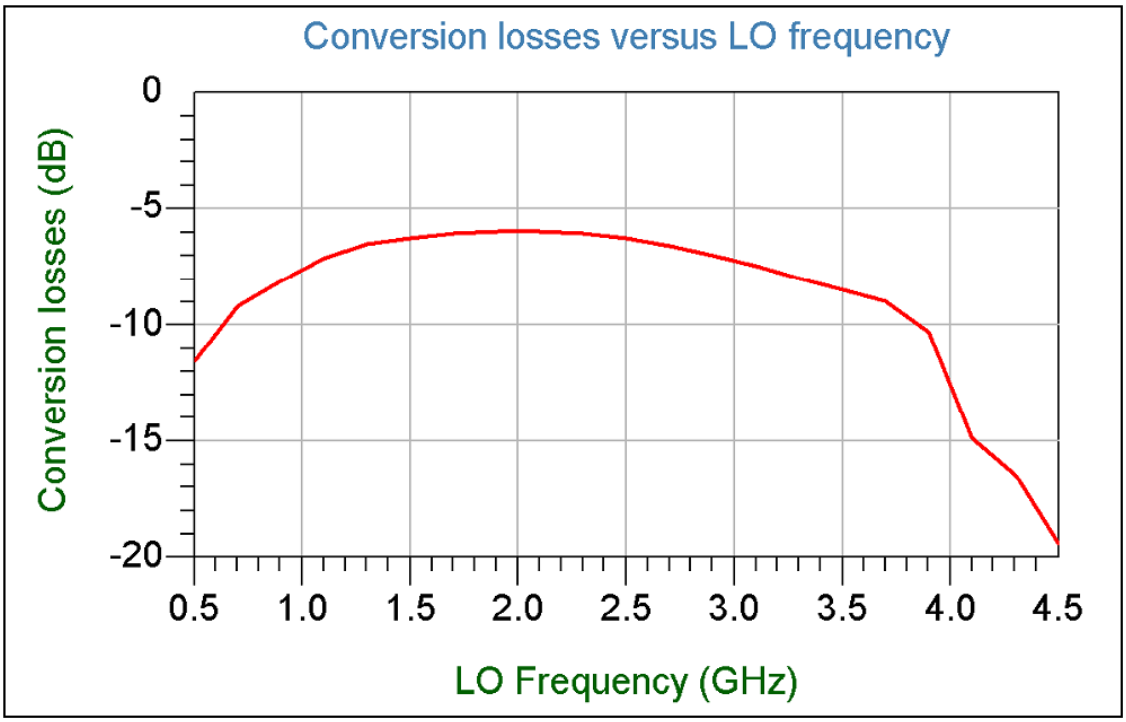
P_{RF}= -15 dBm
F_{IF}=0.1 GHz
NH_{RF}=4
NH_{LO}=8
F_{LO}=sweep
P_{LO}= param



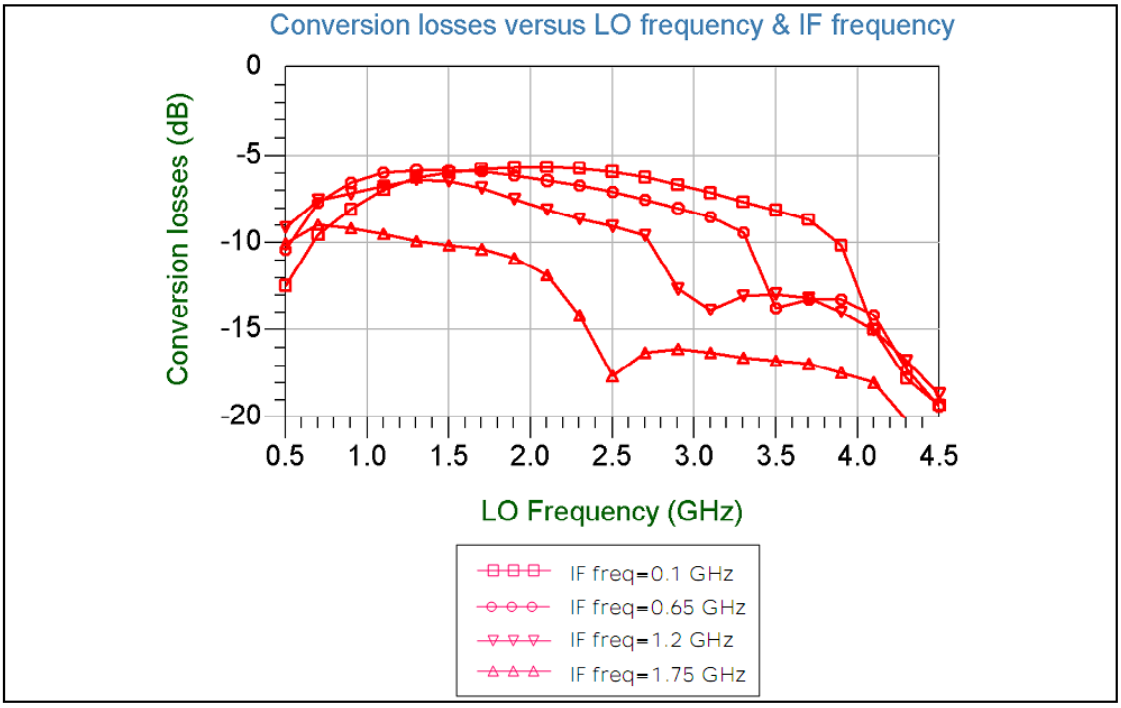
ON WAFER MEASUREMENTS – CONVERSION LOSSES

2 – Up Converter Mode :

P_{LO}= 15 dBm
P_{IF}= -15 dBm
F_{IF}=0.1 GHz
NH_{IF} =4
NH_{LO}=8
F_{LO}=sweep

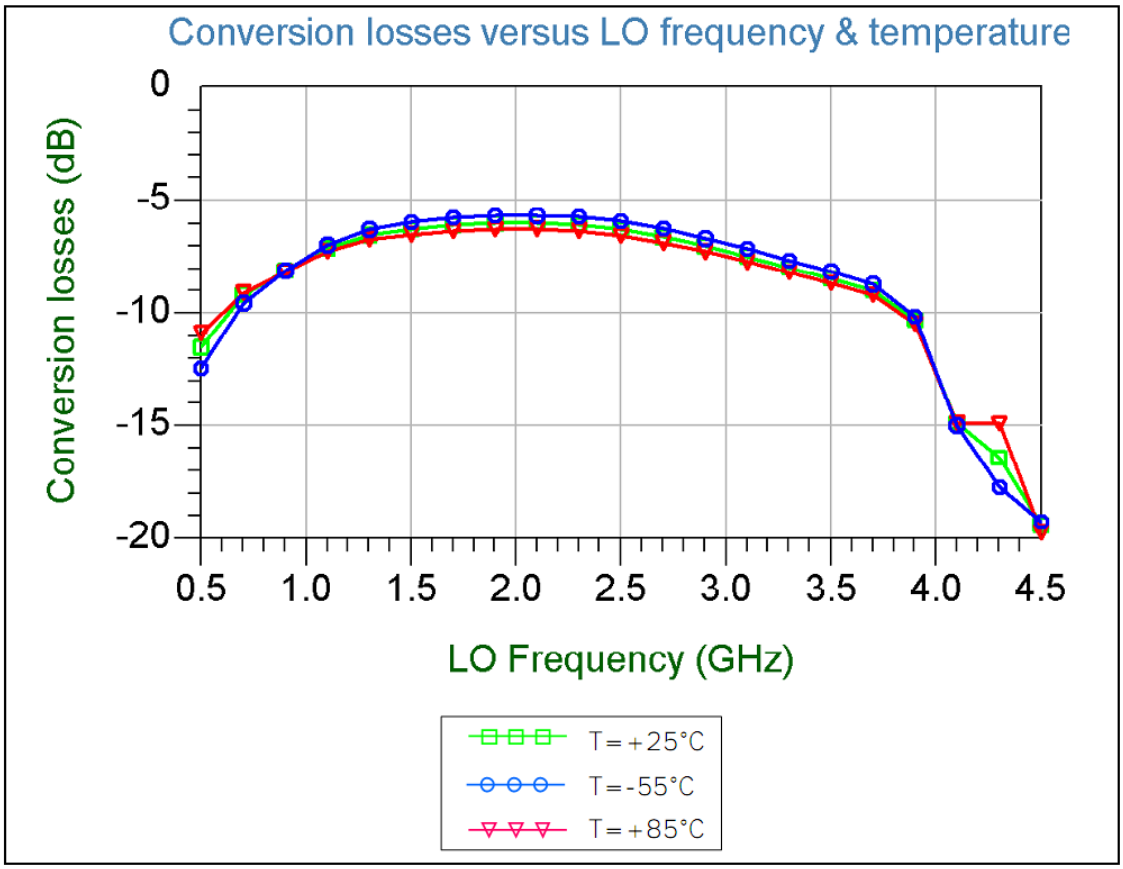


P_{LO}= 15 dBm
P_{IF}= -15 dBm
NH_{IF} =4
NH_{LO}=8
F_{LO}=sweep
F_{IF}= param

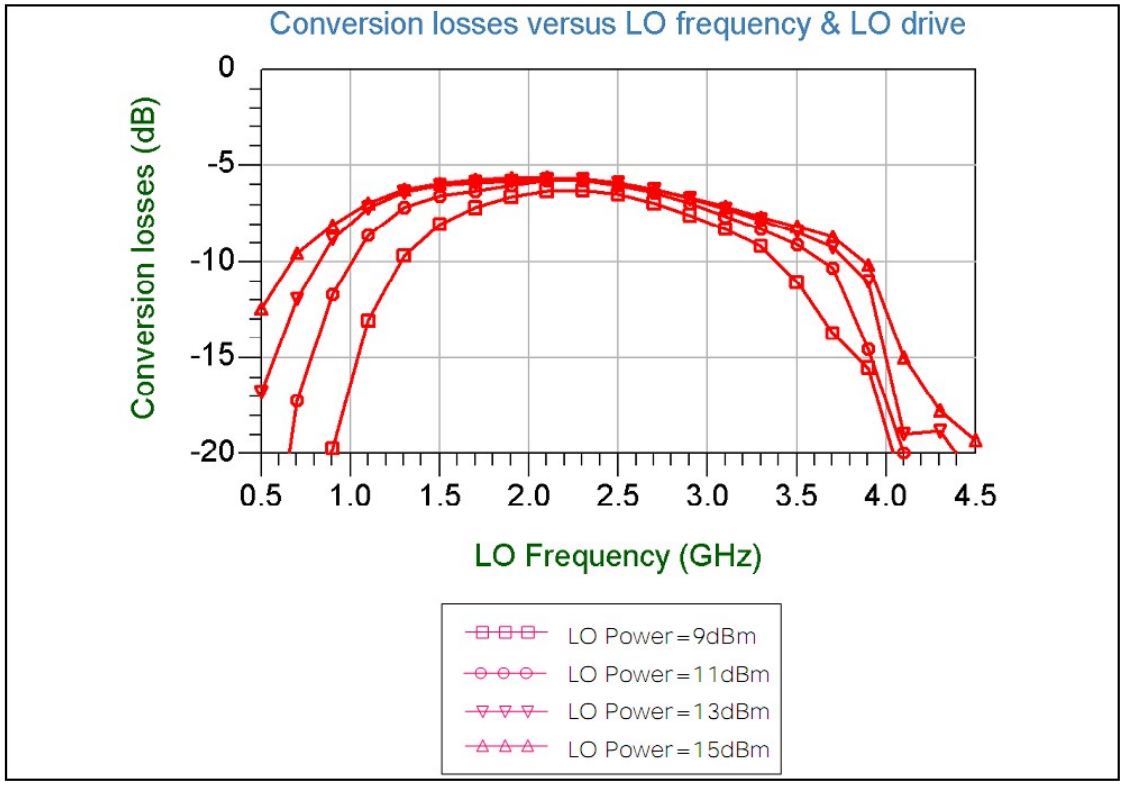


ON WAFER MEASUREMENTS – CONVERSION LOSSES

P_{LO}= 15 dBm
P_{IF}= -15 dBm
F_{IF}=0.1 GHz
NH_{IF} =4
NH_{LO}=8
F_{LO}=sweep
T°=param



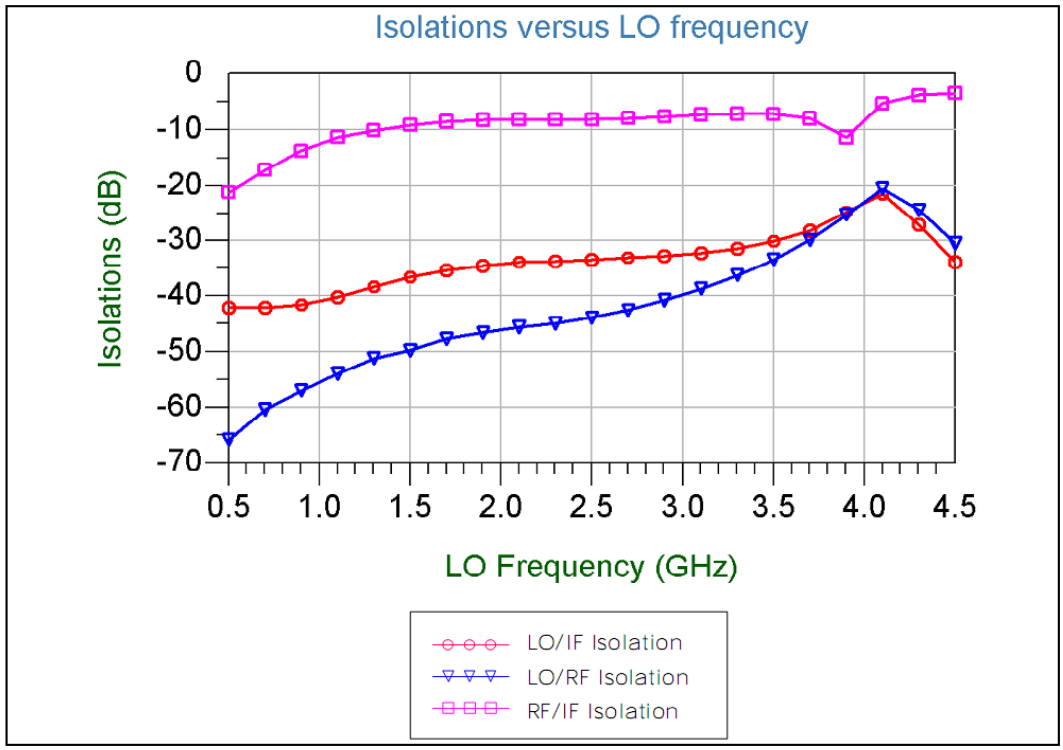
P_{IF}= -15 dBm
F_{IF}=0.1 GHz
NH_{IF} =4
NH_{LO}=8
F_{LO}=sweep
P_{LO}= param



ON WAFER MEASUREMENTS – ISOLATIONS

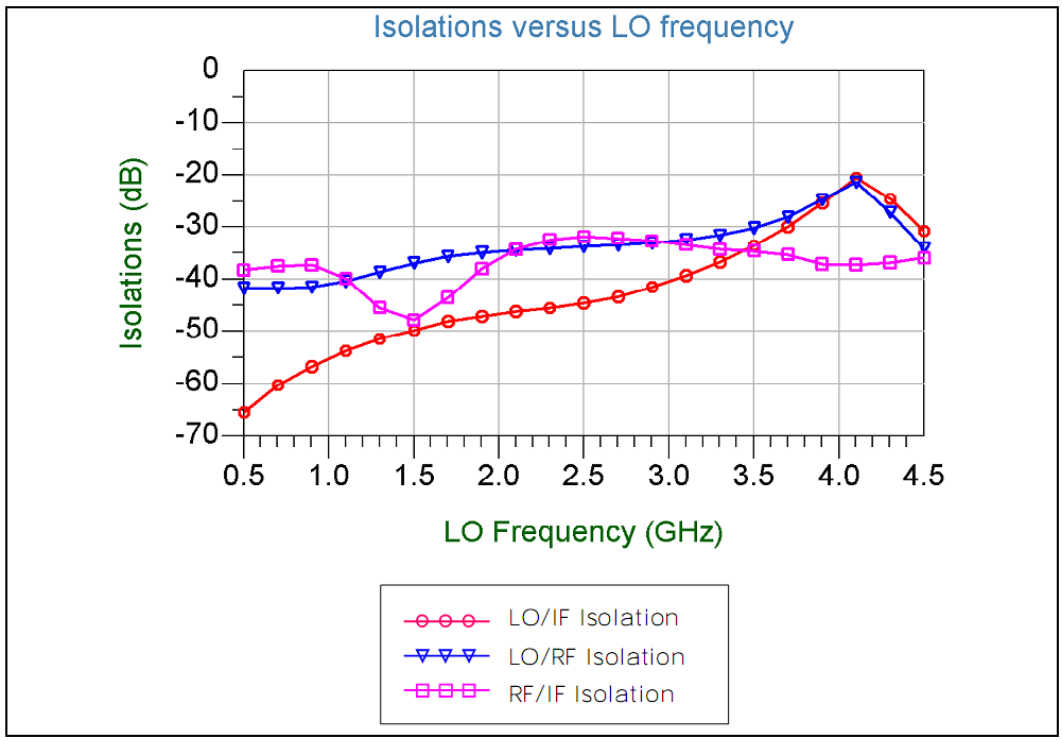
1- Down converter Mode :

P_{LO}= 15 dBm
P_{RF}= -15 dBm
F_{IF}=0.1 GHz
NH_{RF} =4
NH_{LO}=8
F_{LO}=sweep



2 – Up Converter Mode :

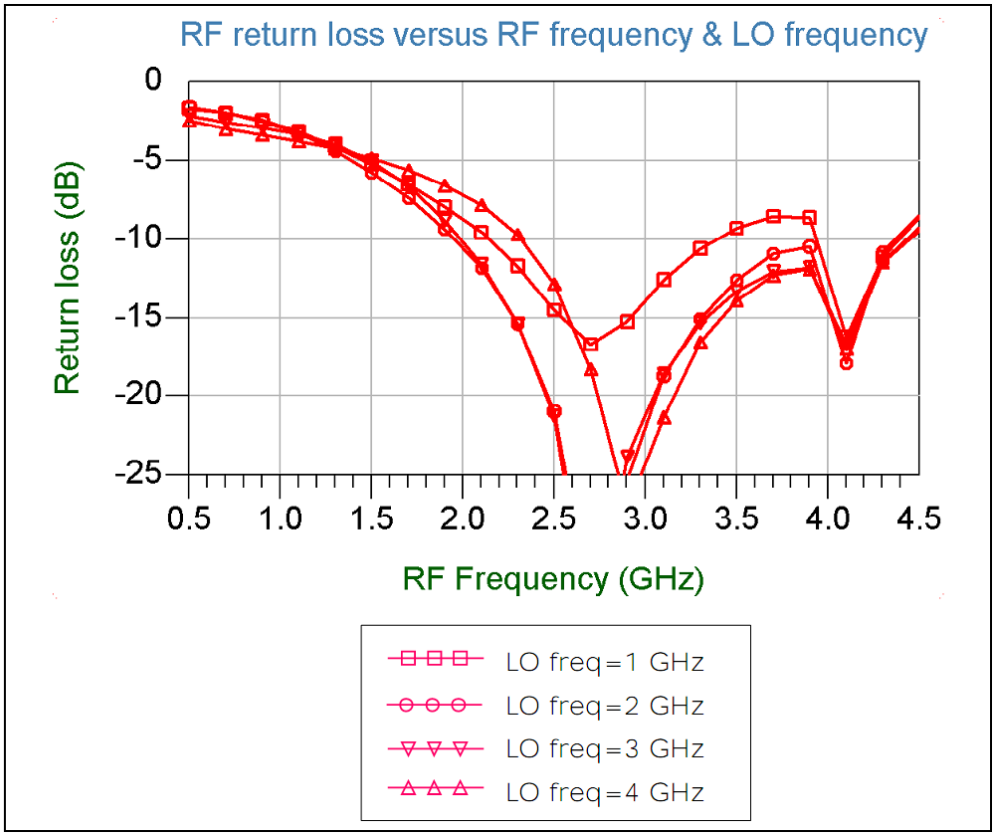
P_{LO}= 15 dBm
P_{IF}= -15 dBm
F_{IF}=0.1 GHz
NH_{IF} =4
NH_{LO}=8
F_{LO}=sweep



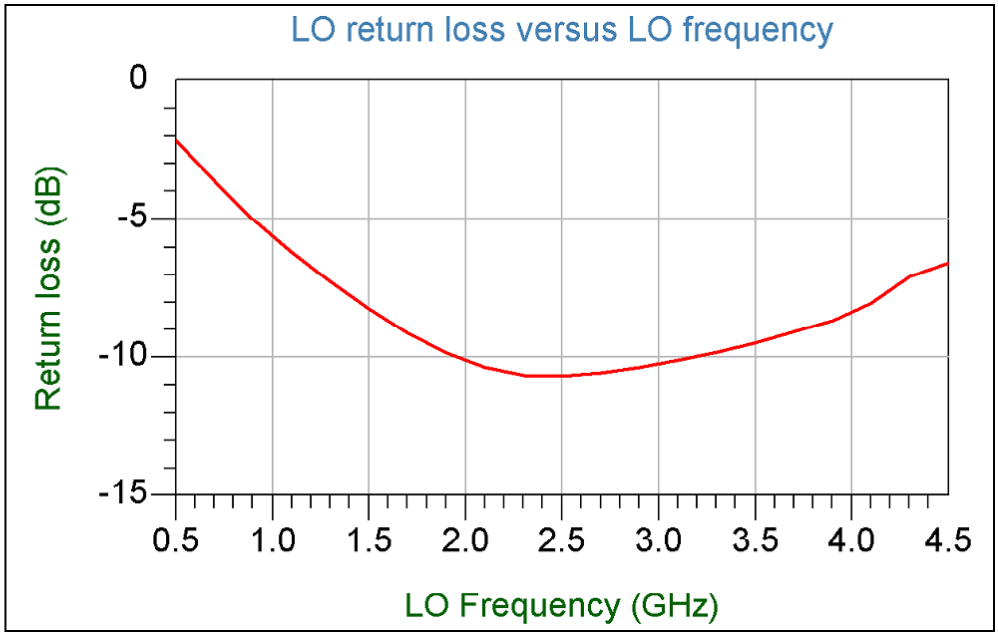
ON WAFER MEASUREMENTS – INPUT/OUTPUT RETURN LOSS

Up or Down converter Mode.

P_{LO}= 15 dBm
P_{RF}= -40 dBm
NH_{RF} =4
NH_{LO}=8
F_{RF}=sweep
F_{LO}= param



P_{LO}= 15 dBm
P_{RF}= -15 dBm
F_{IF}=0.1 GHz
NH_{RF} =4
NH_{LO}=8
F_{LO}=sweep



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Up or Down converter Mode.

P_{LO}= 15 dBm
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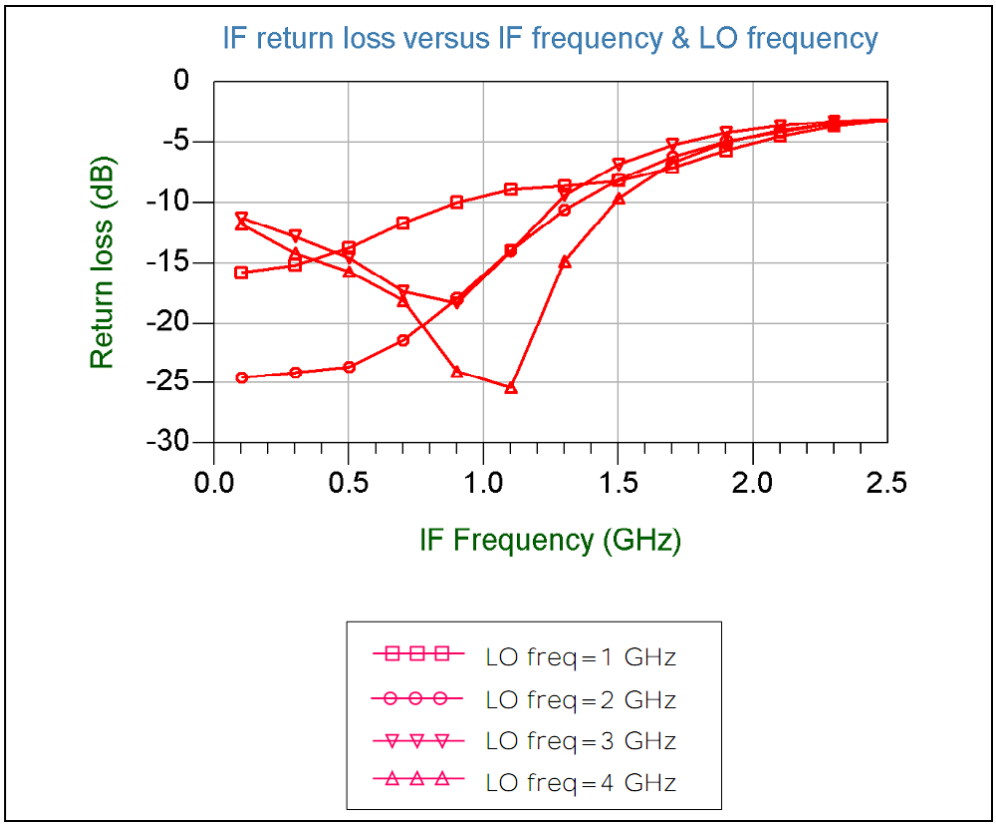
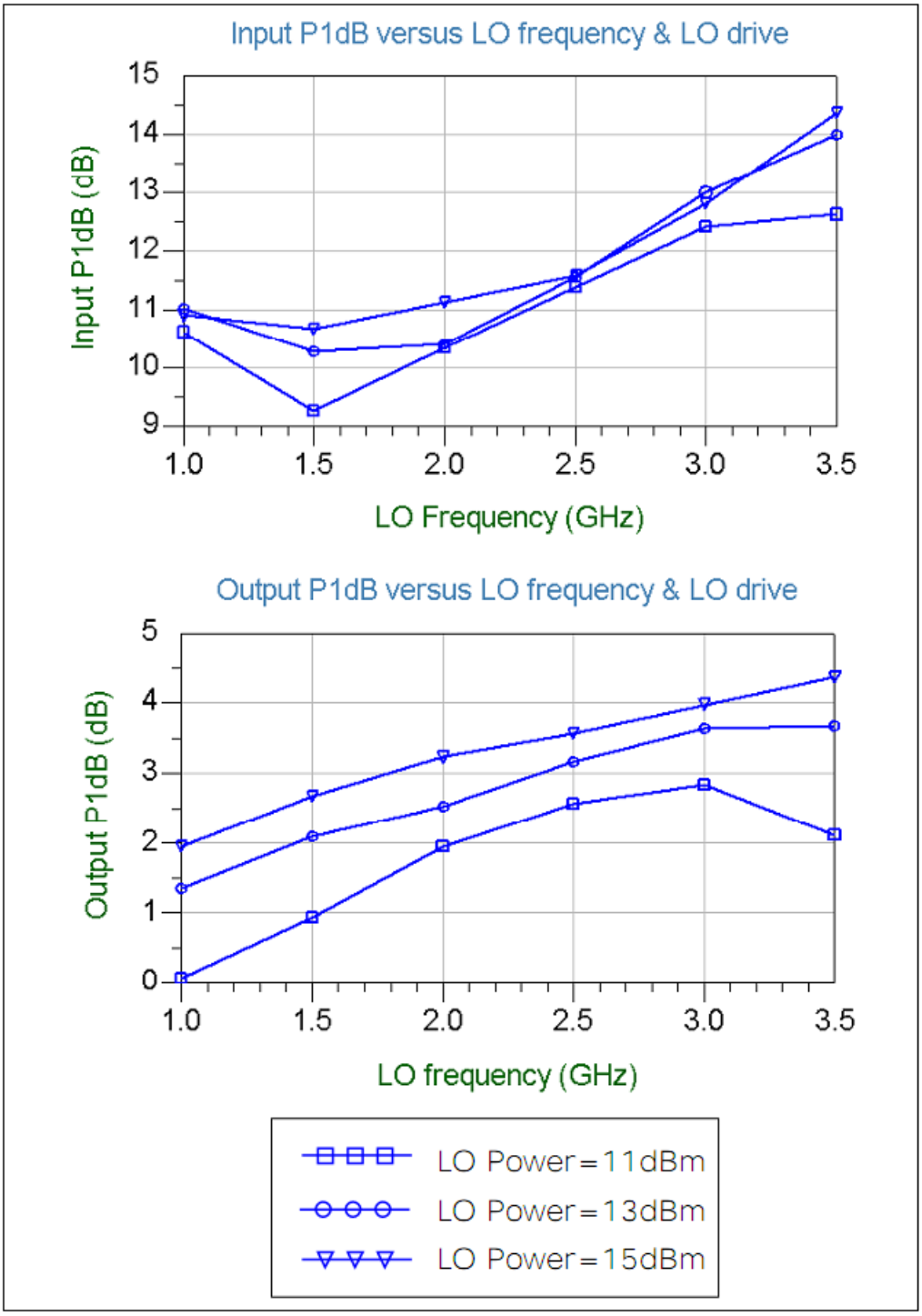
F_{LO}= param



ON WAFER MEASUREMENTS – INPUT & OUTPUT P1DB

1 – Down converter mode :

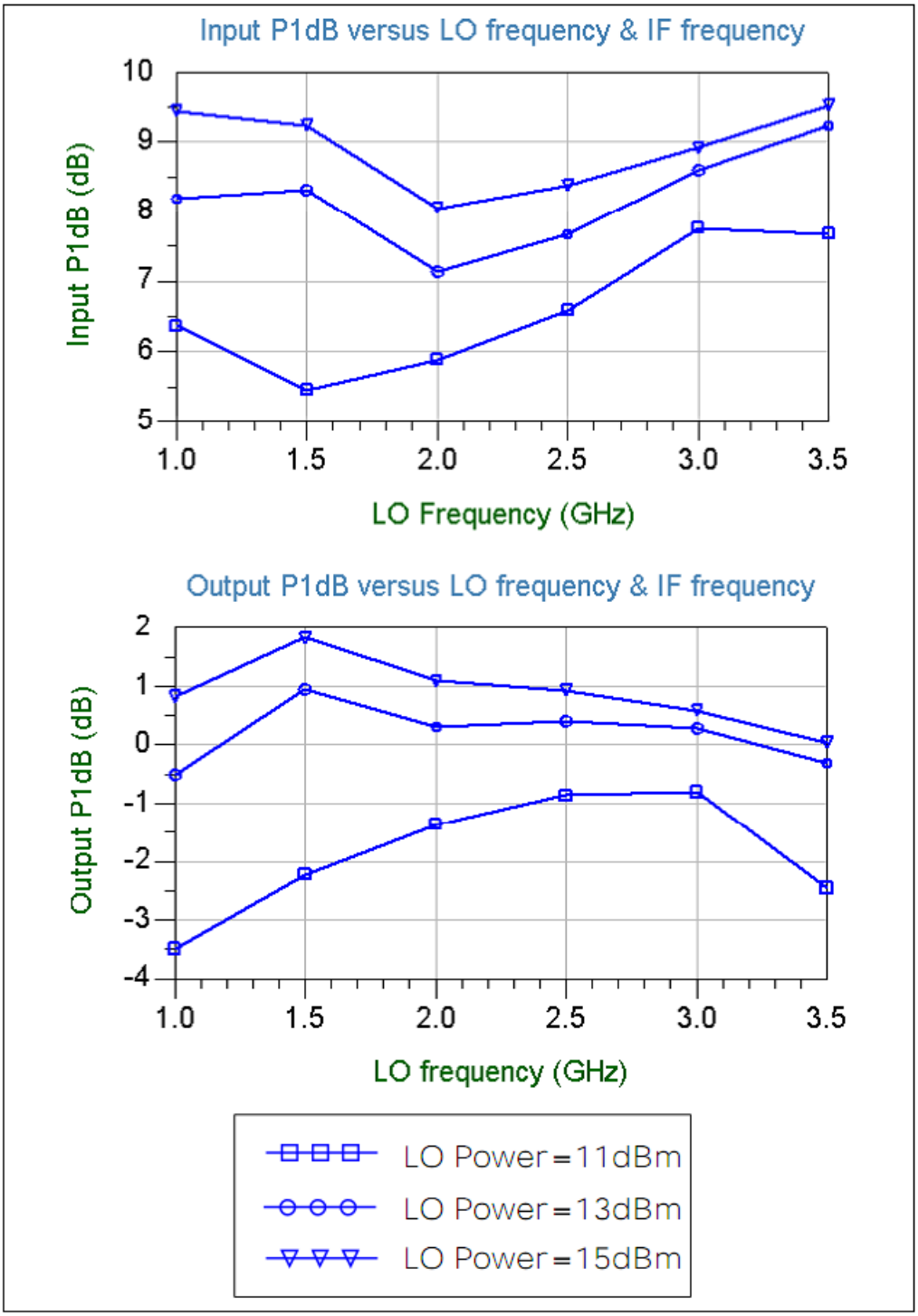
F_{IF}=0.1 GHz
NH_{RF}=4
NH_{LO}=8
F_{LO}=sweep
P_{LO}=param



ON WAFER MEASUREMENTS – INPUT & OUTPUT P1DB

2 – Up converter mode :

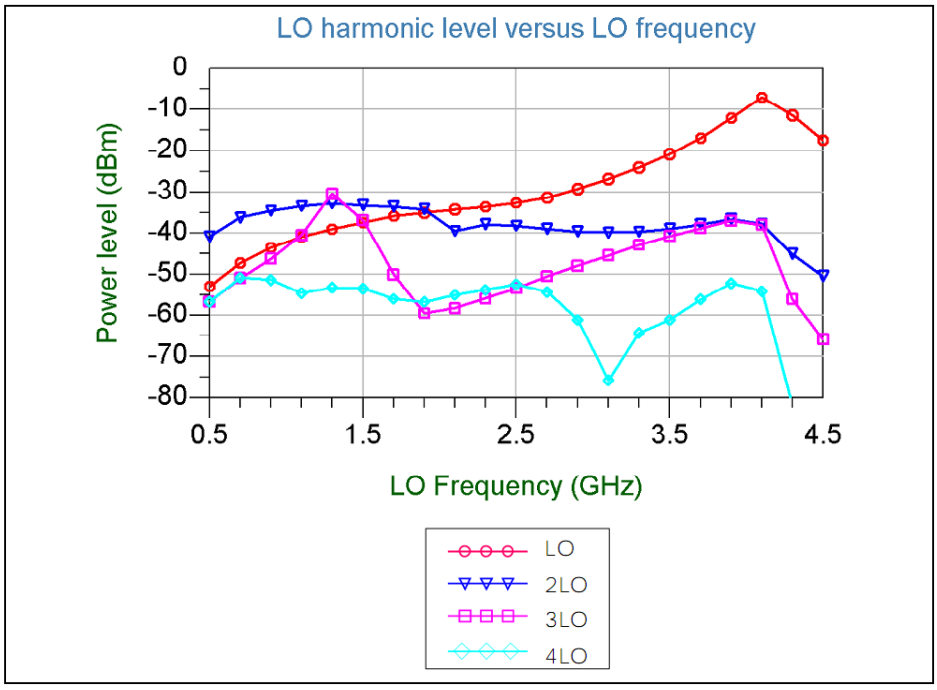
F_{IF}=0.1 GHz
NH_{IF}=4
NH_{LO}=8
F_{LO}=sweep
P_{LO}=param



ON WAFER MEASUREMENTS – LO HARMONICS

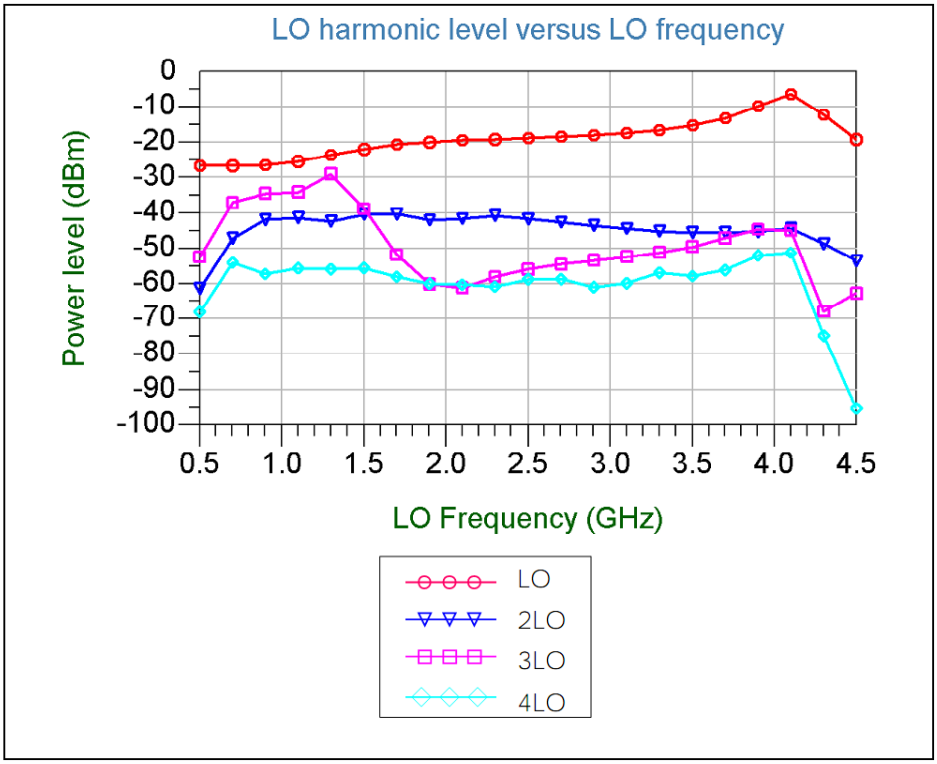
1 – Down converter mode :

P_{LO}= 13 dBm
P_{RF}= -10 dBm
F_{IF}=0.1 GHz
NH_{RF} =4
NH_{LO}=8
F_{LO}=sweep



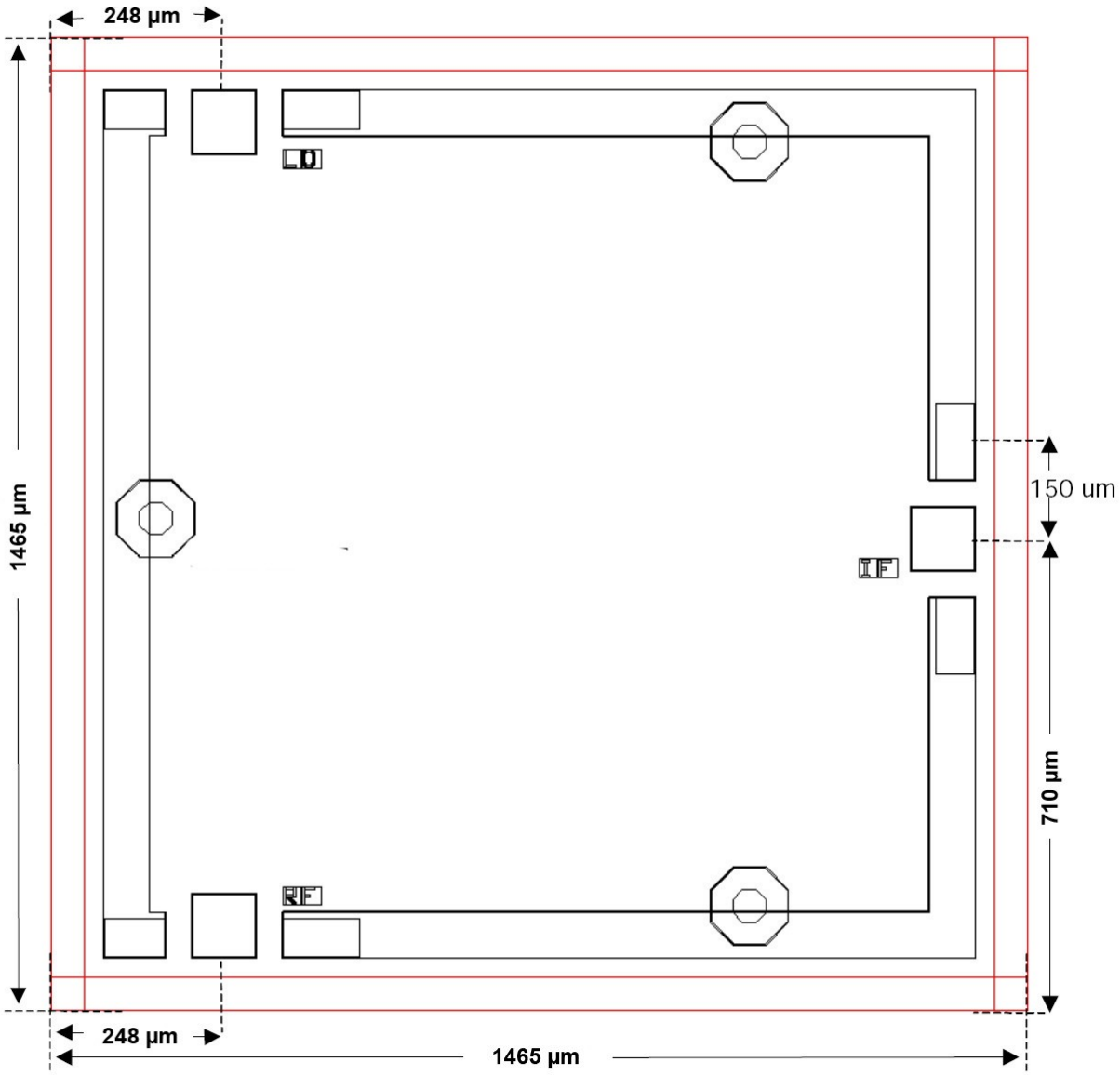
2 – Up converter mode :

P_{LO}= 13 dBm
P_{IF}= -10 dBm
F_{IF}=0.1 GHz
NH_{IF} =4
NH_{LO}=8
F_{LO}=sweep



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



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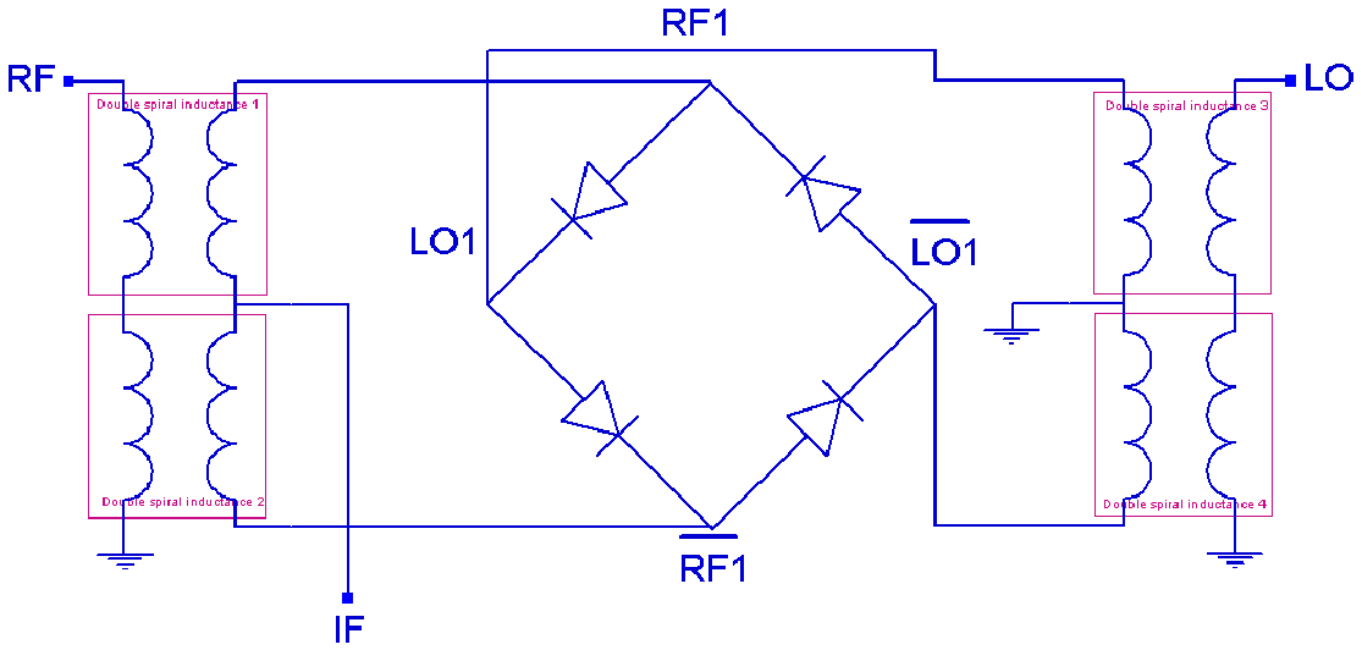
BLOCK DIAGRAM



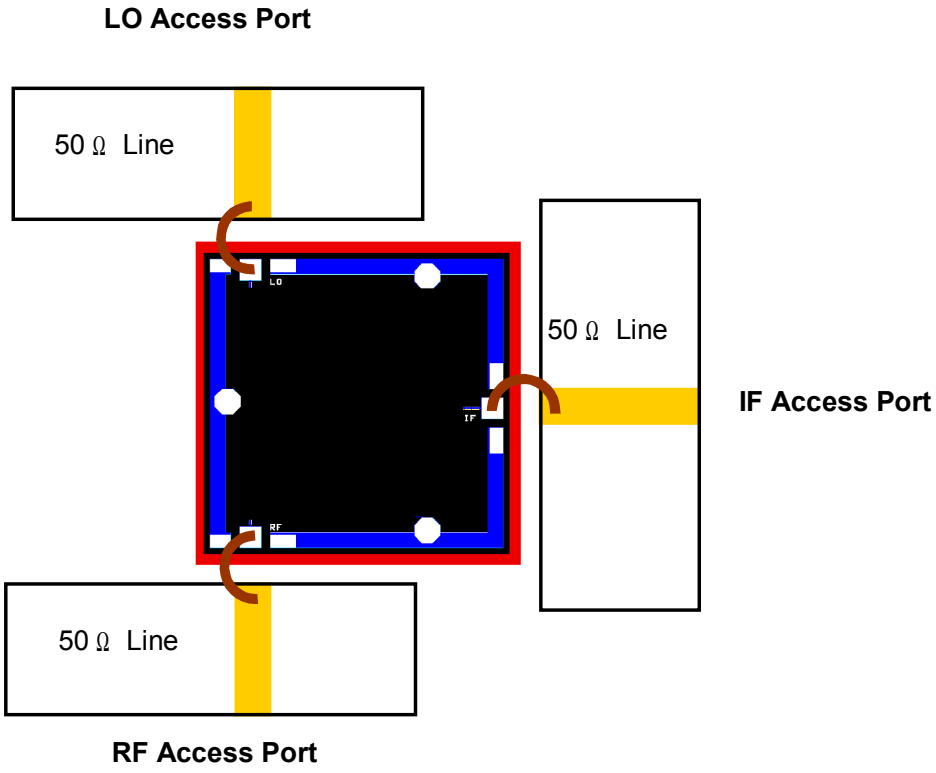
PAD POSITION

PAD NAME	SYMBOL	COORDINATES		DESCRIPTION
		X	Y	
LO	LO	248	1353	Local Oscillator Input
RF	RF	248	112	RF Input
IF	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 AND ASSEMBLY INFORMATION

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



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
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ORDERING INFORMATION

Generic type	Package type	Version	Sort type	Description
CGY2180	UH	C1	-	Double Balanced Quad Mixer MMIC
CGY2180	GS	C1	-	Hermetically Packaged Double Balanced Quad Mixer

RoHS Compliant

Document History : Version 1.0, Last Update 22/05/2012