

W band MMIC Image Cancellation Mixer Carrier

W-ICM-C-9296 Previously named TU-W1340310-Carrier
Image Cancellation MMIC Mixer, 92 - 96GHz on Carrier



Overview

W-ICM-C-9296 is a MMIC diode mixer with integrated quadrature coupler for single sideband (LO+IF / RF-LO) operation in both upconverter and downconverter modes, on a 20-mil thick gold-plated brass carrier. This carrier assembly provides a known good die attach to assist in customer handling of the die, and thermal management. The mixer carrier assembly includes 100pF DC decoupling capacitors, 17 μ m gold DC gold wire wedge bonds, and 50 μ m gold ribbon RF wedge bonds.

This MMIC contains the Arralis W-ICM-9296 Image Cancellation Mixer MMIC, which is fabricated using GaAs Schottky diode technology and is designed for output frequencies in the range from 92GHz to 96GHz using either fixed IF and varying LO (86GHz - 90GHz) or fixed LO and varying IF (2GHz – 6GHz) signals. The circuit typically supplies flat conversion loss at moderate levels of LO power and low dc consumption. All bond pads and the die underside are gold plated.

The MMIC die is compatible with precision die attach methods, as well as thermo-compression and thermosonic wire bonding, making it ideal for MCM and hybrid microcircuit applications. All data shown herein is measured with the chip in a 50Ohm environment and contacted with RF probes, with results calibrated to the probe tips.

Features

- 92 – 96GHz.
- 15 dB conversion loss.
- 13dBm LO drive.
- >20dB RF/ LO isolation.
- 20dB image rejection.

Applications

- Narrow or wide bandwidth millimeter-wave imaging.
- High resolution radar.
- Sensing.
- P2P communications; short haul/high capacity/low interference links.

Measured Performance Data

Test Conditions:- IF = Fixed, 5.4GHz, 4dBm, LO = 86.6GHz – 90.6GHz, Bias=0.5V, 4mA

Parameter	Min.	Typ.	Max.	Units
Frequency	90		97	GHz
LO Frequency	86.6		90.6	GHz
LO Power	10	13		dBm
IF Frequency	2	5.4	6	GHz
Conversion Loss		15	18	dB
Image Rejection	18	22		dB
LO Leakage		23		dB
Vcx		0.5		V
Icx		2		mA

Notes

The tests indicated have all been performed with 100pF de-coupling capacitors on Vc.
All tests are carried out at 25°C.

Absolute Maximum Ratings

Parameter	Rating
VC Voltages	-10V to +2V dc
LO Power	25dBm
IF / RF Power	22dBm
Storage Temperature	-65°C to +150°C
Channel Temperature	+150°C
Operating Temperature	-40°C to +85°C



ESD (electrostatic discharge) sensitive device. Charged devices and circuit boards can discharge without detection. Although this product features proprietary protection circuitry, damage may occur on devices subjected to ESD. Proper ESD precautions should be taken to avoid performance degradation or loss of functionality.

Measured Performance Data

Test Conditions:- IF = Fixed, 5.4GHz, 4dBm, LO = 86.6GHz – 90.6GHz, Bias=0.5V, 4mA

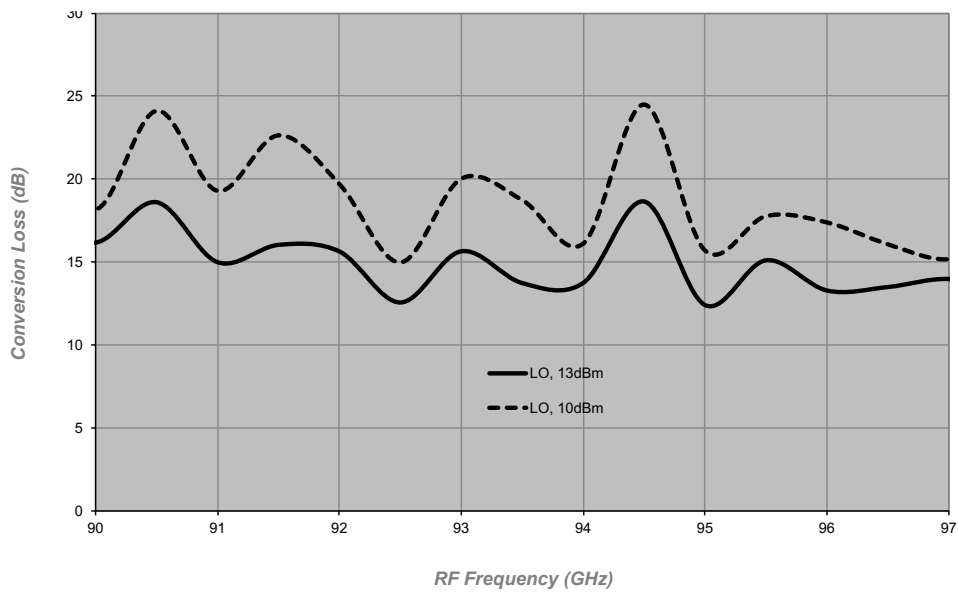


Figure 1
Conversion Loss

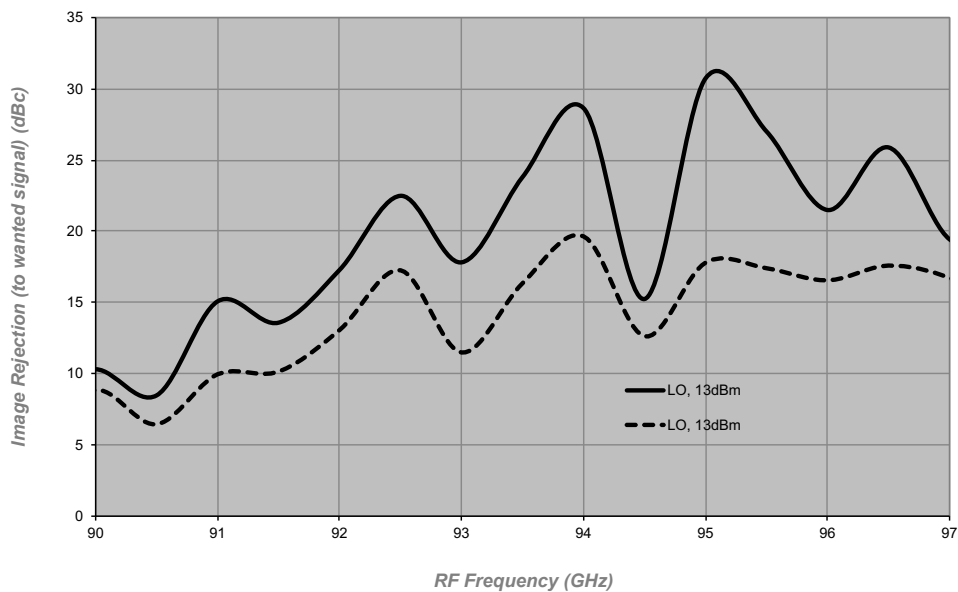


Figure 2
Image Rejection

Measured Performance Data

Test Conditions:- IF = Fixed, 5.4GHz, 4dBm, LO = 86.6GHz – 90.6GHz, Bias=0.5V, 4mA

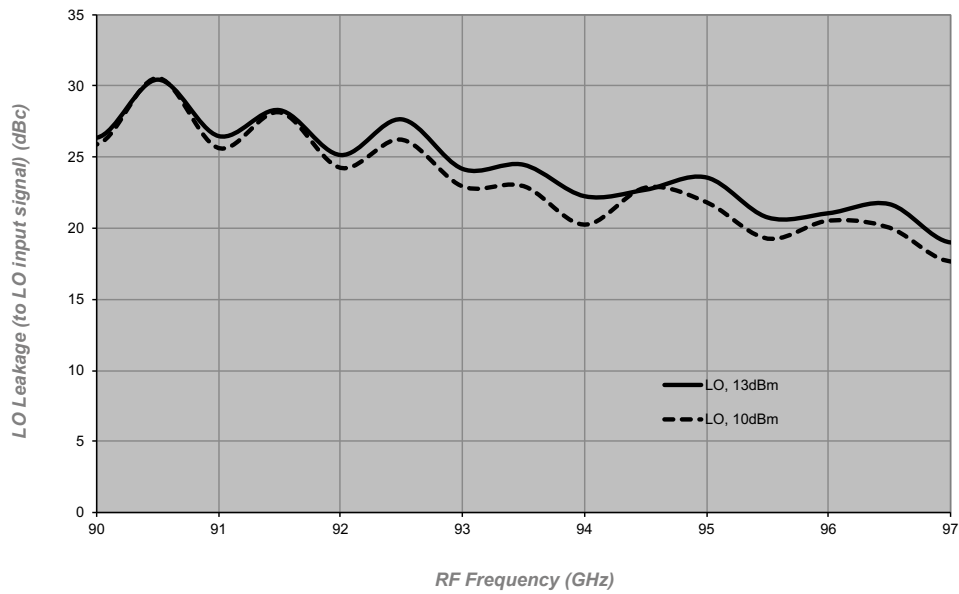


Figure 3
LO Leakage

Measured Performance Data

Test Conditions:- LO = Fixed, 88.6GHz, 13dBm, IF = 2GHz – 6GHz, 4dBm, Bias=0.5V, 4mA

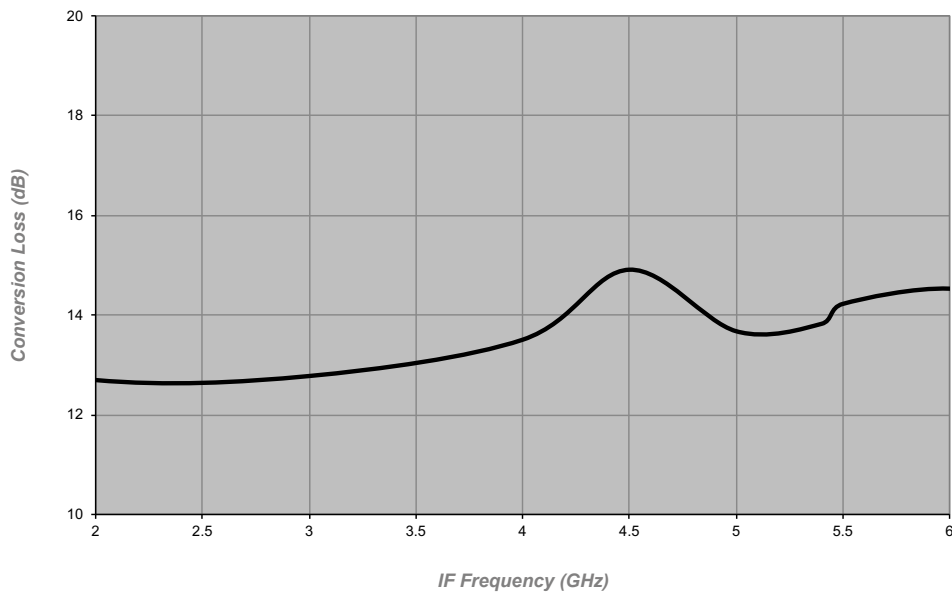


Figure 4
Conversion Loss

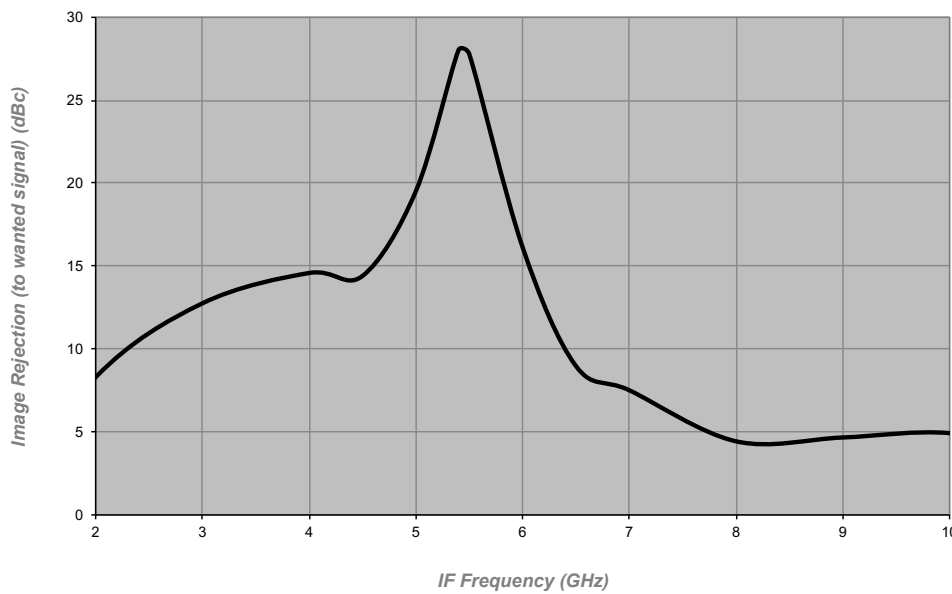


Figure 5
Image Rejection

Measured Performance Data

Test Conditions:- LO = Fixed, 88.6GHz, 13dBm, IF = 2GHz – 6GHz, 4dBm, Bias=0.5V, 4mA

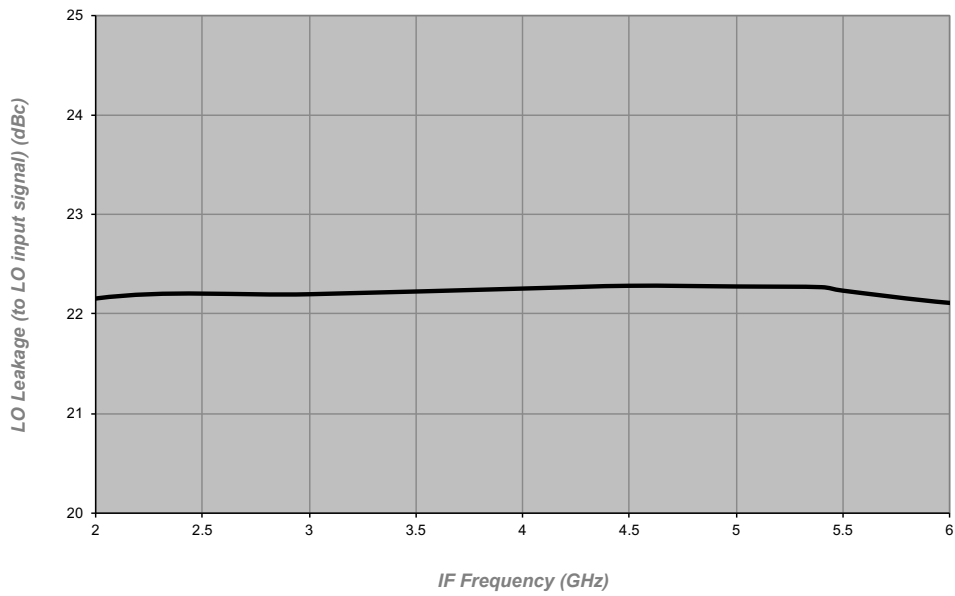
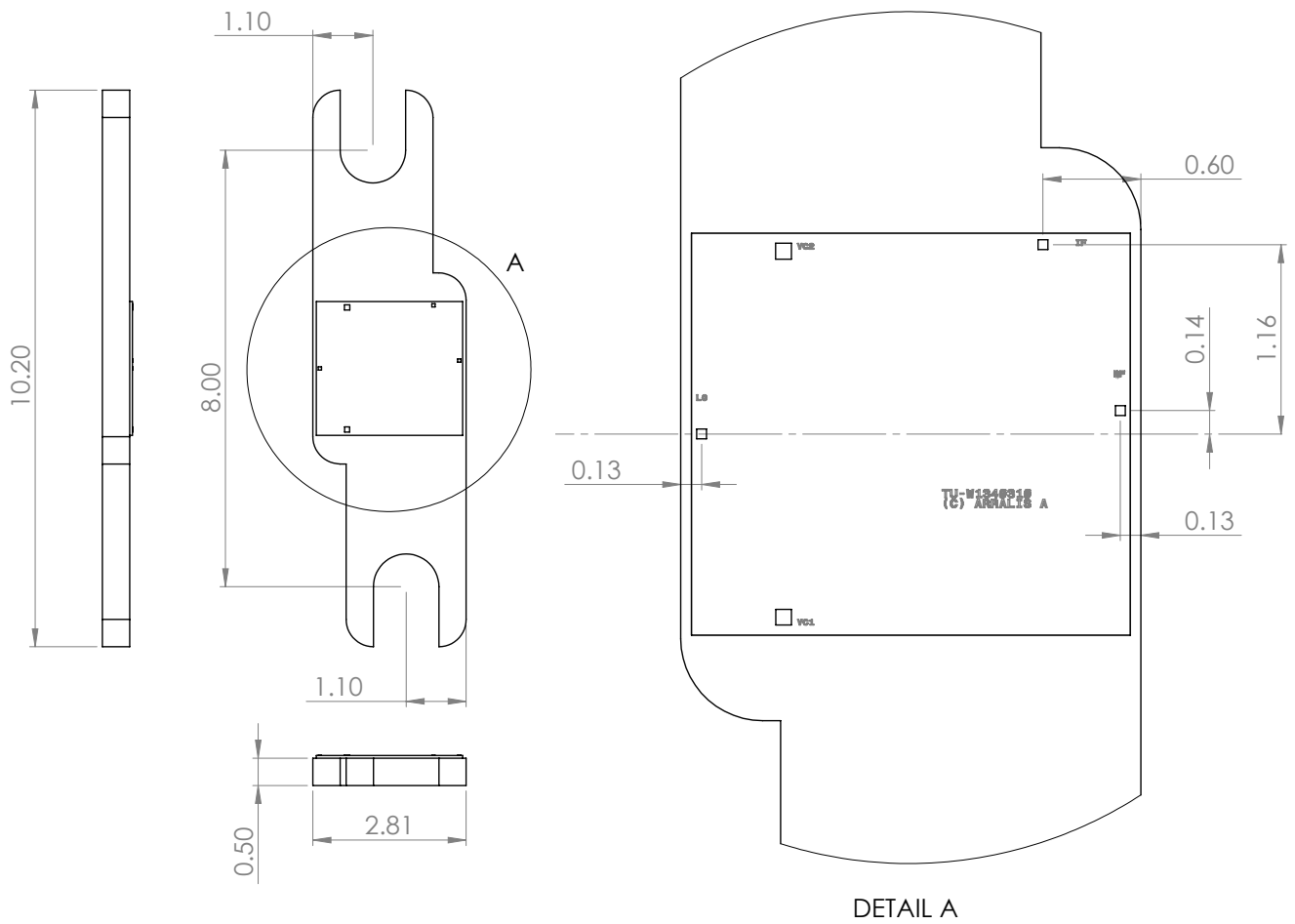


Figure 6
LO Leakage

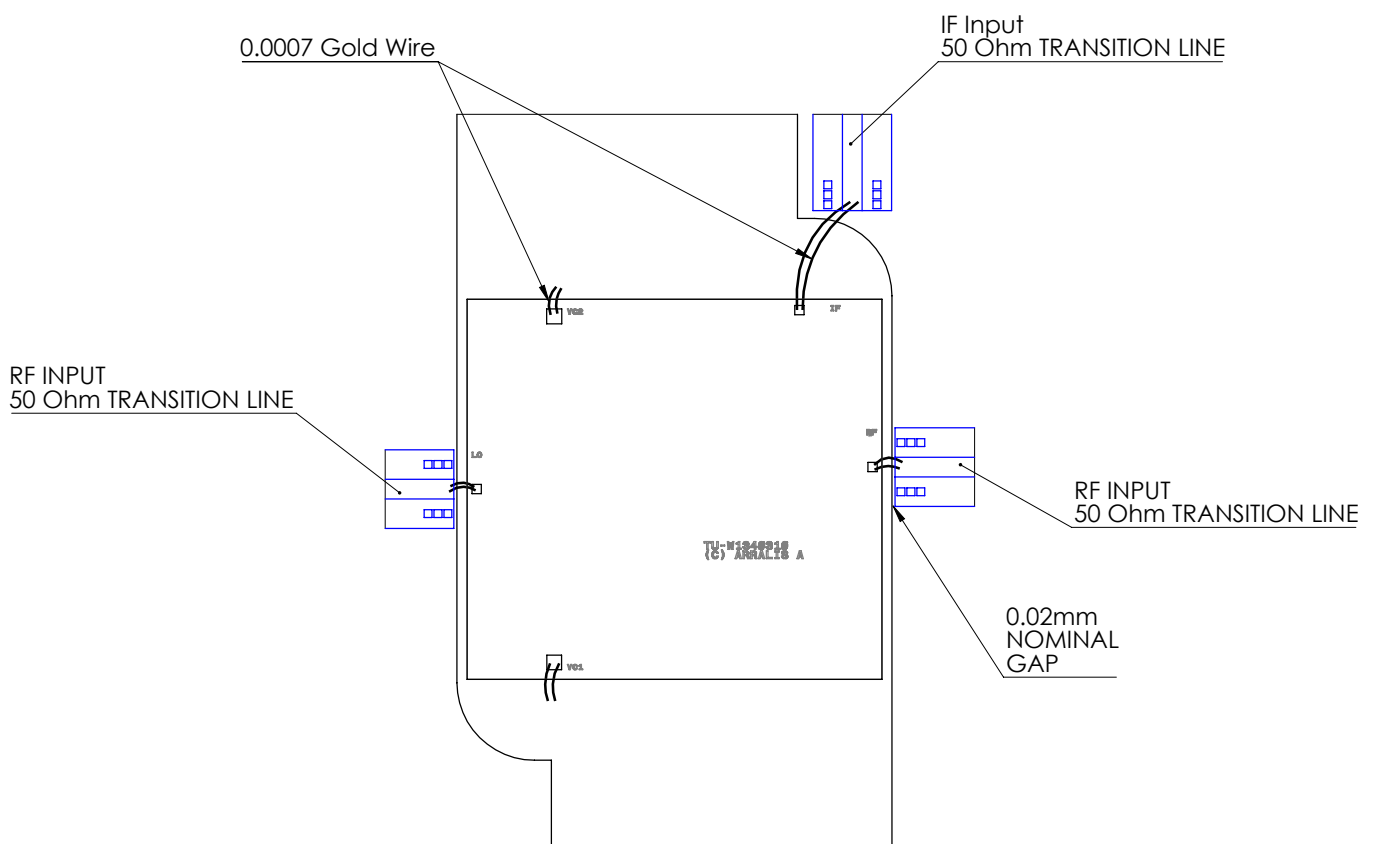
Outline Drawing

Mixer Carrier Assembly TU-W1340310-Carrier



Bonding Diagram

Mixer Carrier Assembly TU-W1340310-Carrier



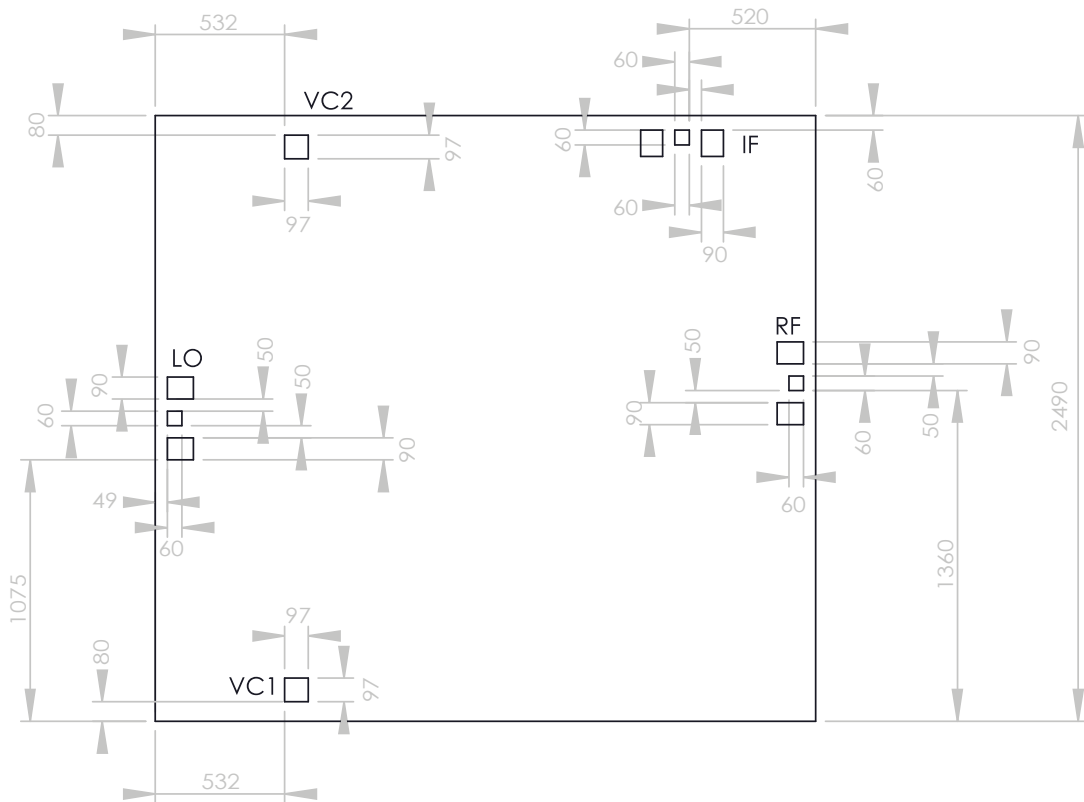
Notes:

- 1) 0.0007 99.99% Au wire
- 2) Bond to be of minimal length and loop (as allowed by the available wire-bonder)

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Outline Drawing

Mixer MMIC TU-W1340310



Pad Descriptions

Mixer MMIC TU-W1340310

Name	Description
LO	LO pad. This pad is AC coupled.
RF	RF pad. This pad is AC coupled.
IF	IF pad. This pad is AC coupled.
VC1	Diode bias pad 1.
VC2	Diode bias pad 2.
BOTTOM	The die backside must be connected to RF/DC ground.

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Arralis European Offices
t: +(44) 1793 239670 (UK)
e: sales@arralis.com

arralis.com

Arralis USA Office
+(1) 386 301 3249 (USA)
e: emilie.wren@arralis.com

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