

E band MMIC DDBM IQ Mixer

E-DBIQM-7681 Previously named CO-E1340303

GaAs Diode DDBM IQ MMIC Mixer, 76-81 GHz

Overview

E-DBIQM-7681 is a double double balanced I/Q MMIC ring mixer designed for operation in either upconverter or downconverter modes for increased LO-IF and RF-IF isolation. This MMIC is fabricated using GaAs Schottky diode technology and is designed for output frequencies in the range from 76GHz to 81GHz using a fixed LO (76GHz) and varying IF (DC–5GHz). The circuit typically supplies flat conversion loss at moderate levels of LO power.

The underside of the die is gold plated. The MMIC 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 50 Ohm environment and contacted with RF probes, with results calibrated to the probe tips.

Features

- 76 - 81GHz RF.
- DC - 5GHz IF.
- 9dB conversion loss.
- 12dBm LO drive.

Applications

- Millimeter-wave imaging.
- High resolution radar.
- Sensing.
- P2P communications; short haul/ high capacity/low interference links.
- Medical.
- Automotive radar.

	E band Datasheet	E-DBIQM-7681	Issue date: 30 April 2021	DOC REV 4	Page 1 of 7
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Specification Overview

Single channel reference

Parameter	Min.	Typ.	Max.	Units
Frequency	76		81	GHz
LO Frequency		76		GHz
LO Power	10	12		dBm
LO-RF Isolation		30		dBc
LO-IF Isolation		20		dBc
IF Frequency	0		5	GHz
Conversion Loss	7	9	10	dB

Notes

All tests are carried out at 25°C.

Absolute Maximum Ratings

Parameter	Rating
LO Power	25 dBm
IF / RF Power	22 dBm
Storage Temperature	-65°C to +175°C
Channel Temperature	+175°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

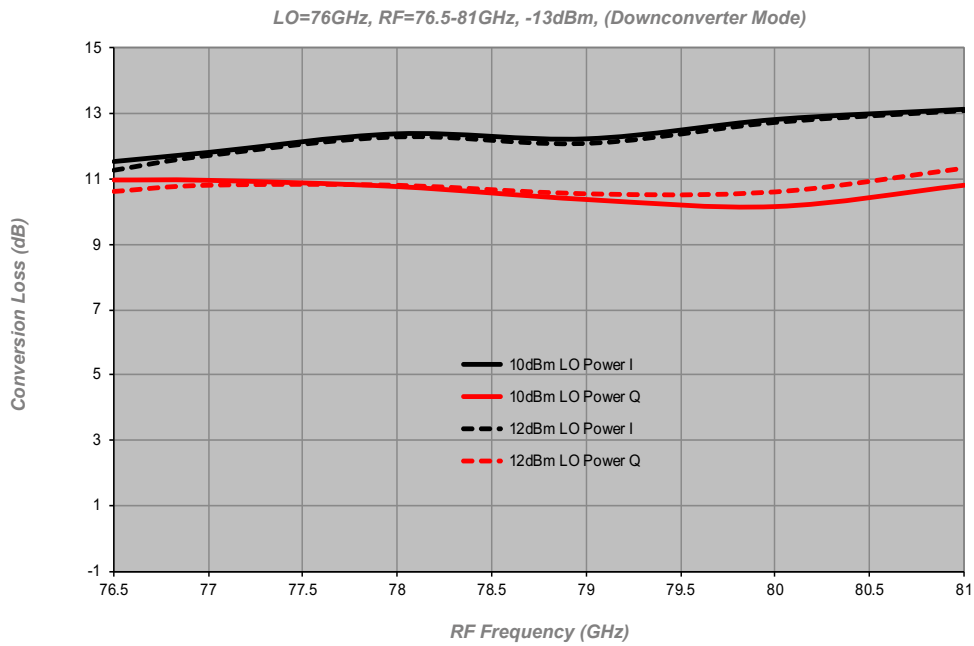


Figure 1
Conversion Loss

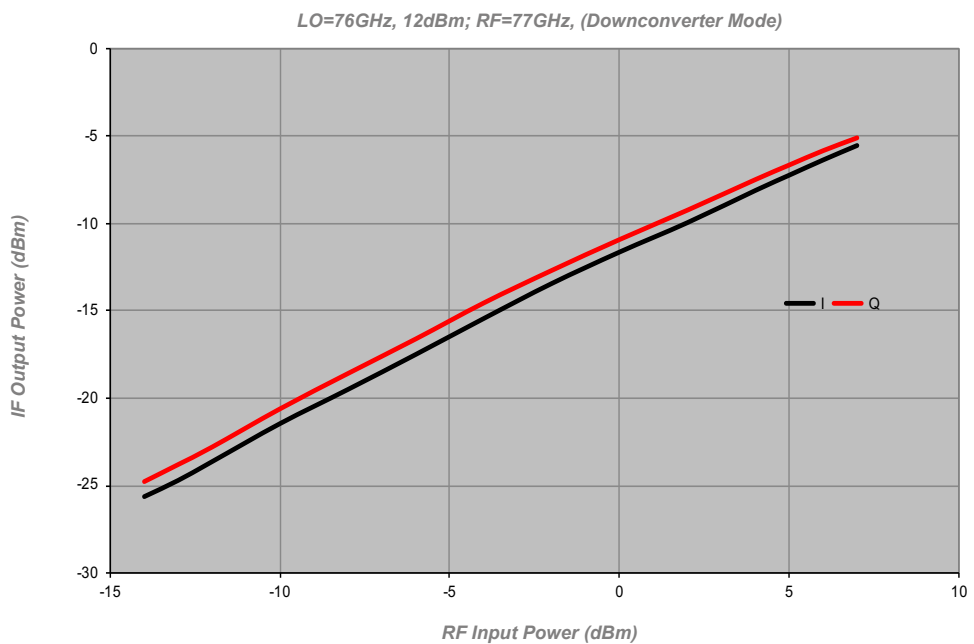
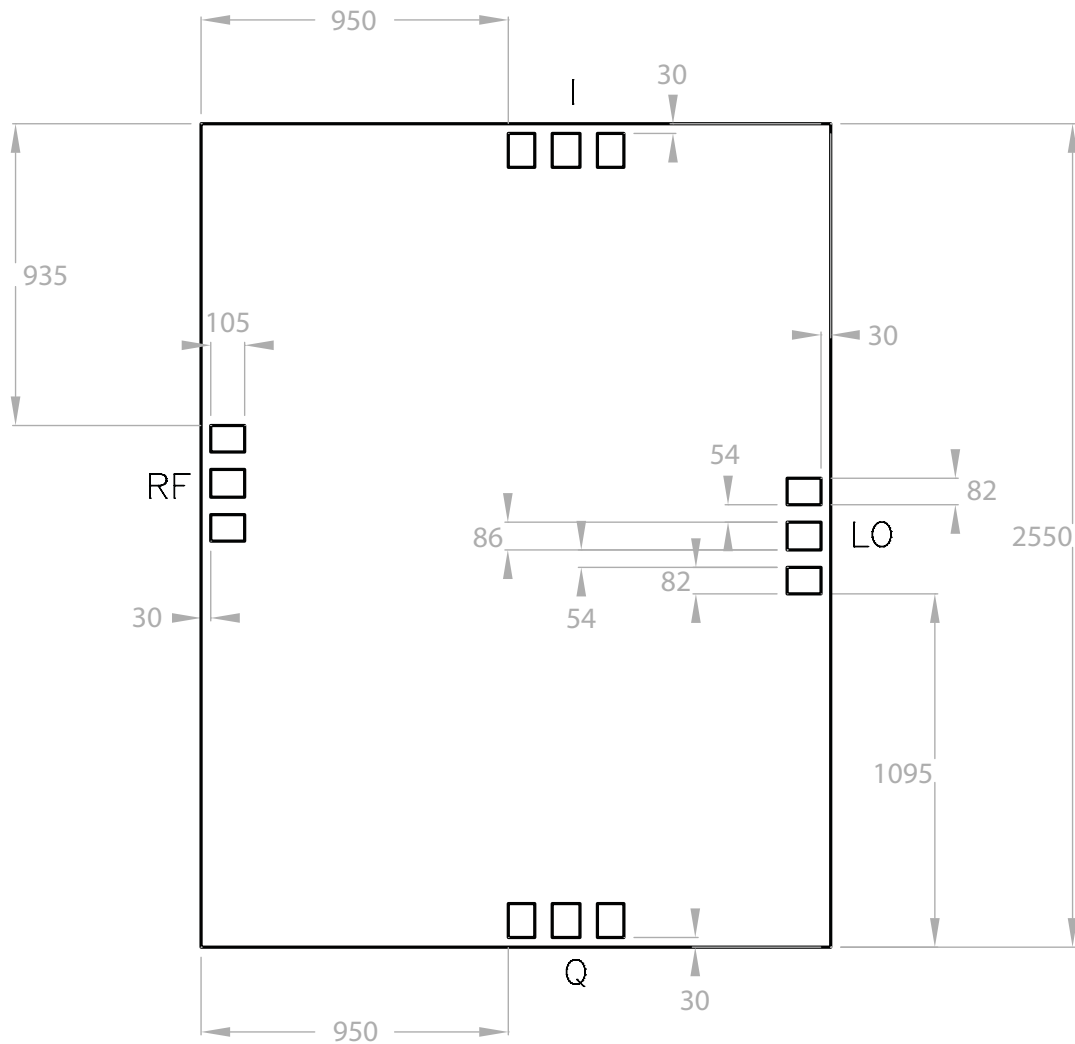


Figure 2
Pin v Pout

Outline Drawing

Die Packing Information
All die are delivered using gel-paks unless otherwise requested.



Notes

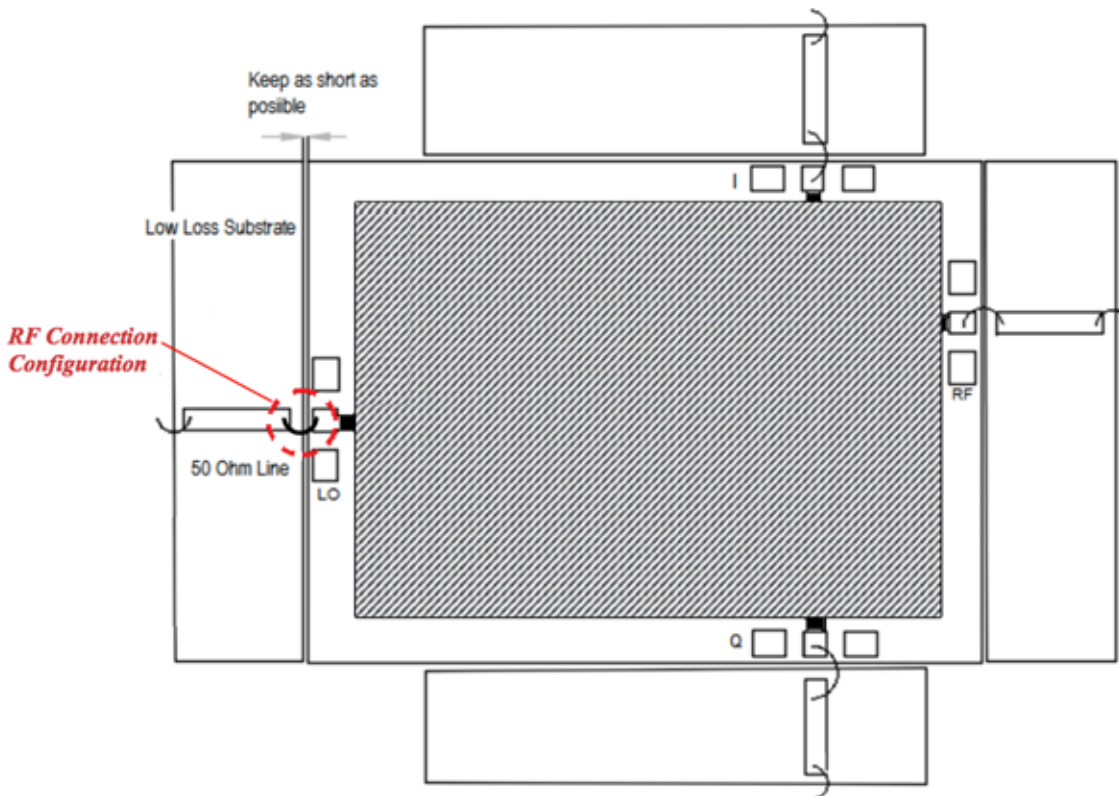
1. All dimensions are in μm.
2. RF bond pads are 105 x 86μm.
3. Gold backside metalisation.
4. Backside metal is ground.
5. Die thickness is 100μm

Pad Descriptions

Name	Description
LO	LO pad. This pad is ac coupled.
RF	RF pad. This pad is ac coupled.
I	I pad. This pad is ac coupled.
Q	Q pad. This pad is ac coupled.
BOTTOM	The die backside must be connected to RF/dc ground.

Connection Configurations

(Not actual die – these rules are applied to all MMICs unless otherwise stated)



General Notes on Assembly

Die should be mounted on conductive material such as gold-plated metal to provide a good ground and suitable heat sink, if necessary.

1. Attaching the die using Au/Sn preforms is preferable. The Eutectic melt for Au/Sn occurs at approximately 280°C so the die (plus mount and preform) is initially heated up to 180°C and then it is heated for approximately 10 seconds to 280°C using a nitrogen heat gun. The device will survive 10 seconds at this temperature. The static breakdown for GaAs devices is approximately 330°C.
2. Pure, dry nitrogen should be used as the heat source.
3. If the devices cannot be lifted/ placed by a vacuum device, then ESD die-lifting tweezers are preferable.
4. Supply lines should be decoupled with 100pF capacitors. Larger planar capacitors could be used if available.
5. Aluminium wire must not be used.

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	E band Datasheet	E-DBIQM-7681	Issue date: 30 April 2021	DOC REV 4	Page 6 of 7
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	E band Datasheet	E-DBIQM-7681	Issue date: 30 April 2021	DOC REV 4	Page 7 of 7
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