HMC-MDB172

v02.0209

GaAs MMIC I/Q MIXER 19 - 33 GHz

Typical Applications

This HMC-MDB172 is ideal for:

- Point-to-Point Radios
- VSAT
- Military Radar, ECM & EW
- Test & Measurement Equipment
- SATCOM

Features

Wide IF Bandwidth: DC - 5 GHz

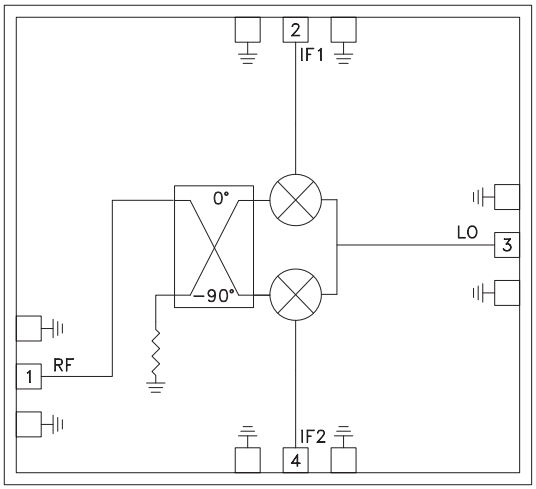
High Image Rejection: 25 dB

High LO to RF Isolation: 35 dB

Passive: No DC Bias Required

Die Size: 2.2 x 2.0 x 0.1 mm

Functional Diagram



General Description

The HMC-MDB172 is a monolithic I/Q Mixer which can be used as either an image reject mixer (IRM) or a single sideband upconverter. This passive MMIC is fabricated with GaAs Heterojunction Bipolar Transistor (HBT) Shottky diode technology. For downconversion applications, an external quadrature hybrid can be used to select the desired sideband while rejecting image signals. All bond pads and the die backside are Ti/Au metallized and the Shottky devices are fully passivated for reliable operation. The HMC-MDB172 I/Q MMIC Mixer is compatible with conventional die attach methods, as well as thermocompression 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.

Electrical Specifications,* T_A = 25 °C, IF = 3 GHz, LO = +16 dBm

Parameter	Min.	Typ.	Max.	Units
Frequency Range, RF & LO		19 - 33		GHz
Frequency Range, IF		DC - 5		GHz
Conversion Loss with External Hybrid		8	11	dB
Image Rejection	20	25		dB
1 dB Compression (Input)		8		dBm
LO to RF Isolation	30	35		dB
LO to IF Isolation	18	23		dB
RF to IF Isolation	19	25		dB
IP3 (Input)		17		dBm

*Unless otherwise indicated, all measurements are from probed die

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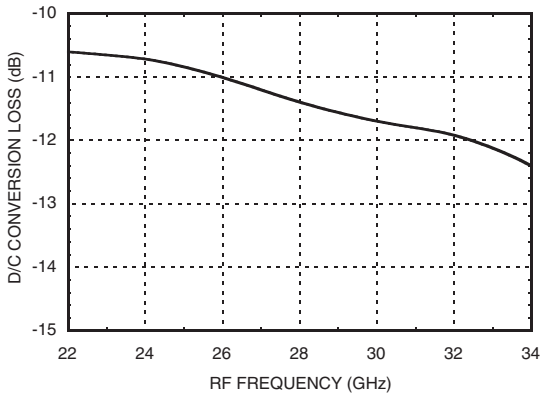
Downconverter Conversion Loss



Note 1: Single side band measurement without 90º hybrid, and second IF port terminated.

RF = 20 - 34 GHz
LO = 17 - 31 GHz
IF = 3 GHz
PLO = +16 dBm
PRF = -20 dBm

Absolute Maximum Ratings

Storage Temperature	-65 °C to 150 °C
Operating Temperature	-55 °C to 85 °C

ELECTROSTATIC SENSITIVE DEVICE
OBSERVE HANDLING PRECAUTIONS

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ANALOG DEVICES

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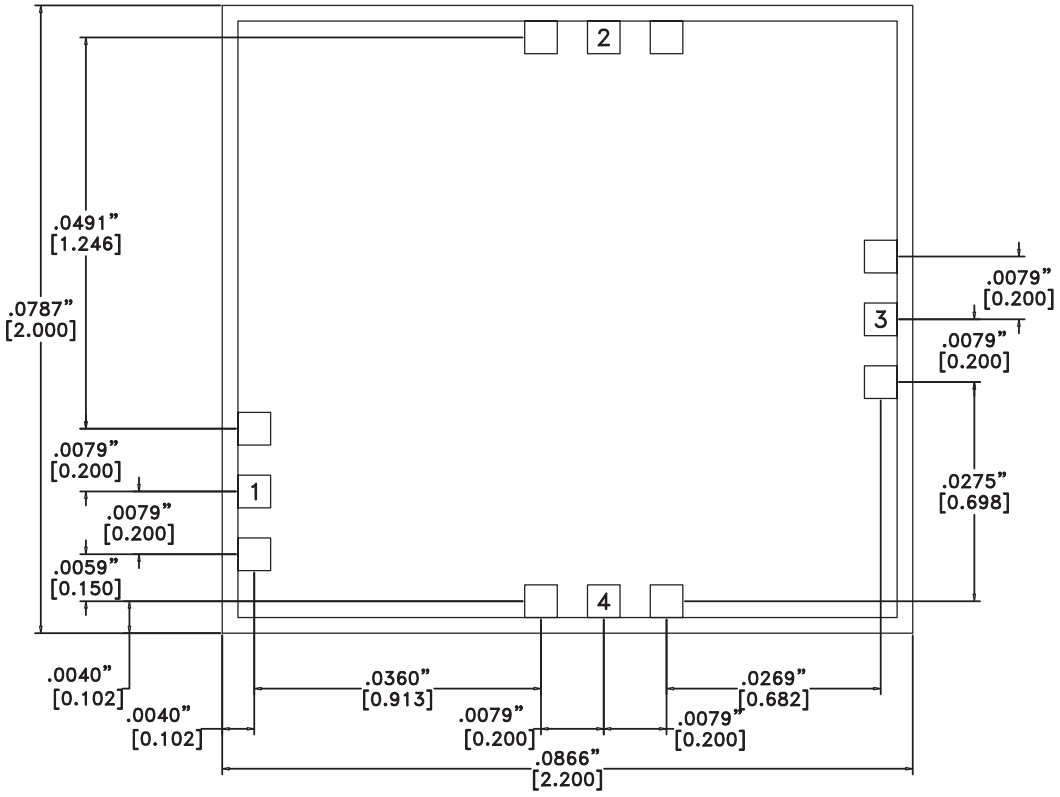
Outline Drawing



Die Packaging Information [1]

Standard	Alternate
GP-1 (Gel Pack)	[2]

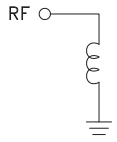
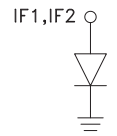
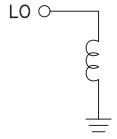
[1] Refer to the "Packaging Information" section for die packaging dimensions.

[2] For alternate packaging information contact Hittite Microwave Corporation.

NOTES:

1. ALL DIMENSIONS ARE IN INCHES [MM].
2. TYPICAL BOND PAD IS .004" SQUARE.
3. BACKSIDE METALLIZATION: GOLD.
4. BACKSIDE METAL IS GROUND.
5. BOND PAD METALLIZATION: GOLD.
6. CONNECTION NOT REQUIRED FOR UNLABELED BOND PADS.
7. OVERALL DIE SIZE ±.002"

Pad Descriptions

Pad Number	Function	Pin Description	Interface Schematic
1	RF	This pad is DC coupled and matched to 50 Ohms.	
2, 4	IF1, IF2	This pad is DC coupled.	
3	LO	This pad is DC coupled and matched to 50 Ohms.	

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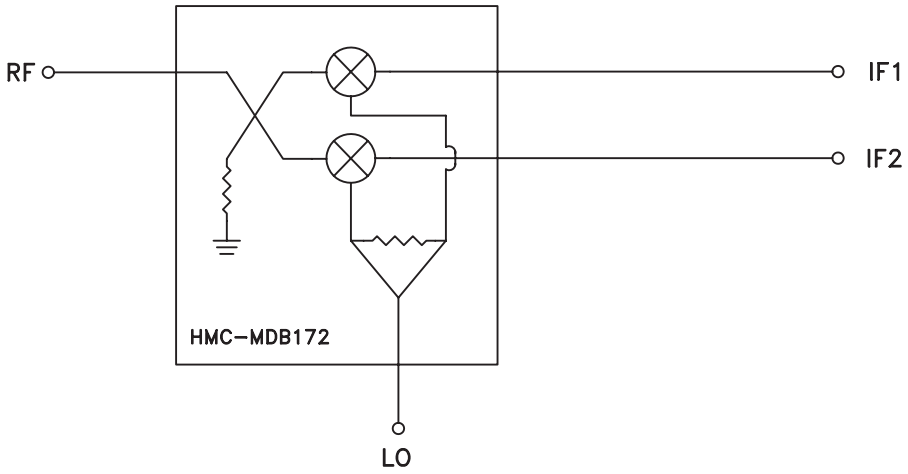
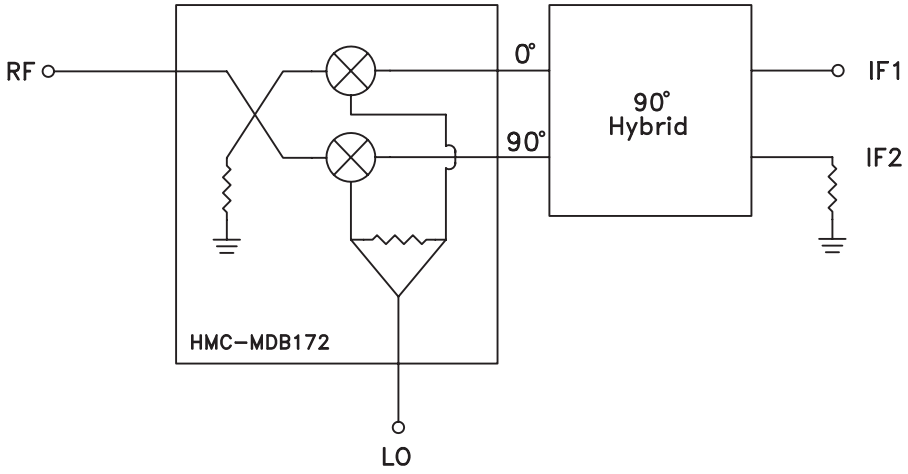
Application Circuits

Application circuit 1 shows the mixer equivalent circuit. Application Circuit 2 depicts the mixer with a 90° hybrid used to achieve signal image rejection. All RF parameters are specified with an ideal 90° hybrid on IF output ports. Conversion loss is measured (on wafer) at IF1 and/or IF2 (Application Circuit 1) with the second IF port terminated into 50 ohms. Three dB is then added to compensate for an ideal hybrid. The IP3 is stated as an input IP3 number and is obtained via a two-tone measurement.

Application Circuit 1



Application Circuit 2



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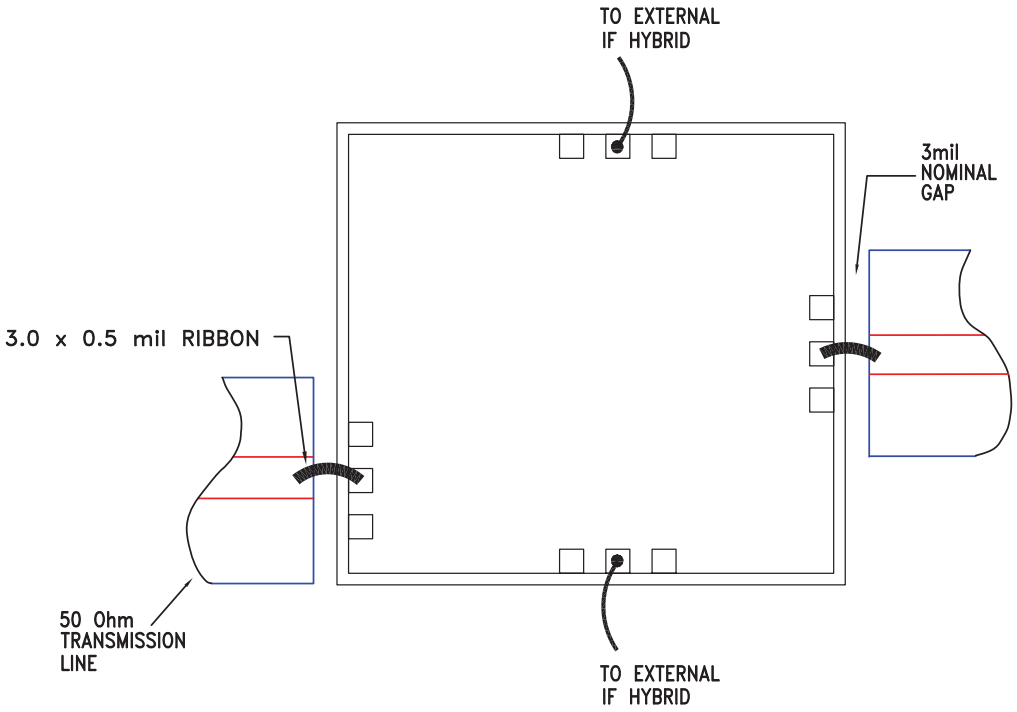
Assembly Diagram



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