HMC-MDB218

GaAs MMIC SUB-HARMONIC IRM MIXER, 54 - 64 GHz

Typical Applications

This HMC-MDB218 is ideal for:

- Short-Haul / High Capacity Radios
- SATCOM
- Military Radar, ECM & EW
- Sensors
- Test & Measurement Equipment

Features

Wide IF Bandwidth: DC - 3 GHz

RF Frequency: 54 to 64 GHz

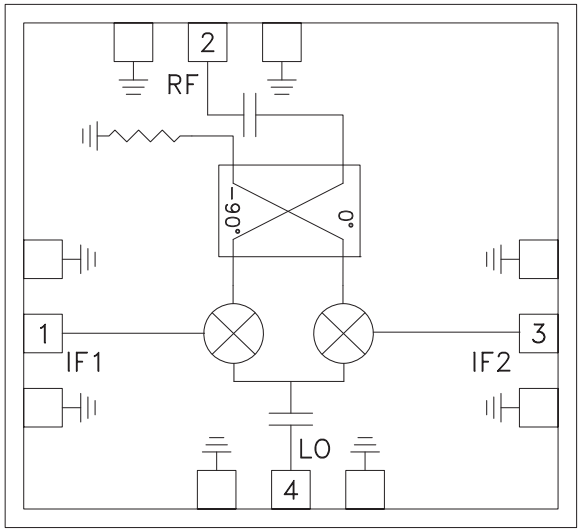
LO Frequency: 27 to 32 GHz

High Image Rejection: 30 dB

Passive; No DC Bias Required

Die Size: 1.54 x 1.41 x 0.1 mm

Functional Diagram



General Description

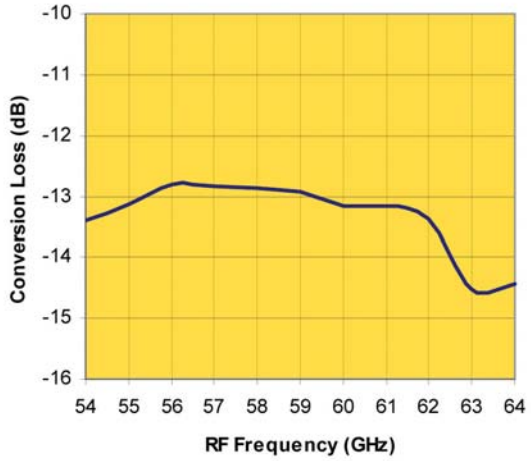
The HMC-MDB218 is a sub-harmonically pumped (x2) MMIC Mixer which can be used as either an image reject mixer (IRM) or a single sideband upconverter. This passive MMIC mixer is fabricated with GaAs Heterojunction Bipolar Transistor (HBT) Shottky diode technology. For downconversion applications, an external 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-MDB218 Sub Harmonic IRM 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 = 1 GHz, LO = +10 dBm

Parameter	Min.	Typ.	Max.	Units
Frequency Range, RF		54 - 64		GHz
Frequency Range, LO		27 - 32		GHz
Frequency Range, IF		DC - 3		GHz
Conversion Loss		12.5	14	dB
1 dB Compression (Input)		-2		dBm
Image Rejection		30		dB
LO to RF Isolation		30		dB
LO to IF Isolation		30		dB
IP3 (Input)		7		dBm
Amplitude Balance		0.3		dB
Phase Balance		1		Deg

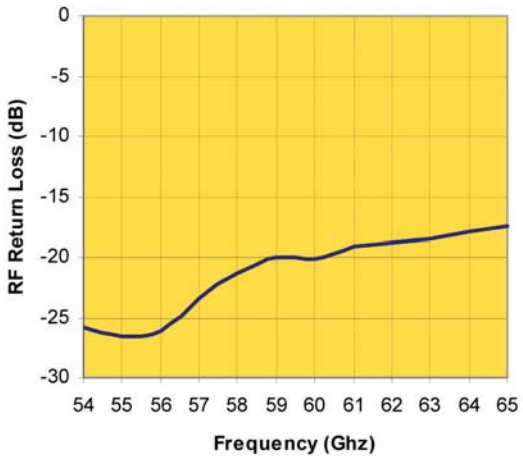
* Unless otherwise indicated, all measurements are from probed die

Downconverter Conversion Loss [1]

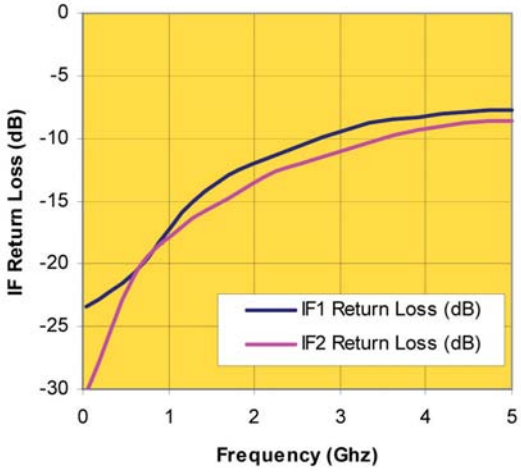


[1] LO = 27 - 30 GHz
IF = 1 GHz
PLO = +10 dBm
PRF = -20 dBm

RF Port Return Loss [2]



IF Port Return Loss [2]



[2] LO = 29.5 GHz, PLO = 10 dBm

Note 1: Measured Performance Characteristics (T_{OP} = 25°C)

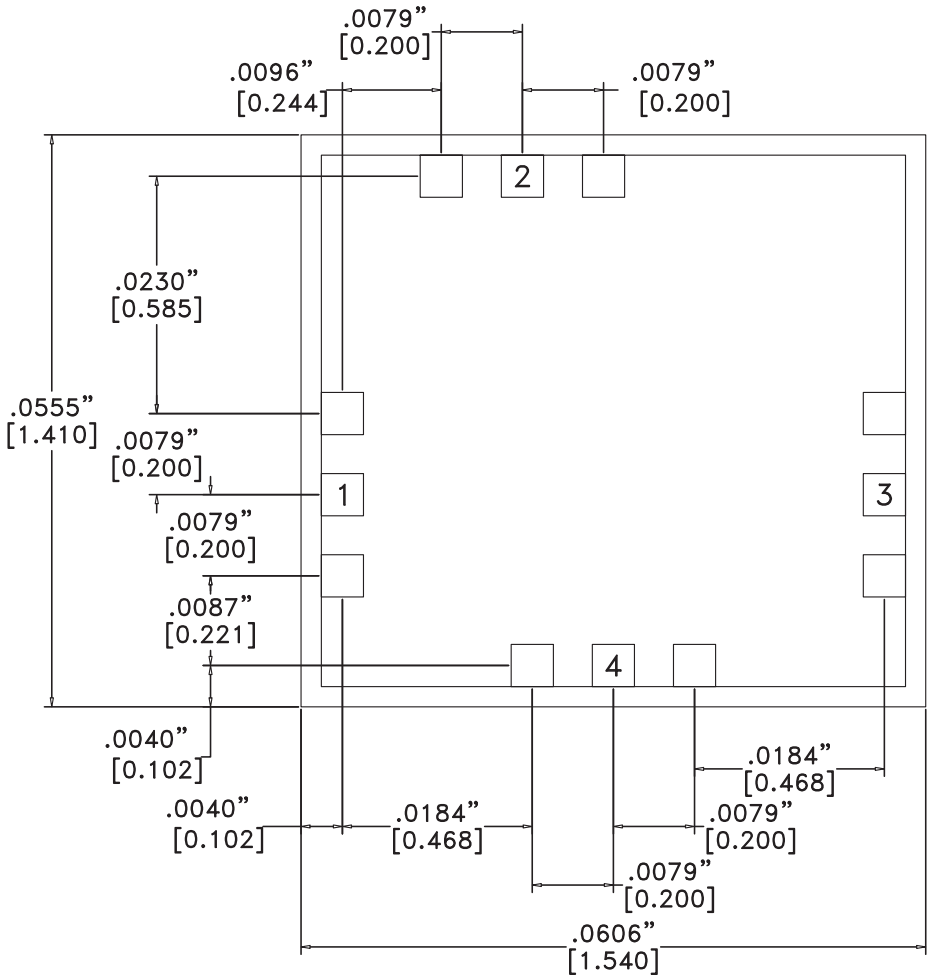
Note 2: Single side band measurement without 90º hybrid, and second IF port terminated.

Absolute Maximum Ratings

LO Drive	16 dBm
Storage Temperature	-65 °C to 150 °C
Operating Temperature	-55 °C to 85 °C

ELECTROSTATIC SENSITIVE DEVICE
OBSERVE HANDLING PRECAUTIONS

Outline Drawing



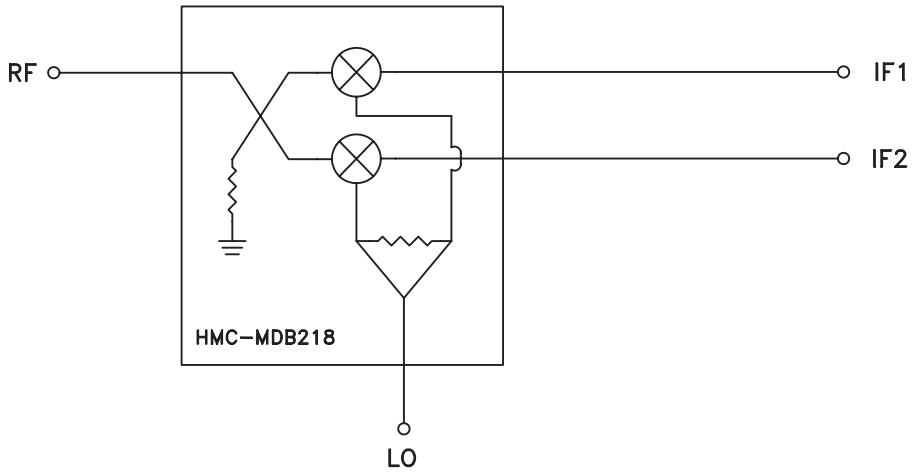
NOTES:

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"

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