GaAs MMIC FREQUENCY DOUBLER 1 - 2 GHz INPUT

FEBRUARY 2001

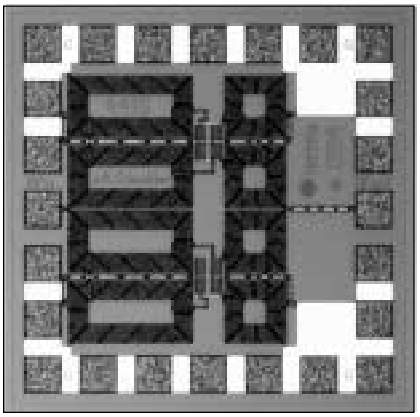
V01.0700

Features

CONVERSION LOSS: 17 dB

Fo, 3Fo, 4Fo ISOLATION: > 35 dB

INPUT DRIVE LEVEL :10 to 20 dBm



General Description

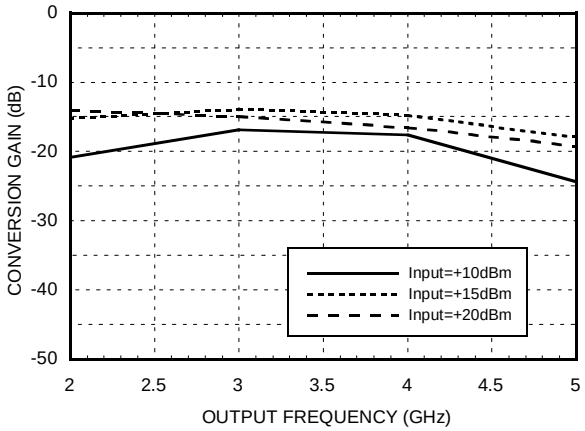
The HMC157 is a miniature frequency doubler in a MMIC die. Suppression of undesired fundamental and higher order harmonics is 35 to 60 dB with respect to input signal level and 18 to 43 dB with respect to the desired output signal level. The doubler uses the same diode/balun technology used in Hittite MMIC mixers, features small size and requires no DC bias.

Guaranteed Performance, *50 Ohm system -55 to +85 deg C*

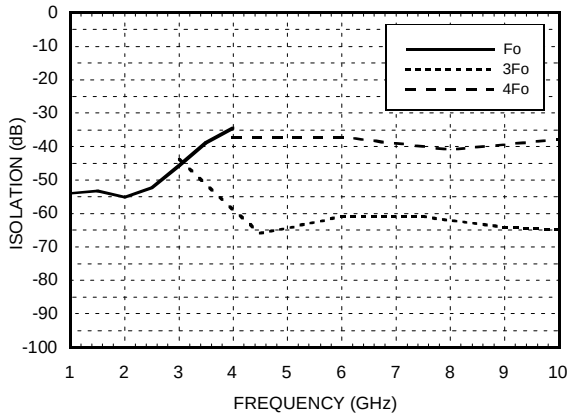
Typical Performance vs. Drive Level				
	10	15	20	dBm
Input Frequency Range	1.5 - 2.0	1.0 - 2.0	1.0 - 2.0	GHz
Output Frequency Range	3.0 - 4.0	2.0 - 4.0	2.0 - 4.0	GHz
Conversion Loss	<18	<16	<17	dB

Performance for Input Signals in the 1.0 - 2.0 GHz Band (+15dBm Drive)				
	Min.	Typ.	Max.	
Fo Isolation (with respect to input level)	35	50		dB
3Fo Isolation (with respect to input level)	40	50		dB
4Fo Isolation (with respect to input level)	30	35		dB

Conversion Loss vs. Drive Level

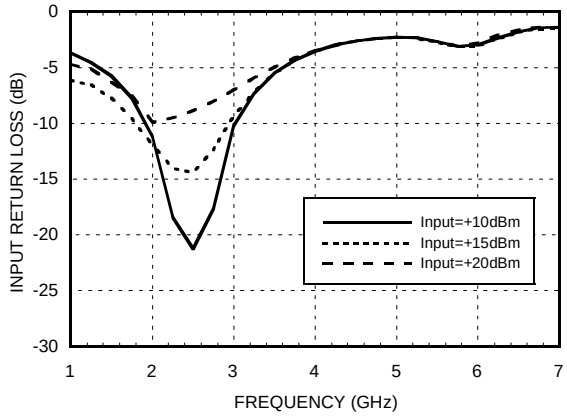


Isolation @ +15 dBm Drive Level *

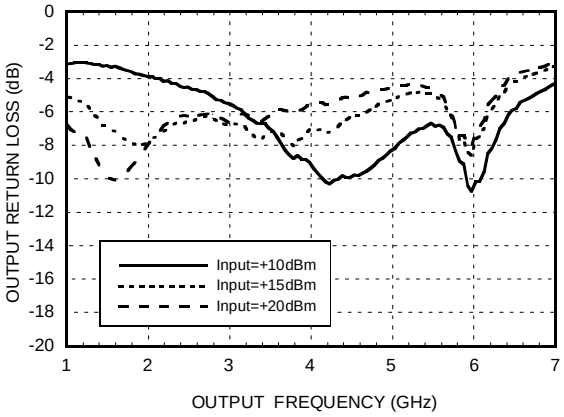


** With respect to input level*

Input Return Loss vs. Drive level



Output Return Loss vs. Drive Level



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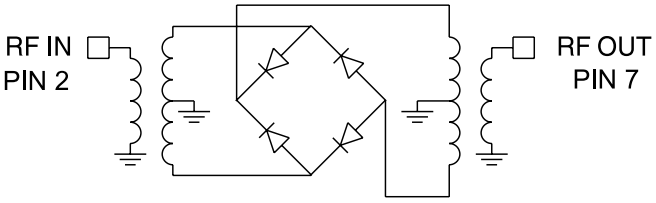
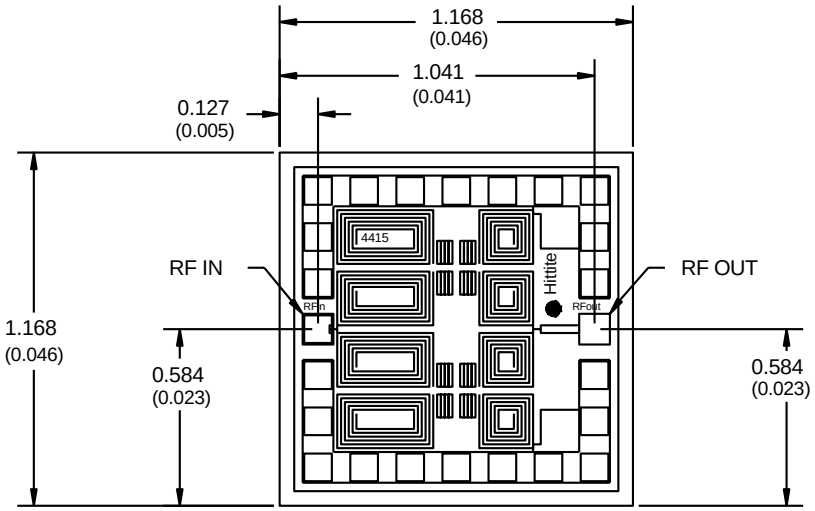
Schematic



Absolute Maximum Ratings

Input Drive	+27 dBm
Storage Temperature	-65 to +150 deg C
Operating Temperature	-55 to +125 deg C

Outline Drawing



THREE PADS ON EACH CORNER MUST BE BONDED TO GROUND (12 TOTAL).
ALL DIMENSIONS IN MILLIMETERS (INCHES)
ALL TOLERANCES ARE ±0.025 (0.001)
DIE THICKNESS IS 0.254 (0.010)
BOND PADS ARE 0.100 (0.004) SQUARE
EQUALLY SPACED AT 0.150 (0.006) CENTERS
BACKSIDE METALLIZATION: NONE
BOND PAD METALLIZATION: GOLD

Handling Precautions

Follow these precautions to avoid permanent damage.
Cleanliness: Handle the chips in a clean environment. DO NOT attempt to clean the chip using liquid cleaning systems.
Static Sensitivity: Follow ESD precautions to protect against ≥ ± 250V ESD strikes (*see page 8 - 2*).
Transients: Suppress instrument and bias supply transients while bias is applied. Use shielded signal and bias cables to minimize inductive pick-up.
General Handling: Handle the chip along the edges with a vacuum collet or with a sharp pair of bent tweezers. The surface of the chip has fragile air bridges and should not be touched with vacuum collet, tweezers, or fingers.

Mounting

The chip is not back-metallized and can be die mounted with electrically conductive epoxy. The mounting surface should be clean and flat.

Epoxy Die Attach:
Apply a minimum amount of epoxy to the mounting surface so that a thin epoxy fillet is observed around the perimeter of the chip once it is placed into position.
Cure epoxy per the manufacturer's schedule.

Wire Bonding

Ball or wedge bond with 1.0 diameter pure gold wire. Thermosonic wirebonding with a nominal stage temperature of 150 deg. C and a ball bonding force of 40 to 50 grams or wedge bonding force of 18 to 22 grams is recommended. Use the minimum level of ultrasonic energy to achieve reliable wirebonds. Wirebonds should be started on the chip and terminated on the package. RF bonds should be as short as possible.