

GaAs MMIC DOUBLE-BALANCED MIXER 6 - 18 GHz

FEBRUARY 2001

Features

INPUT IP3: +21dBm

LO / RF ISOLATION : 25 TO 40 dB

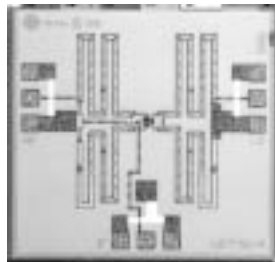
DC TO 6 GHz IF BANDWIDTH

SMALL SIZE: 1.48mm x 1.48mm

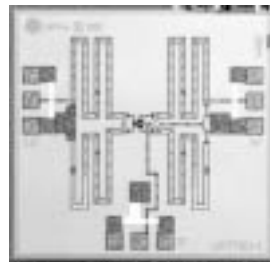
General Description

The HMC141 chip is a miniature double-balanced mixer which can be used as an upconverter or downconverter. The chip utilizes a standard 1 μ m GaAs MESFET process. The HMC142 is identical to the HMC141 except that the layout is a mirror image designed to ease integration into image-reject mixer modules. Broadband operation and excellent isolations are provided by on-chip baluns, which require no external components and no DC bias. The design is similar to the HMC143/144 mixers but without IF combiner, providing a broad DC to 6 GHz IF bandwidth. These devices are much smaller and more reliable replacements to hybrid diode mixers for VSAT and point-to-point radios.

HMC141



HMC142



Guaranteed Performance, LO Drive = +20 dBm, -55 to +85 deg C

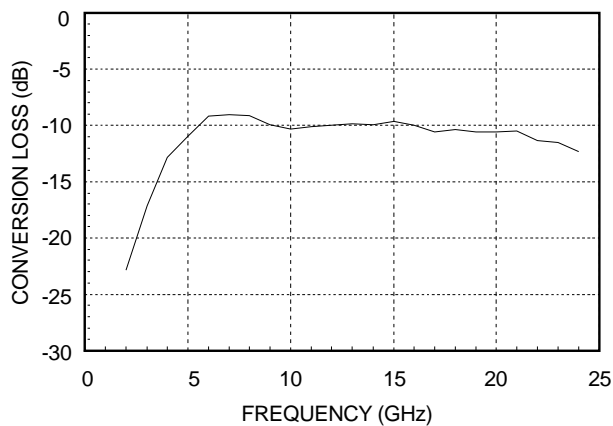
Parameter	Min.	Typ.	Max.	Units
Frequency Range, RF & LO		6 - 18		GHz
Frequency Range , IF		DC - 6		GHz
Conversion Loss		10	12	dB
Noise Figure (SSB)		10	12	dB
LO to RF Isolation	20	25		dB
LO to IF Isolation	20	25		dB
IP3 (Input) at 10, 13, and 16 GHz RF Freq.	16	21		dBm
IP2 (Input) at 10, 13, and 16 GHz RF Freq.	40	47		dBm
1dB Gain Compression (Input)	5	10		dBm
Local Oscillator Drive Level	13	15	23	dBm



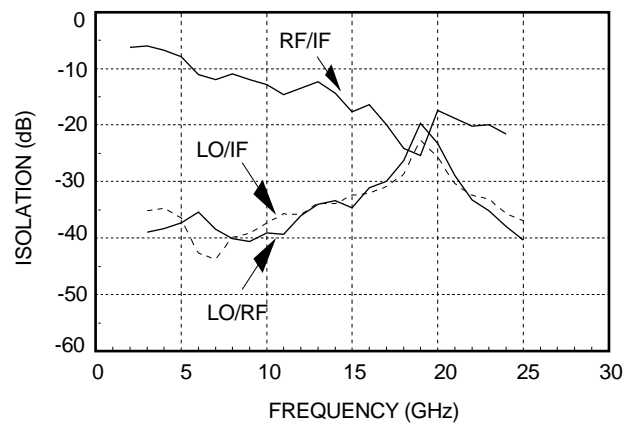
HMC141 / HMC142 DOUBLE-BALANCED MIXER 6 - 18 GHz

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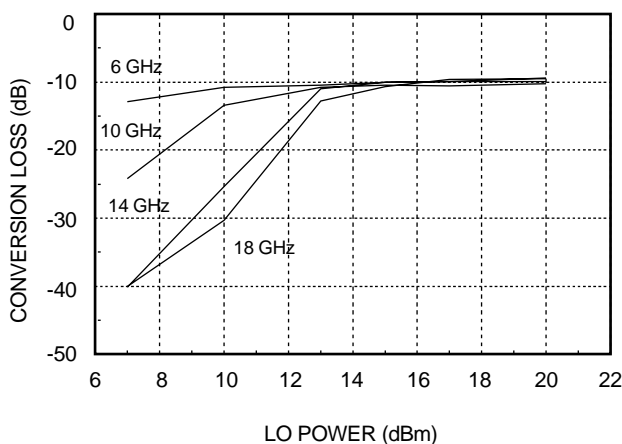
Conversion Loss



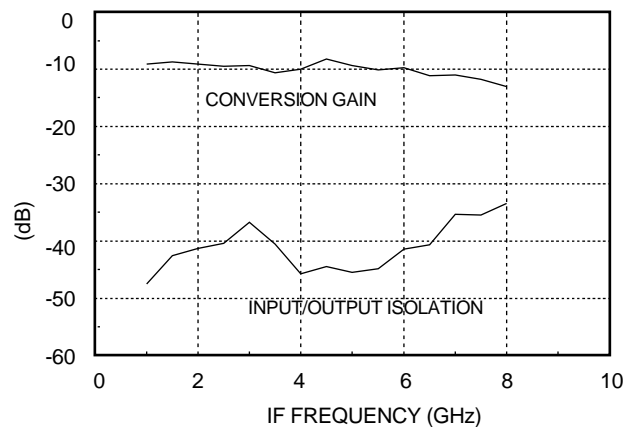
Isolation



Conversion Loss vs. LO Drive Level @ Several RF Frequencies



Upconverter Performance

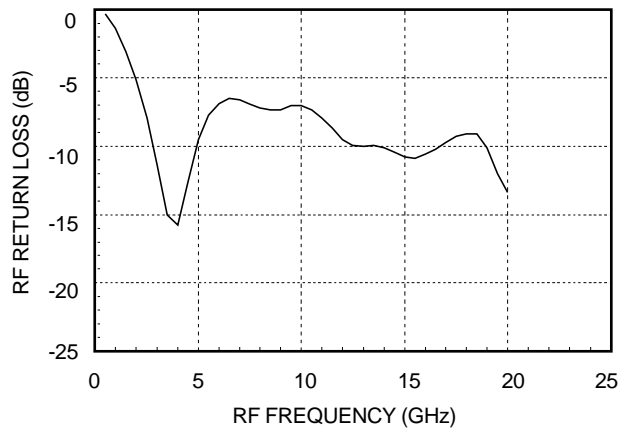


Input at IF Port (1-8GHz); Output at LO Port (9GHz)
Local Oscillator at RF Port (10-17GHz)

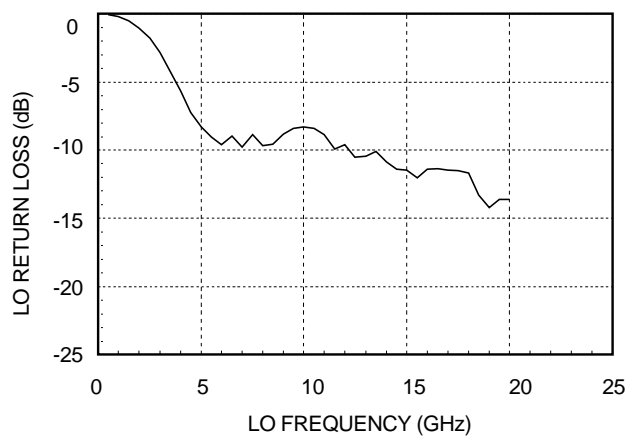
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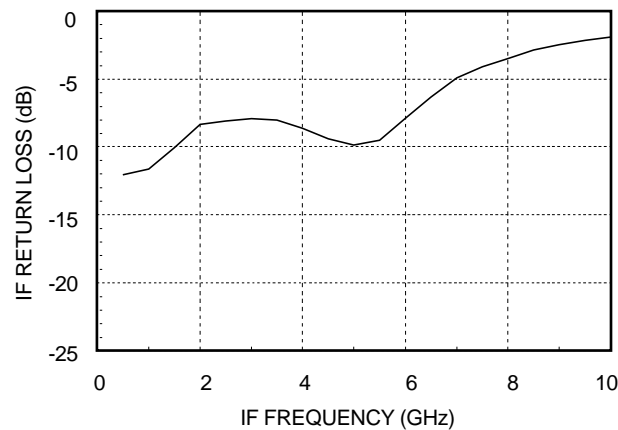
RF Return Loss



LO Return Loss



IF Return Loss



Distortion and 1dB Compression versus LO Drive Level

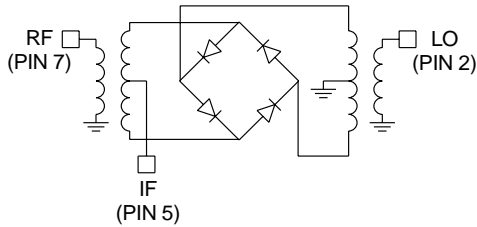
LO Drive (dBm)	Distortion		1 dBm Compression (dBm)
	IP3 (dBm)	IP2 (dBm)	
+13	18	42	7
+15	21	45	10
+17	21	45	10

RF(f1) = 11.01 GHz
 RF(f2) = 11.00 GHz
 LO = 11.5 GHz
 RF Level = 0 dBm

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Schematic

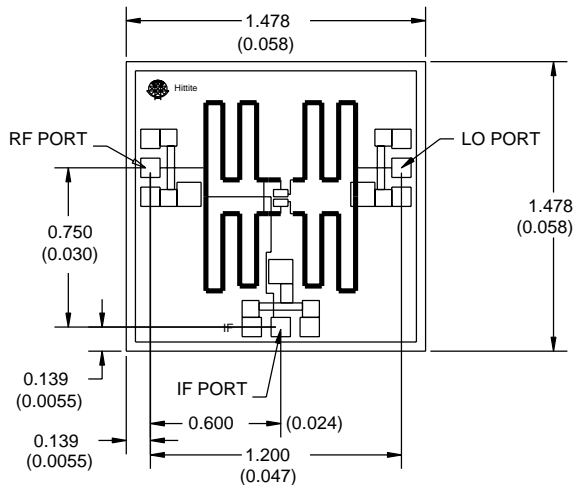


Absolute Maximum Ratings

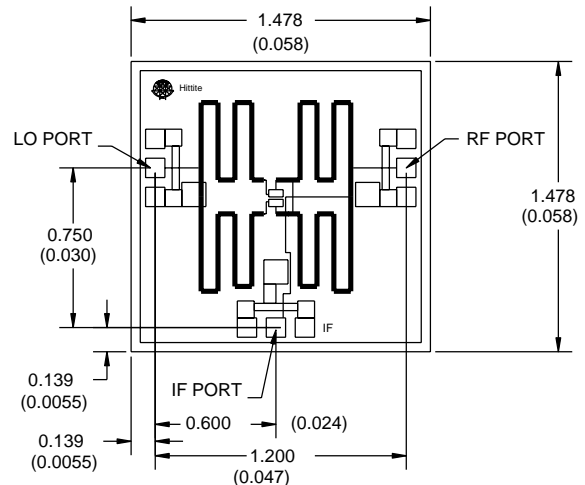
LO Drive	+27 dBm
Storage Temperature	-65 to +150 deg C
Operating Temperature	-55 to +125 deg C

Outline Drawings (See HMC141/142 Operation Application Note in Section 8)

HMC141



HMC142



ALL DIMENSION IN MILLIMETERS (INCHES)
 ALL TOLERANCES ARE ± 0.025 (0.001)
 DIE THICKNESS IS 0.100 (0.004) BACKSIDE IS GROUND
 BOND PADS ARE 0.100 (0.004) SQUARE
 BOND PAD SPACING, CTR-CTR: 0.150 (0.006)
 BACKSIDE METALLIZATION: GOLD
 BOND PAD METALLIZATION: GOLD

