GaAs MMIC DOUBLE-BALANCED MIXER 5 - 20 GHz

FEBRUARY 2001

Features

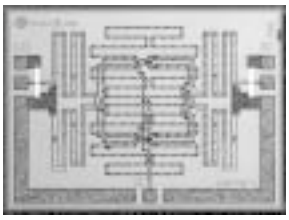
INPUT IP3: +21 dBm

LO / RF ISOLATION: >30dB

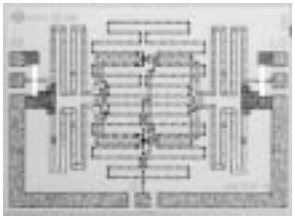
DC TO 3 GHz IF BANDWIDTH

SMALL SIZE: 1.48mm x 2.06mm

HMC143



HMC144



General Description

The HMC143 chip is a miniature double-balanced mixer which can be used as an upconverter or downconverter. The chip utilizes a standard 1µm GaAs MESFET process. The HMC144 is identical to the HMC143 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 HMC141/142 mixers but with an IF combiner in a double-balanced design, providing improved RF/IF isolation. These devices are much smaller and more reliable replacements to hybrid diode mixer designs for VSAT and point-to-point radios.

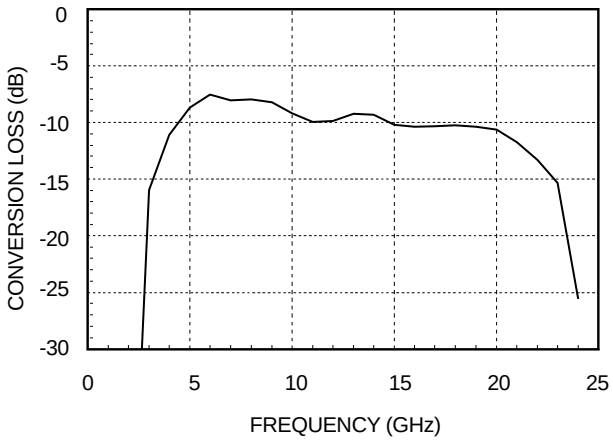
Guaranteed Performance, *LO Drive = +20 dBm, -55 to +85 deg C*

Parameter	Min.	Typ.	Max.	Units
Frequency Range, RF & LO		5 - 20		GHz
Frequency Range, IF		DC - 3		GHz
Conversion Loss		10	12	dB
Noise Figure (SSB)		10	12	dB
LO to RF Isolation	28	30		dB
LO to IF Isolation	14	16		dB
IP3 (Input)	16	21		dBm
IP2 (Input)	42	51		dBm
1 dB Gain Compression (Input)	5	10		dBm
Local Oscillator Drive Level	13	15	23	dBm

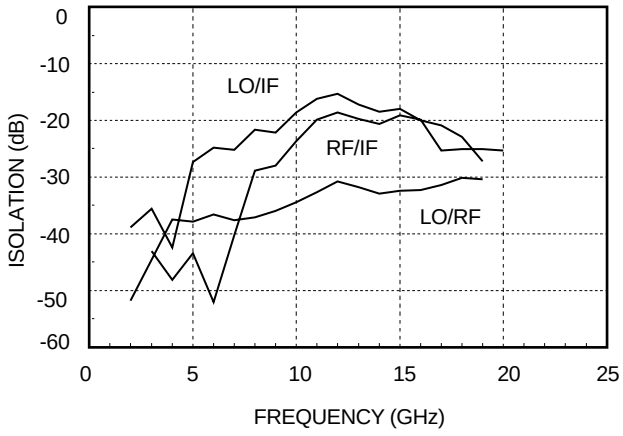
HMC143 / HMC144 DOUBLE-BALANCED MIXER 5 - 20 GHz

FEBRUARY 2001

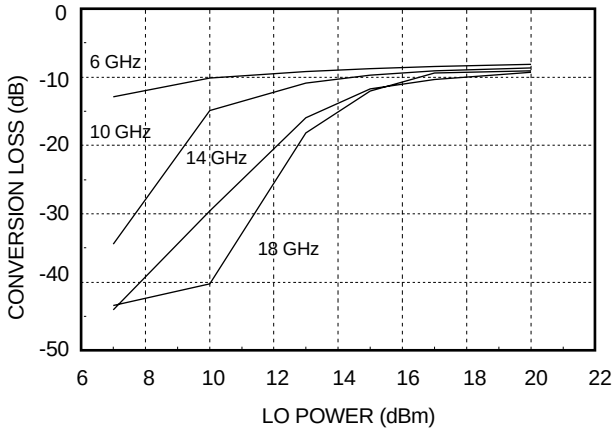
Conversion Loss



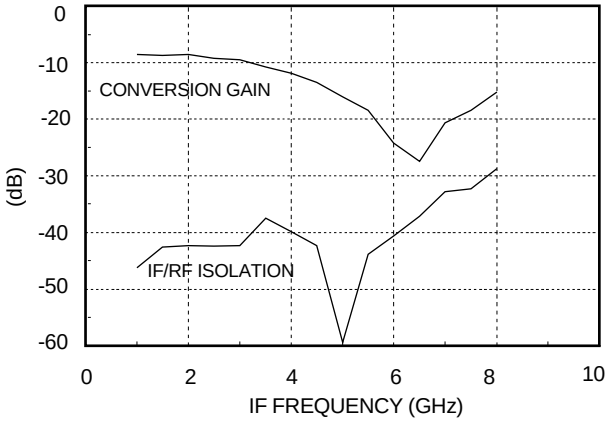
Isolation



Conversion Loss vs. LO Power @ Several RF Frequencies



Upconverter Performance

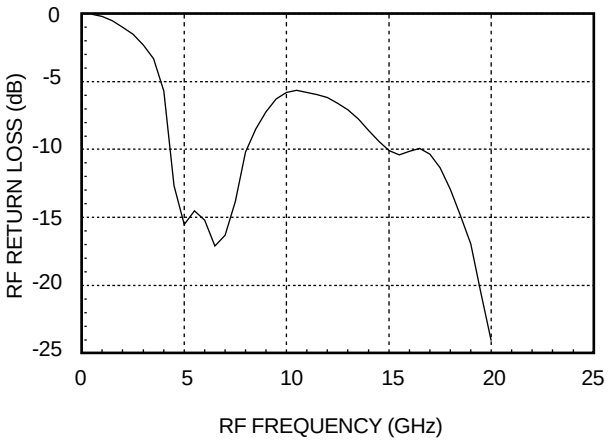


Input at IF Port (1-8GHz); Output at RF Port (9GHz)
Local Oscillator at LO Port (10-17GHz)

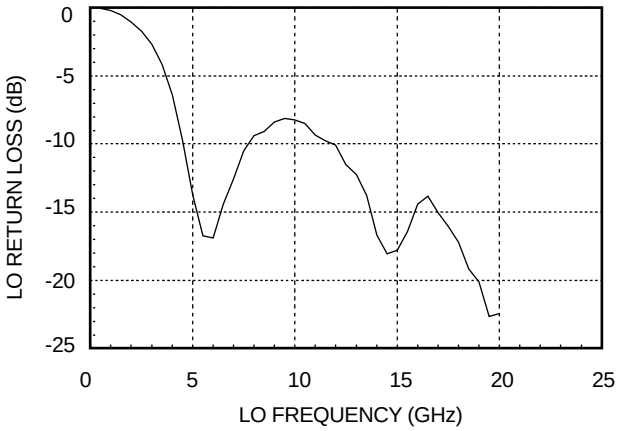
HMC143 / HMC144 DOUBLE-BALANCED MIXER 5 - 20 GHz

FEBRUARY 2001

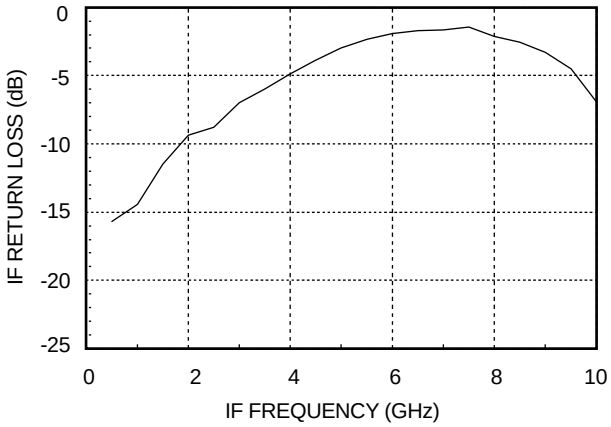
RF Return Loss



LO Return Loss



IF Return Loss



HMC143 / HMC144 DOUBLE-BALANCED MIXER 5 - 20 GHz

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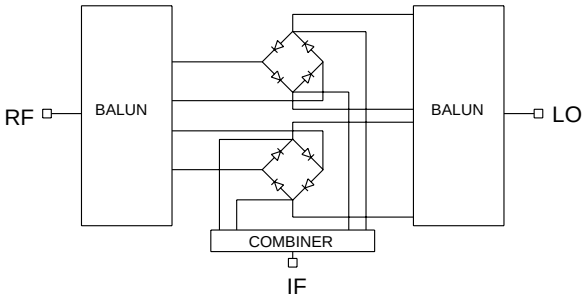
Schematic

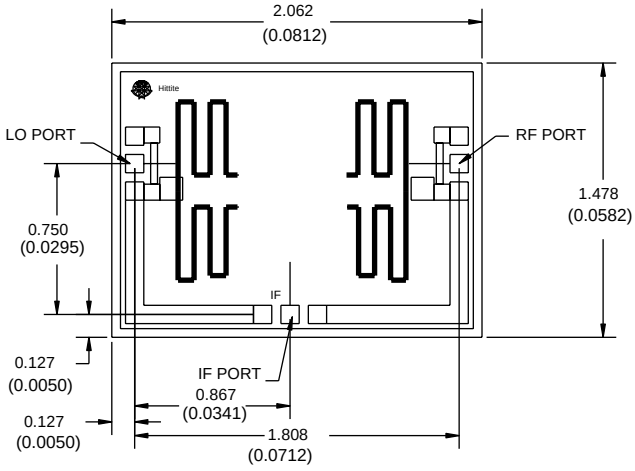


Absolute Maximum Ratings

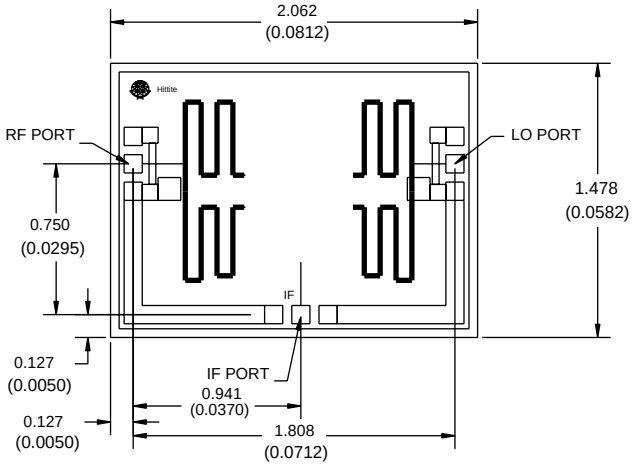
LO Drive	+27 dBm
Storage Temperature	-65 to +150 deg C
Operating Temperature	-55 to +125 deg C

Outline Drawings *(See HMC143/144 Operation Application Note in Section 8)*

HMC143



HMC144



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
BACKSIDE METALLIZATION : GOLD
BOND PAD METALLIZATION : GOLD