

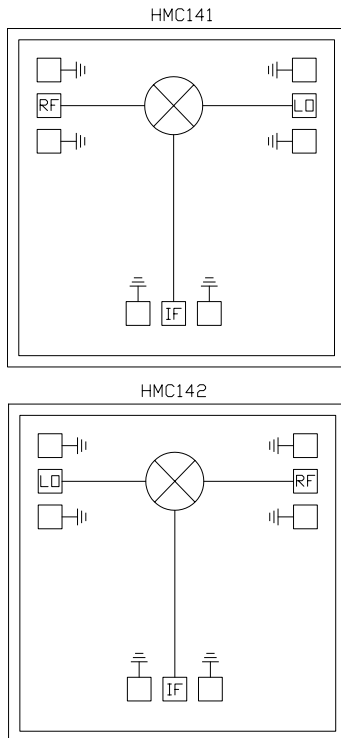
GaAs MMIC DOUBLE-BALANCED MIXER, 6 - 18 GHz

Typical Applications

The HMC141 & HMC142 is ideal for:

- UNII & HiperLAN
- Microwave & MMW Radios
- Military, Space & Test Equipment

Functional Diagram



Features

- Input IP3: +21 dBm
- LO / RF Isolation: 25 to 40 dB
- IF Bandwidth: DC to 6 GHz
- 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 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 an IF combiner, providing a broad DC to 6 GHz IF bandwidth. These devices are much smaller and more reliable than hybrid diode mixers for VSAT and point-to-point radios.

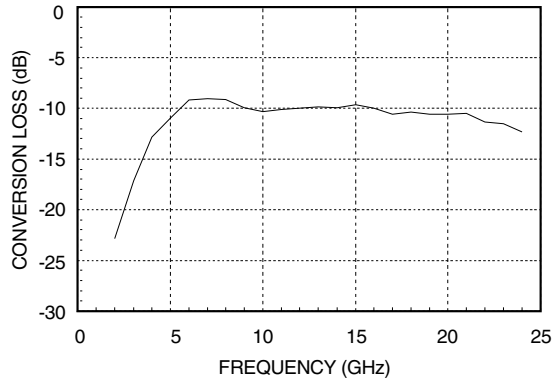
Electrical Specifications, $T_A = +25^\circ\text{C}$, LO Drive = +20 dBm

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)	16	21		dBm
IP2 (Input)	40	47		dBm
1 dB Gain Compression (Input)	5	10		dBm

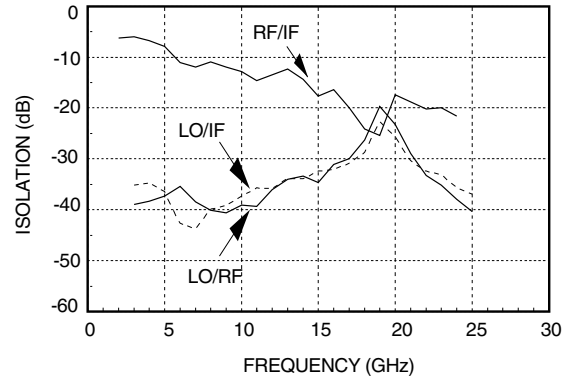
HMC141 / HMC142

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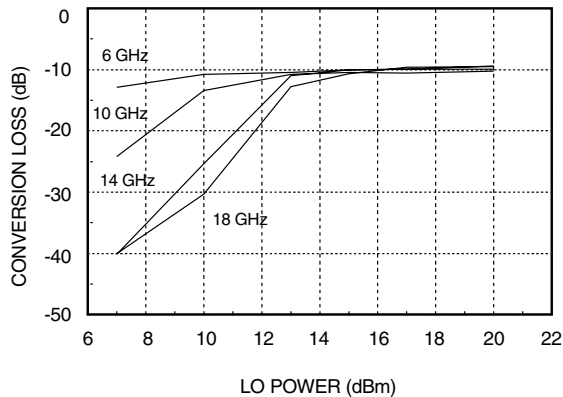
Conversion Loss



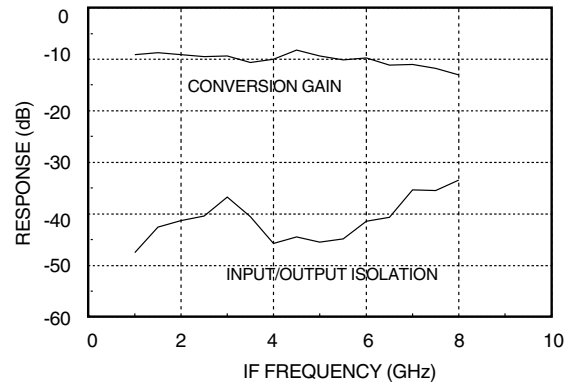
Isolation



Conversion Loss vs. LO Drive Level @ Several RF Frequencies



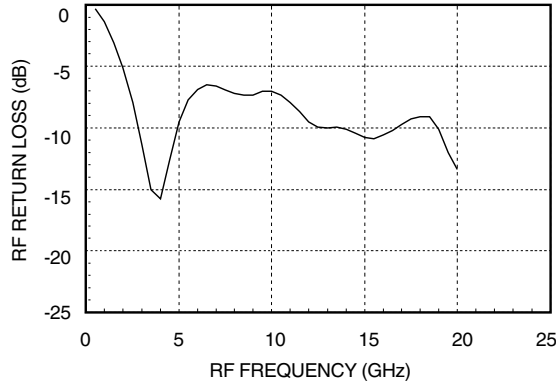
Upconverter Performance



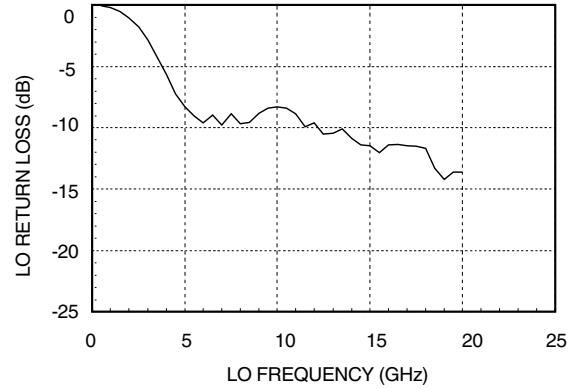
Input at IF Port (1-8 GHz); Output at LO Port (9 GHz)
Local Oscillator at RF Port (10-17 GHz)

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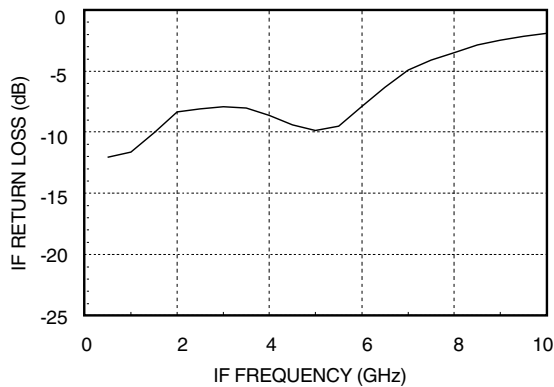
RF Return Loss



LO Return Loss



IF Return Loss



Distortion and 1dB Compression versus LO Drive Level

LO Drive (dBm)	Distortion		1 dB Compression P1dB (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

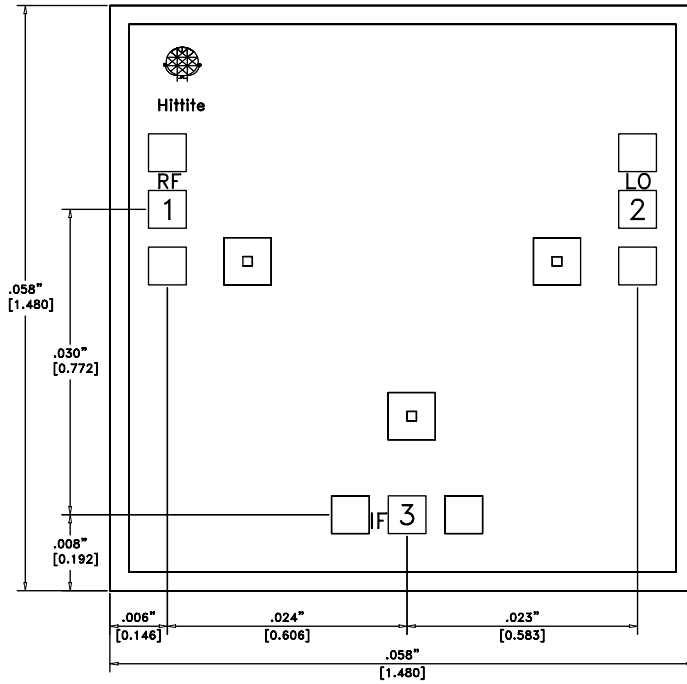
Absolute Maximum Ratings

LO Drive	+27 dBm
Storage Temperature	-65 to +150 °C
Operating Temperature	-55 to +85 °C

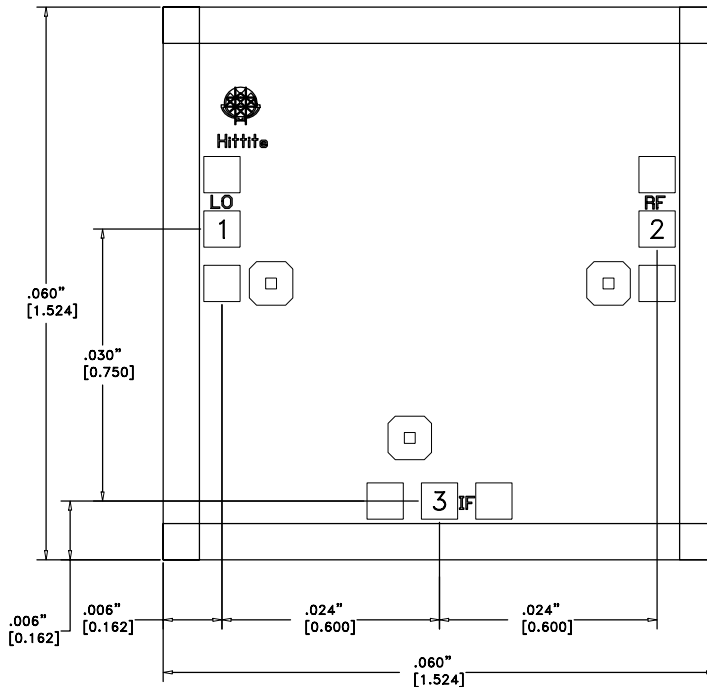
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Outline Drawings (See HMC141/142 Operation Application Note in Section 15)

HMC141



HMC142



NOTES:

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