THE DATASHEET OF

HMC316MS8E

HMC316MS8 / 316MS8E

v02.0505

GaAs MMIC HIGH IP3 DOUBLE-BALANCED MIXER, 1.5 - 3.8 GHz

RoHS✓ EARTH FRIENDLY

Designer's Kit Available

Typical Applications

The HMC316MS8 / HMC316MS8E is ideal for:

- Cellular Basestations
- Cable Modems
- Fixed Wireless Access Systems
- WiMAX

Features

Conversion Loss: 8 dB

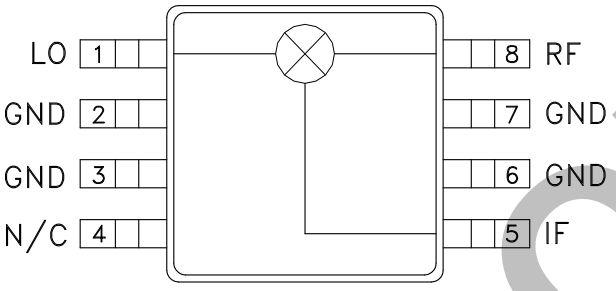
LO/RF Isolation: >35 dB

Input IP3: +25 dBm

Ultra Small Package: <1 mm High

Included in the HMC-DK003 Designer's Kit

Functional Diagram



General Description

The HMC316MS8 & HMC316MS8E are miniature double balanced mixers in 8 lead plastic surface mount packages. The passive GaAs schottky diode mixer implements planar on chip balun transformers, and requires no external components. The mixer can be used as an upconverter, downconverter, or modulator. At mid-band the mixer provides 7.5 dB conversion loss and +25 dBm IIP3 with LO drive levels of +19 dBm. The design was optimized for low cost high volume applications where high converter linearity is required.

Electrical Specifications, T_A = +25° C, As a Function of LO Drive

Parameter	LO = +15 dBm IF = 100 MHz			LO = +17 dBm IF = 100 MHz			LO = +19 dBm IF = 100 MHz			LO = +19 dBm IF = 500 MHz			Units
	Min.	Typ.	Max.	Min.	Typ.	Max.	Min.	Typ.	Max.	Min.	Typ.	Max.	
Frequency Range, RF & LO		1.6 - 3.2			1.6 - 3.2			1.5 - 3.5			3.3 - 3.8		GHz
Frequency Range, IF		DC - 1.0			DC - 1.0			DC - 1.0			DC - 1.0		GHz
Conversion Loss		8	11		8	10		7.5	11		9.5		dB
Noise Figure (SSB)		8	11		8	10		7.5	11		9.5		dB
LO to RF Isolation	28	35		32	38		32	42			34		dB
LO to IF Isolation	22	27		24	28		26	30			40		dB
IP3 (Input)	20	25		19	25		19	25			25		dBm
1 dB Gain Compression (Input)	12.5	15.5		14	16		14.5	17			17		dBm

**Unless otherwise noted, all measurements performed as downconverter, IF= 100 MHz.*

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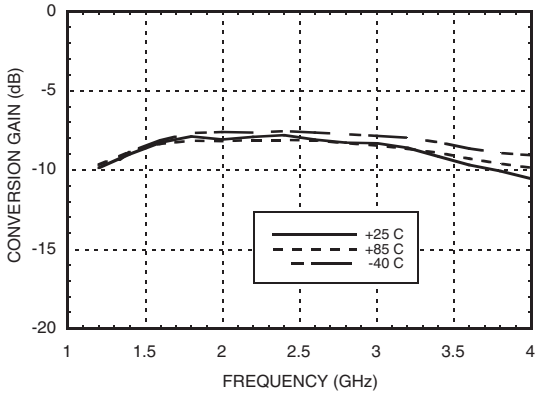
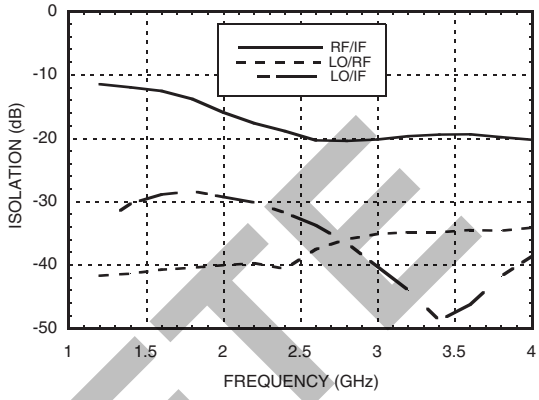
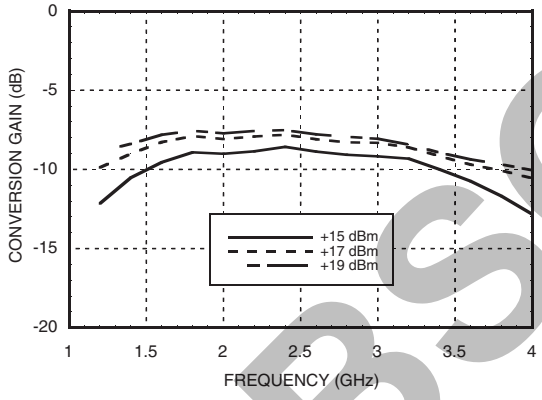
Conversion Gain vs. Temperature @ LO = +17 dBm



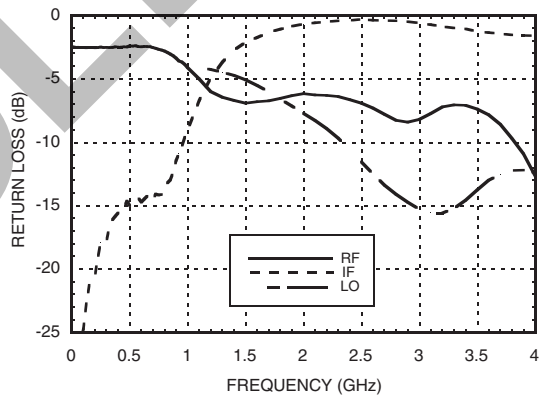
Isolation @ LO = +17 dBm



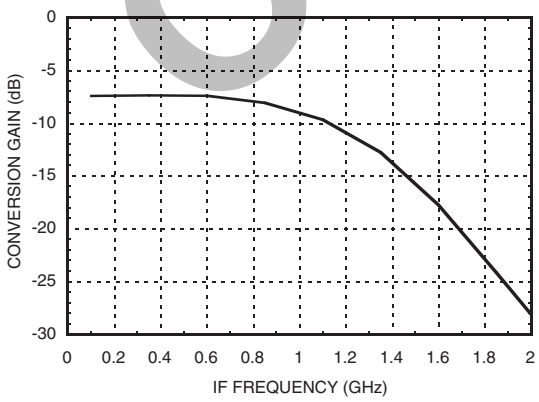
Conversion Gain vs. LO Drive



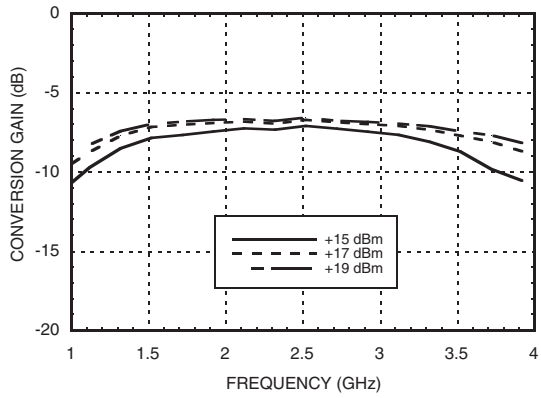
Return Loss @ LO = +17 dBm



If Bandwidth @ LO = +17 dBm



Upconverter Performance vs. LO Drive



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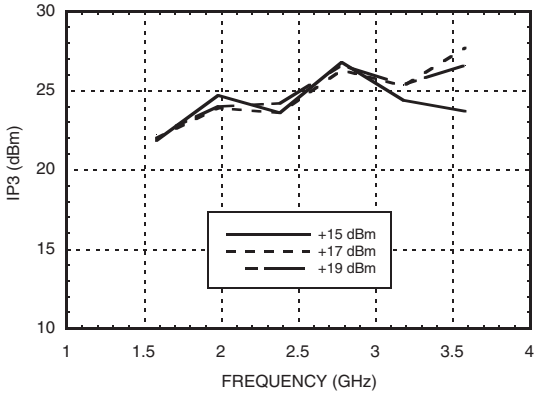
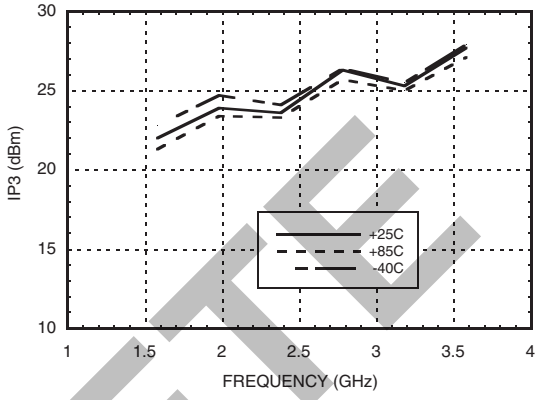
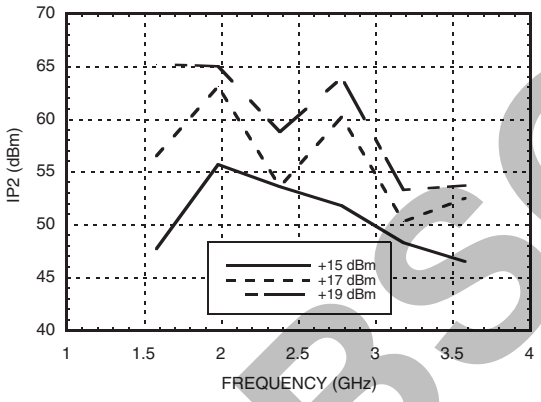
Input IP3 vs. LO Drive*



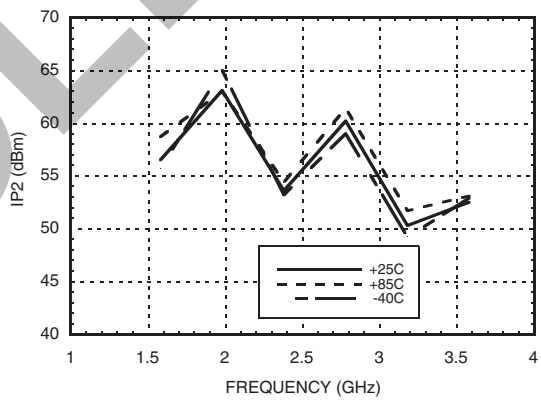
Input IP3 vs. Temperature @ LO = +17dBm*



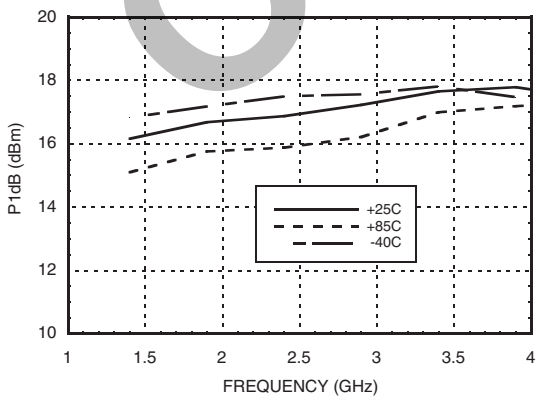
Input IP2 vs. LO Drive*



Input IP2 vs. Temperature @ LO = +17 dBm*



Input P1dB vs. Temperature @ LO = +17 dBm



MxN Spurious Outputs

	nLO				
mRF	0	1	2	3	4
0	xx	-8	3.6	1.1	29
1	10	0	22	44	48
2	71	72	77	60	85
3	>110	>110	>110	91	91
4	>110	>110	>110	>110	>110

RF = 2.08 GHz @ -10 dBm
LO = 1.9 GHz @ +17 dBm
All values in dBc relative to the IF output power.

** Two-tone input power = 0 dBm each tone, 1 MHz spacing.*

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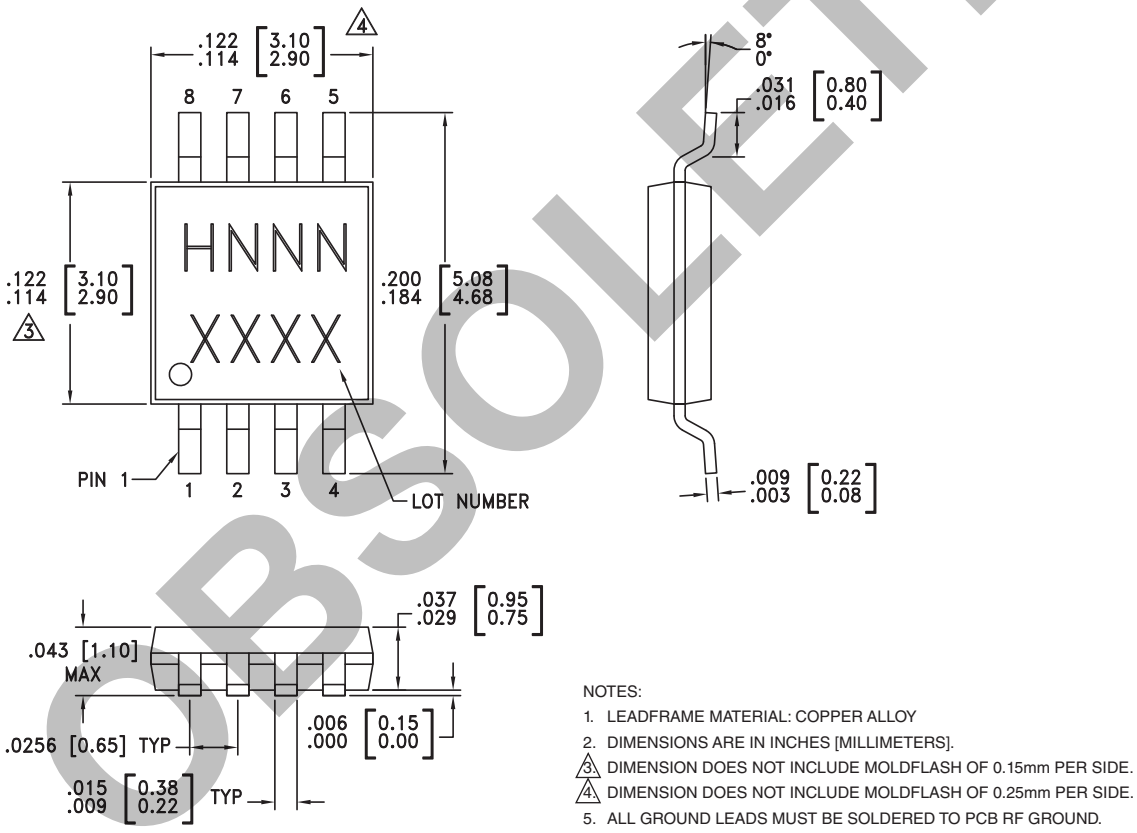
Absolute Maximum Ratings

RF / IF Input	+22 dBm
LO Drive	+27 dBm
Storage Temperature	-65 to +150 °C
Operating Temperature	-40 to +85 °C
IF DC Current	±18 mA
ESD Sensitivity (HBM)	Class 1A

ELECTROSTATIC SENSITIVE DEVICE
OBSERVE HANDLING PRECAUTIONS

Outline Drawing



NOTES:

1. LEADFRAME MATERIAL: COPPER ALLOY
2. DIMENSIONS ARE IN INCHES [MILLIMETERS].
3. DIMENSION DOES NOT INCLUDE MOLDFLASH OF 0.15mm PER SIDE.
4. DIMENSION DOES NOT INCLUDE MOLDFLASH OF 0.25mm PER SIDE.
5. ALL GROUND LEADS MUST BE SOLDERED TO PCB RF GROUND.

Package Information

Part Number	Package Body Material	Lead Finish	MSL Rating	Package Marking [3]
HMC316MS8	Low Stress Injection Molded Plastic	Sn/Pb Solder	MSL1 [1]	H316 XXXX
HMC316MS8E	RoHS-compliant Low Stress Injection Molded Plastic	100% matte Sn	MSL1 [2]	H316 XXXX

[1] Max peak reflow temperature of 235 °C
[2] Max peak reflow temperature of 260 °C
[3] 4-Digit lot number XXXX

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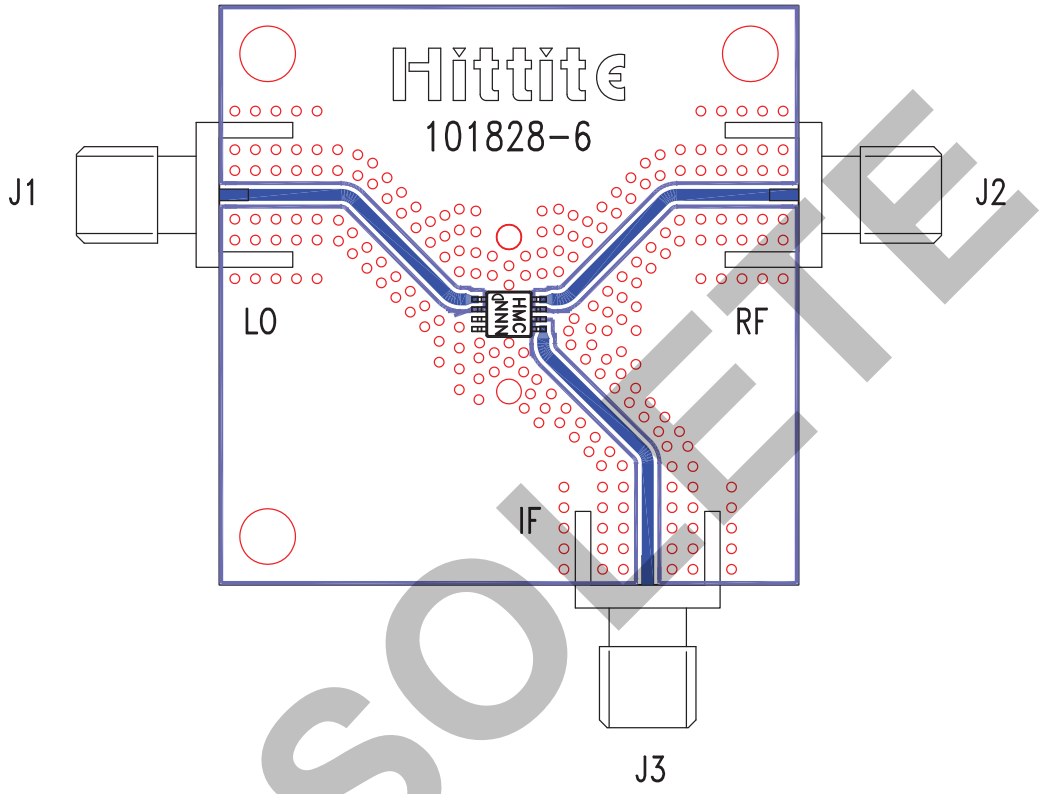
Evaluation PCB



List of Materials for Evaluation PCB 101830 [1]

Item	Description
J1 - J3	PCB Mount SMA RF Connector
U1	HMC316MS8 / HMC316MS8E Mixer
PCB [2]	101828 Eval Board

[1] Reference this number when ordering complete evaluation PCB

[2] Circuit Board Material: Rogers 4350

The circuit board used in the final application should use RF circuit design techniques. Signal lines should have 50 ohm impedance while the package ground leads should be connected directly to the ground plane similar to that shown below. A sufficient number of via holes should be used to connect the top and bottom ground planes. The evaluation circuit board as shown is available from Hittite upon request.

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