HIGH IP3 DOUBLE-BALANCED MIXER 1.5 - 3.5 GHz

FEBRUARY 2001

v00.1200

Features

Conversion Loss: 8 dB

LO/RF Isolation: >35 dB

Input IP3: +25 dBm

Ultra Small Package: < 1 mm High

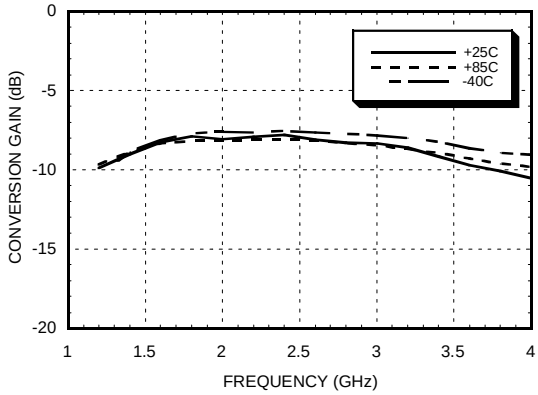
General Description

The HMC316MS8 is a miniature double balanced mixer in an 8 lead plastic surface mount package. 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, down converter, or modulator. It is especially suited for cellular base station, cable modem, and fixed wireless access systems that operate between 1.5 and 3.5 GHz. 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.

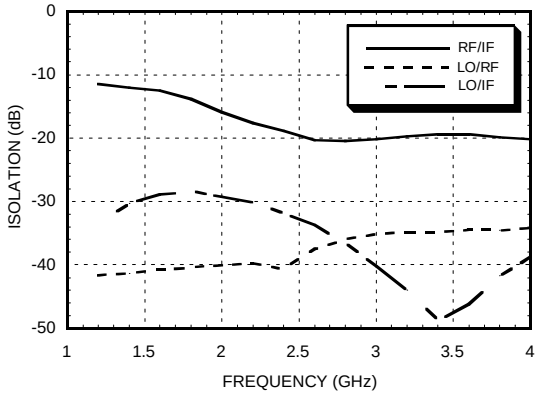
Guaranteed Performance, As a Function of LO Drive, -40 to +85 deg C

Parameter	LO = +15 dBm IF = 100 MHz			LO = +17 dBm IF = 100 MHz			LO = +19 dBm IF = 100 MHz			Units
	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			GHz
Frequency Range, IF	DC - 1.0			DC - 1.0			DC - 1.0			GHz
Conversion Loss		8	11		8	10		7.5	11	dB
Noise Figure (SSB)		8	11		8	10		7.5	11	dB
LO to RF Isolation	28	35		32	38		32	42		dB
LO to IF Isolation	22	27		24	28		26	30		dB
IP3 (Input)	20	25		19	25		19	25		dBm
1 dB Gain Compression (Input)	12.5	15.5		14	16		14.5	17		dBm
Local Oscillator Drive Level			22			22			22	dBm

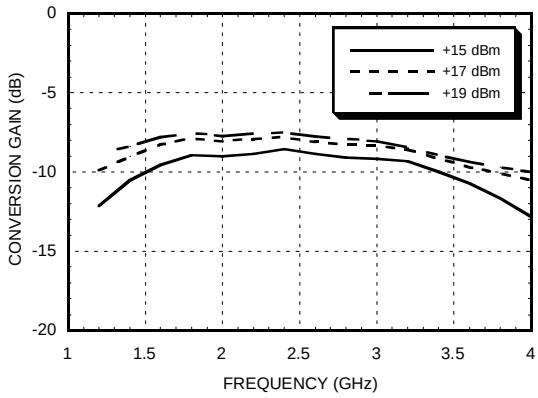
Conversion Gain vs. Temperature @ LO= +17 dBm



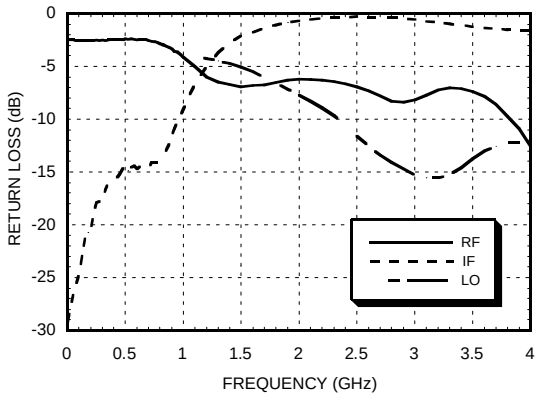
Isolation @ LO = +17 dBm



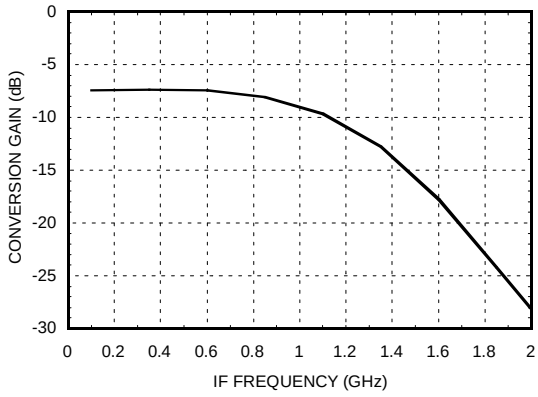
Conversion Gain vs. LO Drive



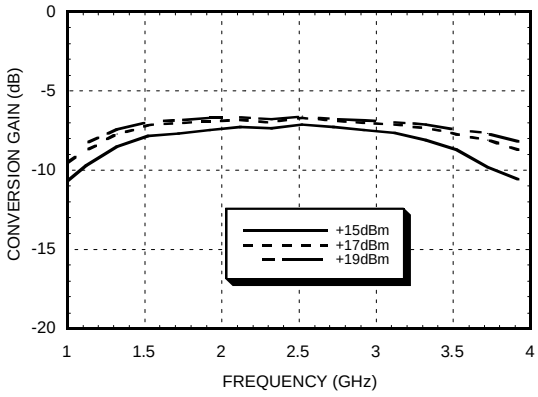
Return Loss @ LO= +17 dBm



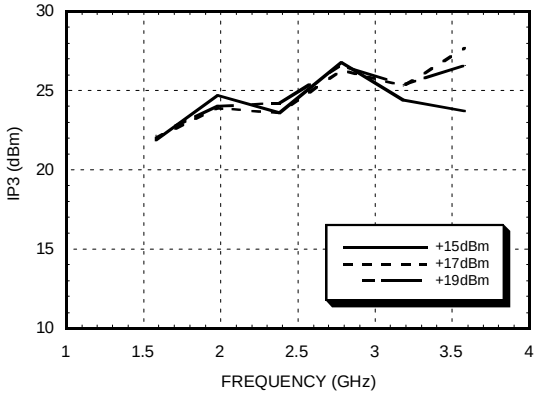
IF Bandwidth @ LO = +17 dBm



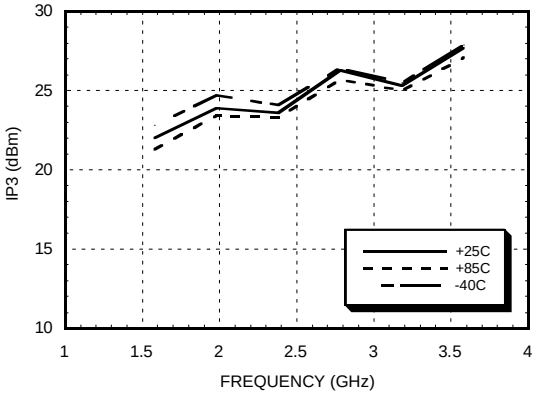
Upconverter Performance vs. LO Drive



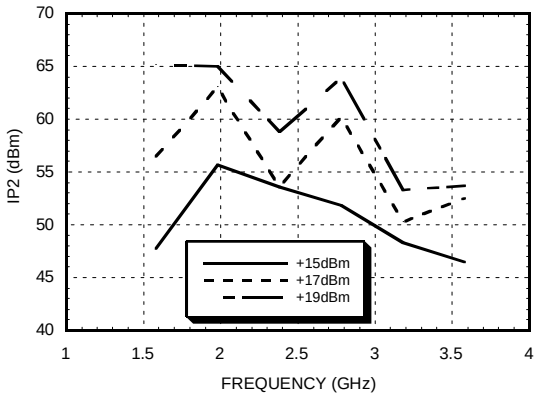
Input IP3 vs. LO Drive



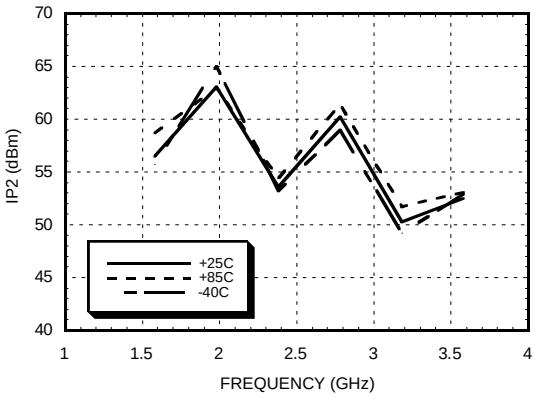
Input IP3 vs. Temperature @ LO= +17 dBm



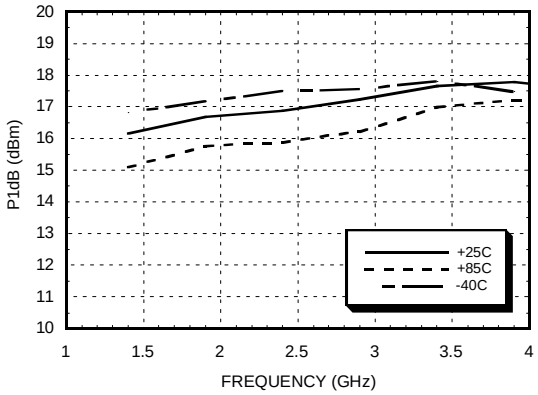
Input IP2 vs. LO Drive



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.

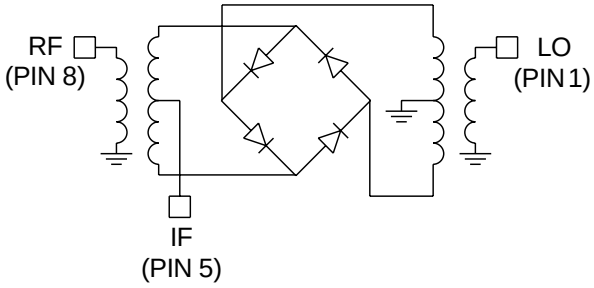
MICROWAVE CORPORATION

HIGH IP3 DOUBLE-BALANCED MIXER 1.5 - 3.5 GHz

v00.1200

FEBRUARY 2001

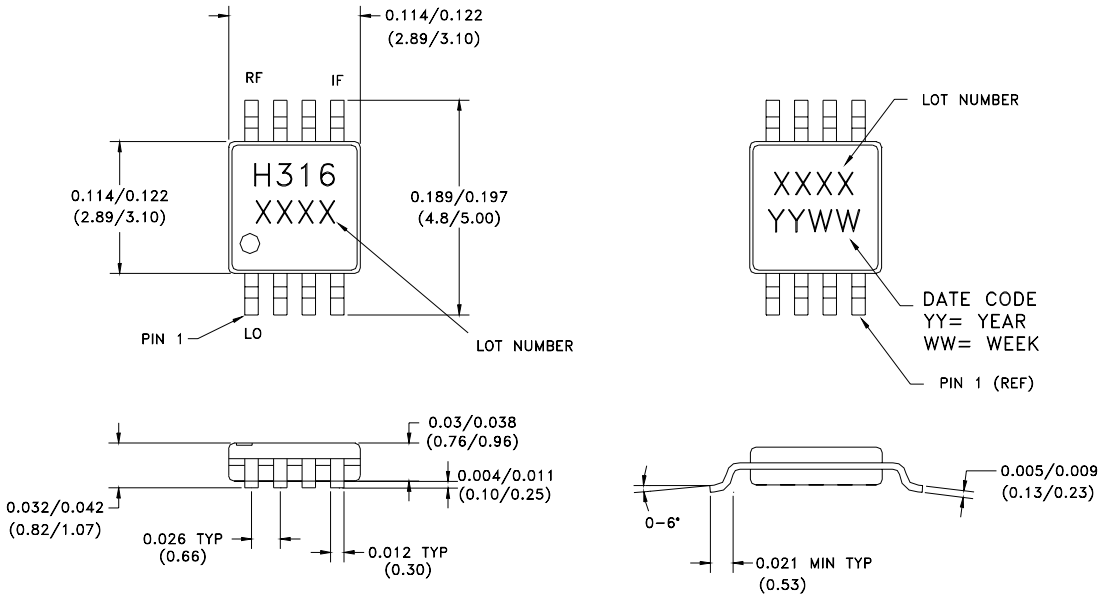
Schematic



Absolute Maximum Ratings

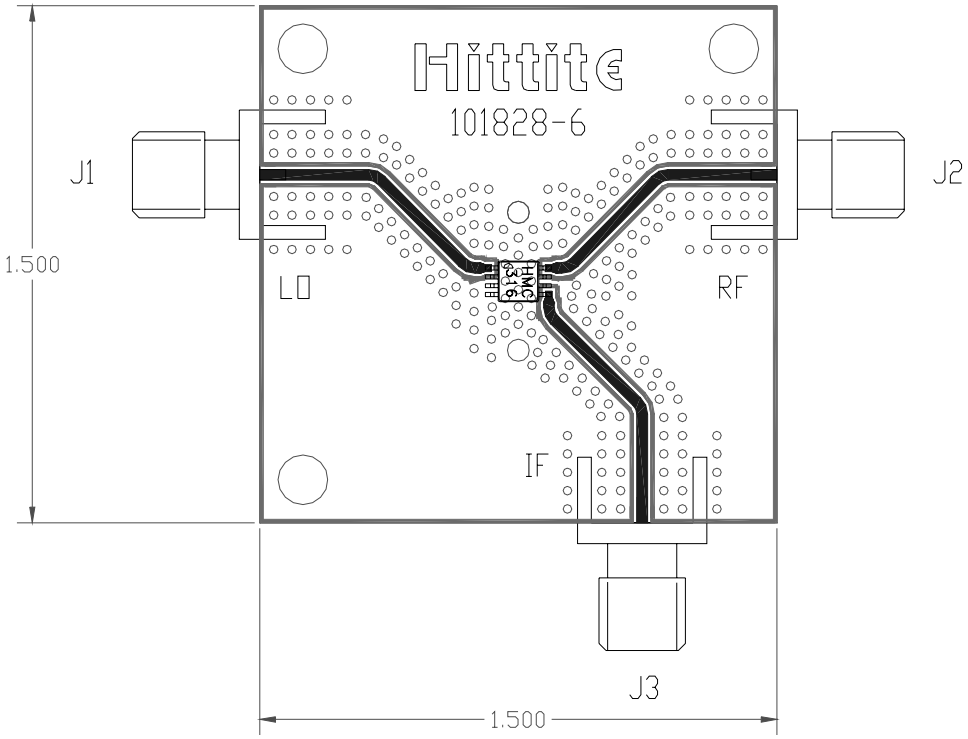
RF / IF Input	+22 dBm
LO Drive	+27 dBm
Storage Temperature	-65 to +150 deg C
Operating Temperature	-55 to +85 deg C
IF DC Current	±18 mA

Outline Drawing



1. MATERIAL:
   A) PACKAGE BODY - LOW STRESS INJECTION-MOLDED PLASTIC, SILICA & SILICONE IMPREGNATED.
   B) LEADFRAME MATERIAL: COPPER ALLOY
2. PLATING: LEAD-TIN SOLDER PLATE
3. DIMENSIONS ARE IN INCHES (MILLIMETERS), UNLESS OTHERWISE SPECIFIED TOL. ARE ±0.005 (±0.13)
4. ALL UNLABELED LEADS ARE GROUND

Evaluation PCB for HMC316MS8



Evaluation Circuit Board

Item	Description
J1 - J3	PC Mount SMA RF Connector
U1	HMC316MS8 Mixer
PCB*	101828 Eval Board
* *Circuit Board Material: Rogers 4350*	

MICROWAVE CORPORATION

HIGH IP3 DOUBLE-BALANCED MIXER 1.5 - 3.5 GHz

v00.1200

FEBRUARY 2001

NOTES: