

HIGH IP3 SINGLE-BALANCED MIXER 0.6 - 1.2 GHz

FEBRUARY 2001

v00.1200

Features

CONVERSION LOSS: 7.5 dB

INPUT IP3: +27 dBm

INPUT IP2: +45 dBm

INPUT P1dB: +17 dBm

General Description

The HMC350MS8 is a miniature single balanced mixer in an 8 lead plastic surface mount package. The passive GaAs schottky diode mixer implements planar on chip Baluns 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 600 and 1200 MHz. The mixer provides 7.5 dB conversion loss and +25 dBm IIP3 with LO drive levels of +19 dBm at mid-band. The design was optimized for low cost high volume applications where high converter linearity is required.



4

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Guaranteed Performance, LO Drive= +19 dBm, -40 to +85 deg C

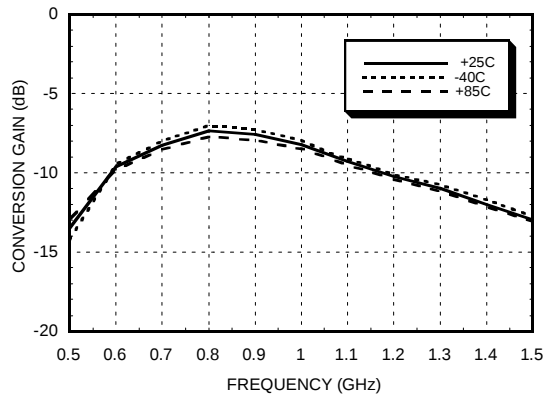
Parameter	LO = +19 dBm, IF = 100 MHz			Units
	Min.	Typ.	Max.	
Frequency Range, RF & LO		0.6 - 1.2		GHz
Frequency Range, IF		DC - 0.3		GHz
Conversion Loss	RF / LO 0.8 - 1.0 RF / LO 0.6 - 1.2	7.5 8	10 12	dB
Noise Figure (SSB)		7.5	10	dB
LO to RF Isolation	19	22		dB
LO to IF Isolation	5	8		dB
RF to IF Isolation	14	18		dB
IP3 (Input)	24	27		dBm
IP2 (Input)	40	45		dBm
1 dB Gain Compression (Input)	14	17		dBm
Local Oscillator Drive Level			21	dBm

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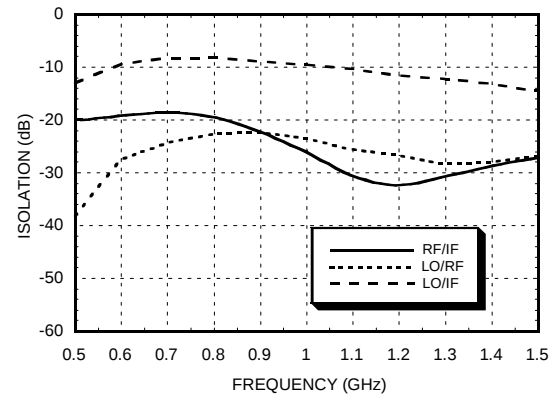
v00.1200

FEBRUARY 2001

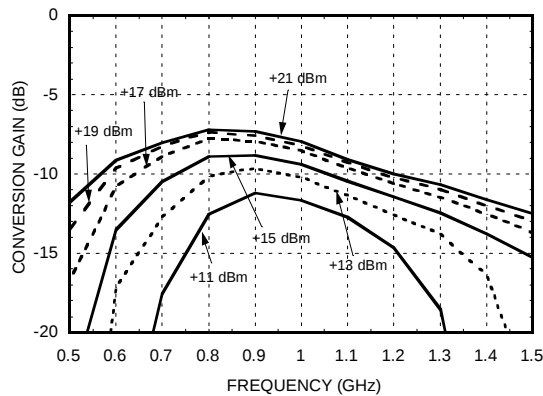
**Conversion Gain vs.
Temperature @ LO = +19 dBm**



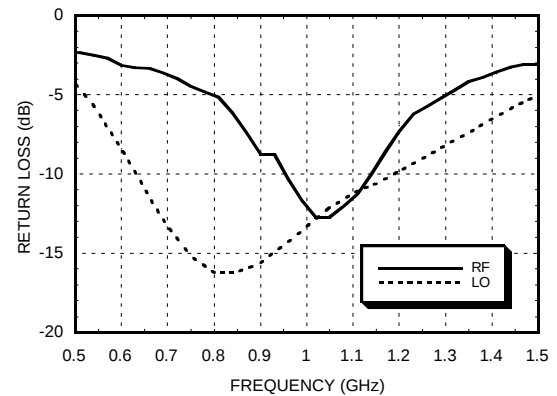
Isolation @ LO = +19 dBm



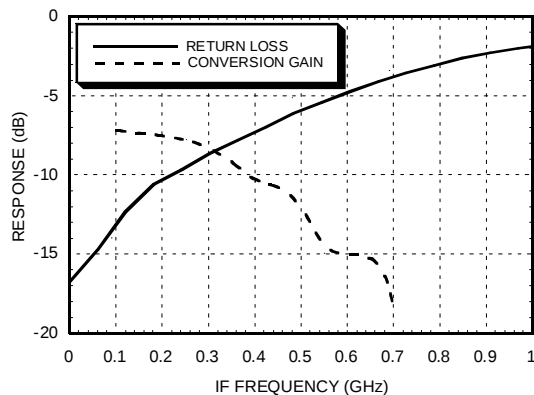
Conversion Gain vs. LO Drive



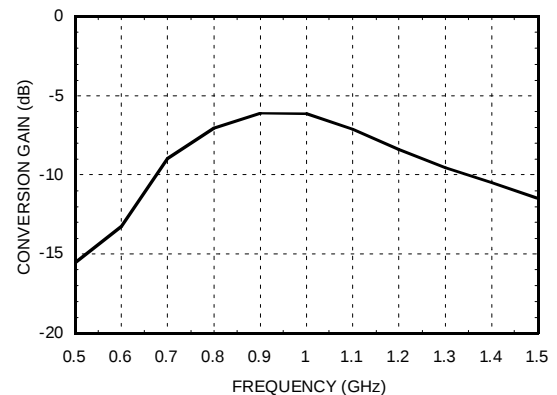
Return Loss @ LO = +19 dBm



IF Bandwidth @ LO = +19 dBm



**Upconverter Performance,
Conversion Gain @ LO = +19 dBm**



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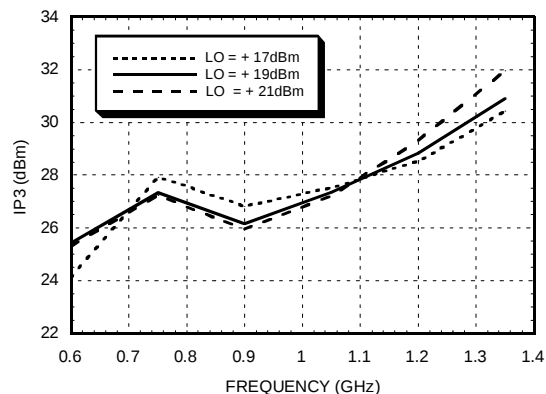


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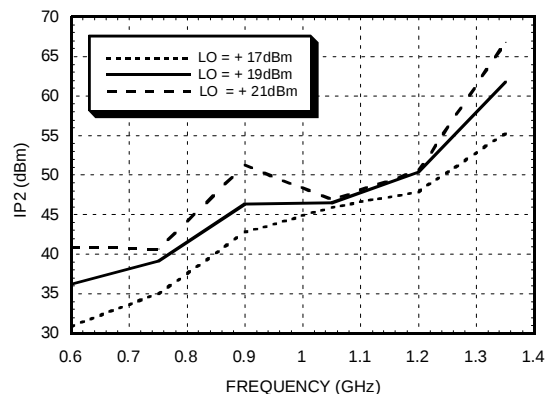
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v00.1200

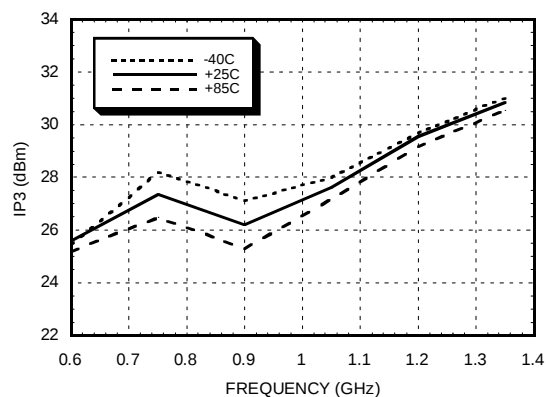
Input IP3 vs. LO Drive



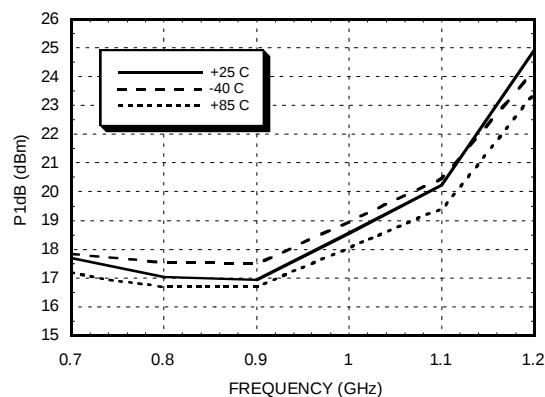
Input IP2 vs. LO Drive



Input IP3 vs. Temperature @ LO Drive = +19 dBm



P1dB vs. Temperature @ LO = +19 dBm



MXN Spurious Outputs

mRF	nLO				
	0	1	2	3	4
0	xx	-28	-3	6	1
1	14	0	37	38	29
2	58	59	63	51	82
3	87	85	85	77	71
4	>94	>94	>94	>92	76

RF = 1 GHz @ -10 dBm
LO = 0.9 GHz @ 19 dBm
All values in dBc relative to the IF output power level.

Harmonics of LO

LO Frequency (GHz)	nLO Spur at RF Port			
	1	2	3	4
0.6	28	15	63	43
0.75	24	16	60	46
0.9	22	18	48	46
1.05	23	20	48	52
1.2	26	22	52	59
1.35	28	26	57	63

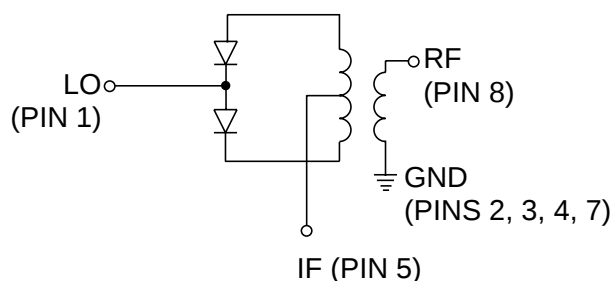
LO = +19 dBm
Values in dBc below input LO level measured at the RF port

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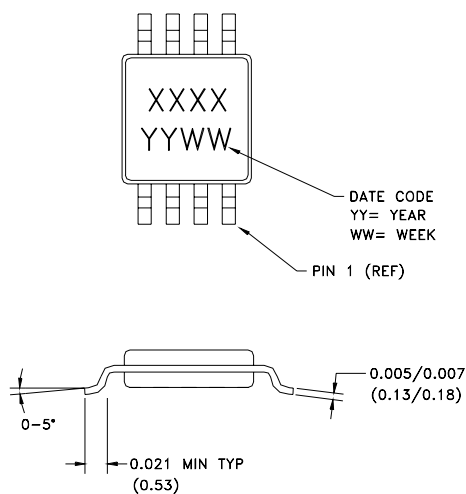
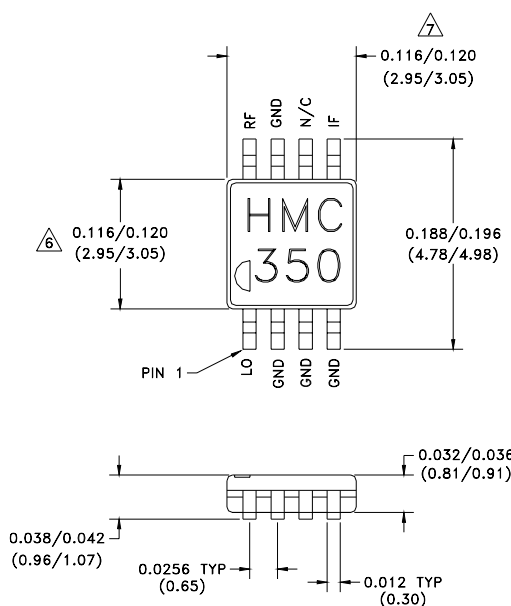
Schematic



Absolute Maximum Ratings

RF / IF Input	+27 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).

4. UNLESS OTHERWISE SPECIFIED ALL TOL. ARE ±0.005 (±0.13).
5. ALL UNLABELED LEADS ARE GROUND.
6. CHARACTERS TO BE HELVETICA MEDIUM, APPROX. .030 HIGH WHITE INK, LOCATED APPROXIMATELY AS SHOWN.
7. DIMENSION DOES NOT INCLUDE MOLDFLASH OF 0.15 MM PER SIDE

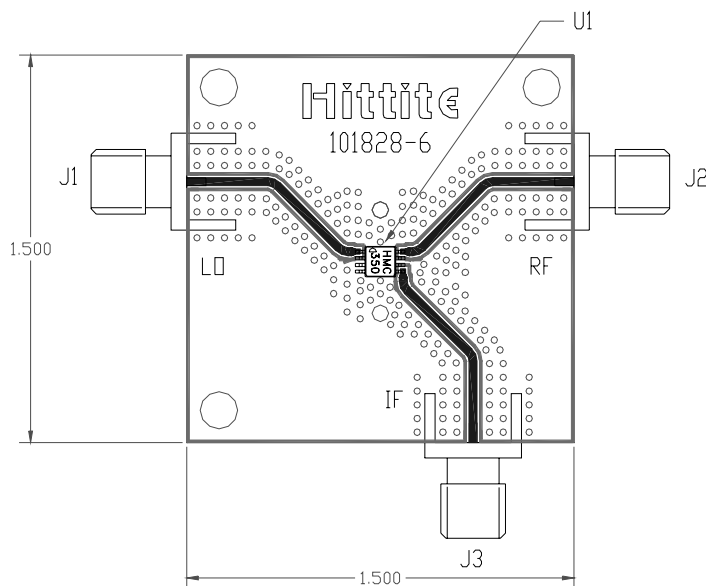


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Evaluation PCB for HMC350MS8



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. 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.

Evaluation Circuit Board

Item	Description
J1, J2, J3	PC Mount SMA RF Connector
U1	HMC350MS8 Mixer
PCB*	101828 Eval Board
* Circuit Board Material: Rogers 4350	



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