

GaAs MMIC HIGH IP3 SINGLE-BALANCED MIXER, 0.6 - 1.2 GHz

Typical Applications

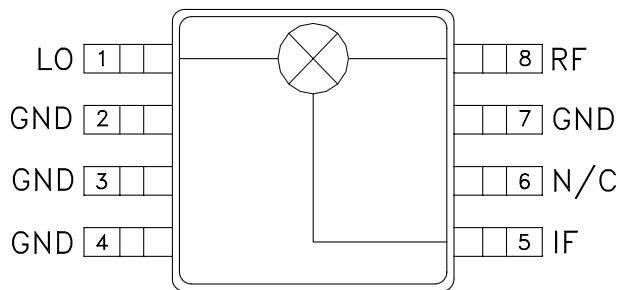
The HMC350MS8 is ideal for:

- Cellular Basestations
- Cable Modems
- Fixed Wireless Access Systems

Features

- Conversion Loss: 8.0 dB
- Input IP3: +27 dBm
- Input IP2: +45 dBm
- Input P1dB: +17 dBm

Functional Diagram



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. 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.

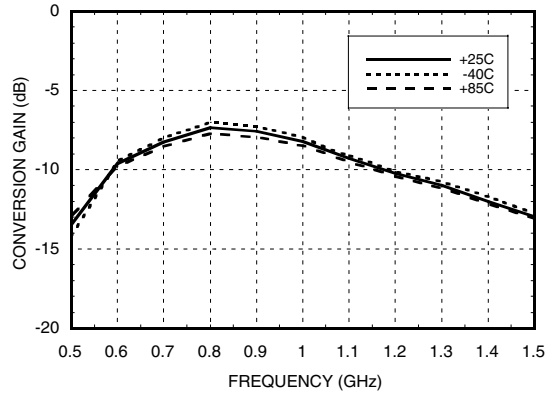
Electrical Specifications, $T_A = +25^\circ C$

Parameter	LO = +19 dBm, IF = 100 MHz						Units
	Min.	Typ.	Max.	Min.	Typ.	Max.	
Frequency Range, RF & LO	0.6 - 1.2			0.8 - 1.0			GHz
Frequency Range, IF	DC - 0.3			DC - 0.3			GHz
Conversion Loss		8	12		7.5	10	dB
Noise Figure (SSB)		8	12		7.5	10	dB
LO to RF Isolation	19	22		19	22		dB
LO to IF Isolation	5	8		5	8		dB
RF to IF Isolation	14	18		15	20		dB
IP3 (Input)	23	27		23	27		dBm
IP2 (Input)	33	45		38	45		dBm
1 dB Compression (Input)	14	17		14	17		dBm

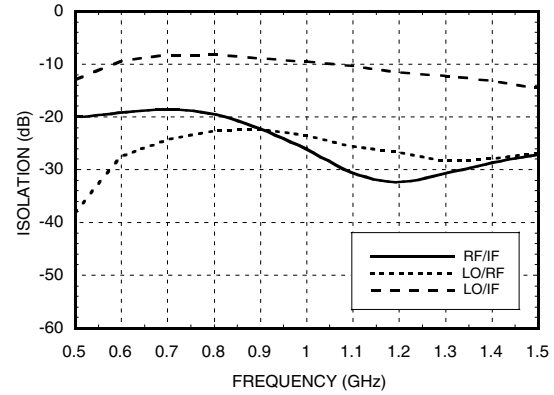
*Unless otherwise noted, all measurements performed as downconverter, IF= 100 MHz.

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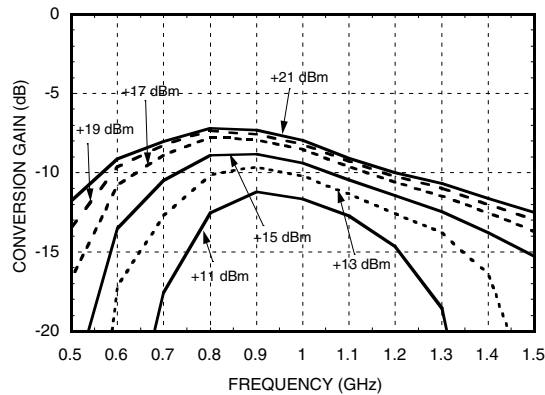
Conversion Gain vs. Temperature @ LO = +19 dBm



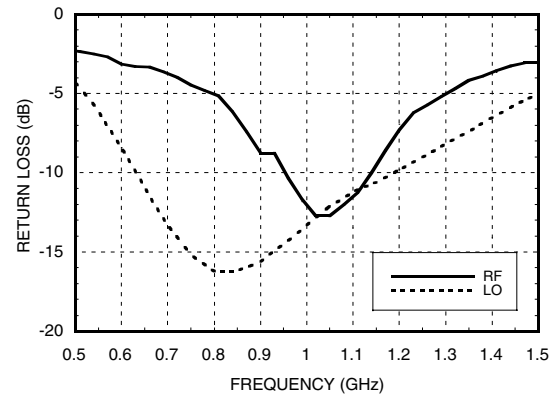
Isolation @ LO = +19 dBm



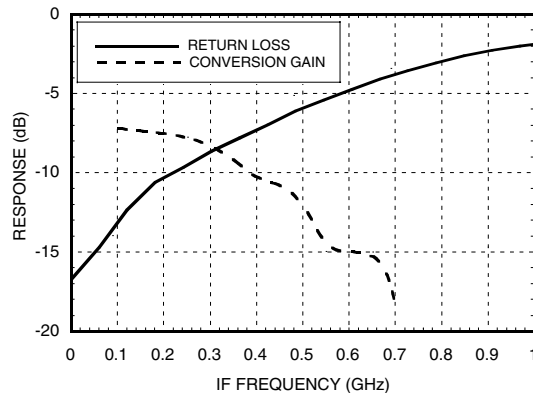
Conversion Gain vs. LO Drive



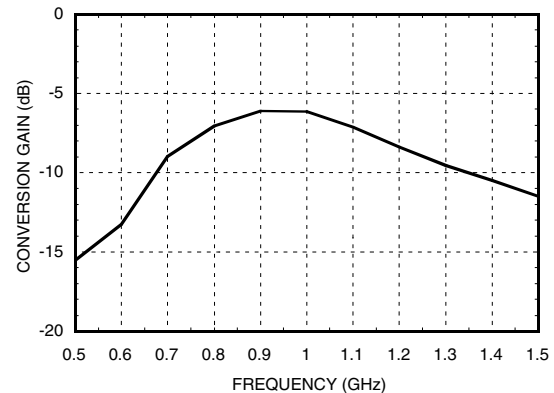
Return Loss @ LO = +19 dBm



IF Bandwidth @ LO = +19 dBm

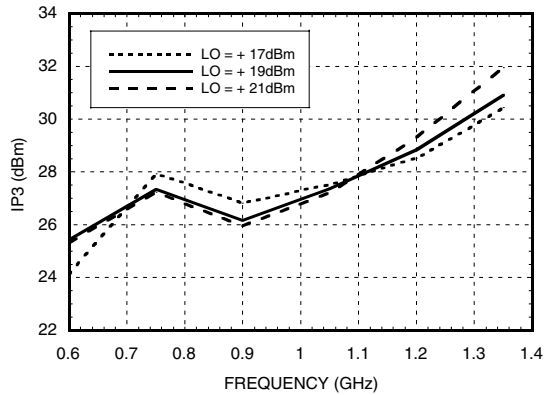


Upconverter Performance, Conversion Gain @ LO = +19 dBm

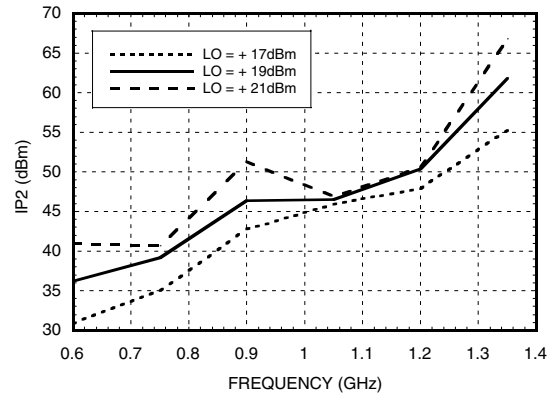


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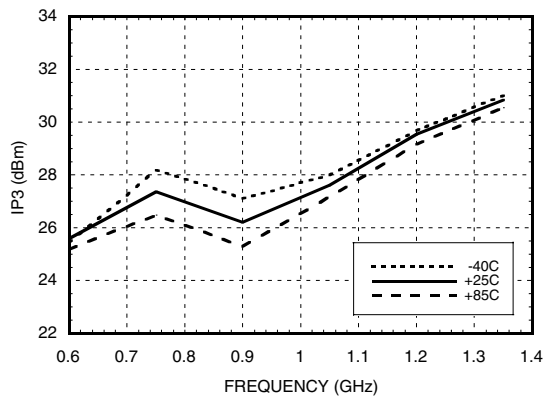
Input IP3 vs. LO Drive *



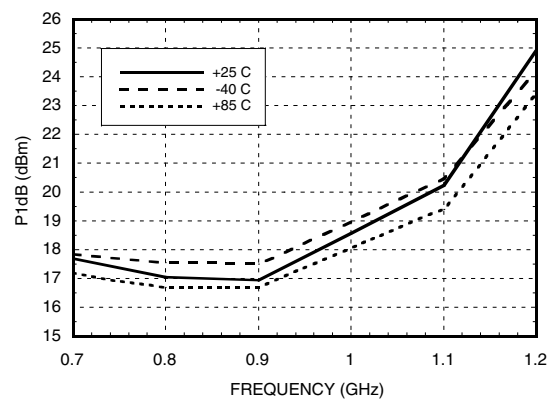
Input IP2 vs. LO Drive *



**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 = 1.0 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.

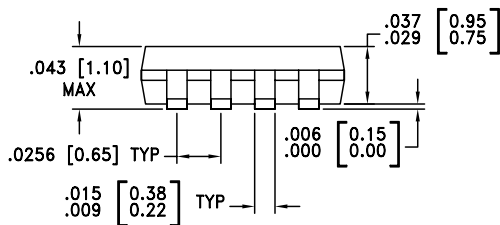
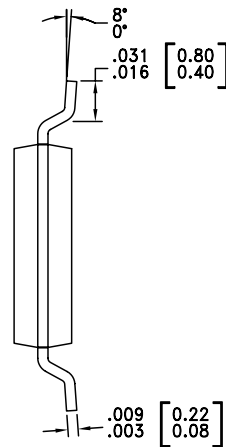
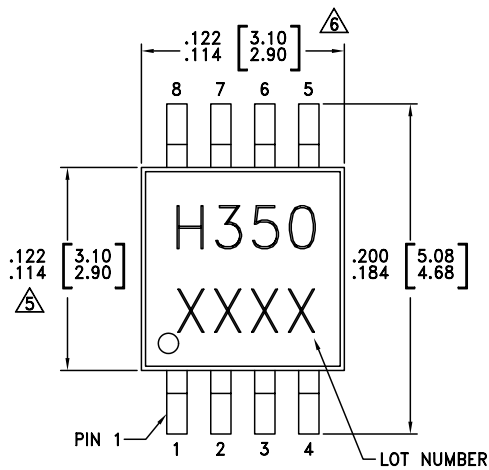
* Two-tone input power = 0 dBm each tone, 1 MHz spacing.

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Absolute Maximum Ratings

RF / IF Input	+27 dBm
LO Drive	+27 dBm
Storage Temperature	-65 to +150 °C
Operating Temperature	-40 to +85 °C
IF DC Current	±18 mA

Outline Drawing

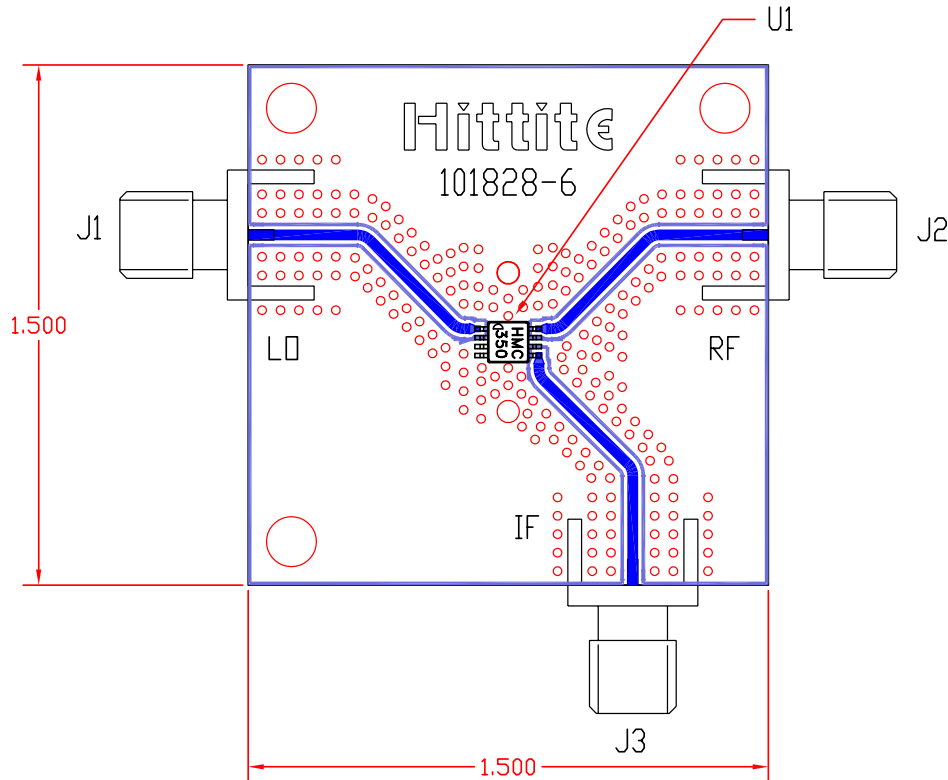


NOTES:

1. PACKAGE BODY MATERIAL: LOW STRESS INJECTION MOLDED PLASTIC SILICA AND SILICON IMPREGNATED.
 2. LEAD MATERIAL: COPPER ALLOY
 3. LEAD PLATING: Sn/Pb SOLDER
 4. DIMENSIONS ARE IN INCHES [MILLIMETERS]
 5. DIMENSION DOES NOT INCLUDE MOLDFLASH OF 0.15mm PER SIDE.
- △ DIMENSION DOES NOT INCLUDE MOLDFLASH OF 0.25mm PER SIDE.
 △ ALL GROUND LEADS AND GROUND PADDLE MUST BE SOLDERED TO THE PCB RF GROUND

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Evaluation PCB



List of Material

Item	Description
J1, J2, J3	PC Mount SMA RF Connector
U1	HMC350MS8 Mixer
PCB*	101828 Eval Board
* 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. 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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Notes: