HMC304MS8

HIGH IP3 SINGLE BALANCED SMT MIXER IC 1.7 – 3 GHz

FEBRUARY 2001 v00.0600

Features

HIGH DYNAMIC RANGE: +32 dBm IIP3

NO EXTERNAL COMPONENTS OR BIAS REQUIRED

LO/RF ISOLATION: 28 dB

ULTRA SMALL MSOP8 PACKAGE: 14.8 mm²

General Description

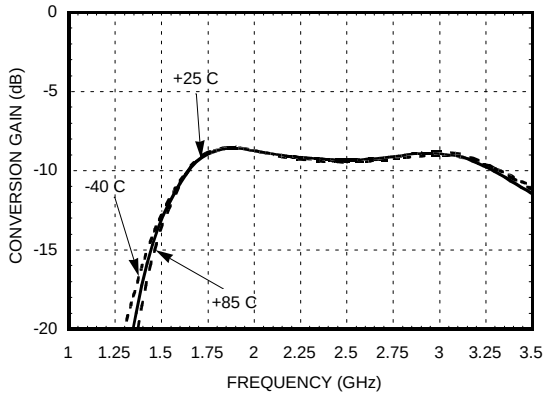
The HMC304MS8 is a passive level 17 high IP3 mixer in an 8 lead plastic surface mount Mini Small Outline Package (MSOP). This miniature single balanced MMIC mixer is constructed of GaAs Schottky diodes and novel planar transformer baluns on the chip while not requiring any external components. The RF port is balanced via the MMIC balun while the LO port is connected directly to the diodes. LO isolations are typically 20 to 30 dB. Excellent input IP3 performance of +27 to +32 dBm makes this device ideal for PCS, 3G, 2.4 GHz ISM, or MMDS applications. The HMC304MS8 is the smallest high IP3 mixer available in the market, 0.118"x 0.190" (3.0 mm x 4.9 mm).

Guaranteed Performance*, As a Function of Frequency, -40 to +85 deg C

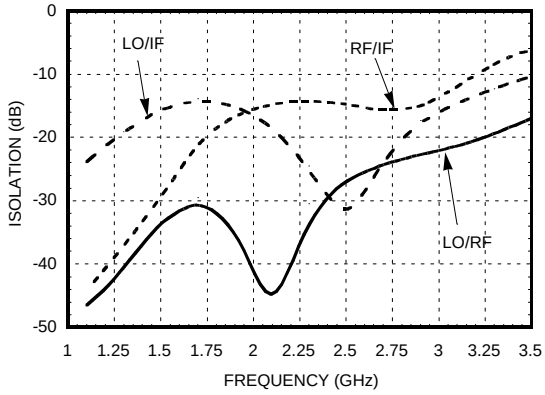
Parameter	LO = +17 dBm IF = 100 MHz			LO = +17 dBm IF = 100 MHz			Units
	Min.	Typ.	Max.	Min.	Typ.	Max.	
Frequency Range, RF & LO	1.7 - 3.0			2.2 - 2.7			GHz
Frequency Range, IF	DC - 0.8			DC - 0.8			GHz
Conversion Loss		9	11		9	10.5	dB
Noise Figure (SSB)		9	11		9	10.5	dB
LO to RF Isolation	20	30		23	32		dB
LO to IF Isolation	12	20		17	25		dB
IP3 (Input)	25	30		27	32		dBm
1 dB Gain Compression (Input)	15	19		18	19.5		dBm
Local Oscillator Drive Level	15	17	19	15	17	19	dBm

** Specifications are for downconverter performance. Similar results are achieved when using mixer as an upconverter with a resulting input IP3 of 5dB less.*

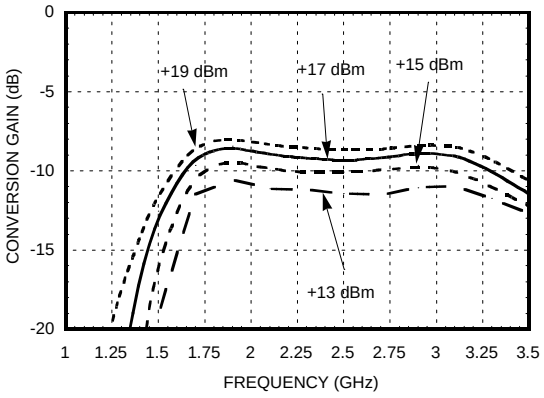
Conversion Gain vs. Temperature @ LO = +17 dBm



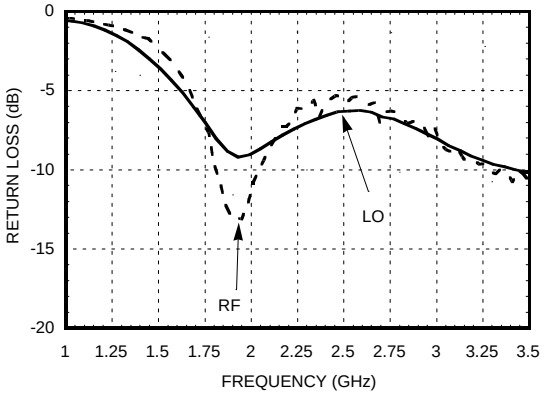
Isolation @ LO = +17 dBm



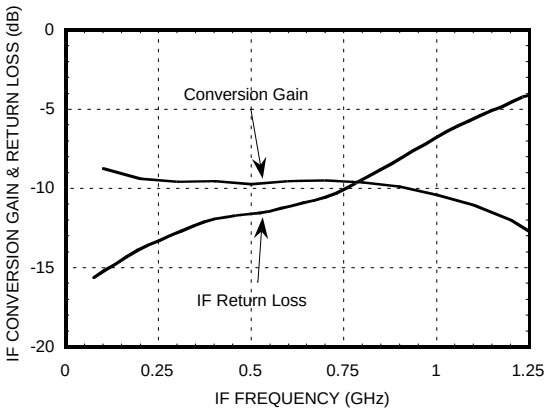
Conversion Gain vs. LO Drive



Return Loss @ LO = +17 dBm



IF Bandwidth @ LO = +17 dBm



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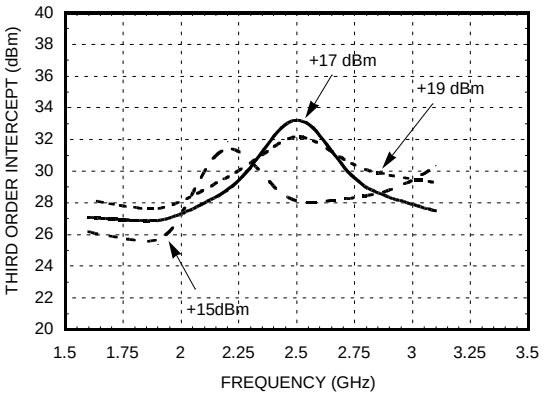
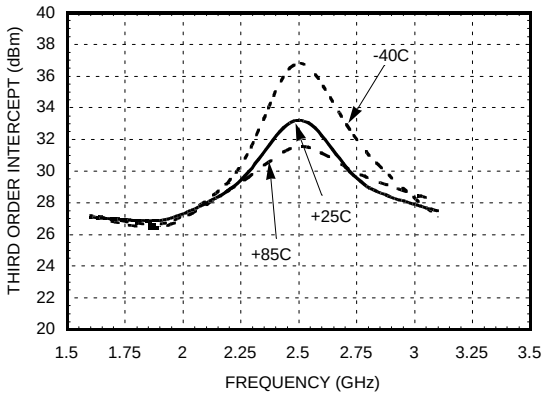
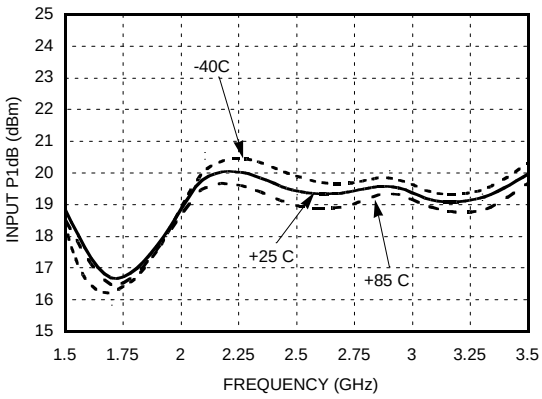
Input IP3 vs. LO Drive



Input IP3 vs. Temperature @ LO = +17 dBm



P1dB vs. Temperature @ LO = +17 dBm



MXN Spurious Outputs

	nLO				
mRF	0	1	2	3	4
0	xx	-20	-11	2	7
1	10	0	32	29	31
2	50	61	62	52	59
3	89	90	93	85	81
4	107	> 107	>107	>107	>107

RF= 2 GHz @ -10 dBm
LO= 1.9 GHz @ +17 dBm
All values in dBc relative to the IF

Harmonics of LO

	nLO Spur at RF Port			
LO Frequency (GHz)	1	2	3	4
1.5	34	18	32	49
1.9	34	18	32	48
2.3	32	22	36	58
2.7	25	26	39	73
3.1	23	29	35	64
3.6	17	31	36	57

LO= +17 dBm
Values in dBc below input LO level measured at the RF port

MICROWAVE CORPORATION

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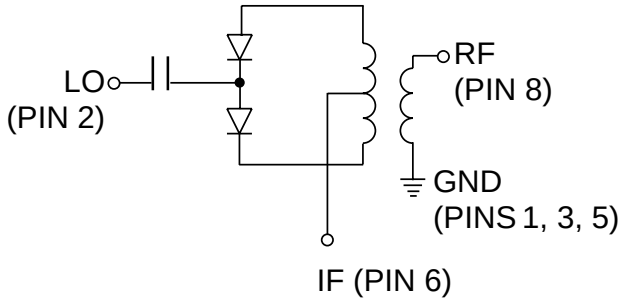
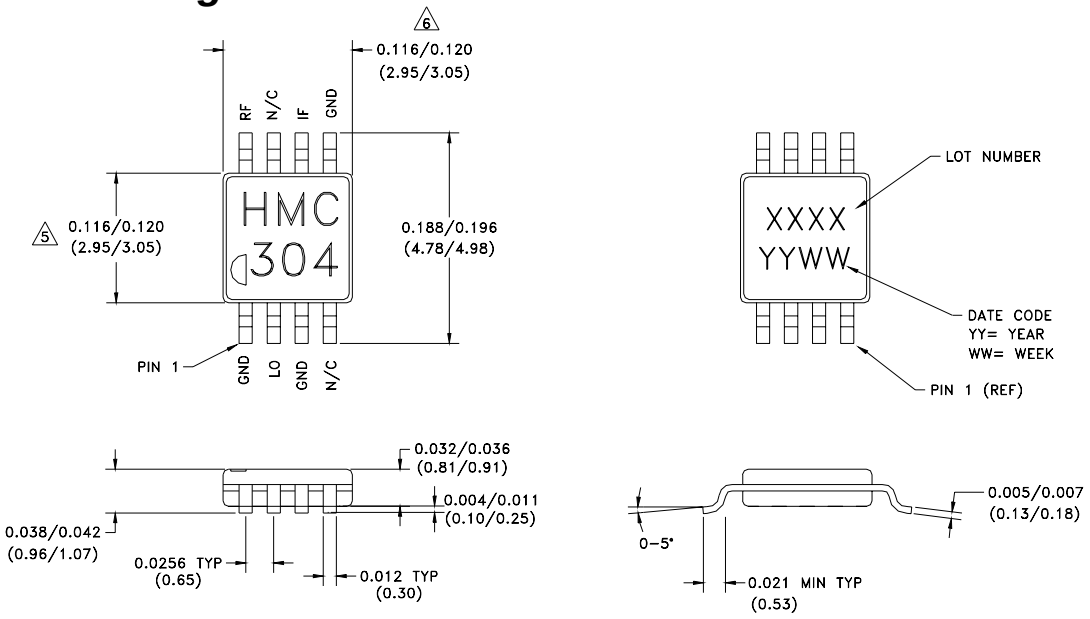
Schematic



Absolute Maximum Ratings

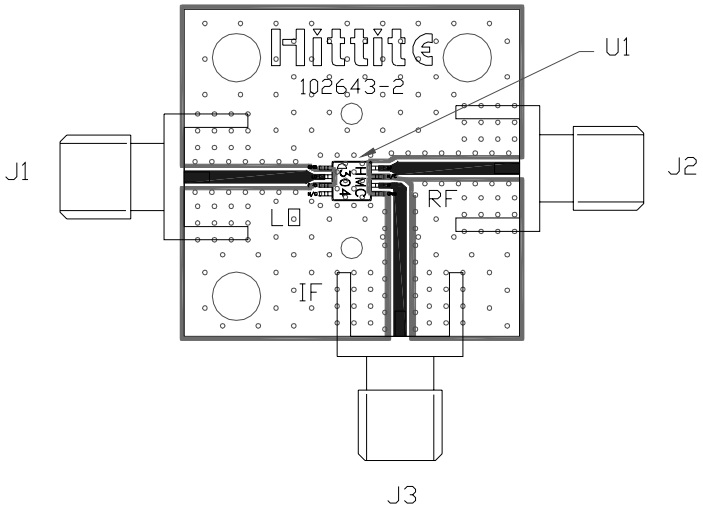
RF / IF Input	+27 dBm
LO Drive	+27 dBm
DC Current Into IF Port	± 9 mA
Storage Temperature	-65 to +150 deg C
Operating Temperature	-55 to +85 deg C

Outline Drawing



1. MATERIAL:
   A) PACKAGE BODY - LOW STRESS INJECTION-MOLDED PLASTIC
   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. CHARACTERS TO BE HELVETICA MEDIUM, 0.030 HIGH
5. DIMENSION DOES NOT INCLUDE MOLDFLASH OF 0.006 (0.15mm) PER SIDE
6. DIMENSION DOES NOT INCLUDE MOLDFLASH OF 0.010 (0.25mm) PER SIDE
7. N/C = NO CONNECTION, RF GROUND THESE PINS

Recomenmended PCB Layout for HMC304MS8



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.

Evaluation Circuit Board Layout Design Details

Item	Description
J1, J2, J3	PC Mount SMA RF Connector
U1	HMC304MS8 Mixer
PCB*	102643 Eval Board
** Circuit Board Material : Rogers 4350*	

NOTES: