GaAs MMIC SMT DOUBLE-BALANCED MIXER 1.7 - 4.5 GHz

FEBRUARY 2001

v01.1000

Features

ULTRA SMALL PACKAGE: MSOP8

CONVERSION LOSS: 8 dB

LO/IF ISOLATION: 32 dB

LO/RF ISOLATION: 35 dB

IP3 (INPUT): +18 dBm

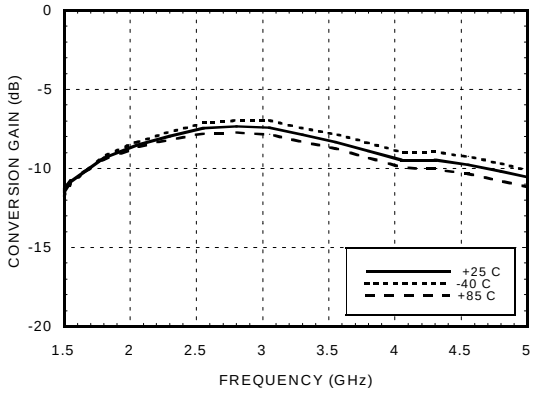
General Description

The HMC175MS8 is a miniature double-balanced mixer in an 8-lead plastic surface mount Mini Small Outline Package (MSOP). The device can be used as an upconverter or downconverter and is especially suitable for portable wireless applications, PCMCIA cards and mini-basestations, because of its small size and zero DC bias requirement. The mixer provides exceptional isolation and Intermodulation performance for application in high signal density environments. This device can also be used as a biphase modulator or demodulator. The MSOP8 is the smallest footprint available for a complete double-balanced mixer (0.118" x 0.190" x 0.040").

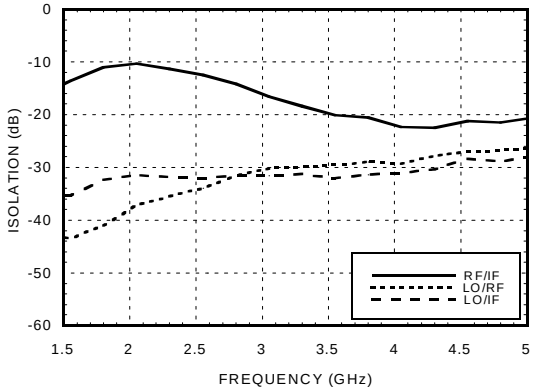
Guaranteed Performance *With LO Drive of +13 dBm & IF =100MHz, - 40 to + 85 deg. C*

Parameter	Broadband			PCS Band			ISM Band			Units
	Min.	Typ.	Max.	Min.	Typ.	Max.	Min.	Typ.	Max.	
Frequency Range, RF & LO	1.7 - 4.5			1.7 - 2.0			2.2 - 2.6			GHz
Frequency Range, IF	DC - 1.0			DC - 1.0			DC - 1.0			GHz
Conversion Loss		8	11		9	11		8	10	dB
Noise Figure (SSB)		8	11		9	11		8	10	dB
LO to RF Isolation	25	30		35	40		30	35		dB
LO to IF Isolation	27	32		28	32		28	32		dB
IP3 (Input)	15	20		15	18		15	18		dBm
1 dB Gain Compression (Input)	9	12		9	11		9	11		dBm
Local Oscillator Drive Level	10	13	15	10	13	15	10	13	15	dBm

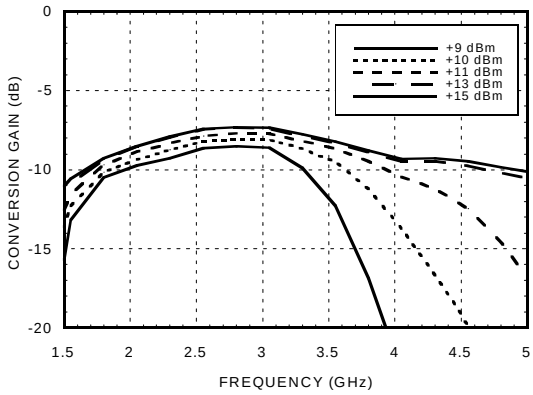
Conversion Gain vs. Temperature @ Lo = +13 dBm



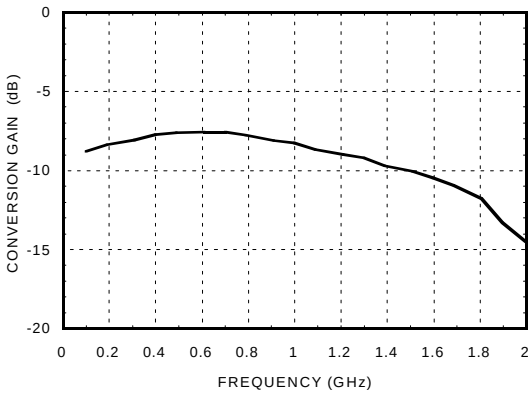
Isolation @ Lo = +13 dBm



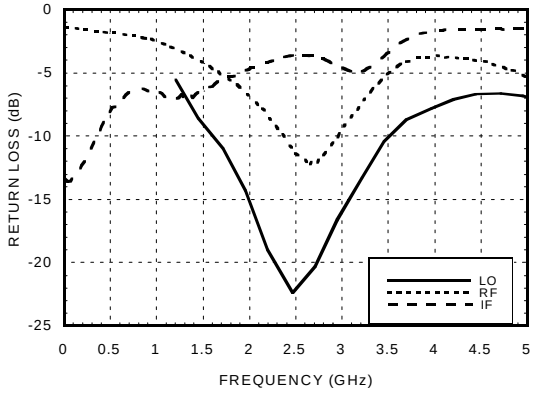
Conversion Gain vs. Lo Drive



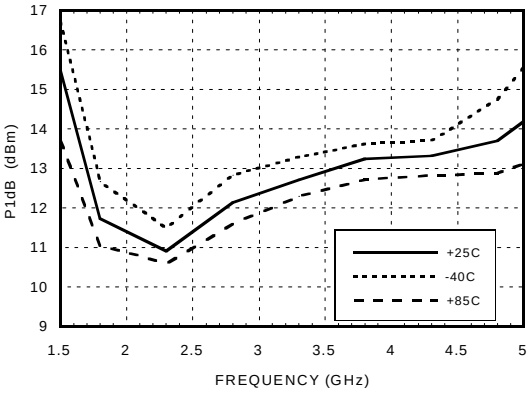
IF Bandwidth @ Lo = +13 dBm



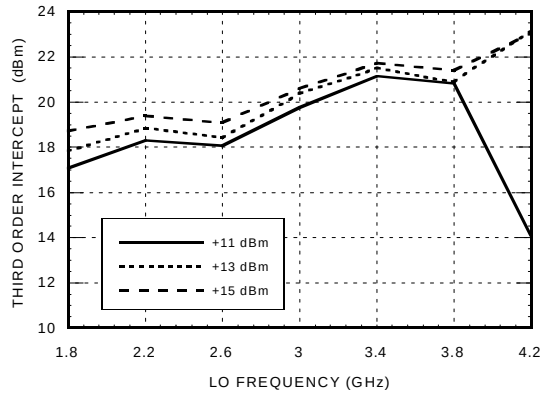
Return Loss @ Lo = +13 dBm



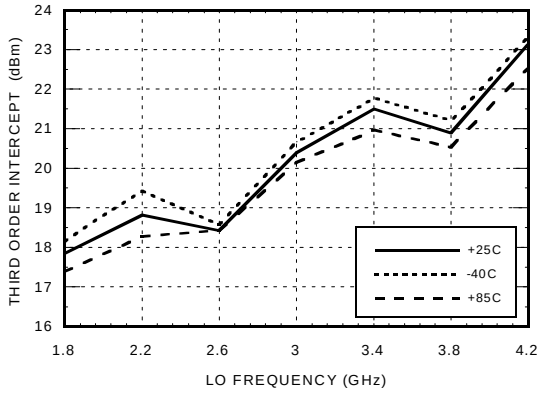
P1dB vs. Temperature @ Lo = +13 dBm



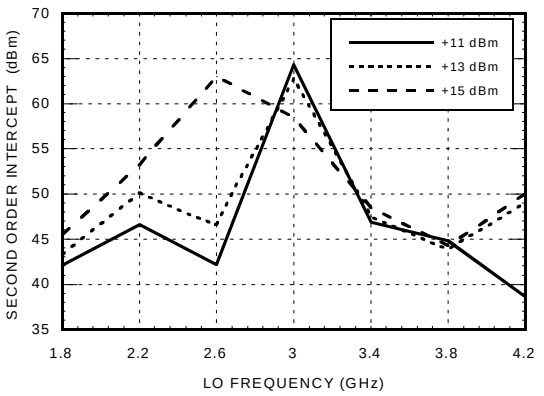
Input IP3 vs. Lo Drive



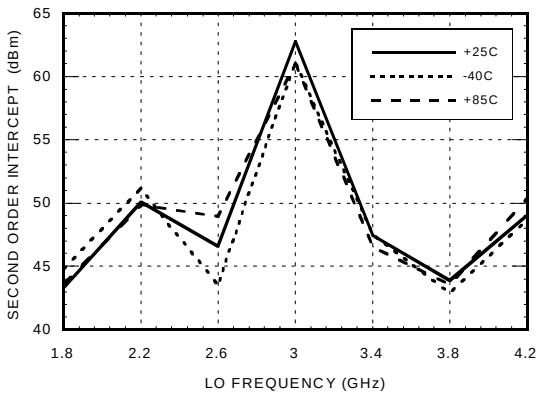
Input IP3 vs. Temperature @ Lo = +13 dBm



Input IP2 vs. Lo Drive



Input Ip2 vs. Temperature @ Lo = +13 dBm



MXN Spurious Outputs

RF Frequency = 2.3 GHz @ -10 dBm					
LO Frequency = 2.4 GHz @ 13 dBm					
	nLO				
mRF	0	1	2	3	4
0	xx	1	12	12	37
1	4	0	27	39	38
2	74	53	56	60	67
3	78	>105	73	72	79
4	>105	>105	>105	>105	>105
All values in dBc below IF power level.					

Harmonics of Lo

LO Freq. (GHz)	nLO Spur at RF port			
	1	2	3	4
1.8	37	32	63	53
2.2	35	30	37	63
2.6	32	28	33	55
3	30	29	53	52
3.1	29	30	56	51
3.6	29	39	52	53
4.2	27	46	48	61
LO = +13 dBm Values in dBc below input LO level measured at RF port.				

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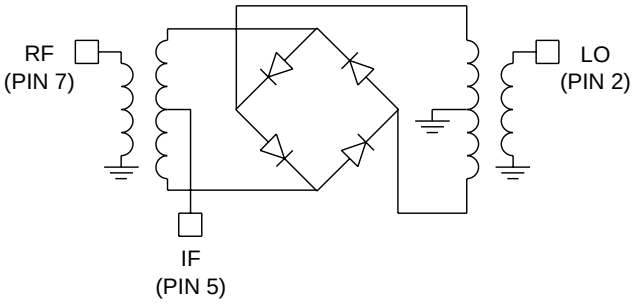
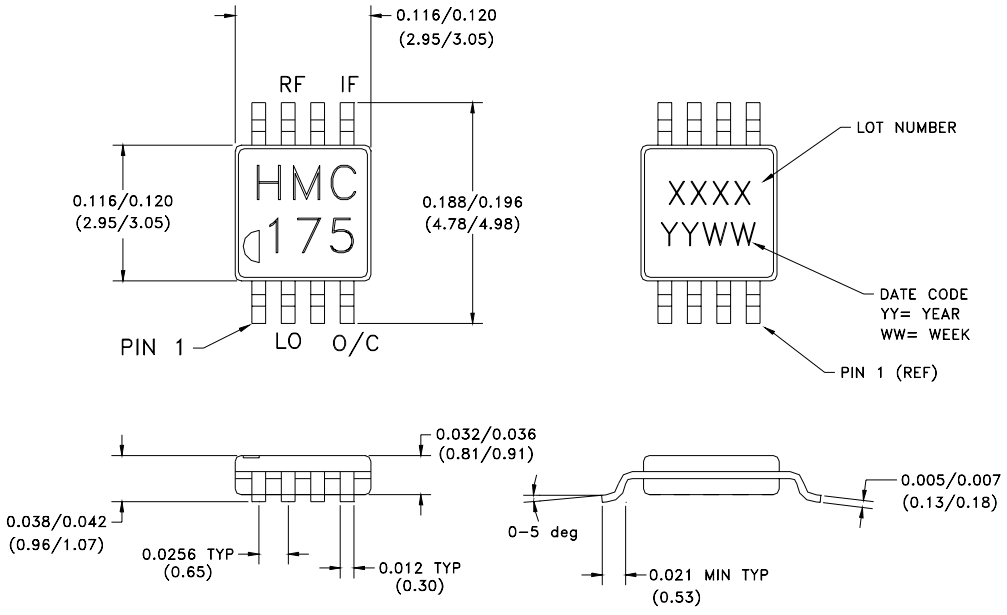
Schematic



Absolute Maximum Ratings

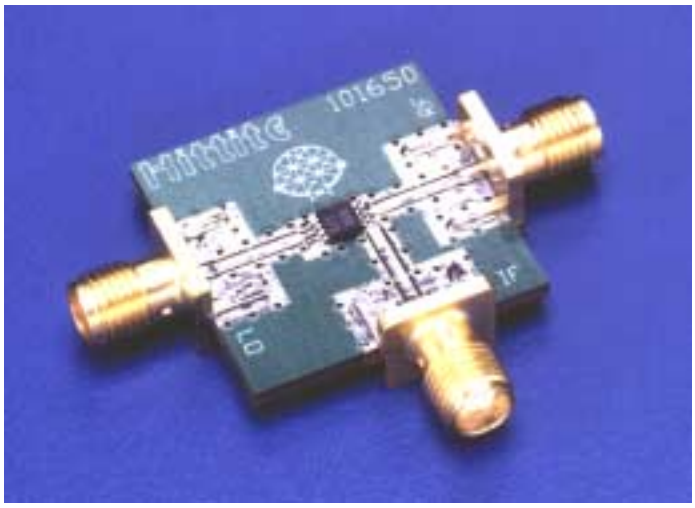
RF / IF Input	+13 dBm
LO Drive	+27 dBm
Storage Temperature	-65 to +150 deg C
Operating Temperature	-55 to +85 deg C

Outline Drawing



1. MATERIAL:
   A) PACKAGE BODY - LOW STRESS INJECTION-MOLDED PLASTIC, 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 Circuit Board



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

Layout Technique	Grounded Co-Planar Waveguide (GCPW)
Material	FR4
Dielectric Thickness	0.028" (0.71 mm)
50 Ohm Line Width	0.037" (0.94 mm)
Gap to Ground Edge	0.010" (0.25 mm)
Ground VIA Hole Diameter	0.014" (0.36 mm)
Connectors	SMA-F (EF - Johnson P/N 142-0701-806)

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NOTES: