

## GaAs MMIC SMT DOUBLE-BALANCED MIXER 0.7 - 2.0 GHz

FEBRUARY 2000

### 900 MHz Performance

ULTRA SMALL PACKAGE: MSOP8

CONVERSION LOSS: 8 dB

LO/RF ISOLATION: 42 dB

IP3 (INPUT) : +17 dBm

### General Description

The HMC208MS8 is an ultra miniature double-balanced mixer in an 8 lead plastic surface mount Mini Small Outline Package (MSOP). This passive MMIC mixer is constructed of GaAs Schottky diodes and novel planar transformer baluns on the chip. The device can be used as a up, or downconverter, bi-phase (de)modulator or phase comparator for 900, 1500, or 1900 MHz applications. It is especially suited for miniature basestations, PCMCIA transceivers, cable modems, and portable wireless applications because of its high dynamic input signal range, small size, and zero DC bias requirement. The consistent MMIC performance will improve system operation and assure regulatory compliance. The MSOP8 package is the smallest footprint available for a complete double-balanced mixer, 0.118" x 0.190" (3.0mm x 4.9mm). At a height of 0.040" (1.0mm) this is the *thinnest* mixer package available today.



4

MIXERS

SMT



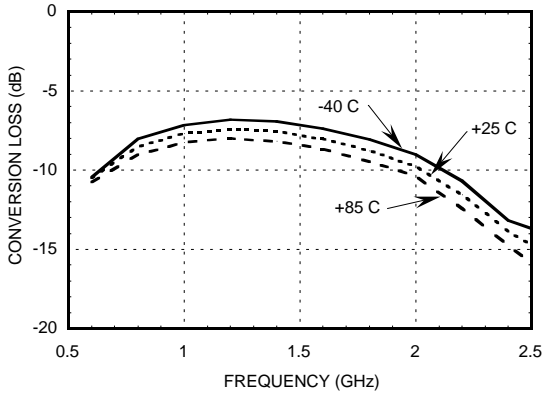
### Guaranteed Performance As a Function of LO Drive , -40 to +85 deg C

Parameter	LO = +13 dBm IF = 70 MHz			LO = +10 dBm IF = 70 MHz			Units
	Min.	Typ.	Max.	Min.	Typ.	Max.	
Frequency Range, RF & LO		0.7 - 2.0			0.8 - 1.2		GHz
Frequency Range, IF		DC - 0.5			DC - 0.5		GHz
Conversion Loss		9	10.5		8.5	10.5	dB
Noise Figure (SSB)		9	10.5		8.5	10.5	dB
LO to RF Isolation	20	24		32	40		dB
LO to IF Isolation	13	17		22	30		dB
RF to IF Isolation	10	14		17	22		dB
IP3 (Input)	13	17		12	16		dBm
1 dB Gain Compression (Input)	7	10		5	8		dBm
Local Oscillator Drive Level	8		17	8		17	dBm

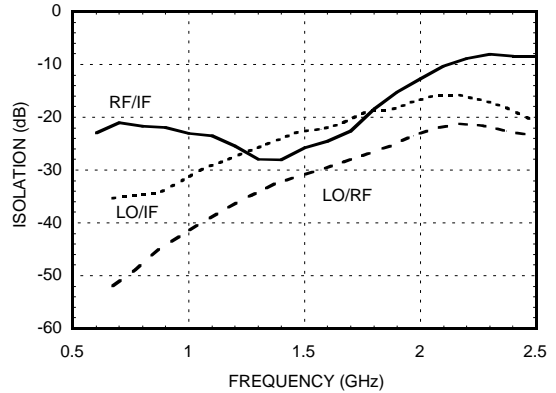
## HMC208MS8 SMT DOUBLE-BALANCED MIXER 0.7 - 2.0 GHz

FEBRUARY 2000

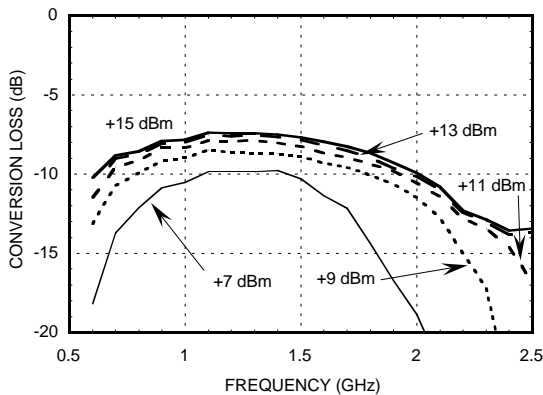
**Conversion Loss vs. Temperature @ LO = +13 dBm**



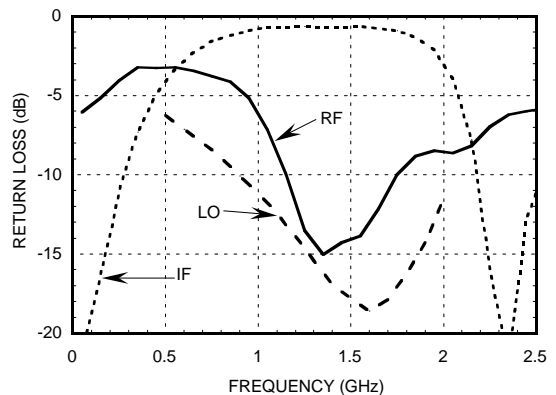
**Isolation @ LO = +13 dBm**



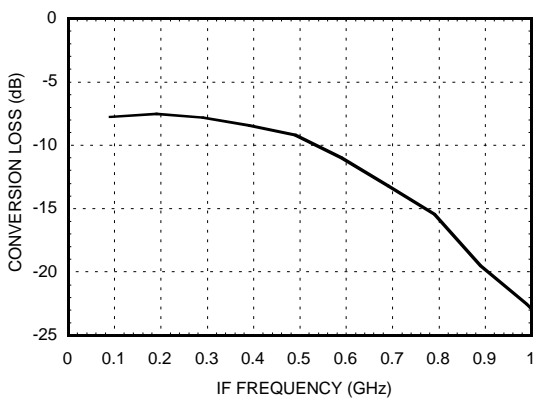
**Conversion Loss vs. LO Drive**



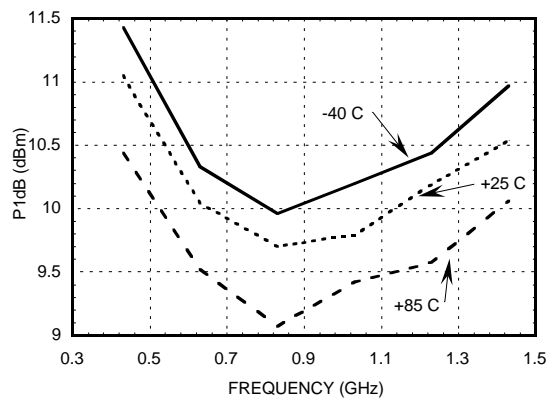
**Return Loss @ LO = +13 dBm**



**IF Bandwidth @ LO = +13 dBm**



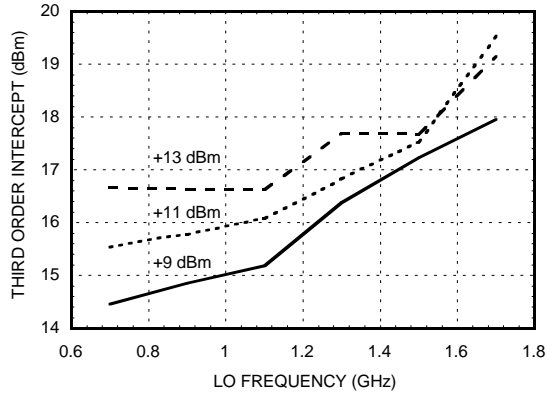
**P1dB vs. Temperature @ LO = +13 dBm**



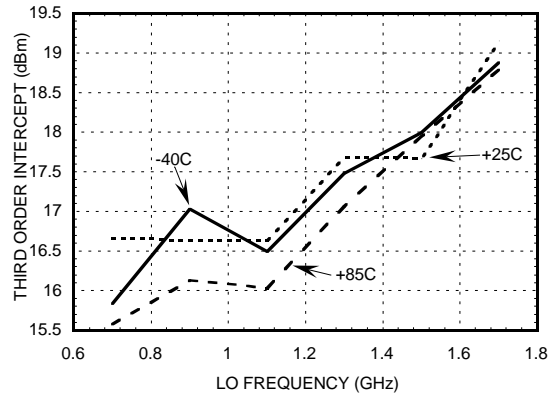
## HMC208MS8 SMT DOUBLE-BALANCED MIXER 0.7 - 2.0 GHz

FEBRUARY 2000

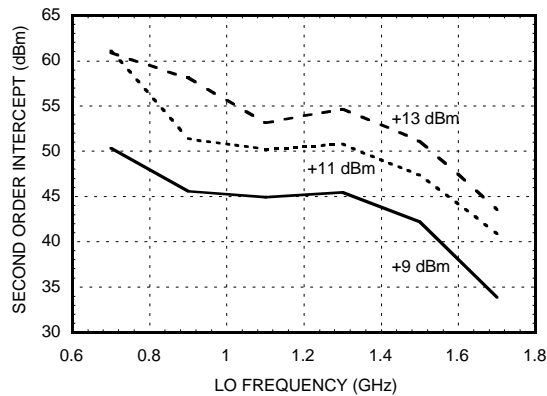
### Input IP3 vs. LO Drive



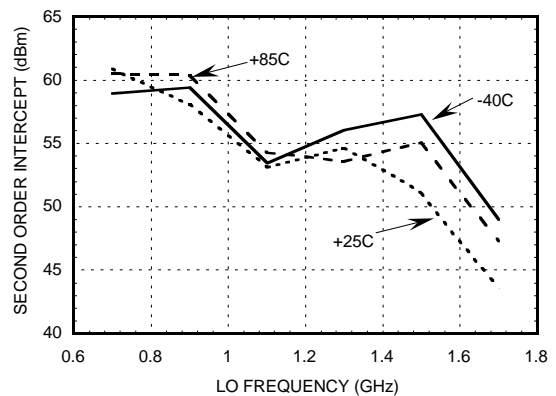
### Input IP3 vs. Temperature @ LO = +13 dBm



### Input IP2 vs. LO Drive



### Input IP2 vs. Temperature @ LO = +13 dBm



### MXN Spurious Outputs

mRF	nLO				
	0	1	2	3	4
0	xx	2	25	17	45
1	16	0	52	38	27
2	60	55	72	62	77
3	65	96	88	64	91
4	> 105	> 105	> 105	100	> 105

RF= 0.9 GHz @ -10 dBm  
 LO= 0.97 GHz @ +13 dBm  
 All values in dBc relative to the IF

### Harmonics of LO

LO Frequency (GHz)	nLO Spur at RF Port			
	1	2	3	4
0.7	50	40	47	61
0.9	46	54	56	71
1.1	39	54	51	72
1.3	34	53	51	90
1.5	31	50	65	87
1.7	28	50	72	82

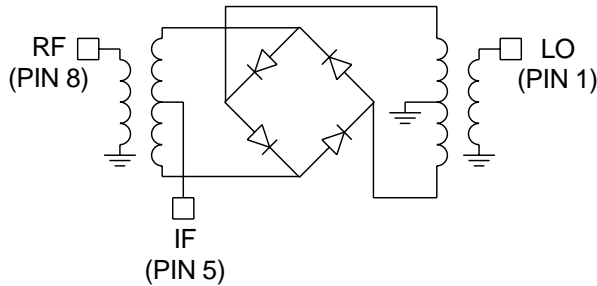
LO= +13 dBm  
 Values in dBc below input LO level measured at the RF port



## HMC208MS8 SMT DOUBLE-BALANCED MIXER 0.7 - 2.0 GHz

FEBRUARY 2000

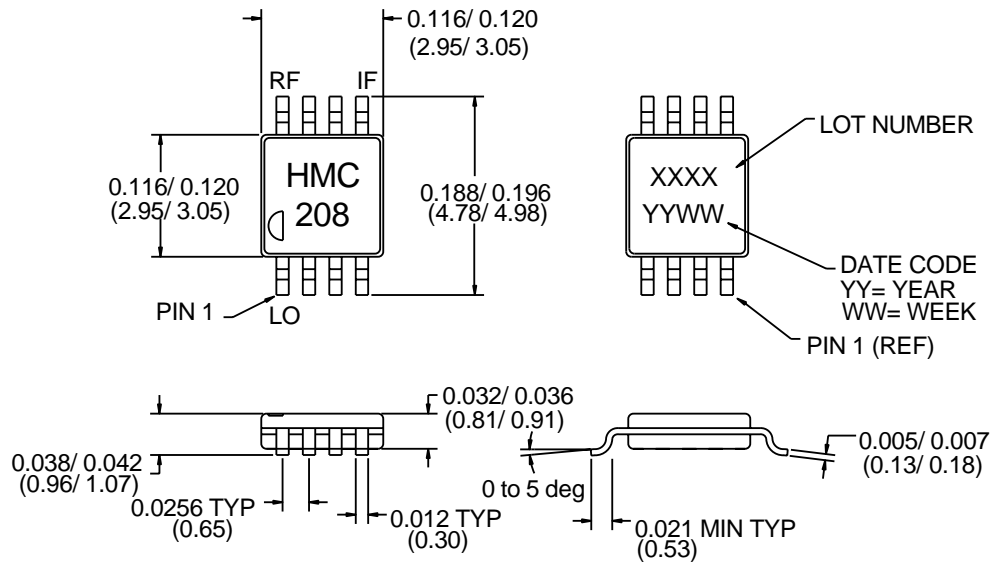
### Schematic



### 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  $\pm 0.005$  ( $\pm 0.13$ )
4. ALL UNLABELED LEADS ARE GROUND