

GaAs MMIC SMT DOUBLE-BALANCED FET MIXER 1.3 - 2.5 GHz

FEBRUARY 2001

Features

IP3 (INPUT): +25 dBm @ +11 dBm LO

LO RANGE = +3 to +11 dBm

CONVERSION LOSS: 8.5 dB

LO/RF ISOLATION: 35 dB

General Description

The HMC216MS8 is an ultra miniature double-balanced FET mixer in an 8 lead plastic surface mount package (MSOP). This MMIC mixer is constructed of switched GaAs FETs and novel planar transformer baluns on the chip. In addition to an LO drive of +3 to +13 dBm, a gate voltage of $V_{gg} = -0.9$ to -1.6 Vdc is required. The device can be used as an up, or downconverter for 1900 or 2400 MHz applications. It is especially suited for miniature basestations, WLAN, PCMCIA, and portable wireless applications. 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* SMT FET mixer available today.



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MIXERS

SMT

Guaranteed Performance,

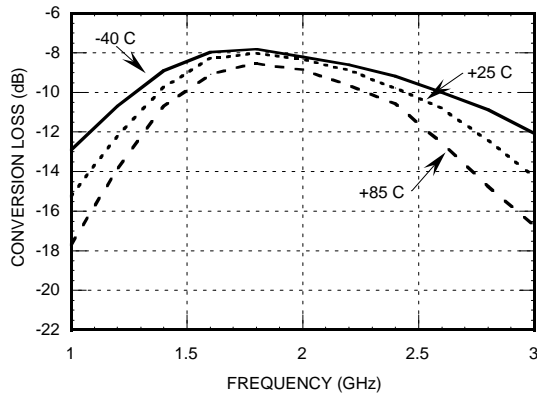
As a Function of LO Drive, IF = 175 MHz, $V_{gg} = -1.2$ Vdc, - 40 to + 85 deg. C

Parameter	LO = +11 dBm			LO = +7 dBm			LO = +3 dBm			Units
	Min.	Typ.	Max.	Min.	Typ.	Max.	Min.	Typ.	Max.	
Frequency Range, RF & LO	1.3 - 2.5			1.6 - 2.3			1.7 - 2.0			GHz
Frequency Range, IF	DC - 0.65			DC - 0.5			DC - 0.4			GHz
Conversion Loss		9	10.5		8.5	10		9	10.5	dB
Noise Figure (SSB)		9	10.5		8.5	10		9	10.5	dB
LO to RF Isolation	27	30		27	32		27	32		dB
LO to IF Isolation	17	20		17	20		17	20		dB
IP3 (Input) $V_{gg} = -1.5$ Vdc	21	25		14	18		8	12		dBm
1 dB Gain Compression (Input)	8	11		5	10		3	8		dBm
Local Oscillator Drive Level	0	11	15	0	7	15	0	3	15	dBm
Gate Voltage (V_{gg})	-0.8		-1.8	-0.8		-1.8	-0.8		-1.8	Vdc

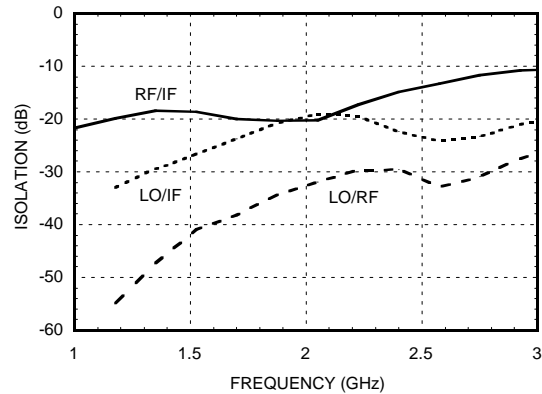
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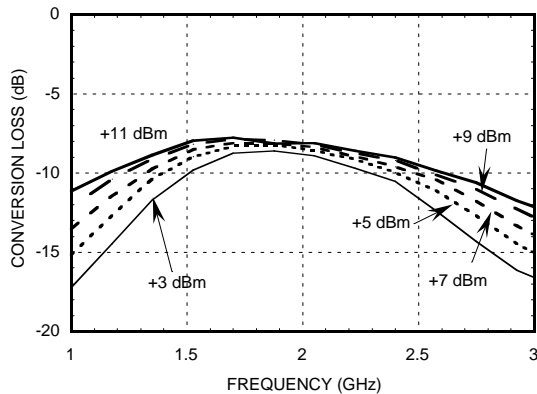
Conversion Loss vs. Temperature @ LO = +7 dBm



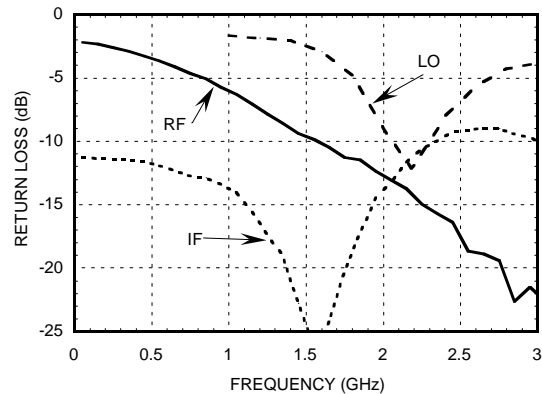
Isolation @ LO = +7 dBm



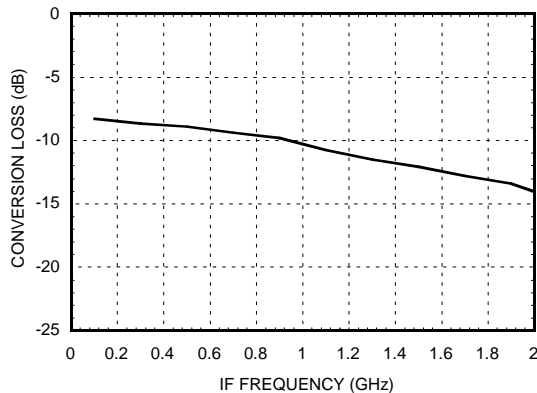
Conversion Loss vs. LO Drive



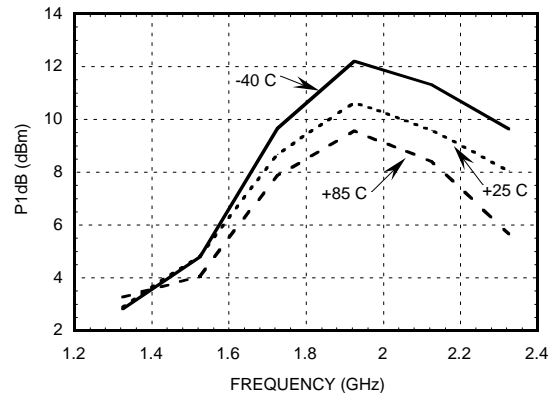
Return Loss @ LO = +7 dBm



IF Bandwidth @ LO = +7 dBm



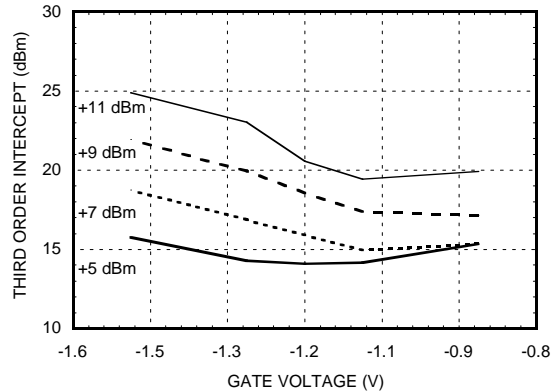
P1dB vs. Temperature for LO = +7 dBm, V_{gg} = -1.2 Vdc



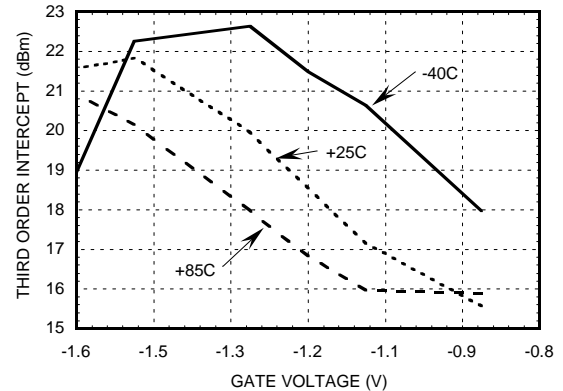
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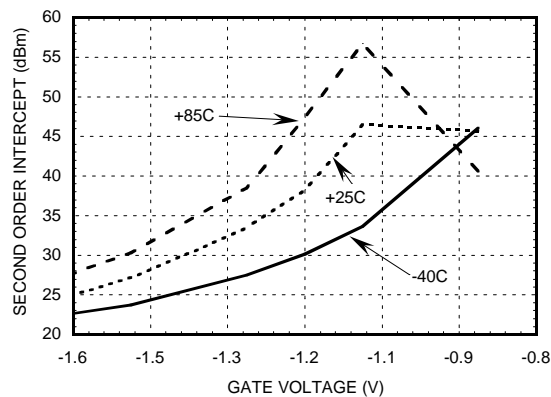
Input IP3 vs. LO Drive and V_{gg}



Input IP3 vs. Temperature and V_{gg} for @ LO = +7 dBm



Input IP2 vs. Temperature and V_{gg} for @ LO = +7 dBm



MXN Spurious Outputs

mRF	nLO				
	0	1	2	3	4
0	xx	-1	14	24	40
1	14	0	28	21	46
2	45	45	59	55	50
3	83	67	62	59	77
4	> 105	> 105	> 105	85	96

RF= 1.975 GHz @ -10 dBm
 LO= 1.8 GHz @ +7 dBm, V_{gg} = -1.2 V
 All values in dBc relative to the IF

Harmonics of LO

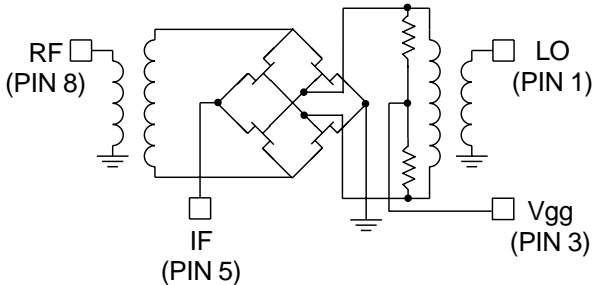
LO Frequency (GHz)	nLO Spur at RF Port			
	1	2	3	4
1.5	41	47	61	78
1.7	38	47	72	71
1.9	34	41	69	72
2.1	31	37	72	79
2.3	29	38	74	74
2.5	32	45	65	74

LO= +7 dBm, V_{gg} = -1.2 V
 Values in dBc below input LO level measured at the RF port

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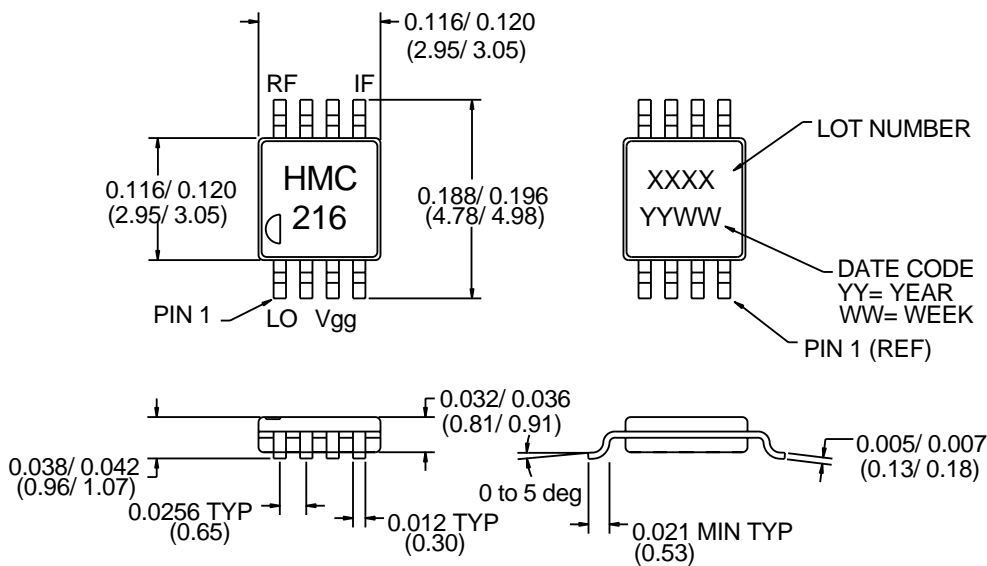
Schematic



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