

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

### Typical Applications

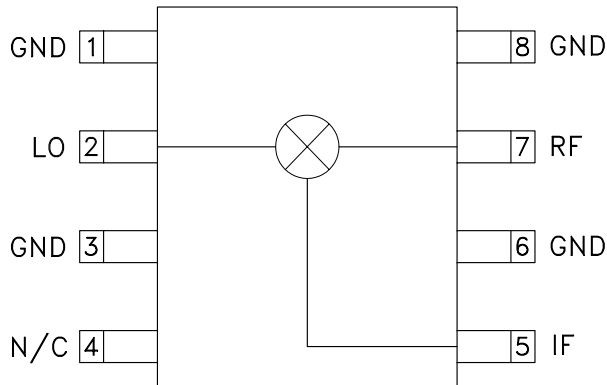
The HMC207S8 is ideal for:

- Base Stations
- Cable Modems
- Portable Wireless

### Features

- Conversion Loss: 9.0 dB
- LO / IF Isolation: 45 dB
- LO / RF Isolation: 40 dB
- IP3 (Input): +17 dBm

### Functional Diagram



### General Description

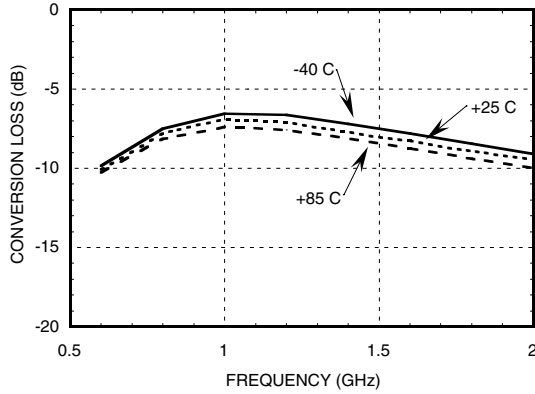
The HMC207S8 is a miniature double-balanced mixer in an 8 lead plastic surface mount Small Outline IC (SOIC) package. This passive MMIC mixer is constructed of GaAs Schottky diodes and novel planar transformer baluns on the chip. The device can be used as an upconverter, down-converter, biphas modulator (de)modulator, or phase comparator. The consistent MMIC performance will improve system operation and assure regulatory compliance. The high LO suppression of 45 to 50 dB yields excellent carrier suppression for modulator applications.

### Electrical Specifications, $T_A = +25^\circ C$ , As a Function of LO Drive

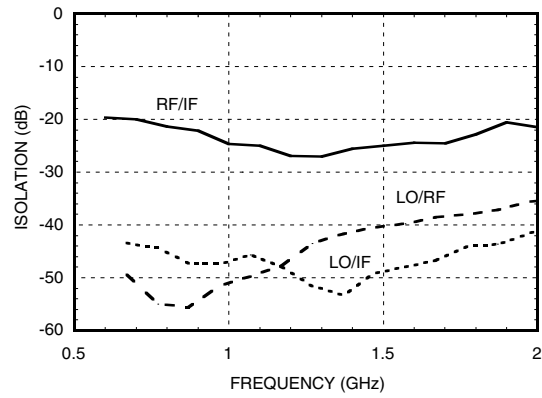
Parameter	LO = +13 dBm IF = 70 MHz			LO = +10 dBm IF = 70 MHz			Units
	Min.	Typ.	Max.	Min.	Typ.	Max.	
Frequency Range, RF & LO	0.7 - 2.0			0.8 - 1.2			GHz
Frequency Range, IF	DC - 0.3			DC - 0.3			GHz
Conversion Loss		9	10.5		7.5	10	dB
Noise Figure (SSB)		9	10.5		7.5	10	dB
LO to RF Isolation	32	40		40	45		dB
LO to IF Isolation	38	45		40	45		dB
RF to IF Isolation	17	23		18	22		dB
IP3 (Input)	14	17		12	15		dBm
1 dB Gain Compression (Input)	8	11		7	10		dBm

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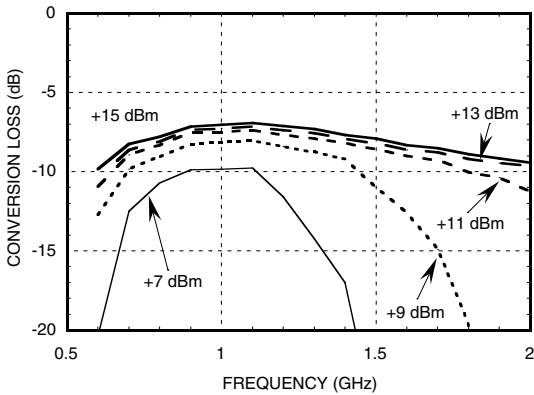
**Conversion Loss vs Temperature @ LO = +13 dBm**



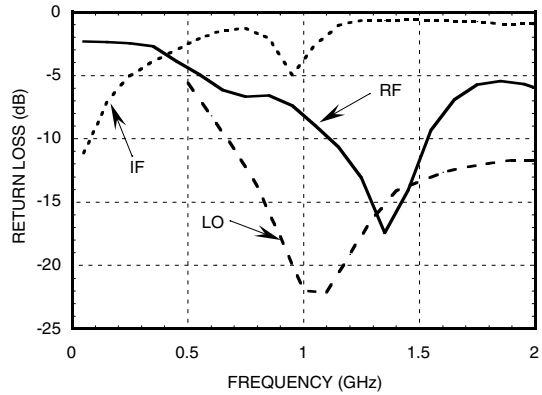
**Isolation @ LO = +13 dBm**



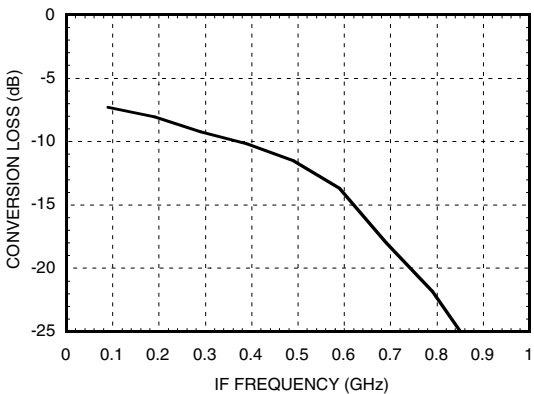
**Conversion Loss vs. LO Drive**



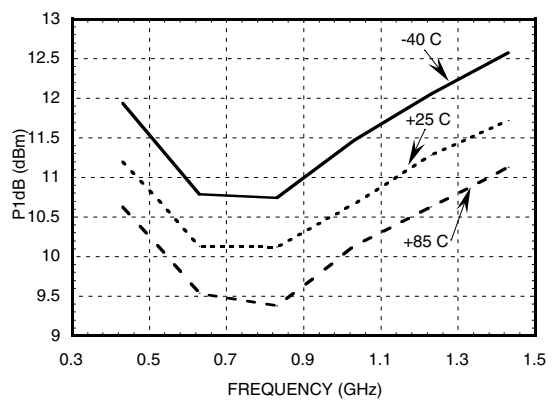
**Return Loss @ LO = +13 dBm**



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

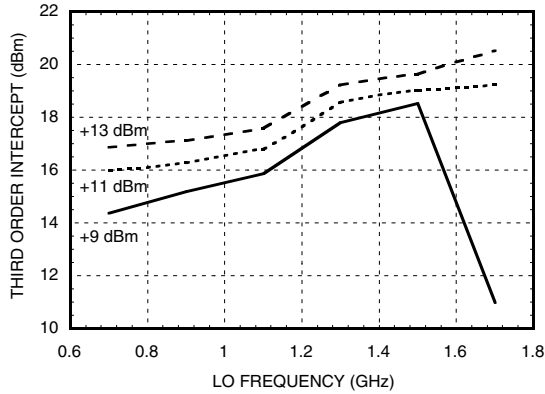


**P1dB vs. Temperature @ LO = +13 dBm**

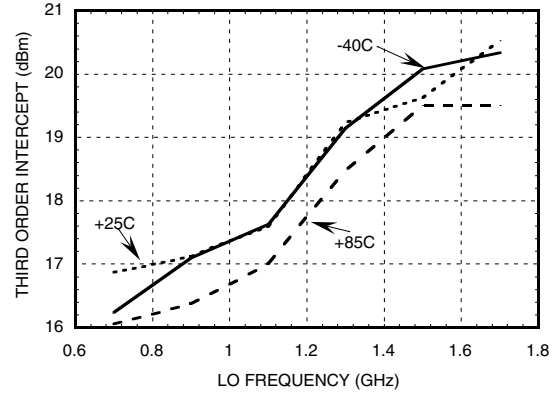


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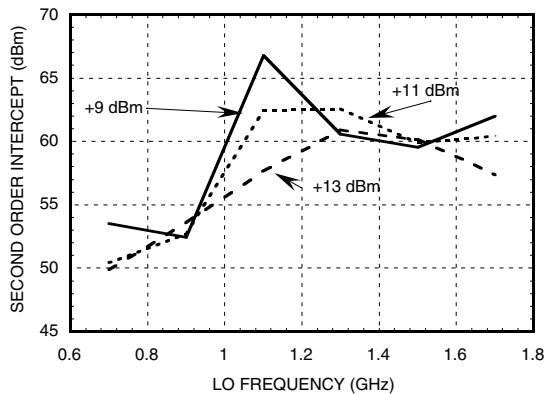
**Input IP3 vs. LO Drive**



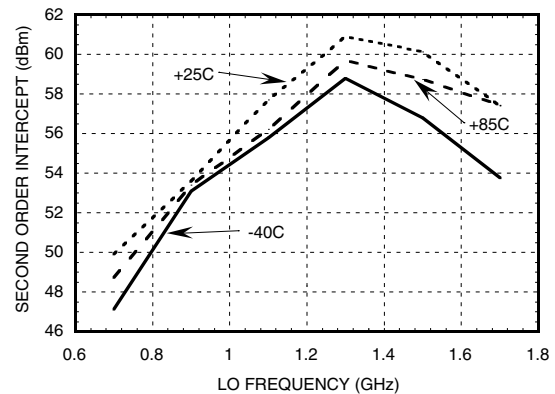
**Input IP3 vs. Temperature @ LO = +13 dBm**



**Input IP2 vs. LO Drive**



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



**MxN Spurious Outputs**

mRF	nLO				
	0	1	2	3	4
0	xx	19	27	20	36
1	17	0	43	43	39
2	64	66	63	74	75
3	91	94	92	65	86
4	>105	>105	>105	97	97

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

**Harmonics of LO**

LO Freq. (GHz)	nLO Spur at RF Port			
	1	2	3	4
0.7	49	38	54	50
0.9	54	35	53	59
1.1	49	34	53	57
1.3	42	34	46	56
1.5	40	36	43	58
1.7	38	42	40	61

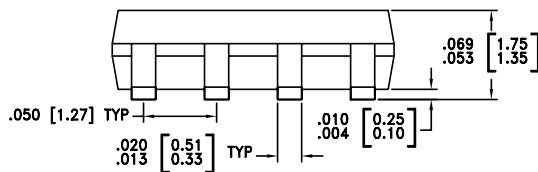
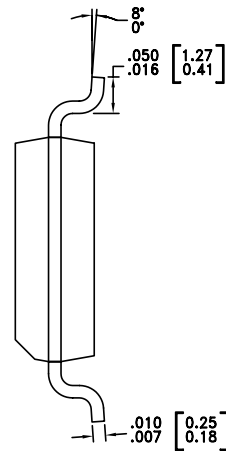
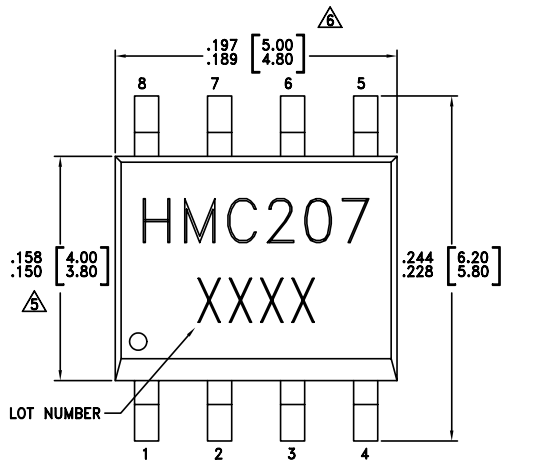
LO = +13 dBm  
 Values in dBc below input LO level measured at RF Port.

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
### Absolute Maximum Ratings

RF / IF Input	+13 dBm
LO Drive	+27 dBm
Storage Temperature	-65 to +150 °C
Operating Temperature	-40 to +85 °C

### Outline Drawing

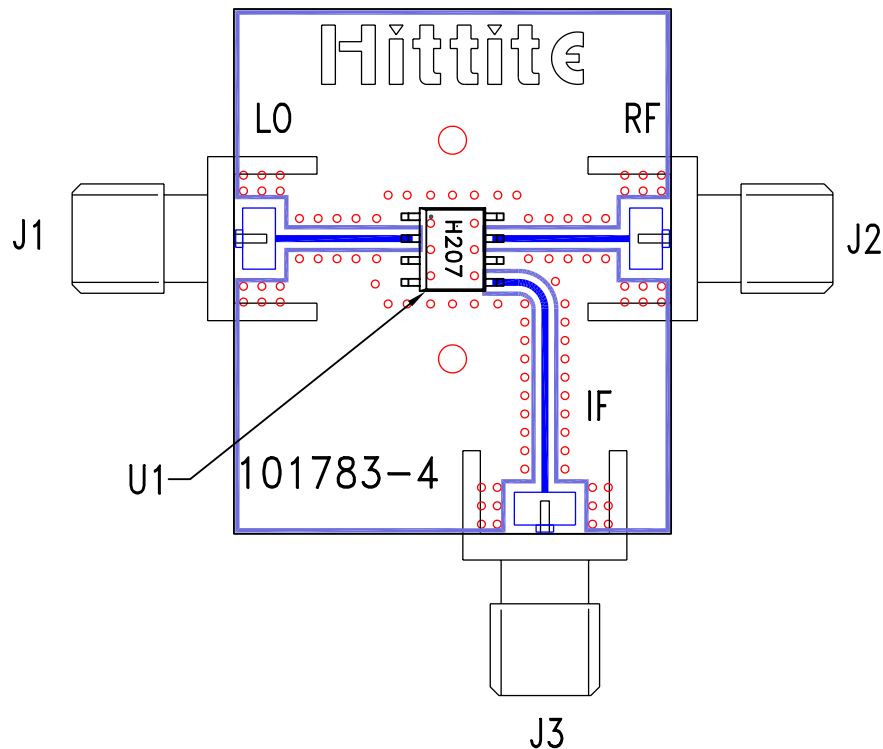


#### NOTES:

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

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### Evaluation PCB



### List of Material

Item	Description
J1 - J3	PC Mount SMA RF Connector
U1	HMC207S8 Mixer
PCB*	101783 Evaluation 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 shown is available from Hittite upon request.

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

**Notes:**