

# Analog Devices Welcomes Hittite Microwave Corporation

NO CONTENT ON THE ATTACHED DOCUMENT HAS CHANGED



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### Typical Applications

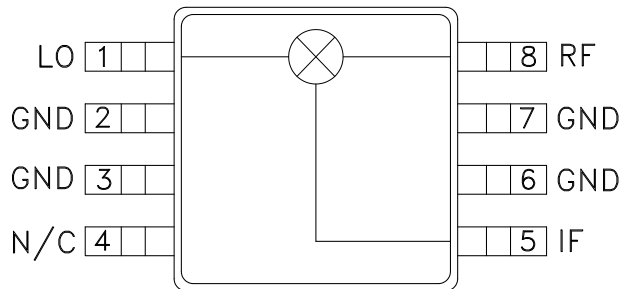
The HMC218AMS8E is ideal for:

- Basestations, Repeaters & Access Points
- WiMAX, WiBro & Fixed Wireless
- Portables & Subscribers
- PLMR, Public Safety & Telematics

### Features

- Passive Double-Balanced Topology
- Input IP3: +18 dBm
- Low Conversion Loss: 6.5 dB
- LO / RF Isolation: 30 dB
- LO / IF Isolation: 25 dB
- Upconverter & Downconverter Applications

### Functional Diagram



### General Description

The HMC218AMS8E is an ultra miniature double-balanced mixer in an 8 lead plastic surface mount 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 an upconverter, downconverter, biphas modulator / demodulator, or phase comparator. The low conversion loss, high isolation and wide IF bandwidth make this mixer ideal for a variety of Rx and Tx frequency plans.

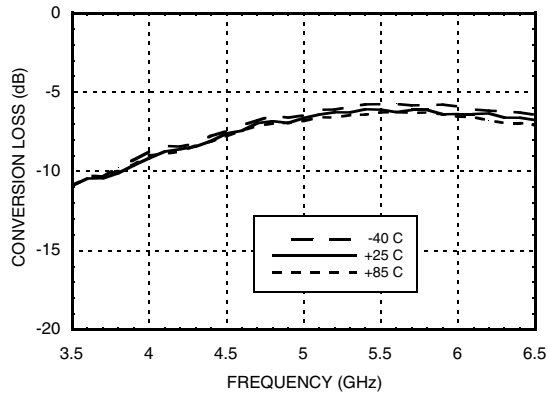
### Electrical Specifications, $T_A = +25^\circ \text{C}$ , As a Function of LO Drive

Parameter	LO = +13 dBm IF = 100 MHz			LO = +10 dBm IF = 100 MHz			LO = +7 dBm IF = 100 MHz			Units
	Min.	Typ.	Max.	Min.	Typ.	Max.	Min.	Typ.	Max.	
Frequency Range, RF & LO	4.5 - 6.0			4.5 - 6.0			4.7 - 5.9			GHz
Frequency Range, IF	DC - 1.6			DC - 1.6			DC - 1.5			GHz
Conversion Loss		6.5	8.5		8	9.5		8	9.5	dB
Noise Figure (SSB)		6.5	8.5		8	9.5		8	9.5	dB
LO to RF Isolation	25	30		25	30		23	28		dB
LO to IF Isolation	15	25		14	25		12	23		dB
IP3 (Input)	5.2 GHz	12	16	11	14		9	12		dBm
	5.8 GHz	15	18	13	17		10	13		dBm
1 dB Gain Compression (Input)	7	10		5	9		4	7		dBm

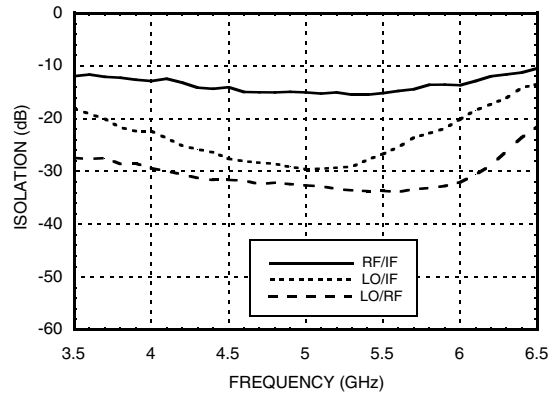


**GaAs MMIC SMT DOUBLE-BALANCED MIXER, 4.5 - 6 GHz**

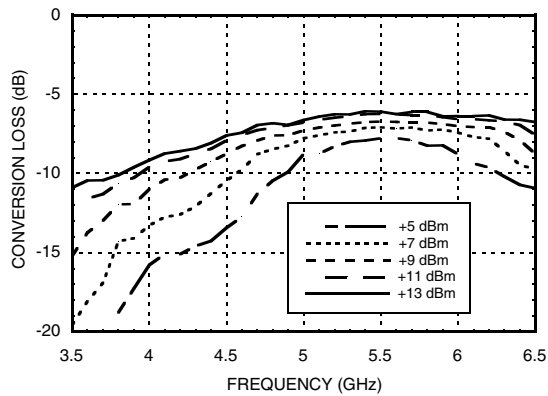
**Conversion Loss vs Temperature @ LO = +13 dBm**



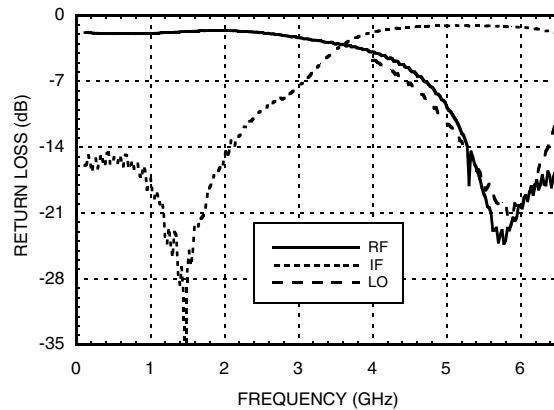
**Isolation @ LO = +13 dBm**



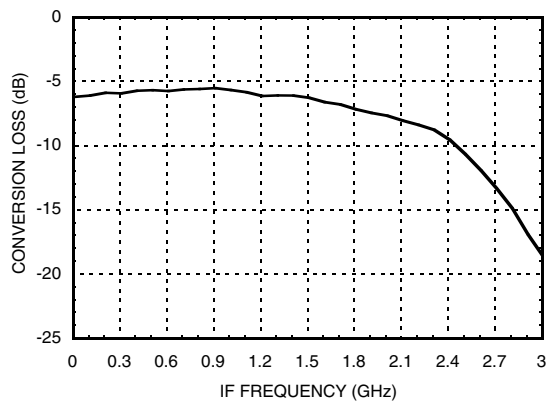
**Conversion Loss vs. LO Drive**



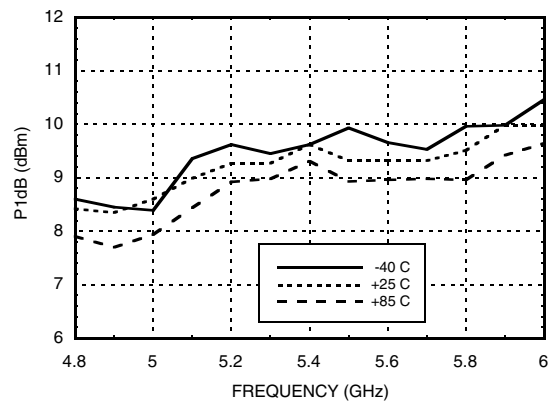
**Return Loss @ LO = +13 dBm**

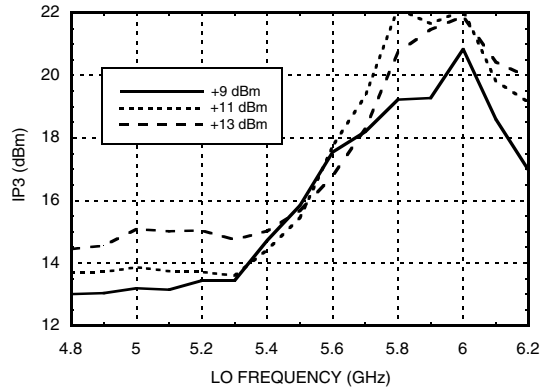
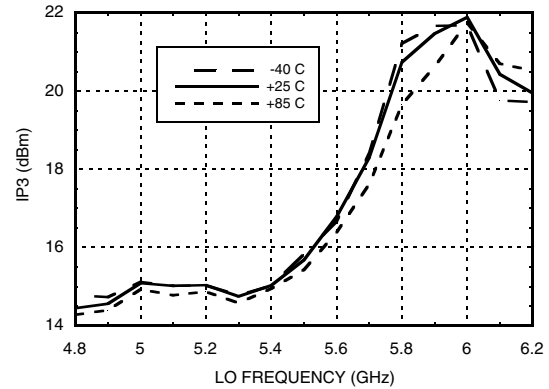
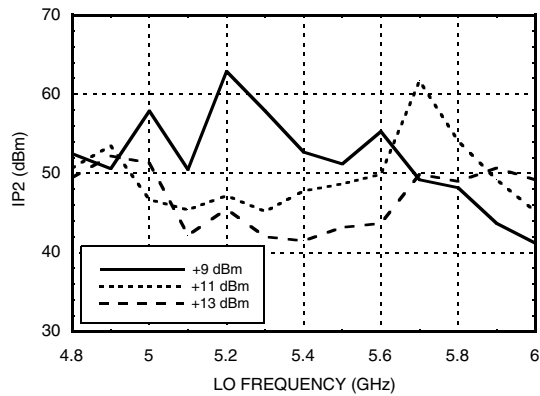
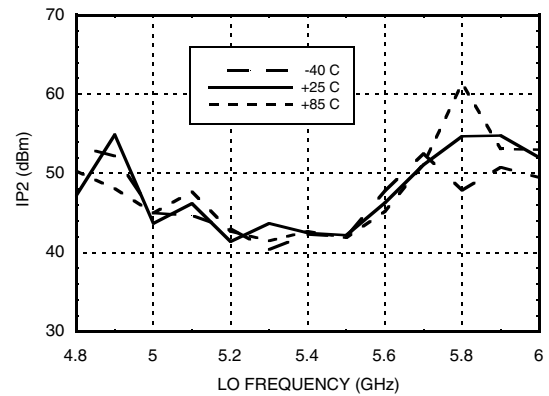


**IF Bandwidth @ LO = +13 dBm**



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



**GaAs MMIC SMT DOUBLE-BALANCED MIXER, 4.5 - 6 GHz**
**Input IP3 vs. LO Drive**

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

**Input IP2 vs. LO Drive**

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




## GaAs MMIC SMT DOUBLE-BALANCED MIXER, 4.5 - 6 GHz

### MxN Spurious Outputs

mRF	nLO				
	0	1	2	3	4
0	xx	1	10	22	35
1	8	0	37	29	54
2	67	60	58	58	77
3	>85	79	79	59	77
4	>85	>85	>85	>85	>85

RF = 5.15 GHz @ -10 dBm  
LO = 5.25 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
5.0	32	26	50	69
5.2	32	28	55	71
5.4	33	32	54	75
5.6	33	33	55	69
5.8	33	32	56	62
6.0	32	34	57	58

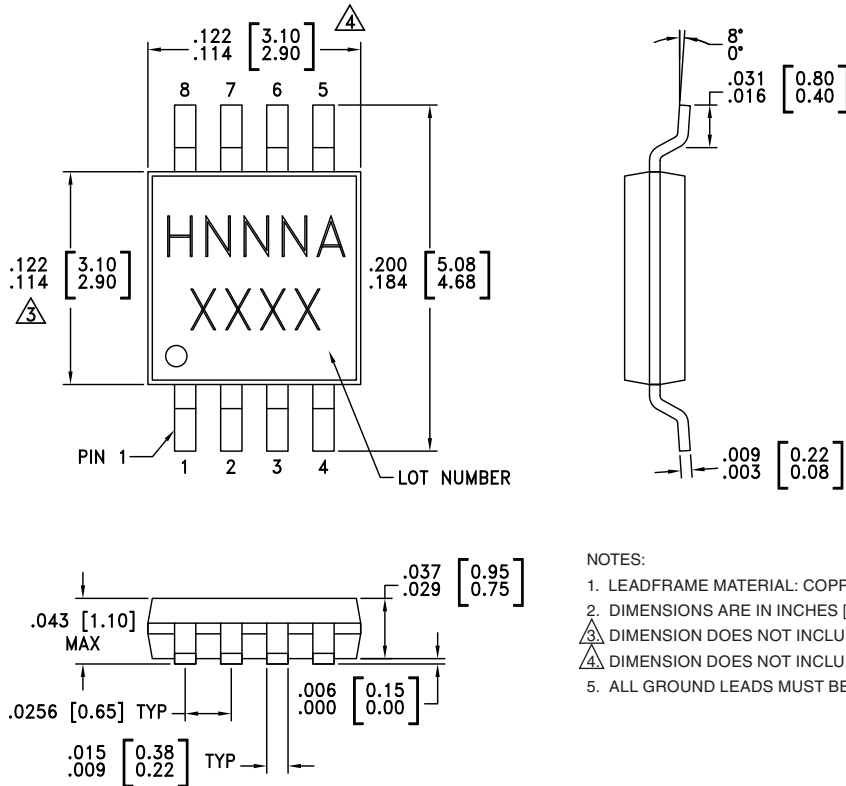
LO = +13 dBm  
Values in dBc below LO level measured at RF Port.

### Absolute Maximum Ratings

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



**ELECTROSTATIC SENSITIVE DEVICE  
OBSERVE HANDLING PRECAUTIONS**

**Outline Drawing**

**NOTES:**

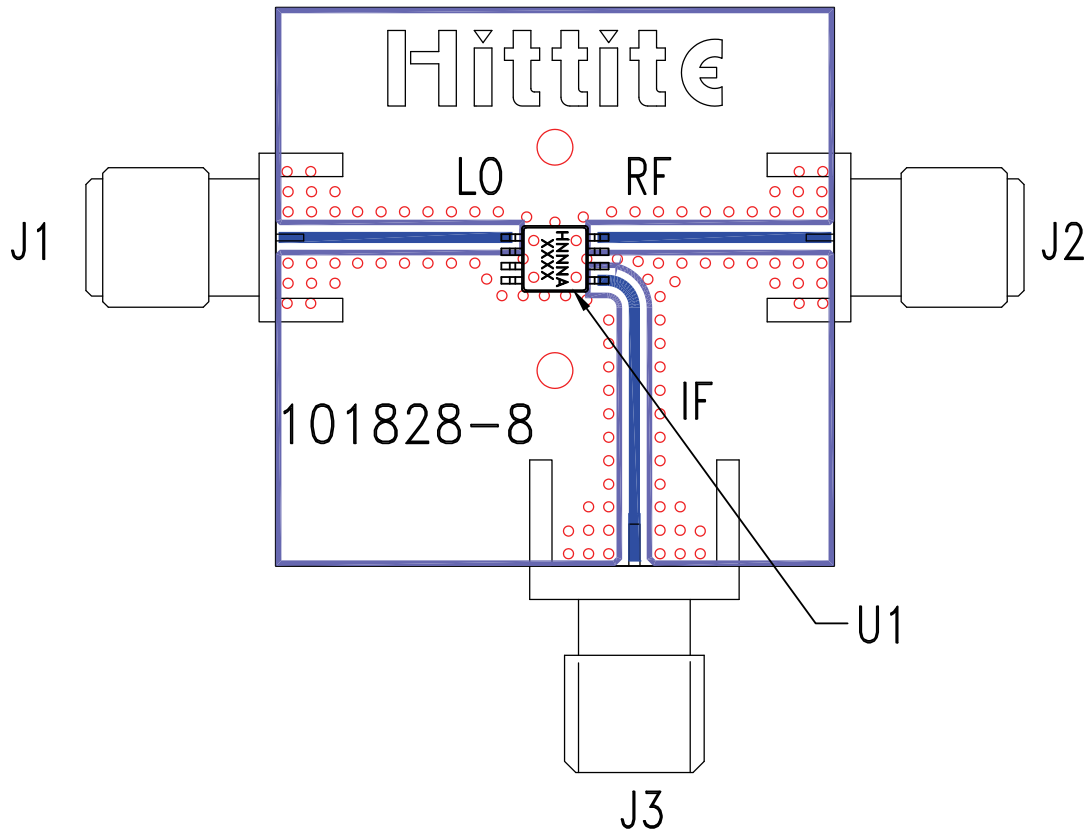
- LEADFRAME MATERIAL: COPPER ALLOY
- DIMENSIONS ARE IN INCHES [MILLIMETERS]
- $\triangle$  DIMENSION DOES NOT INCLUDE MOLDFLASH OF 0.15 mm PER SIDE.
- $\triangle$  DIMENSION DOES NOT INCLUDE MOLDFLASH OF 0.25 mm PER SIDE.
- ALL GROUND LEADS MUST BE SOLDERED TO PCB RF GROUND.

**Package Information**

Part Number	Package Body Material	Lead Finish	MSL Rating	Package Marking <sup>[2]</sup>
HMC218AMS8E	RoHS-compliant Low Stress Injection Molded Plastic	100% matte Sn	MSL1 <sup>[1]</sup>	H218A XXXX

[1] Max peak reflow temperature of 260 °C

[2] 4-Digit lot number XXXX

**Evaluation PCB**

**List of Materials for Evaluation PCB 101830 [1]**

Item	Description
J1 - J3	PCB Mount SMA RF Connector
U1	HMC218AMS8E Mixer
PCB [2]	101828 Evaluation Board

[1] Reference this number when ordering complete evaluation PCB

[2] Circuit Board Material: Rogers 4350

The circuit board used in the 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.