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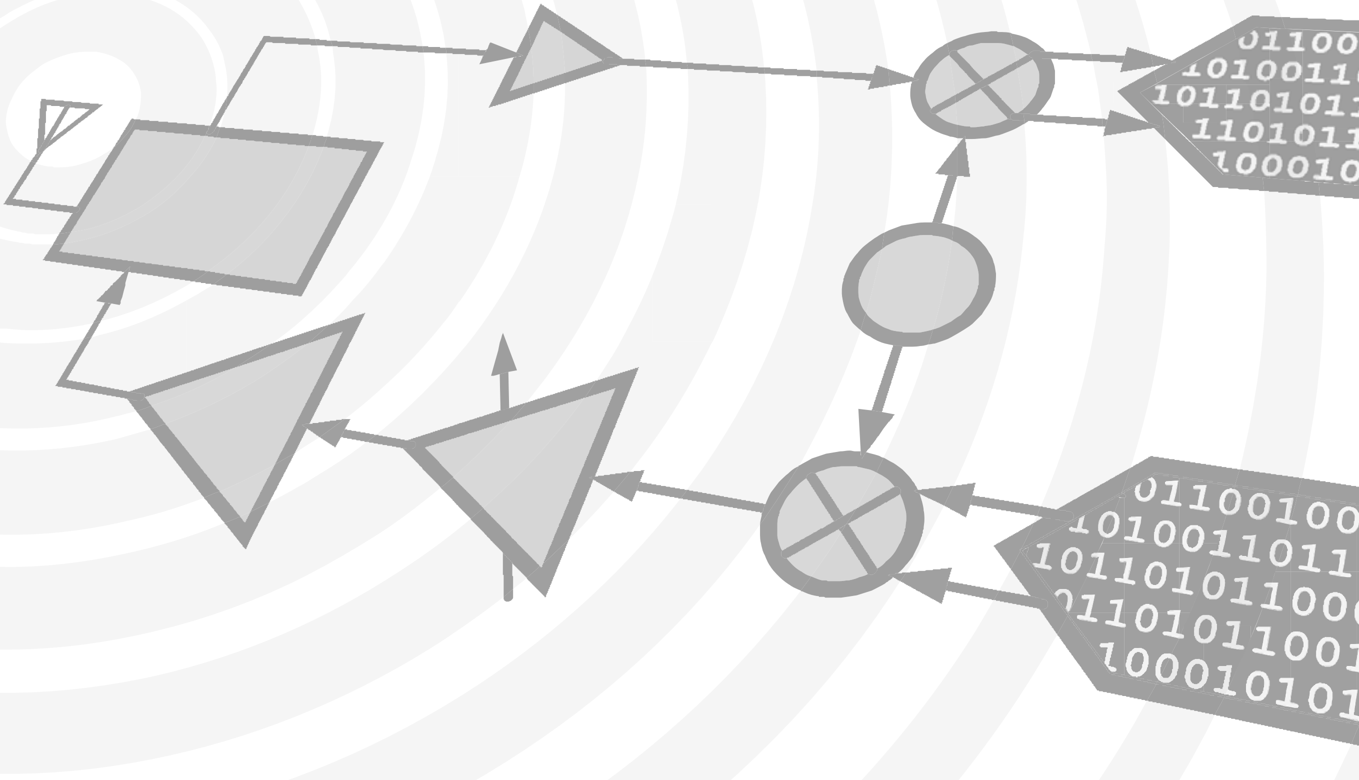

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MICROWAVE CORPORATION

v04.0712

HMC422MS8 / 422MS8E

GaAs MMIC MIXER w/ INTEGRATED LO AMPLIFIER, 1.2 - 2.6 GHz

RoHS✓
EARTH FRIENDLY

Typical Applications

The HMC422MS8 / HMC422MS8E is ideal for:

- MMDS & ISM
- Wireless Local Loop
- WirelessLAN
- Cellular Infrastructure

Features

Integrated LO Amplifier w/ Pdiss <100 mW

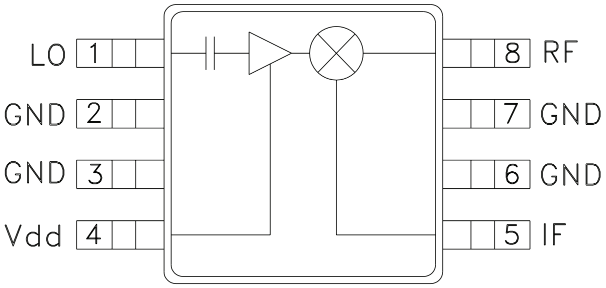
Conversion Loss / Noise Figure: 8 dB

Low LO Drive: 0 dBm

Input IP3: +15 dBm

Single Positive Supply: 3V, 30 mA

Functional Diagram



General Description

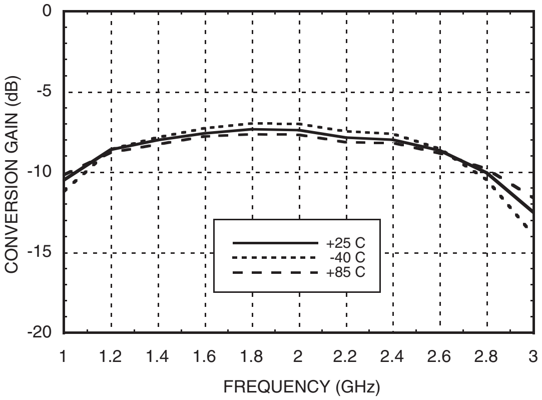
The HMC422MS8 & HMC422MS8E are double balanced mixer ICs with integrated LO amplifiers. This mixer can operate as an upconverter or downconverter between 1.2 GHz and 2.6 GHz. With the integrated LO amplifier, the mixer requires an LO drive level of only 0 dBm, and requires only 30mA from a single positive +3V rail. The mixer has 8 dB of conversion loss, an input P1dB of +8 dBm and an input third order intercept point of +15 dBm at 2 GHz.

Electrical Specifications, T_A = +25° C

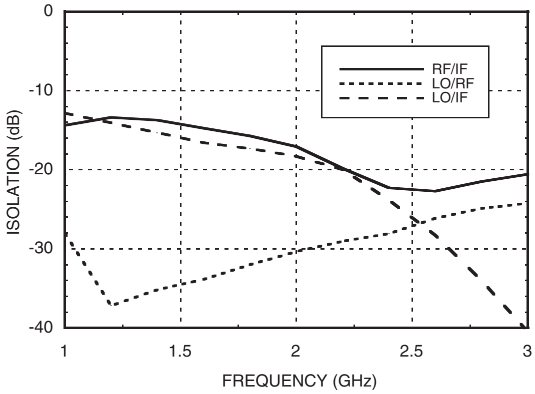
Parameter	IF = 100 MHz LO = 0 dBm & Vdd = 3V			Units
	Min.	Typ.	Max.	
Frequency Range, RF & LO	1.2 - 2.6			GHz
Frequency Range, IF	DC - 1			GHz
Conversion Loss		8	10.5	dB
Noise Figure (SSB)		8	10.5	dB
LO to RF Isolation	23	30		dB
LO to IF Isolation	9	15 - 20		dB
RF to IF Isolation	9	15 - 20		dB
IP3 (Input)	12	15		dBm
1 dB Compression (Input)	5	8		dBm
Supply Current (Idd)		37		mA

** Unless otherwise noted, all measurements performed as downconverter, IF= 100 MHz.*

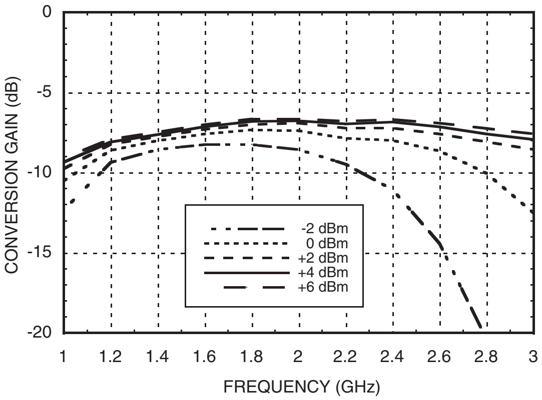
Conversion Gain vs. Temperature @ LO = 0 dBm



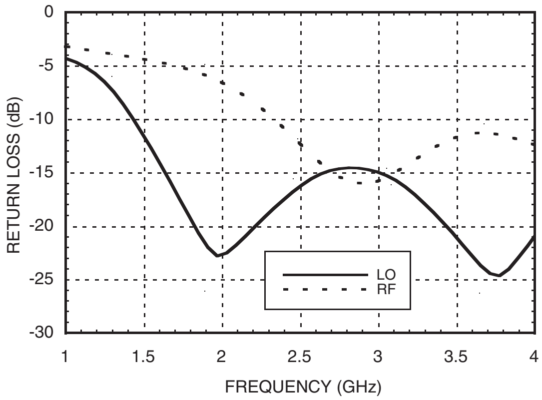
Isolation @ LO = 0 dBm



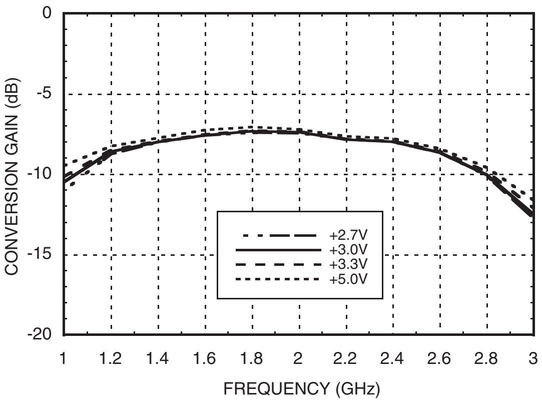
Conversion Gain vs. LO Drive



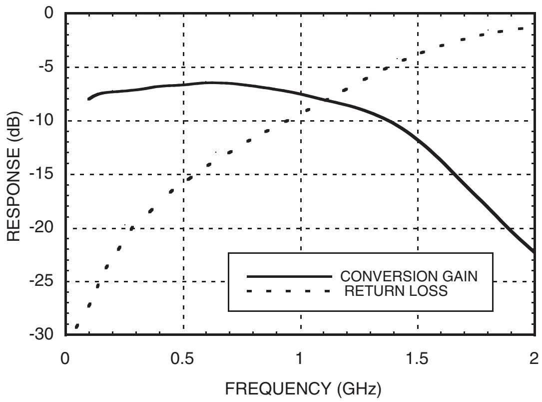
Return Loss @ LO = 0 dBm



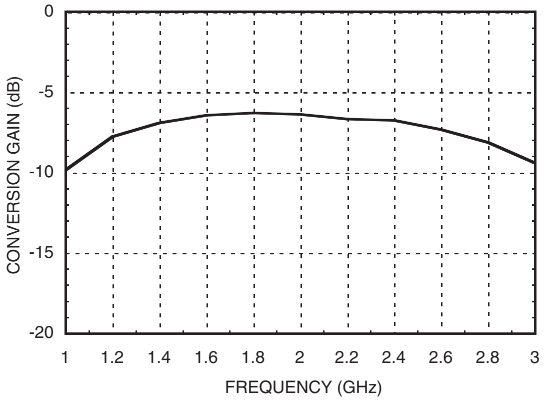
Conversion Gain vs. Vdd @ LO = 0 dBm



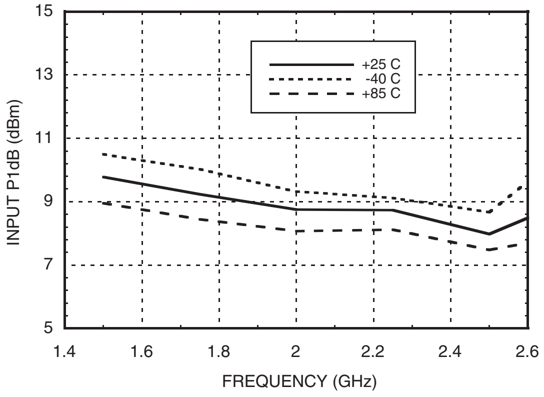
IF Bandwidth @ LO = 0 dBm



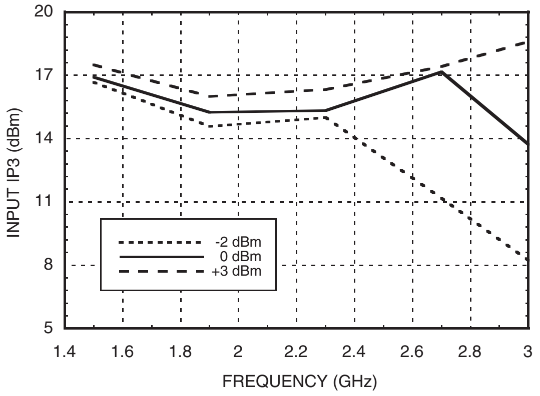
Upconverter Performance Conversion Gain @ LO = 0 dBm



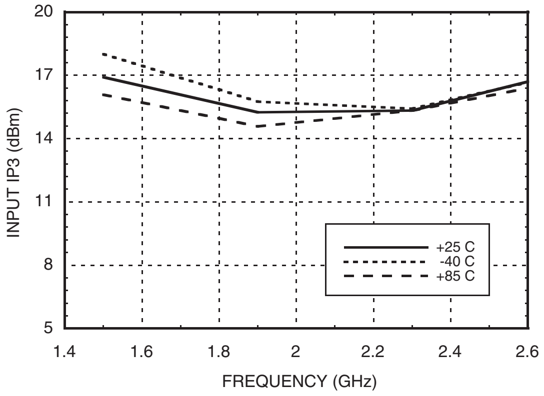
Input P1dB vs. Temperature @ LO = 0 dBm



Input IP3 vs. LO Drive*



Input IP3 vs. Temperature @ LO = 0 dBm*



MxN Spurious @ IF Port

	nLO				
mRF	0	1	2	3	4
0	XX	2	22	26	41
1	10	0	27	48	57
2	66	60	64	53	73
3	>85	>85	83	69	80
4	>85	>85	>85	>85	>85

RF = 2.1 GHz @ -10 dBm
LO = 2 GHz @ 0 dBm
All values in dBc relative to the IF power level.

Harmonics of LO

	nLO Spur @ RF Port			
LO Freq. (GHz)	1	2	3	4
1.5	33	14	38	35
1.75	30	16	39	44
2	29	17	45	47
2.25	27	20	50	52
2.5	25	26	49	61
3	22	37	69	72

LO = 0 dBm
All values in dBc below input LO level @ RF port.

* Two-tone input power= 0 dBm each tone, 1 MHz spacing.

HMC422MS8 / 422MS8E

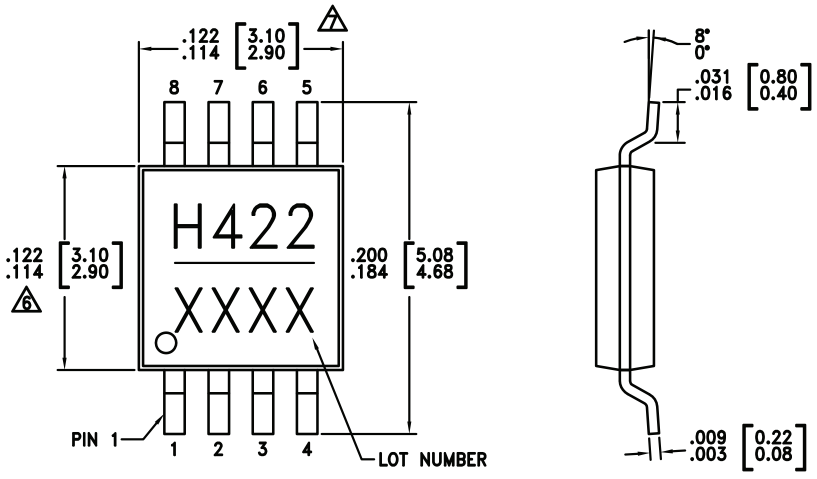
GaAs MMIC MIXER w/ INTEGRATED LO AMPLIFIER, 1.2 - 2.6 GHz

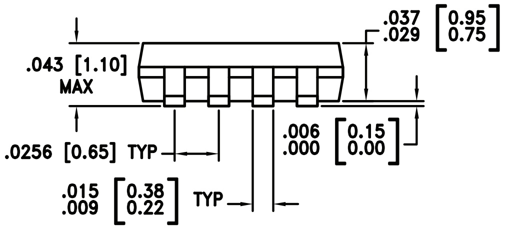
Absolute Maximum Ratings

RF / IF Input (Vdd = +3V)	+13 dBm
LO Drive (Vdd = +3V)	+13 dBm
Vdd	+7 Vdc
IF DC Current	±10 mA
Channel Temperature (Tc)	150 °C
Continuous Pdiss (T = 85°C) (Derate 5.8 mW/°C above 85 C)	0.38 W
Storage Temperature	-65 to +150 °C
Operating Temperature	-40 to +85 °C
ESD Sensitivity (HBM)	Class 1A

ELECTROSTATIC SENSITIVE DEVICE
OBSERVE HANDLING PRECAUTIONS

Outline Drawing





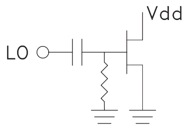
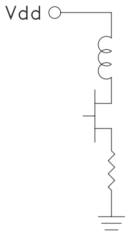
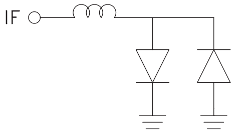
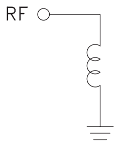
1. PACKAGE BODY MATERIAL: LOW STRESS INJECTION MOLDED PLASTIC SILICA AND SILICON IMPREGNATED.
2. LEAD MATERIAL: COPPER ALLOY
3. LEAD PLATING: 100% MATTE TIN.
4. DIMENSIONS ARE IN INCHES [MILLIMETERS]
5. CHARACTERS TO BE HELVETICA MEDIUM, .030 HIGH, LASER OR WHITE INK, LOCATED APPROXIMATELY AS SHOWN.
6. DIMENSION DOES NOT INCLUDE MOLDFLASH OF 0.15mm PER SIDE.
7. DIMENSION DOES NOT INCLUDE MOLDFLASH OF 0.25mm PER SIDE.
8. ALL GROUND LEADS AND GROUND PADDLE MUST BE SOLDERED TO PCB RF GROUND

Package Information

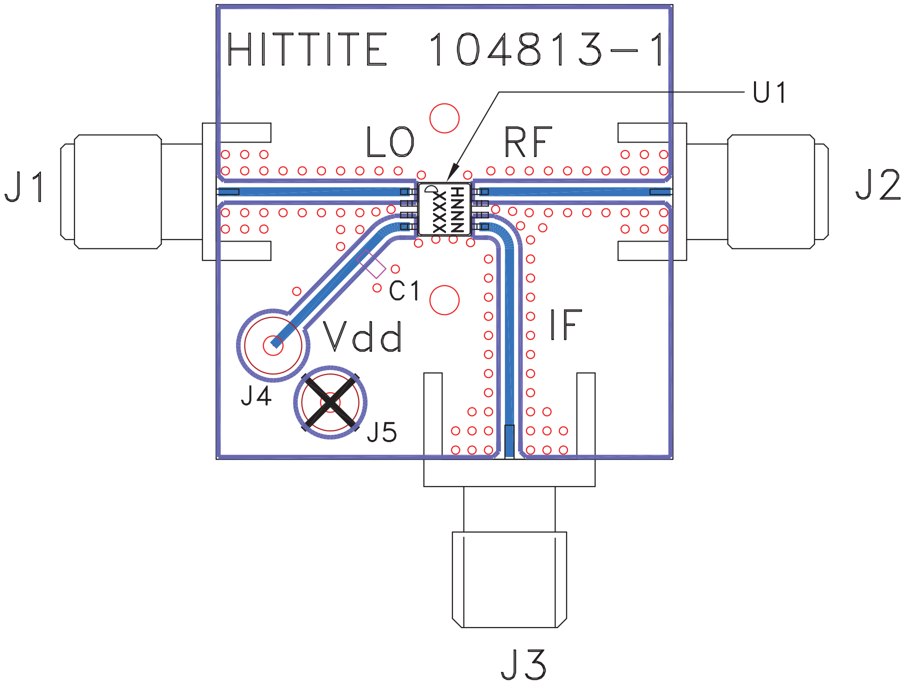
Part Number	Package Body Material	Lead Finish	MSL Rating	Package Marking [3]
HMC422MS8	Low Stress Injection Molded Plastic	Sn/Pb Solder	MSL1 [1]	H422 XXXX
HMC422MS8E	RoHS-compliant Low Stress Injection Molded Plastic	100% matte Sn	MSL1 [2]	H422 XXXX

[1] Max peak reflow temperature of 235 °C
[2] Max peak reflow temperature of 260 °C
[3] 4-Digit lot number XXXX

Pin Descriptions

Pin Number	Function	Description	Interface Schematic
1	LO	This pin is AC coupled and matched to 50 Ohms.	
2, 3, 6, 7	GND	Pins must connect to RF ground.	
4	Vdd	Power supply for the LO Amplifier. One external RF bypass capacitor (10,000 pF) is required.	
5	IF	This pin is DC coupled. For applications not requiring operation to DC, this port should be DC blocked externally using a series capacitor whose value has been chosen to pass the necessary IF frequency range. For operation to DC, this pin must not source/sink more than 10 mA of current or die non-function and possible die failure will result.	
8	RF	This pin is DC coupled and matched to 50 Ohms.	

Evaluation PCB



List of Materials for Evaluation PCB 105188 [1]

Item	Description
J1 - J3	PCB Mount SMA RF Connector
J4 - J5	DC Pin
C1	10k pF Chip Capacitor, 0603 Pkg.
U1	HMC422MS8 / HMC422MS8E Mixer
PCB [2]	104813 Evaluation PCB, 1.0” x 1.0”

[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.