



GaAs MMIC I/Q MIXER MODULE 6 - 10 GHz

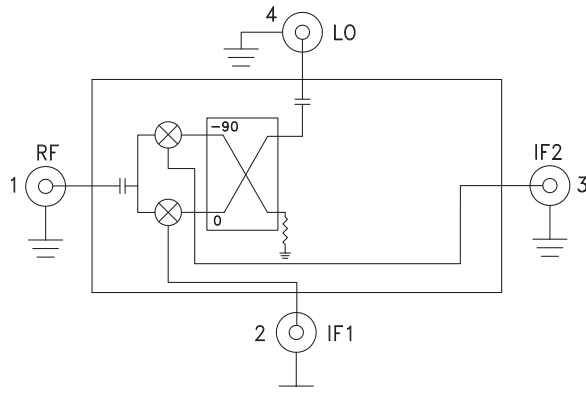


Typical Applications

The HMC-C041 is ideal for:

- Point-to-Point Radios
- Point-to-Multi-Point Radios & VSAT
- Test Equipment & Sensors
- Military End-Use

Functional Diagram



Features

- Wide IF Bandwidth: DC - 3.5 GHz
- Image Rejection: 35 dB
- LO to RF Isolation: 45 dB
- High Input IP3: +25 dBm
- Hermetically Sealed Module
- Field Replaceable SMA Connectors
- 55 °C to +85 °C Operating Temperature

General Description

The HMC-C041 is a passive I/Q MMIC mixer housed in a miniature hermetic module which can be used as either an Image Reject Mixer or a Single Sideband Upconverter. The module utilizes two standard Hittite double balanced mixer cells and a 90 degree hybrid fabricated on a GaAs MESFET process. A low frequency quadrature hybrid was used to produce a 100 MHz USB IF output. This MMIC based module is a more reliable and consistent alternative to hybrid style I/Q Mixers and Single Sideband Converter assemblies. The module features removable SMA connectors which can be detached to allow direct connection of the I/O pins to a microstrip or coplanar circuit.

Electrical Specifications, $T_A = +25^\circ \text{C}$, $IF = 100 \text{ MHz}$, $LO = +19 \text{ dBm}^*$

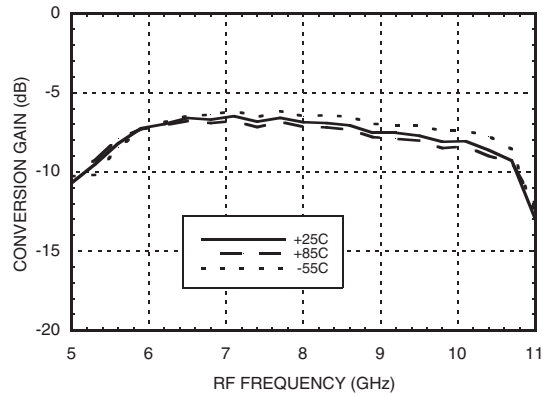
Parameter	Min.	Typ.	Max.	Units
Frequency Range, RF/LO		6 - 10		GHz
Frequency Range, IF		DC - 3.5		GHz
Conversion Loss (As IRM)		7.5	10	dB
Image Rejection	20	35		dB
1 dB Compression (Input)		+17		dBm
LO to RF Isolation	35	45		dB
LO to IF Isolation	20	25		dB
IP3 (Input)		+25		dBm
Amplitude Balance		0.5		dB
Phase Balance		5		Deg

* Unless otherwise noted, all measurements performed as downconverter.



Data taken As IRM With External IF Hybrid

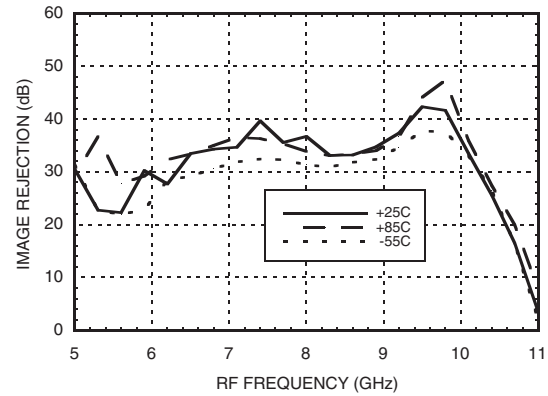
Conversion Gain vs. Temperature



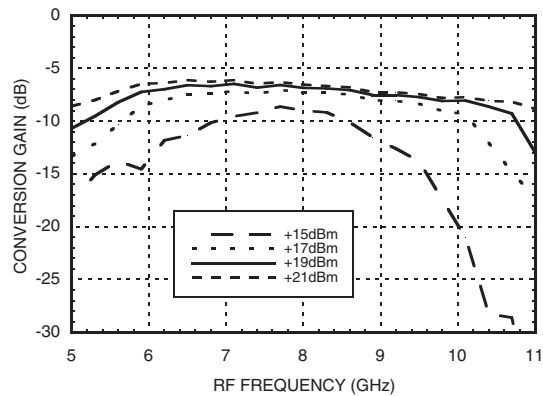
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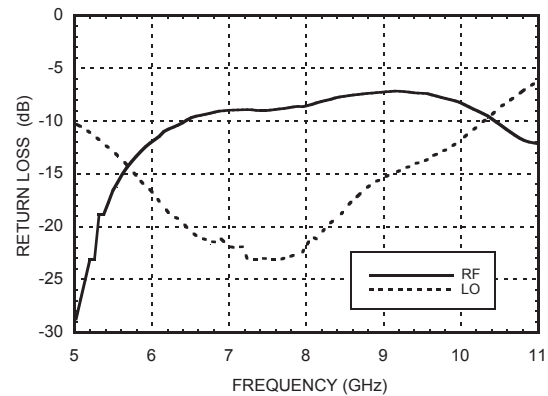
Image Rejection vs. Temperature



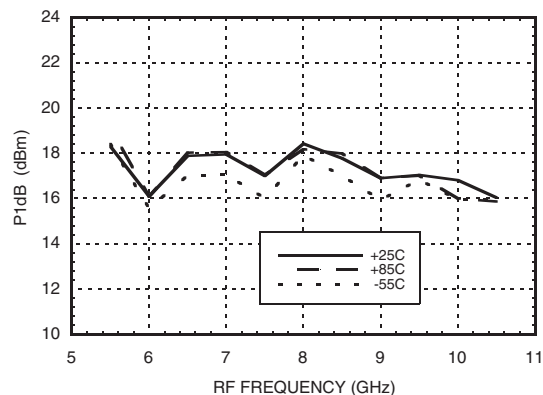
Conversion Gain vs. LO Drive



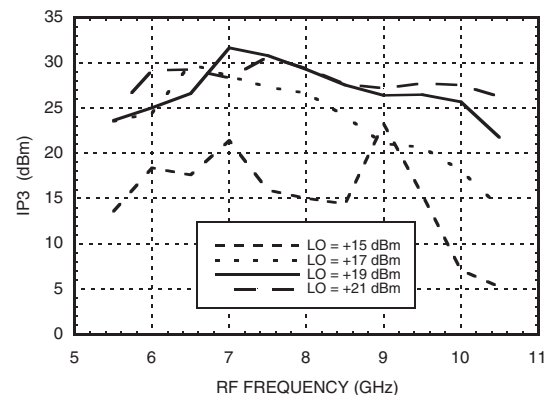
Return Loss



Input P1dB vs. Temperature



Input IP3 vs. LO Drive

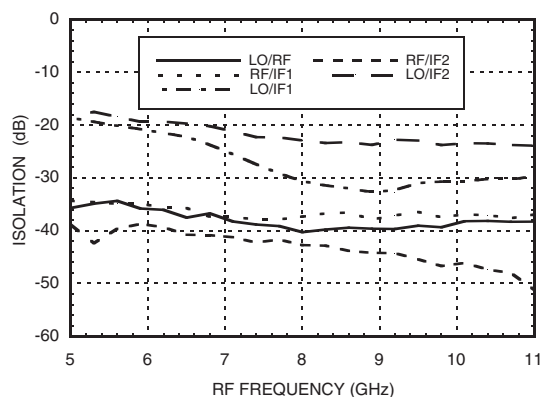




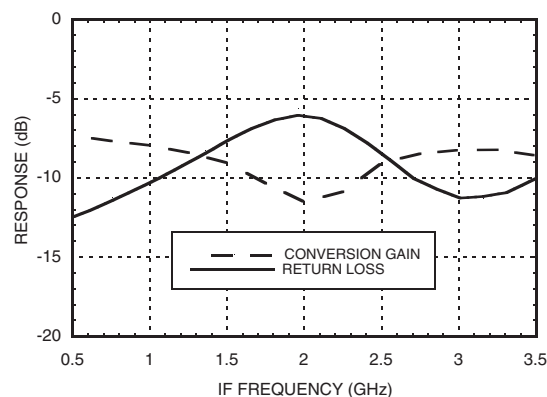
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Quadrature Channel Data Taken Without IF Hybrid

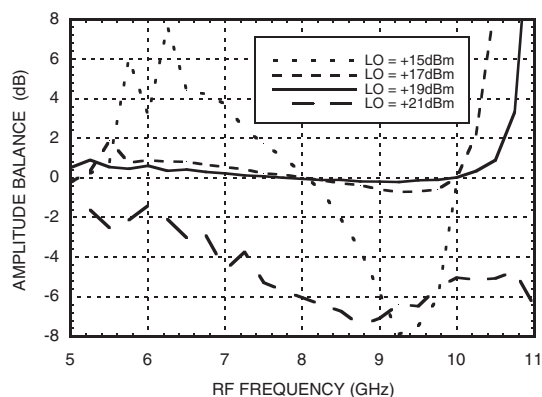
Isolations



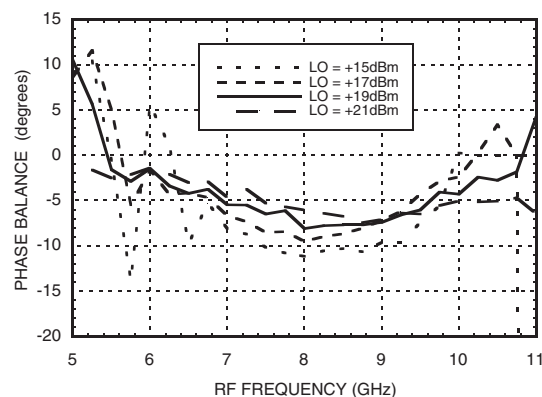
IF Bandwidth*



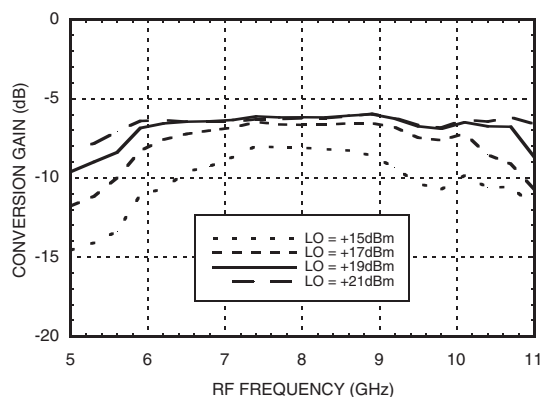
Amplitude Balance vs. LO Drive



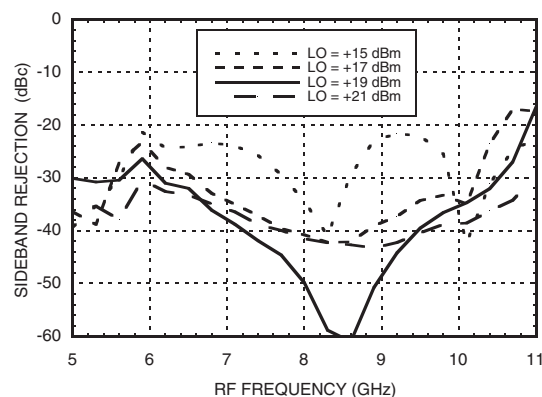
Phase Balance vs. LO Drive



Upconverter Performance Conversion Gain vs. LO Drive*



Upconverter Performance Sideband Rejection vs. LO Drive*



* Conversion gain data taken with external IF hybrid

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Harmonics of LO

LO Freq. (GHz)	nLO Spur at RF Port			
	1	2	3	4
3.5	39	40	52	51
6.5	43	49	51	70
7.5	51	65	53	62
8.5	56	61	56	50
9.5	47	57	65	63
10.5	45	55	59	46

LO = +19 dBm
Values in dBc below input LO level measured at RF Port.

MxN Spurious Outputs

mRF	nLO				
	0	1	2	3	4
0	xx	-10	29	18	51
1	33	0	46	77	68
2	99	71	75	70	99
3	97	101	100	86	101
4	99	98	98	102	107

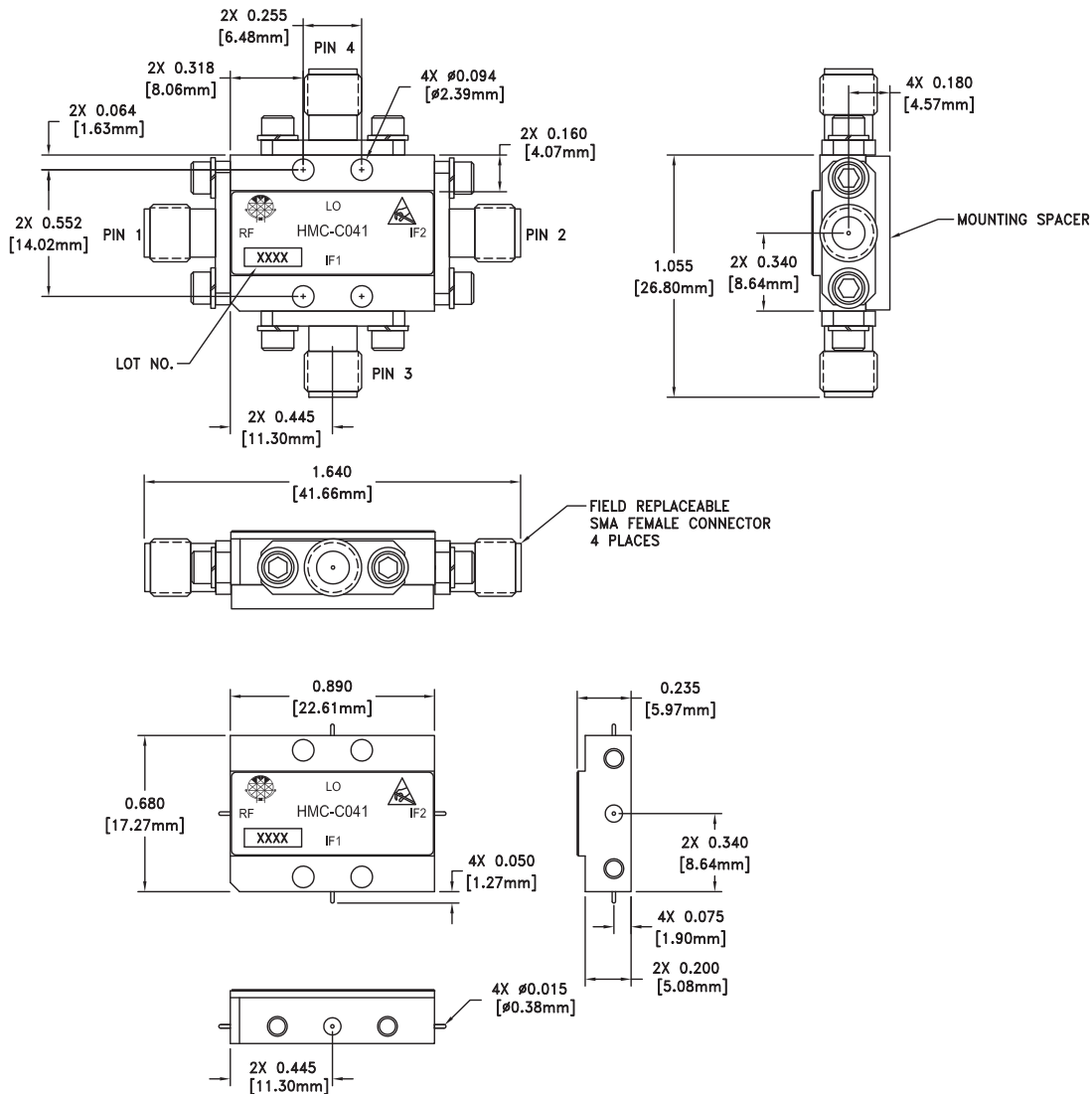
RF = 7.6 GHz @ -10 dBm
LO = 7.5 GHz @ +19 dBm
Data taken without IF hybrid
All values in dBc below IF power level

Absolute Maximum Ratings

RF / IF Input	+20 dBm
LO Drive	+27 dBm
Channel Temperature	150°C
Continuous P _{diss} (T=85°C) (derate 7.8 mW/°C above 85°C)	507 mW
Thermal Resistance (R _{TH}) (junction to die bottom)	128 °C/W
Storage Temperature	-65 to +150 °C
Operating Temperature	-55 to +85 °C



**ELECTROSTATIC SENSITIVE DEVICE
OBSERVE HANDLING PRECAUTIONS**


**GaAs MMIC I/Q MIXER MODULE
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Outline Drawing


VIEW SHOWN WITH CONNECTORS REMOVED

Package Information

Package Type	C-4
Package Weight ^[1]	20 gms ^[2]
Spacer Weight	2.6 gms ^[2]


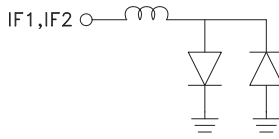

^[1] Includes the connectors

^[2] ± 1 gms Tolerance

NOTES:

1. PACKAGE, LEADS, COVER MATERIAL: KOVAR™
2. FINISH: GOLD PLATE OVER NICKEL PLATE
3. MOUNTING SPACER: NICKEL PLATED ALUMINUM
4. ALL DIMENSIONS ARE IN INCHES [MILLIMETERS]
5. TOLERANCES:
 - 5.1 .XX = ± 0.02
 - 5.2 .XXX = ± 0.010
6. FIELD REPLACEABLE SMA CONNECTORS
TENSOLITE 5602 - 5CCSF OR EQUIVALENT
7. TO MOUNT MODULE TO SYSTEM PLATFORM REPLACE 0 -80
HARDWARE WITH DESIRED MOUNTING SCREWS

Pin Descriptions

Pin Number	Function	Description	Interface Schematic
1	RF	This pin is AC coupled and matched to 50 Ohms.	RF 
2	IF1	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 3mA of current or part non-function and possible part failure will result.	IF1, IF2 
3	IF2		
4	LO	This pin is AC coupled and matched to 50 Ohms.	LO 

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