



# HMC-C046

## GaAs MMIC I/Q MIXER MODULE 20 - 31 GHz

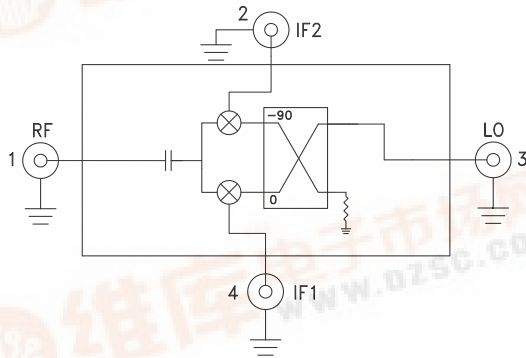


### Typical Applications

The HMC-C046 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 - 4.5 GHz
- Image Rejection: 24 dB
- LO to RF Isolation: 42 dB
- High Input IP3: 22.5 dBm
- Hermetically Sealed Module
- Field Replaceable SMA Connectors
- 55 to +85 °C Operating Temperature

### General Description

The HMC-C046 is a passive I/Q MMIC mixer housed in a miniature hermetic module which can be used as either an Image Reject Mixer (IRM) or a Single Side-band 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 Upper Side Band (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, $T_A = +25^\circ C$ , $IF = 100 MHz$ , $LO = +17 dBm^*$

Parameter	Min.	Typ.	Max.	Units
Frequency Range, RF/LO		20 - 31		GHz
Frequency Range, IF		DC - 4.5		GHz
Conversion Loss (As IRM)		10	15	dB
Image Rejection	17	24		dB
1 dB Compression (Input)		17		dBm
LO to RF Isolation	29	42		dB
LO to IF Isolation	18	30		dB
IP3 (Input)		22.5		dBm
Amplitude Balance		0.3		dB
Phase Balance		4		Deg

\* Unless otherwise noted, all measurements performed as downconverter.

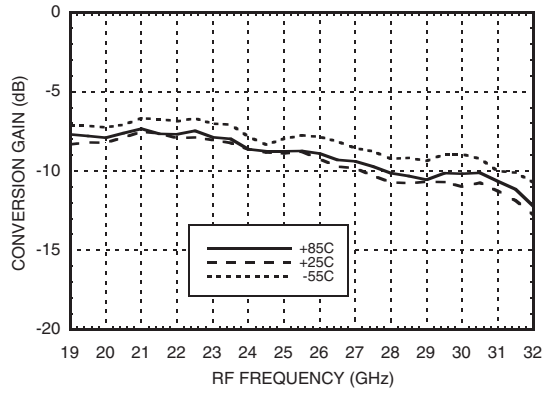


Data taken As IRM With External IF 90° Hybrid

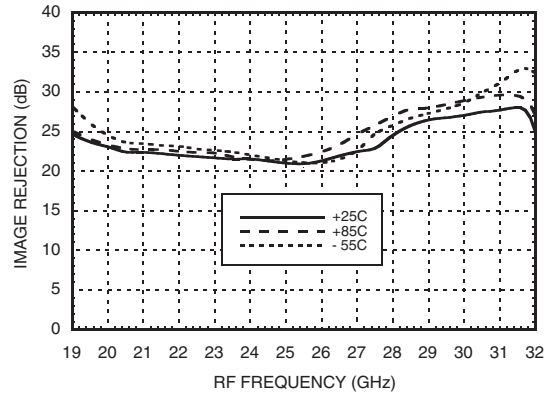
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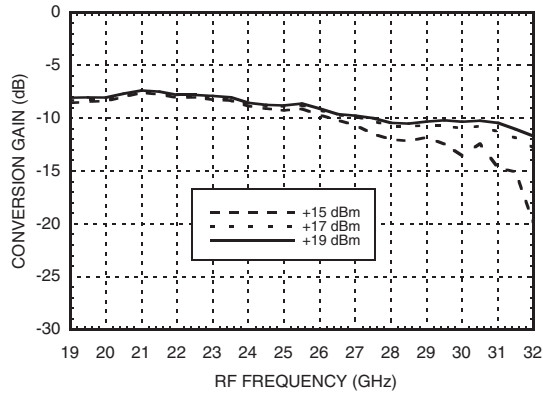
**Conversion Gain vs. Temperature**



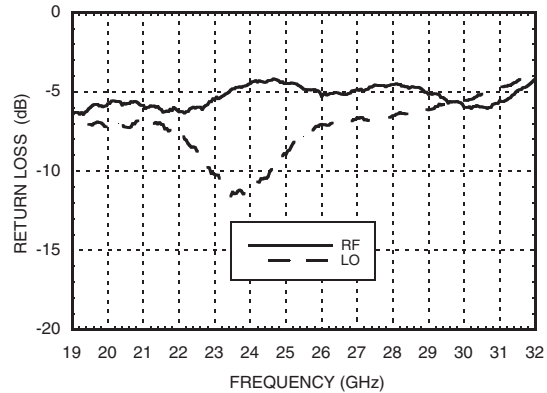
**Image Rejection vs. Temperature**



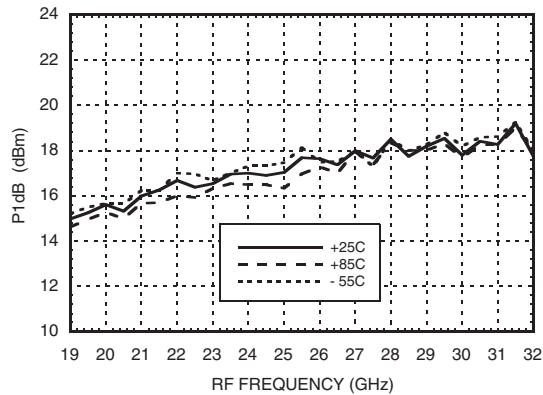
**Conversion Gain vs. LO Drive**



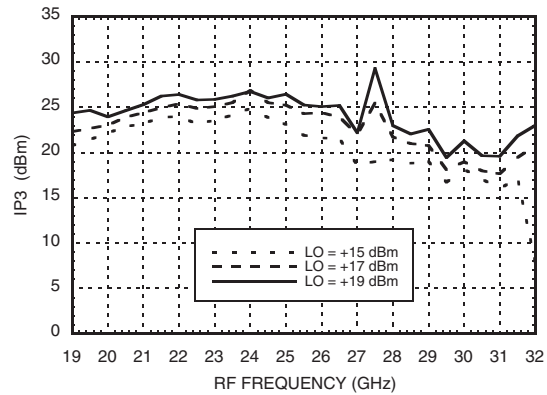
**Return Loss**



**Input P1dB vs. Temperature**



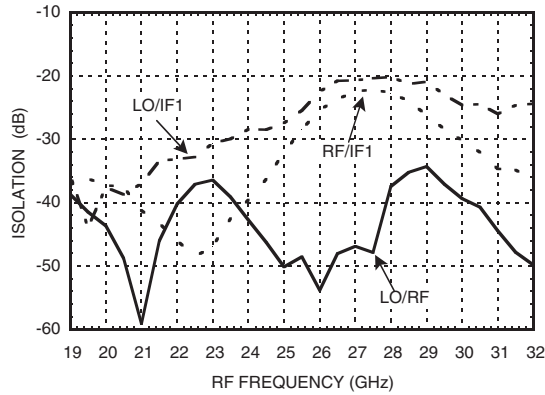
**Input IP3 vs. LO Drive**



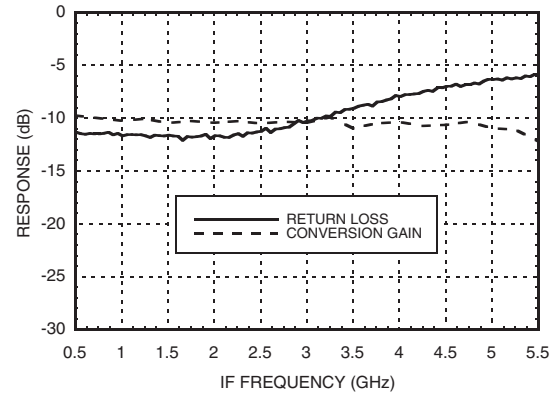


**IF1 & IF2 Port Characteristics**

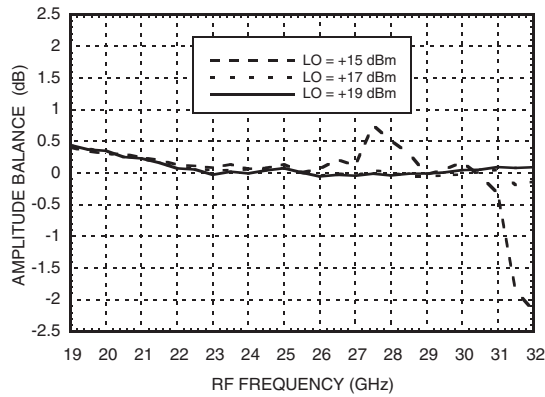
**Isolations**



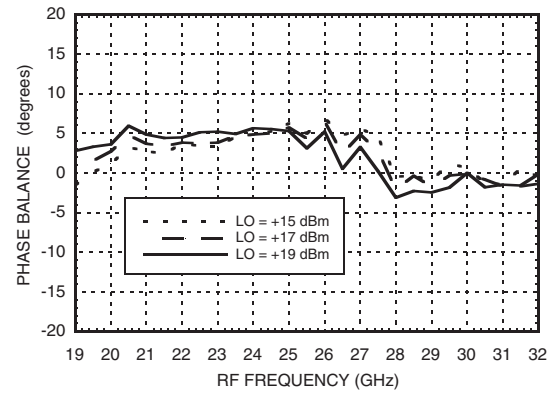
**IF Bandwidth\***



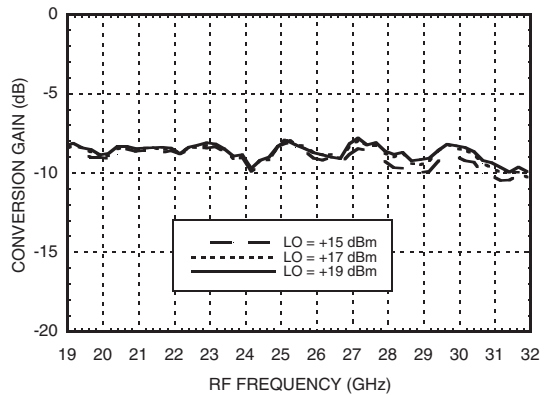
**Amplitude Balance vs. LO Drive**



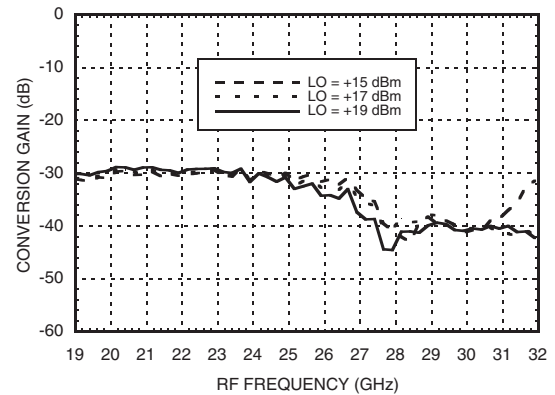
**Phase Balance vs. LO Drive**



**Upconverter Performance Conversion Gain vs. LO Drive\***



**Upconverter Performance Sideband Rejection vs. LO Drive\***



\* Conversion gain data taken with external IF hybrid



### Absolute Maximum Ratings

RF / IF Input	13 dBm
LO Drive	27 dBm
Storage Temperature	-65 to +150 °C
Operating Temperature	-55 to +85 °C

### MxN Spurious Outputs

mRF	nLO				
	0	1	2	3	4
0	xx	-13	27	xx	xx
1	18	0	35	52	xx
2	76	74	87	74	82
3	xx	83	87	77	87
4	xx	xx	82	87	87

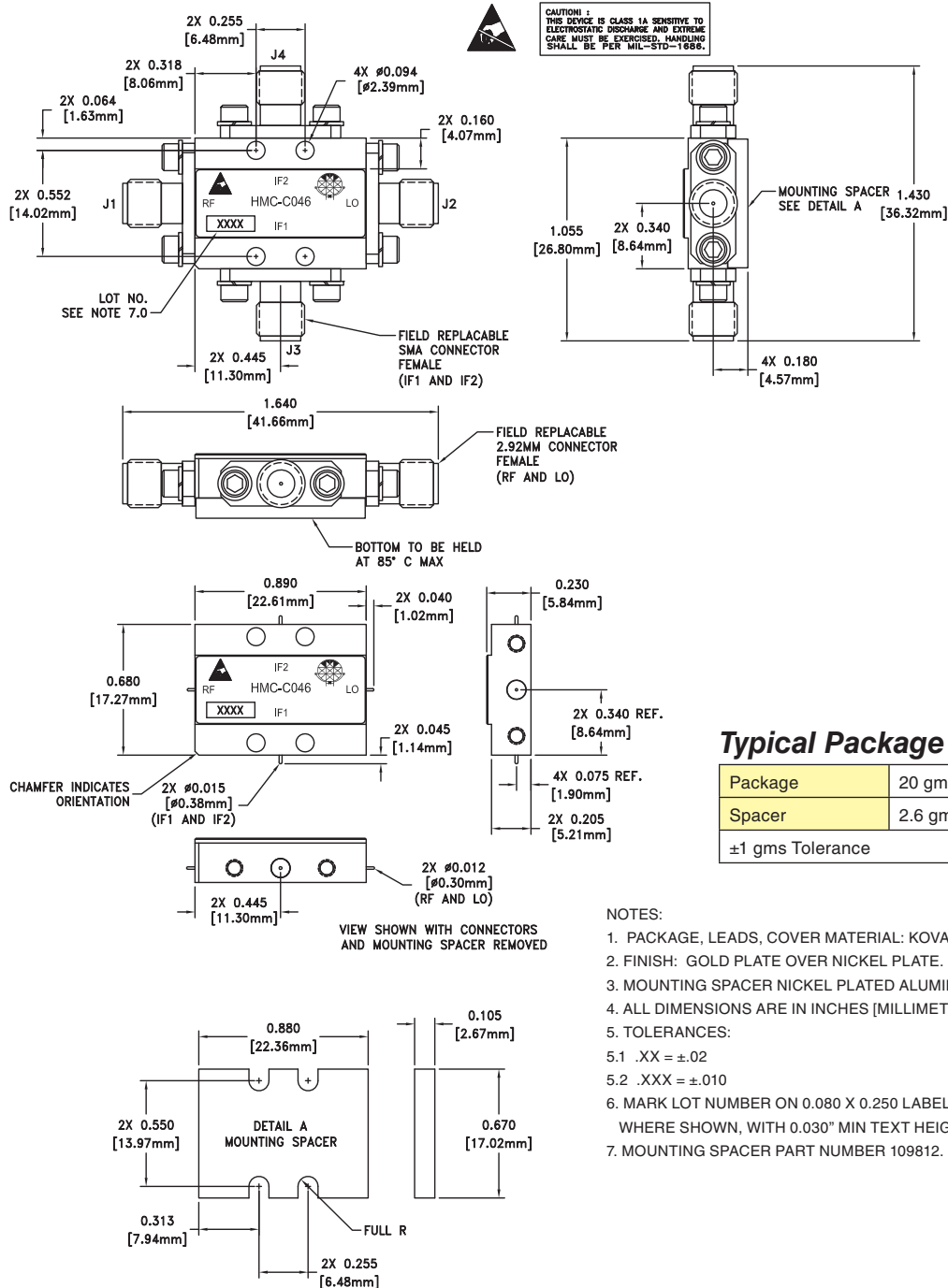
RF = 24.5 GHz @ -10 dBm  
 LO = 24.4 GHz @ +17 dBm  
 Data taken without IF 90° hybrid  
 All values in dBc with reference to output power at IF= 100 MHz



**ELECTROSTATIC SENSITIVE DEVICE  
OBSERVE HANDLING PRECAUTIONS**



### Outline Drawing



### Typical Package Weight

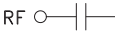
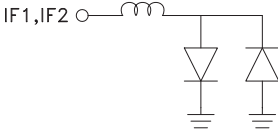
Package	20 gms
Spacer	2.6 gms
±1 gms Tolerance	

#### NOTES:

1. PACKAGE, LEADS, COVER MATERIAL: KOVART™
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 = ±.02
  - 5.2 .XXX = ±.010
6. MARK LOT NUMBER ON 0.080 X 0.250 LABEL WHERE SHOWN, WITH 0.030" MIN TEXT HEIGHT.
7. MOUNTING SPACER PART NUMBER 109812.



### Pin Descriptions

Pin Number	Function	Description	Interface Schematic
1	RF	This pin is AC coupled and matched to 50 Ohms.	
2	IF2	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.	
4	IF1		
3	LO	This pin is DC coupled and matched to 50 Ohms.	