ANALOG DEVICES

v02.0711

RoHS✓
EARTH FRIENDLY

GaAs MMIC I/Q MIXER MODULE
20 - 31 GHz

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
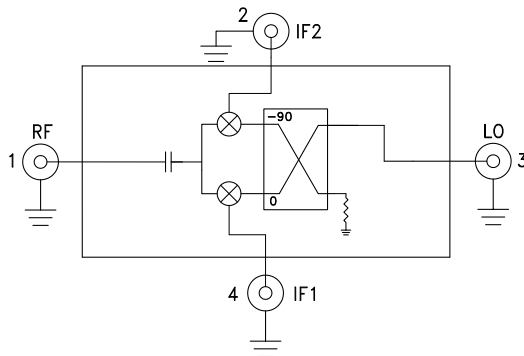
-55 to +85 °C Operating Temperature

Typical Applications

The HMC-C046 is ideal for:

• Point-to-Point Radios

• Point-to-Multi-Point Radios & VSAT

• Test Equipment & Sensors

• Military End-Use

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 consis-tent 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.

Functional Diagram

Electrical Specifications, T_A = +25° 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	15	30		dB
IP3 (Input)		22.5		dBm
Amplitude Balance		0.3		dB
Phase Balance		4		Deg

Unless otherwise noted, all measurements performed as downconverter.

5

MIXERS

ANALOG DEVICES

v02.0711

GaAs MMIC I/Q MIXER MODULE
20 - 31 GHz

RoHS ✓
EARTH FRIENDLY

5

MIXERS

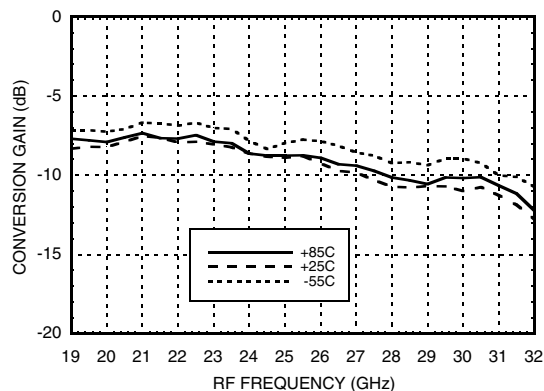### Data taken As IRM With External IF 90° Hybrid
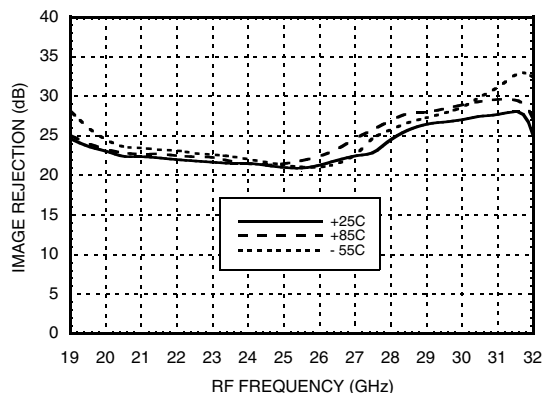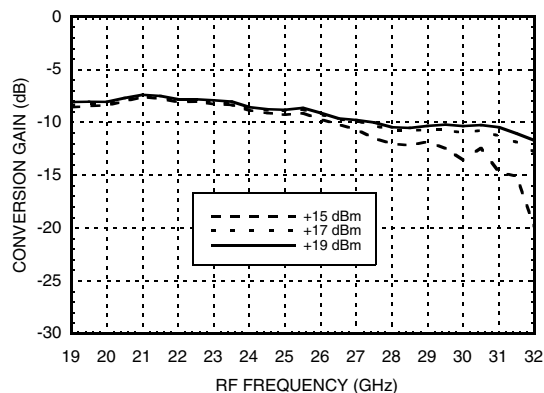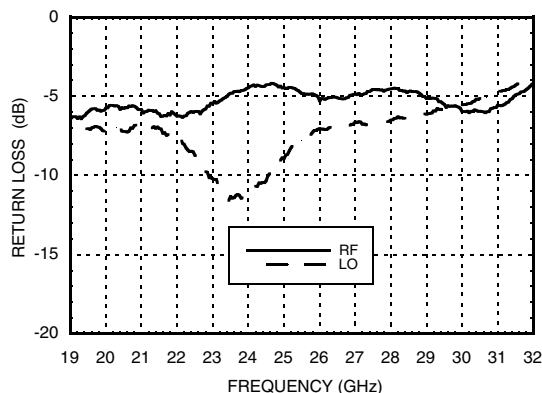
Conversion Gain vs. Temperature

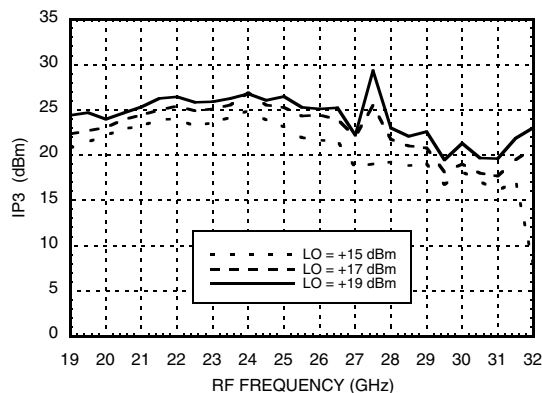#### Image Rejection vs. Temperature

Conversion Gain vs. LO Drive

Return Loss

Input P1dB vs. Temperature

Input IP3 vs. LO Drive

ANALOG DEVICES

RoHS ✓
EARTH FRIENDLY
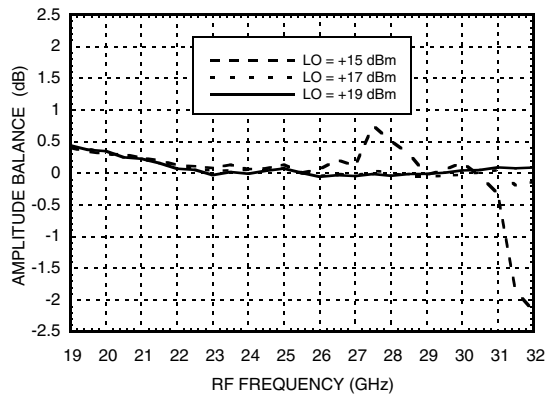
5

MIXERS

IF1 & IF2 Port Characteristics

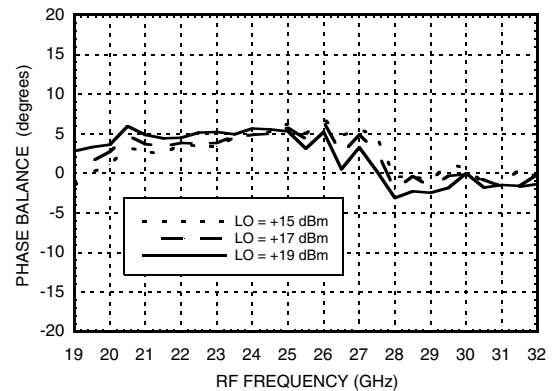### Isolation, LO=+10dBm
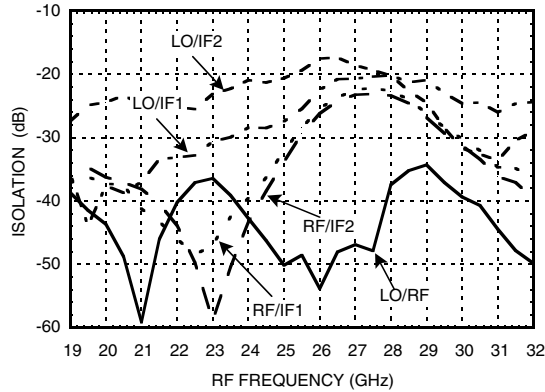
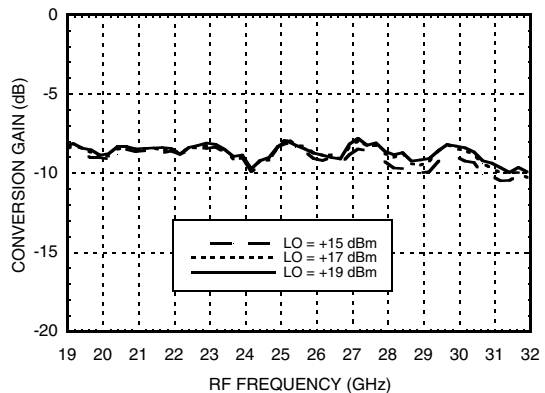

IF Bandwidth*
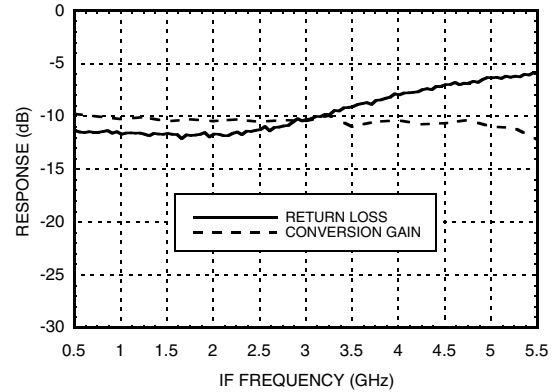
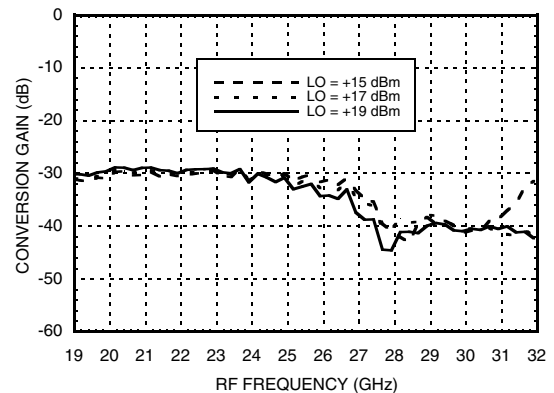### Amplitude Balance vs. LO Drive

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 90° hybrid

**ANALOG
DEVICES**

RoHS ✓
EARTH FRIENDLY

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

	nLO				
mRF	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

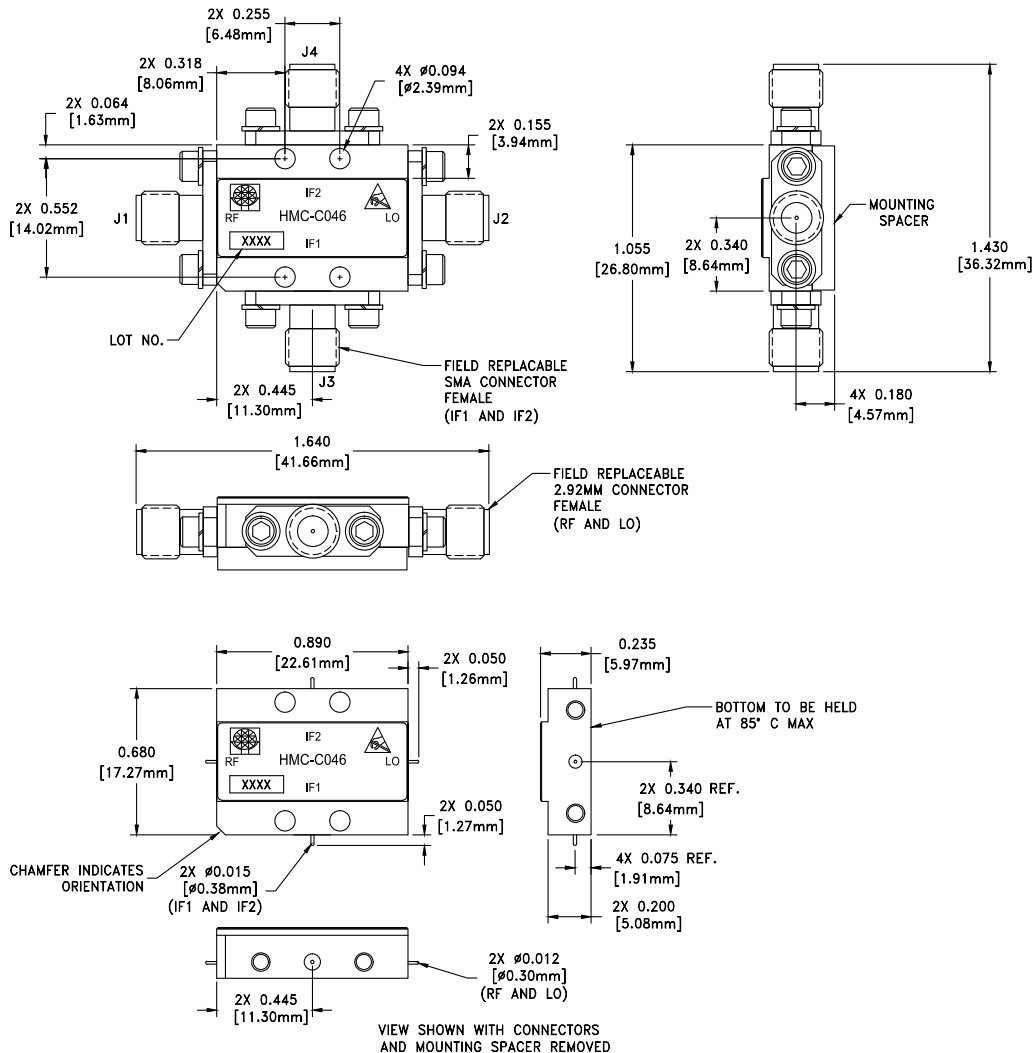RF = 24.5 GHz @ -10 dBm
LO = 24.4 GHz @ +17 dBm
Data taken without IF 90° hybrid
All values in dBc with reference to output power at IF= 100 MHz

⚠ ELECTROSTATIC SENSITIVE DEVICE
OBSERVE HANDLING PRECAUTIONS

5

MIXERS

ANALOG DEVICES

RoHS ✓
EARTH FRIENDLY

5

MIXERS

Outline Drawing

Package Information

Package Type	C-4B
Package Weight [1]	20 gms (Typ.)
Spacer Weight	2.6 gms (Typ.)

[1] Package weight includes the connectors

[2] ±1 gms Tolerance

NOTES:

1.O PACKAGE, LEADS, COVER MATERIAL: KOVAR™

2.0 FINISH: GOLD PLATE OVER NICKEL PLATE

3.0 MOUNTING SPACER: NICKEL PLATED ALUMINUM.

4.0 ALL DIMENSIONS ARE IN INCHES [MILLIMETERS].

5.0 TOLERANCES:

5.1 .XX = ±.02

5.2 .XXX = ±.010

6.0 FIELD REPLACEABLE SMA CONNECTORS.
   TENSOLITE 5602-5CCSF OR EQUIVALENT.

7.0 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	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.	IF1,IF2
4	IF1		
3	LO	This pin is DC coupled and matched to 50 Ohms.	LO

5

MIXERS