



GaAs MMIC I/Q MIXER MODULE 30 - 38 GHz

Features

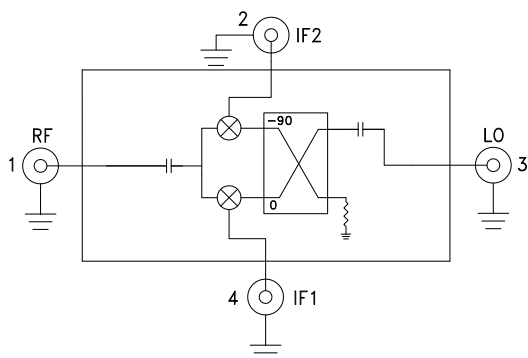
- Wide IF Bandwidth: DC - 3.5 GHz
- Image Rejection: 15 dB
- LO to RF Isolation: 35 dB
- High Input IP3: 19 dBm
- Hermetically Sealed Module
- Field Replaceable SMA Connectors
- 55 to +85 °C Operating Temperature

Typical Applications

The HMC-C047 is ideal for:

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

Functional Diagram



General Description

The HMC-C047 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 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 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, $T_A = +25^\circ \text{C}$, $IF = 100 \text{ MHz}$, $LO = +17 \text{ dBm}^*$

| Parameter | Min. | Typ. | Max. | Min. | Typ. | Max. | Units |
|--------------------------|----------|------|------|----------|------|------|-------|
| Frequency Range, RF/LO | 30 - 34 | | | 34 - 38 | | | GHz |
| Frequency Range, IF | DC - 3.5 | | | DC - 3.5 | | | GHz |
| Conversion Loss (As IRM) | | 10.5 | 13.5 | | 11 | 14 | dB |
| Image Rejection | 11 | 15 | | 11 | 15 | | dB |
| 1 dB Compression (Input) | | 17 | | | 17 | | dBm |
| LO to RF Isolation | 30 | 35 | | 23 | 34 | | dB |
| LO to IF Isolation | 18 | 25 | | 14 | 23 | | dB |
| IP3 (Input) | | 19 | | | 19 | | dBm |
| Amplitude Balance | | 0.5 | | | 1 | | dB |
| Phase Balance | | 13 | | | 12 | | Deg |

* Unless otherwise noted, all measurements performed as downconverter.

HMC-C047* PRODUCT PAGE QUICK LINKS

Last Content Update: 02/23/2017

COMPARABLE PARTS

View a parametric search of comparable parts.

DOCUMENTATION

Data Sheet

- HMC-C047 Data Sheet

DESIGN RESOURCES

- HMC-C047 Material Declaration
- PCN-PDN Information
- Quality And Reliability
- Symbols and Footprints

DISCUSSIONS

View all HMC-C047 EngineerZone Discussions.

SAMPLE AND BUY

Visit the product page to see pricing options.

TECHNICAL SUPPORT

Submit a technical question or find your regional support number.

DOCUMENT FEEDBACK

Submit feedback for this data sheet.



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

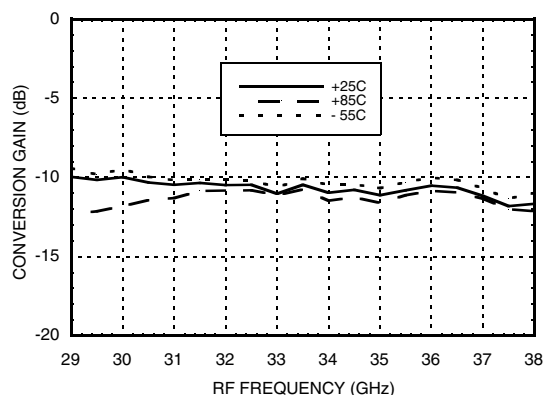
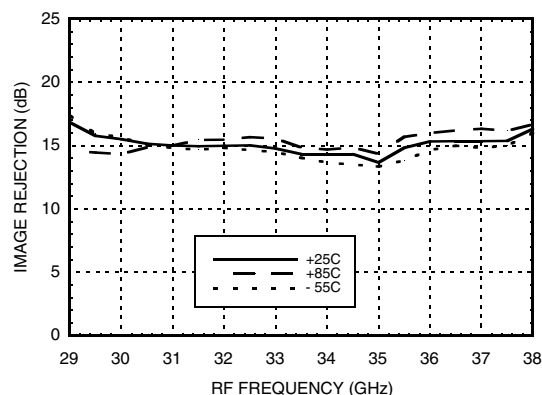
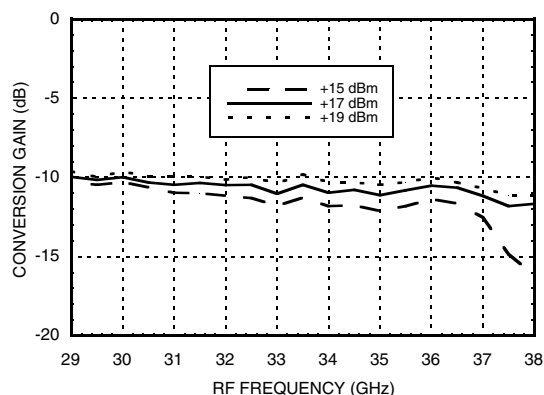


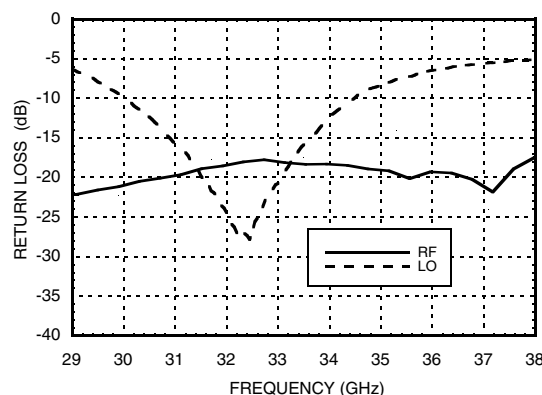
Image Rejection vs. Temperature



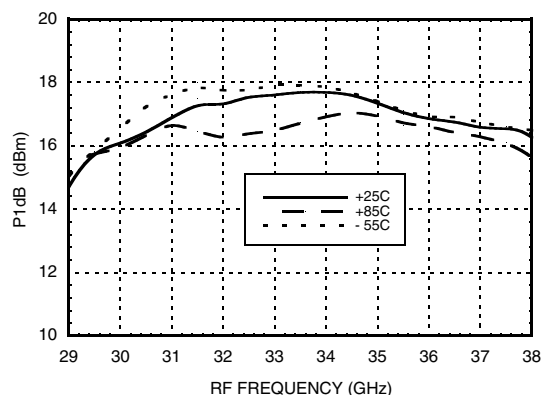
Conversion Gain vs. LO Drive



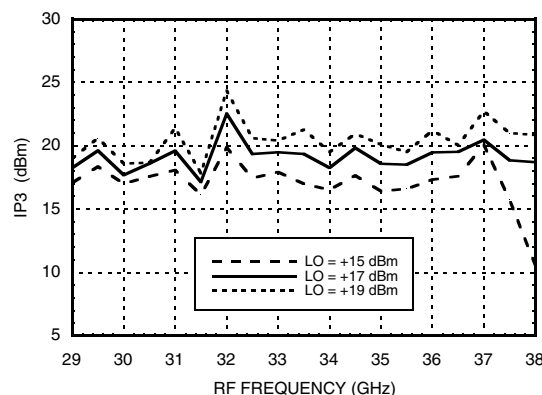
Return Loss

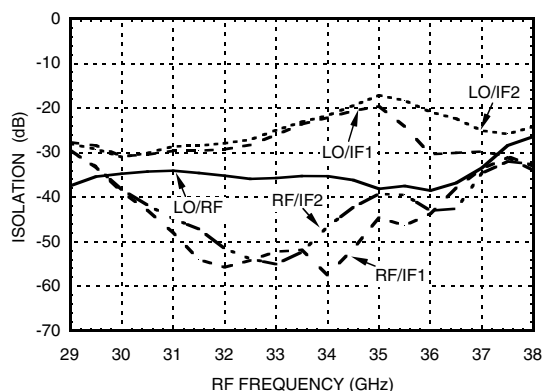
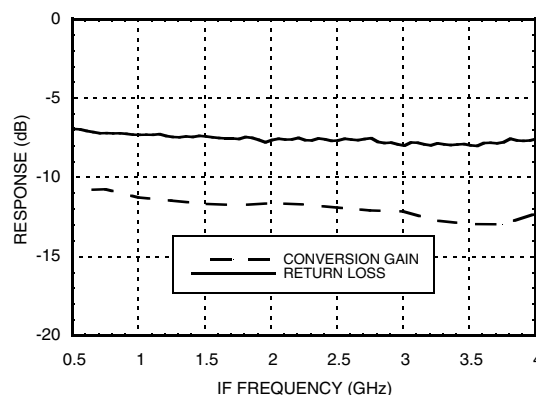
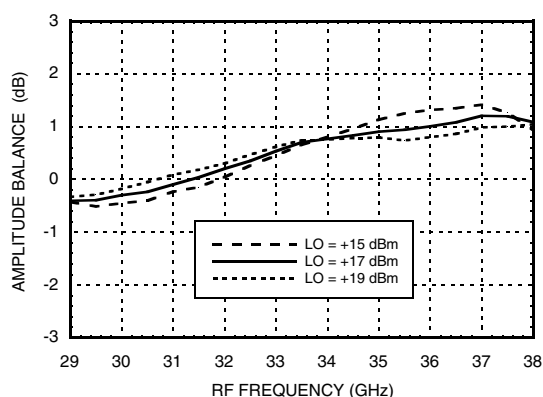
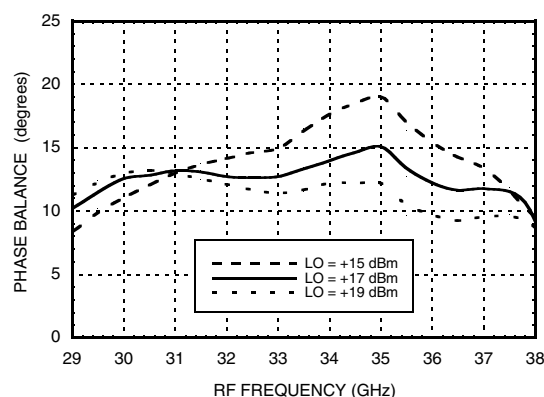
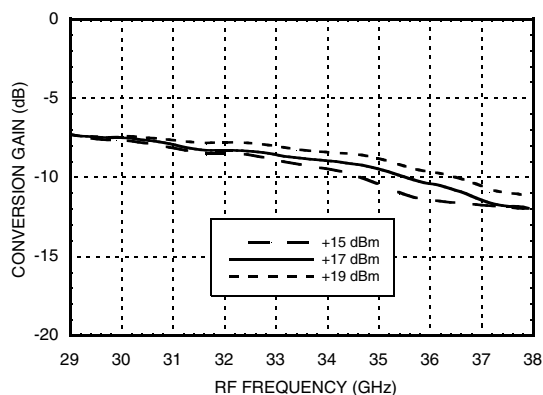
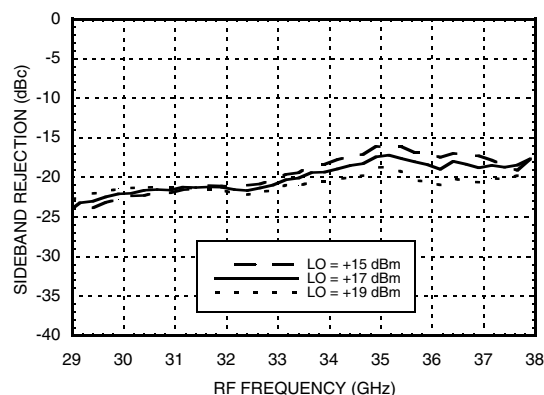


Input P1dB vs. Temperature



Input IP3 vs. LO Drive




IF1 & IF2 Port Characteristics
Isolations, LO = +19 dBm

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

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GaAs MMIC I/Q MIXER MODULE
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Absolute Maximum Ratings

| | |
|-----------------------|----------------|
| RF Input | +19 dBm |
| IF1 / IF2 Input | +24 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 | -12 | xx | xx | xx |
| 1 | 47 | 0 | 53 | xx | xx |
| 2 | xx | 62 | 68 | 59 | xx |
| 3 | xx | xx | 101 | 70 | 90 |
| 4 | xx | xx | xx | 90 | 104 |

RF = 35.1 GHz @ -10 dBm

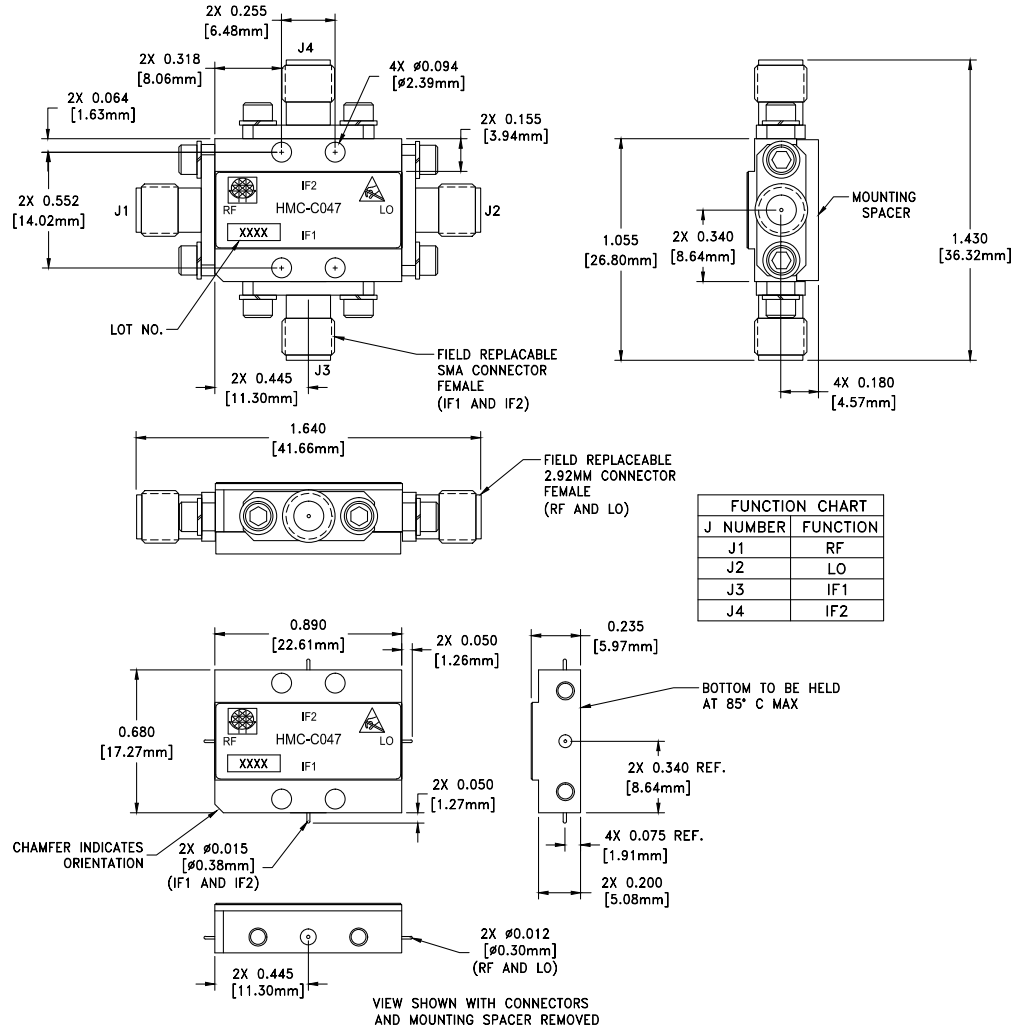
LO = 35 GHz @ +17 dBm

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

**GaAs MMIC I/Q MIXER MODULE
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Outline Drawing

Package Information

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

[1] Includes the connectors

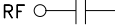
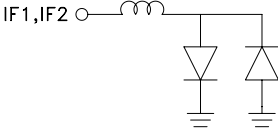
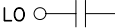
[2] ± 1 gms Tolerance

NOTES:

- 1.0 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 = ± 0.02
 - 5.2 .XXX = ± 0.010
- 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.

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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 AC coupled and matched to 50 Ohms. | LO  |