# HMC-C042

v03.0310

## GaAs MMIC I/Q MIXER MODULE 8.5 - 13.5 GHz


## Features

Wide IF Bandwidth: DC - 2 GHz

Image Rejection: 28 dB

LO to RF Isolation: 38 dB

High Input IP3: +25 dBm

Hermetically Sealed Module

Field Replaceable SMA Connectors

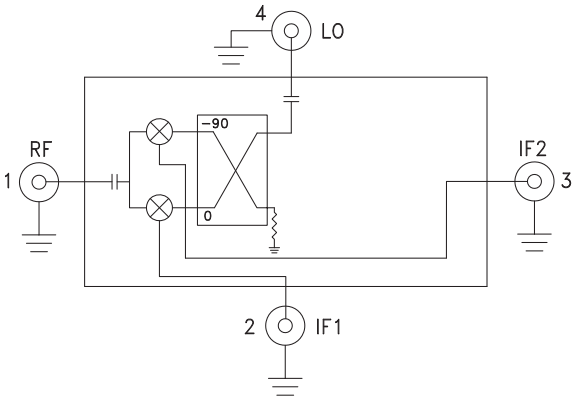
-55 to +85 °C Operating Temperature

## Typical Applications

The HMC-C042 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-C042 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° C, IF= 100 MHz, LO = +19 dBm*

| Parameter | Min. | Typ. | Max. | Units |
|---|---|---|---|---|
| Frequency Range, RF/LO | | 8.5 - 13.5 | | GHz |
| Frequency Range, IF | | DC - 2 | | GHz |
| Conversion Loss (As IRM) | | 8 | 10 | dB |
| Image Rejection | 17 | 28 | | dB |
| 1 dB Compression (Input) | | +17 | | dBm |
| LO to RF Isolation | 35 | 38 | | dB |
| LO to IF Isolation | 20 | 25 | | dB |
| IP3 (Input) | | +25 | | dBm |
| Amplitude Balance | | 0.6 | | dB |
| Phase Balance | | 6 | | Deg |

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



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# HMC-C042* PRODUCT PAGE QUICK LINKS

**Last Content Update: 11/29/2017**

## COMPARABLE PARTS

View a parametric search of comparable parts.

## DOCUMENTATION

**Data Sheet**

- HMC-C042 Data Sheet

## DESIGN RESOURCES

- HMC-C042 Material Declaration
- PCN-PDN Information
- Quality And Reliability
- Symbols and Footprints

## DISCUSSIONS

View all HMC-C042 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.

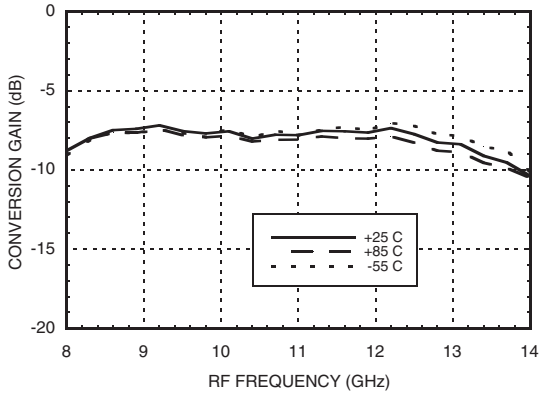
## DOCUMENT FEEDBACK

Submit feedback for this data sheet.

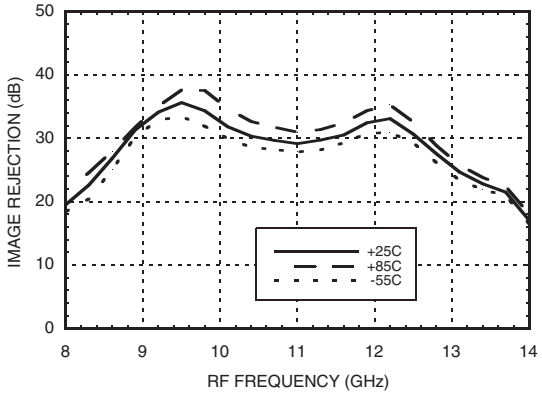
RoHS✓ EARTH FRIENDLY

## Data taken As IRM With External IF Hybrid

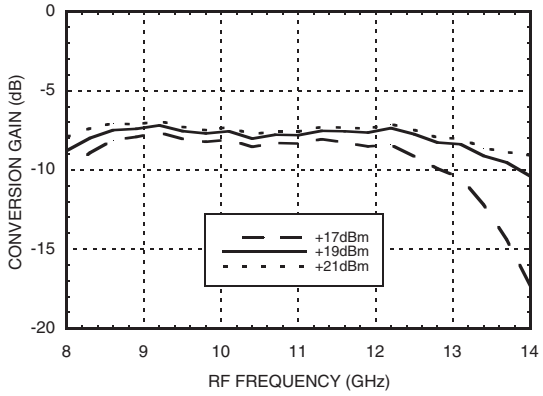
### Conversion Gain vs. Temperature



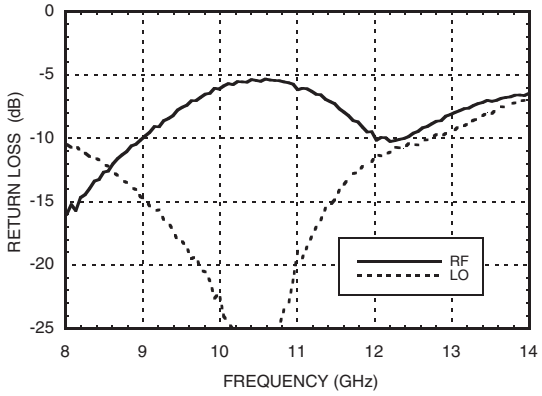

### Image Rejection vs. Temperature



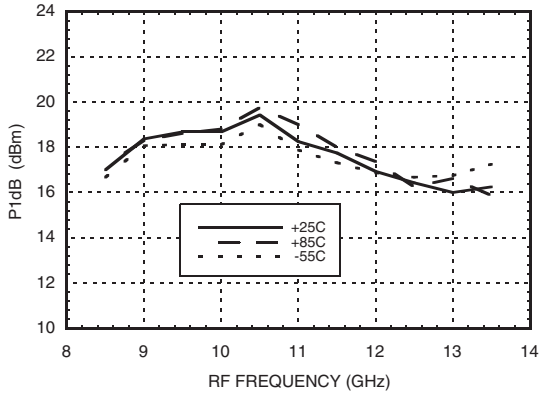

### Conversion Gain vs. LO Drive



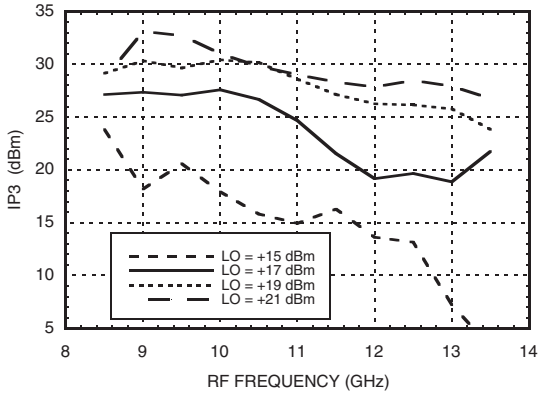

### Return Loss




### Input P1dB vs. Temperature




### Input IP3 vs. LO Drive





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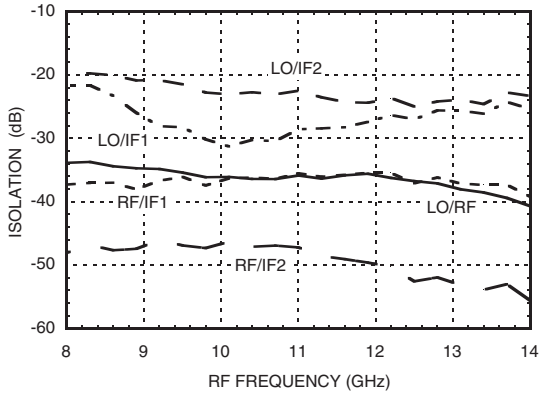
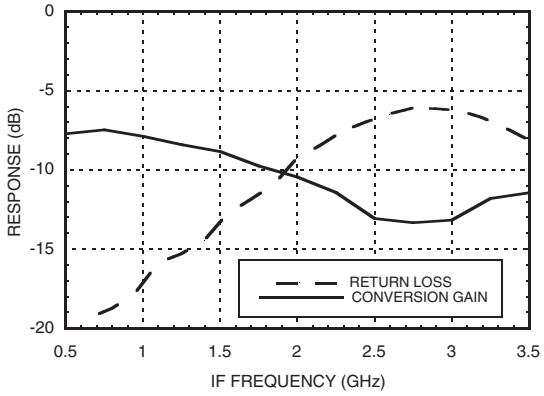
## Quadrature Channel Data Taken Without IF Hybrid

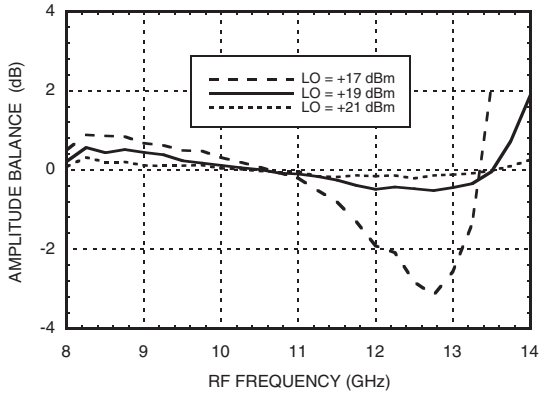
### Isolations



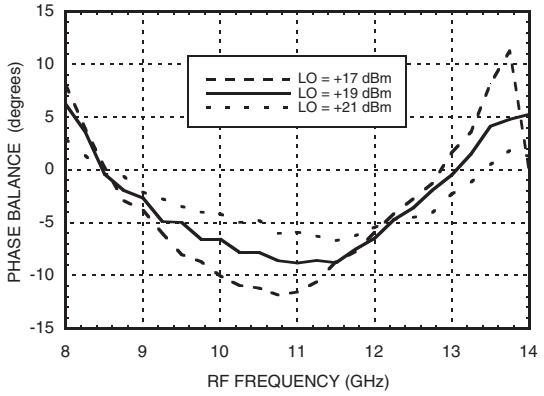

### IF Bandwidth*



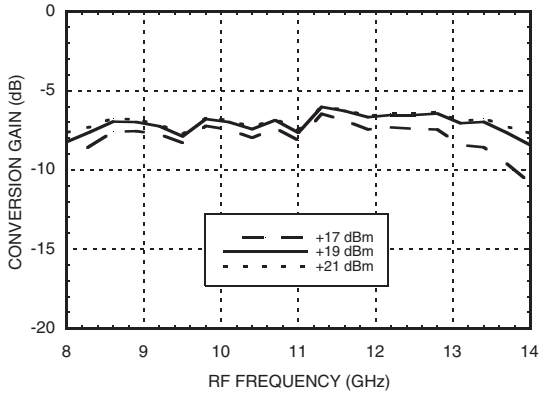

### Amplitude Balance vs. LO Drive



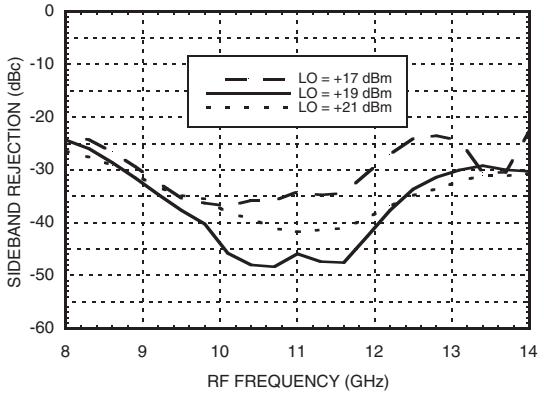

### Phase Balance vs. LO Drive




### 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 |
| 8.5 | 34 | 48 | 50 | 77 |
| 9.5 | 35 | 47 | 57 | 64 |
| 10.5 | 36 | 51 | 62 | 53 |
| 11.5 | 35 | 57 | 67 | 45 |
| 12.5 | 36 | 52 | 67 | 47 |
| 13.5 | 38 | 51 | 64 | xx |

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

## MxN Spurious Outputs

| | nLO | | | | |
|---|---|---|---|---|---|
| mRF | 0 | 1 | 2 | 3 | 4 |
| 0 | xx | -11 | 16 | 22 | 38 |
| 1 | 33 | 0 | 53 | 62 | 95 |
| 2 | 86 | 77 | 76 | 78 | 94 |
| 3 | 96 | 95 | 101 | 91 | 102 |
| 4 | 89 | 94 | 96 | 101 | 107 |

RF = 10.6 GHz @ -10 dBm
LO = 10.5 GHz @ +19 dBm
Data taken without IF hybrid
All values in dBc below IF power level

ELECTROSTATIC SENSITIVE DEVICE
OBSERVE HANDLING PRECAUTIONS

## Absolute Maximum Ratings

| | |
|---|---|
| RF / IF Input | +20 dBm |
| LO Drive | +27 dBm |
| Channel Temperature | 150°C |
| Continuous Pdiss (T=85°C) (derate 7.1 mW/°C above 85°C) | 460 mW |
| Thermal Resistance ($R_{TH}$) (junction to die bottom) | 140 °C/W |
| Storage Temperature | -65 to +150 °C |
| Operating Temperature | -55 to +85 °C |





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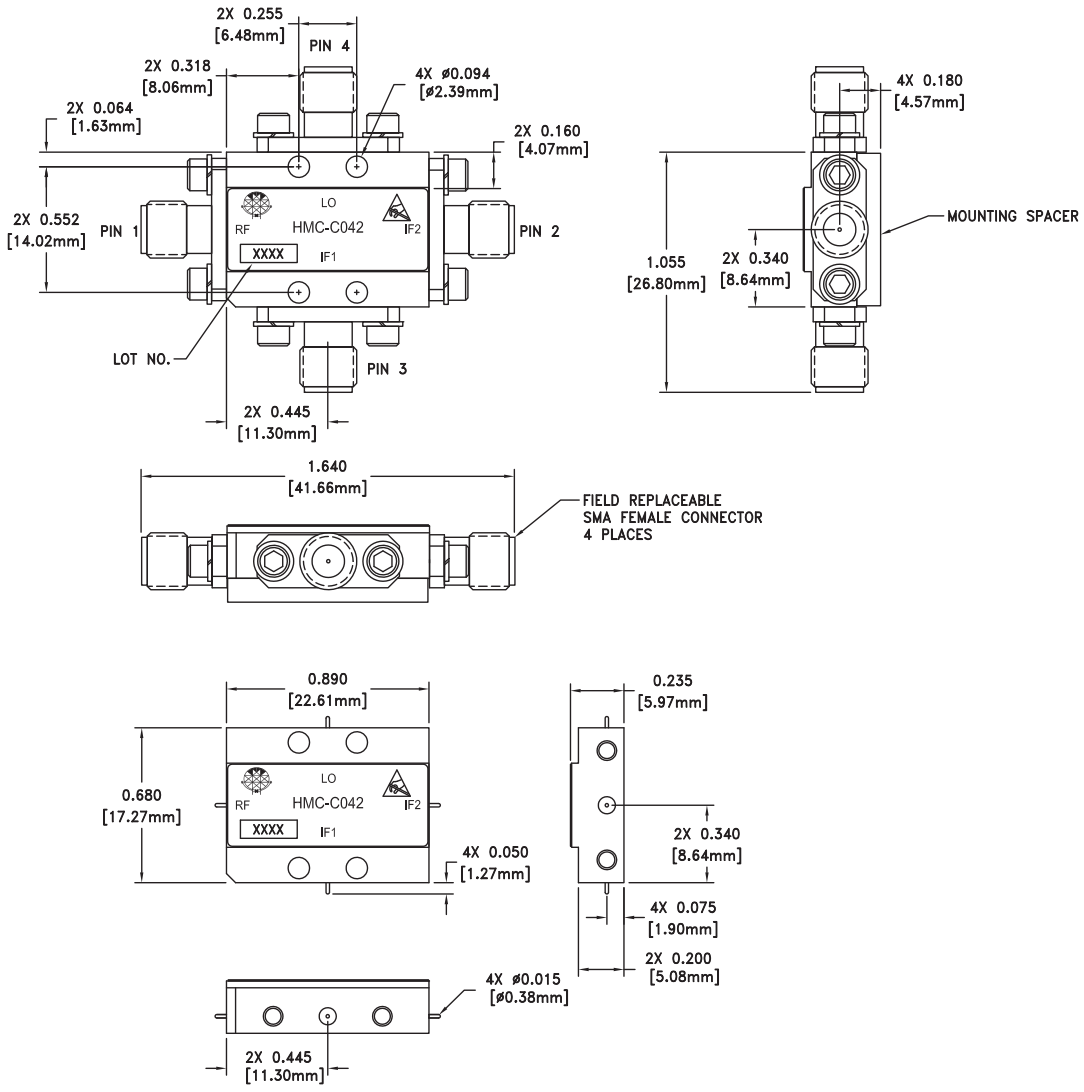
## Outline Drawing




VIEW SHOWN WITH CONNECTORS REMOVED

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

## 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



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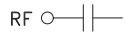
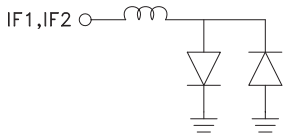
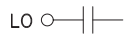
## Pin Descriptions

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





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