



## GaAs MMIC DOUBLE BALANCED MIXER MODULE, 23 - 37 GHz

### Features

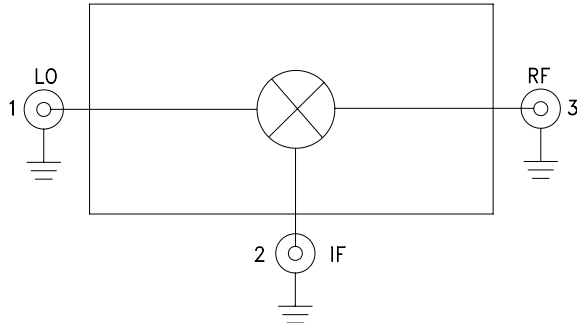
- Wide IF Bandwidth: DC - 13 GHz
- Passive: No DC Bias Required
- Input IP3: +19 dBm
- LO/RF Isolation: 35 dB
- Hermetically Sealed Module
- Field Replaceable Coaxial Connectors
- 55 to +85 °C Operating Temperature

### Typical Applications

The HMC-C035 is ideal for:

- Telecom Infrastructure
- Military Radio, Radar & ECM
- Space Systems
- Test Instrumentation

### Functional Diagram



### General Description

The HMC-C035 is a general purpose double-balanced mixer housed in a miniature hermetic module which can be used as an upconverter or downconverter between 23 and 37 GHz. This mixer requires no external components or matching circuitry. The HMC-C035 provides excellent, LO to RF, and LO to IF suppression due to optimized balun structures. The mixer operates with LO drive levels from +11 to +15 dBm and requires no DC bias. The HMC-C035 may also be used as a Bi-Phase Modulator/Demodulator or phase comparator. The module features removable coaxial connectors which can be detached to allow direct connection of the I/O pins to a microstrip or coplanar circuit.

### Electrical Specifications, $T_A = +25^\circ\text{C}$ , $IF = 1\text{ GHz}$ , $LO = +13\text{ dBm}^*$

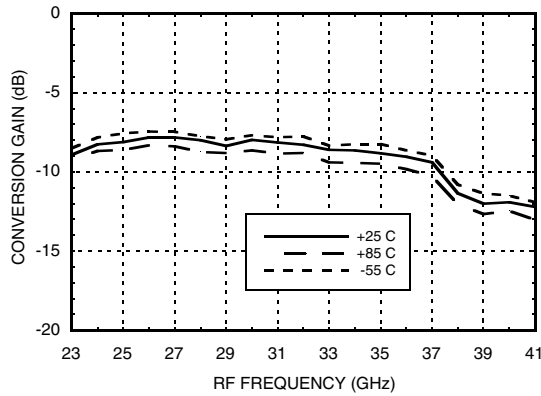
Parameter	Min.	Typ.	Max.	Units
Frequency Range, RF & LO	23 - 37			GHz
Frequency Range, IF	DC - 13			GHz
Conversion Loss		9	12	dB
Noise Figure (SSB)		9	12	dB
LO to RF Isolation	20	35		dB
LO to IF Isolation	20	35		dB
RF to IF Isolation	13	25		dB
IP3 (Input)		19		dBm
IP2 (Input)		50		dBm
1 dB Gain Compression (Input)		12		dBm

\*Unless otherwise noted, all measurements performed as downconverter,  $IF = 1\text{ GHz}$ .

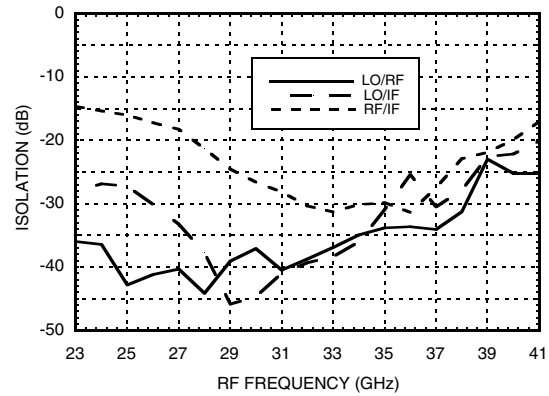


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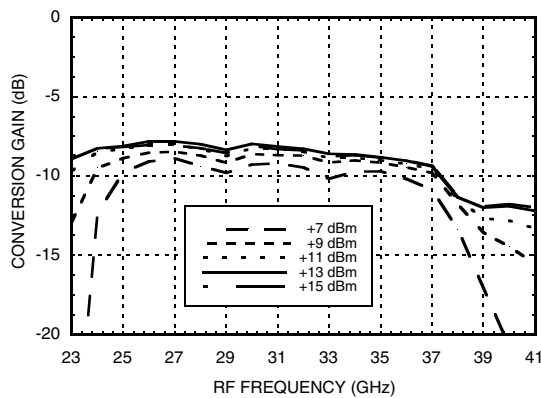
**Conversion Gain vs. Temperature**



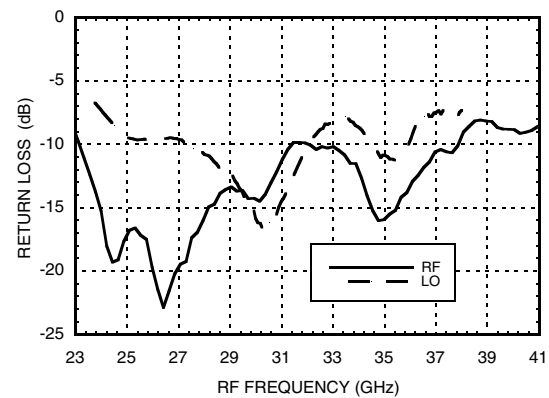
**Isolation**



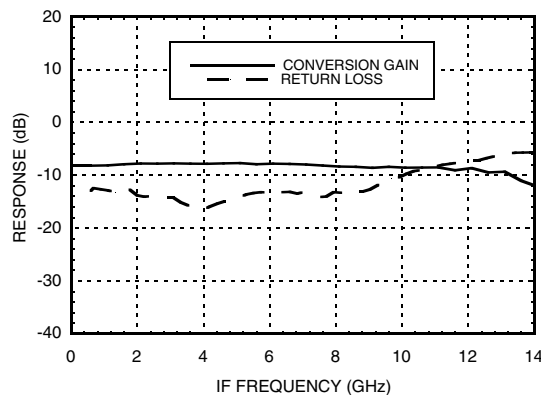
**Conversion Gain vs. LO Drive**



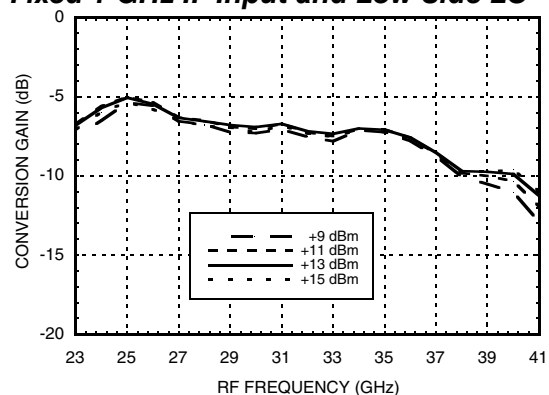
**Return Loss**



**IF Bandwidth Downconversion with Low Side LO = 24 GHz @ +13 dBm**



**Upconverter Performance, Conversion Gain vs. LO Drive for Fixed 1 GHz IF Input and Low Side LO**



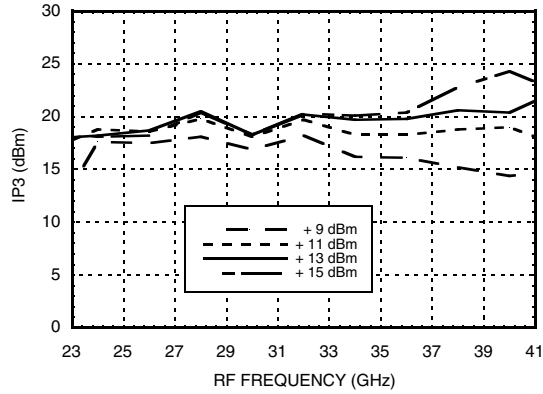
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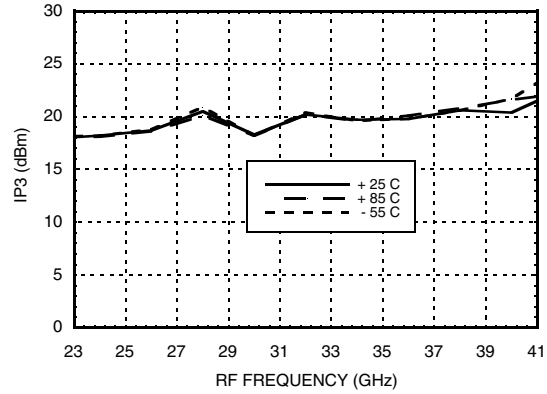


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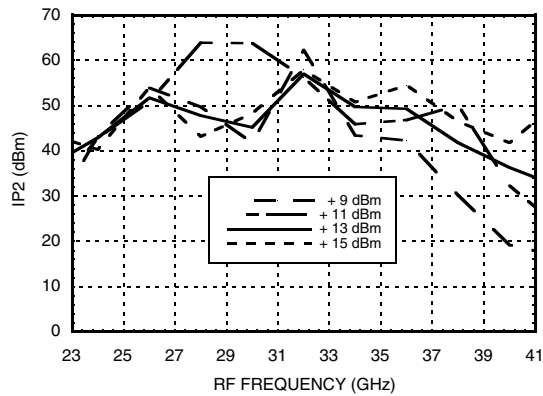
**Input IP3 vs. LO Drive \***



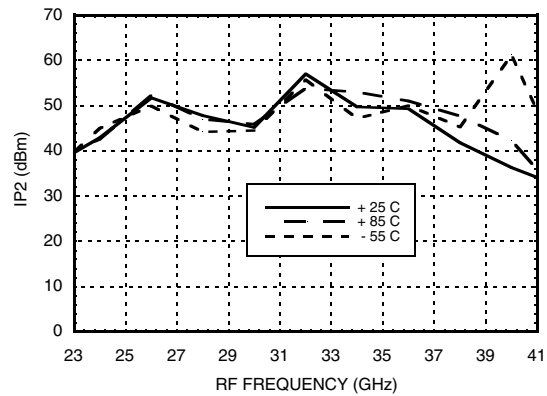
**Input IP3 vs. Temperature\***



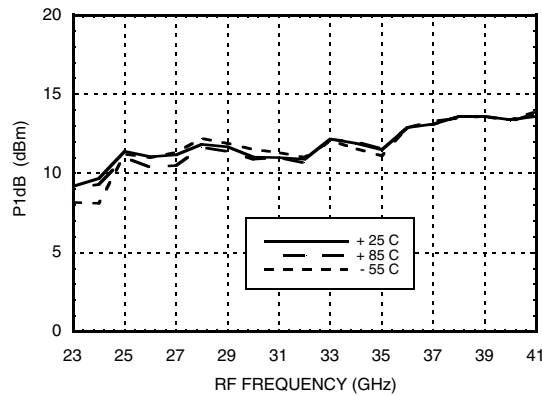
**Input IP2 vs. LO Drive \***



**Input IP2 vs. Temperature \***



**Input P1dB vs. Temperature**



\* Two-tone input power = -10 dBm each tone, 1 MHz spacing.

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**GaAs MMIC DOUBLE BALANCED  
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**MxN Spurious Outputs**

mRF	nLO				
	0	1	2	3	4
0	xx	0	13	xx	xx
1	8	0	29	xx	xx
2	69	53	50	64	xx
3	xx	78	80	67	86
4	xx	xx	87	92	94

RF = 24 GHz @ -10 dBm  
 LO = 25 GHz @ +13 dBm  
 All values in dBc below the IF output power level (-1 RF + 1 LO).

**Absolute Maximum Ratings**

RF / IF Input	+25 dBm
LO Drive	+23 dBm
IF DC Current	±2 mA
Storage Temperature	-65 to +150 °C
Operating Temperature	-55 to +85 °C

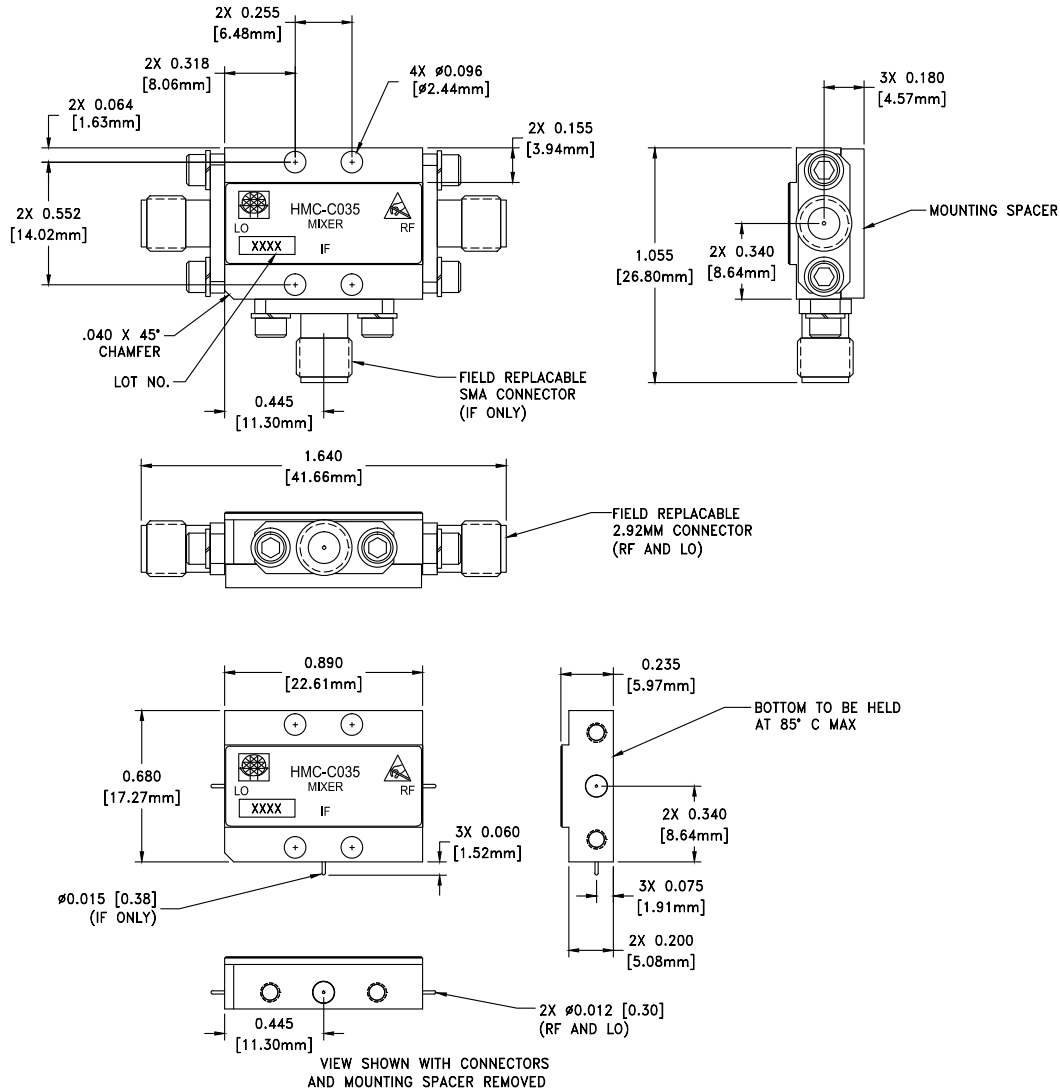


**ELECTROSTATIC SENSITIVE DEVICE  
OBSERVE HANDLING PRECAUTIONS**



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**Outline Drawing**



**Package Information**

Package Type	C-11
Package Weight [1]	18.2 gms [2]
Spacer Weight	2.6 gms [2]

[1] Includes the connectors

[2]  $\pm$ 1 gms Tolerance

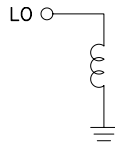
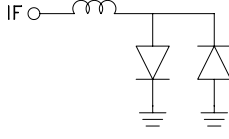
**NOTES:**

1. PACKAGE, LEADS, COVER MATERIAL: KOVAR™
2. PLATING: GOLD PLATE OVER NICKEL PLATE.
3. MOUNTING SPACER: NICKEL PLATED ALUMINUM.
4. ALL DIMENSIONS ARE IN INCHES [MILLIMETERS].
5. TOLERANCES:  $\pm$ 0.010 [0.23] UNLESS OTHERWISE SPECIFIED
6. FIELD REPLACEABLE 2.92mm CONNECTORS. TENSOLITE 231CCSF OR EQUIVALENT.

## GaAs MMIC DOUBLE BALANCED MIXER MODULE, 23 - 37 GHz



### Pin Descriptions

Pin Number	Function	Description	Interface Schematic
1	LO	This pin is DC coupled and matched to 50 Ohms.	
2	IF	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 or sink more than 2 mA of current or part non-function and possible part failure will result.	
3	RF	This pin is DC coupled and matched to 50 Ohms.	