



## 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

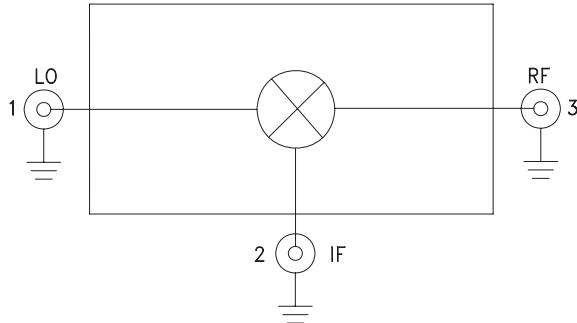
### Typical Applications

- The HMC-C035 is ideal for:
- Telecom Infrastructure
  - Military Radio, Radar & ECM
  - Space Systems
  - Test Instrumentation

### 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.

### Functional Diagram



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

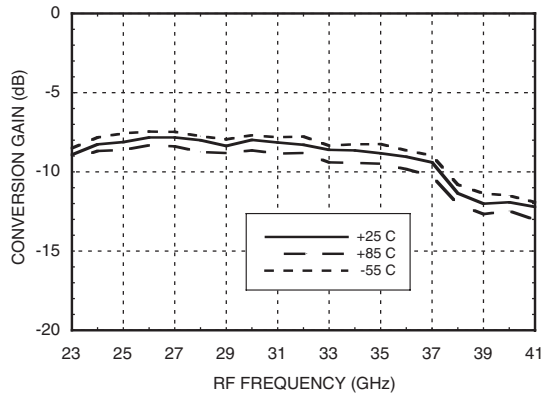
Parameter	Min.	Typ.	Max.	Units
Frequency Range, RF & LO	23 - 37			GHz
Frequency Range, IF	DC - 13			GHz
Conversion Loss		9	12	dB
Noise Figure (SSB)		9	12	dB
LO to RF Isolation	20	35		dB
LO to IF Isolation	20	35		dB
RF to IF Isolation	13	25		dB
IP3 (Input)		19		dBm
IP2 (Input)		50		dBm
1 dB Gain Compression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

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

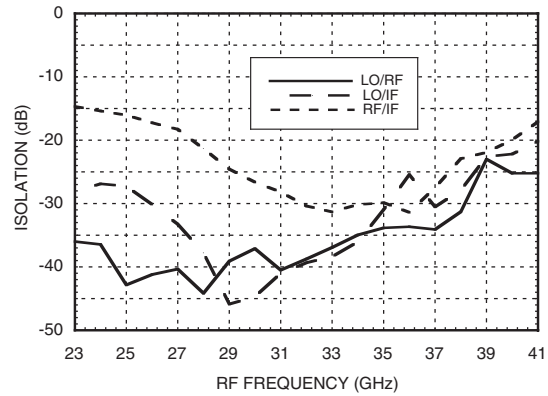


**GaAs MMIC DOUBLE BALANCED MIXER MODULE, 23 - 37 GHz**

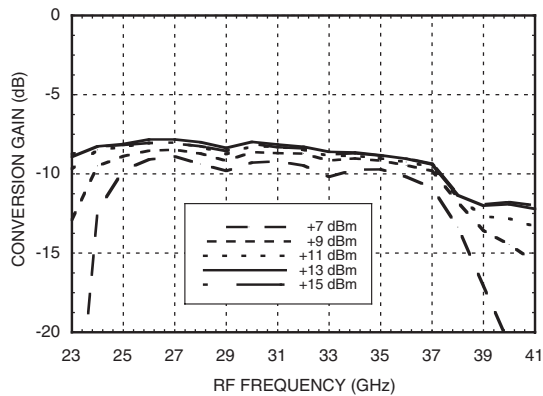
**Conversion Gain vs. Temperature**



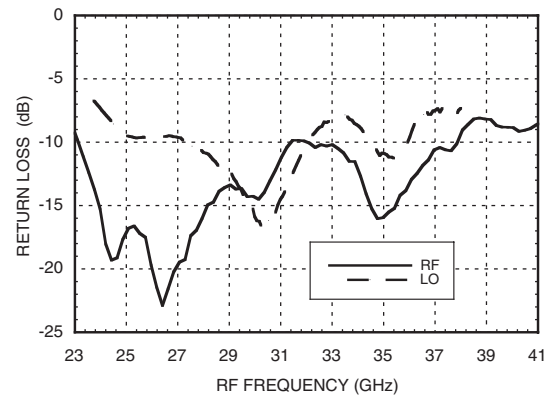
**Isolation**



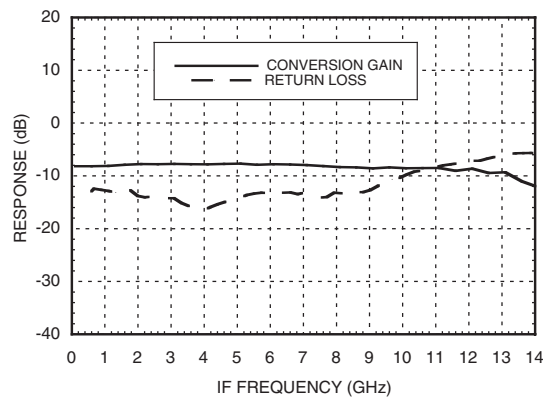
**Conversion Gain vs. LO Drive**



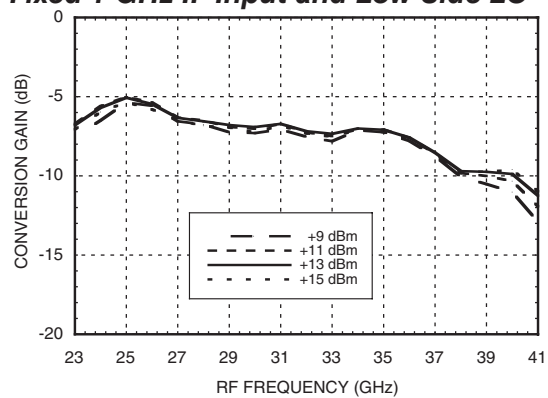
**Return Loss**

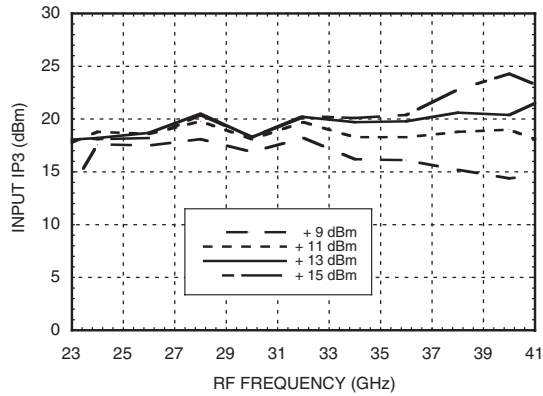
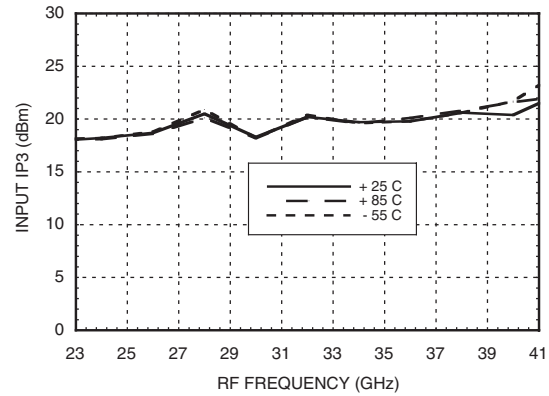
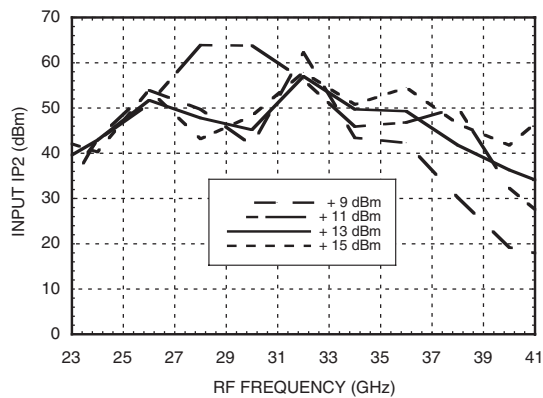
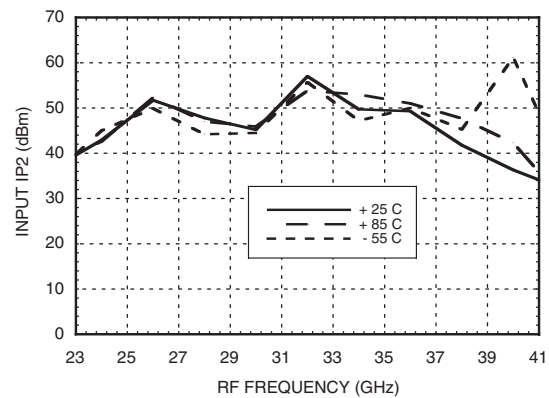
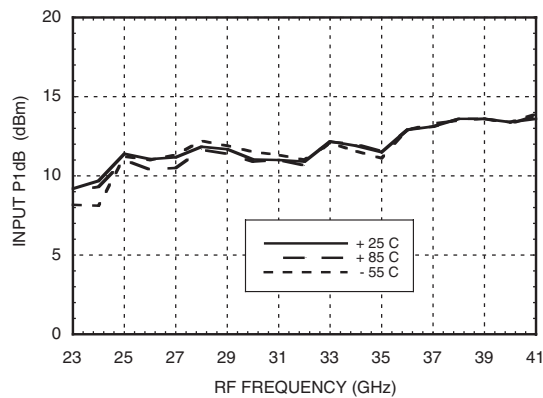


**IF Bandwidth Downconversion with Low Side LO = 24 GHz @ +13 dBm**



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



**GaAs MMIC DOUBLE BALANCED  
MIXER MODULE, 23 - 37 GHz**
**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.


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

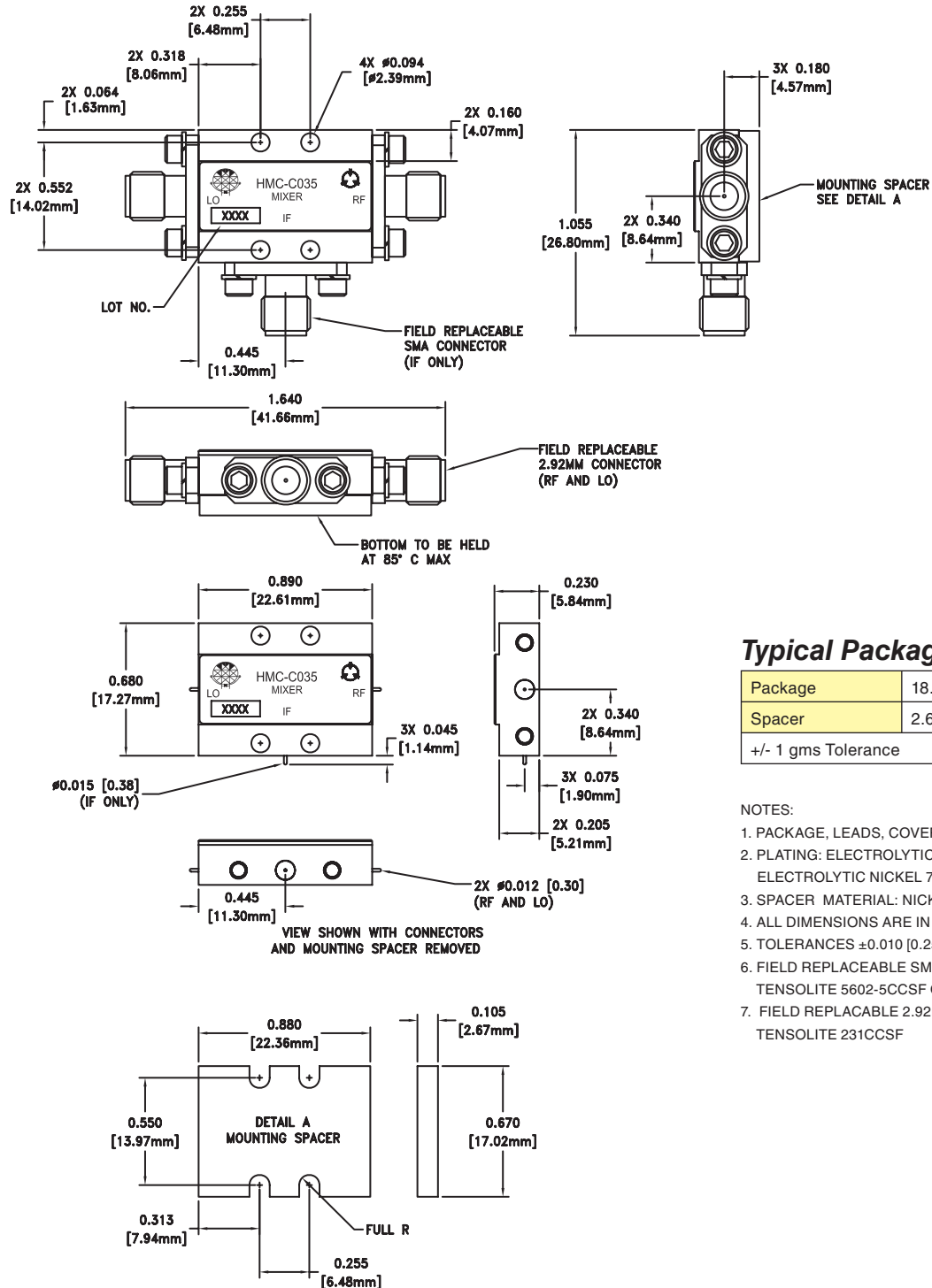
RF / IF Input	+25 dBm
LO Drive	+23 dBm
IF DC Current	±2 mA
Storage Temperature	-65 to +150 °C
Operating Temperature	-55 to +85 °C



**ELECTROSTATIC SENSITIVE DEVICE  
OBSERVE HANDLING PRECAUTIONS**

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

#### Outline Drawing



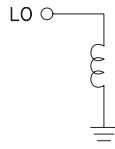
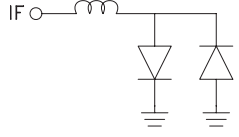
#### Typical Package Weight

Package	18.2 gms
Spacer	2.6 gms
+/- 1 gms Tolerance	

#### NOTES:

1. PACKAGE, LEADS, COVER MATERIAL: KOVAR™
2. PLATING: ELECTROLYTIC GOLD 50 MICROINCHES MIN., OVER ELECTROLYTIC NICKEL 75 MICROINCHES MIN.
3. SPACER MATERIAL: NICKEL PLATED ALUMINUM
4. ALL DIMENSIONS ARE IN INCHES [MILLIMETERS].
5. TOLERANCES ±0.010 [0.25] UNLESS OTHERWISE SPECIFIED.
6. FIELD REPLACEABLE SMA CONNECTOR. TENSOLITE 5602-5CCSF OR EQUIVALENT.
7. FIELD REPLACEABLE 2.92mm CONNECTORS TENSOLITE 231CCSF


**Pin Descriptions**

Pin Number	Function	Description	Interface Schematic
1	LO	This pin is DC coupled and matched to 50 Ohm from 23 to 37 GHz.	
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 Ohm from 23 to 37 GHz.	