

## GaAs MMIC DOUBLE BALANCED MIXER MODULE, 24 - 38 GHz

### Features

- Passive: No DC Bias Required
- Input IP3: +20 dBm
- LO/RF Isolation: 35 dB
- Wide IF Bandwidth: DC - 8 GHz
- Hermetically Sealed Module
- Field Replaceable Coaxial Connectors
- 55 to +85 °C Operating Temperature

### Typical Applications

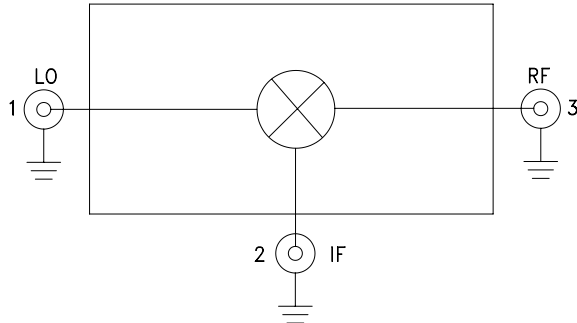
The HMC-C015 is ideal for:

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

### General Description

The HMC-C015 is a general purpose double-balanced mixer housed in a miniature hermetic module which can be used as an upconverter or downconverter between 24 and 38 GHz. This mixer requires no external components or matching circuitry. The HMC-C015 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-C015 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, $T_A = +25^\circ\text{C}$ , $IF = 1\text{ GHz}$ , $LO = +13\text{ dBm}^*$

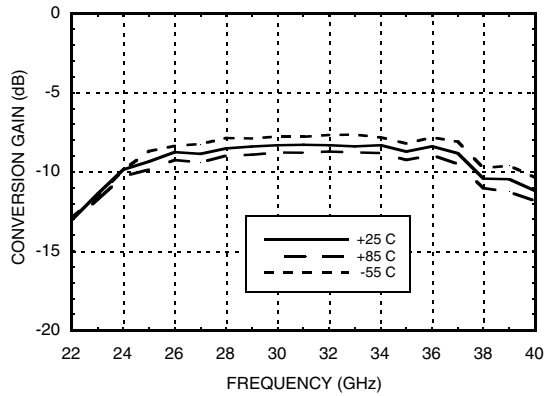
Parameter	Min.	Typ.	Max.	Units
Frequency Range, RF & LO	24 - 38			GHz
Frequency Range, IF	DC - 8			GHz
Conversion Loss		9	12	dB
Noise Figure (SSB)		9	12	dB
LO to RF Isolation	27	35		dB
LO to IF Isolation	26	40		dB
RF to IF Isolation	20	30		dB
IP3 (Input)		20		dBm
IP2 (Input)		55		dBm
1 dB Gain Compression (Input)		11		dBm

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

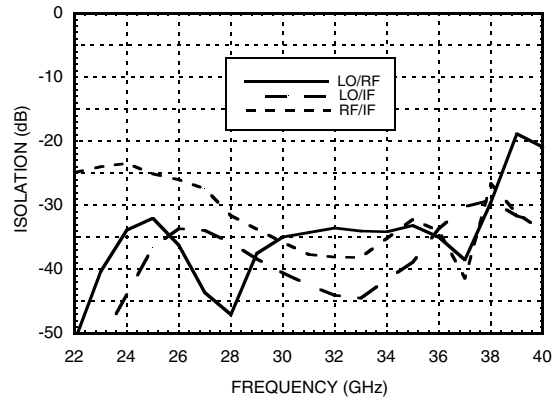


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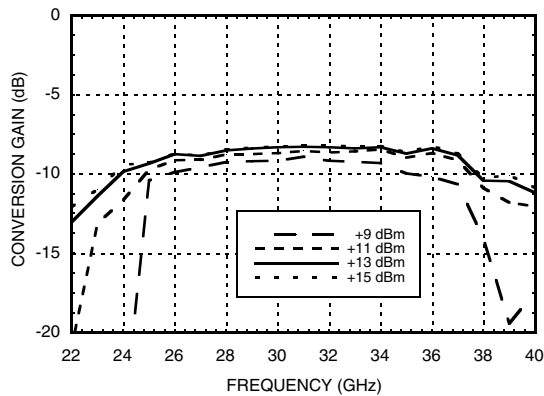
**Conversion Gain vs. Temperature**



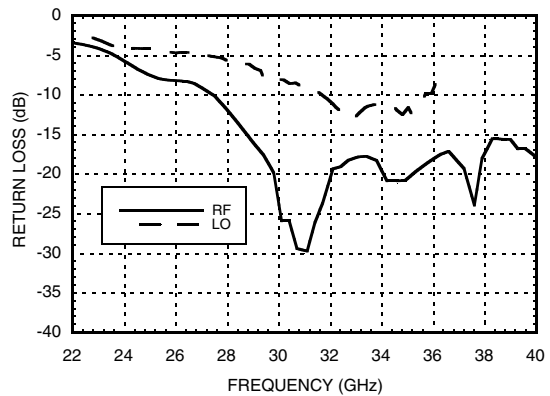
**Isolation**



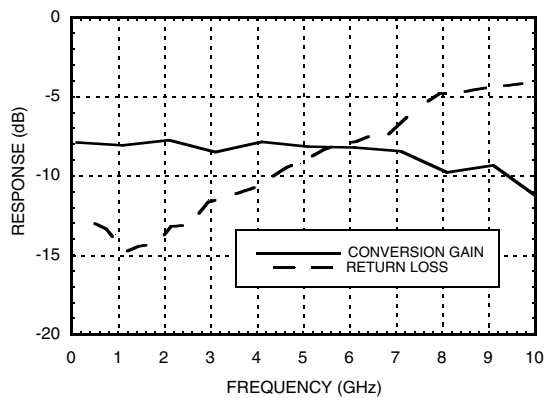
**Conversion Gain vs. LO Drive**



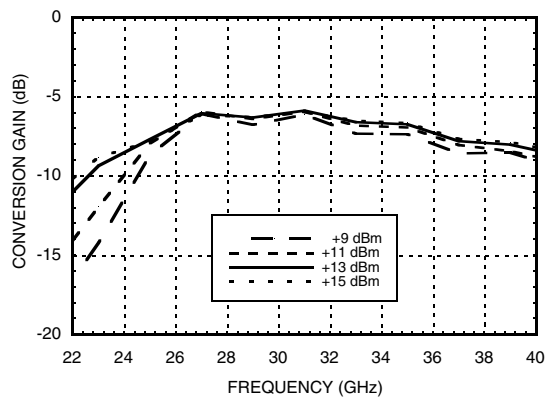
**Return Loss**



**IF Bandwidth**



**Upconverter Performance Conversion Gain vs. LO Drive**



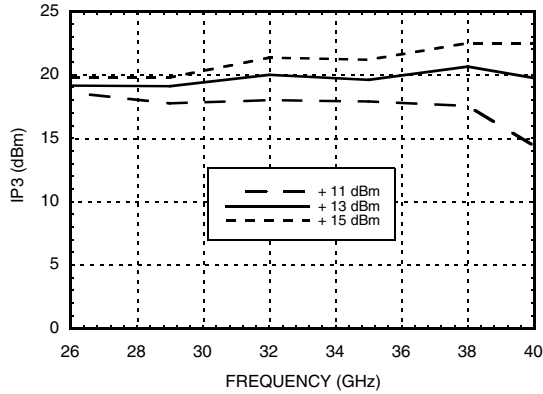
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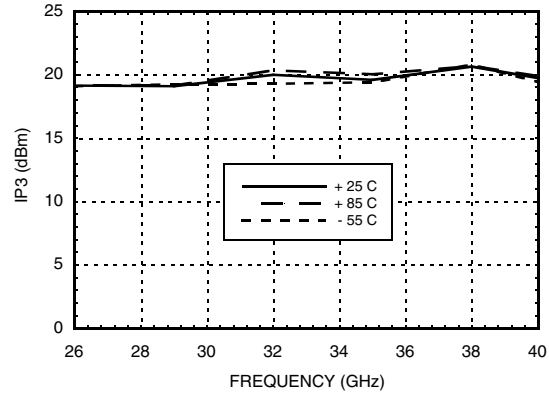


**GaAs MMIC DOUBLE BALANCED  
MIXER MODULE, 24 - 38 GHz**

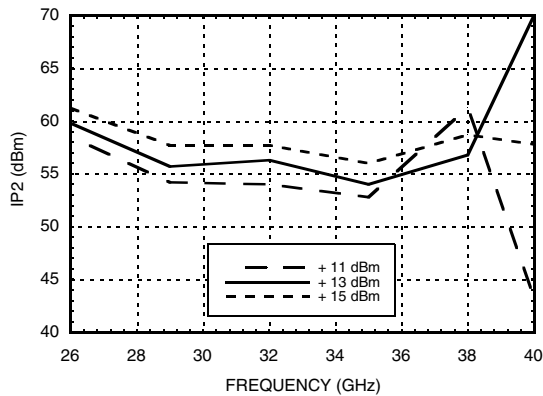
**Input IP3 vs. LO Drive \***



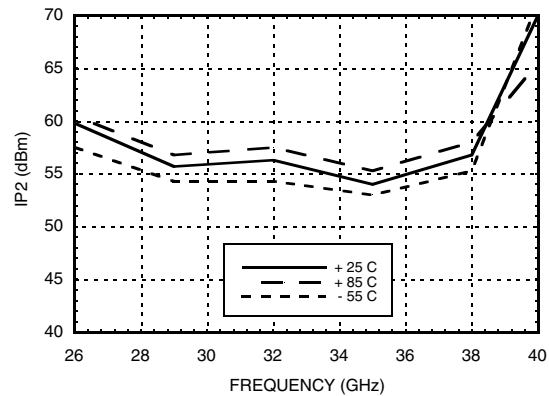
**Input IP3 vs. Temperature\***



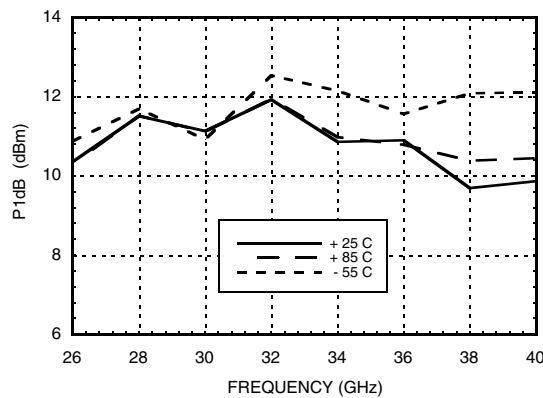
**Input IP2 vs. LO Drive \***



**Input IP2 vs. Temperature \***



**Input P1dB vs. Temperature**



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

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

mRF	nLO				
	0	1	2	3	4
0	xx	10	xx	xx	xx
1	23	0	45	xx	xx
2	xx	72	58	72	xx
3	xx	xx	103	68	90
4	xx	xx	xx	103	104

RF = 28 GHz @ -10 dBm  
LO = 27 GHz @ +13 dBm  
All values in dBc below the IF output power level.

**Absolute Maximum Ratings**

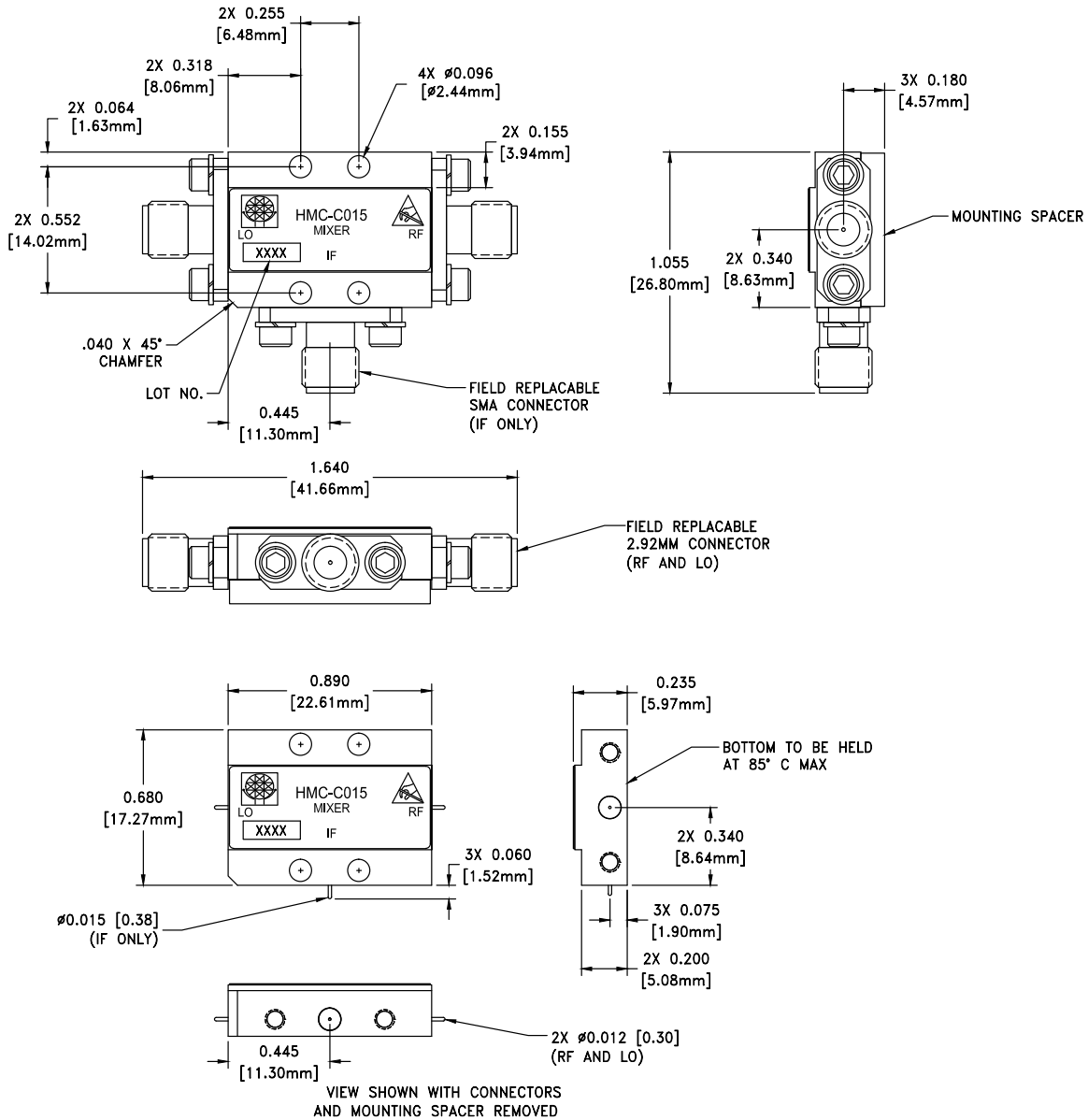
RF / IF Input	+13 dBm
LO Drive	+27 dBm
Storage Temperature	-65 to +150 °C
Operating Temperature	-55 to +85 °C


**ELECTROSTATIC SENSITIVE DEVICE  
OBSERVE HANDLING PRECAUTIONS**



**GaAs MMIC DOUBLE BALANCED  
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**Outline Drawing**



**Package Information**

Package Type	C-11
Package Weight <sup>[1]</sup>	18.2 gms <sup>[2]</sup>
Spacer Weight	2.6 gms <sup>[2]</sup>

[1] Includes the connectors

[2]  $\pm$ 1 gms Tolerance

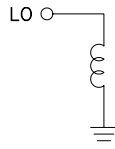
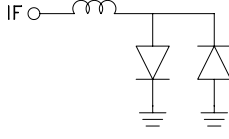
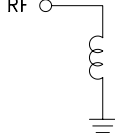
**NOTES:**

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, 24 - 38 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.	

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