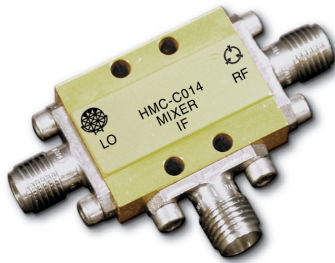


GaAs MMIC FUNDAMENTAL MIXER MODULE, 16 - 32 GHz

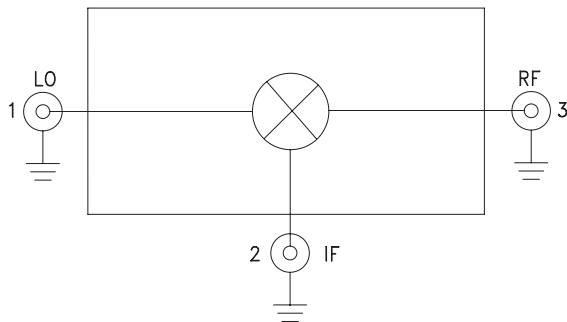


Typical Applications

The HMC-C014 is ideal for:

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

Functional Diagram



Features

- Passive: No DC Bias Required
- Input IP3: +19 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

General Description

The HMC-C014 is a general purpose passive double-balanced mixer housed in a miniature hermetic module that can be used as an upconverter or downconverter between 16 and 32 GHz. This mixer requires no external components or matching circuitry. The HMC-C014 provides excellent LO to RF and LO to IF suppression due to optimized balun structures. The mixer operates with LO drive levels from +9 dBm to +15 dBm and requires no DC Bias. The HMC-C014 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.

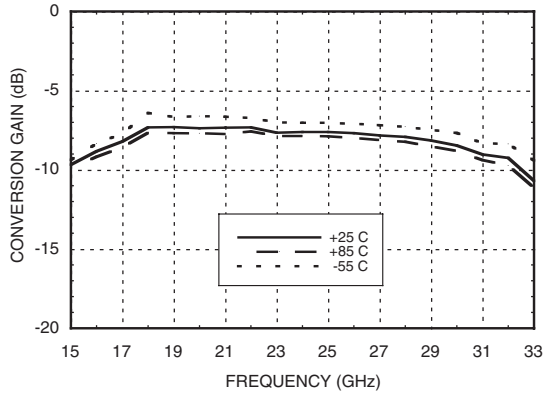
Electrical Specifications, $T_A = +25^\circ \text{C}$, $IF = 1 \text{ GHz}$, $LO = +13 \text{ dBm}^*$

Parameter	Min.	Typ.	Max.	Min.	Typ.	Max.	Units
Frequency Range, RF & LO	16 - 26		26 - 32				GHz
Frequency Range, IF	DC - 8		DC - 8				GHz
Conversion Loss		8	11		8	11	dB
Noise Figure (SSB)		8	11		8	11	dB
LO to RF Isolation	30	40		25	35		dB
LO to IF Isolation	30	40		30	40		dB
RF to IF Isolation	17	25		20	28		dB
IP3 (Input)		19			19		dBm
IP2 (Input)		50			50		dBm
1 dB Gain Compression (Input)		12			13		dBm

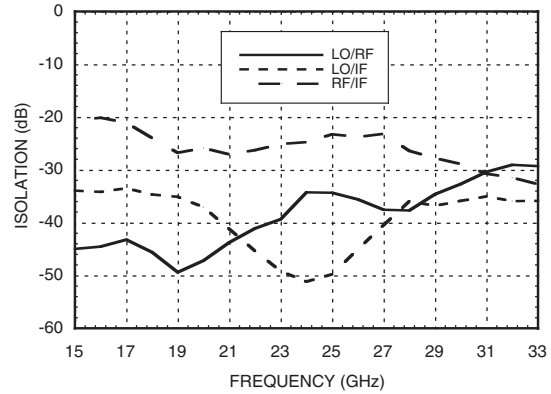
*Unless otherwise noted, all measurements performed as downconverter, $IF = 1 \text{ GHz}$.

GaAs MMIC FUNDAMENTAL MIXER MODULE, 16 - 32 GHz

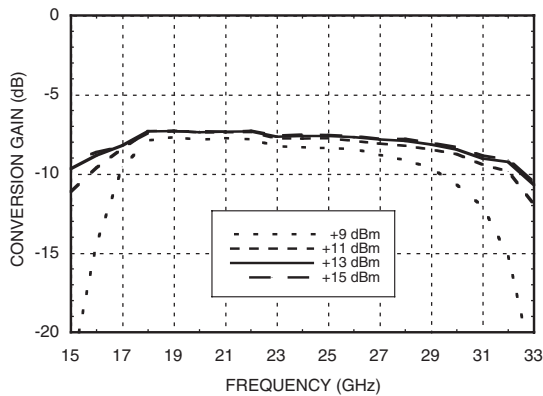
Conversion Gain vs. Temperature



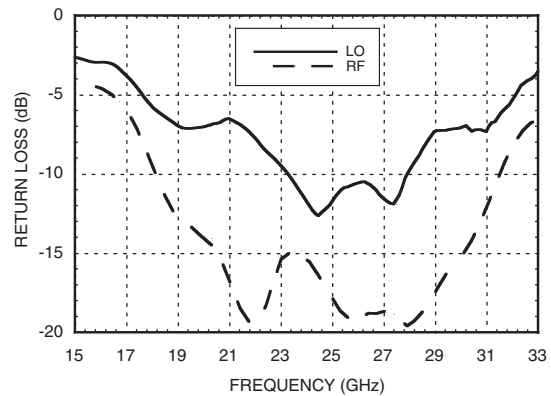
Isolation



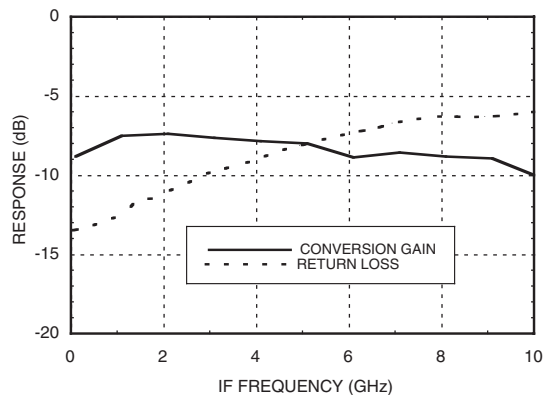
Conversion Gain vs. LO Drive



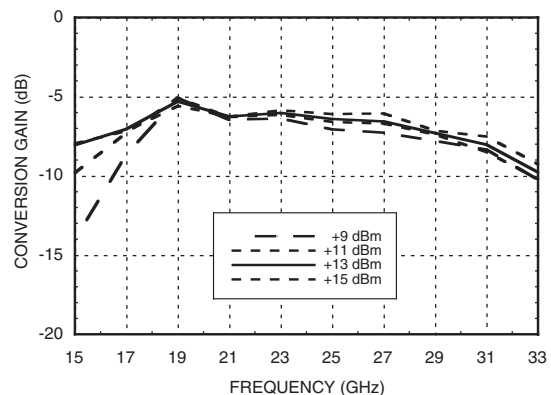
Return Loss



IF Bandwidth

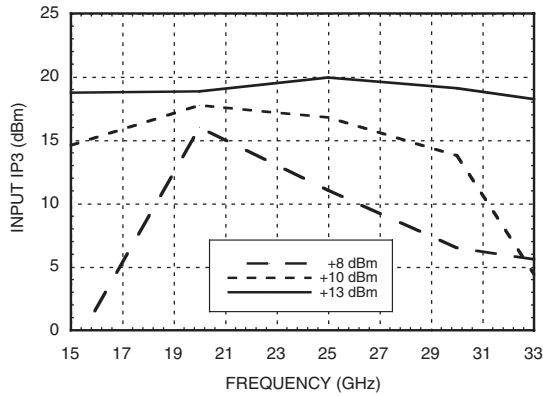


**Upconverter Performance
Conversion Gain vs. LO Drive**

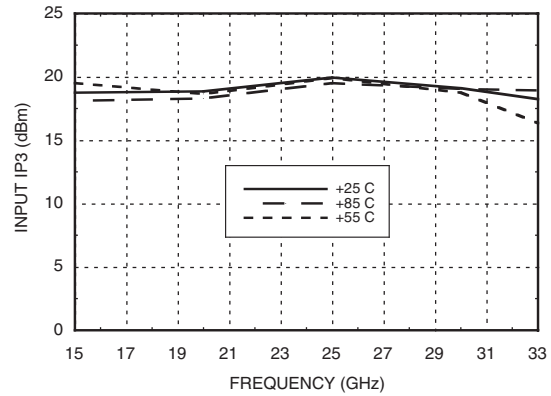


**GaAs MMIC FUNDAMENTAL
MIXER MODULE, 16 - 32 GHz**

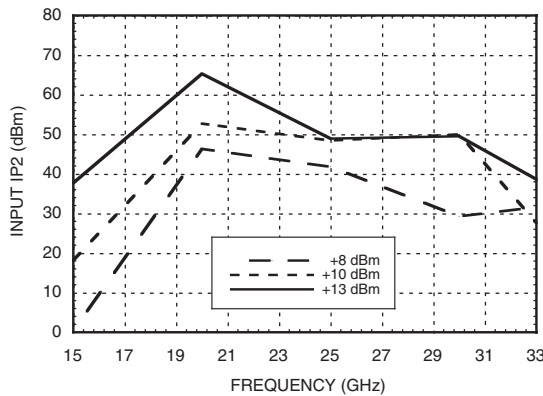
Input IP3 vs. LO Drive *



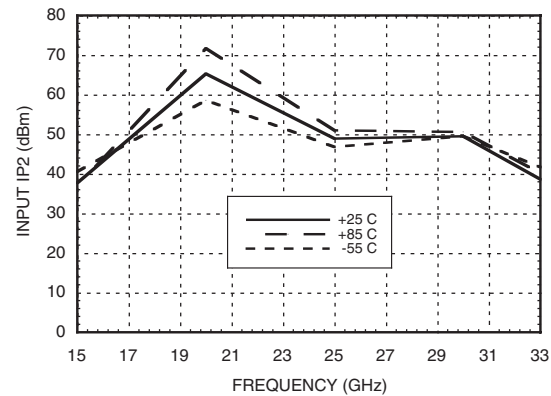
Input IP3 vs. Temperature *



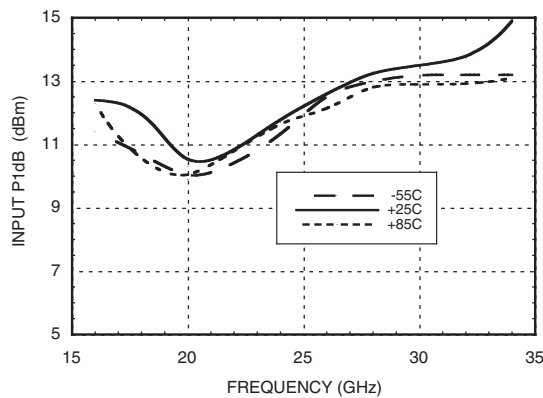
Input IP2 vs. LO Drive *



Input IP2 vs. Temperature *



Input P1dB vs. Temperature



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

**GaAs MMIC FUNDAMENTAL
MIXER MODULE, 16 - 32 GHz**

MxN Spurious Outputs

mRF	nLO				
	0	1	2	3	4
0	xx	14	31	xx	xx
1	21	0	44	37	xx
2	78	84	69	81	89
3	xx	86	90	81	91
4	xx	xx	86	89	100

RF = 22 GHz @ -10 dBm
LO = 21 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



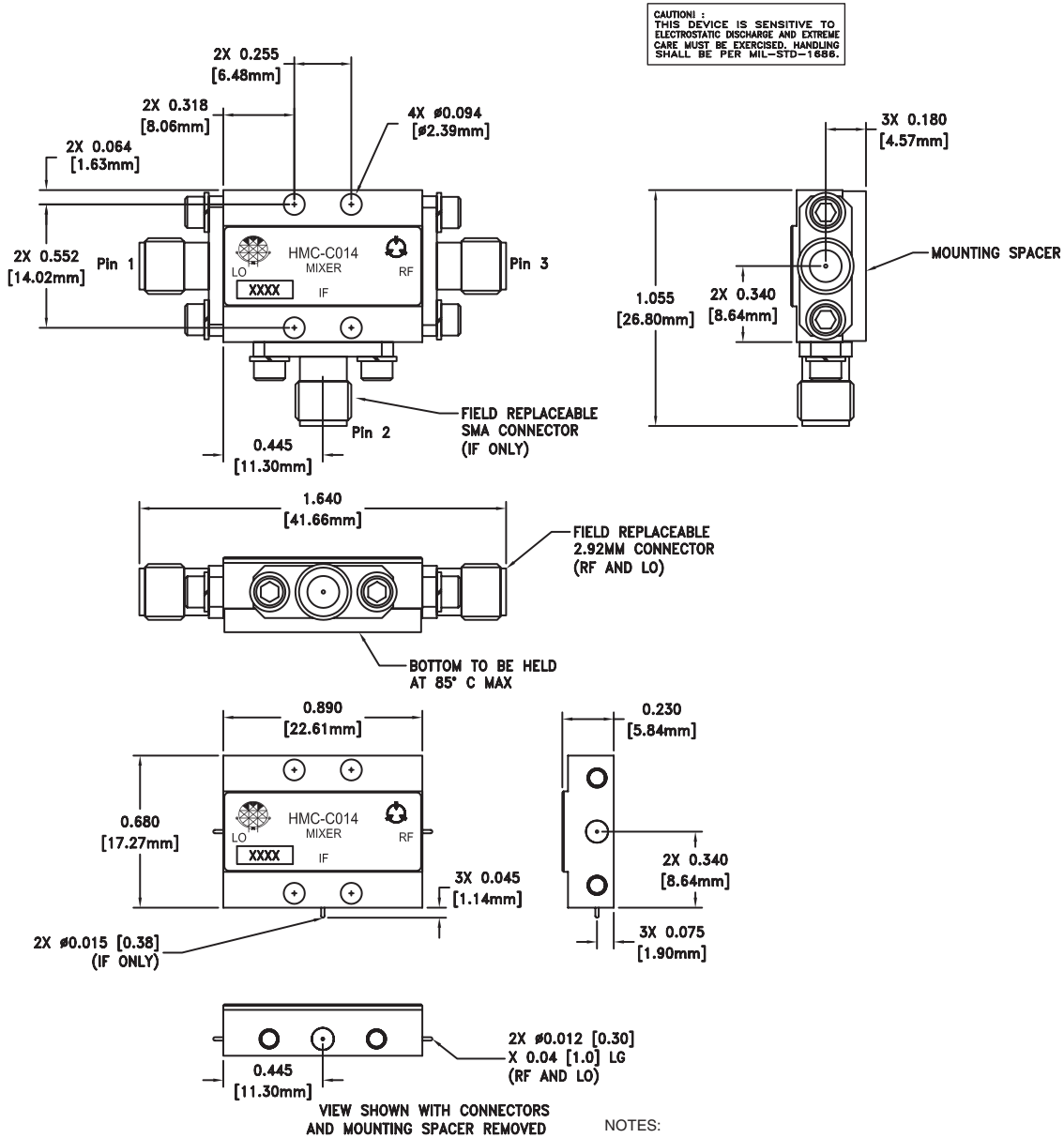
**ELECTROSTATIC SENSITIVE DEVICE
OBSERVE HANDLING PRECAUTIONS**

**GaAs MMIC FUNDAMENTAL
MIXER MODULE, 16 - 32 GHz**

10

MIXERS - CONNECTORIZED MODULES

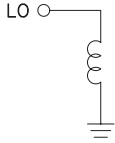
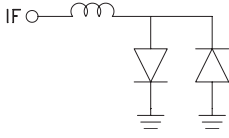
Outline Drawing



- NOTES:
1. PACKAGE, LEADS, COVER MATERIAL: KOVAR™
 2. SPACER MATERIAL: ALUMINUM
 3. PLATING: ELECTROLYTIC GOLD 50 MICROINCHES MIN., OVER ELECTROLYTIC NICKEL 75 MICROINCHES MIN.
 4. ALL DIMENSIONS ARE IN INCHES [MILLIMETERS].
 5. TOLERANCES \pm .005 [0.13] UNLESS OTHERWISE SPECIFIED.
 6. FIELD REPLACEABLE SMA CONNECTOR: TENSOLITE 5602-5CCSF OR EQUIVALENT.
 7. FIELD REPLACABLE 2.92mm CONNECTOR: TENSOLITE 231CCSF

**GaAs MMIC FUNDAMENTAL
MIXER MODULE, 16 - 32 GHz**

Pin Descriptions

Pin Number	Function	Description	Interface Schematic
1	LO	This pin is DC coupled and matched to 50 Ohm from 16 to 32 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 16 to 32 GHz.	