

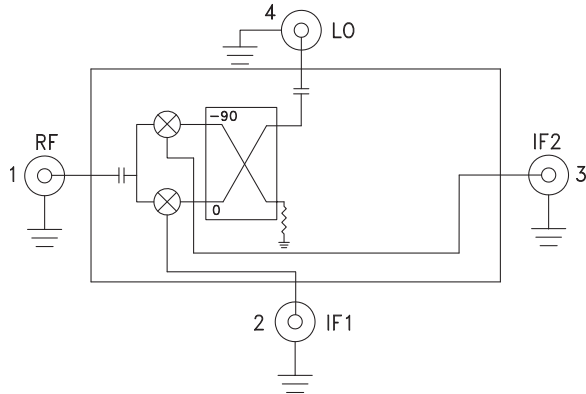


### Typical Applications

The HMC-C009 is ideal for:

- Telecommunications Equipment
- Test Equipment
- Military Radios, Radar & ECM
- Space Systems

### Functional Diagram



### Features

- Wide IF Bandwidth: DC - 3.5 GHz
- Image Rejection: 35 dB
- LO to RF Isolation: 40 dB
- High Input IP3: +23 dBm
- Hermetically Sealed Module
- Field Replaceable SMA Connectors
- 55 to +85 °C Operating Temperature

### General Description

The HMC-C009 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. 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 modules I/O pins to a microstrip or coplanar circuit.

### Electrical Specifications, $T_A = +25^\circ \text{C}$ , $IF = 100 \text{ MHz}$ , $LO = +15 \text{ dBm}^*$

Parameter	Min.	Typ.	Max.	Min.	Typ.	Max.	Units
Frequency Range, RF/LO	4.0 - 8.5		5.5 - 7.5				GHz
Frequency Range, IF	DC - 3.5		DC - 3.5				GHz
Conversion Loss (As IRM)		7.5	10.5		7.5	9.5	dB
Image Rejection	22	35		28	34		dB
1 dB Compression (Input)		+14			+15		dBm
LO to RF Isolation	32	40		35	40		dB
LO to IF Isolation	14	20		15	20		dB
IP3 (Input)		+23			+23		dBm
Amplitude Balance		0.3			0.2		dB
Phase Balance		8			6		Deg

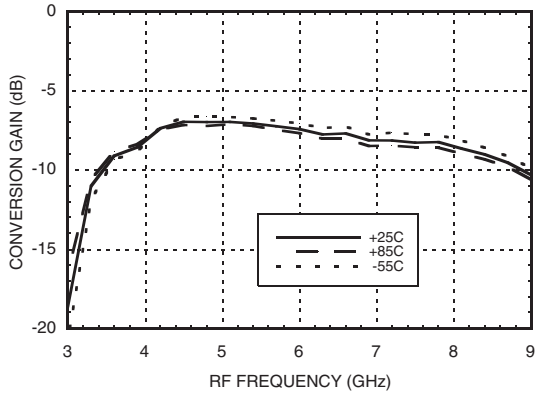
\* Unless otherwise noted, all measurements performed as downconverter.

For price, delivery, and to place orders, please contact Hittite Microwave Corporation:  
20 Alpha Road Chelmsford, MA 01824 Phone: 978-250-3343 Fax: 978-250-3373  
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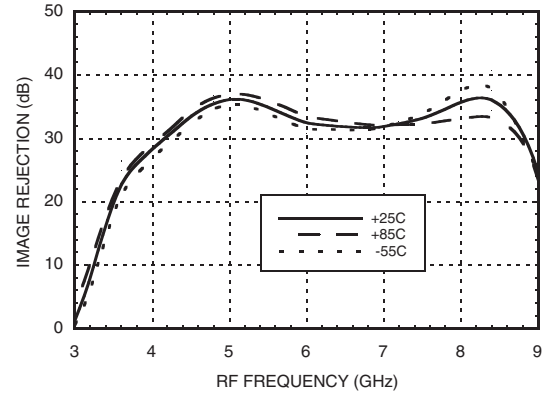


Data taken As IRM With External IF Hybrid

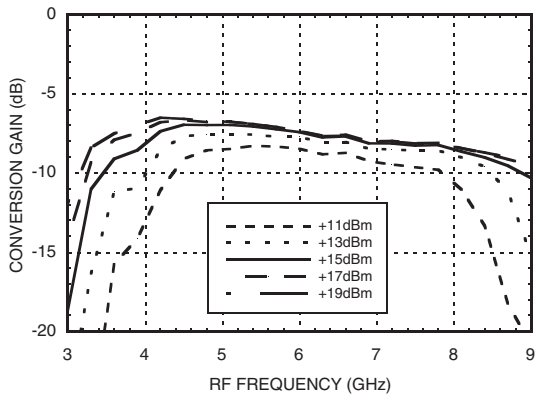
**Conversion Gain vs. Temperature**



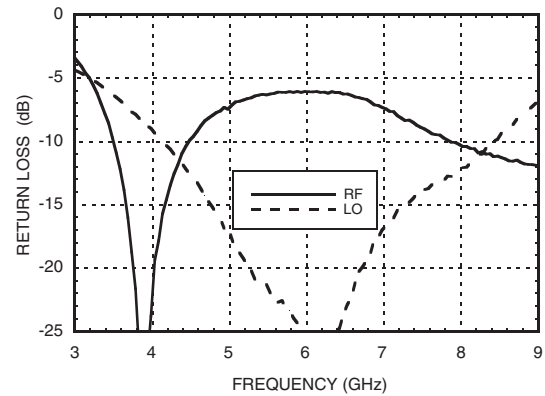
**Image Rejection vs. Temperature**



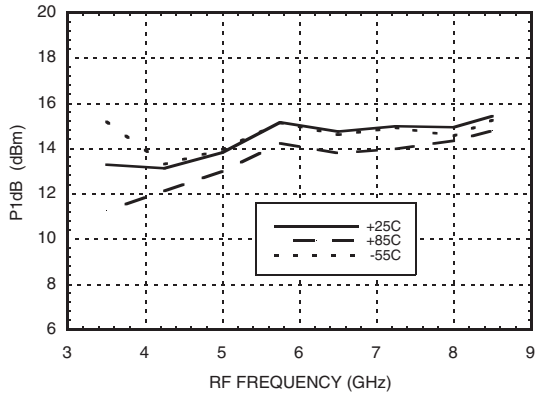
**Conversion Gain vs. LO Drive**



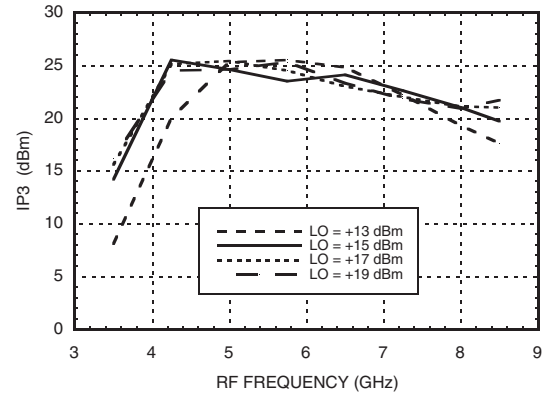
**Return Loss**



**Input P1dB vs. Temperature**



**Input IP3 vs. LO Drive**

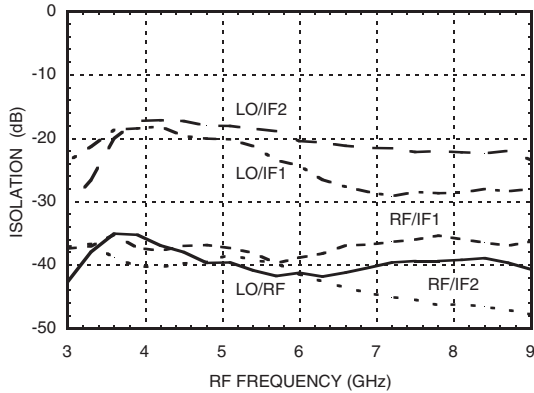


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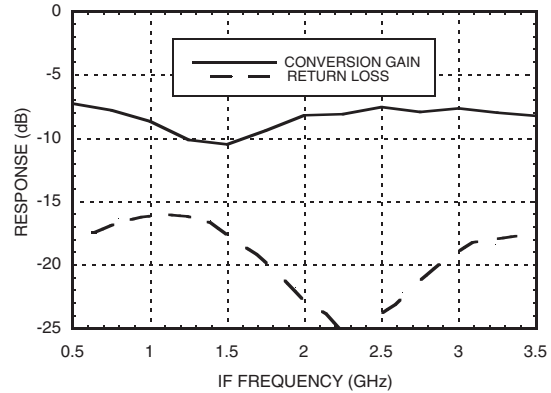


**Quadrature Channel Data Taken Without IF Hybrid**

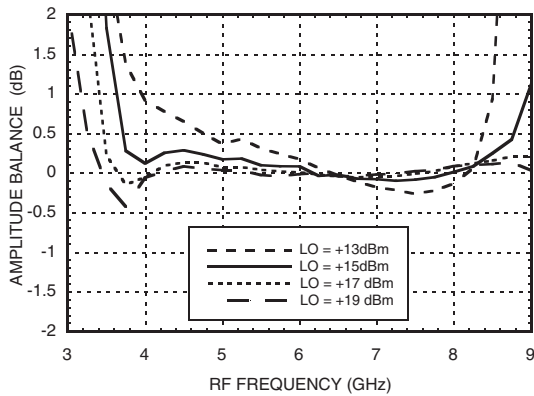
**Isolations**



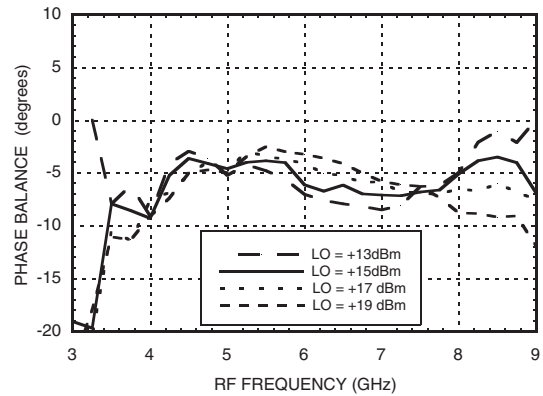
**IF Bandwidth\***



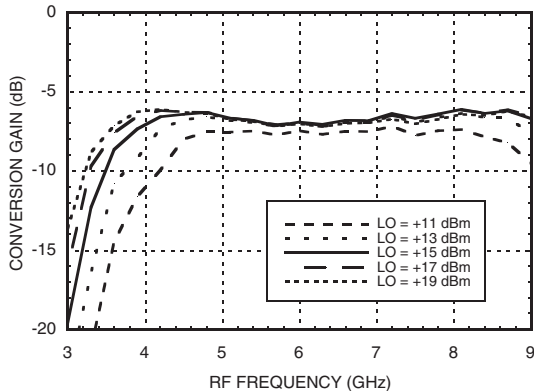
**Amplitude Balance vs. LO Drive**



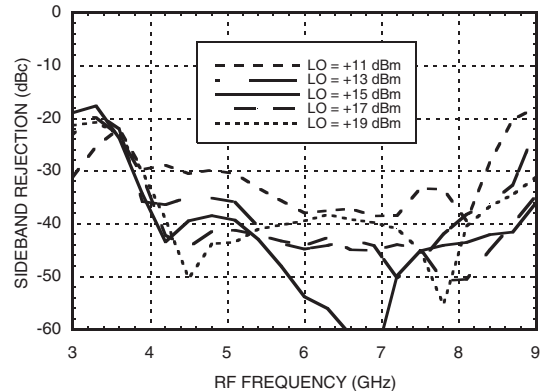
**Phase Balance vs. LO Drive**



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



**Upconverter Performance Sideband Rejection vs. LO Drive\***



\* Conversion gain data taken with external IF hybrid



### Harmonics of LO

LO Freq. (GHz)	nLO Spur at RF Port			
	1	2	3	4
3.5	41	54	59	57
4.5	43	43	59	58
5.5	46	57	52	71
6.5	44	60	71	60
7.5	43	66	69	62
8.5	44	65	69	70

LO = +15 dBm  
Values in dBc below input LO level measured at RF Port.  
Data taken with IF ports terminated in 50 Ohms.

### MxN Spurious Outputs

mRF	nLO				
	0	1	2	3	4
0	xx	-10	35	25	51
1	35	0	45	54	74
2	94	64	72	67	95
3	95	97	99	84	97
4	90	93	95	97	106

RF = 5.6 GHz @ -10 dBm  
LO = 5.5 GHz @ +15 dBm  
Data taken without IF hybrid  
All values in dBc below IF power level

### Absolute Maximum Ratings

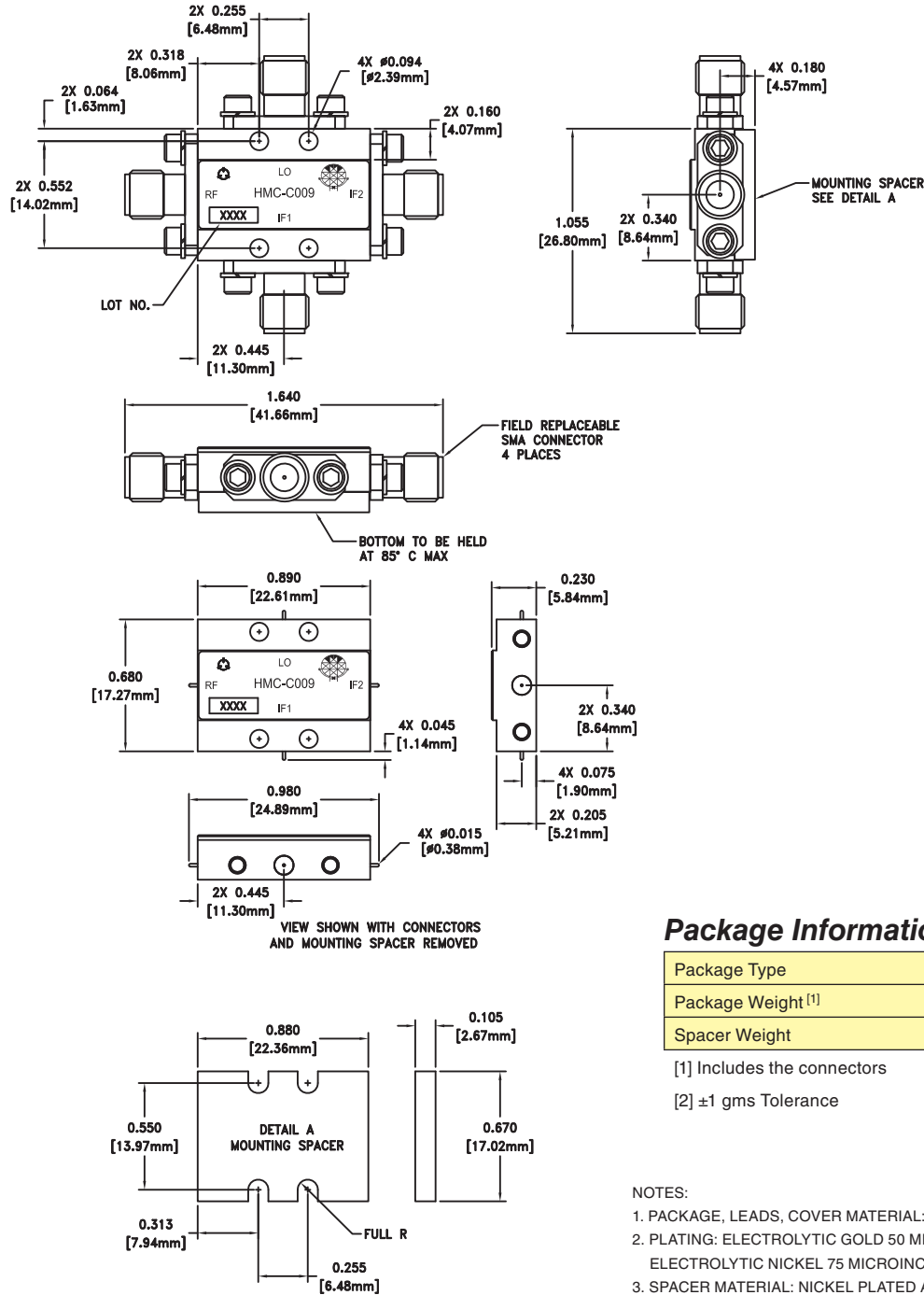
RF / IF Input	+20 dBm
LO Drive	+27 dBm
Storage Temperature	-65 to +150 °C
Operating Temperature	-55 to +85 °C



ELECTROSTATIC SENSITIVE DEVICE  
OBSERVE HANDLING PRECAUTIONS



### Outline Drawing



### 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

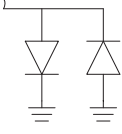
#### NOTES:

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 CONNECTORS. TENSOLITE 5602-5CCSF OR EQUIVALENT.

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**Pin Descriptions**

Pin Number	Function	Description	Interface Schematic
1	RF	This pin is AC coupled and matched to 50 Ohms.	RF ○ —  —
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 3mA of current or part non-function and possible part failure will result.	IF1,IF2 ○ —  — 
3	IF2		
4	LO	This pin is AC coupled and matched to 50 Ohms.	LO ○ —  —