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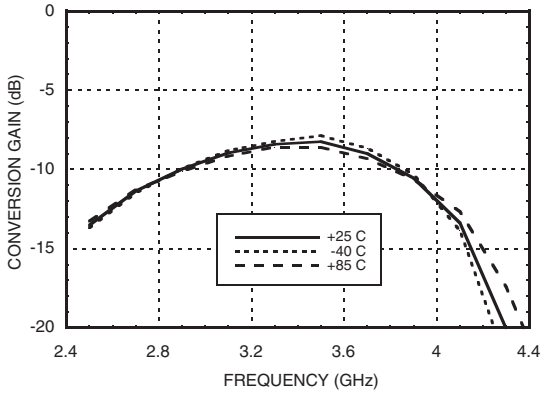
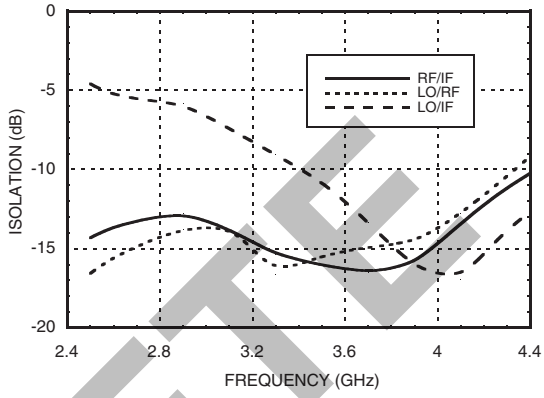
## GaAs MMIC MIXER w/ INTEGRATED LO AMPLIFIER, 3.0 - 3.8 GHz

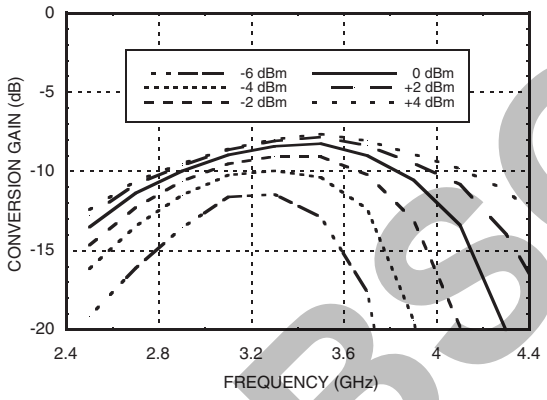
### Conversion Gain vs. Temperature @ LO = 0 dBm



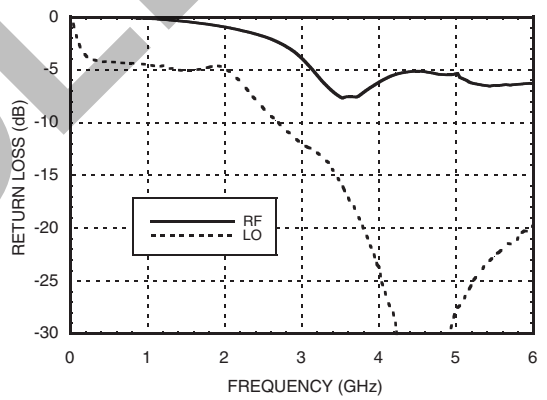

### Isolation @ LO = 0 dBm



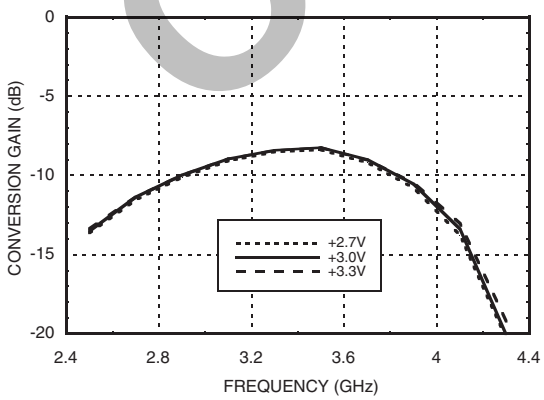

### Conversion Gain vs. LO Drive



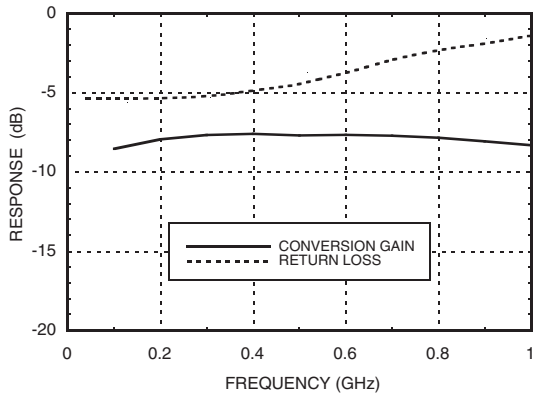

### Return Loss @ LO = 0 dBm




### Conversion Gain vs. Vdd @ LO = 0 dBm




### IF Bandwidth @ LO = 0 dBm







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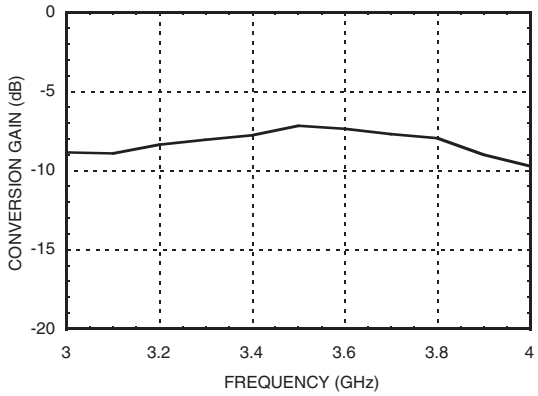
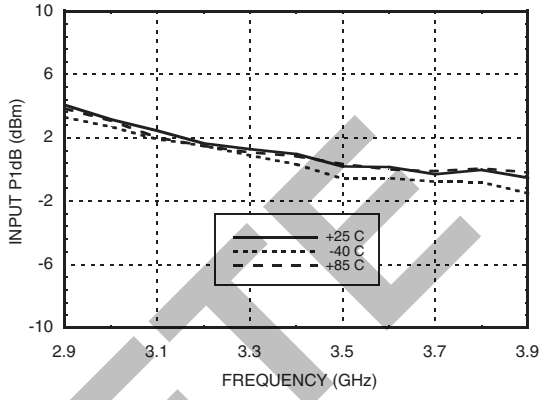
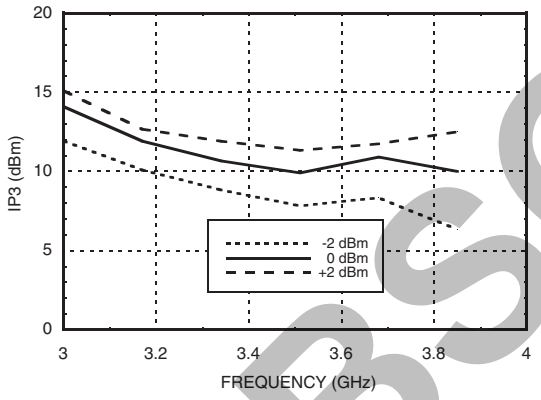
### Upconverter Performance Conversion Gain @ LO = 0 dBm



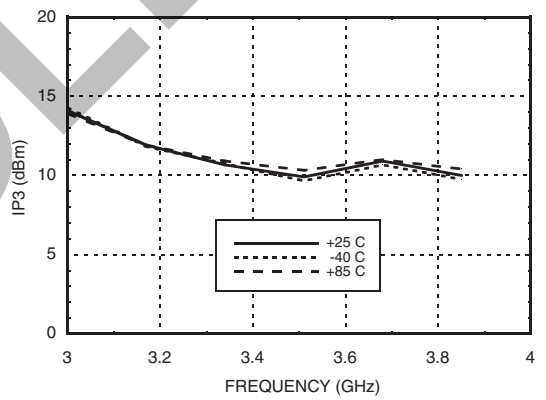

### Input P1dB vs. Temperature @ LO = 0 dBm



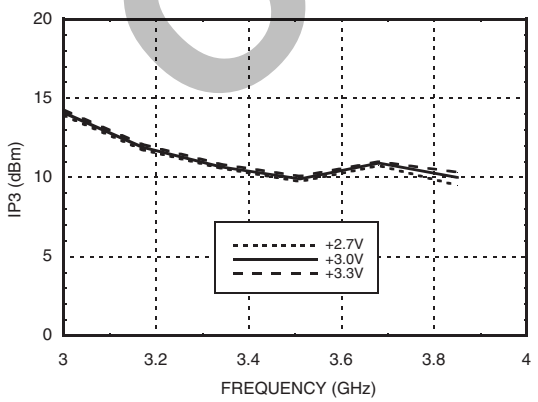

### Input IP3 vs. LO Drive*



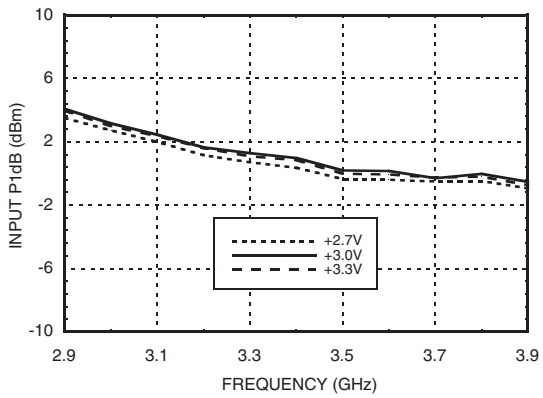

### Input IP3 vs. Temperature @ LO = 0 dBm*




### Input IP3 vs. Vdd @ LO = 0 dBm*




### Input P1dB vs. Vdd @ LO = 0 dBm






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



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## MxN Spurious @ IF Port

| | nLO | | | | |
|---|---|---|---|---|---|
| mRF | 0 | 1 | 2 | 3 | 4 |
| 0 | xx | -9 | -5 | 12 | 34 |
| 1 | 8 | 0 | 32 | 25 | 34 |
| 2 | 33 | 49 | 40 | 40 | 43 |
| 3 | 68 | 56 | 68 | 48 | 72 |
| 4 | 77 | 80 | 79 | 80 | 71 |

RF = 3.5 GHz @ -10 dBm
LO = 3.4 GHz @ 0 dBm
All values in dBc below IF power level.

## Harmonics of LO

| | nLO Spur @ RF Port | | | |
|---|---|---|---|---|
| LO Freq. (GHz) | 1 | 2 | 3 | 4 |
| 3 | 12 | 8 | 16 | 49 |
| 3.17 | 13 | 8 | 20 | 39 |
| 3.34 | 17 | 10 | 22 | 42 |
| 3.51 | 15 | 14 | 26 | 48 |
| 3.68 | 14 | 17 | 25 | 42 |
| 3.85 | 14 | 18 | 22 | 43 |

LO = 0 dBm
All values in dBc below input LO level @ RF port.







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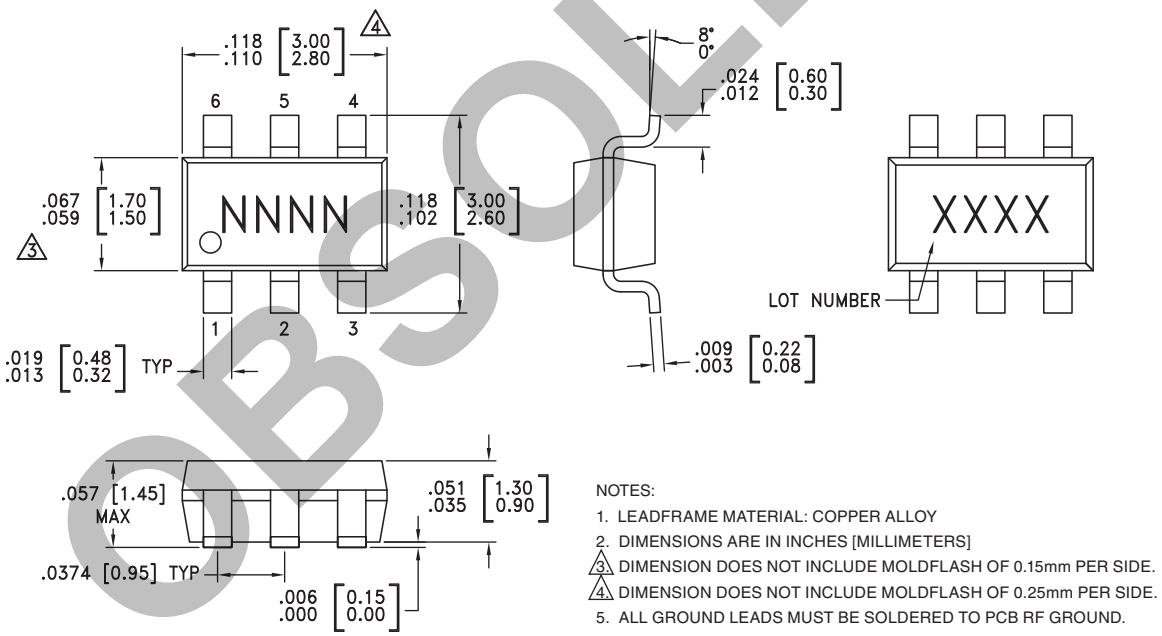
## Absolute Maximum Ratings

| | |
|---|---|
| RF / IF Input (Vdd = +3V) | +13 dBm |
| LO Drive (Vdd = +3V) | +13 dBm |
| Vdd | 5.5V |
| Continuous Pdiss (Ta = 85 °C) (derate 2.64 mW/°C above 85 °C) | 238 mW |
| IF DC Current | ±3 mA |
| Storage Temperature | -65 to +150 °C |
| Operating Temperature | -40 to +85 °C |

ELECTROSTATIC SENSITIVE DEVICE
OBSERVE HANDLING PRECAUTIONS



## Outline Drawing




NOTES:

1. LEADFRAME MATERIAL: COPPER ALLOY
2. DIMENSIONS ARE IN INCHES [MILLIMETERS]
3. DIMENSION DOES NOT INCLUDE MOLDFLASH OF 0.15mm PER SIDE.
4. DIMENSION DOES NOT INCLUDE MOLDFLASH OF 0.25mm PER SIDE.
5. ALL GROUND LEADS MUST BE SOLDERED TO PCB RF GROUND.

## Package Information

| Part Number | Package Body Material | Lead Finish | MSL Rating | Package Marking [3] |
|---|---|---|---|---|
| HMC333 | Low Stress Injection Molded Plastic | Sn/Pb Solder | MSL1 [1] | H333<br>XXXX |
| HMC333E | RoHS-compliant Low Stress Injection Molded Plastic | 100% matte Sn | MSL1 [2] | 333E<br>XXXX |

[1] Max peak reflow temperature of 235 °C
[2] Max peak reflow temperature of 260 °C
[3] 4-Digit lot number XXXX



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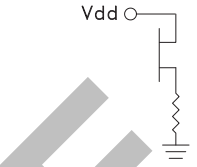
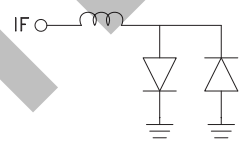
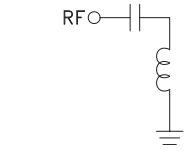
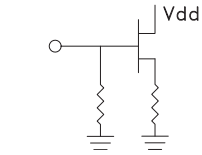
## Pin Descriptions

| Pin Number | Function | Description | Interface Schematic |
|---|---|---|---|
| 1 | Vdd | Power supply for the LO Amplifier. Two external RF bypass capacitors (10 pF & 10,000 pF) and an external inductor (1.8 nH) are required. |   |
| 2, 5 | GND | Ground: Pin must connect to RF ground. | |
| 3 | 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/sink more than 3mA of current or die non-function and possible die failure will result. |   |
| 4 | RF | This pin is AC coupled and matched to 50 Ohm from 3.0 - 3.8 GHz. |   |
| 6 | LO | This pin is AC coupled and matched to 50 Ohm from 3.0 - 3.8 GHz |   |







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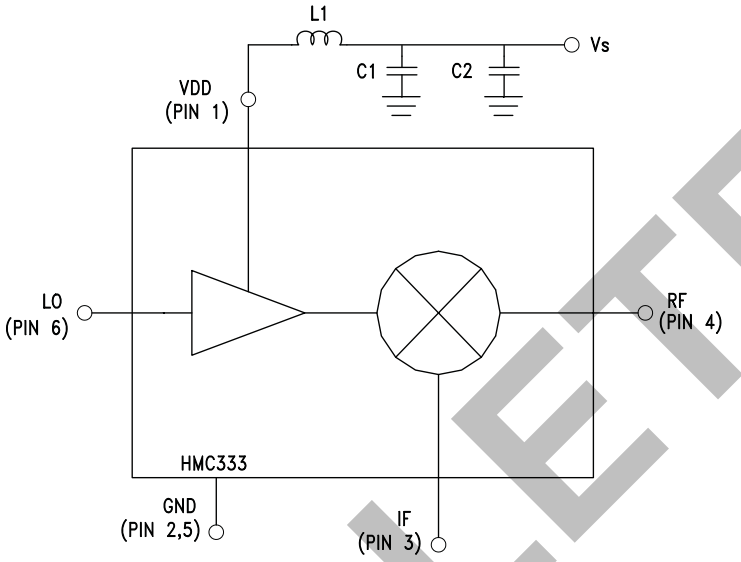
## GaAs MMIC MIXER w/ INTEGRATED LO AMPLIFIER, 3.0 - 3.8 GHz



### Application Circuit





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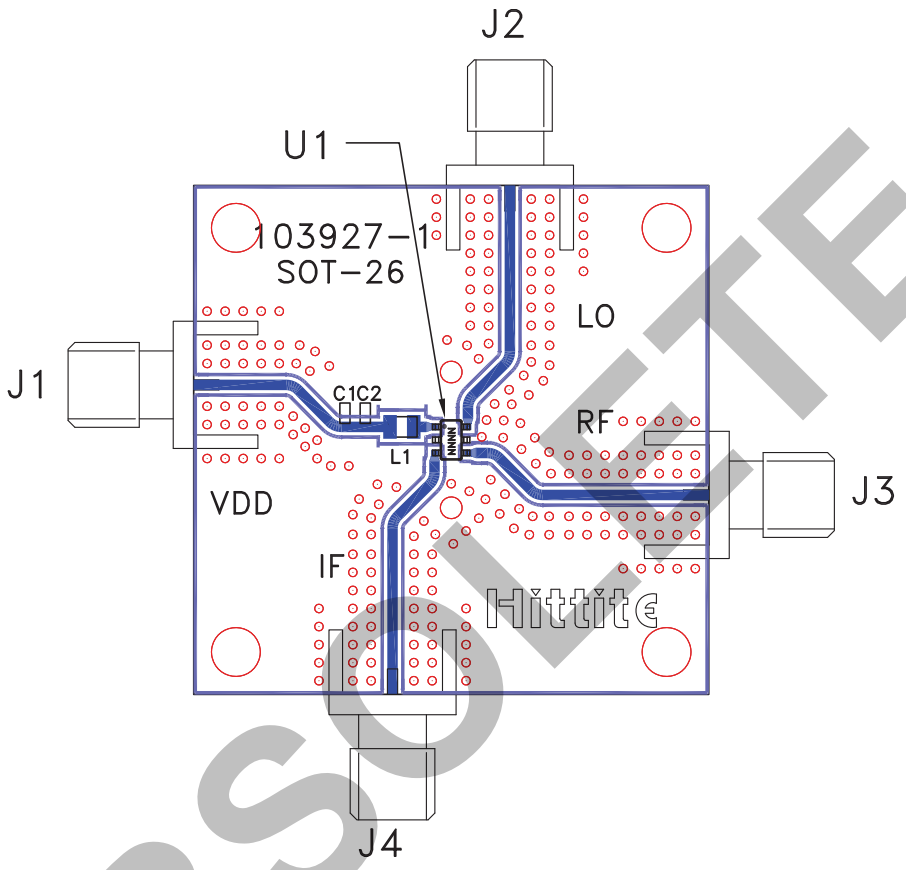
## Evaluation PCB






## List of Materials for Evaluation PCB 105128 [1]

| Item | Description |
|---|---|
| J1 - J4 | PCB Mount SMA RF Connector |
| C1 | 10 pF Capacitor, 0603 Pkg. |
| C2 | .01 µF Capacitor, 0603 Pkg. |
| L1 | 1.8 nH Inductor, 0805 Pkg. |
| U1 | HMC333 / HMC333E Mixer |
| PCB [2] | 103927 Evaluation Board |

[1] Reference this number when ordering complete evaluation PCB

[2] Circuit Board Material: Rogers 4350

The circuit board used in the final application should use RF circuit design techniques. Signal lines should have 50 ohm impedance while the package ground leads should be connected directly to the ground plane similar to that shown. A sufficient number of via holes should be used to connect the top and bottom ground planes. The evaluation circuit board shown is available from Hittite upon request.





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