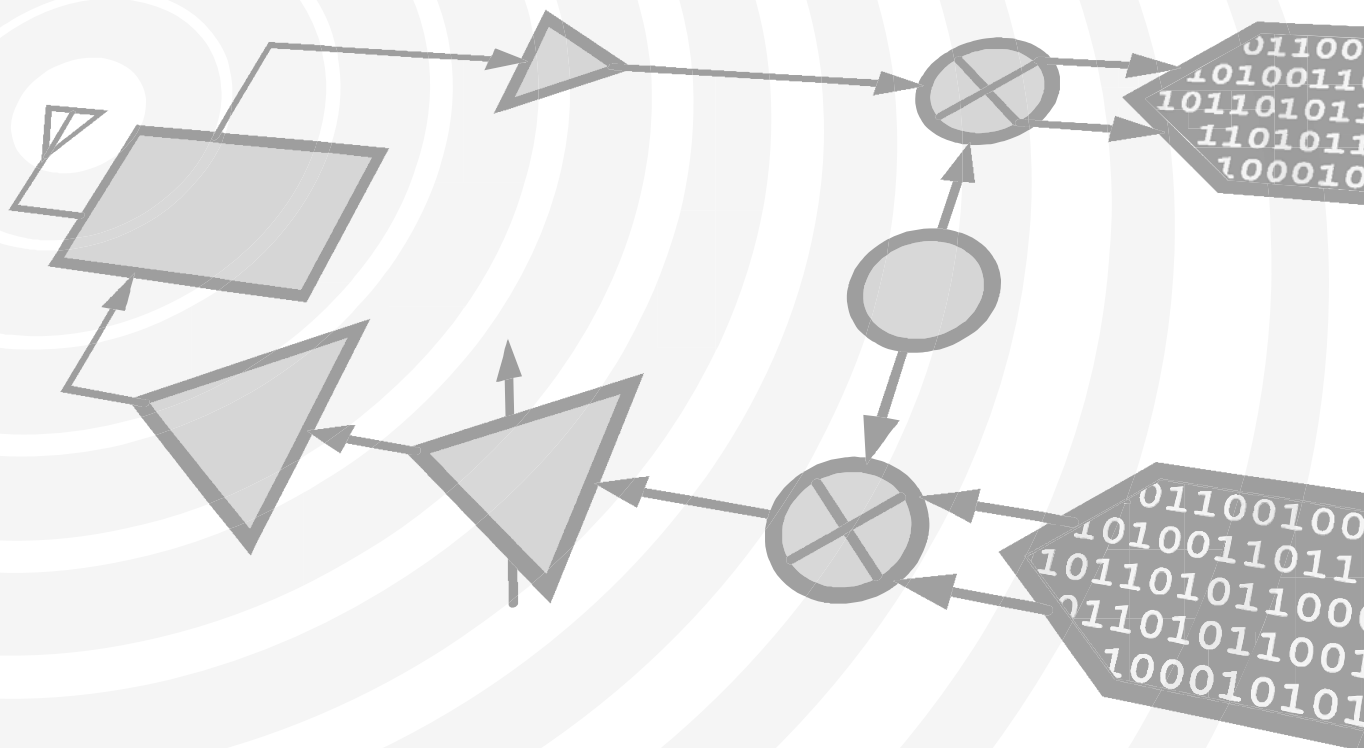




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MICROWAVE CORPORATION v01.0112



# HMC207AS8 / 207AS8E

## GaAs MMIC SMT DOUBLE-BALANCED MIXER, 0.7 - 2.0 GHz

### Typical Applications

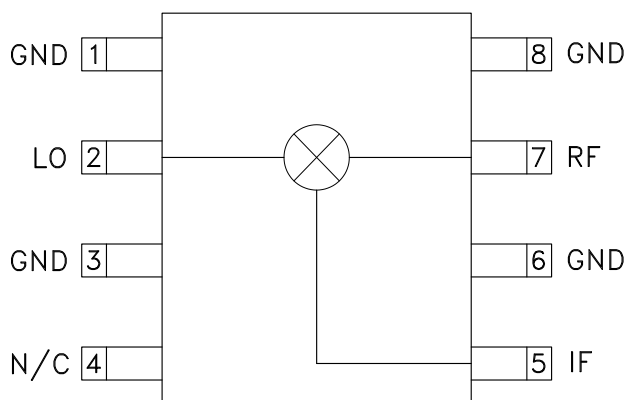
The HMC207AS8 / HMC207AS8E is ideal for:

- Base Stations
- Cable Modems
- Portable Wireless

### Features

Conversion Loss: 9 dB  
LO / IF Isolation: 45 dB  
LO / RF Isolation: 40 dB  
Input IP3: +17 dBm

### Functional Diagram



### General Description

The HMC207AS8 & HMC207AS8E are miniature double-balanced mixers in 8 lead plastic surface mount Small Outline IC (SOIC) packages. This passive MMIC mixer is constructed of GaAs Schottky diodes and novel planar transformer baluns on the chip. The device can be used as an upconverter, downconverter, biphas modulator (de)modulator, or phase comparator. The consistent MMIC performance will improve system operation and assure regulatory compliance. The high LO suppression of 45 to 50 dB yields excellent carrier suppression for modulator applications.

### Electrical Specifications, $T_A = +25^\circ \text{C}$ , As a Function of LO Drive

| Parameter                     | LO = +13 dBm<br>IF = 70 MHz |      |      | LO = +10 dBm<br>IF = 70 MHz |      |      | Units |
|-------------------------------|-----------------------------|------|------|-----------------------------|------|------|-------|
|                               | Min.                        | Typ. | Max. | Min.                        | Typ. | Max. |       |
| Frequency Range, RF & LO      | 0.7 - 2.0                   |      |      | 0.8 - 1.2                   |      |      | GHz   |
| Frequency Range, IF           | DC - 0.3                    |      |      | DC - 0.3                    |      |      | GHz   |
| Conversion Loss               |                             | 9    | 10.5 |                             | 7.5  | 10   | dB    |
| Noise Figure (SSB)            |                             | 9    | 10.5 |                             | 7.5  | 10   | dB    |
| LO to RF Isolation            | 32                          | 40   |      | 40                          | 45   |      | dB    |
| LO to IF Isolation            | 38                          | 45   |      | 40                          | 45   |      | dB    |
| RF to IF Isolation            | 17                          | 23   |      | 18                          | 22   |      | dB    |
| IP3 (Input)                   | 14                          | 17   |      | 12                          | 15   |      | dBm   |
| 1 dB Gain Compression (Input) | 8                           | 11   |      | 7                           | 10   |      | dBm   |

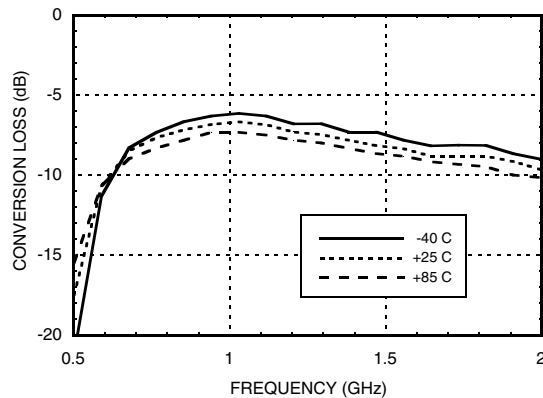
For price, delivery and to place orders: Hittite Microwave Corporation, 2 Elizabeth Drive, Chelmsford, MA 01824

Phone: 978-250-3343 Fax: 978-250-3373 Order On-line at [www.hittite.com](http://www.hittite.com)

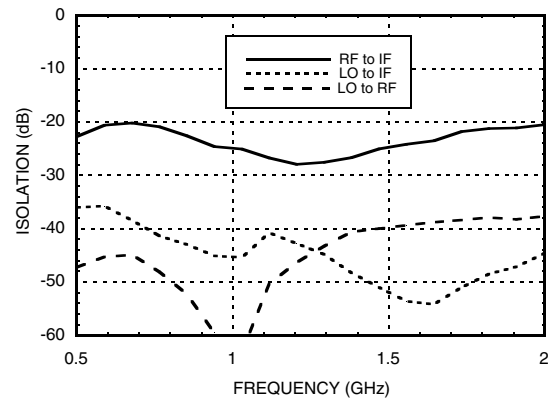
Application Support: Phone: 978-250-3343 or [apps@hittite.com](mailto:apps@hittite.com)

## GaAs MMIC SMT DOUBLE-BALANCED MIXER, 0.7 - 2.0 GHz

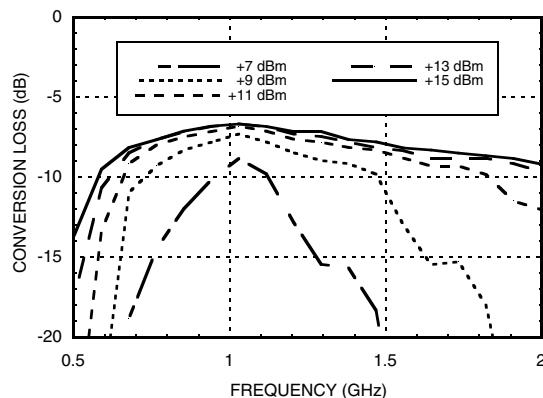
**Conversion Loss vs Temperature @ LO = +13 dBm**



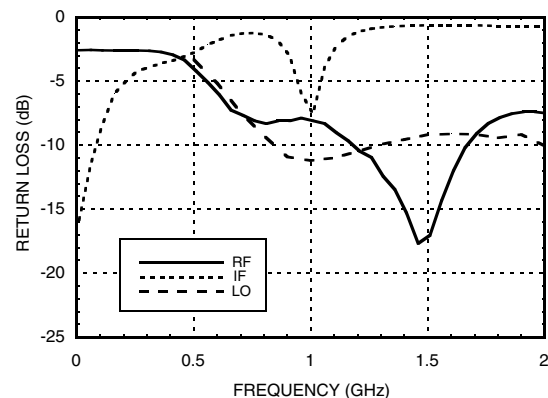
**Isolation @ LO = +13 dBm**



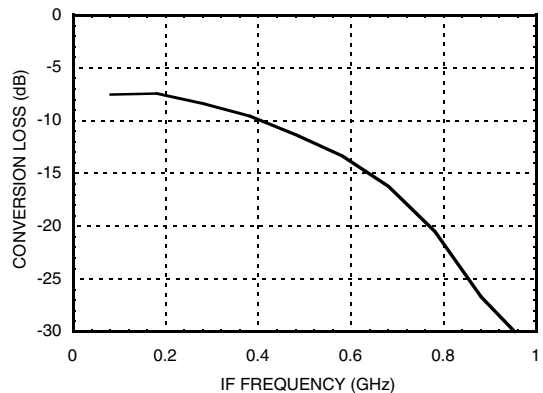
**Conversion Loss vs. LO Drive**



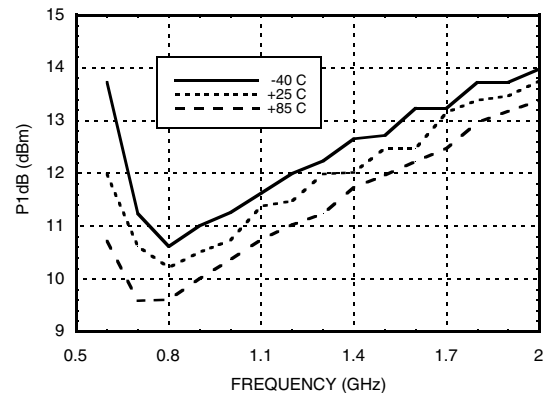
**Return Loss @ LO = +13 dBm**



**IF Bandwidth @ LO = +13 dBm**



**P1dB vs. Temperature @ LO = +13 dBm**





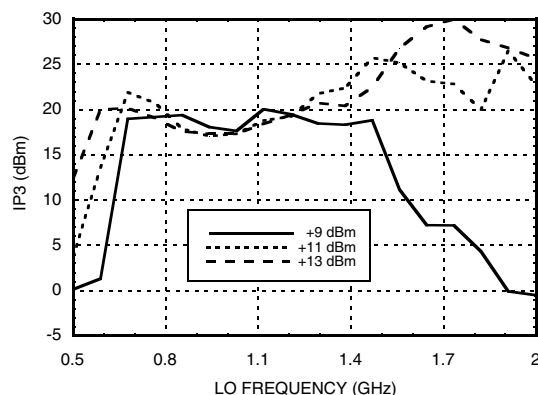
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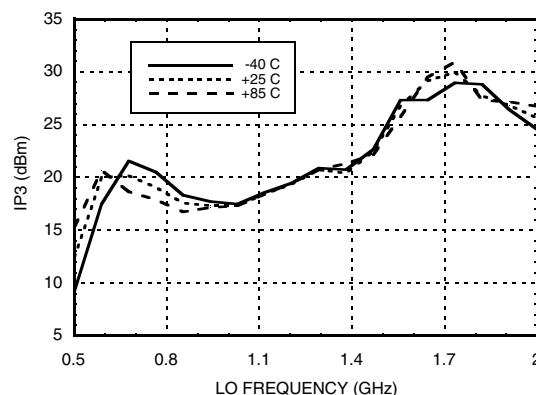
# HMC207AS8 / 207AS8E

## GaAs MMIC SMT DOUBLE-BALANCED MIXER, 0.7 - 2.0 GHz

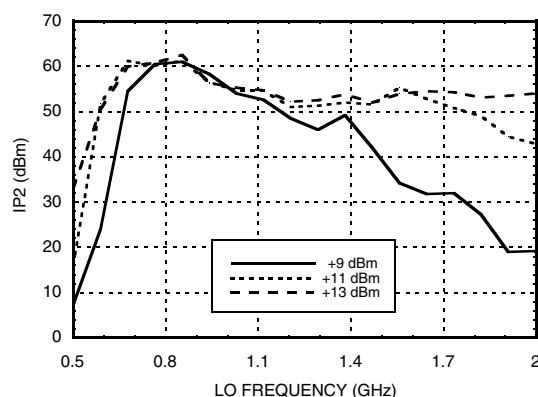
### Input IP3 vs. LO Drive



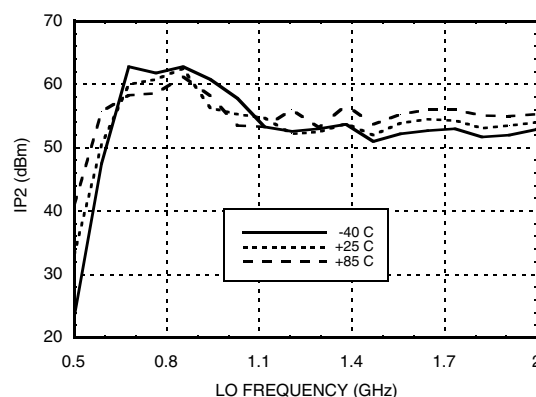
### Input IP3 vs. Temperature @ LO = +13 dBm



### Input IP2 vs. LO Drive



### Input IP2 vs. Temperature @ LO = +13 dBm



### MxN Spurious Outputs

| mRF | nLO  |      |      |    |    |
|-----|------|------|------|----|----|
|     | 0    | 1    | 2    | 3  | 4  |
| 0   | xx   | 14   | 27   | 22 | 44 |
| 1   | 16   | 0    | 46   | 45 | 46 |
| 2   | 68   | 62   | 67   | 69 | 73 |
| 3   | 89   | 92   | 91   | 65 | 86 |
| 4   | >105 | >105 | >105 | 95 | 96 |

RF = 0.9 GHz @ -10 dBm  
LO = 0.97 GHz @ +13 dBm  
All values in dBc relative to the IF

### Harmonics of LO

| LO Freq.<br>(GHz) | nLO Spur at RF Port |    |    |    |
|-------------------|---------------------|----|----|----|
|                   | 1                   | 2  | 3  | 4  |
| 0.7               | 48                  | 38 | 66 | 50 |
| 0.9               | 64                  | 33 | 73 | 63 |
| 1.1               | 47                  | 32 | 54 | 54 |
| 1.3               | 40                  | 34 | 39 | 55 |
| 1.5               | 39                  | 40 | 45 | 57 |
| 1.7               | 38                  | 51 | 42 | 60 |

LO = +13 dBm  
Values in dBc below input LO level measured at RF Port.

## HMC207AS8 / 207AS8E

### GaAs MMIC SMT DOUBLE-BALANCED MIXER, 0.7 - 2.0 GHz

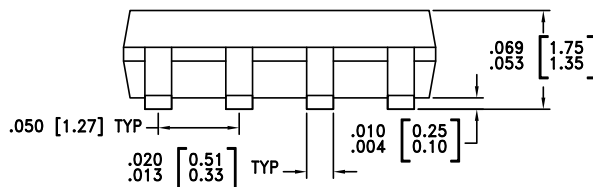
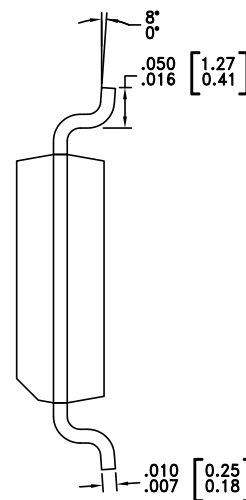
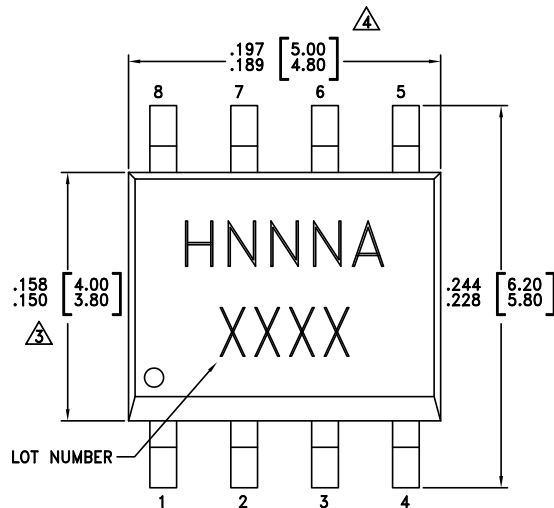
#### Absolute Maximum Ratings

|                       |                |
|-----------------------|----------------|
| RF / IF Input         | +13 dBm        |
| LO Drive              | +27 dBm        |
| Storage Temperature   | -65 to +150 °C |
| Operating Temperature | -40 to +85 °C  |
| ESD Sensitivity (HBM) | Class 1A       |



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 <sup>[3]</sup> |
|-------------|----------------------------------------------------|---------------|---------------------|--------------------------------|
| HMC207AS8   | Low Stress Injection Molded Plastic                | Sn/Pb Solder  | MSL1 <sup>[1]</sup> | H207A<br>XXXX                  |
| HMC207AS8E  | RoHS-compliant Low Stress Injection Molded Plastic | 100% matte Sn | MSL1 <sup>[2]</sup> | H207A<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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Application Support: Phone: 978-250-3343 or [apps@hittite.com](mailto:apps@hittite.com)

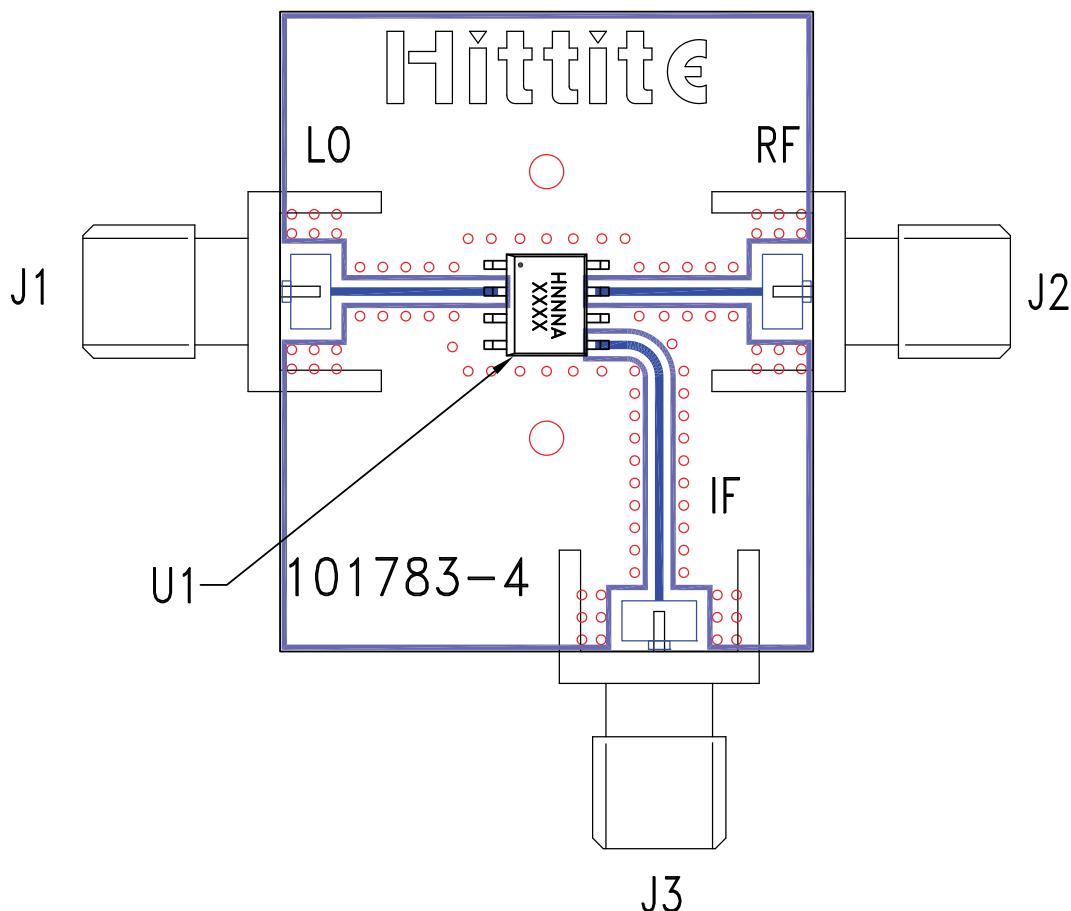


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**HMC207AS8 / 207AS8E****GaAs MMIC SMT DOUBLE-BALANCED MIXER, 0.7 - 2.0 GHz****Pin Descriptions**

| Pin Number | Function | Description                                                                                                                                                                                                                                                                                                                                                   | Interface Schematic |
|------------|----------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|
| 1, 3, 6, 8 | GND      | Package bottom must also be connected to RF/DC ground.                                                                                                                                                                                                                                                                                                        |                     |
| 2          | LO       | This pin is DC coupled and matched to 50 Ohm.                                                                                                                                                                                                                                                                                                                 |                     |
| 4          | N/C      | No connection required. These pins may be connected to RF/DC ground without affecting performance.                                                                                                                                                                                                                                                            |                     |
| 5          | 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 10 mA of current or part non-function and possible part failure will result. |                     |
| 8          | RF       | This pin is DC coupled and matched to 50 Ohm.                                                                                                                                                                                                                                                                                                                 |                     |

**Evaluation PCB**



**List of Materials for Evaluation PCB 101785 [1]**

| Item    | Description                  |
|---------|------------------------------|
| J1 - J3 | PCB Mount SMA RF Connector   |
| U1      | HMC207AS8 / HMC207AS8E Mixer |
| PCB [2] | 101783 Evaluation Board      |

[1] Reference this number when ordering complete evaluation PCB

[2] Circuit Board Material: Rogers 4350

The circuit board used in the 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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- Техническая поддержка проекта;
- Защита от снятия компонента с производства.



#### Как с нами связаться

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**Факс:** 8 (812) 320-02-42

**Электронная почта:** [org@eplast1.ru](mailto:org@eplast1.ru)

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