



THE DATASHEET OF HMC393MS8GE





Typical Applications

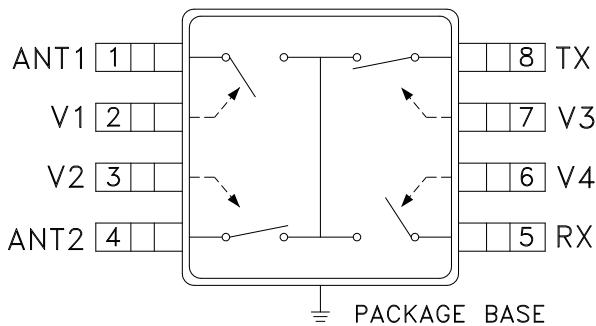
This switch is ideal for use as a DPDT Diversity Switch for 5.0 - 6.0 GHz applications:

- HiperLAN
- UNII

Features

- Low Insertion Loss: 1.2 dB @ 5.5 GHz
- High IP3: 49 dBm
- Positive Control: 0/+5V
- Ultra Small MSOP8G Package: 14.8 mm²

Functional Diagram



General Description

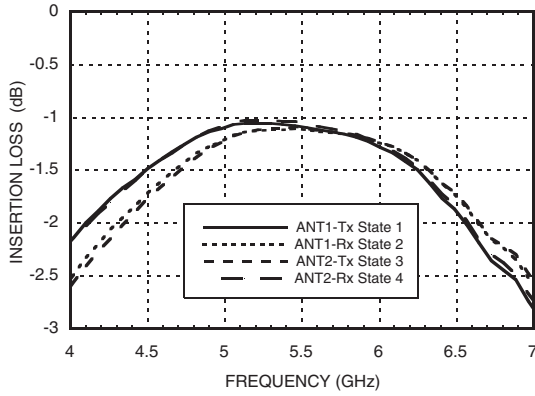
The HMC393MS8G & HMC393MS8GE are low cost C-band DPDT switches that operate between 5 and 6 GHz. This switch can operate as an integrated antenna diversity and transmit/receive switch for the HyperLAN and UNII radio platforms. The design provides 20 dB of isolation between antennas and between Tx and Rx ports. The switch features 1.2 dB insertion loss and high power handling capability. Switch state is controlled using four CMOS level control voltage lines.

Electrical Specifications, $T_A = +25^\circ C$, $V_{ctl} = 0/+5 V_{dc}$, 50 Ohm System

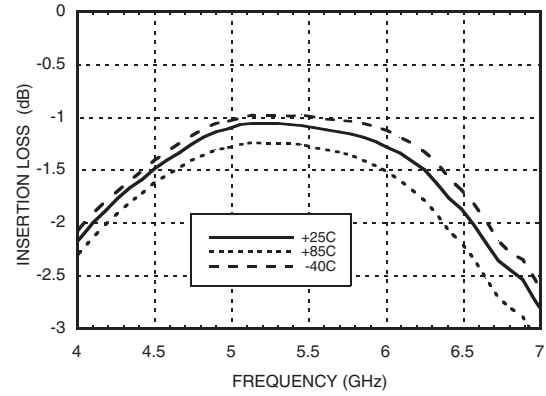
| Parameter | Frequency | Min. | Typ. | Max. | Units |
|---|---------------|------|------|------|-------|
| Insertion Loss | 5.0 - 6.0 GHz | | 1.2 | 2.0 | dB |
| Isolation | 5.0 - 6.0 GHz | 15 | 20 | | dB |
| Return Loss (On State, Any Port) | 5.0 - 6.0 GHz | 13 | 20 | | dB |
| Input Power for 0.1 dB Compression | 5.0 - 6.0 GHz | 27 | 30 | | dBm |
| Input Third Order Intercept (Two-Tone Input Power = +22 dBm Each Tone) | 5.0 - 6.0 GHz | 45 | 49 | | dBm |
| Switching Characteristics | 5.0 - 6.0 GHz | | | | |
| tRISE / tFALL (10/90% RF) | | | 11 | | ns |
| tON / tOFF (50% CTL to 10/90% RF) | | | 22 | | ns |



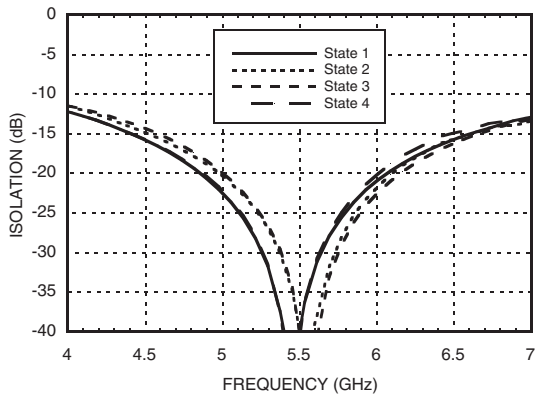
Insertion Loss



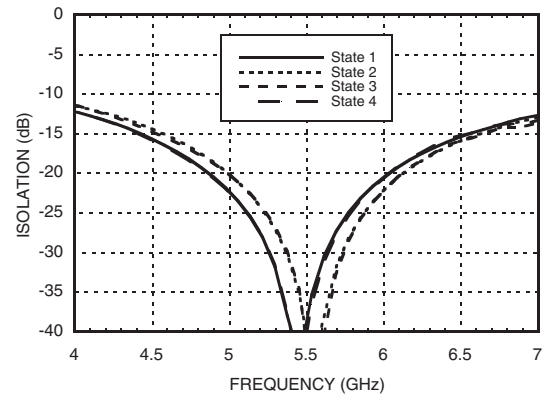
Insertion Loss vs. Temperature



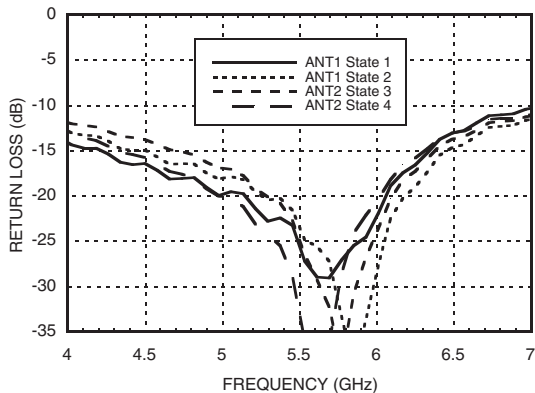
Isolation, Tx & Rx



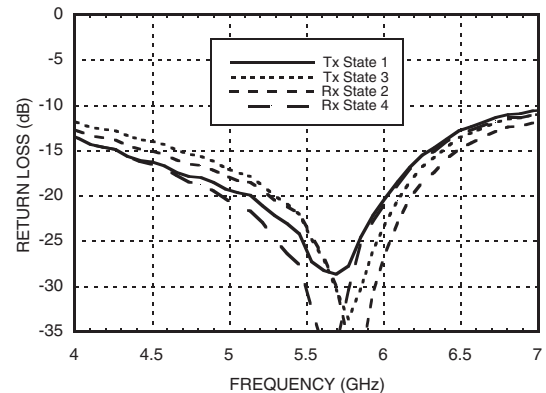
Isolation, ANT1 & ANT2



Return Loss, ANT1 & ANT2

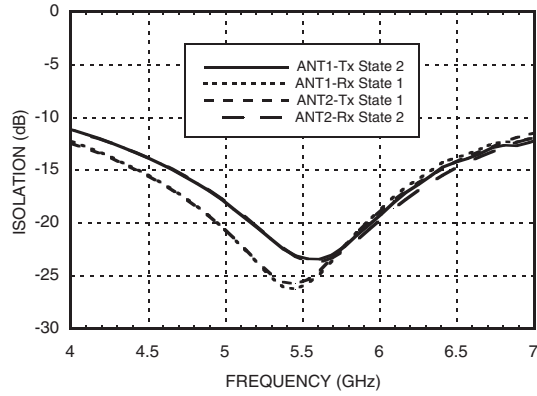


Return Loss, Tx & Rx

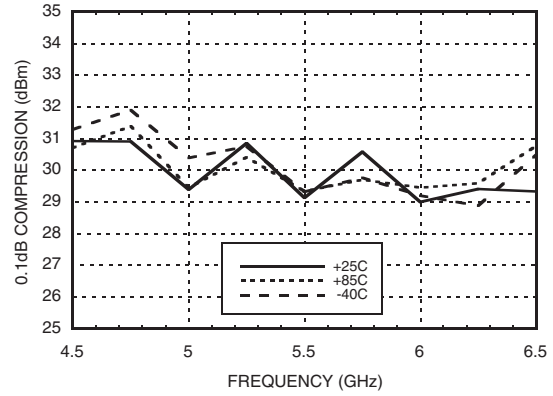




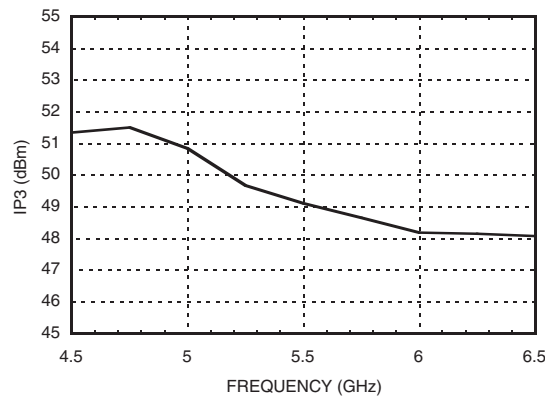
Isolation, ANT1 / ANT2 - Tx / Rx



Input 0.1 dB Compression Point



Input IP3 *



Control Voltages

| State | Bias Condition |
|-------|-------------------------------|
| Low | 0 to +0.5 Vdc @ 10 uA Typ. |
| High | +5.0 to +6.5 Vdc @ 10 uA Typ. |

Truth Table

| Path | V1 | V2 | V3 | V4 | State |
|-----------|------|------|------|------|-------|
| ANT1 - Tx | High | Low | High | Low | 1 |
| ANT1 - Rx | High | Low | Low | High | 2 |
| ANT2 - Tx | Low | High | High | Low | 3 |
| ANT2 - Rx | Low | High | Low | High | 4 |

* Two-tone input power = +22 dBm each tone, 1 MHz spacing.

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
 Order On-line at www.hittite.com

Absolute Maximum Ratings

| | |
|--|------------------|
| RF Input Power $V_{ctl} = 0/+5V$ | +33 dBm |
| Control Voltage Range (V1, V2, V3, V4) | -0.5 to +7.5 Vdc |
| Storage Temperature | -65 to +150 °C |
| Operating Temperature | -40 to +85 °C |
| ESD Sensitivity (HBM) | Class 1A |

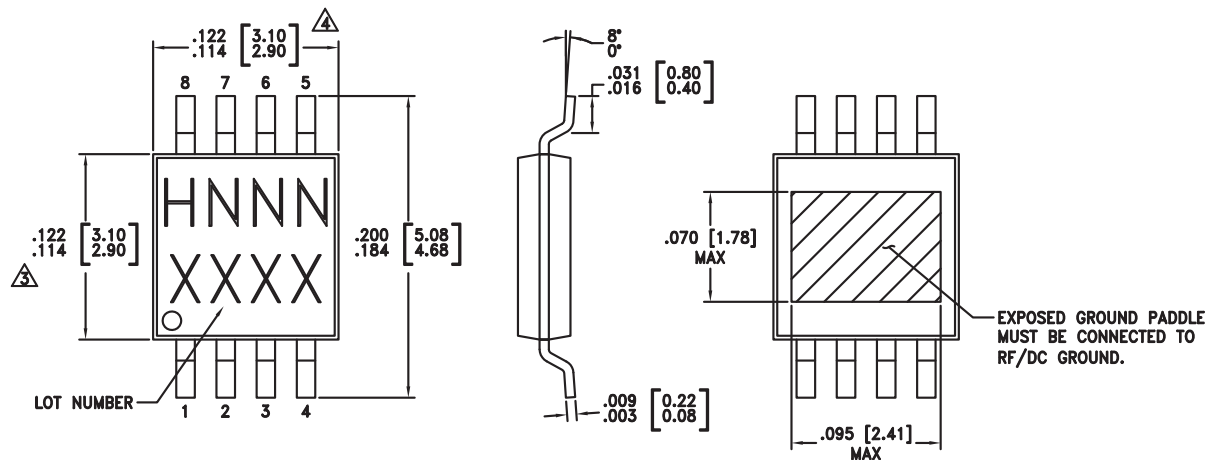


**ELECTROSTATIC SENSITIVE DEVICE
OBSERVE HANDLING PRECAUTIONS**

Caution: Do not "Hot Switch" power levels greater than +23 dBm ($V_{ctl} = 0/+5 Vdc$).

DC blocking capacitors are required at ports ANT1, ANT2, Tx, Rx. Choose value for lowest frequency of operation.

Outline Drawing



NOTES:

- LEADFRAME MATERIAL: COPPER ALLOY
- DIMENSIONS ARE IN INCHES [MILLIMETERS]
- \triangle DIMENSION DOES NOT INCLUDE MOLDFLASH OF 0.15mm PER SIDE.
- \triangle DIMENSION DOES NOT INCLUDE MOLDFLASH OF 0.25mm PER SIDE.
- ALL GROUND LEADS AND GROUND PADDLE MUST BE SOLDERED TO PCB RF GROUND.

Package Information

| Part Number | Package Body Material | Lead Finish | MSL Rating | Package Marking ^[3] |
|-------------|--|---------------|---------------------|--------------------------------|
| HMC393MS8G | Low Stress Injection Molded Plastic | Sn/Pb Solder | MSL1 ^[1] | H393 XXXX |
| HMC393MS8GE | RoHS-compliant Low Stress Injection Molded Plastic | 100% matte Sn | MSL1 ^[2] | H393 XXXX |

[1] Max peak reflow temperature of 235 °C

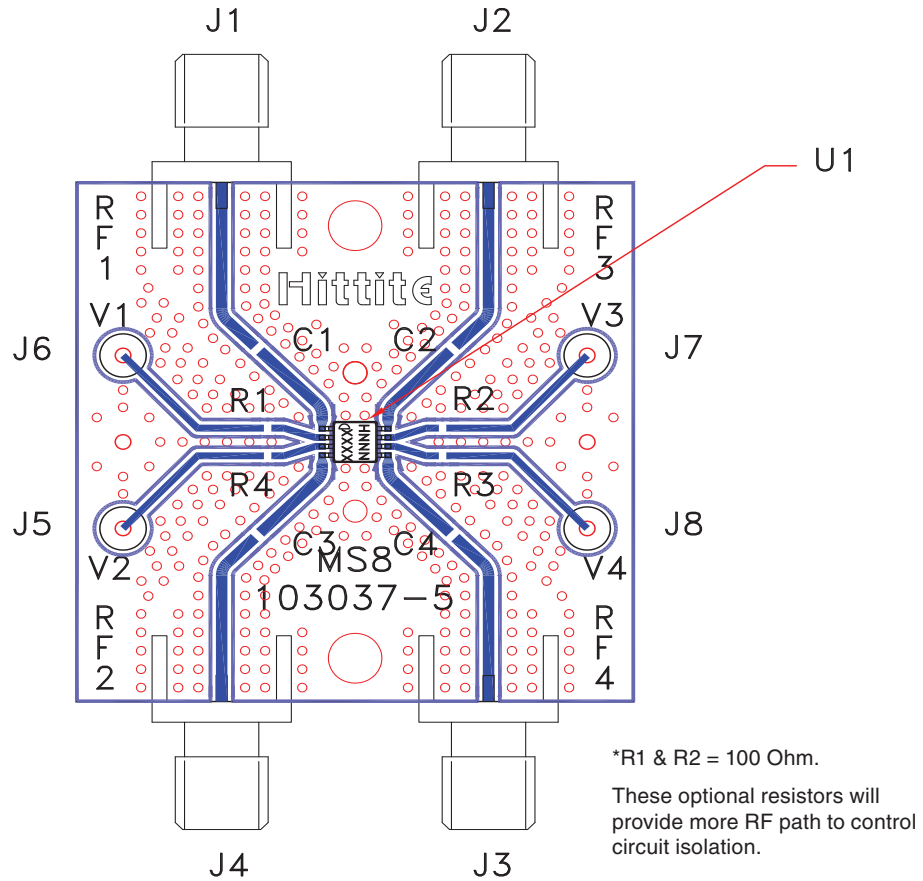
[2] Max peak reflow temperature of 260 °C

[3] 4-Digit lot number XXXX

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Evaluation PCB



List of Materials for Evaluation PCB 103132 [1]

| Item | Description |
|---------|--|
| J1 - J4 | PCB Mount SMA Connector |
| J5 - J8 | DC Pin |
| C1 - C4 | Chip Capacitor, 0402 Pkg. Choose value for lowest frequency of operation. 100 pF is provided on PCB. |
| R1 - R2 | 100 Ohm Resistor, 0402 Pkg. |
| U1 | HMC393MS8G / HMC393MS8GE DPDT Diversity Switch |
| PCB [2] | 103037 Evaluation PCB 1.5"x1.5" |

[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 and exposed paddle should be connected directly to the ground plane similar to that shown above. A sufficient number of via holes should be used to connect the top and bottom ground planes. The evaluation circuit board shown above is available from Hittite upon request.



v04.0607



HMC393MS8G / 393MS8GE

**GaAs MMIC DPDT DIVERSITY
SWITCH, 5 - 6 GHz**



Notes:

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SWITCHES - SMT

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