

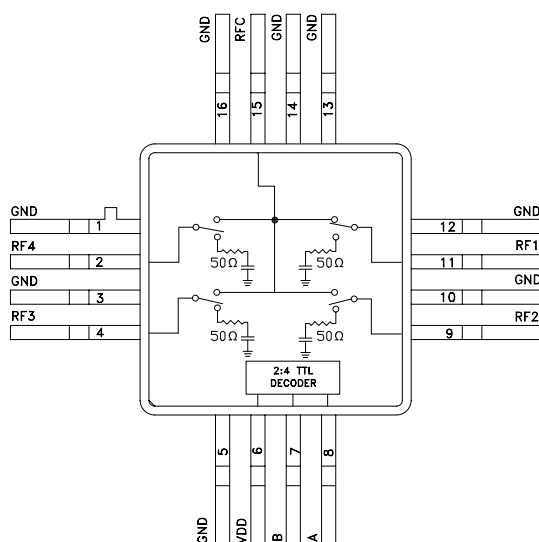
GaAs MMIC SP4T NON-REFLECTIVE SWITCH, DC - 4 GHz

Typical Applications

The HMC244AG16 is ideal for:

- Telecom Infrastructure
- Military Radios, Radar & ECM
- Space Applications
- Test Instrumentation

Functional Diagram



Features

- Low Insertion Loss: 0.9 dB
- Non-Reflective Design
- Integrated 2:4 TTL Decoder
- Single Positive Supply: Vdd = +5V, +3V
- 16 Lead Hermetic SMT Package

General Description

The HMC244AG16 is a non-reflective SP4T switch in a 16 lead glass/metal (hermetic) package. Covering DC to 4 GHz, the switch offers 30~50 dB isolation and a low insertion loss of 0.9 dB through 3 GHz. A 2:4 TTL/CMOS compatible decoder is integrated on the switch requiring only 2 control lines and a positive 5V bias to select each path, replacing 8 control lines normally required by GaAs SP4T switches.

Electrical Specifications, $T_A = +25^\circ\text{C}$, With 0/+5V Control, 50 Ohm System

| Parameter | | Frequency | Min. | Typ. | Max. | Units |
|---|---------------------|---------------|------|------|------|-------|
| Insertion Loss | | DC - 1.0 GHz | | 0.6 | 0.9 | dB |
| | | DC - 3.0 GHz | | 0.9 | 1.1 | dB |
| | | DC - 3.5 GHz | | 1.0 | 1.4 | dB |
| | | DC - 4.0 GHz | | 1.2 | 1.8 | dB |
| Isolation | | DC - 1.0 GHz | 40 | 45 | | dB |
| | | DC - 2.0 GHz | 36 | 40 | | dB |
| | | DC - 3.0 GHz | 30 | 35 | | dB |
| | | DC - 4.0 GHz | 24 | 28 | | dB |
| Return Loss | “On State” | DC - 3.5 GHz | | 22 | | dB |
| | | DC - 4.0 GHz | | 16 | | dB |
| Return Loss | RF 1 -4 “Off State” | 0.2 - 4.0 GHz | | 10 | | dB |
| | | 0.5 - 4.0 GHz | | 15 | | dB |
| Input Power for 1 dB Compression | | 0.5 - 4.0 GHz | 24 | 28 | | dBm |
| Input Third Order Intercept (Two-Tone Input Power = +10 dBm Each Tone) | | 0.5 - 3.0 GHz | 43 | 47 | | dBm |
| | | 0.5 - 4.0 GHz | 40 | 45 | | dBm |
| Switching Characteristics tRISE, tFALL (10/90% RF) tON, tOFF (50% CTL to 10/90% RF) | | DC - 4.0 GHz | | 40 | | ns |
| | | | | 150 | | ns |

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HMC244A* Product Page Quick Links

Last Content Update: 08/30/2016

Comparable Parts

View a parametric search of comparable parts

Evaluation Kits

- HMC244A Evaluation Board

Documentation

Data Sheet

- HMC244AG16: GaAs MMIC SP4T Non-Reflexive Switch, DC-4 GHz Data Sheet

Design Resources

- HMC244A Material Declaration
- PCN-PDN Information
- Quality And Reliability
- Symbols and Footprints

Discussions

View all HMC244A EngineerZone Discussions

Sample and Buy

Visit the product page to see pricing options

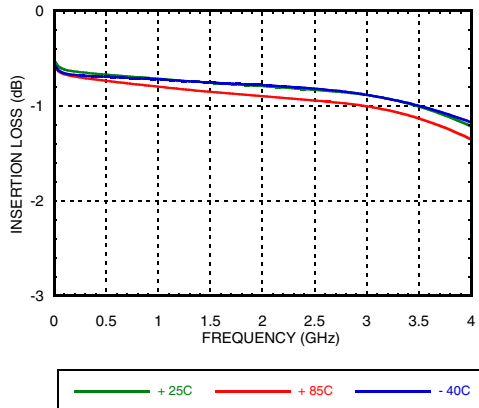
Technical Support

Submit a technical question or find your regional support number

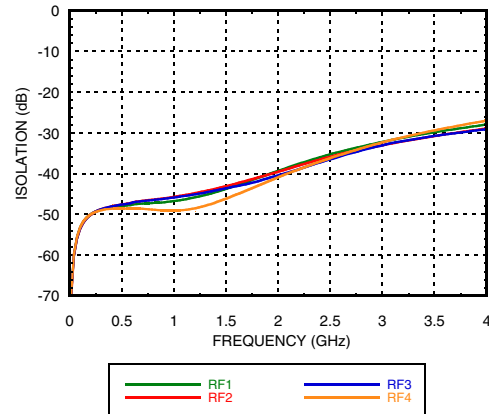
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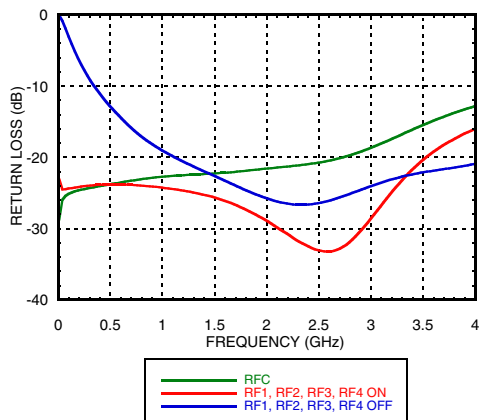
Insertion Loss



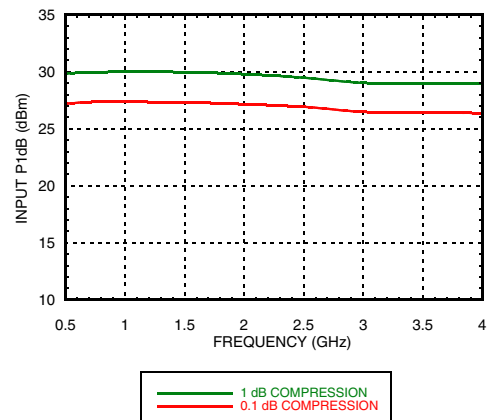
Isolation



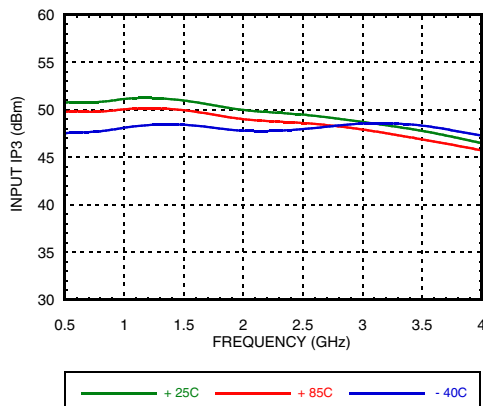
Return Loss



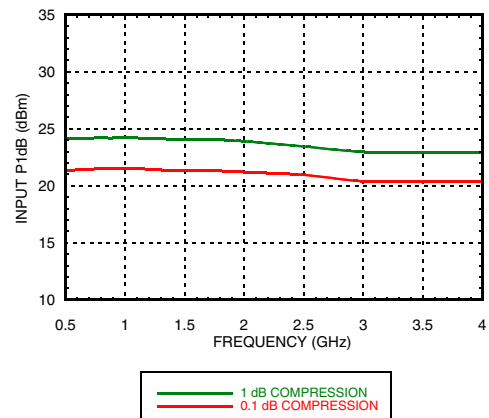
0.1 and 1 dB Input Compression Point



Input Third Order Intercept Point



0.1 and 1 dB Input Compression Point, 3V



GaAs MMIC SP4T NON-REFLECTIVE SWITCH, DC - 4 GHz

Absolute Maximum Ratings

| | |
|--|---|
| Bias Voltage Range (Port Vdd) | +7.0 Vdc |
| Control Voltage Range (A & B) | -0.5V to Vdd +1 Vdc |
| Channel Temperature | 150 °C |
| Thermal Resistance (Insertion Loss Path) | 171 °C/W |
| Thermal Resistance (Terminated Path) | 332 °C/W |
| Storage Temperature | -65 to +150 °C |
| Operating Temperature | -40 to +85 °C |
| Maximum Input Power Vdd = +5 Vdc | +20 dBm (0.05 - 0.5 GHz) +27 dBm (0.5 - 3.5 GHz) |

Bias Voltage & Current

| Vdd Range= +5 Vdc ±10% | | |
|------------------------|----------------|----------------|
| Vdd (Vdc) | Idd (Typ) (mA) | Idd (Max) (mA) |
| +5 | 3 | 7.0 |
| +3 | 7 | 7.0 |

TTL/CMOS Control Voltages

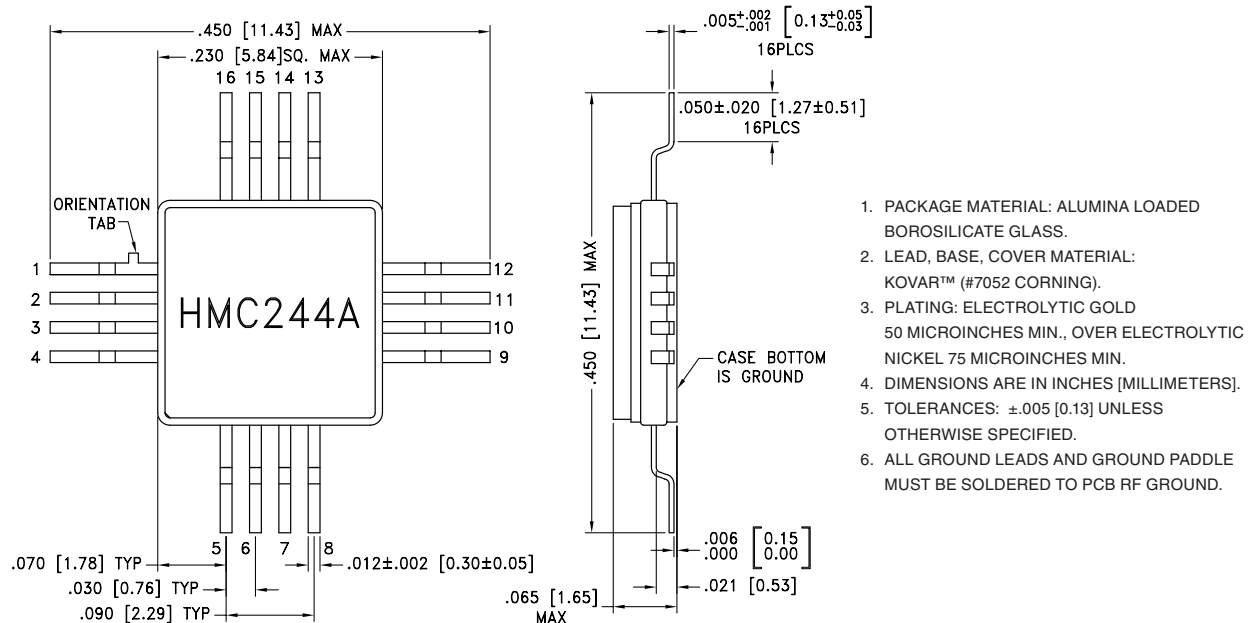
| State | Bias Condition |
|-------|-----------------------------|
| Low | 0 to +0.8 Vdc @ 0.5 µA Typ. |
| High | +2.0 to +Vdd @ 70 µA Typ. |


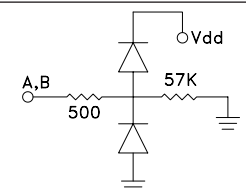
Truth Table

| Control Input | | Signal Path State |
|---------------|------|-------------------|
| A | B | RF COM to: |
| Low | Low | RF1 |
| High | Low | RF2 |
| Low | High | RF3 |
| High | High | RF4 |



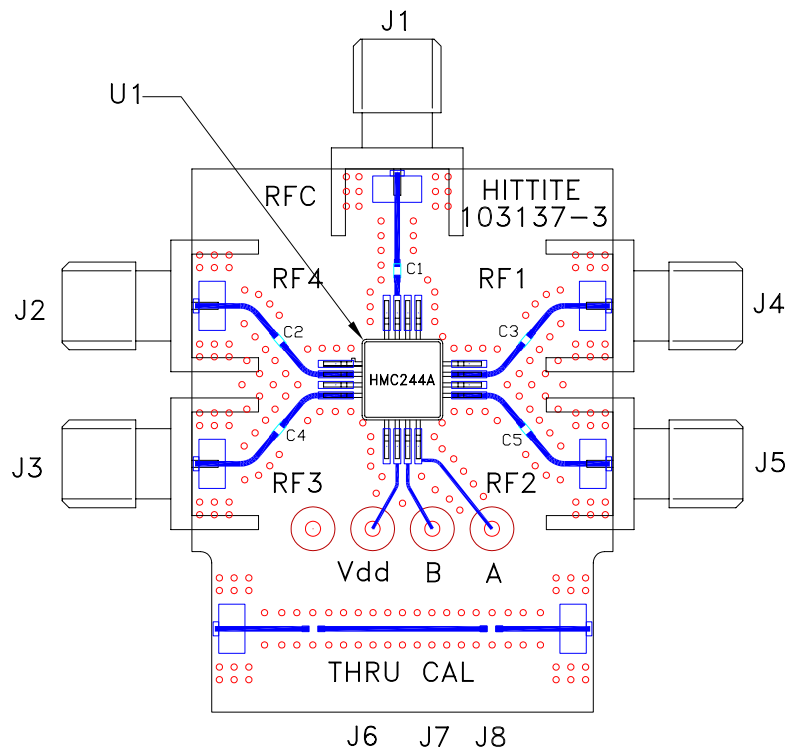
**ELECTROSTATIC SENSITIVE DEVICE
OBSERVE HANDLING PRECAUTIONS**

**GaAs MMIC SP4T NON-REFLECTIVE
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Outline Drawing

Pin Descriptions

| Pin Number | Function | Description | Interface Schematic |
|-----------------------------|-------------------------|---|---|
| 1, 3, 5, 10, 12, 13, 14, 16 | GND | Package bottom has exposed metal paddle that must also be connected to PCB RF ground. |  |
| 2, 4, 9, 11, 15 | RF4, RF3, RF2, RF1, RFC | These pins are DC coupled and matched to 50 Ohms. Blocking capacitors are required. | |
| 6 | Vdd | Supply Voltage +5 Vdc ±10% | |
| 7 | B | See truth table and control voltage table. |  |
| 8 | A | See truth table and control voltage table. | |

**GaAs MMIC SP4T NON-REFLECTIVE
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Evaluation PCB



List of Materials for Evaluation PCB EV1HMC244AG16 [1]

| Item | Description |
|---------|------------------------------|
| J1 - J5 | PCB Mount SMA RF Connector |
| J6 - J8 | DC Pin |
| C1 - C5 | 330 pF Capacitors, 0402 Pkg. |
| U1 | HMC244AG16 SP4T Switch |
| PCB [2] | 103137 Evaluation PCB |

[1] Reference this number when ordering complete evaluation PCB

[2] Circuit Board Material: Rogers 4350

The circuit board used in the application should be generated with proper RF circuit design techniques. Signal lines at the RF port should have 50 ohm impedance and the package ground leads and package bottom should be connected directly to the ground plane similar to that shown above. The evaluation circuit board shown above is available from Analog Devices upon request.