



GaAs MMIC SMT HIGH ISOLATION SPDT SWITCH, DC - 8 GHz

Typical Applications

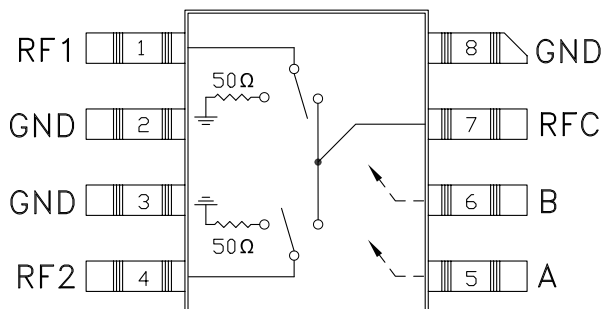
The HMC347C8 is ideal for:

- Telecom Infrastructure
- Microwave Radio & VSAT
- Military Radios, Radar & ECM
- Test Instrumentation

Features

- Isolation: 50 dB @ 2.5 GHz
36 dB @ 8 GHz
- Insertion Loss: 2 dB Typical
- Non-Reflective Design
- Surface Mount Ceramic Package

Functional Diagram



General Description

The HMC347C8 is a broadband high isolation non-reflective GaAs MESFET SPDT switch in a non-hermetic surface mount ceramic package. Covering DC to 8 GHz, the switch features >50 dB isolation up to 2 GHz and >35 dB isolation up to 8 GHz. The switch operates using complementary negative control voltage logic lines of -5/0V and requires no bias supply. This SPDT is an excellent replacement for the HMC132C8 SPDT.

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SWITCHES - SMT

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

| Parameter | Frequency | Min. | Typ. | Max. | Units |
|--|---------------|----------------------------------|------|------|-------|
| Insertion Loss | DC - 2.0 GHz | | 1.7 | 2.0 | dB |
| | DC - 6.0 GHz | | 2.0 | 2.4 | dB |
| | DC - 8.0 GHz | | 2.4 | 2.8 | dB |
| Isolation | DC - 2.0 GHz | 49 | 54 | | dB |
| | DC - 6.0 GHz | 35 | 40 | | dB |
| | DC - 8.0 GHz | 32 | 36 | | dB |
| Return Loss | DC - 2.0 GHz | 10 | 13 | | dB |
| | DC - 6.0 GHz | 7 | 10 | | dB |
| | DC - 8.0 GHz | 6 | 9 | | dB |
| Return Loss RF1, RF2 | DC - 2.0 GHz | | 9 | | dB |
| | DC - 6.0 GHz | | 6 | | dB |
| | DC - 8.0 GHz | | 6 | | dB |
| Input Power for 1 dB Compression | 0.5 - 8.0 GHz | 19 | 23 | | dBm |
| Input Third Order Intercept (Two-Tone Input Power= +7 dBm Each Tone, 1 MHz Tone Separation) | 0.5 - 8.0 GHz | 38 | 43 | | dBm |
| Switching Characteristics | DC - 8.0 GHz | tRISE, tFALL (10/90% RF) | 3 | | ns |
| | | tON, tOFF (50% CTL to 10/90% RF) | 6 | | ns |
| | | | | | |

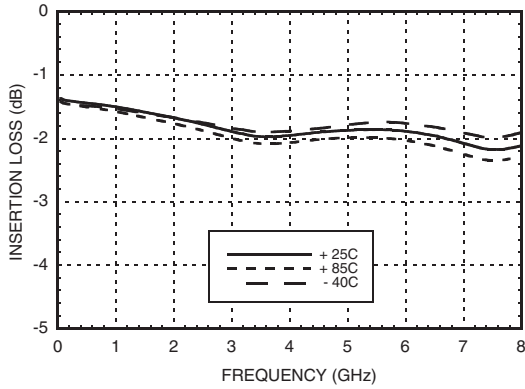
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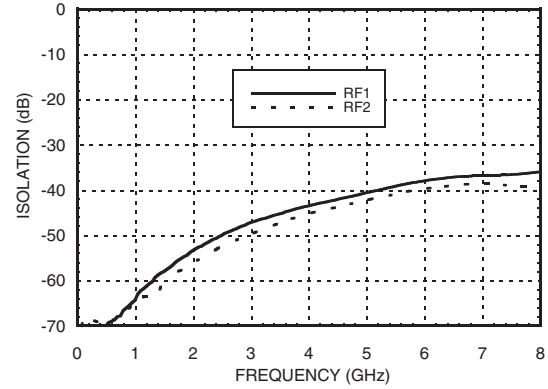


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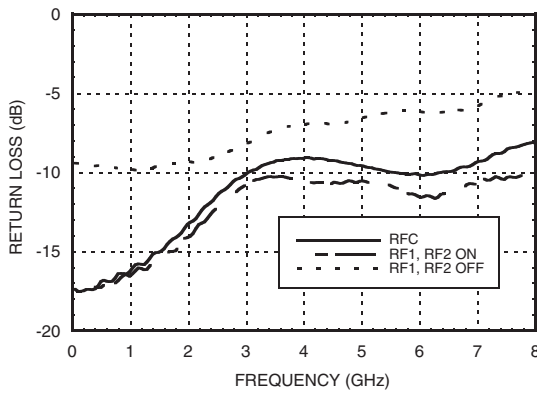
Insertion Loss



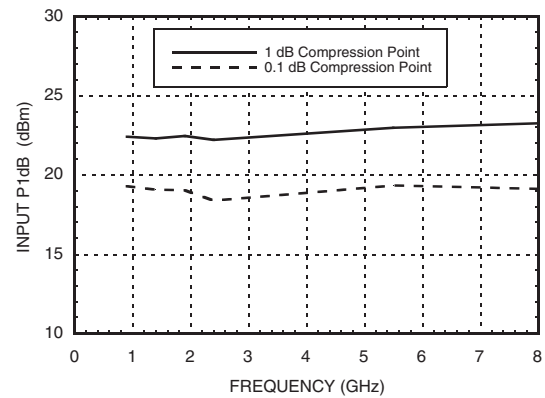
Isolation



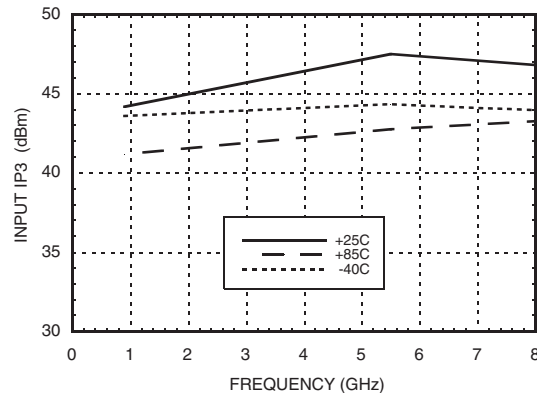
Return Loss



0.1 and 1 dB Input Compression Point



Input Third Order Intercept Point



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Absolute Maximum Ratings

| | |
|--|-------------------|
| RF Input Power (Vctl = -5V) | +27 dBm |
| Control Voltage Range (A & B) | +0.5V to -7.5 Vdc |
| Channel Temperature | 150 °C |
| Thermal Resistance (Insertion Loss Path) | 440 °C/W |
| Thermal Resistance (Terminated Path) | 540 °C/W |
| Storage Temperature | -65 to +150 °C |
| Operating Temperature | -55 to +85 °C |
| ESD Sensitivity (HBM) | Class 1A |

Control Voltages

| State | Bias Condition |
|-------|--|
| Low | 0 to -0.2V @ 10 uA Max. |
| High | -5V @ 10 uA Typ. to -7V @ 40 uA Typ. (± 0.5 Vdc) |

Truth Table

| Control Input | | Signal Path State | |
|---------------|------|-------------------|------------|
| A | B | RFC to RF1 | RFC to RF2 |
| High | Low | On | Off |
| Low | High | Off | On |

Caution: Do not "Hot Switch" power levels greater than +13 dBm (Vctl = 0/-5 Vdc).

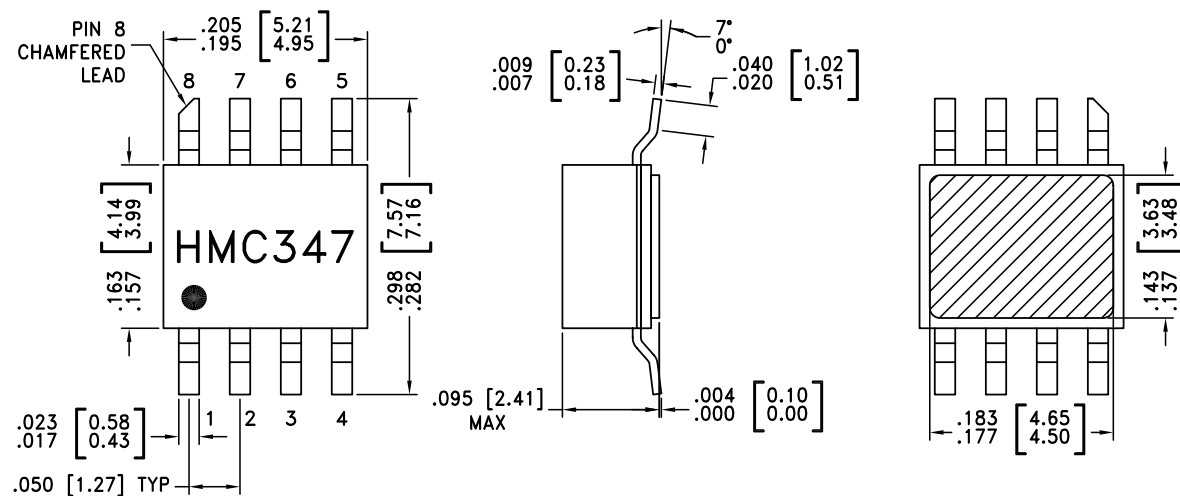
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ELECTROSTATIC SENSITIVE DEVICE
OBSERVE HANDLING PRECAUTIONS

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Outline Drawing



NOTES:

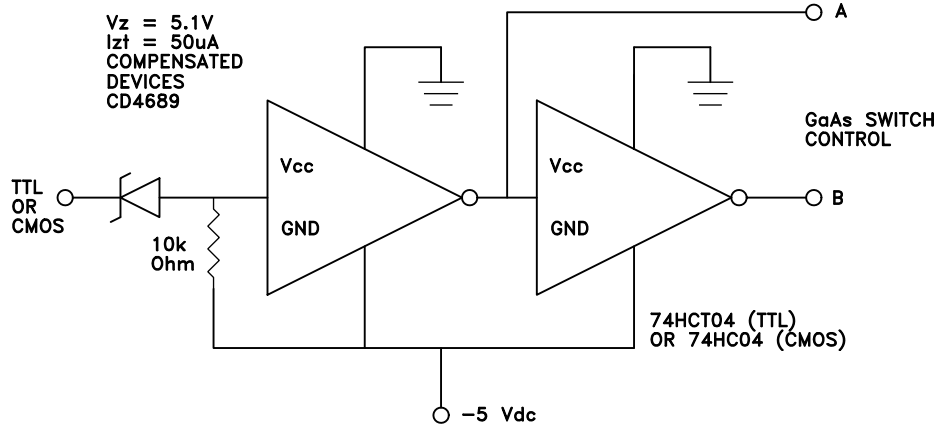
1. PACKAGE BODY MATERIAL: WHITE ALUMINA 92%
2. LEAD, PACKAGE BOTTOM MATERIAL: COPPER
3. PLATING: ELECTROLYTIC GOLD 100-200 MICROINCHES, OVER ELECTROLYTIC NICKEL 100-250 MICROINCHES.
4. DIMENSIONS ARE IN INCHES [MILLIMETERS].
5. PACKAGE LENGTH AND WIDTH DIMENSIONS DO NOT INCLUDE LID SEAL PROTRUSION .005 PER SIDE.
6. ALL GROUND LEADS AND GROUND PADDLE MUST BE SOLDERED TO PCB RF GROUND.



v01.0404

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Suggested Driver Circuit



Pin Descriptions

| Pin Number | Function | Description | Interface Schematic |
|------------|---------------|---|---------------------|
| 1, 4, 7 | RFC, RF1, RF2 | This pin is DC coupled and matched to 50 Ohm. Blocking capacitors are required if RF line potential is not equal to 0V. | |
| 2, 3, 8 | GND | Package bottom must also be connected to PCB RF ground. | |
| 5 | CTLA | See truth table and control voltage table. | |
| 6 | CTLB | See truth table and control voltage table. | |

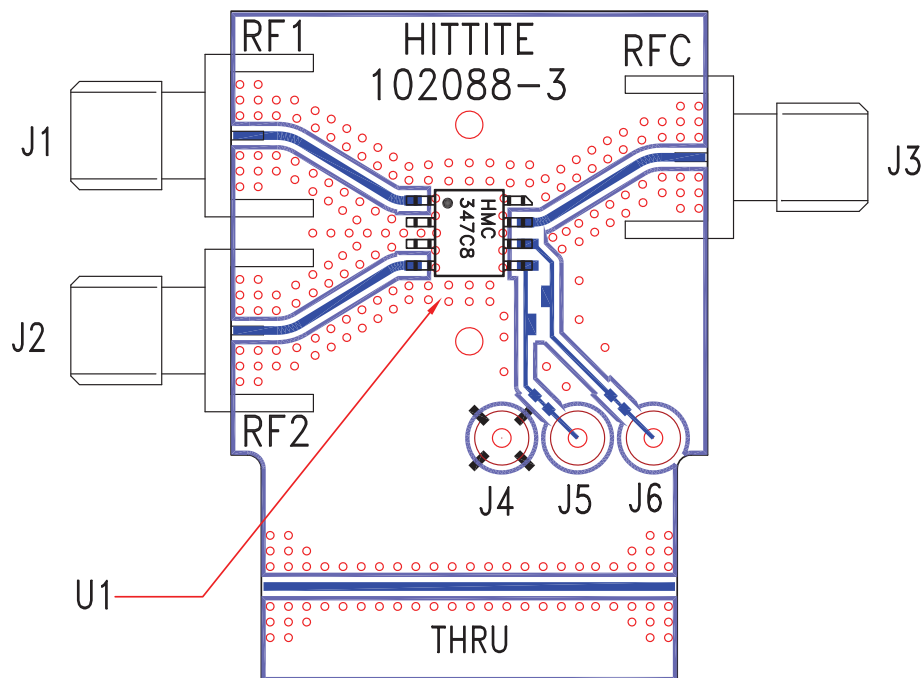
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Evaluation PCB



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List of Materials for Evaluation PCB 107261 [1]

| Item | Description |
|---------|----------------------------|
| J1 - J3 | PCB Mount SMA RF Connector |
| J4 - J6 | DC Pin |
| U1 | HMC347C8 SPDT Switch |
| PCB [2] | 102088 Evaluation PCB |

[1] Reference this number when ordering complete evaluation PCB

[2] Circuit Board Material: Rogers 4350

The circuit board used in the final 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 Hittite Microwave Corporation upon request.



Notes:

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HMC347C8

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