HMC347LP3

GaAs MMIC SPDT NON-REFLECTIVE SWITCH, DC - 14.0 GHz

Typical Applications

The HMC347LP3 is ideal for:

- Basestation Infrastructure
- Fiber Optics & Broadband Telecom
- Microwave Radio & VSAT
- Military Radios, Radar, & ECM
- Test Instrumentation

Features

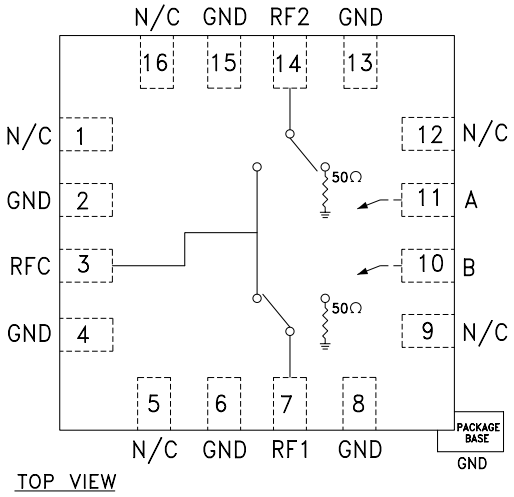
High Isolation: >50 dB up to 3 GHz
>45 dB up to 10 GHz

Low Insertion Loss: 1.6 dB @ 10 GHz

Non-Reflective Design

3 x 3 x 1 mm QFN SMT Package

Functional Diagram



General Description

The HMC347LP3 is a broadband high isolation non-reflective GaAs MESFET SPDT switch in a low cost leadless QFN surface mount plastic package. Covering DC to 14 GHz, the switch offers high isolation and low insertion loss. The switch features >50 dB isolation up to 3 GHz and >40 dB isolation up to 13 GHz. The switch operates using complementary negative control voltage logic lines of -5/0V and requires no bias supply. This SPDT is an excellent alternative to the HMC132C8 SPDT.

Electrical Specifications, T_A = +25° C, With 0/-5V Control, 50 Ohm System

Parameter		Frequency	Min.	Typ.	Max.	Units
Insertion Loss		DC - 3.0 GHz DC - 6.0 GHz DC - 12.0 GHz DC - 14.0 GHz		1.5 1.6 1.6 1.9	1.9 2.0 2.1 2.4	dB dB dB dB
Isolation		DC - 3.0 GHz DC - 6.0 GHz DC - 12.0 GHz DC - 14.0 GHz	49 41 39 33	53 46 44 38		dB dB dB dB
Return Loss	"On State"	DC - 6.0 GHz DC - 14.0 GHz	10 8	13 13		dB dB
Return Loss RF1, RF2	"Off State"	DC - 6.0 GHz DC - 14.0 GHz	7 6	10 9		dB dB
Input Power for 1 dB Compression		0.5 - 14.0 GHz	19	23		dBm
Input Third Order Intercept (Two-Tone Input Power= +7 dBm Each Tone)		0.5 - 14.0 GHz	38	43		dBm
Switching Characteristics tRISE, tFALL (10/90% RF) tON, tOFF (50% CTL to 10/90% RF)		DC - 14 GHz		 3 6		 ns ns

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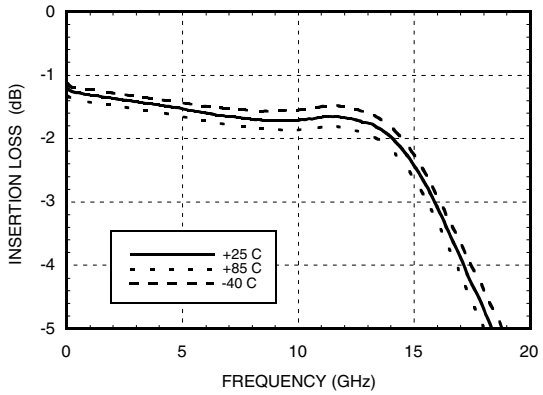
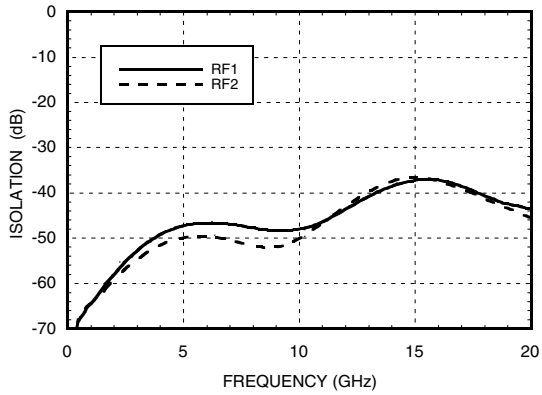
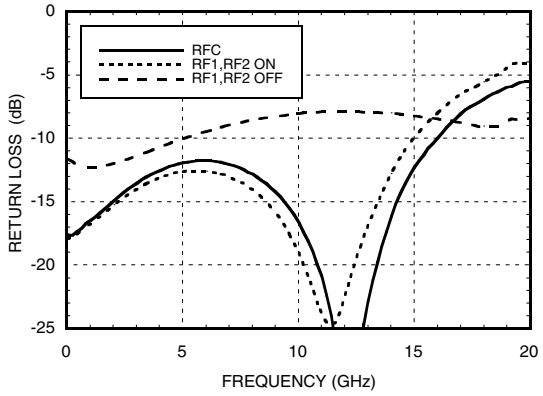
Insertion Loss



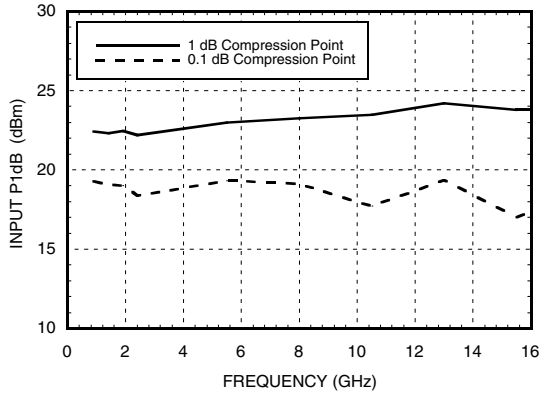
Isolation



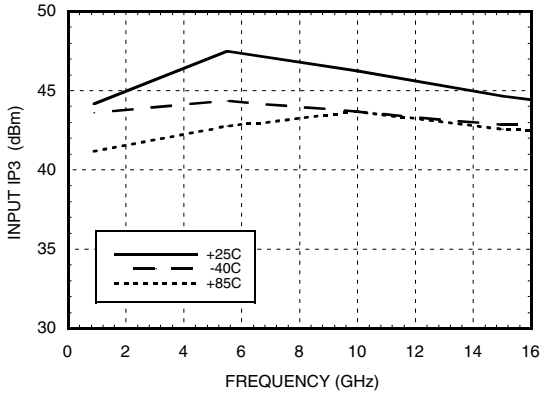
Return Loss



0.1 and 1 dB Input Compression Point



Input Third Order Intercept Point



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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

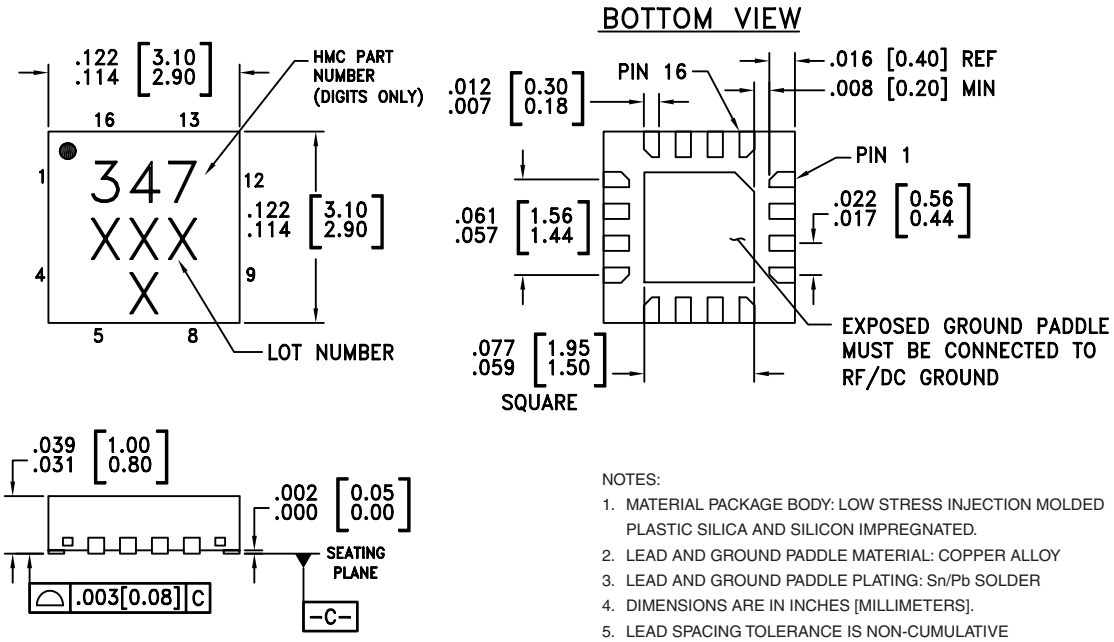
Control Input		Signal Path State	
A	B	RFC to RF1	RFC to RF2
High	Low	On	Off
Low	High	Off	On

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

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

Outline Drawing



NOTES:

1. MATERIAL PACKAGE BODY: LOW STRESS INJECTION MOLDED PLASTIC SILICA AND SILICON IMPREGNATED.
2. LEAD AND GROUND PADDLE MATERIAL: COPPER ALLOY
3. LEAD AND GROUND PADDLE PLATING: Sn/Pb SOLDER
4. DIMENSIONS ARE IN INCHES [MILLIMETERS].
5. LEAD SPACING TOLERANCE IS NON-CUMULATIVE
6. PAD BURR LENGTH SHALL BE 0.15mm MAXIMUM. PAD BURR HEIGHT SHALL BE 0.05mm MAXIMUM.
7. PACKAGE WARP SHALL NOT EXCEED 0.05mm.
8. ALL GROUND LEADS AND GROUND PADDLE MUST BE SOLDERED TO PCB RF GROUND.
9. REFER TO HITTITE APPLICATION NOTE FOR SUGGESTED PCB LAND PATTERN.

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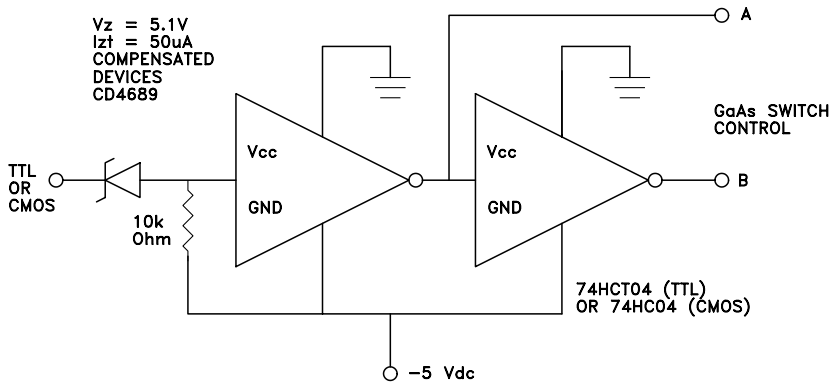
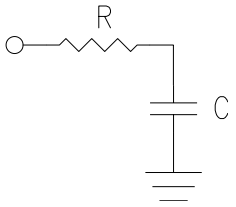
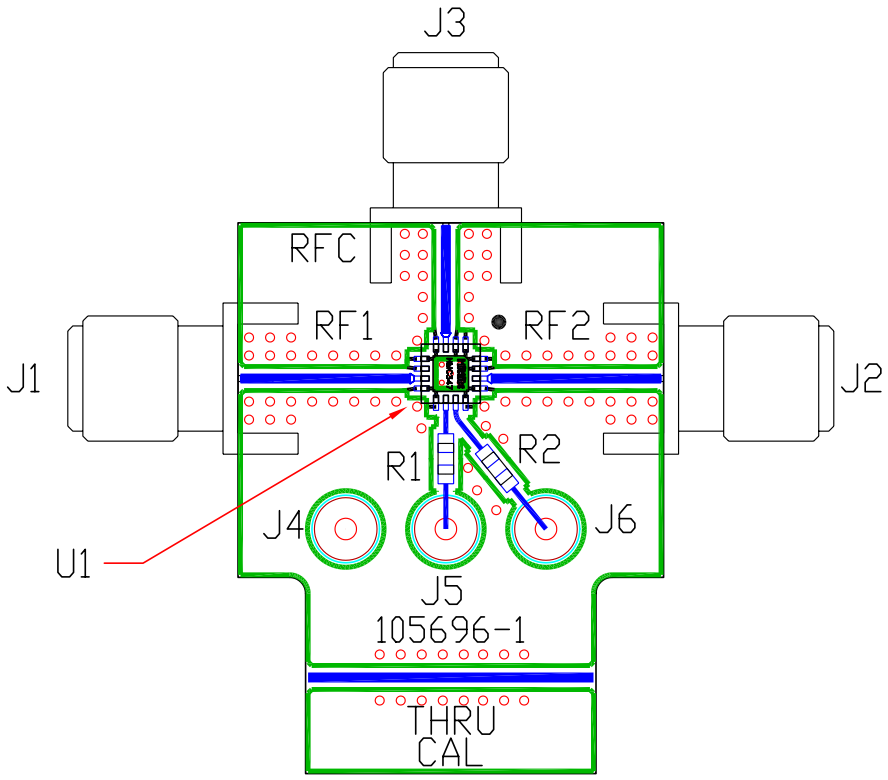
Suggested Driver Circuit



Pin Descriptions

Pin Number	Function	Description	Interface Schematic
1, 5, 9, 12, 16	N/C	This pin should be connected to PCB RF ground to maximize isolation	
2, 4, 6, 8, 13, 15	GND	Package bottom has exposed metal paddle that must also be connected to PCB RF ground.	
3, 7, 14	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.	
10	CTLB	See truth table and control voltage table.	
11	CTLA	See truth table and control voltage table.	

Evaluation PCB



List of Material

Item	Description
J1 - J3	PC Mount SMA RF Connector
J4 - J6	DC Pin
R1 - R2	100 Ohm Resistor, 0603 Pkg.
U1	HMC347LP3 SPDT Switch
PCB*	105696 Evaluation PCB
* 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.

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Notes: