

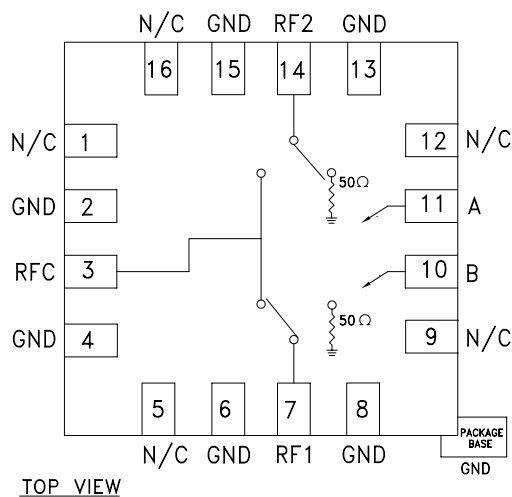
GaAs MMIC SPDT NON-REFLECTIVE SWITCH, DC - 14 GHz

Typical Applications

The HMC347ALP3E is ideal for:

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

Functional Diagram



Features

- High Isolation: >54 dB up to 3 GHz
>44 dB up to 10 GHz
- Low Insertion Loss: 1.8 dB @ 10 GHz
- Non-Reflective Design
- 3x3 mm QFN SMT Package

General Description

The HMC347ALP3E is a broadband high isolation non-reflective GaAs pHEMT SPDT switch in 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 >54 dB isolation up to 3 GHz and >44 dB isolation up to 13 GHz. The switch operates using complementary negative control voltage logic lines of -5/0V and requires no bias supply.

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

Parameter	Frequency	Min.	Typ.	Max.	Units
Insertion Loss	DC - 3.0 GHz		1.5	1.9	dB
	DC - 6.0 GHz		1.7	2.1	dB
	DC - 12.0 GHz		1.9	2.4	dB
	DC - 14.0 GHz		2.0	2.5	dB
Isolation	DC - 3.0 GHz	50	54		dB
	DC - 6.0 GHz	44	48		dB
	DC - 12.0 GHz	40	44		dB
	DC - 14.0 GHz	34	40		dB
Return Loss RFC	DC - 6.0 GHz	14	17		dB
	DC - 14.0 GHz	12	17		dB
Return Loss RF1, RF2	DC - 6.0 GHz	23	26		dB
	DC - 14.0 GHz	15	18		dB
Input Power for 1 dB Compression	0.5 - 14.0 GHz	24	29		dBm
Input Third Order Intercept (Two-Tone Input Power= +7 dBm Each Tone)	0.5 - 14.0 GHz	42	47		dBm
Switching Characteristics	DC - 14 GHz		2		ns
			10		ns

HMC347ALP3E* PRODUCT PAGE QUICK LINKS

Last Content Update: 12/18/2017

COMPARABLE PARTS

View a parametric search of comparable parts.

EVALUATION KITS

- HMC347ALP3E Evaluation Board

DOCUMENTATION

Data Sheet

- HMC347ALP3E: GaAs MMIC SPDT Non-Reflective Switch, DC - 14 GHz Data Sheet

TOOLS AND SIMULATIONS

- HMC347ALP3E S-Parameters

REFERENCE MATERIALS

Product Selection Guide

- RF, Microwave, and Millimeter Wave IC Selection Guide 2017

Quality Documentation

- Semiconductor Qualification Test Report: PHEMT-J (QTR: 2013-00285)

DESIGN RESOURCES

- HMC347ALP3E Material Declaration
- PCN-PDN Information
- Quality And Reliability
- Symbols and Footprints

DISCUSSIONS

View all HMC347ALP3E EngineerZone Discussions.

SAMPLE AND BUY

Visit the product page to see pricing options.

TECHNICAL SUPPORT

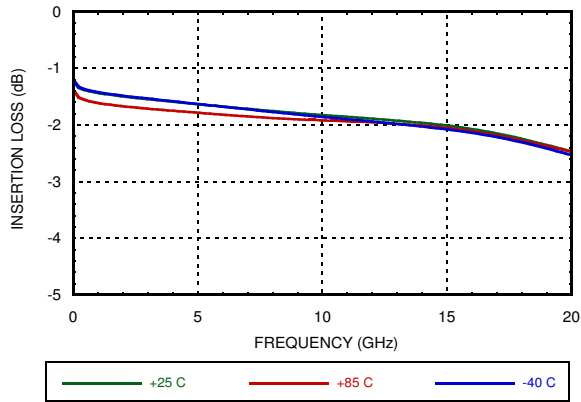
Submit a technical question or find your regional support number.

DOCUMENT FEEDBACK

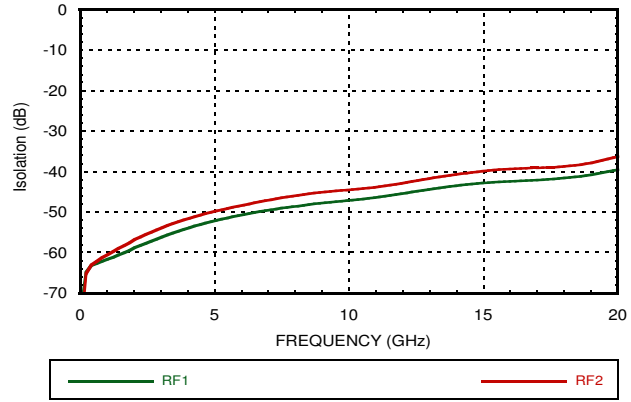
Submit feedback for this data sheet.

**GaAs MMIC SPDT NON-REFLECTIVE
SWITCH, DC - 14 GHz**

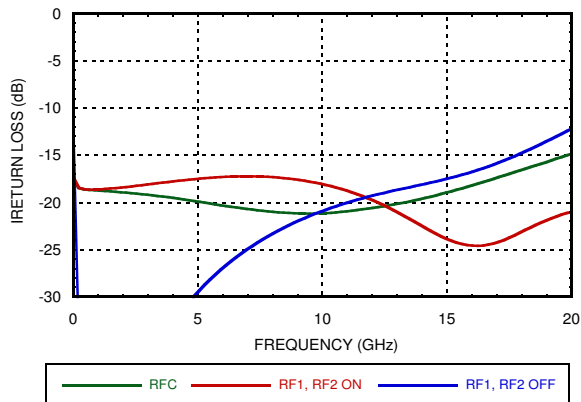
Insertion Loss



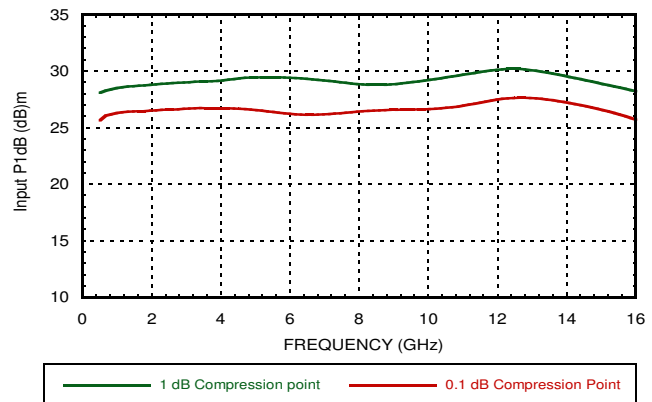
Isolation



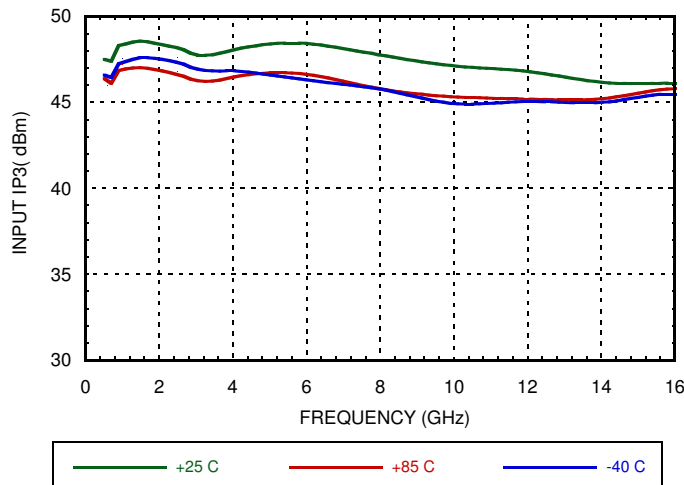
Return Loss



0.1 and 1 dB Input Compression Point



Input Third Order Intercept Point



**GaAs MMIC SPDT NON-REFLECTIVE
SWITCH, DC - 14 GHz**
Absolute Maximum Ratings

RF Input Power (Vctl = -5V)	+27 dBm
Control Voltage Range (A & B)	+0.5V to -7.5 Vdc
Hot Switch Power Level (Vctl = -5 V)	+23 dBm
Channel Temperature	150 °C
Terminated Power Level (Vctl = -5V)	+25dBm
Thermal Resistance (Insertion Loss Path)	118 °C/W
Thermal Resistance (Terminated Path)	200 °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 -0.5V @ 10 uA Max.
High	-5V @ 3uA Typ. to -7V @ 40 uA Max (± 0.5 Vdc)

Truth Table

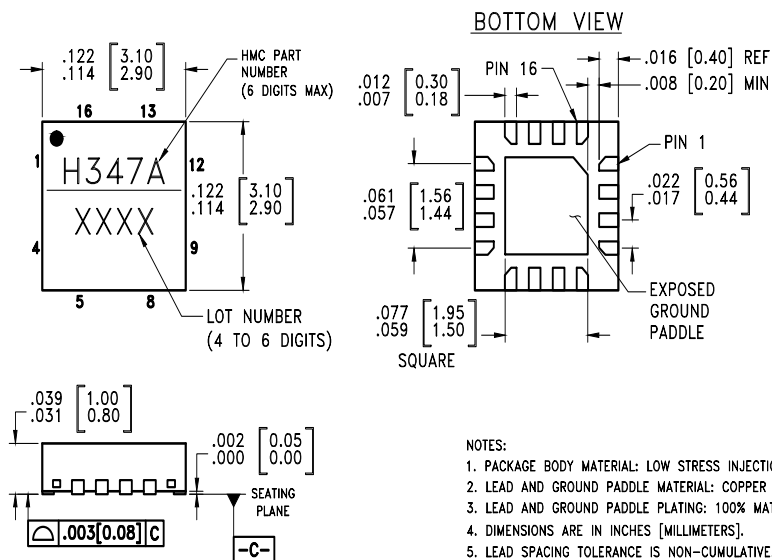
Control Input		Signal Path State	
A	B	RFC to RF1	RFC to RF2
High	Low	On	Off
Low	High	Off	On



**ELECTROSTATIC SENSITIVE DEVICE
OBSERVE HANDLING PRECAUTIONS**

GaAs MMIC SPDT NON-REFLECTIVE SWITCH, DC - 14 GHz

Outline Drawing



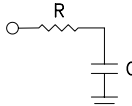
Package Information

Part Number	Package Body Material	Lead Finish	MSL Rating	Package Marking ^[2]
HMC347ALP3E	RoHS-compliant Low Stress Injection Molded Plastic	100% matte Sn	MSL3 ^[1]	H347A XXXX

[1] Max peak reflow temperature of 260 °C

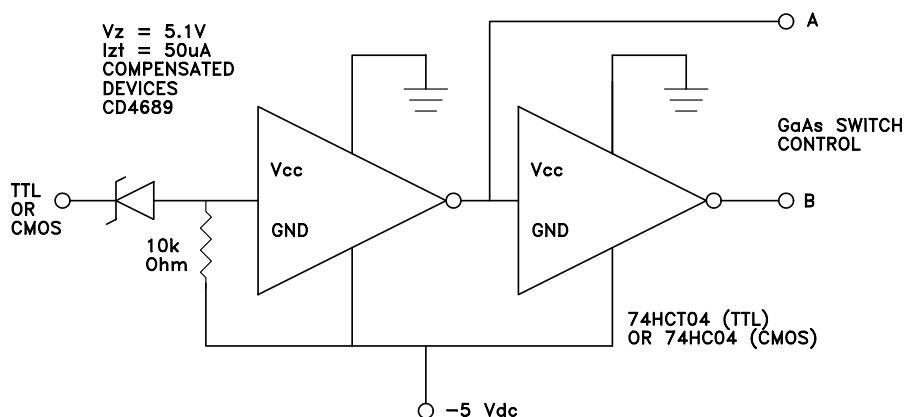
[2] 4-Digit lot number XXXX

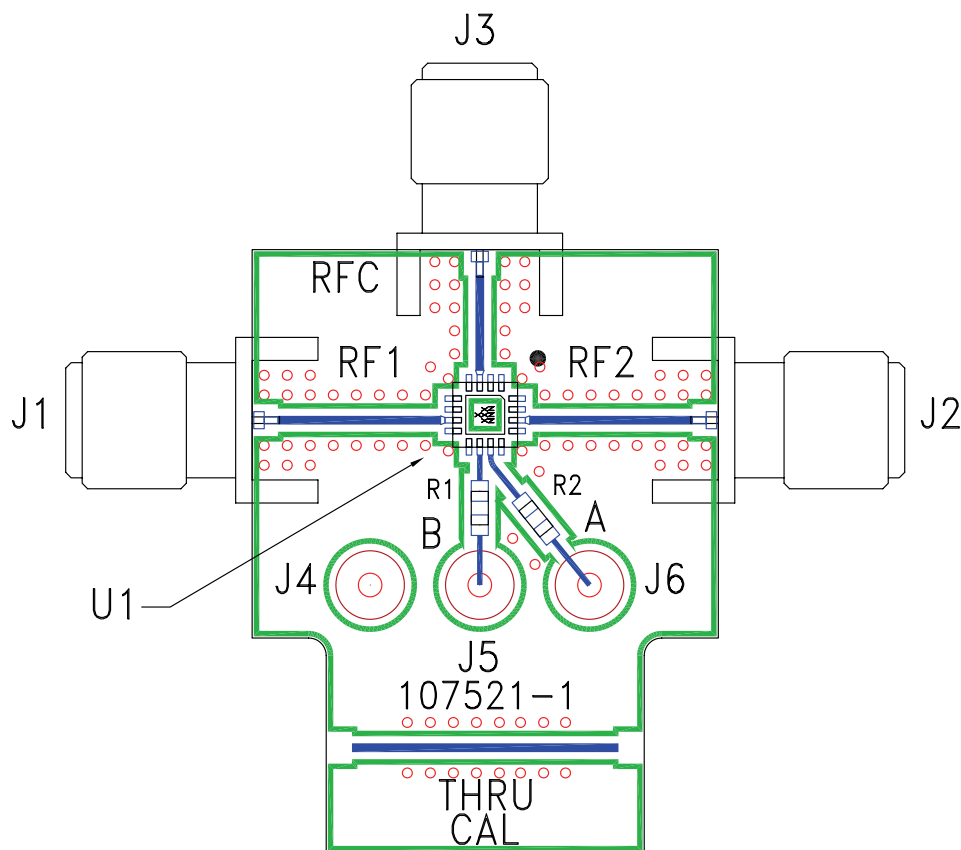
**GaAs MMIC SPDT NON-REFLECTIVE
SWITCH, DC - 14 GHz**
Pin Descriptions

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.	

7

SWITCHES - CHIP

Suggested Driver Circuit


**GaAs MMIC SPDT NON-REFLECTIVE
SWITCH, DC - 14 GHz**
Evaluation PCB

List of Materials for EV1HMC347ALP3 ^[1]

Item	Description
J1 - J3	PCB Mount SRI SMA Connector
J4 - J6	DC Pin
R1 - R2	100 Ohm Resistor, 0603 Pkg.
U1	HMC347ALP3E SPDT Switch
PCB [2]	107521 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 Inc. upon request.