

GaAs MMIC SP4T NON-REFLECTIVE SWITCH, DC - 8 GHz

Typical Applications

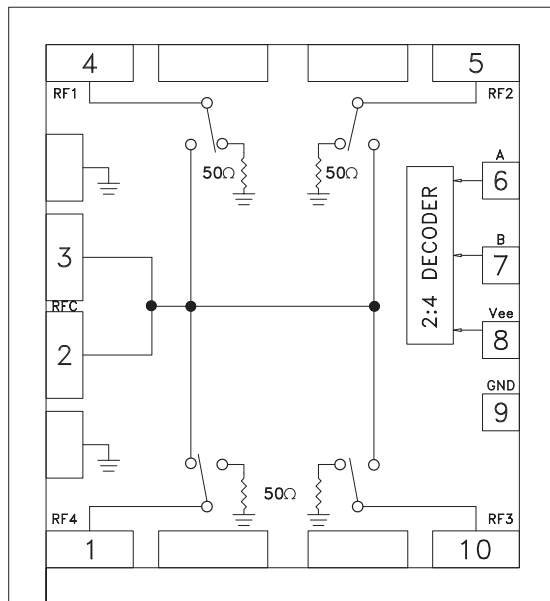
The HMC344 is ideal for:

- Telecom Infrastructure
- Microwave Radio & VSAT
- Military & Space
- Test Instrumentation

Features

- Broadband Performance: DC - 8 GHz
- Non-Reflective Topology
- Low Insertion Loss: 1.8 dB @ 6 GHz
- Integrated 2:4 TTL Decoder
- Small Size: 1.08 x 1.05 x 0.10 mm

Functional Diagram



General Description

The HMC344 is a broadband non-reflective GaAs MESFET SP4T switch chip. Covering DC to 8 GHz, this switch offers high isolation, low insertion loss, and a compact form factor. This switch also includes an on board binary decoder circuit which reduces the number of required logic control lines to two. The switch operates using a negative control voltage of 0/-5V, and requires a fixed bias of -5V. All data is tested with the chip in a 50 Ohm test fixture connected via 0.025 mm (1 mil) diameter wire bonds of minimal length 0.31 mm (12 mils). This SP4T switch is also available in SMT packaged form as the HMC344LC3.

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

Parameter	Frequency	Min.	Typ.	Max.	Units
Insertion Loss	DC - 6.0 GHz		1.8	2.1	dB
	DC - 8.0 GHz		1.9	2.2	dB
Isolation	DC - 2.0 GHz	44	49		dB
	DC - 4.0 GHz	37	42		dB
	DC - 6.0 GHz	34	39		dB
	DC - 8.0 GHz	30	35		dB
Return Loss	"On State"	DC - 2.0 GHz	10	14	dB
		DC - 8.0 GHz	7	10	dB
Return Loss	"Off State"	DC - 8.0 GHz	7	10	dB
Input Power for 1 dB Compression	0.5 - 8.0 GHz	17	21		dBm
Input Third Order Intercept (Two-Tone Input Power = +7 dBm Each Tone)	0.5 - 8.0 GHz	37	40		dBm
Switching Characteristics	DC - 8.0 GHz				
		tRISE, tFALL (10/90% RF)	35		ns
		tON, tOFF (50% CTL to 10/90% RF)	150		ns

Information furnished by Analog Devices is believed to be accurate and reliable. However, no responsibility is assumed by Analog Devices for its use, nor for any infringements of patents or other rights of third parties that may result from its use. Specifications subject to change without notice. No license is granted by implication or otherwise under any patent or patent rights of Analog Devices. Trademarks and registered trademarks are the property of their respective owners.

For price, delivery, and to place orders: Analog Devices, Inc., One Technology Way, P.O. Box 9106, Norwood, MA 02062-9106 Phone: 781-329-4700 • Order online at www.analog.com Application Support: Phone: 1-800-ANALOG-D

HMC344* PRODUCT PAGE QUICK LINKS

Last Content Update: 02/23/2017

COMPARABLE PARTS

View a parametric search of comparable parts.

EVALUATION KITS

- HMC344LC3 Evaluation Board.
- HMC344LH5 Evaluation Board
- HMC344LP3 Evaluation Board.

DOCUMENTATION

Data Sheet

- HMC344 Die Data Sheet
- HMC344LC3 Data Sheet
- HMC344LH5 Data Sheet
- HMC344LP3 Data Sheet

TOOLS AND SIMULATIONS

- HMC344 Die S-Parameters
- HMC344LC3 S-Parameters
- HMC344LH5 S-Parameters
- HMC344LP3 S-Parameters

REFERENCE MATERIALS

Quality Documentation

- Package/Assembly Qualification Test Report: 16L 3x3mm QFN Package (QTR: 11003 REV: 02)
- Package/Assembly Qualification Test Report: LC3, LC3B, LC3C (QTR: 2014-00376 REV: 01)
- Package/Assembly Qualification Test Report: LP2, LP2C, LP3, LP3B, LP3C, LP3D, LP3F, LP3G (QTR: 2014-0364)
- Package/Assembly Qualification Test Report: Plastic Encapsulated QFN (QTR: 05006 REV: 02)
- Semiconductor Qualification Test Report: MESFET-F (QTR: 2013-00247)

DESIGN RESOURCES

- HMC344 Material Declaration
- PCN-PDN Information
- Quality And Reliability
- Symbols and Footprints

DISCUSSIONS

View all HMC344 EngineerZone Discussions.

SAMPLE AND BUY

Visit the product page to see pricing options.

TECHNICAL SUPPORT

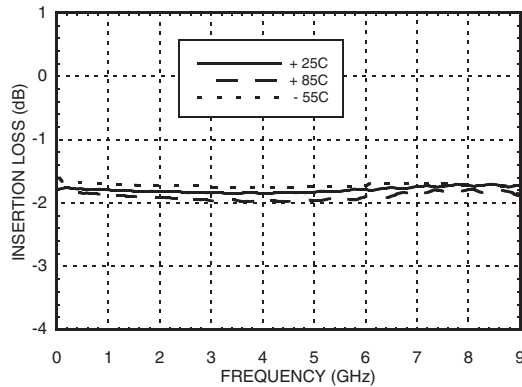
Submit a technical question or find your regional support number.

DOCUMENT FEEDBACK

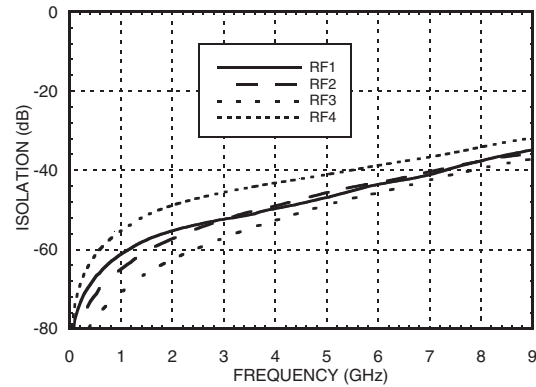
Submit feedback for this data sheet.

**GaAs MMIC SP4T NON-REFLECTIVE
SWITCH, DC - 8 GHz**

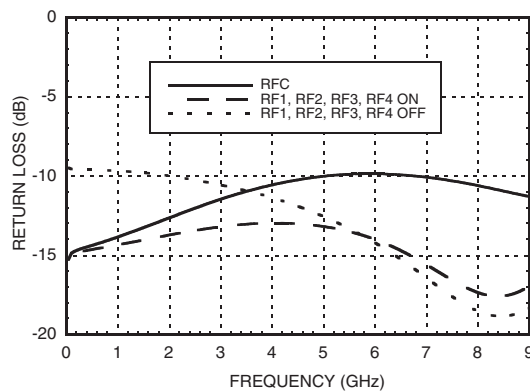
Insertion Loss vs. Temperature



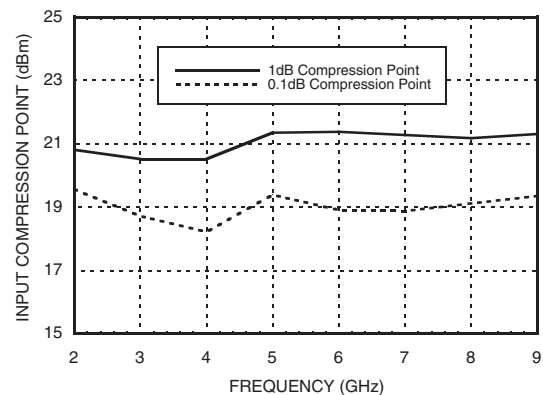
Isolation



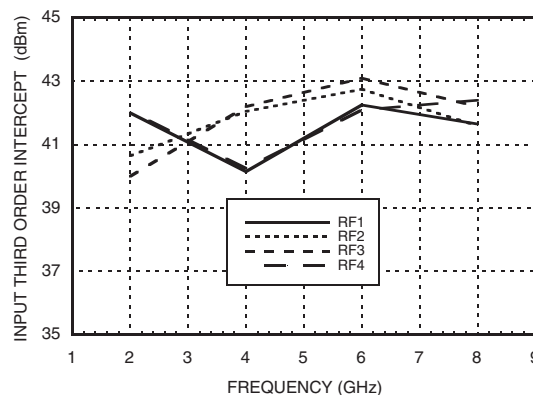
Return Loss



0.1 and 1 dB Input Compression Point



Input Third Order Intercept Point



**GaAs MMIC SP4T NON-REFLECTIVE
SWITCH, DC - 8 GHz**
Absolute Maximum Ratings

Bias Voltage Range (Vee)	-7V
Control Voltage Range (A & B)	Vee -0.5V to +1V
Channel Temperature	150 °C
Thermal Resistance (Insertion Loss Path)	143 °C/W
Thermal Resistance (Terminated Path)	1,030 °C/W
Storage Temperature	-65 to +150 °C
Operating Temperature	-55 to +85 °C
Maximum Input Power	+24 dBm
ESD Sensitivity (HBM)	Class 1A



**ELECTROSTATIC SENSITIVE DEVICE
OBSERVE HANDLING PRECAUTIONS**

Truth Table

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

Bias Voltage & Current

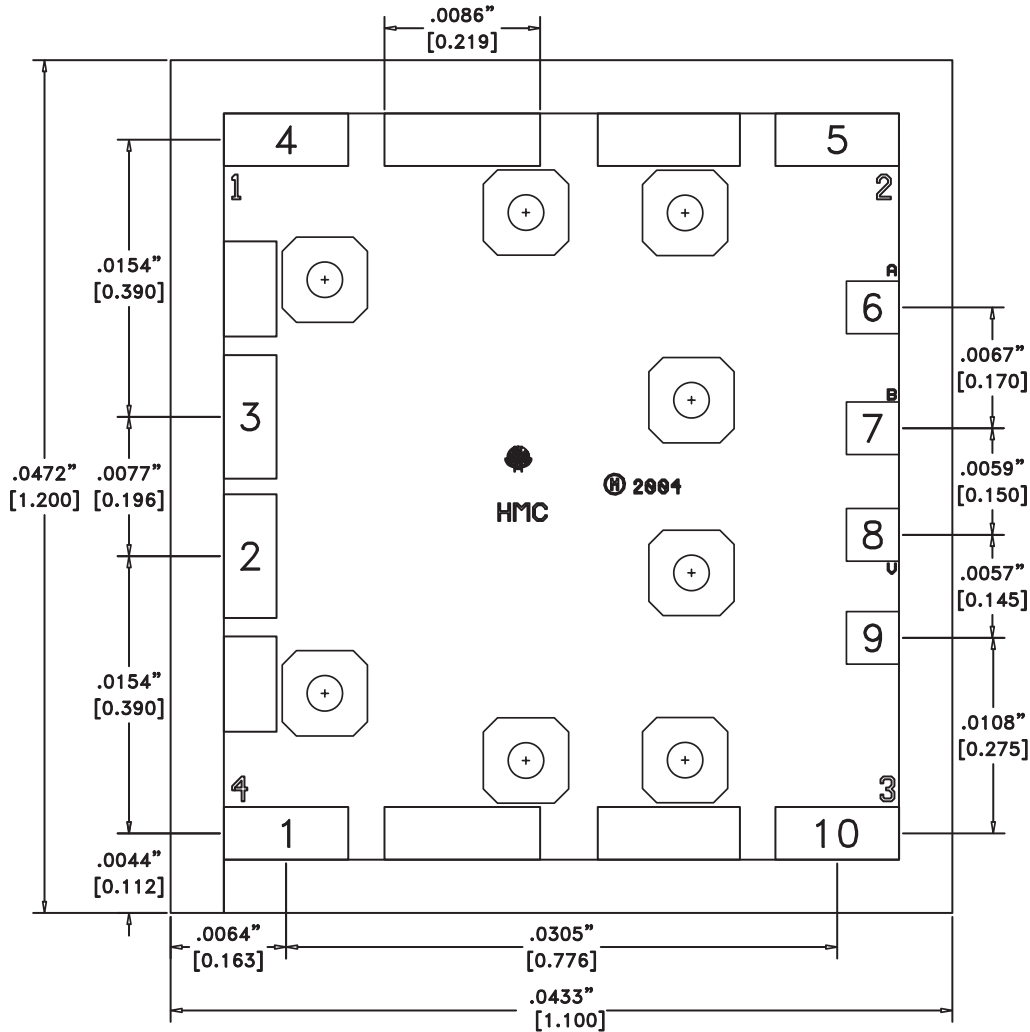
Vee Range = -5 Vdc ±10%		
Vee (V)	Idd (Typ) (mA)	Idd (Max) (mA)
-5	3	6

TTL/CMOS Control Voltages

State	Bias Condition
Low	-3V to 0 Vdc @ 60 uA Typ.
High	-5 to 4.2 Vdc @ 5 uA Typ.

**GaAs MMIC SP4T NON-REFLECTIVE
SWITCH, DC - 8 GHz**

Outline Drawing



Die Packaging Information [1]

Standard	Alternate
WP-2 (Waffle Pack)	[2]

[1] Refer to the "Packaging Information" section for die packaging dimensions.

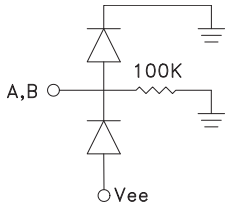
[2] For alternate packaging information contact Hittite Microwave Corporation.

NOTES:

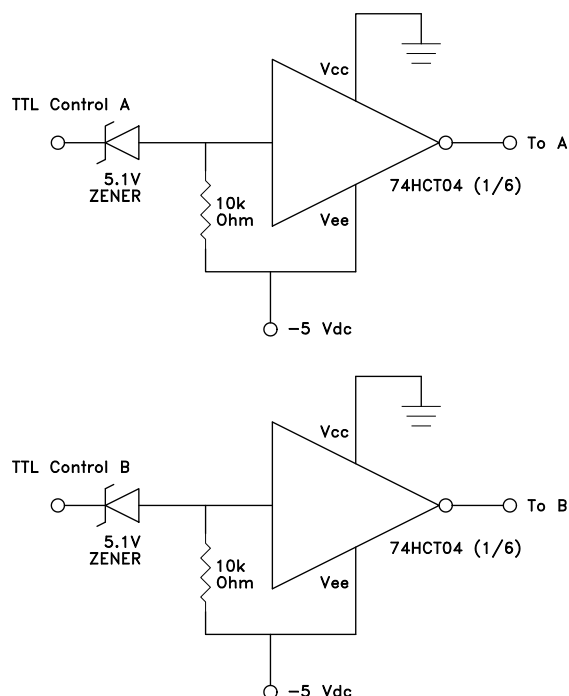
1. DIMENSIONS IN INCHES [MILLIMETERS].
2. DIE THICKNESS IS 0.004".
3. TYPICAL BOND PAD IS 0.004" SQUARE.
4. TYPICAL BOND PAD SPACING IS 0.006" CENTER TO CENTER.
5. BOND PAD METALLIZATION: GOLD.
6. BACKSIDE METALLIZATION: GOLD.
7. BACKSIDE METAL IS GROUND.
8. NO CONNECTION REQUIRED FOR UNLABELED BOND PADS.

GaAs MMIC SP4T NON-REFLECTIVE SWITCH, DC - 8 GHz

Pad Descriptions

Pad Number	Function	Description	Interface Schematic
1, 2, 3, 4, 5, 10	RF4, RFC, RF1, RF2, RF3	These pads are DC coupled and matched to 50 Ohms. Blocking capacitors are required.	
6	A	See truth table and control voltage table.	
7	B	See truth table and control voltage table.	
8	Vee	Supply Voltage -5.0 Vdc $\pm 10\%$	
9, Die Bottom	GND	Die bottom and pad must be connected to RF/DC ground.	

TTL Interface Circuit



Note:

Control inputs A and B can be driven directly with TTL logic with -5 Volts applied to the HCT logic gates Vee pin and to Vee (pad) of the RF Switch.

Information furnished by Analog Devices is believed to be accurate and reliable. However, no responsibility is assumed by Analog Devices for its use, nor for any infringements of patents or other rights of third parties that may result from its use. Specifications subject to change without notice. No license is granted by implication or otherwise under any patent or patent rights of Analog Devices. Trademarks and registered trademarks are the property of their respective owners.

For price, delivery, and to place orders: Analog Devices, Inc., One Technology Way, P.O. Box 9106, Norwood, MA 02062-9106 Phone: 781-329-4700 • Order online at www.analog.com Application Support: Phone: 1-800-ANALOG-D

Assembly Diagram

