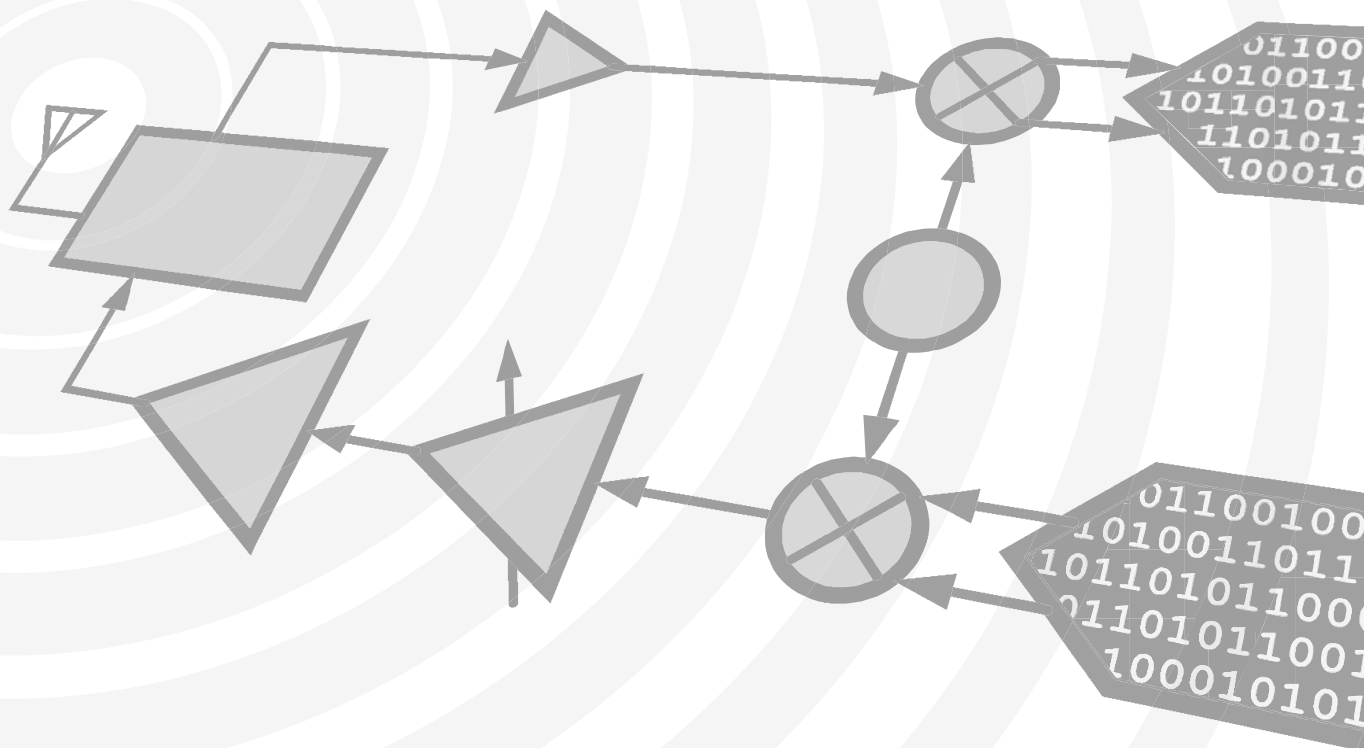




NO CONTENT ON THE ATTACHED DOCUMENT HAS CHANGED



HMC641ALC4* Product Page Quick Links

Last Content Update: 11/01/2016

Comparable Parts

View a parametric search of comparable parts

Evaluation Kits

- HMC641A Evaluation Board

Documentation

Data Sheet

- HMC641ALC4 Data Sheet

Tools and Simulations

- HMC641ALC4 S-Parameters

Design Resources

- HMC641ALC4 Material Declaration
- PCN-PDN Information
- Quality And Reliability
- Symbols and Footprints

Discussions

View all HMC641ALC4 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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MICROWAVE CORPORATION v00.0713



HMC641ALC4

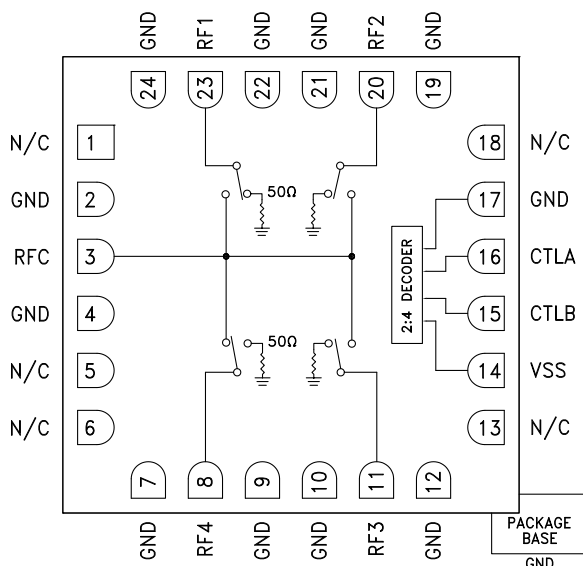
GaAs MMIC SP4T NON-REFLECTIVE SWITCH, DC - 20 GHz

Typical Applications

The HMC641ALC4 is ideal for:

- Telecom Infrastructure
- Microwave Radio & VSAT
- Military & Space Hybrids
- Test Instrumentation
- SATCOM & Sensors

Functional Diagram



Features

Broadband Performance: DC - 20 GHz

High Isolation: 42 dB @ 12 GHz

Low Insertion Loss: 2.1 dB @ 12 GHz

Integrated 2:4 TTL Decoder

24 Lead 4x4mm SMT Package: 16mm²

General Description

The HMC641ALC4 is a broadband non-reflective GaAs pHEMT SP4T switch in a compact 4x4 mm ceramic package. Covering DC to 20 GHz, this switch offers high isolation, low insertion loss and on-chip termination of isolated ports. This switch also includes an on board binary decoder circuit which reduces the number of required logic control lines from four to two. The HMC641ALC4 is controlled with 0/-5V logic, exhibits fast switching speed and consumes much less DC current than pin diode based solutions.

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

Parameter	Frequency	Min.	Typ.	Max.	Units
Insertion Loss	DC - 12 GHz		1.8	2.8	dB
	DC - 20 GHz		2.3	3.5	dB
Isolation (RFC to RF1 - RF4)	DC - 12 GHz	30	42		dB
	DC - 20 GHz	30	40		dB
Return Loss	DC - 12 GHz		18		dB
	DC - 20 GHz		17		dB
Return Loss	DC - 20 GHz		19		dB
Input Power for 1 dB Compression	0.05 - 0.25 GHz	10	15		dBm
	0.25 - 20 GHz	20	25		dBm
Input Third Order Intercept (Two-Tone Input Power= +10 dBm Each Tone)	0.05 - 0.25 GHz		32		dBm
	0.25 - 20 GHz		41		dBm
Switching Characteristics tRISE, tFALL (10/90% RF) tON, tOFF (50% CTL to 10/90% RF)	DC - 20 GHz		30		ns
			100		ns

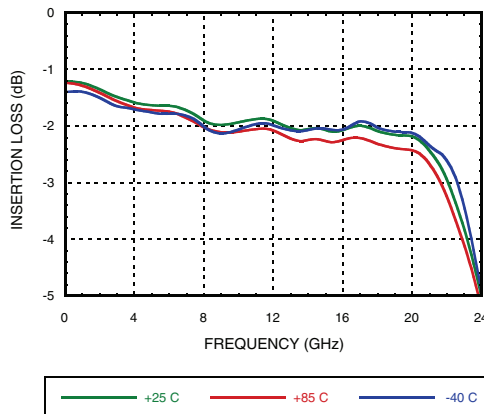
For price, delivery and to place orders: Hittite Microwave Corporation, 2 Elizabeth Drive, Chelmsford, MA 01824

Phone: 978-250-3343 Fax: 978-250-3373 Order On-line at www.hittite.com

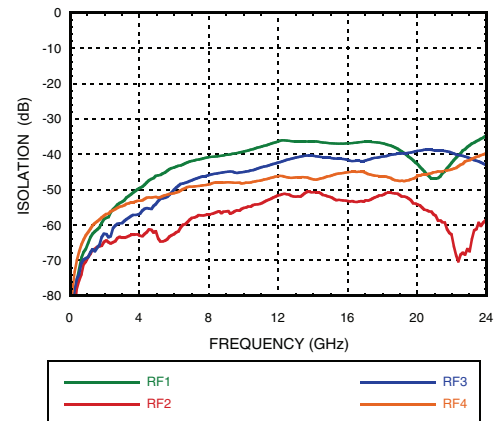
Application Support: Phone: 978-250-3343 or apps@hittite.com

GaAs MMIC SP4T NON-REFLECTIVE SWITCH, DC - 20 GHz

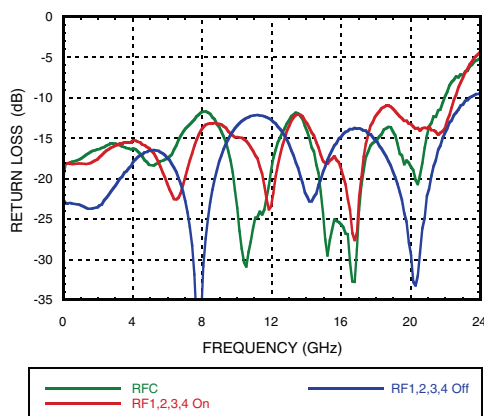
Insertion Loss vs. Temperature



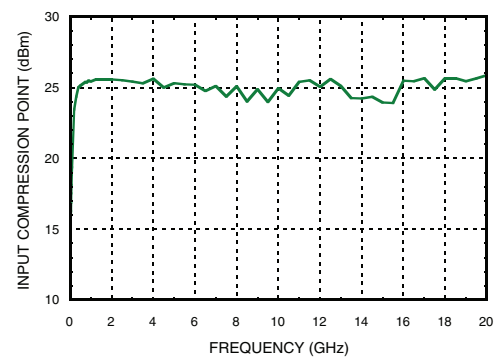
Isolation



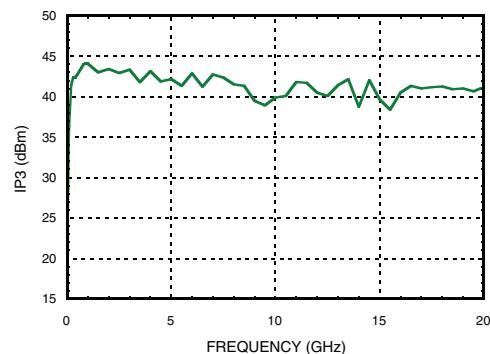
Return Loss



1 dB Input Compression Point



Input Third Order Intercept Point @ 10 dBm Tone Power



**GaAs MMIC SP4T NON-REFLECTIVE
SWITCH, DC - 20 GHz**
Absolute Maximum Ratings

Bias Voltage (Vss)	-7V
Control Voltage Range (A & B)	Vss -0.5V to +1V
Maximum Input Power	
Insertion Loss Path	+26.5 dBm
Terminated Path	+23 dBm
Channel Temperature	150 °C
Thermal Resistance	
Channel to die bottom	
Insertion Loss Path	201 °C/W
Terminated Path	321 °C/W
Storage Temperature	-65 to +150 °C
Operating Temperature	-40 to +85 °C



**ELECTROSTATIC SENSITIVE DEVICE
OBSERVE HANDLING PRECAUTIONS**

Truth Table

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

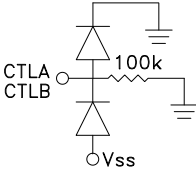
Bias Voltage & Current

Vss Range= -5.0 Vdc ±10%		
Vss (Vdc)	Iss (Typ) (mA)	Iss (Max) (mA)
-5	1.8	5.0

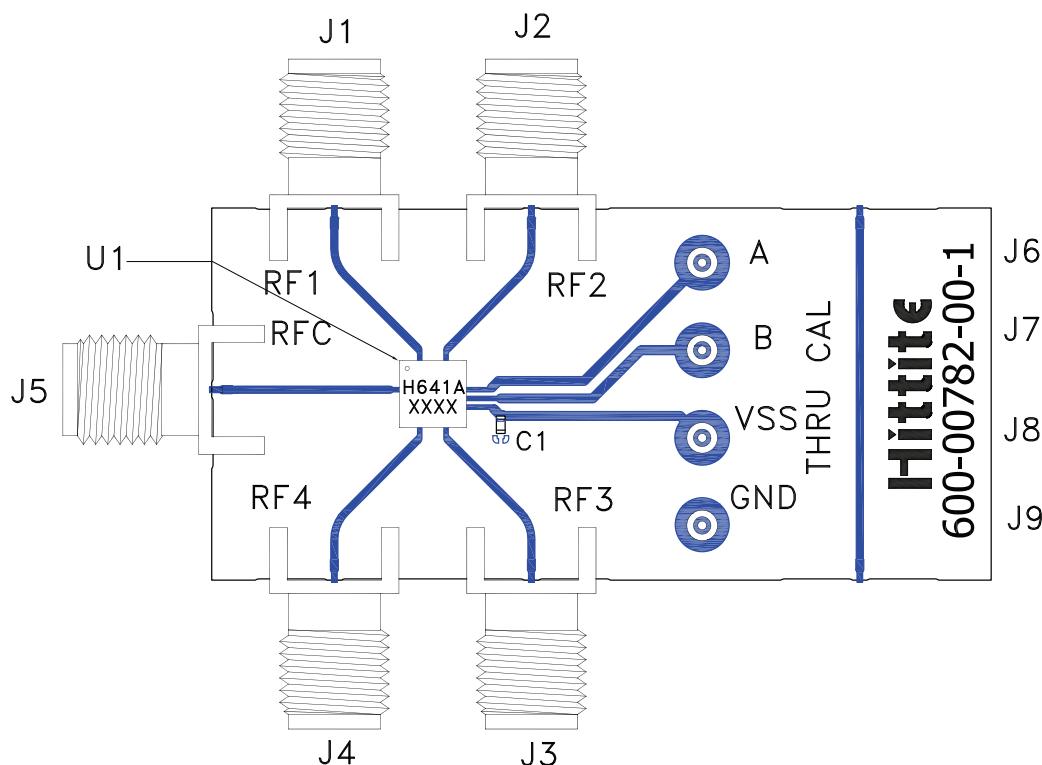
TTL/CMOS Control Voltages

State	Bias Condition
Low	-2.5V to 0V @ 30 µA Typ.
High	-5V to -3.8V @ 0.5 µA Typ.

Pin Descriptions

Pin Number	Function	Description	Interface Schematic
1, 5, 6, 13, 18	N/C	These pins are not connected internally; however, all data shown herein was measured with these pins connected to RF/DC ground externally.	
2, 4, 7, 9, 10, 12, 17, 19, 21, 22, 24 Ground Paddle	GND	These pins and the exposed ground paddle must be connected to RF/DC ground.	
3, 8, 11, 20, 23	RFC, RF1, RF2, RF3, RF4	These pads are DC coupled and matched to 50 Ohms. Blocking capacitors are required if RF line potential is not equal to 0V.	
14	Vss	Supply Voltage -5 Vdc $\pm$ 10%.	
15	CTLB	See Truth Table and Control Voltage Table.	
16	CTLA	See Truth Table and Control Voltage Table.	

Evaluation PCB



List of Materials for Evaluation PCB EVAL01 - HMC641ALC4 ^[1]

Item	Description
J1 - J5	PCB Mount SMA Connector
J6 - J9	DC Pin
C1	1000 pF Capacitor, 0402 Pkg.
U1	HMC641ALC4 Switch
PCB ^[2]	600-00782-00-1 Evaluation PCB

[1] Reference this number when ordering complete evaluation PCB

[2] Circuit Board Material: Rogers 4350 or Arlon FR4

The circuit board used in the application should use RF circuit design techniques. Signal lines should have 50 Ohm impedance while the package ground leads and exposed paddle should be connected directly to the ground plane similar to that shown. A sufficient number of via holes should be used to connect the top and bottom ground planes. The evaluation board should be mounted to an appropriate heat sink. The evaluation circuit board shown is available from Hittite upon request.