HMC284MS8G / 284MS8GE

SPDT NON-REFLECTIVE SWITCH, DC - 3.5 GHz

Designer's Kit Available

Typical Applications

The HMC284MS8G / HMC284MS8GE is ideal for:

- Cellular/PCS Base Stations
- 2.4 GHz ISM
- 3.5 GHz Wireless Local Loop

Features

High Isolation: >45 dB

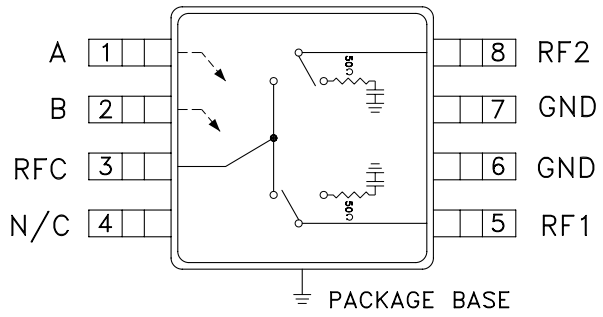
Positive control: 0/+5V

Non-Reflective Design

Ultra Small Pakcage: MSOP8G

Indluded in the HMC-DK005 Designers' Kit

Functional Diagram



General Description

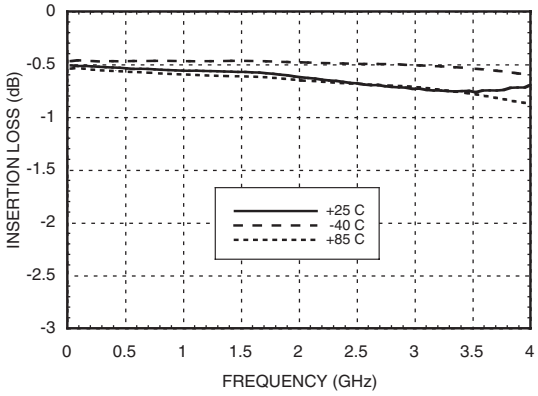
The HMC284MS8G & HMC284MS8GE are low-cost SPDT switches in 8-lead grounded base MSOP packages. The design has been optimized to provide high isolation with minimal insertion loss for medium and low power applications. On-chip circuitry allows positive voltage control operation at very low DC currents with control inputs compatible with CMOS and most TTL logic families. In the "OFF" state, RF1 and RF2 are non-reflective. See reflective high isolation SPDT version, HMC194MS8.

Electrical Specifications, T_A = +25° C, Vctl = 0/+5 Vdc, 50 Ohm System

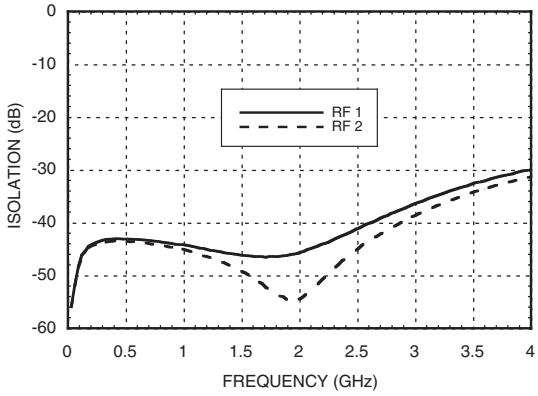
Parameter	Frequency	Min.	Typ.	Max.	Units
Insertion Loss	DC - 2.0 GHz DC - 3.0 GHz DC - 3.5 GHz		0.5 0.6 0.7	0.8 0.9 1.1	dB dB dB
Isolation RF1 & RF2 RF1 / RF2 RF1 / RF2 RF1 & RF2	DC - 2.0 GHz DC - 2.5 GHz DC - 3.0 GHz DC - 3.5 GHz	41 38/41 34/36 30	45 41/45 37/39 33		dB dB dB dB
Return Loss (On State)	DC - 2.0 GHz DC - 2.5 GHz DC - 3.5 GHz	21 13 10	25 17 12		dB dB dB
Return Loss (Off State)	0.5 - 3.5 GHz	10	13		dB
Input Power for 1 dB Compression	0.5 - 1.0 GHz 0.5 - 3.5 GHz	20 18	25 24		dBm dBm
Input Third Order Intercept (Two-Tone Input Powew = 0 dBm Each Tone)	0.5 - 3.5 GHz	43	48		dBm
Switching Speed tRISE, tFALL (10/90% RF) tON, tOFF (50% CTL to 10/90% RF)	DC - 3.5 GHz		 40 60		 ns ns

For price, delivery, and to place orders, please contact Hittite Microwave Corporation:
20 Alpha Road, Chelmsford, MA 01824 Phone: 978-250-3343 Fax: 978-250-3373
Order On-line at www.hittite.com

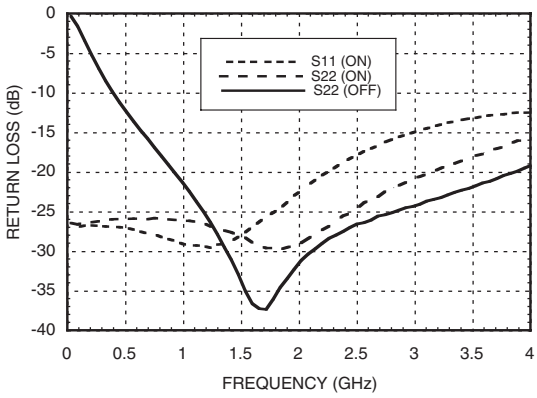
Insertion Loss



Isolation



Return Loss



Compression vs Frequency

	Carrier at 900 MHz		Carrier at 1900 MHz	
CTL Input	Input Power for 0.1 dB Compression	Input Power for 1.0 dB Compression	Input Power for 0.1 dB Compression	Input Power for 1.0 dB Compression
(Vdc)	(dBm)	(dBm)	(dBm)	(dBm)
+5	23	25	22	24

Caution:
Do not operate continuously at RF power input greater than 1 dB compression. (Vctl = 0/+5 Vdc).

Distortion vs Frequency

Control Input	Third Order Intercept (dBm) 0 dBm Each Tone	
(Vdc)	900 MHz	1900 MHz
+5	48	50

Truth Table

***Control Input Tolerances are +/-0.2 Vdc**

Control Input*		Control Current		Signal Path State	
A (Vdc)	B (Vdc)	Ia (uA)	Ib (uA)	RFC to RF1	RFC to RF2
0	+5	-25	25	ON	OFF
+5	0	25	-25	OFF	ON

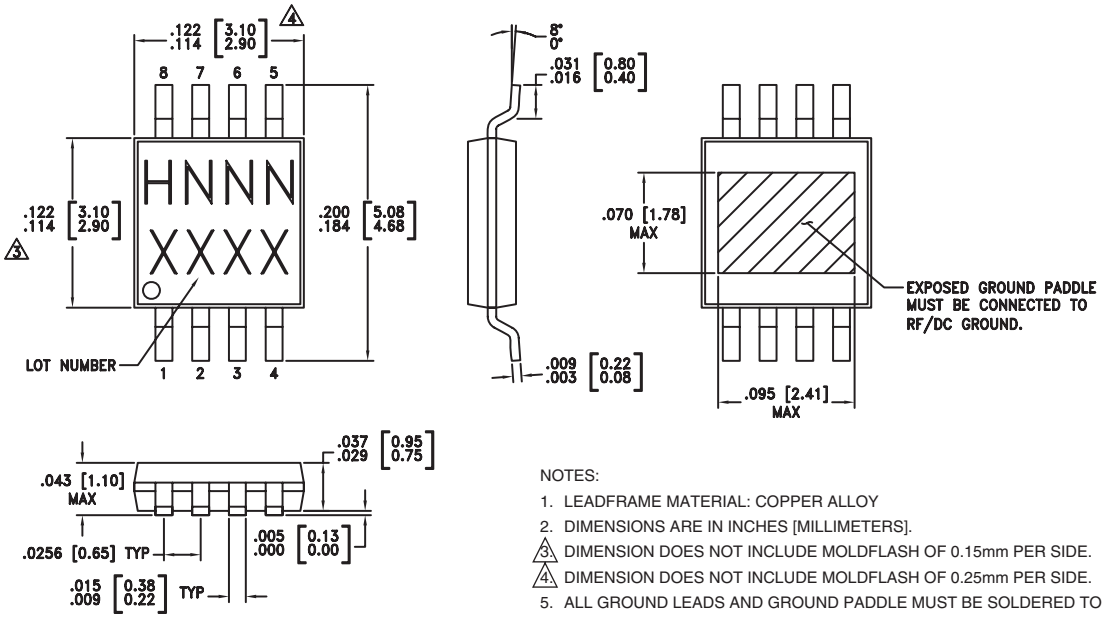
DC blocks are required at ports RFC, RF1, RF2.

Absolute Maximum Ratings

RF Input Power (Vctl = 0/+5V)	+26 dBm
Control Voltage Range	-0.2 to +7.5 Vdc
Hot Switch Power Level (Vctl = 0/+5V)	+18 dBm
Channel Temperature	150 °C
Thermal Resistance (Insertion Loss Path)	140 °C/W
Thermal Resistance (Terminated Path)	190 °C/W
Storage Temperature	-65 to +150 °C
Operating Temperature	-40 to +85 °C
ESD Sensitivity (HBM)	Class 1A

ELECTROSTATIC SENSITIVE DEVICE
OBSERVE HANDLING PRECAUTIONS

Outline Drawing



NOTES:

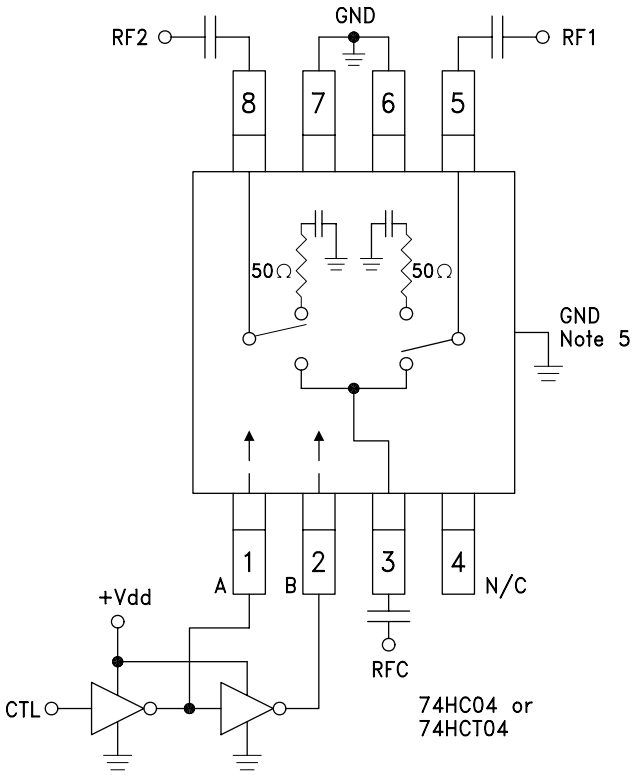
1. LEADFRAME MATERIAL: COPPER ALLOY
2. DIMENSIONS ARE IN INCHES [MILLIMETERS].
3. DIMENSION DOES NOT INCLUDE MOLDFLASH OF 0.15mm PER SIDE.
4. DIMENSION DOES NOT INCLUDE MOLDFLASH OF 0.25mm PER SIDE.
5. ALL GROUND LEADS AND GROUND PADDLE MUST BE SOLDERED TO PCB RF GROUND.

Package Information

Part Number	Package Body Material	Lead Finish	MSL Rating	Package Marking [3]
HMC284MS8G	Low Stress Injection Molded Plastic	Sn/Pb Solder	MSL1 [1]	H284 XXXX
HMC284MS8GE	RoHS-compliant Low Stress Injection Molded Plastic	100% matte Sn	MSL1 [2]	H284 XXXX

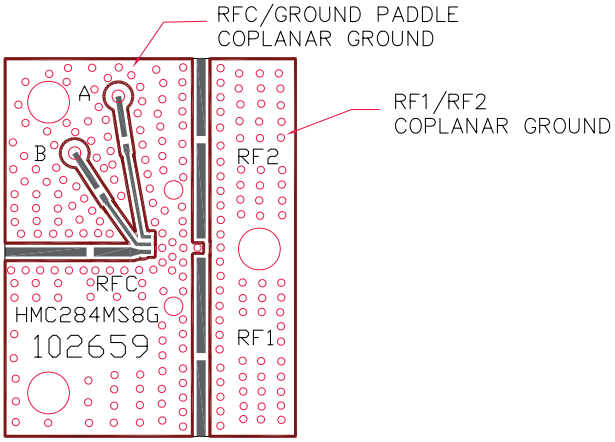
[1] Max peak reflow temperature of 235 °C
[2] Max peak reflow temperature of 260 °C
[3] 4-Digit lot number XXXX

Typical Application Circuit

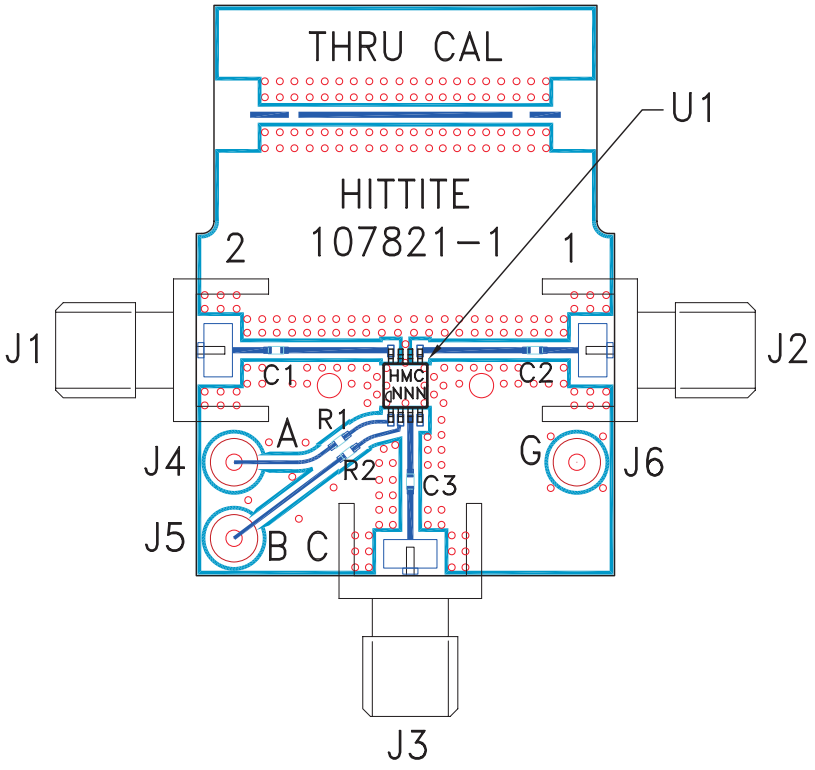


Notes:

1. Set A/B control to 0/+5V, Vdd = +5V and use HCT series logic to provide a TTL driver interface.
2. Control inputs A/B can be driven directly with CMOS logic (HC) with Vdd = +5 Volts applied to the CMOS logic gates.
3. DC blocking capacitors are required for each RF port as shown. Capacitor value determines lowest frequency of operation.
4. Highest RF signal power capability is acheived wiht Vdd = +7V and A/B set to 0/+7V.
5. Back side paddle must be connected to RF ground.
6. A grounded coplanar waveguide PCB layout technique is recommended to achieve high isolation. The component side ground plane between RFC/grounded paddle and RF1/RF2 should be continuous, see below. There should be a continuous ground plane under component side layout.



Evaluation PCB



List of Materials for Evaluation PCB 105143 [1]

Item	Description
J1 - J3	PCB Mount SMA RF Connector
J4 - J6	DC Pin
C1 - C3	100 pF capacitor, 0402 Pkg.
R1, R2	100 Ohm resistor, 0402 Pkg.
U1	HMC284MS8 / HMC284MS8GE SPDT Switch
PCB [2]	107821 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.