



v02.0701

HMC270MS8G

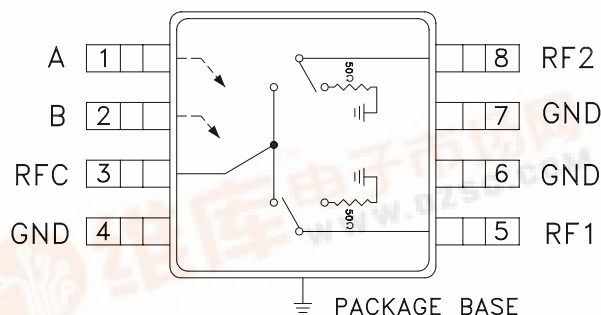
GaAs MMIC SPDT SWITCH NON-REFLECTIVE, DC - 8.0 GHz

Typical Applications

The HMC270MS8G is ideal for DC - 8.0 GHz applications:

- CATV
- MMDS & WirelessLAN
- Wireless Local Loop

Functional Diagram



Features

Broadband Performance: DC - 8 GHz

Very High Isolation: 45 dB @ 6 GHz

Non-Reflective Design

Low Cost MSOP-8 Package: 14.8 mm²

General Description

The HMC270MS8G is a broadband non-reflective GaAs SPDT switch in an 8 lead MSOP grounded base surface mount plastic package. Covering DC to 8 GHz, the switch offers excellent isolation from 70 to 35 dB. The negative control voltage of -5 volts allows operation down to DC. If positive control is required along with high isolation, see the DC to 3.5 GHz HMC284MS8G non-reflective SPDT.

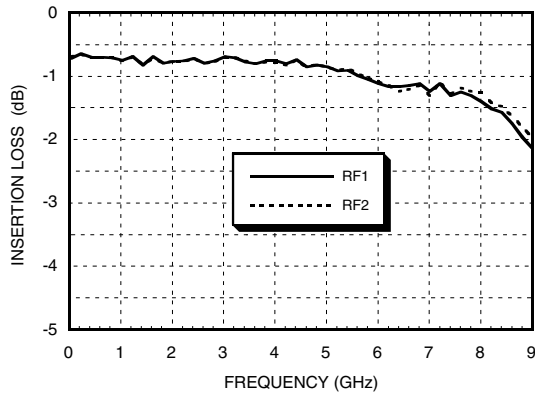
Electrical Specifications, $T_A = +25^\circ C$, With 0/-5V Control, 50 Ohm system

Parameter	Frequency	Min.	Typ.	Max.	Units
Insertion Loss	DC - 2.0 GHz		0.8	1.2	dB
	DC - 6.0 GHz		1.0	1.7	dB
	DC - 8.0 GHz		1.5	2.4	dB
Isolation	DC - 2.0 GHz	43	48		dB
	DC - 4.0 GHz	42	47		dB
	DC - 6.0 GHz	37	45		dB
	DC - 8.0 GHz	28	33		dB
Return Loss	DC - 2.0 GHz	11	14		dB
	DC - 6.0 GHz	9	12		dB
	DC - 8.0 GHz	7	10		dB
Return Loss RF1, RF2	DC - 2.0 GHz	15	20		dB
	DC - 6.0 GHz	13	18		dB
	DC - 8.0 GHz	10	15		dB
Input Power for 1 dB Compression	0.5 - 8.0 GHz	20	23		dBm
Input third Order Intercept (Two-Tone Input Power = +7 dBm Each Tone)	0.5 - 8.0 GHz	33	36		dBm
Switching Characteristics	DC - 8.0 GHz				
		tRISE, tFALL (10/90% RF) tON, tOFF (50% CTL to 10/90% RF)		20 50	ns ns

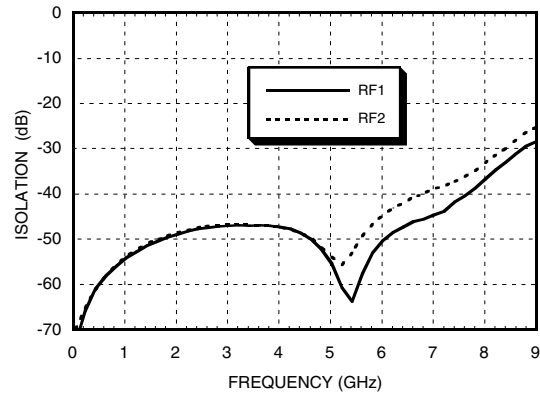


GaAs MMIC SPDT SWITCH NON-REFLECTIVE, DC - 8.0 GHz

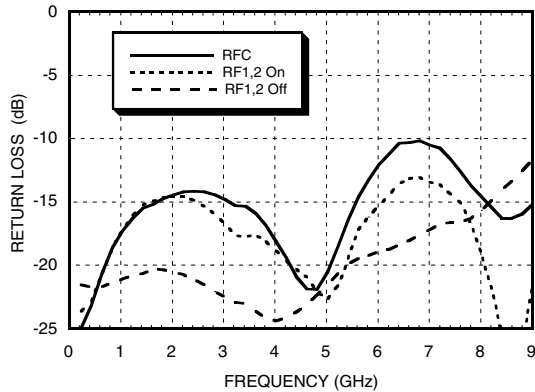
Insertion Loss



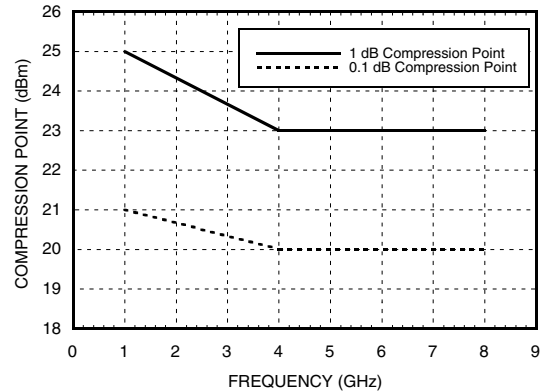
Isolation



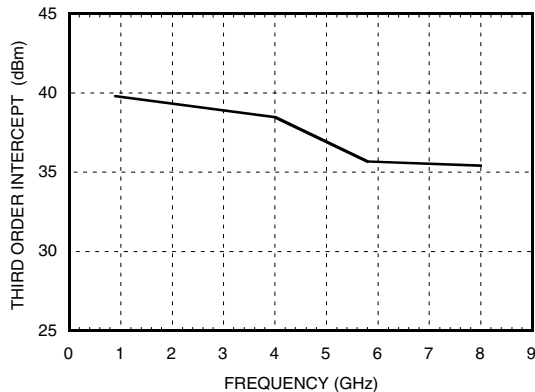
Return Loss



0.1 and 1 dB Input Compression Point



Input Third Order Intercept Point



Control Voltages

State	Bias Condition
Low	0 to -0.2V @ 10 uA Typ.
High	-5V @ 35 uA Typ. to -7V @ 100 uA Typ (±0.5 Vdc)

RFC, RF1, & RF2 should be at <100 mV DC potential. Otherwise, DC blocking capacitors are recommended. Choose value for lowest frequency of operation.

Do not "HOT" switch power levels >+13 dBm (Vctl = 0/-5Vdc)

Truth Table

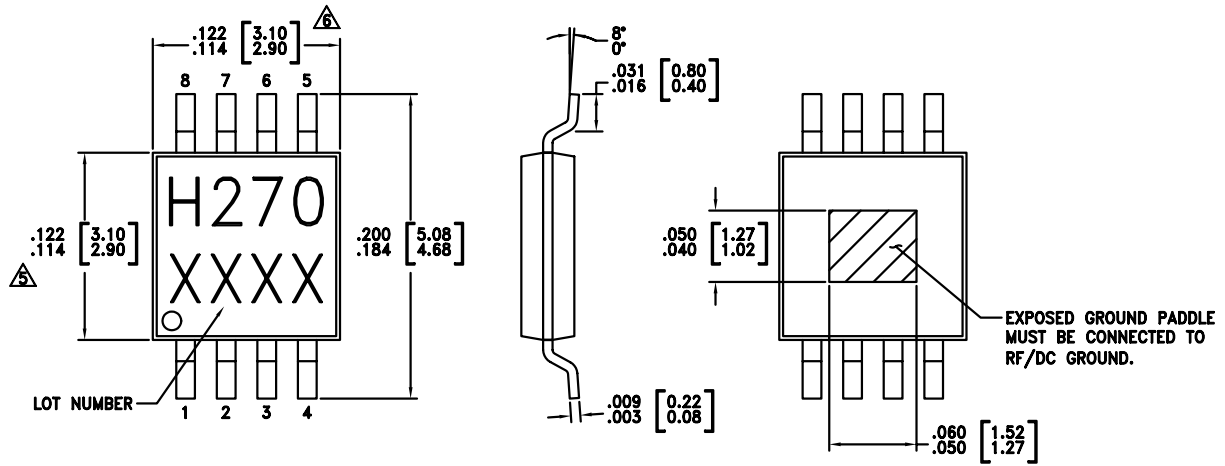
Control Input		Signal Path State	
A	B	RFC to RF1	RFC to RF2
High	Low	ON	OFF
Low	High	OFF	ON

GaAs MMIC SPDT SWITCH NON-REFLECTIVE, DC - 8.0 GHz

Absolute Maximum Ratings

Max RF Input Power, Vctl = -5V	+24 dBm
Control Voltage Range	+0.5 to -7.5 Vdc
Storage Temperature	-65 to +150 °C
Operating Temperature	-40 to +85 °C

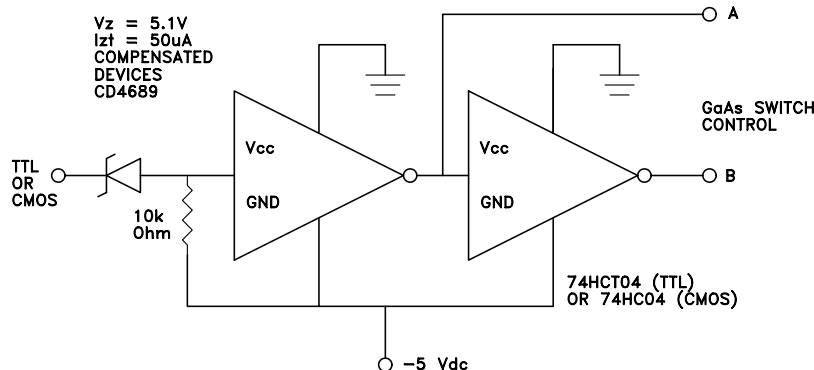
Outline Drawing



NOTES:

1. PACKAGE BODY MATERIAL: LOW STRESS INJECTION MOLDED PLASTIC SILICA AND SILICON IMPREGNATED.
2. LEADFRAME MATERIAL: COPPER ALLOY
3. LEADFRAME PLATING: Sn/Pb SOLDER
4. DIMENSIONS ARE IN INCHES [MILLIMETERS].
5. DIMENSION DOES NOT INCLUDE MOLDFLASH OF 0.15mm PER SIDE.
6. DIMENSION DOES NOT INCLUDE MOLDFLASH OF 0.25mm PER SIDE.
7. ALL GROUND LEADS AND GROUND PADDLE MUST BE SOLDERED TO PCB RF GROUND.

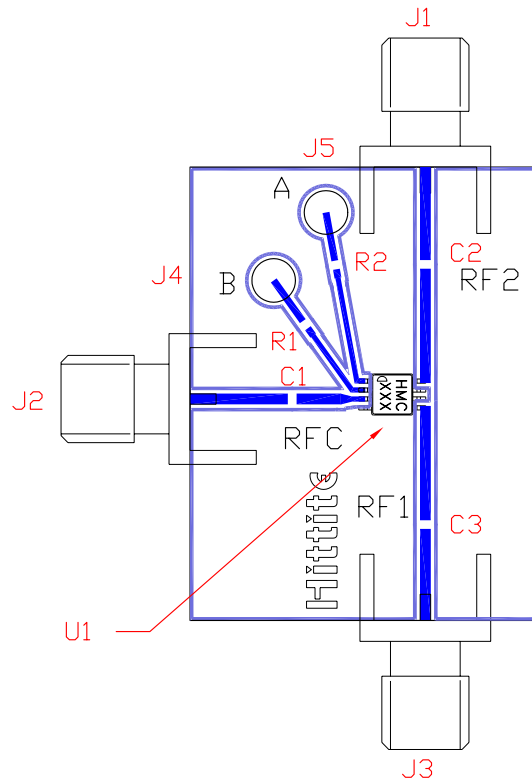
Suggested Driver Circuit for HMC270MS8G



Simple driver using inexpensive standard logic ICs provides fast switching using minimum DC current while translating from standard positive voltage TTL or CMOS logic to negative voltage GaAs IC logic.

GaAs MMIC SPDT SWITCH NON-REFLECTIVE, DC - 8.0 GHz

Eval Board Layout (Top View)



*R1 = R2 = 100 Ohm.
These are optional resistors.

List of Materials

Item	Description
J1 - J3	PC Mount SMA Connector
J4 - J5	DC Pin
C1 - C3	Chip Capacitor, 0402 Pkg, choose value for lowest frequency of operation. PCBs are provided with 100 ~ 300 pF capacitors. User may jumper capacitor mounting gaps on PCB to allow operation to "DC".
R1 - R2	100 Ohm Resistor, 0402 Pkg.
U1	HMC270MS8G SPDT Switch
PCB*	102807 Evaluation PCB 2.0" x 2.6"
* 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 ports should have 50 ohm impedance and the package ground leads and exposed ground paddle 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.