

GaAs MMIC SP4T NON-REFLECTIVE SWITCH, DC - 3.5 GHz

Typical Applications

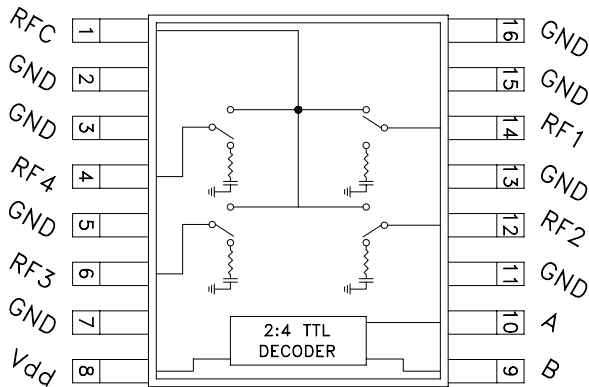
The HMC241QS16 is ideal for:

- Base Stations & Portable Wireless
- CATV / DBS
- Wireless Local Loop
- Test Equipment

Features

- Low Insertion Loss (2 GHz): 0.5 dB
- Single Positive Supply: Vdd = +5V
- Integrated 2:4 TTL Decoder
- 16 Lead QSOP Package

Functional Diagram



General Description

The HMC241QS16 is a low-cost non-reflective SP4T switch in a 16-lead QSOP package. Covering DC - 3.5 GHz, this switch offers high isolation and has a low insertion loss of 0.5 dB at 2 GHz. The switch offers a single positive bias and true TTL/CMOS compatibility. A 2:4 decoder is integrated on the switch requiring only 2 control lines and a positive bias to select each path, replacing 8 control lines normally required by GaAs SP4T switches.

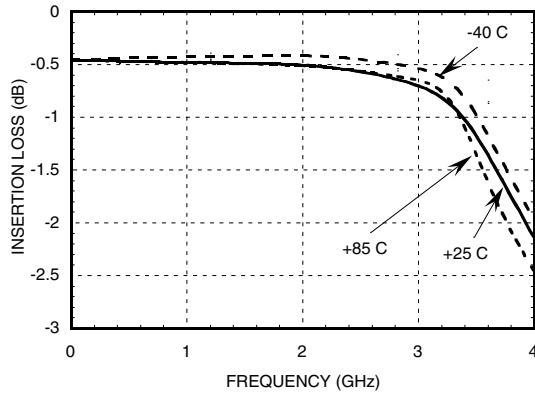
Electrical Specifications,

$T_A = +25^\circ C$, For TTL Control and Vdd = +5V in a 50 Ohm System

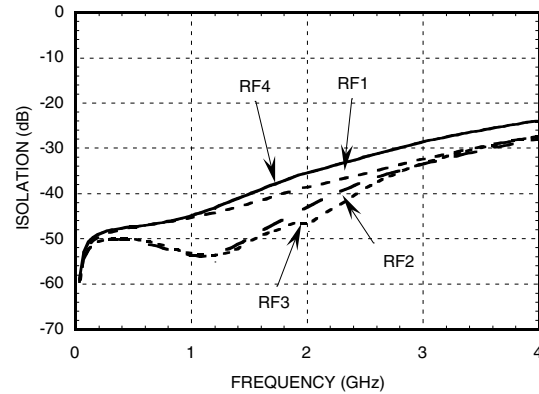
Parameter	Frequency	Min.	Typ.	Max.	Units
Insertion Loss	DC - 1.0 GHz		0.5	0.8	dB
	DC - 2.0 GHz		0.5	0.8	dB
	DC - 2.5 GHz		0.6	0.9	dB
	DC - 3.5 GHz		1.0	1.5	dB
Isolation	DC - 1.0 GHz	40	45		dB
	DC - 2.0 GHz	32	36		dB
	DC - 2.5 GHz	28	32		dB
	DC - 3.5 GHz	23	26		dB
Return Loss	"On State"	DC - 2.5 GHz	17	21	dB
		DC - 3.5 GHz	9	12	dB
Return Loss	RF1-4 "Off State"	0.3 - 3.5 GHz	8	12	dB
		0.5 - 2.5 GHz	12	16	dB
Input Power for 1dB Compression	0.3 - 3.5 GHz	22	25		dBm
Input Third Order Intercept (Two-Tone Input Power = +7 dBm Each Tone)	0.3 - 3.5 GHz	40	44		dBm
Switching Characteristics	0.3 - 3.5 GHz	tRISE, tFALL (10/90% RF)	40		ns
		tON, tOFF (50% CTL to 10/90% RF)	150		ns

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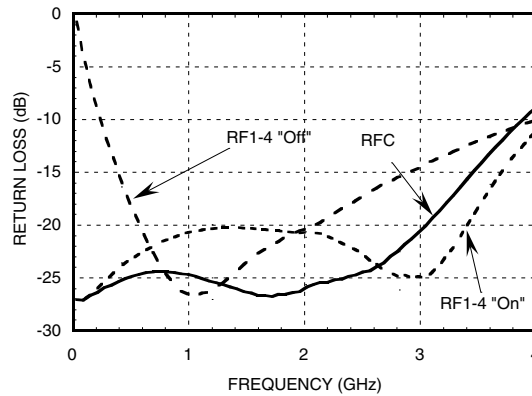
Insertion Loss



Isolation



Return Loss



Bias Voltage & Current

Vdd Range = +5.0 Vdc ± 10%		
Vdd (Vdc)	Idd (Typ.) (mA)	Idd (Max.) (mA)
+5.0	4.0	7.0

TTL/CMOS Control Voltages

State	Bias Condition
Low	0 to +0.8 Vdc @ 5uA Typ.
High	+2.0 to +5.0 Vdc @ 70 uA Typ.

Truth Table

Control Input		Signal Path State
A	B	RFCOM to:
LOW	LOW	RF1
HIGH	LOW	RF2
LOW	HIGH	RF3
HIGH	HIGH	RF4

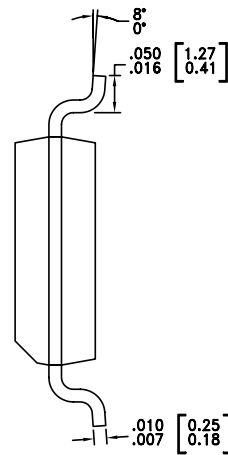
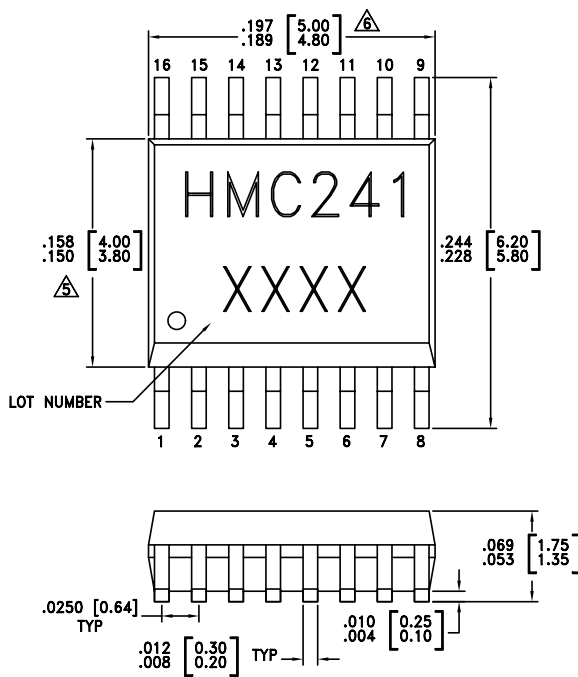
NOTE:
DC Blocking capacitors are required at ports RFC and RF1, 2, 3, 4.

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Absolute Maximum Ratings

Bias Voltage Range (Port Vdd)	+7.0 Vdc
Control Voltage Range (A & B)	-0.5V to Vdd +1 Vdc
Channel Temperature	150 °C
Thermal Resistance (Insertion Loss Path)	210 °C/W
Thermal Resistance (Terminated Path)	250 °C/W
Storage Temperature	-65 to +150 °C
Operating Temperature	-40 to +85 °C
Maximum Input Power Vdd = +5 Vdc	+20 dBm (0.05 - 0.5 GHz) +27 dBm (0.5 - 3.5 GHz)

Outline Drawing

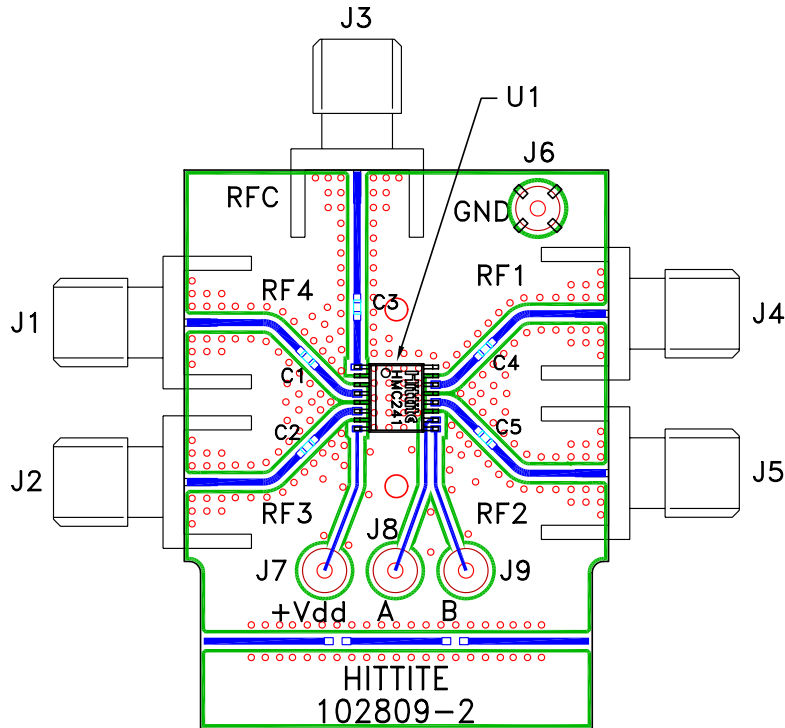


NOTES:

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

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Evaluation PCB



List of Material

Item	Description
J1 - J5	PC Mount SMA RF Connector
J6 - J9	DC Pin
C1 - C5	330 pF capacitor, 0402 Pkg.
U1	HMC241QS16 SP4T Switch
PCB*	102809 Evaluation PCB
* 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 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.



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