

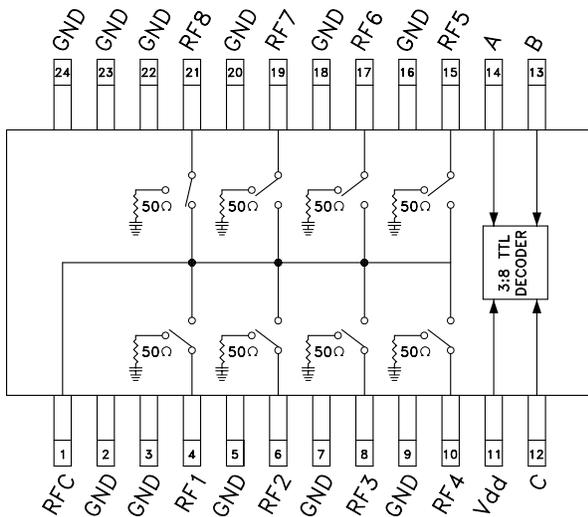
## GaAs MMIC SP8T NON-REFLECTIVE SWITCH, DC - 2.5 GHz

### Typical Applications

The HMC253QS24 is ideal for DC - 2.5 GHz applications:

- CATV/DBS
- CDMA
- Cellular/PCS

### Functional Diagram



### Features

- Low Insertion Loss (2 GHz): 1.3dB
- Single Positive Supply: Vdd = +5V
- Integrated 3:8 TTL Decoder
- 24 Lead QSOP Package

### General Description

The HMC253QS24 is a low-cost non-reflective SP8T switch in a 24-lead QSOP package featuring wideband operation from DC to 2.5 GHz. The switch offers a single positive bias and true TTL/CMOS compatibility. A 3:8 decoder is integrated on the switch requiring only 3 control lines and a positive bias to select each path. The HMC253QS24 SP8T will replace multiple configurations of SP4T and SPDT MMIC switches.

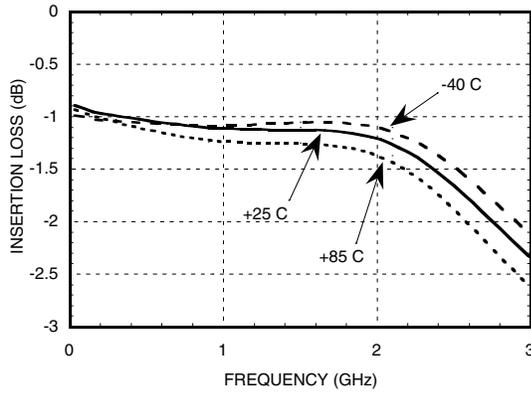
### Electrical Specifications,

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

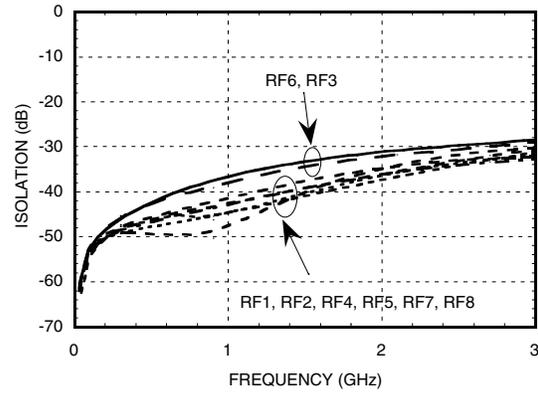
Parameter	Frequency	Min.	Typ.	Max.	Units
Insertion Loss	DC - 1.0 GHz		1.1	1.5	dB
	DC - 2.0 GHz		1.3	1.7	dB
	DC - 2.5 GHz		1.8	2.4	dB
Isolation	DC - 1.0 GHz	32	36		dB
	DC - 2.0 GHz	26	30		dB
	DC - 2.5 GHz	24	28		dB
Return Loss	"On State"	DC - 1.0 GHz	14	18	dB
		DC - 2.0 GHz	9	12	dB
		DC - 2.5 GHz	6	8	dB
Return Loss (RF1-8)	"Off State"	0.3 - 2.5 GHz	7	10	dB
		0.5 - 2.5 GHz	10	13	dB
Input Power for 1 dB Compression	0.3 - 2.5 GHz	20	23		dBm
Input Third Order Intercept (Two-Tone Input Power = +7 dBm Each Tone)	0.3 - 2.5 GHz	40	43		dBm
Switching Characteristics	0.3 - 2.5 GHz				
tRISE, tFALL (10/90% RF)			30		ns
tON, tOFF (50% CTL to 10/90% RF)			100		ns

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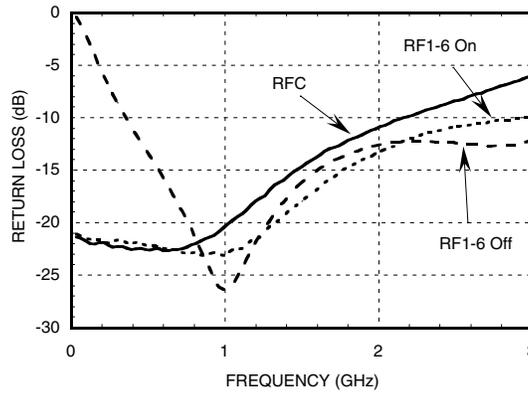
**Insertion Loss**



**Isolation**



**Return Loss**



**Bias Voltage & Current**

Vdd Range = +5.0 Vdc ± 10%		
Vdd (Vdc)	Idd (Typ.) (mA)	Idd (Max.) (mA)
+5.0	6.0	9.0

**TTL/CMOS Control Voltages**

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

**Truth Table**

Control Input			Signal Path State
A	B	C	RFCOM to:
Low	Low	Low	RF1
High	Low	Low	RF2
Low	High	Low	RF3
High	High	Low	RF4
Low	Low	High	RF5
High	Low	High	RF6
Low	High	High	RF7
High	High	High	RF8

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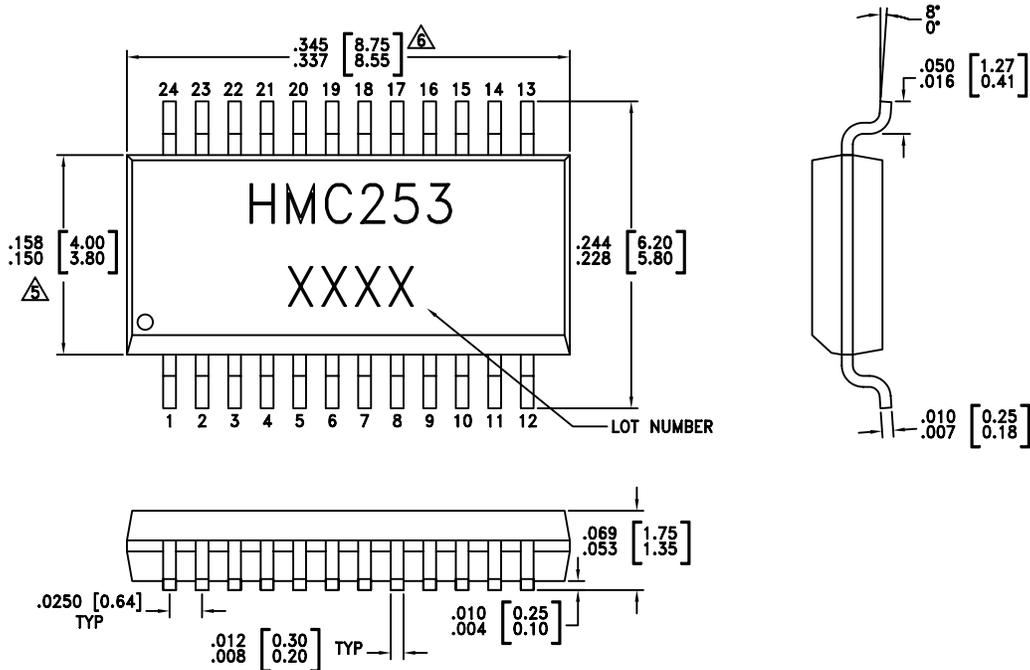
### Absolute Maximum Ratings

Bias Voltage Range (Port Vdd)	+7.0 Vdc
Control Voltage Range (A, B, C)	-0.5V to Vdd +1Vdc
Storage Temperature	-65 to +150 °C
Operating Temperature	-40 to +85 °C
Maximum Input Power Vdd = +5V	+20 dBm (0.05 - 0.5 GHz) +24 dBm (0.5 - 2.5 GHz)

**NOTE:**

DC Blocking capacitors are required at ports RFC and RF1, 2, 3, 4, 5, 6, 7, 8.

### Outline Drawing

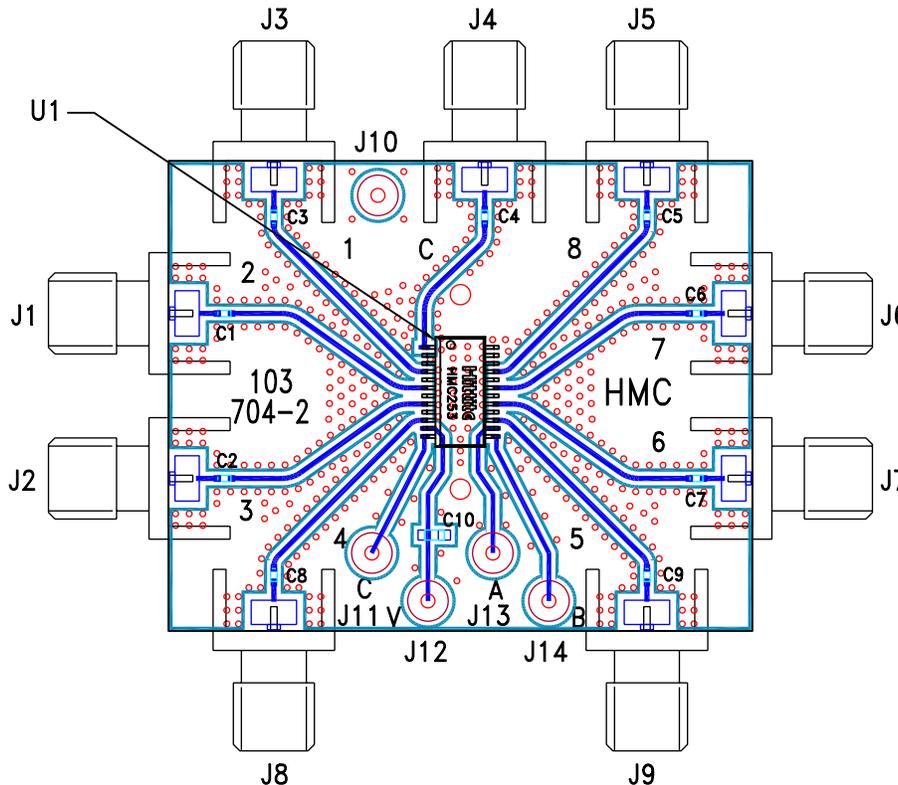


**NOTES:**

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 MUST BE SOLDERED TO PCB RF GROUND.

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### Evaluation Circuit Board



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 while the package ground leads should be connected directly to the ground plane similar to that shown above. A sufficient number of VIA holes should be used to connect the top and bottom ground planes. The evaluation circuit board shown above is available from Hittite Microwave Corporation upon request.

### List of Material

Item	Description
J1 - J9	PC Mount SMA Connector
J10 - J14	DC Pin
C1 - C9	100 pF Capacitor, 0402 Pkg.
C10	0.01 uF Capacitor, 0603 Pkg.
U1	HMC253QS24 SP8T Switch
PCB*	103704 Eval Board

\* Circuit Board Material: Rogers 4350