HMC172QS24

GaAs MMIC SP6T SWITCH DC - 2.5 GHz

Typical Applications

The HMC172QS24 is ideal for:

- Basestation Infrastructure

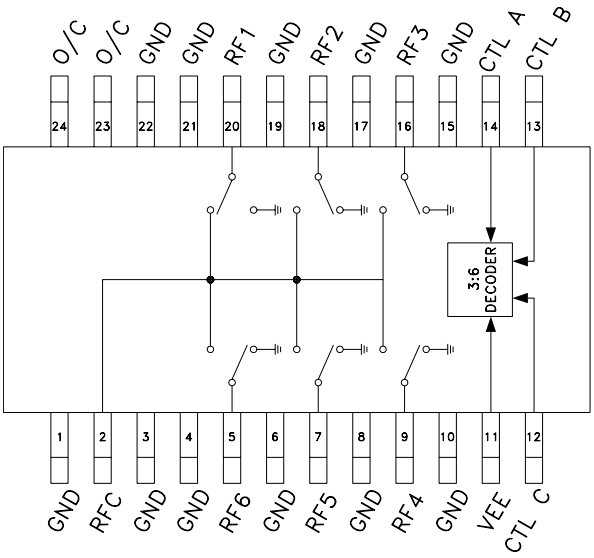
Features

Low Insertion Loss (1 GHz): 0.6 dB

Integrated 3:6 Decoder

24 Lead QSOP Package

Functional Diagram



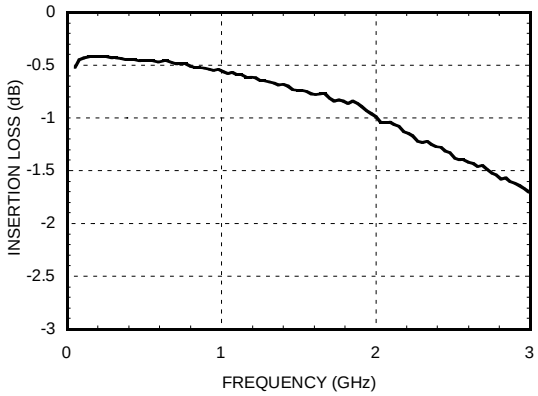
General Description

The HMC172QS24 is a low-cost SP6T switch in a 24-lead QSOP package for use in antenna diversity, switched filter banks, gain/attenuation selection, and general channel multiplexing applications. The switch can control signals up to 2.5 GHz and is especially suited for 800-1000 MHz and 1700-2000 MHz basestation applications. A 3:6 decoder is integrated on the switch, requiring only 3 control lines and a negative bias to select each RF path. The 3:6 decoder replaces 12 control lines normally required by GaAs SP6T switches. Switch outputs are reflective shorts when "off". The QSOP24 package occupies the same area as a 14-lead SOIC. See positive bias/TTL SP6T version HMC252QS24.

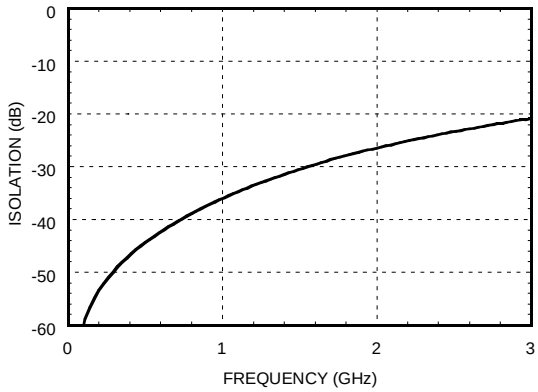
Electrical Specifications, T_A = +25° C, For 0/-5V Control and Vee = -5V in a 50 Ohm System

Parameter	Frequency	Min.	Typ.	Max.	Units
Insertion Loss	DC - 0.5 GHz DC - 1.0 GHz DC - 2.0 GHz DC - 2.5 GHz		0.5 0.6 1.0 1.5	0.8 0.9 1.5 2.0	dB dB dB dB
Isolation	DC - 0.5 GHz DC - 1.0 GHz DC - 2.0 GHz DC - 2.5 GHz	36 31 22 19	41 35 26 23		dB dB dB dB
Return Loss	DC - 1.0 GHz DC - 2.0 GHz DC - 2.5 GHz	19 7 5	23 11 8		dB dB dB
Input Power for 1 dB Compression	50 MHz 0.5 - 2.5 GHz		22 24		dBm dBm
Input Third Order Intercept	50 MHz 0.5 - 2.5 GHz		35 40		dBm dBm
Switching Characteristics tRISE, tFALL (10/90% RF) tON, tOFF (50% CTL to 10/90% RF)	DC - 2.5 GHz		 25 50		 ns ns

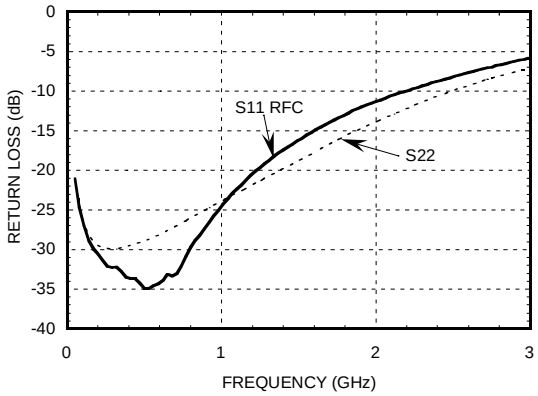
Insertion Loss



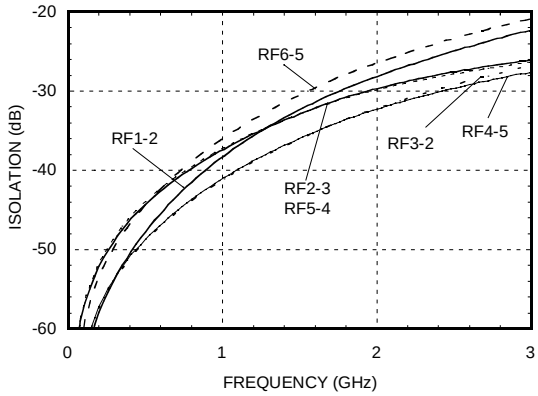
Isolation



Return Loss



Isolation Between several RF I/0s



Truth Table

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

Bias Voltage & Current

Vee Range = -5.0 Vdc ± 10%		
Vee (Vdc)	Iee (Typ.) (mA)	Iee (Max.) (mA)
-5.0	5.0	8.5

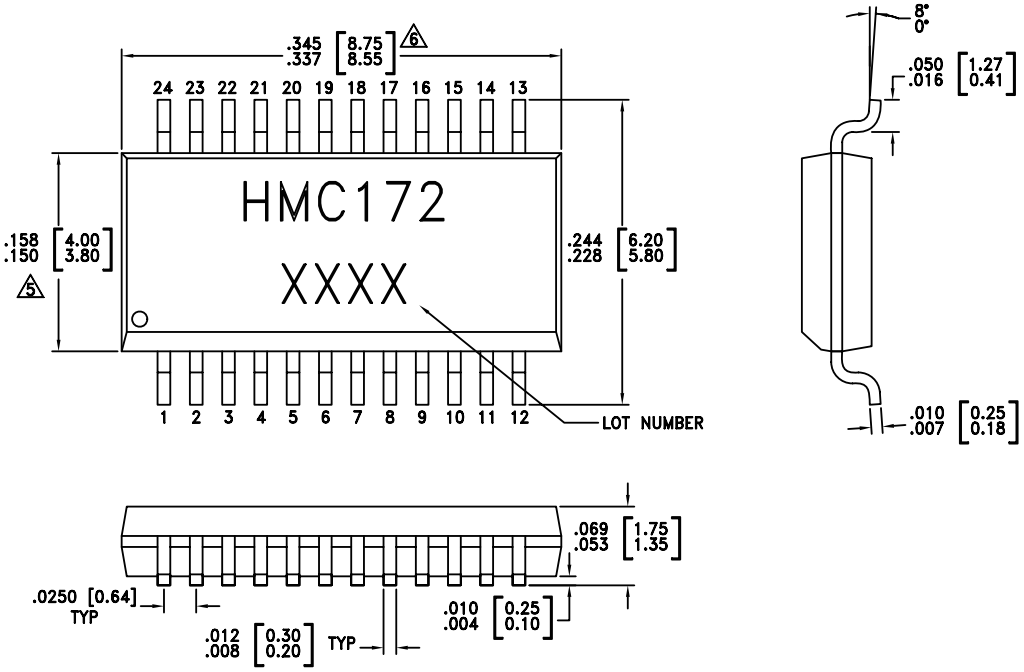
Control Voltages

State	Bias Condition
Low	0 to -3 VDC @ 250uA Typ.
High	Vee +0.8 VDC @ 100uA Max.

Absolute Maximum Ratings

Bias Voltage Range (Port Vee)	-7.0 Vdc
Control Voltage Range (A & B)	Vee -0.5V to +1.0 Vdc
Storage Temperature	-65 to +150 °C
Operating Temperature	-40 to +85 °C
Maximum Input Power	+26 dBm (<500MHz) +29 dBm (>500MHz)

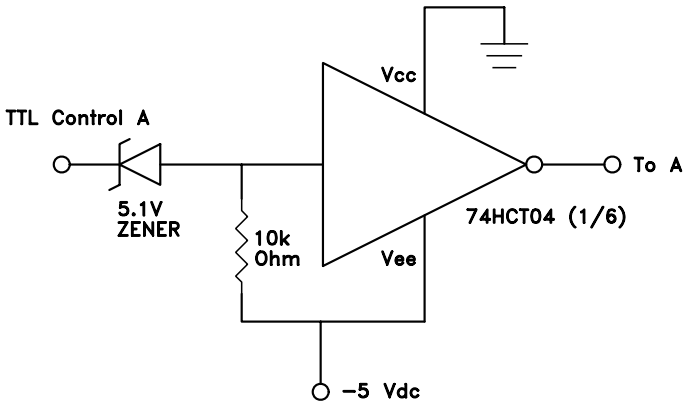
Outline Drawing

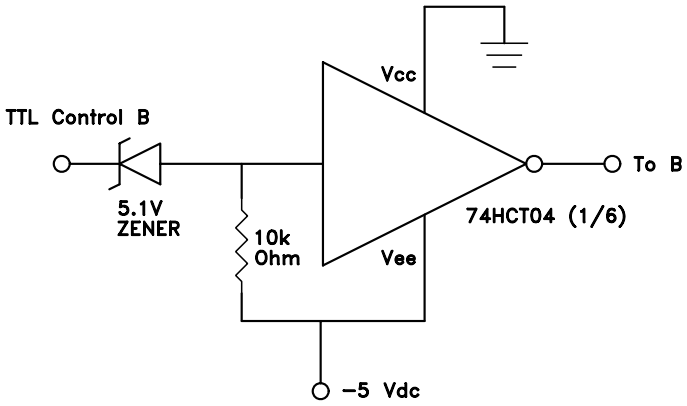


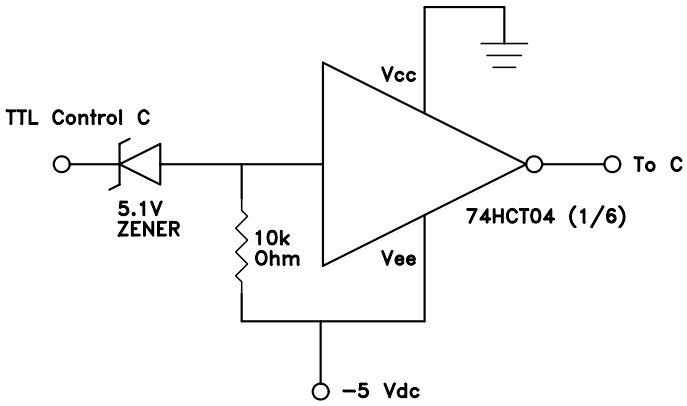
NOTES:

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.

TTL Interface Circuit

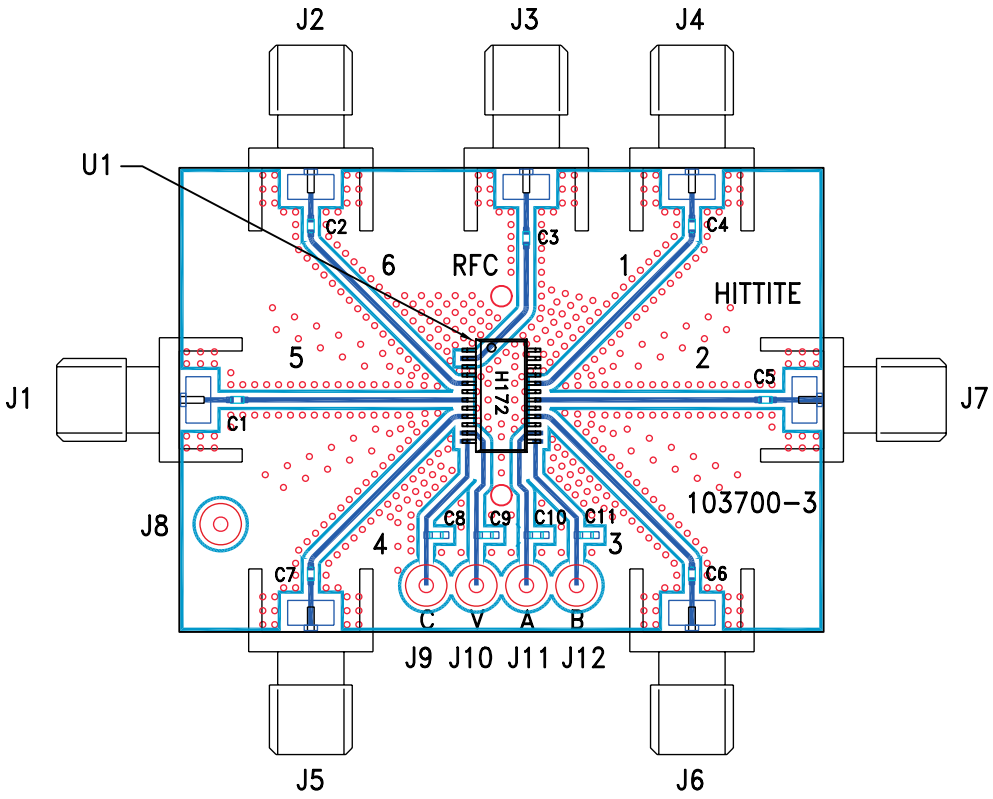






Note:
Control inputs A, B, and C can be driven directly with TTL logic with -5 Volts applied to the HCT logic gate Vee and to pin 11 (Vee) of the RF switch.

Evaluation Circuit Board



List of Material

Item	Description
J1 - J7	PC Mount SMA RF Connector
J8 - J12	DC Pin
C1 - C7	100 pF Capacitor, 0402 Pkg.
C8 - C11	10,000 pF capacitor, 0603 Pkg.
U1	HMC172QS24 SP6T Switch
PCB*	103700 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 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.

For price, delivery, and to place orders, please contact Hittite Microwave Corporation:
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