Hittite MICROWAVE CORPORATION

HMC172QS24

GaAS MMIC SP6T SWITCH DC TO 2.5 GHz

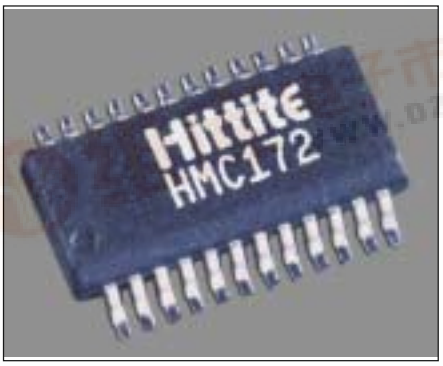
FEBRUARY 2001 v01.0101

Features

LOW INSERTION LOSS (1 GHz): 0.6dB

INTEGRATED 3:6 DECODER

24 LEAD QSOP PACKAGE



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.

Guaranteed Performance

For 0/-5V Control and Vee = -5V in a 50 Ohm system, -40 to +85 deg C

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

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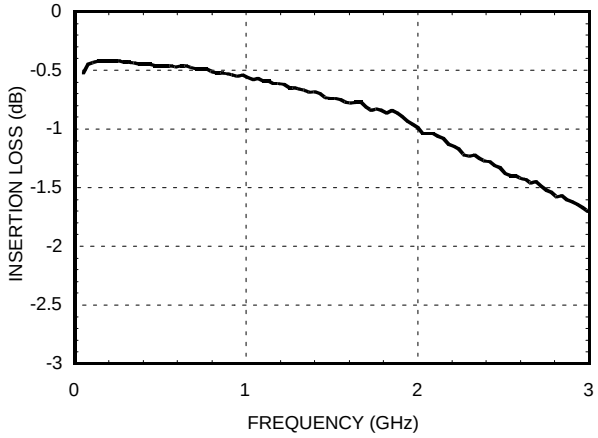
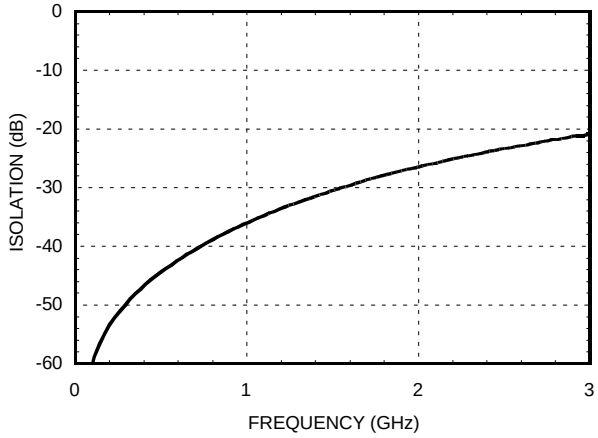
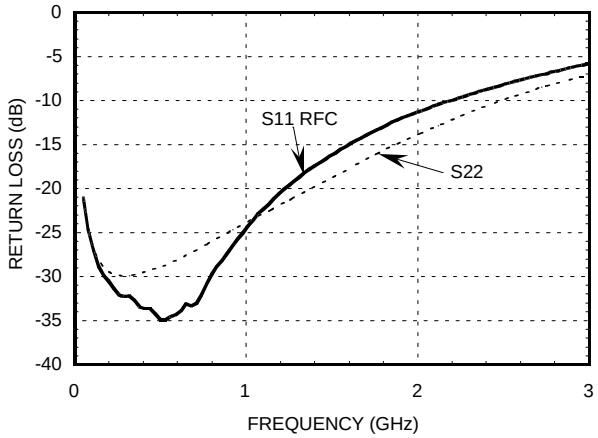
Insertion Loss



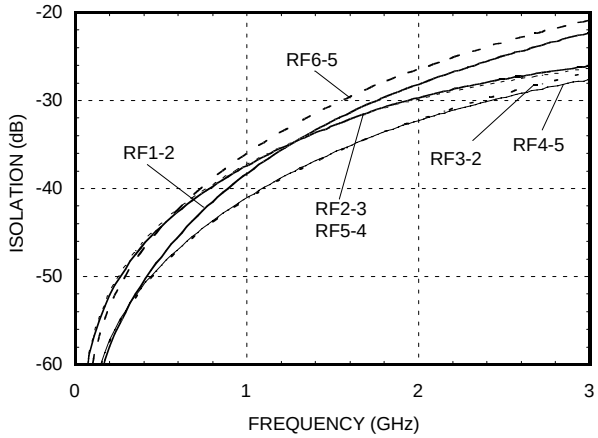
Isolation



Return Loss



Isolation Between Several RF I / Os



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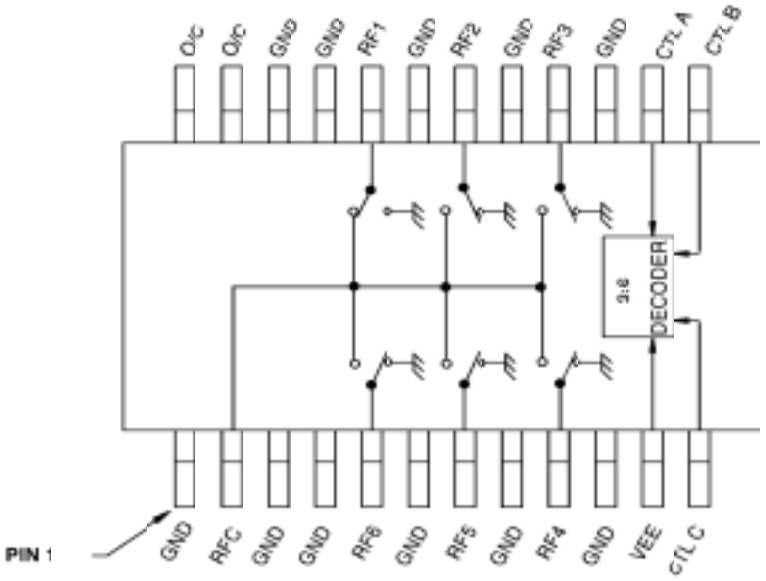
Functional Diagram



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 deg C
Operating Temperature	-40 to +85 deg C
Maximum Input Power	+26dBm (<500MHz) +29dBm (>500MHz)

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.

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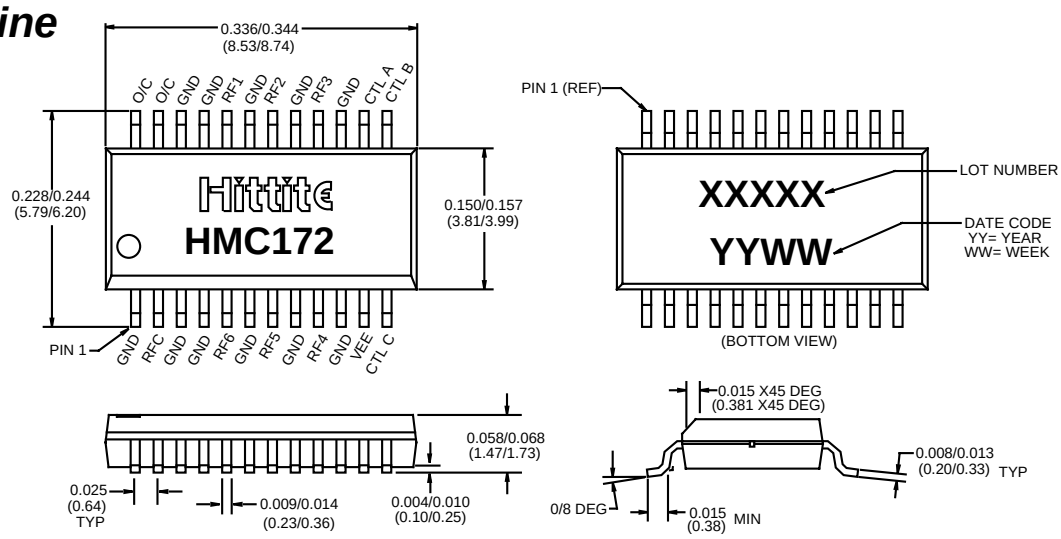
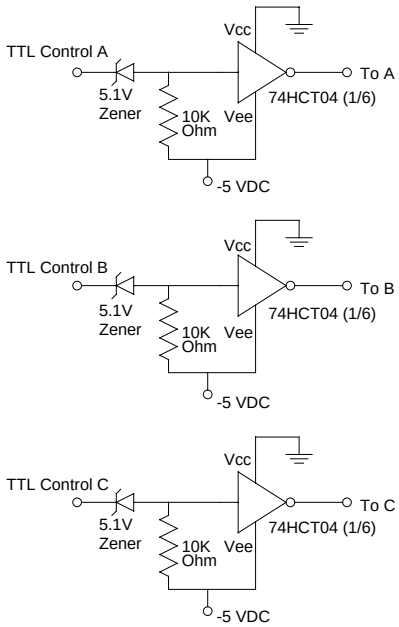
Outline



1) MATERIAL:
   A) PACKAGE BODY: LOW STRESS INJECTION MOLDED PLASTIC, SILICA & SILICONE IMPREGNATED
   B) LEADFRAME MATERIAL: COPPER ALLOY
2. PLATING: LEAD-TIN SOLDER PLATE
3. DIMENSIONS ARE IN INCHES (MILLIMETERS) UNLESS OTHERWISE SPECIFIED TOL. ARE ±0.005(±0.13)

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.