MICROWAVE CORPORATION

HMC222C12

GaAs MMIC SP4T SWITCH NON-REFLECTIVE DC TO 6.0 GHz

FEBRUARY 2001 v02.0101

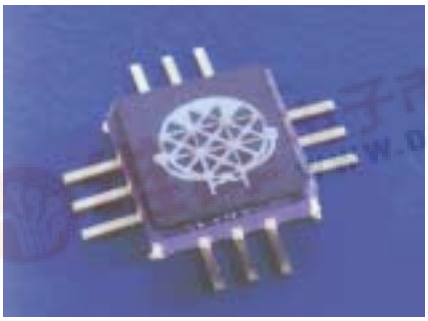
Features

BROADBAND PERFORMANCE: DC to 6GHz

SINGLE POSITIVE SUPPLY: Vdd = +5V

INTEGRATED 2:4 TTL DECODER

CERAMIC SMT PACKAGE



General Description

The HMC222C12 is a broadband non-reflective SP4T switch in a ceramic surface mount package. This SP4T switch covers RF telecom/datacom bands from DC - 6 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 +5V bias to select each path. An input IP3 of +40 dBm helps maintain the best possible dynamic range in receiver & test instrument applications. The integrated 2:4 TTL/CMOS decoder replaces 8 control lines normal required by GaAs SP4T switches.

Guaranteed Performance

For TTL Control and Vdd = +5V in a 50 Ohm system, -40 to +85 deg C

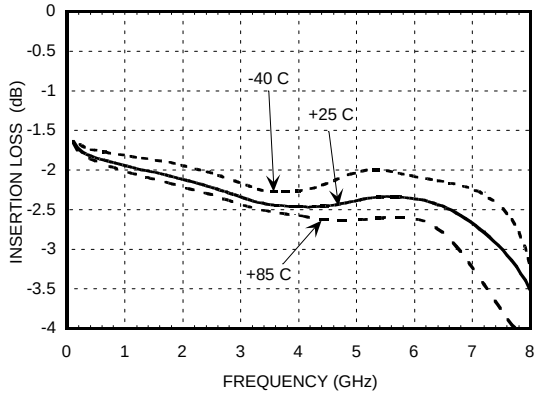
Parameter	Frequency	Min.	Typ.	Max.	Units
Insertion Loss	DC - 1.0 GHz DC - 2.0 GHz DC - 6.0 GHz		1.9 2.1 2.4	2.2 2.5 2.8	dB dB
Isolation	DC - 1.0 GHz DC - 2.0 GHz DC - 6.0 GHz	42 37 22	52 43 27		dB dB
Return Loss "On State"	DC - 2.0 GHz DC - 6.0 GHz	15 9	18 12		dB dB
Return Loss RF1-4 "Off State"	0.7 - 6.0 GHz 2.0 - 6.0 GHz	6.5 11	>10 14		dB dB
Input Power for 1dB Compression	0.5 - 6.0 GHz	17	20		dBm
Input Third Order Intercept (Two-Tone Input Power = +7dBm Each Tone)	0.5 - 6.0 GHz		43		dBm
Switching Characteristics tRISE, tFALL (10/90% RF) tON, tOFF (50% CTL to 10/90% RF)	0.5 - 6.0 GHz		 35 150		 ns ns

HMC222C12 SP4T SWITCH NON-REFLECTIVE DC TO 6.0 GHz

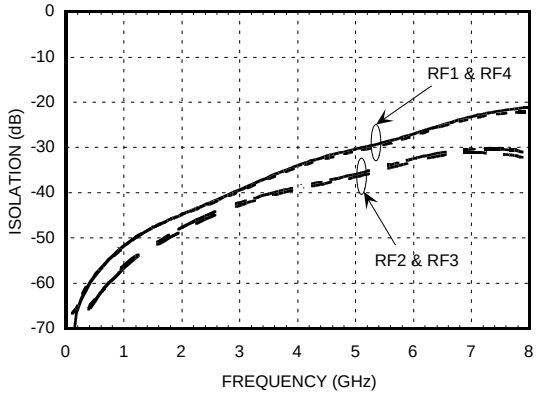
v02.0101

FEBRUARY 2001

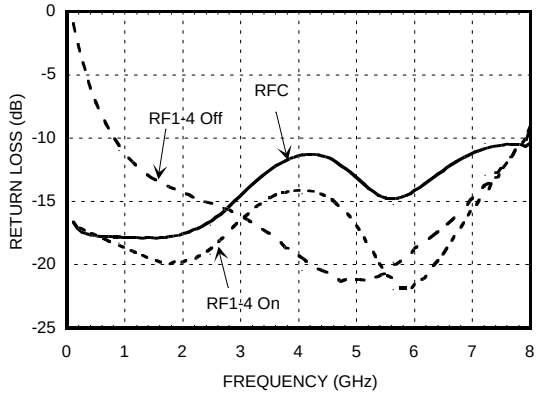
Insertion Loss



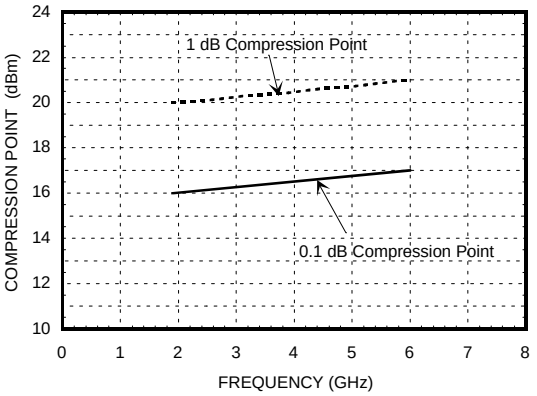
Isolation



Return Loss



0.1 and 1 dB Input Compression Point

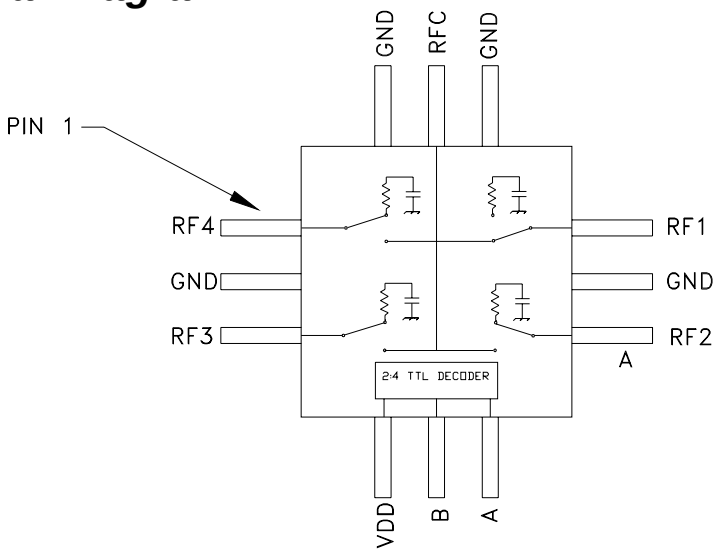


MICROWAVE CORPORATION

HMC222C12 SP4T SWITCH NON-REFLECTIVE DC TO 6.0 GHz

FEBRUARY 2001 v02.0101

Functional Diagram



Absolute Maximum Ratings

Bias Voltage Range (Port Vdd)	+7.0 Vdc
Control Voltage Range (A & B)	-0.5V to Vdd + 1Vdc
Storage Temperature	-65 to +150 deg C
Operating Temperature	-40 to +85 deg C
Maximum Input Power Vdd = +5 Vdc	+16dBm (0.05-0.5GHz) +22dBm (0.5-6.0GHz)

NOTE:

1) DC blocking capacitors are required at ports RFC and RF1, 2, 3, 4.

Truth Table

Control Input		Signal Path State
A	**B**	**RFCOM to:**
Low	Low	RF1
High	Low	RF2
Low	High	RF3
High	High	RF4

Bias Voltage & Current

Vdd Range = +5.0 Vdc ± 10%		
Vdd (Vdc)	**Idd (Typ.) (mA)**	**Idd (Max.) (mA)**
+5.0	3.0	5.0

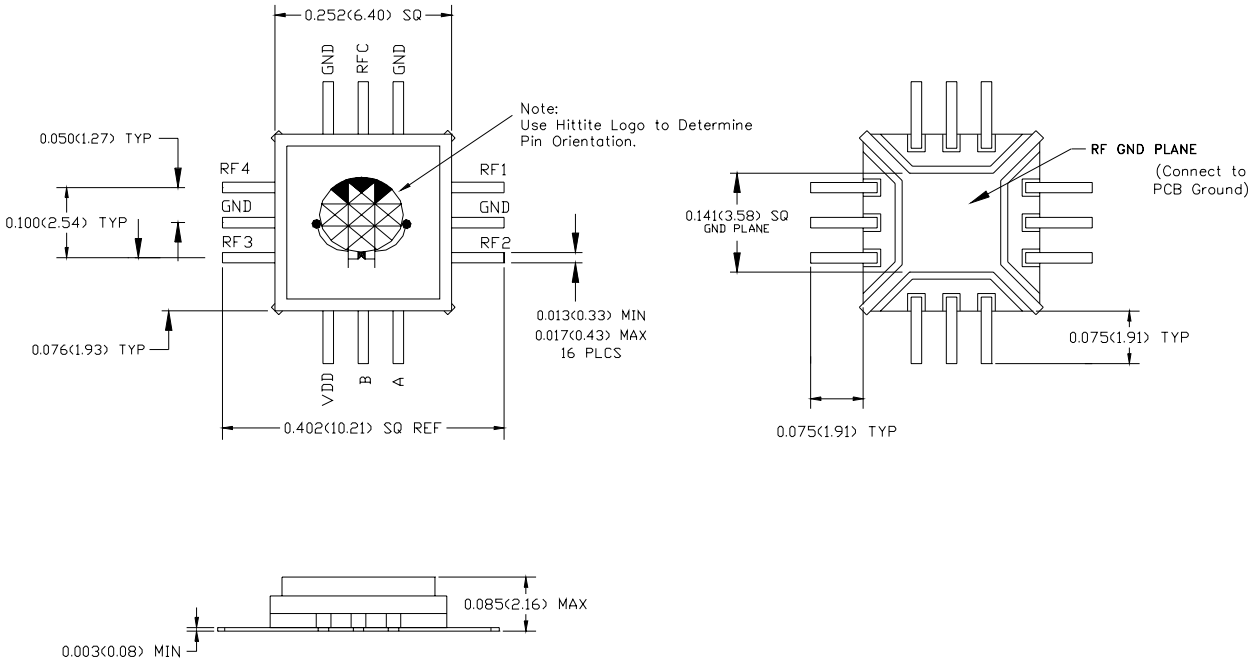
TTL/CMOS Control Voltages

State	Bias Condition
Low	0 to +0.8Vdc @5uA Typ.
High	+2.0 to +5.0 Vdc @ 50uA Typ.

HMC222C12 SP4T SWITCH NON-REFLECTIVE DC TO 6.0 GHz

v02.0101 FEBRUARY 2001

Outline Drawing



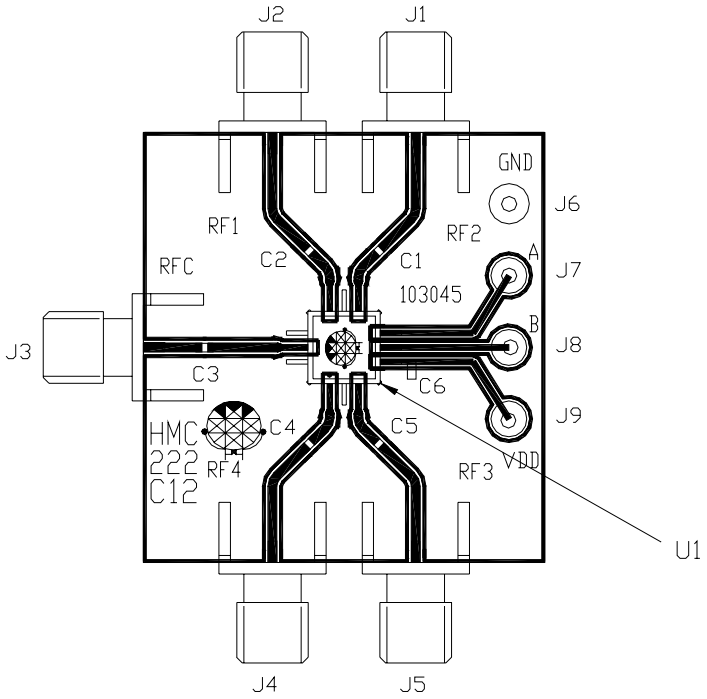
1. MATERIAL:
   A) PACKAGE BODY & COVER : WHITE ALUMINA (92%)
   B) LEADS: KOVAR (TM) OR ASTM F-15 (ALLOY 42) EQUIVALENT
2. PLATING (LEADS): ELECTROLYTIC GOLD 25 MICROINCHES. MINIMUM, OVER ELECTROLYTIC NICKEL 100 TO 250 MICROINCHES
3. DIMENSIONS ARE IN INCHES (MILLIMETERS), UNLESS OTHERWISE SPECIFIED TOL. ARE ±0.005.
4. ALL UNLABELED LEADS ARE GROUND.

MICROWAVE CORPORATION

HMC222C12 SP4T SWITCH NON-REFLECTIVE DC TO 6.0 GHz

FEBRUARY 2001 v02.0101

Eval Board Layout *(Top View)*



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 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.

List of Material

Item	Description
J1 - J5	PC Mount SMA Connector
J6 - J9	DC Pin
C1 - C5	100pF Capacitor, 0402 Pkg.
C6	0.01 uF Capacitor, 0603 Pkg.
U1	HMC222C12 SP4T Switch
PCB*	103045 Evaluation PCB 1.4 x 1.5
**Circuit Board Material: Rogers 4350*	

HMC222C12 SP4T SWITCH NON-REFLECTIVE DC TO 6.0 GHz

v02.0101

FEBRUARY 2001

NOTES: