

HMC182S14 / 182S14E

v03.0805



GaAs MMIC SP4T NON-REFLECTIVE SWITCH, DC - 2 GHz

Typical Applications

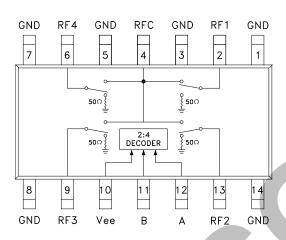
The HMC182S14 / HMC182S14E is ideal for:

• 800 - 1000 MHz Basestation

Features

Low Insertion Loss: 0.8dB Integrated 2:4 Decoder 14 Lead SOIC Package

Functional Diagram



General Description

The HMC182S14 & HMC182S14E are low-cost terminated SP4T switches in 14-lead SOIC packages for use in antenna diversity, switched filter banks, gain/attenuation selection, and general channel multiplexing applications. The switch can control signals up to 2 GHz. A 2:4 decoder is integrated on the switch, requiring only 2 control lines and a negative bias to select each RF path. The 2:4 decoder replaces 4 to 8 control lines normally required by GaAs SP4T switches. The HMC182S14(E) are drop-in replacements for the HMC165S14 in applications requiring low "off state" VSWR. See positive bias / TTL SP4T HMC241QS16.

Electrical Specifications,

$T_A = +25^{\circ}$ C, For 0/-5V Control and Vee = -5V in a 50 Ohm System

Parameter		Frequency	Min.	Тур.	Max.	Units
Insertion Loss		DC - 1.0 GHz DC - 2.0 GHz		0.7 0.8	1.1 1.2	dB dB
Isolation		DC - 0.5 GHz DC - 1.0 GHz DC - 2.0 GHz	41 36 28	45 40 32		dB dB dB
Return Loss	"On State" "On State" "Off State" "Off State"	DC - 1.0 GHz DC - 2.0 GHz DC - 1.0 GHz DC - 2.0 GHz	21 16 17 13	25 20 21 17		dB dB dB dB
Input Power for 1 dB Compression		50 MHz 0.5 - 2.0 GHz		22 24		dBm dBm
Input Third Order Intercept (Two-Tone Input Power = 7 dBm Each Tone).	50 MHz 0.5 - 1.0 GHz 0.5 - 2.0 GHz	25 41 37	30 45 41		dBm dBm dBm	
Switching Characteristics		DC - 2.0 GHz				
tRISE, tFALL (10/90% RF) tON, tOFF (50% CTL to 10/90% RF)				25 50		ns ns

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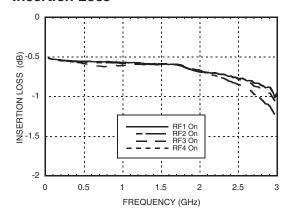
For price, delivery, and to place orders: Analog Devices, Inc., One Technology Way, P.O. Box 9106, Norwood, MA 02062-9106 Phone: 781-329-4700 • Order online at www.analog.com Application Support: Phone: 1-800-ANALOG-D



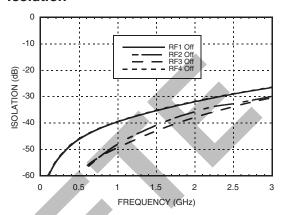


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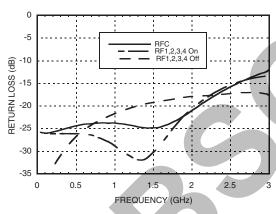
Insertion Loss



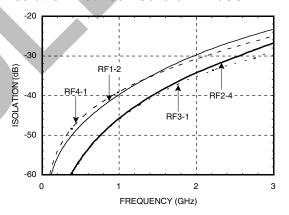
Isolation



Return Loss



Isolation Between Several RF I/Os



Bias Voltage & Current

		1				
		Ve	e Rang	ge =	-5.0 Vdc ± 1	0%
	e e dc)				(Typ.) nA)	lee (Max.) (mA)
-5	5.0			4	1.0	7.0

Truth Table

Control Input		Signal Path State		
А	В	RFCOM to:		
High	High	RF1		
Low	High	RF2		
High	Low	RF3		
Low	Low	RF4		

Control Voltages

State	Bias Condition
Low	0 to -3 VDC @ 70 uA Typ.
High	-5 to -4.2 VDC @ 5 uA Typ.



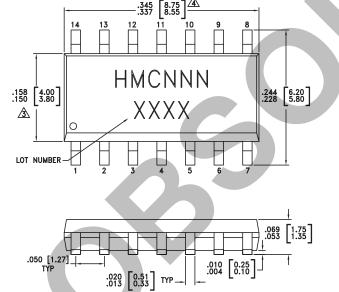
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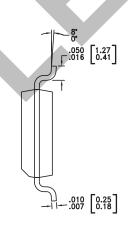
Absolute Maximum Ratings

Bias Voltage Range (Port Vee)	-7 Vdc
Control Voltage Range (A & B)	Vee -0.5V to +1.0 Vdc
Channel Temperature	150 °C
Thermal Resistance (Insertion Loss Path)	123 °C/W
Thermal Resistance (Terminated Path)	260 °C/W
Storage Temperature	-65 to +150 °C
Operating Temperature	-40 to +85 °C
Maximum Input Power	+27 dBm (<500 MHz) +30 dBm (>500 MHz)



Outline Drawing





NOTES:

- LEADFRAME MATERIAL: COPPER ALLOY
- 2. DIMENSIONS ARE IN INCHES [MILLIMETERS].
- DIMENSION DOES NOT INCLUDE MOLDFLASH OF 0.15mm PER SIDE.
- DIMENSION DOES NOT INCLUDE MOLDFLASH OF 0.25mm PER SIDE.
- 5. ALL GROUND LEADS MUST BE SOLDERED TO PCB RF GROUND.

Package Information

Part Number	Package Body Material	Leadframe Plating	MSL Rating	Package Marking [3]
HMC182S14	Low Stress Injection Molded Plastic Silica and Silicon Impregnated		MSL1 [1]	HMC182 XXXX
HMC182S14E	RoHS-compliant Low Stress Injection Molded Plastic Silica and Silicon Impregnated	100% Matte Tin	MSL1 [2]	HMC182 XXXX

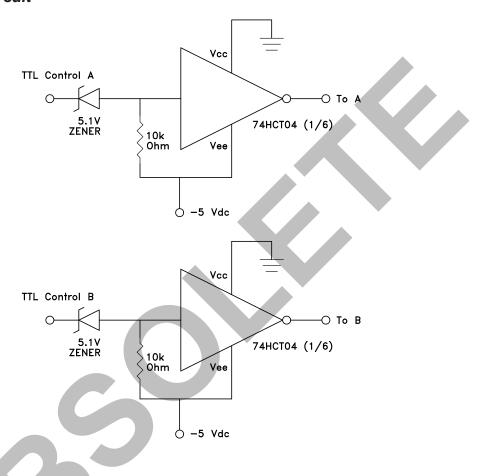
- [1] Max peak reflow temperature of 235 $^{\circ}\text{C}$
- [2] Max peak reflow temperature of 260 °C
- [3] 4-Digit lot number XXXX





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TTL Interface Circuit



Note:

Control inputs A and B can be driven directly with TTL logic with -5 Volts applied to theHCT logic gate Vee pin and to Vee (pin 10) of the RF switch.

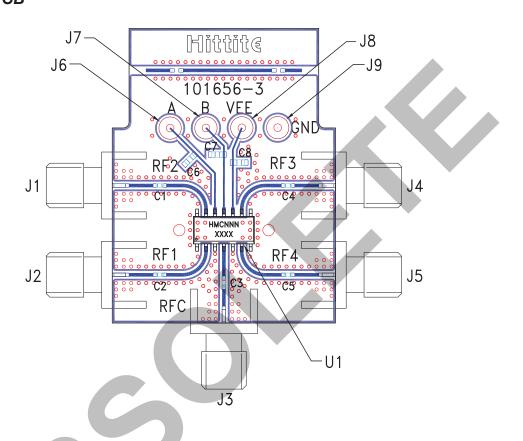




Evaluation PCB

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List of Materials for Evaluation PCB 101672 [1]

Item	Description		
J1 - J5	PCB Mount SMA RF Connector		
J6 - J9	DC Pin		
C1 - C5	330 pF capacitor, 0402 Pkg.		
C6 - C8	10,000 pF capacitor, 0603 Pkg.		
U1	HMC182S14 / HMC182S14E SP4T Switch		
PCB [2]	101656 Evaluation PCB		

[1] Reference this number when ordering complete evaluation PCB

[2] 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.





Notes:

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