HRF-SW1021

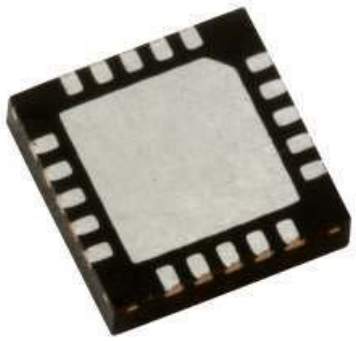
Honeywell

Preliminary

SP4T Absorptive RF Switch

Features

- High Isolation Of > 40 dB @ 2 GHz
- Low Insertion Loss Of 1.45dB @ 2 GHz
- DC To 2.5 GHz Operating Frequency
- Integrated CMOS Control Logic
- Integrated ESD Protection on Digital I/O
- Single Positive Supply Voltage
- Ultra Small LPCC™ Packaging
- Impedance matched to 75 Ohm systems



HRF-SW1021 in LPCC™ Package

Product Description

The Honeywell HRF-SW1021 is a high performance single pole four throw (SP4T) absorptive RF switch that is ideal for use in wireless basestation and handset applications that require minimum power and minimum insertion loss.

The HRF-SW1021 is manufactured with Honeywell's patented Silicon On Insulator (SOI) CMOS technology, which provides the performance of GaAs with the economy and integration capabilities of conventional CMOS technology.

RF Electrical Specifications @ + 25°C

Results @ Vdd=5.0 +/- 10%, Vss = 0 unless otherwise stated, Z0= 75 ohms

Parameter	Test Condition	Frequency	Minimum	Typical	Maximum	Units
Insertion Loss		DC – 1.0 GHz 2.0 GHz 2.5 GHz		1.35 1.45 2.60	1.7 2.1 2.9	dB dB dB
Isolation		DC – 1.0 GHz 2.0 GHz 2.5 GHz		53.5 43.0 40.0		dB dB dB
VSWR*		DC – 0.5 GHz 0.5 – 1.5 GHz 1.5 – 2.5 GHz		1.1:1 1.2:1 1.6:1	 1.8:1	Ratio Ratio Ratio
1dB Compression	Input Power Vss = Gnd Vss = -3	 1.0 GHz 1.0 GHz		 19 28		 dBm dBm
Input IP3	Two-Tone Inputs Up To + 5 dBm Vss = Gnd Vss = -3	 2.0 GHz 2.0 GHz		 31 32		 dBm dBm
Trise, Tfall* Ton, Toff Transients	10% To 90% 50% Cntl To 90%/10%Rf In-Band			10 20 10		nS nS mV

*By design

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DC Electrical Specifications @ + 25°C

Parameter	Minimum	Typical	Maximum	Units
Single V_{DD} Supply Voltage	3.3*	5.0	5.5	V
CMOS Logic Level (0)	0		0.8	V
CMOS Logic Level (1)	V_{DD} – 0.8		V_{DD}	V
Input Leakage Current			10	uA

* Note, performance curves are for Vdd = +5.0 +/- 10%

Absolute Maximum Ratings[1]

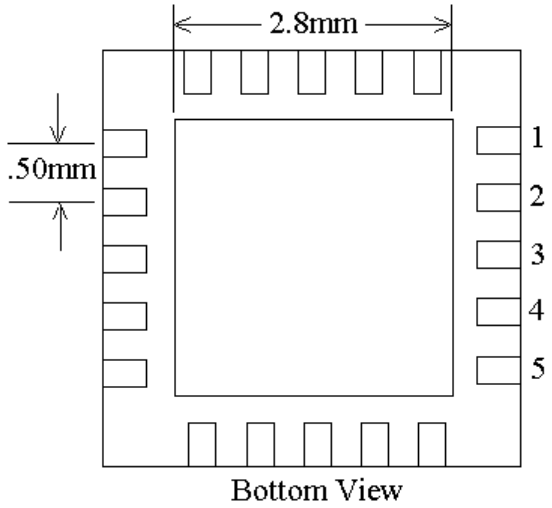
Parameter	Absolute Maximum	Units
V_{DD}	+6.0	V
Vin Digital Logic 0	Vss - 0.6	V
Vin Digital Logic 1	Vdd + 0.6	V
Maximum Input Power	> 35	dBm
ESD Voltage	400	V
Operating Temperature Range	+85	Degrees C
Storage Temperature Range	+125	Degrees C

(Note 1) Operation beyond any of these parameters may cause permanent damage.

Latch-Up: Unlike conventional CMOS RF switches, Honeywell's HRF-SW1021 is immune to latch-up.

ESD Protection: Although this device contains ESD protection circuitry on all digital inputs, conventional precautions should be taken to ensure that the Absolute Maximum Ratings are not exceeded.

Package Outline Drawing



Bottom View, 20 Pin 4X4 mm LPCC™ Package
ASAT LPCC Marketing Outline Dwg. # GMJ00004
For more information see http://www.asat.com

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Truth Table

C1	C0	RF Output 1	RF Output 2	RF Output 3	RF Output 4
0	0	RFINPUT			
0	1		RFINPUT		
1	0			RFINPUT	
1	1				RFINPUT

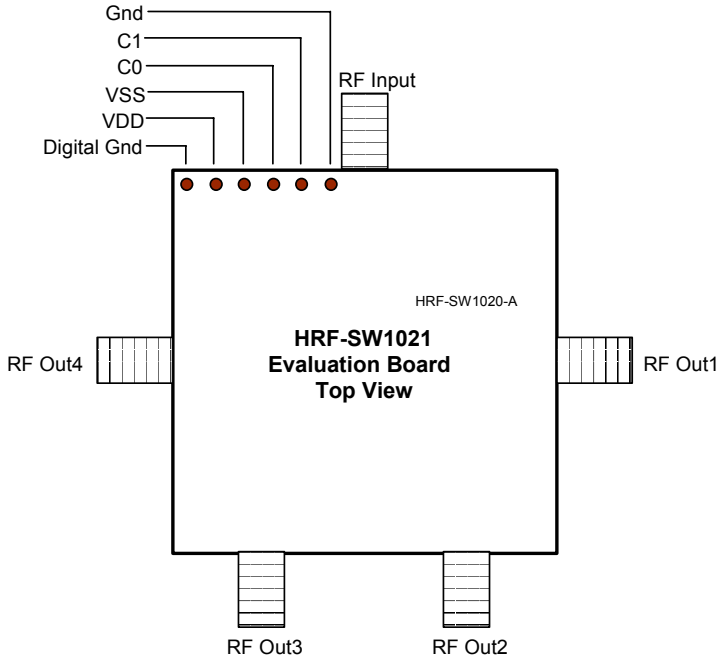
"0" = CMOS Low, "1" = CMOS High

Pin Configuration

Pin	Function	Pin	Function
1	GROUND	11	C1
2	RFOUTPUT4	12	C0
3	GROUND	13	GROUND
4	VDD	14	RFOUTPUT1
5	DIGITAL GROUND	15	GROUND
6	RFOUTPUT3	16	GROUND
7	GROUND	17	GROUND
8	GROUND	18	RFINPUT
9	GROUND	19	GROUND
10	RFOUTPUT2	20	VSS

Note: Bottom ground plate must be grounded for proper RF performance.

Evaluation Circuit Board Connections



"0" = CMOS Low, "1" = CMOS

Note:
HRF-SW1021 is the Z0 = 75 ohm version of the SW1020 evaluation board.

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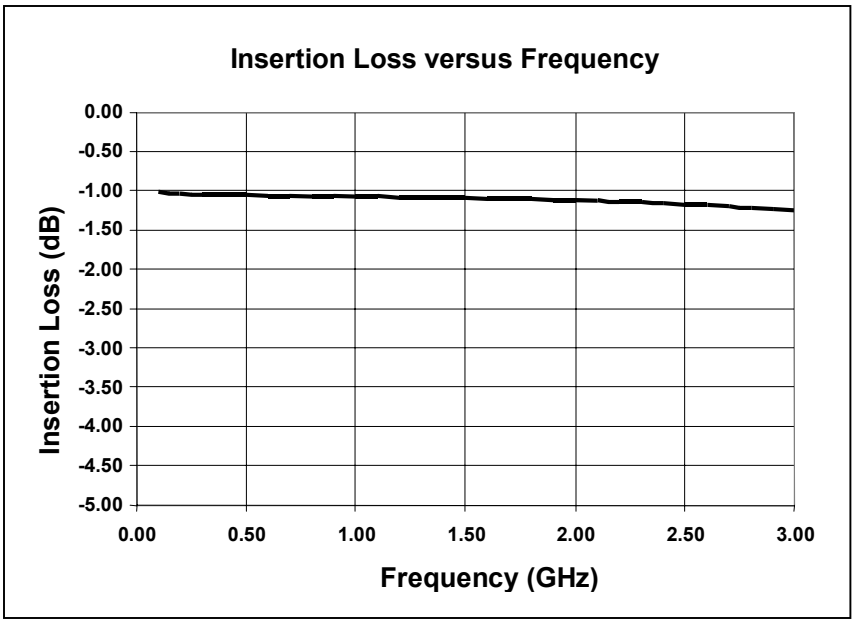
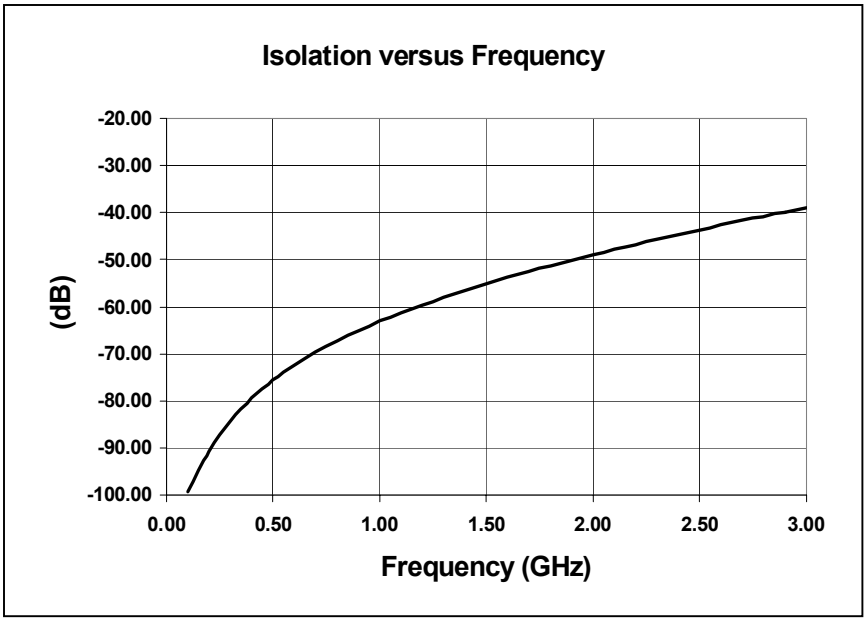
Performance Curves

Insertion Loss



The Insertion Loss curve shows the worst case loss versus frequency at Vdd = +5.0 +/- 10%, Ta = 25C, Z0 = 75 Ohms

Isolation



The Isolation curve shows the typical isolation of an “off” state output to the insertion path.

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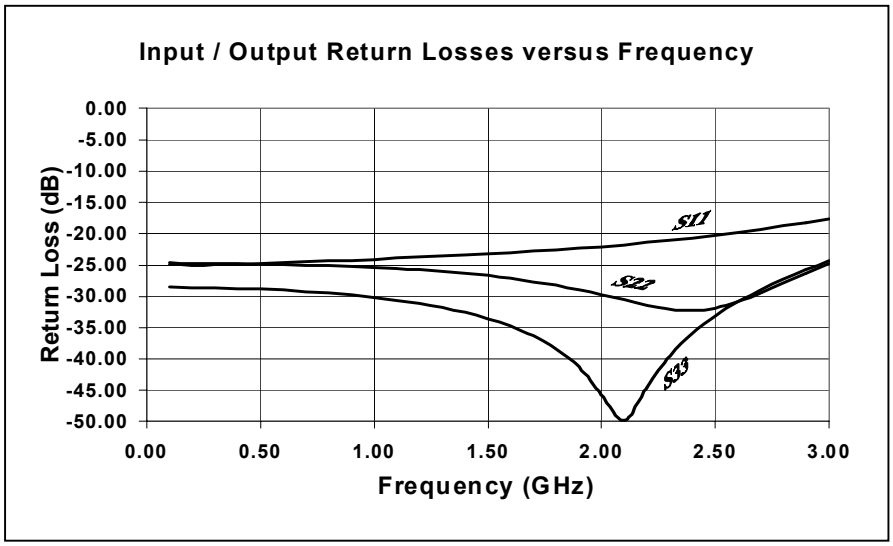
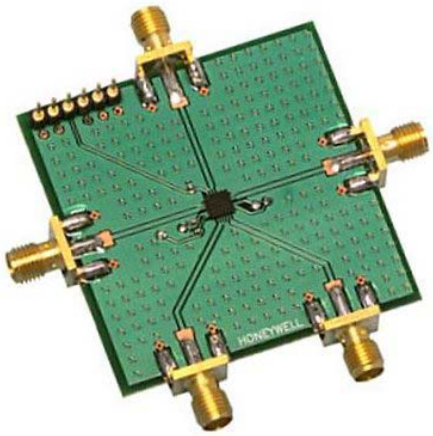
Return Loss



The return loss curve shows the input return loss S11, the output return loss in the insertion path S22, and the output return loss in the isolation state S33.

Evaluation Circuit Board



HRF-SW1021 Evaluation Board

Honeywell's evaluation board provides an easy to use method of evaluating the RF performance of our switch. Simply connect power, DC and RF signals to be measuring switch performance in less than 10 minutes.

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Evaluation Circuit Board Layout Design Details

Item	Description
PCB	Impedance Matched Multi-Layer FR4
Switch	HRF-SW1021 RF Switch
Chip Capacitor	Panasonic Model ECU-E1C103KBQ Capacitor, .01uf 0402 10% 16V
RF Connector	Johnson Connectors Model 142-0701-801 SMA RF Coaxial Connector
DC Pin	Mil-Max Model 800-10-064-10-001 Header Pins

Ordering Information

Ordering Number	Product
HRF-SW1021-B	Delivered In Chip Tubes
HRF-SW1021-TR	Delivered On Tape And Reel[2]
HRF-SW1021-E	Engineering Evaluation Board

(Note 2) Contact Honeywell for details

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