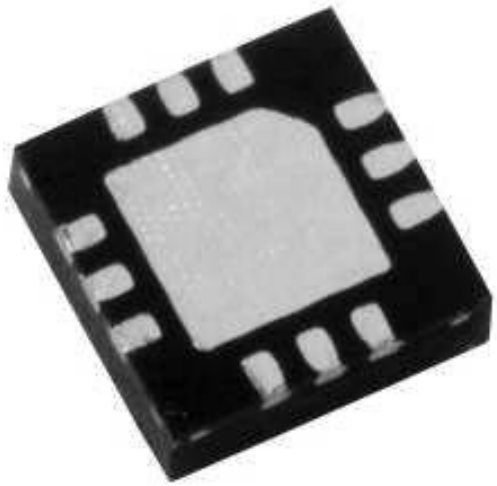
HRF-SW1000

Honeywell

SPDT Absorptive RF Switch

Features

- High Isolation Of > 40 dB @ 2 GHz
- Low Insertion Loss Of 1.1dB @ 2 GHz
- DC To 4GHz Operating Frequency
- Integrated CMOS Control Logic
- Integrated ESD Protection on Digital I/O
- Single Positive Supply Voltage
- Ultra Small LPCC™ Packaging
- Impedance matched for 50 Ohm systems



HRF-SW1000 in LPCC™ Package

Product Description

The Honeywell HRF-SW1000 is a high performance single pole double throw (SPDT) absorptive RF switch that is ideal for use in wireless basestation and handset applications that require minimum power and minimum insertion loss.

The HRF-SW1000 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, Z_0=50 ohms

Parameter	Test Condition	Frequency	Minimum	Typical	Maximum	Units
Insertion Loss		DC – 0.5 GHz		0.9	1.2	dB
		2.0 GHz		1.1	1.5	dB
		3.0 GHz		1.3	1.7	dB
Isolation		DC – 0.5 GHz	50	53.5		dB
		2.0 GHz	40	42.5		dB
		3.0 GHz	35	39.0		dB
VSWR*		DC – 0.5 GHz		1.1:1		Ratio
		2.0 GHz		1.2:1		Ratio
		3.0 GHz		1.2:1	1.3:1	Ratio
1dB Compression	Input Power					
	Vss=Gnd	1.0 GHz		21		dBm
	Vss= -3	1.0 GHz		29		dBm
Input IP3	Two-Tone Inputs Up To + 5 dBm					
	Vss=Gnd	2.0 GHz		35		dBm
	Vss= -3	2.0 GHz		35		dBm
Trise, Tfall*	10% To 90%			10		nS
Ton, Toff	50% Cntl To 90%/10%Rf			20		nS
Transients	In-Band			10		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

***** Performance curves are for Vdd = +5.0 +/- 10%

Absolute Maximum Ratings[1]

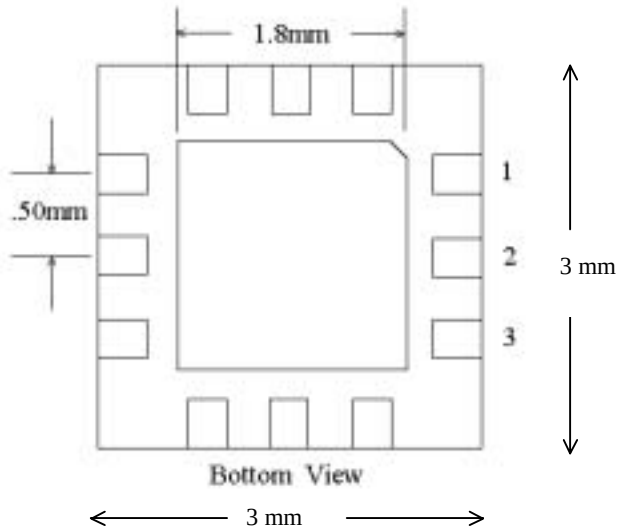
Parameter	Absolute Maximum	Units
V_{DD}	+6.0	V
Vin Digital Logic 0	Vss - 0.6	V
Vin Digital Logic 1	Vdd + 0.6	V
Maximum Input Power	> 35	dBm
ESD Voltage	400	V
Operating Temperature Range	+85	Degrees C
Storage Temperature Range	+125	Degrees C

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

Latch-Up: Unlike conventional CMOS RF switches, Honeywell's HRF-SW1000 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
12 Pin 3X3 mm LPCC™ Package
ASAT LPCC Marketing Outline Dwg. # GMJ00004
For more information see http://www.asat.com

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Truth Table

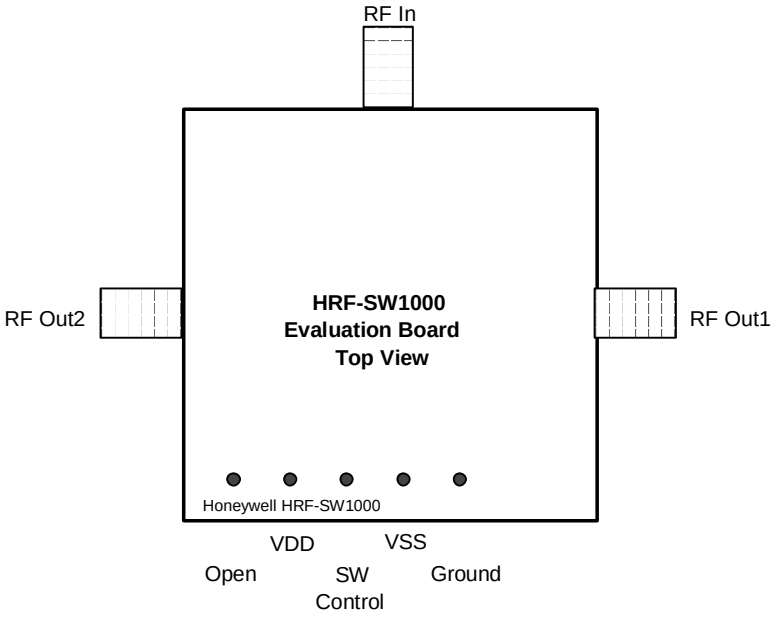
Switch Control	RF Output 1	RF Output 2
0	RF INPUT	- - -
1	- - -	RF INPUT

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

Pin Configuration

Pin	Function	Pin	Function
1	GROUND	7	GROUND
2	RF OUT 2	8	RF OUT 1
3	GROUND	9	GROUND
4	VDD	10	GROUND
5	SWITCH CONTROL	11	RF IN
6	VSS	12	GROUND

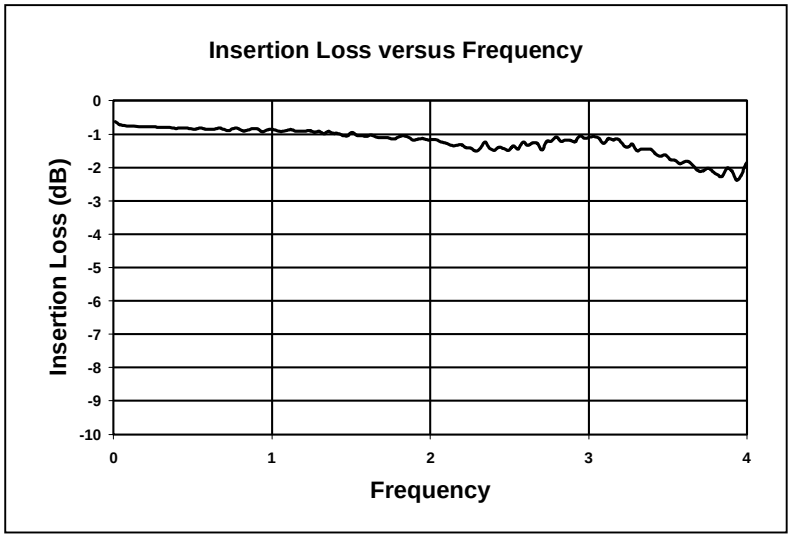
Evaluation Circuit Board Connections



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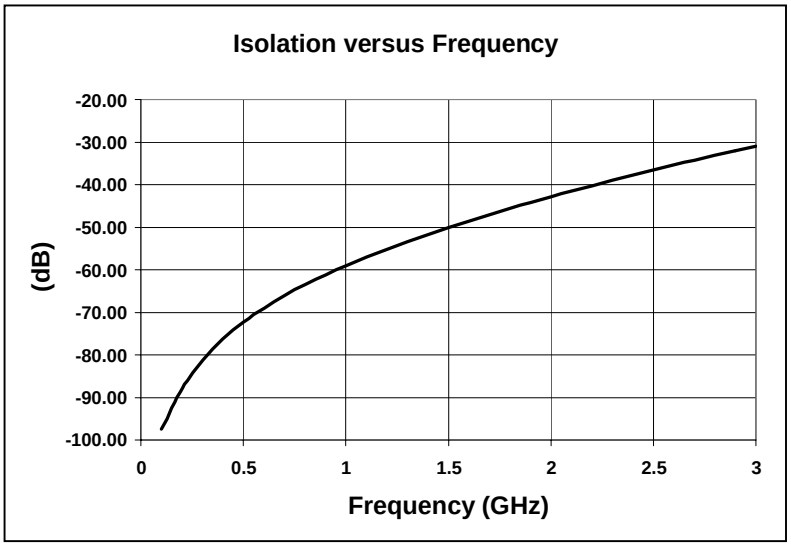
Performance Curves

Insertion Loss



The Insertion Loss curve shows the worst case loss versus frequency at Vdd = +5.0 +/- 10%, Ta = 25C, Z_0 = 50 Ohms

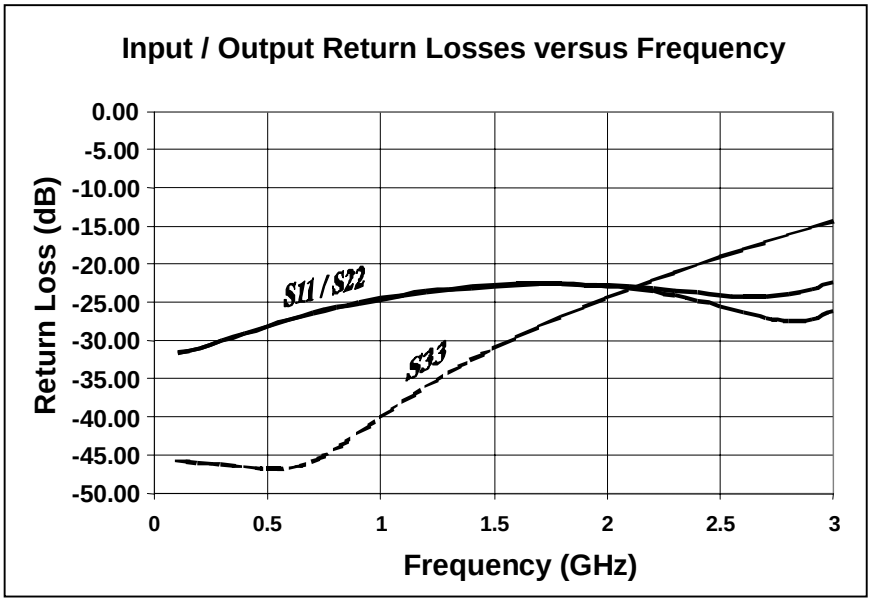
Isolation



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-SW1000 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-SW1000 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-SW1000-B	Delivered In Chip Tubes
HRF-SW1000-TR	Delivered On Tape And Reel[2]
HRF-SW1000-E	Engineering Evaluation Board

(Note 2) Contact Honeywell for details

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