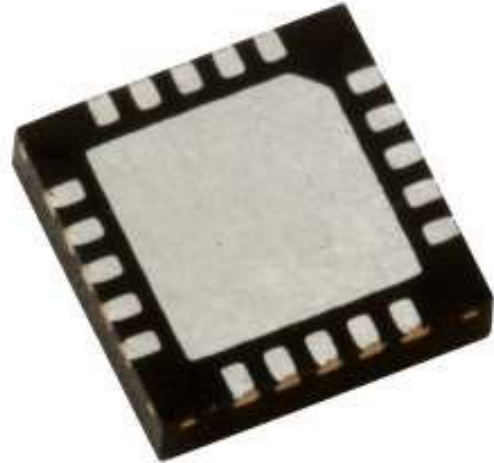


SP4T Absorptive RF Switch

Features

- High Isolation Of > 40 dB @ 3 GHz
- Insertion Loss Of 2.0dB @ 2 GHz
- DC To 6 GHz Operating Frequency
- Integrated CMOS Control Logic, with all OFF mode
- Integrated ESD Protection on Digital I/O
- Single Positive Supply Voltage
- Ultra Small LPCC™ Packaging
- Impedance matched for 50 Ohm systems



HRF-SW1022 in LPCC™ Package

Product Description

The Honeywell HRF-SW1022 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-SW1022 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= 50 ohms

Parameter	Test Condition	Frequency	Minimum	Typical	Maximum	Units
Insertion Loss		DC - 1.0 GHz		1.5		dB
		2.0 GHz		2.0		dB
		3.0 GHz		3.0		dB
Isolation		DC - 1.0 GHz		50		dB
		2.0 GHz		50		dB
		3.0 GHz		45		dB
		4.0 GHz		38		dB
VSWR		DC - 0.5 GHz		1.1:1		Ratio
		0.5 - 2.0 GHz		1.2:1		Ratio
		2.0 - 4.0 GHz		1.3:1	1.4:1	Ratio
1dB Compression	Input Power	0.5 - 3.0 GHz		20		dBm
Input IP3	Two-Tone Inputs Up To + 5 dBm	0.5 - 3.0 GHz		35		dBm
Trise, Tfall Ton, Toff Transients	10% To 90%			10		nS
	50% Cntl To 90%/10%Rf			20		nS
	In-Band			10		mV

DC Electrical Specifications @ + 25°C

Parameter	Minimum	Typical	Maximum	Units
Single V _{DD} Supply Voltage	4.5	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 V_{dd} = +5.0 +/- 10%

Absolute Maximum Ratings¹

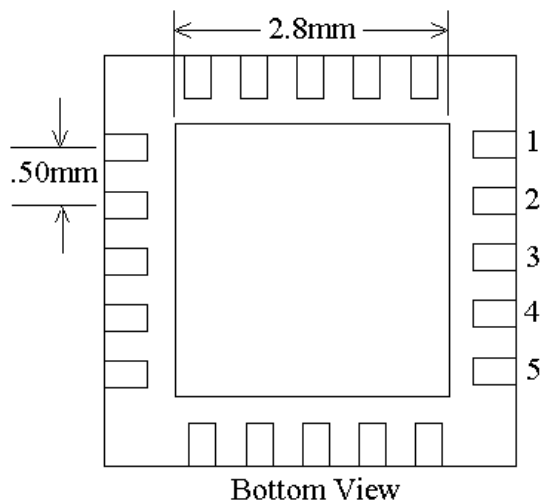
Parameter	Absolute Maximum	Units
V _{DD}	+6.0	V
V _{in} Digital Logic 0	- 0.6	V
V _{in} Digital Logic 1	V _{dd} + 0.6	V
Maximum Input Power	> 35	dBm
ESD Voltage (Human Body Model)	TBD	V
Operating Temperature	+85	Degrees C
Storage Temperature	+125	Degrees C

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

Latch-Up: Unlike conventional CMOS RF switches, Honeywell's HRF-SW1022 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>

Truth Table

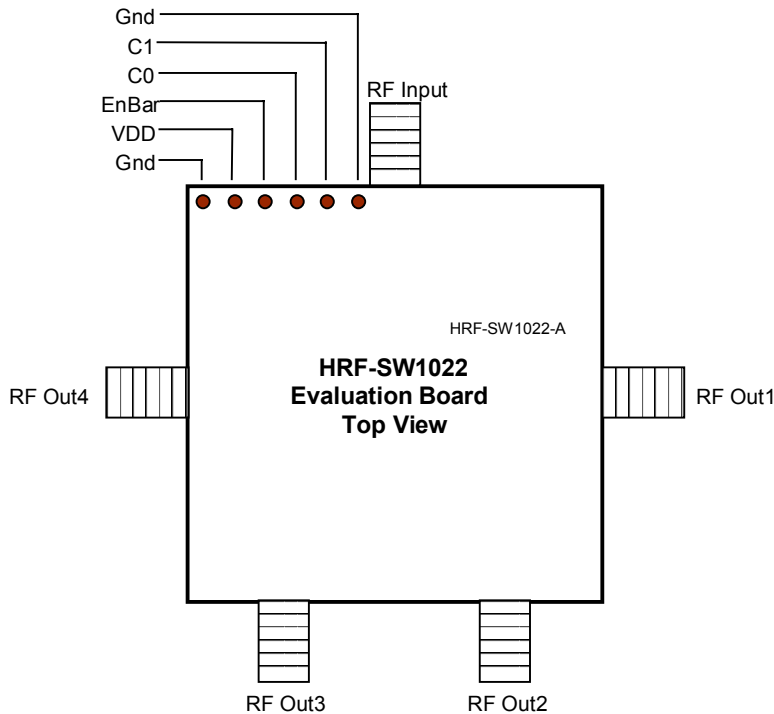
C0	C1	En Bar	RF Output 1	RF Output 2	RF Output 3	RF Output 4
0	0	0	RFINPUT	*	*	*
0	1	0	*	RFINPUT	*	*
1	0	0	*	*	RFINPUT	*
1	1	0	*	*	*	RFINPUT
X	X	1	*	*	*	*

"0" = CMOS Low, "1" = CMOS High "*" = 50 Ohm terminated in RF OFF path

Preliminary Pin Configuration

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

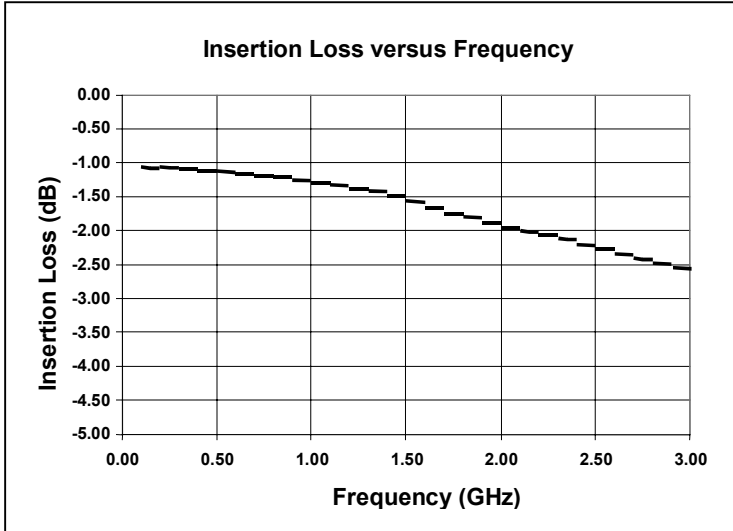
Evaluation Circuit Board Connections



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

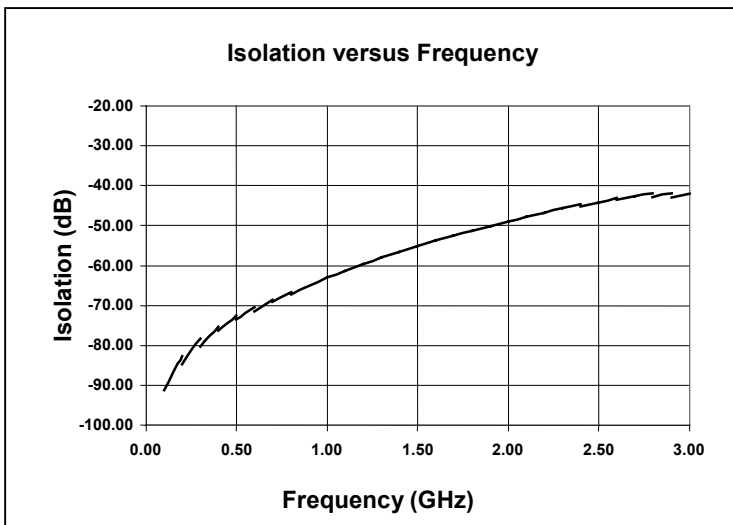
Performance Curves

Insertion Loss



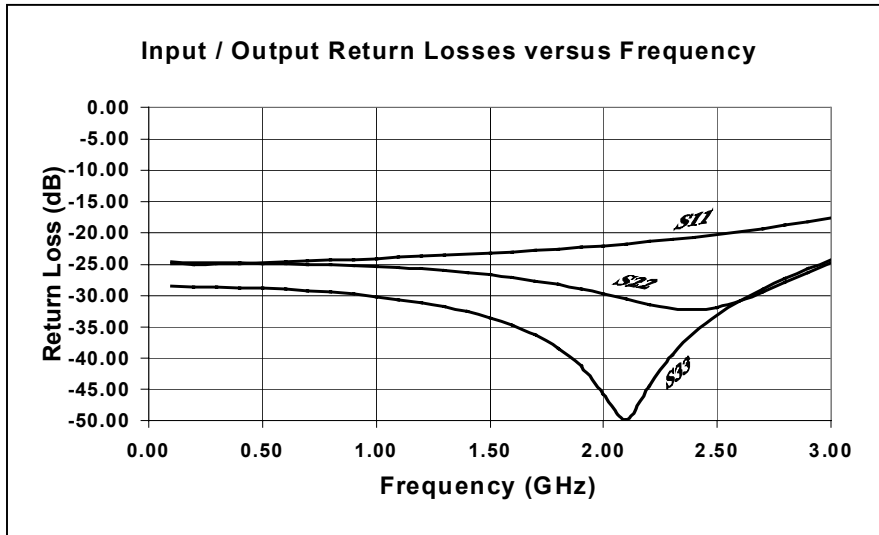
The Insertion Loss curve shows the worst case loss versus frequency at $V_{dd} = +5.0$ $\pm 10\%$, $T_a = 25^\circ\text{C}$, $Z_0 = 50$ Ohms.

Isolation



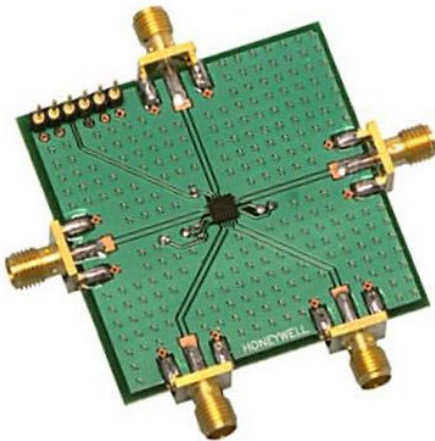
The Isolation curve shows the typical isolation of an "off" state output to the insertion path.

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-SW1022 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.

Evaluation Circuit Board Layout Design Details

Item	Description
PCB	Impedance Matched Multi-Layer FR4
Switch	HRF-SW1022 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-SW1022-B	Delivered In Chip Tubes
HRF-SW1022-TR	Delivered On Tape And Reel ²
HRF-SW1022-E	Engineering Evaluation Board

(Note 2) Contact Honeywell for details

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