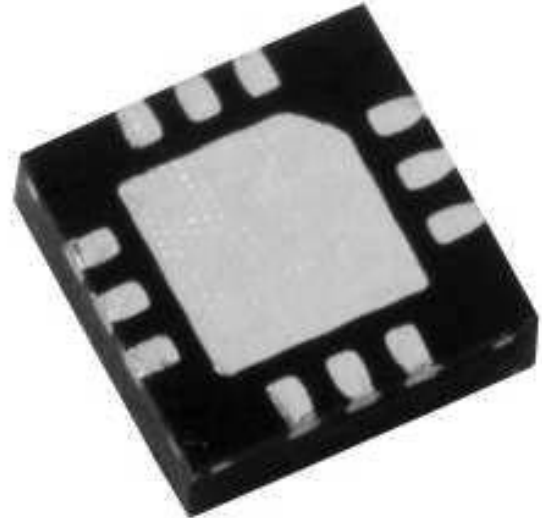


SPDT Absorptive RF Switch

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 75 Ohm systems



HRF-SW1001 in LPCC™ Package

Product Description

The Honeywell HRF-SW1001 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-SW1001 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 – 0.5 GHz | | 0.9 | 1.5 | dB |
| | | 2.0 GHz | | 1.1 | 1.7 | dB |
| | | 3.0 GHz | | 1.4 | 1.9 | 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 Vss= -3 | 1.0 GHz | | 21 | | dBm |
| | | 1.0 GHz | | 29 | | dBm |
| Input IP3 | Two-Tone Inputs Up To + 5 dBm Vss=Gnd Vss= -3 | 2.0 GHz | | 35 | | dBm |
| | | 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 V_{dd} = +5.0 +/- 10%

Absolute Maximum Ratings¹

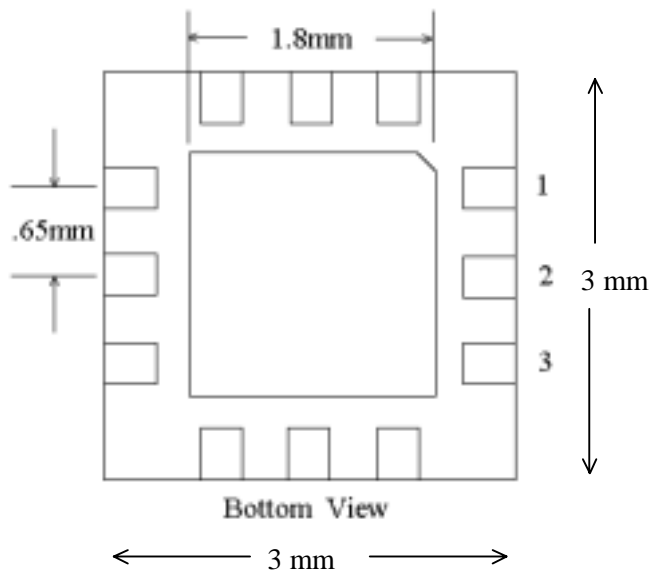
| Parameter | Absolute Maximum | Units |
|---------------------------------|-----------------------|-----------|
| V _{DD} | +6.0 | V |
| V _{in} Digital Logic 0 | V _{ss} - 0.6 | V |
| V _{in} Digital Logic 1 | V _{dd} + 0.6 | V |
| Maximum Input Power | > 35 | dBm |
| ESD Voltage | 400 | V |
| Operating 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-SW1001 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 LPCCTM Package
 ASAT LPCC Marketing Outline Dwg. # GMJ00004
 For more information see <http://www.asat.com>

Truth Table

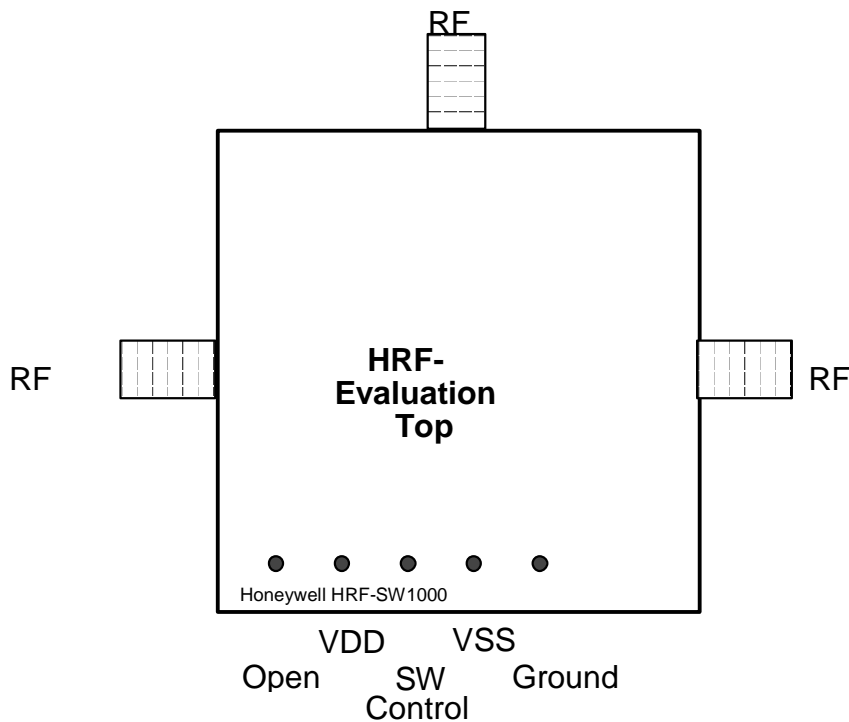
| Switch Control | RF Output 1 | RF Output 2 |
|----------------|-------------|-------------|
| 0 | RF INPUT | --- |
| 1 | --- | RF INPUT |

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

Pin Configuration

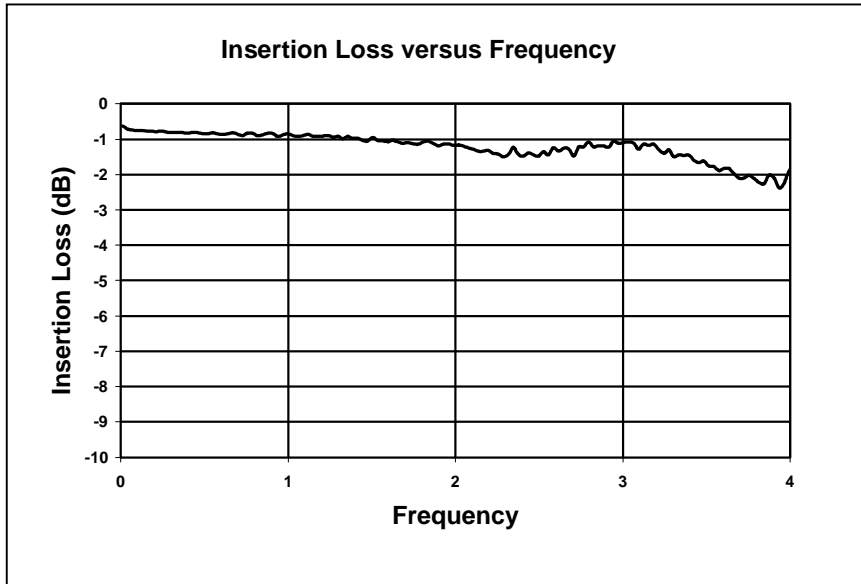
| Pin | Function | Pin | Function |
|-----|----------------|-----|----------|
| 1 | GROUND | 7 | GROUND |
| 2 | RF OUT 2 | 8 | RF OUT 1 |
| 3 | GROUND | 9 | GROUND |
| 4 | VDD | 10 | GROUND |
| 5 | SWITCH CONTROL | 11 | RF IN |
| 6 | VSS | 12 | GROUND |

Evaluation Circuit Board Connections



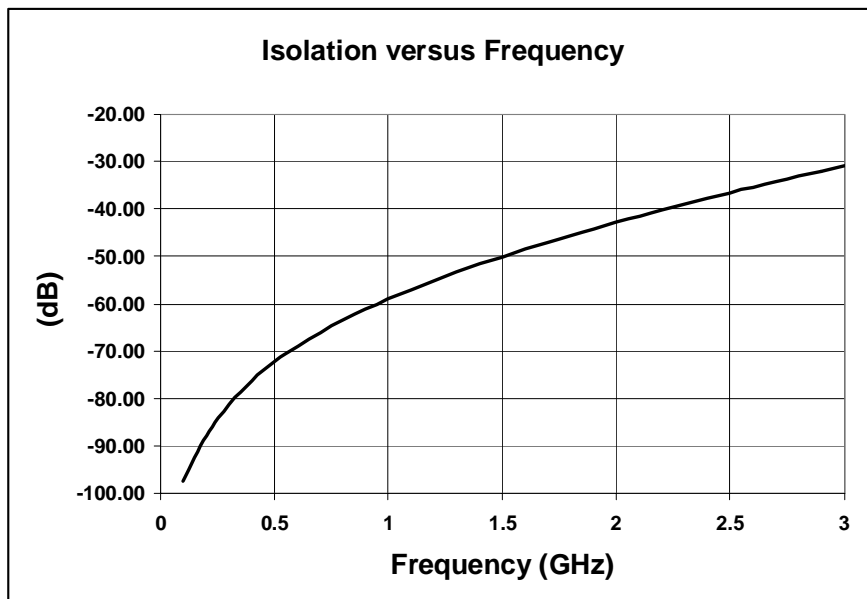
Performance Curves

Insertion Loss



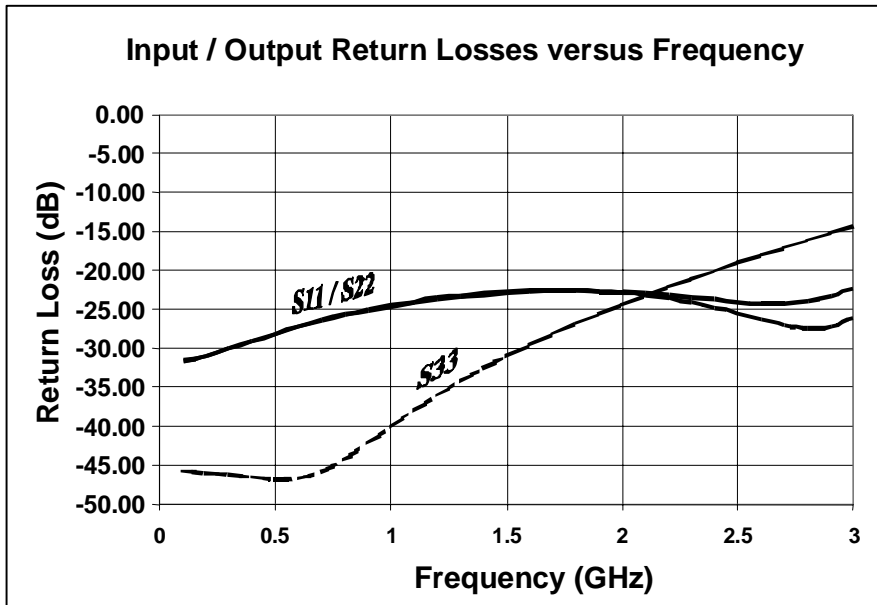
The Insertion Loss curve shows the worst case loss versus frequency at $V_{dd} = +5.0 \pm 10\%$, $T_a = 25^\circ\text{C}$, $Z_0 = 75 \text{ Ohms}$

Isolation



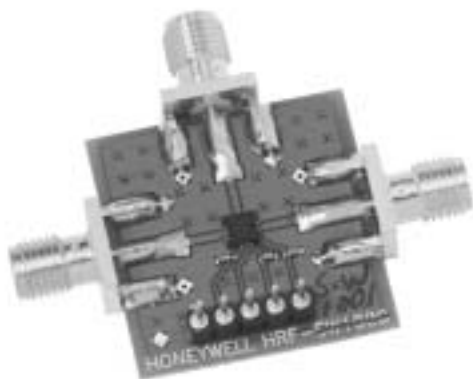
The Isolation curve shows the typical isolation of an "off" state output to the insertion path.

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-SW1001 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-SW1001 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-SW1001-B | Delivered In Chip Tubes |
| HRF-SW1001-TR | Delivered On Tape And Reel ² |
| HRF-SW1001-E | Engineering Evaluation Board |

(Note 2) Contact Honeywell for details

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