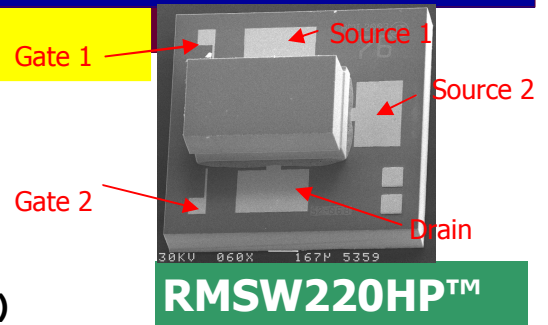




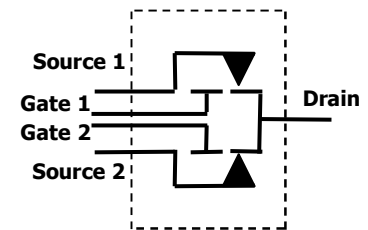
# SPDT, High Power, Broadband RF-MEMS Switch



## Features

- Long Life at High Power (typical >10 billion cycles @ 36 dBm cold-switched, >1 billion cycles @ 40 dBm cold-switched)
- High Isolation (typical 20 dB @ 10 GHz, 13 dB @ 35 GHz)
- Low Insertion Loss (<0.5 dB typical @ 20 GHz)
- Near Zero Harmonic Distortion
- No Quiescent Power Dissipation
- Hermetically sealed die designed for die-attach and wire-bond to board. Please contact us for other packaging options.

## Functional Block Diagram



## Description

The RMSW220HP™ is a Single Pole Double Throw (SPDT) Reflective RF Switch utilizing Radant's break-through MEMS technology that delivers high linearity, high isolation and low insertion loss in a chip-scale package configuration.

This device is ideally suited for use in many applications such as RF and microwave multi-throw switching, radar beam steering antennas, phase shifters, RF test instrumentation, ATE, cellular, and broadband wireless access.

## Typical Device Specifications

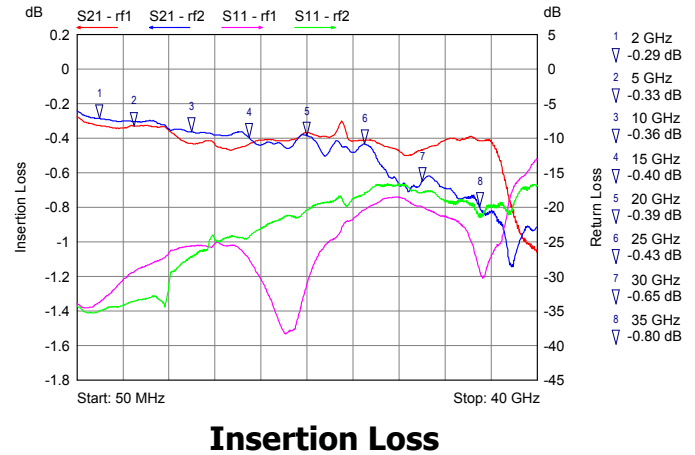
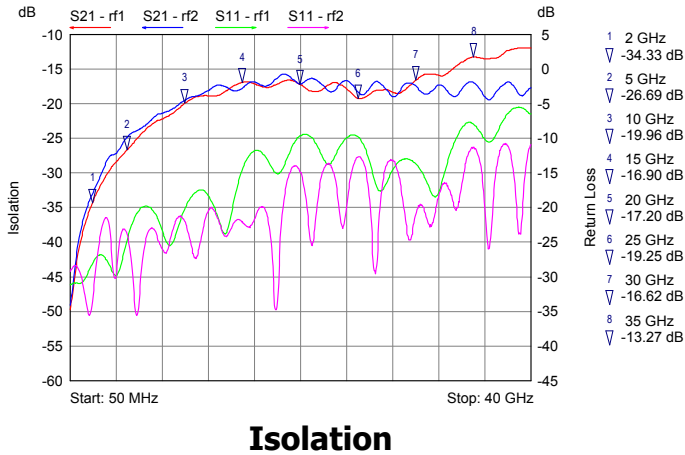
<b>Insertion Loss</b>		<b>Lifecycle</b>	
DC	< 4 Ω	Cold-switched, 36 dBm	> 10 <sup>10</sup> cycles
10 GHz	< 0.45 dB	Cold-switched, 40 dBm	> 10 <sup>9</sup> cycles
20 GHz	< 0.5 dB	Cold-switched, 42 dBm	> 10 <sup>3</sup> cycles
35 GHz	< 0.8 dB	Hot-switched, -20 dBm	> 10 <sup>11</sup> cycles
		Hot-switched, -10 dBm	> 10 <sup>9</sup> cycles
		Hot-switched, 20 dBm	> 10 <sup>3</sup> cycles
<b>Isolation</b>		<b>Control</b>	
DC	> 1 GΩ	Gate-Source Voltage (on)	+/- 100 V
10 GHz	> 19 dB	Gate-Source Voltage (off)	0 V
20 GHz	> 17 dB	Control Power, steady-state	< 1 nW
35 GHz	> 12 dB	Control Power, 1 KHz cycle rate	< 2 μW
<b>Return Loss</b>		<b>Switching speed</b>	
10 GHz	< -25 dB	On	< 10 μs
20 GHz	< -18 dB	Off	< 2 μs
35 GHz	< -15 dB		
<b>Input IP3</b> (Two-tone inputs 900 MHz and 901 MHz up to +5 dBm)	> 65 dBm	<b>Operating temperature</b>	
		Maximum	85 °C
		Minimum	-40 °C
		<b>Storage temperature</b>	
		Maximum	150 °C
		Minimum	-55 °C

### Notes:

1. All RF measurements were made in a 50 Ω system.
2. Measurements include bond-wires from die to test-board.

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## Typical RF Performance

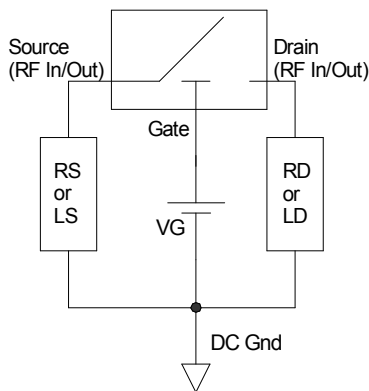


\* Measurement results include bond wires

## Absolute Maximum Ratings

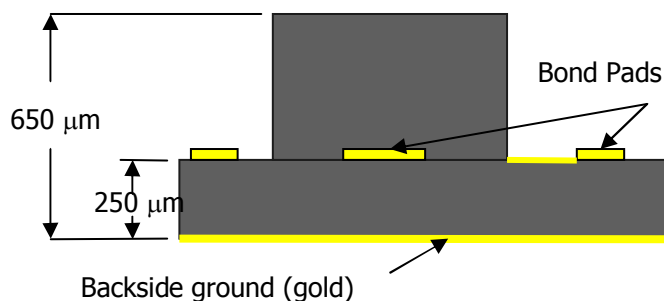
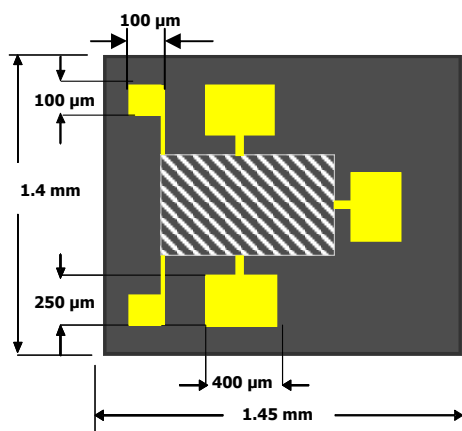
Maximum Temperature (10 seconds)	290 °C
(120 seconds)	250 °C
Maximum Voltage, Gate-Source	+/- 130 V
Maximum Voltage, Drain-Source	+/- 100 V

## Recommended Application



1. Figure shows one half of the SPDT switch. The Drain terminal is common to both halves.
2. A resistor  $R_S$  (40 K $\Omega$ -100 K $\Omega$ ) or inductor  $L_S$  should be used to provide a path to DC Ground from each Source. Similarly, a resistor  $R_D$  (40 K $\Omega$ -100 K $\Omega$ ) or inductor  $L_D$  should be used to provide a path to DC Ground from the common Drain.
3.  $V_G$  may be of either polarity.
4.  $V_G$  rise-time should be at least 10  $\mu s$  for optimal lifetime.
5. Please refer to "Application Note for Test and Handling of SPST RF-MEMS Switches" for more information. Contact us for driver solutions.

**Nominal Device Dimensions**



Please contact us for a footprint in .gds or .dxf format.

**Static sensitivity**

This device has an ESD (HBM) sensitivity of 100 V. Use proper ESD precautions when handling. Please refer to "Application Note for Test and Handling of SPST RF-MEMS Switches" for more information.

**Die Assembly**

The gold backside-metallization on the die is designed to be mounted with electrically conductive silver epoxy, or with a lower temperature solder which does not consume gold. Bond pads on the die are made of gold. Ball-bonds should be utilized to attach gold or Aluminum 1 mil wires. Please refer to "Application Note for Test and Handling of SPST RF-MEMS Switches" for more information.

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