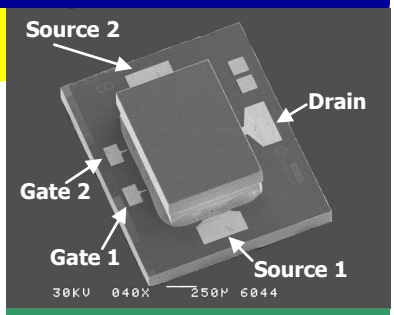
SPDT, High-Isolation, RF-MEMS Switch DC to 20 GHz

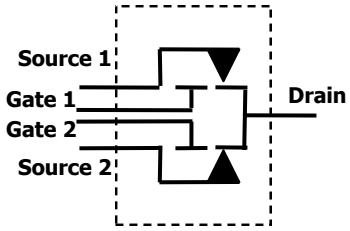


RMSW221

Features

- **High Isolation (>25 dB typical @ 18 GHz)**
- **Low Insertion Loss (typ <0.5 dB @ 10 GHz, <0.8 dB @ 18 GHz)**
- **Near Zero Harmonic Distortion**
- **No Quiescent Power Dissipation**
- **Long Life (typical lifetime >100 billion cycles @ 27 dBm, >1 billion cycles @ 30 dBm)**
- **Hermetically sealed die designed for die-attach and wire-bond to board. Please contact us for other packaging options.**

Functional Block Diagram



Description

The RMSW221 is a Single Pole Double Throw (SPDT) Reflective RF Switch utilizing Radant's breakthrough 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, telecommunications, and broadband wireless access.

Typical Device Specifications

Insertion Loss		**Lifecycle**	
DC	< 4 Ω	Cold-switched, 27 dBm	> 10^{11} cycles
2 GHz	< 0.4 dB	Cold-switched, 30 dBm	> 10^{9} cycles
10 GHz	< 0.5 dB	Cold-switched, 33 dBm	> 10^{3} cycles
18 GHz	< 0.8 dB	Hot-switched, -20 dBm	> 10^{11} cycles
		Hot-switched, -10 dBm	> 10^{9} cycles
		Hot-switched, 20 dBm	> 10^{3} cycles
Isolation		**Control**	
DC	> 1 GΩ	Gate-Source Voltage (on)	+/- 90 V
2 GHz	> 38 dB	Gate-Source Voltage (off)	0 V
10 GHz	> 26 dB	Control Power, steady-state	< 1 nW
18 GHz	> 25 dB	Control Power, 1 KHz cycle rate	< 2 µW
Return Loss		**Switching speed**	
2 GHz	< -35 dB	On	< 10 µs
10 GHz	< -30 dB	Off	< 2 µs
18 GHz	< -13 dB		
Input IP3 (Two-tone inputs 900 MHz and 901 MHz up to +5 dBm)	> 65 dBm	**Operating temperature**	
		Maximum	85 °C
		Minimum	-40 °C
		Storage temperature	
		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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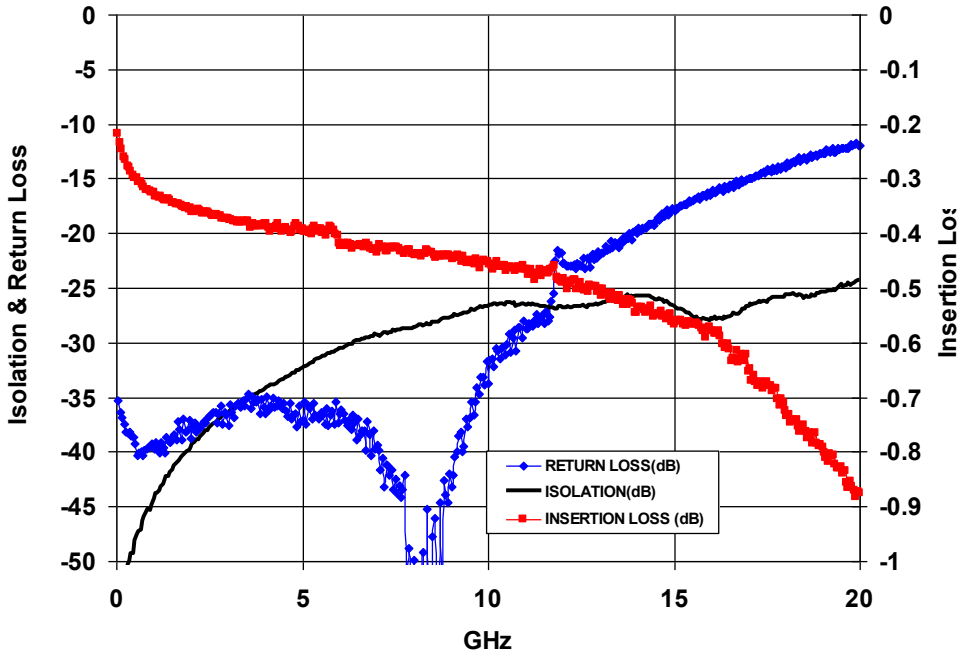
Typical RF Performance

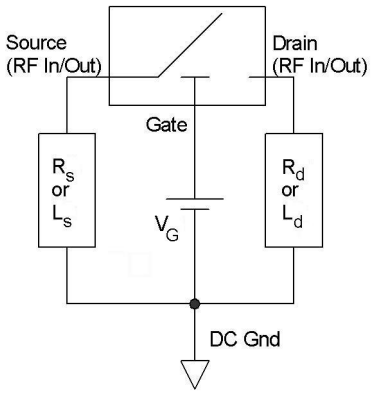


- Measured characteristics between RF ports Drain and Source 1. Similar characteristics were measured between Drain and Source 2.
- Measurement results include bond wires.

Absolute Maximum Ratings

Maximum Temperature (10 seconds) (120 seconds)	 290 °C 250 °C
Maximum Voltage, Gate-Source	+/- 110 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. Resistors R_S and R_D (40 kΩ-100 kΩ) or inductors L_S and L_D should be used to provide a path to DC Ground from Source and Drain.
3. V_G may be of either polarity.
4. V_G rise-time should be at least 10 μs for optimal lifetime.
5. Please refer to the application note entitled "Test and Handling of SPST RF-MEMS Switches" for more information. Contact us for driver solutions.

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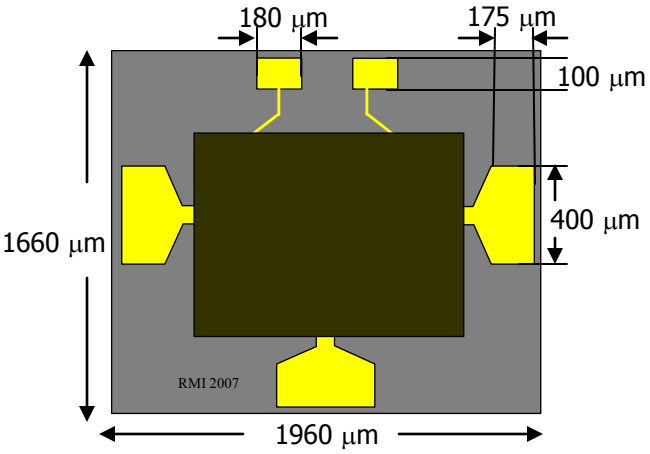
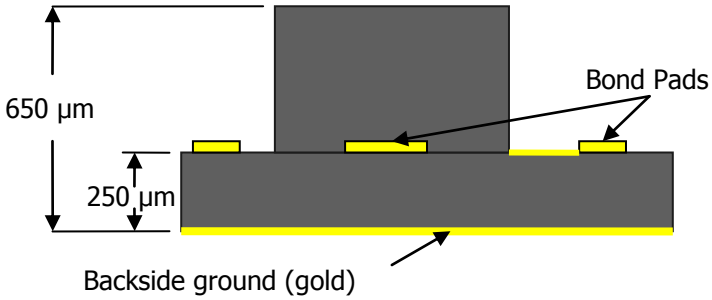
Nominal Device Dimensions





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 the application note entitled "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 the application note entitled "Test and Handling of SPST RF-MEMS Switches" for more information.

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