

## 一种低驱动电压的SP4T RF MEMS开关

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摘要：

本文设计并制备了一种低电压的静电驱动接触式单刀四掷（SP4T）RF MEMS开关。单元开关采用以低应力氮氧化硅（SiON）作为桥膜的双端固定桥式结构，并利用附着的金层形成接触结构。整个SP4T开关包括与50Ω特征阻抗相匹配的共面波导，1个输入端，4个输出端，4个静电驱动的侧拉桥，以及4个驱动引出区（pad）。测试数据表明，开关驱动电压18.8V；插入损耗 $S_{21} < 0.26\text{dB}$ @DC-3GHz,  $S_{31} < 0.46\text{dB}$ @DC-3GHz；隔离度 $S_{21} > 69.5\text{dB}$ @DC-3GHz,  $S_{31} > 69.2\text{dB}$ @DC-3GHz。结果显示，此开关的隔离度在所有输出端有很好的一致性，插损在DC-3GHz的频段内均较小，非常适合低频使用。

关键词：RF MEMS；开关；单刀多掷；接触式

## P4T RF MEMS Switch with Low Actuation Voltage

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**Abstract:**

An electrostatic actuated SP4T (single-pole multi-throw) contact RF MEMS switch with low voltage is designed and fabricated in this paper. SiON (silicon oxynitride) with low initial stress is used as the functional material of the fixed-fixed bridge of the unit switch, and gold as the contact metal. The whole SP4T switch consists of coplanar waveguide which meets 50Ω characteristic impedance match, an input port, four output ports, four static actuated bridges, and four control pads. Measurements show the actuation voltage is 18.8V, insertion loss  $S_{21} < 0.26\text{dB}$ @DC-3GHz,  $S_{31} < 0.46\text{dB}$ @DC-3GHz, isolation  $S_{21} > 69.5\text{dB}$ @DC-3GHz,  $S_{31} > 69.2\text{dB}$ @DC-3GHz. The results indicate that the isolation of the four output ports has good consentaneity, and the insertion loss is quite low. The switch is suitable for low frequency applications.

**Keywords:** RF MEMS; switch; SPMT; contact

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