

## 宽带直接接触式RF MEMS开关

作者: 郁元卫<sup>1,2</sup>, 贾世星<sup>1</sup>, 朱健<sup>1,2</sup>, 陈辰<sup>1,2</sup>

单位: 1.南京电子器件研究所,南京 210016; 2.单片集成电路与模块国家级重点实验室

基金项目:

摘要:

本文提出一种静电驱动直接接触式宽带MEMS开关, 包含CPW传输线、双U型金属悬臂梁、触点和锚区, 兼顾了开关接触可靠、克服微结构粘连和低驱动电压结构可靠性设计因素。本开关为三端口开关, 使用低温表面微机械工艺, 制作在400 $\mu\text{m}$ 厚的高阻硅衬底上, 芯片尺寸0.8mm $\times$ 0.9mm。样品在片测试结果表明, 30GHz频段, 开关本征损耗0.1dB, 隔离度24.8dB, 等效开关接触电阻0.6 $\Omega$ , 关态电容6.4fF, 开关时间47 $\mu\text{s}$ , 开关驱动电压为20-60V。

关键词: 射频微机电开关; 直接接触式; 宽带; 宽驱动电压

## A Broadband Ohmic RF MEMS Switch

**Author's Name:** YU Yuanwei<sup>1,2</sup>, JIA Shixing<sup>1</sup>, ZHU Jian<sup>1,2</sup>, Chen Chen<sup>1,2</sup>

**Institution:** 1.Nanjing Electronic Devices Institute, Nanjing,210016 2. National Key Lab. of Monolithic Integrated Circuits and Modules, Nanjing, 210016

**Abstract:**

A broadband electrostatic-driven direct-contact series MEMS switch is present, composed of a coplanar waveguide (CPW) line, two folded U-shape cantilevers, two metal contact pins and one anchor. To improve the switch's reliability, the mechanical parameters are optimized for fine ohmic contact, no stiction between the beam and the actuation electrodes and low-actuation voltage. The switch, which has 3 ports, is fabricated on 400  $\mu\text{m}$ -thick silicon substrate by low temperature metal-dielectric surface micromachining process. And its chip size is 0.8 mm $\times$ 0.9 mm. The measured intrinsic loss of the switch is 0.1dB(equivalent resistance  $R_s=0.6\Omega$ ) and the measured isolation is 24.8 dB(off-state capacitor  $C_u=6.4\text{fF}$ ) at 6GHz. The switch exhibits good mechanical properties with switching time of 47 $\mu\text{s}$  and wide actuation voltage of 20-60V.

**Keywords:** RF MEMS switch; Metal-contact; Broadband; Wide-actuation voltage

投稿时间: 2010-04-09