

一种微电容式传感器检测电路的分析与改进

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基金项目:

摘要:

介绍了一种本实验室开发的集成传感器, 它实现了敏感电容和接口电路在一块芯片上的集成。重点分析了它的接口电路, 基于施密特触发器构建, 实现敏感电容以及参考电容值与频率值的转换, 通过对两频率求差来抑制各种共模干扰。对样片进行了测试, 输出频率与理论值有较大的偏差。通过分析, 给出了测试结果偏差的原因。最后, 给该电路设计了启动电路, 改进了CMOS开关控制电路, 重新对电路的结构进行了设计, 实现了与实验室新一代传感器的集成。

关键词: MEMS; 微电容式传感器; 接口电路; 频率输出

Analysis and Improvement of an Interface Circuit of Capacitive Sensors

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Abstract:

A new integrated capacitive sensor is introduced briefly. The sensitive capacitance and the interface are integrated into one chip. The interface circuit, which is based on Schmitt trigger, works as a capacitor-frequency converter. A differential frequency circuit is designed following the oscillator. It can reduce the common-mode distribution. The output frequency displays a large difference from theoretic calculation during testing. The reason for the difference is analyzed. Circuit schematic and parameters are redesigned to realize the integration with a new sensor designed in our laboratory.

Keywords: MEMS; capacitive sensor; interface circuit; frequency output

投稿时间: 2010-03-31