

## 新型硅基MOS力敏传感器的设计与制作

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摘要:

随着汽车、航天、生物等领域对力敏传感器的越来越巨大的市场需求, 力敏传感器再次成为研究的热点。压阻式力敏传感器由于其性能稳定、制作工艺简单、稳定性好且价格低成为商家的首选。研究表明, 在应力作用下, MOS晶体管的源漏电流的大小会随着沟道区所受应力大小而变化, 具有类似压敏电阻的力敏效应。本文基于MOS晶体管的这种力敏效应, 采用晶体管和电阻构成压敏电桥, 提出了一种新型的硅基MOS力敏传感器。该器件在与传统的压阻式力敏传感器相比, 一方面继承了其制作工艺简单、稳定性和线性度好等优点, 另一方面大幅提高了传感器灵敏度并降低了功耗, 使得器件性能得到整体提高。

关键词: 力敏效应; MOS晶体管; 灵敏度; 功耗

## Design and Fabrication of a Novel Si MOS Pressure Microsensor

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**Abstract:**

With the rapid expansion of consumption electronic product markets and emerging of new technologies, such as automotive tire pressure monitoring system (TPMS), biomedicine, aerospace and so on, great research efforts have been motivated again in developing high-performance pressure microsensors with simpler IC fabrication, higher reliability and lower costs. Traditional piezoresistive pressure sensor adopts the piezoresistors to transform pressure into electric signal. Similar to the piezoresistors, MOSFET has stress sensitive phenomenon, in which the source current changes with the stress in channel region. Based on this effect, a novel Si MOS pressure microsensor is proposed. Compared with the traditional piezoresistive pressure sensor, sensitivity of the new sensor is improved significantly, and the power is decreased. It also has a simple fabrication and good linearity as well as the stability.

**Keywords:** piezoresistive; MOSFET; sensitivity; power dissipation;

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