

## 一种圆片级硅三层键合的三明治加速度传感器

作者: 徐伟鹤<sup>1,2</sup> 林友玲<sup>1</sup> 车录锋<sup>1</sup> 李玉芳<sup>1</sup> 熊斌<sup>1</sup> 王跃林<sup>1</sup>

单位: (1 中国科学院上海微系统与信息技术研究所 传感技术国家重点实验室 上海200050) (2 中国科学院研究生院 北京 100039)

基金项目:

摘要:

提出了一种利用体微机械加工技术制作的硅三层键合电容式加速度传感器。采用硅各向异性腐蚀和深反应离子刻蚀技术实现中间梁-质量块结构的制作, 通过玻璃软化键合方法完成上、下电极的键合。在完成整体结构圆片级真空封装的同时通过引线腔结构方便地实现了中间电极的引线。传感器芯片大小为 $6.8\text{mm} \times 5.6\text{mm} \times 1.26\text{mm}$ , 其中敏感质量块尺寸为 $3.2\text{mm} \times 3.2\text{mm} \times 0.42\text{mm}$ 。对封装的传感器性能进行了初步测试, 结果表明制作的传感器灵敏度约 $4.15\text{pF/g}$ , 品质因子为56, 谐振频率为774Hz。

关键词: 电容式加速度传感器; 硅硅键合; 圆片级真空封装

## A sandwich accelerometer by wafer-level silicon three-layer bonding

**Author's Name:** Weihe Xu<sup>1,2</sup>, Youling Lin<sup>1</sup>, Lufeng Che<sup>1</sup>, Yufang Li<sup>1</sup>, Bin Xiong<sup>1</sup>, Yuelin Wang<sup>1</sup>

**Institution:** (1 State Key Laboratory of Transducer Technology, Shanghai Institute of Microsystem and Information Technology, Chinese Academy of Sciences, Shanghai 200050, China) (2 The Graduate School of Chinese Academy of Sciences, Beijing 100039)

**Abstract:**

This paper presents a capacitive accelerometer fabricated by 3 silicon wafers bonded together. The cantilever-mass structure is fabricated by KOH etch and DRIE then the two static electrodes are bonded later by glass melting bonding. Through the silicon bonding, the wafer-level vacuum package is achieved and the wire-bonding PAD is made after all the fabrication work is finished. The whole dimension of the chip is  $6.8\text{mm} \times 5.6\text{mm} \times 1.26\text{mm}$  and the one of the mass is  $3.2\text{mm} \times 3.2\text{mm} \times 0.42\text{mm}$ . The performance of the sensor is tested. The sensitivity is about  $4.15\text{pF/g}$ , the Q value is 56 and the resonant frequency is 774Hz.

**Keywords:** capacitive accelerometer; silicon bonding; wafer-level vacuum package

投稿时间: 2010-03-31

[查看pdf文件](#)