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主办

冲击硅微机械加速度传感器的封装与封装性能分析

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摘 要：

本文给出了一种压阻式冲击硅微机械加速度传感器的器件封装结构并对封装的性能进行了分析。加速度传感器的封装采用可伐合金做管壳，采用环氧粘合剂将芯片粘结在金属基板上，采用金丝连接芯片铝焊点和管脚，使用环氧灌封胶充填管壳内空余的区域，来缓冲芯片受到冲击时承受的冲击应力。用ANSYS软件对封装后的器件进行了模态分析。分析结果表明，封装后加速度传感器敏感结构—悬臂梁敏感方向上的模态频率与封装前基本相同，封装后器件管壳三个破坏方向上的模态频率足够大。因此，封装不影响加速度传感器的测试性能并有良好的抗冲击能力。用霍普金森杆对封装后器件进行了冲击破坏实验。实验结果表明，引线从芯片铝焊点处脱落是冲击破坏的主要形式。

关键词：冲击硅微机械加速度传感器；封装；可伐合金；模态频率；破坏

Package of Silicon Micromachined Shock Accelerometer and Package Performance Analysis

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Abstract:

This paper presents one package structure of silicon micromachined shock accelerometer and analyzes its performance. Kovar alloy is used as accelerometer package shell. Epoxy resin binder sticks the chip on metal base. Gold lines connect chip alumina welding pads with device feet. Pour-sealing glue fills the rest room of device to relieve the shock stress acting on the chip. ANSYS software is used to analyze the vibration mode of packaged device. Analysis results show the sensed structure of packaged accelerometer— cantilever has the same mode in sensing direction as that before package. The mode frequency of packaged device in three destruction directions is large enough. So, package has no influence on accelerometer measurement performance while it presents good ability in resist shock. Destruction experiments under high shock are done with Hopkinson bar. Experiment results show the connecting lines escaping from chip alumina welding pads is the main shock destruction.

Keywords: silicon micromachined shock accelerometer; package; Kovar alloy; mode frequency; destruction

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