

双闭环真空硅微陀螺仪设计及测试性能分析

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摘要：

所设计的硅微陀螺仪工作在10pa, 品质因素达到3000, 采用CAN金属壳封装形式, 测控线路采用闭环自激驱动, 力反馈式闭环检测方式。驱动又采用单边驱动单边检测, 尽量使线路简化; 检测采用双重分解和重构回路。测试结果表明: 有用信号和正交信号实现很好的相位解耦, 互不影响。在实现标度因素的情况下, 零偏稳定性已达到了 ; 线性度已达到了 ; 带宽仿真达到 ; 这较以前设计的空气下闭环开检方式下的硅微陀螺性能提高了近2个数量级。

关键词：硅微陀螺仪, 自激驱动, 双闭环检测, 标度因素, 零偏稳定性

Design and Testing Analysis of Double closed Loop Vacuum Silicon Microgyroscope

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Abstract:

The quality factor of Silicon Microgyroscope sealed with CAN mental package in this paper working under the air pressure of 10 Pa is near 3000. Self oscillating and closed loop methods are adopted in measure and control circuit. Single side driving and sensing methods are used to simplify the whole circuit. Two channel decomposition and reconstruction closed loop are applied. The testing results demonstrat that the useful and quarduare signal will not interact because of their phase decoupling. Under the condition of the scale factor of 10 mv/o/s, the zero bias stability attains 60o/h with linearity coefficient of 400 ppm and simulated bandwidth of 150 Hz, which has been improved two order magnitude compared to under the condition of atmospheric pressure.

Keywords: Silicon Microgyroscope, Self oscillating, double closed loop, scale factor, zero bias stability

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