



GaAs基PHEMT加速度传感器的研究

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摘要：

PHEMT结构一种高电子迁移率晶体管，以其高频和低噪声等方面的优越性，成为当今微电子领域中最活跃的研究主题之一。将其良好的力敏特性应用在加速度计方面更是成为前沿的研究方向。基于GaAs基PHEMT结构压阻效应，设计加工出一种悬臂梁式微加速度传感器，通过力作用在加速度计上，改变PHEMT结构漏极电流的输出，并通过外围测试电路来检测该电流变化，从而实现力电转换。文中，对其基本原理和结构设计进行阐述，并进行力学特性的研究。结果表明，在动态测试下，PHEMT结构的漏极输出电流与栅压、漏压之间的关系与静态测试I-V特性曲线保持一致。该加速度计具有良好的线性特性，经过测试在饱和区灵敏度为0.177 mV/g。

关键词：微加速度计；PHEMT；动态测试；灵敏度；GaAs

Research on the accelerated sensor based on GaAs PHEMT

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Abstract:

Pseudomorphic HEMT has become most active research topics of micro-electronics field because of its advantages in high-frequency and low-yawp. It is one of the research directions of the most forward position to fabricate accelerator with the force-sensitive characteristic of PHEMT. According to the piezoresistive effect theory of GaAs-based PHEMT, a novel cantilever accelerated sensor has been designed and fabricated. The drain current output of PHEMT changes when the force is applied on the cantilever. And then the change of drain current is detected through the external testing circuit. The structure and mechanical characteristics are described in this paper. The testing results show that the relationship between drain current and gate voltage, drain voltage under the dynamic test is in according with the static IV characteristic. The accelerometer has good linearity and the sensitivity has been calculated 0.177mV/g in saturation region.

Keywords: micro-accelerometer; PHEMT; dynamic test; sensitivity; GaAs

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