

基于硅压阻式压力传感器的TPMS无线传感器节点设计

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摘要:

针对量程在800kPa以上进口TPMS传感器芯片价格非常昂贵和目前大客/货车安装胎压监测的必要性之间的矛盾, 本文使用TI公司生产的处理器MSP430F2112, 提出了一种高性价比的TPMS无线传感器节点设计方案, 包括总体方案、压力传感器非线性补偿算法、详细的硬件设计、软件控制策略。最后通过实验室测试表明: 该设计的硬件电路及补偿计算均较简单; 压力传感器的热灵敏度补偿效果明显; 系统无线通信可靠、组态灵活; 无线传感器节点功耗低, 体积小, 重量轻, 性价比合理, 有着广阔的应用前景。

关键词: 传感器技术; 胎压监测; 补偿; 压力传感器

Design of TPMS wireless sensor nodes with silicon piezoresistive pressure transducer

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Abstract:

It is necessary to equip TPMS on a vehicle like a van or a bus to reducing the risk of accidents that are caused by under inflated tires, however, TPMS sensor chips with maximum pressure over 800kPa are very expensive. This paper discusses the development of a novel design of TPMS wireless sensor nodes based on TI processor MSP430F2112, including the system architecture, hardware, software control strategy and the nonlinear compensation algorithm of the pressure sensor. The test results show that the temperature compensation approach of the pressure sensor is simple and effective; the proposed scheme of TPMS sensor nodes possesses the advantages of reliable communication, flexible configuration, small size, light weight, low power consumption and cost, and wide application prospect.

Keywords: Sensor Technique, Tire Pressure Monitoring, Compensation, Pressure Sensor

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