

集成温度传感器的无源UHF RFID标签设计与验证

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摘要：

针对超高频EPC C1 Gen-2协议，设计了一款集成温度传感器的无源RFID标签。系统整体构架包括射频模拟前端、数字逻辑控制器四部分。通过复用模拟前端电路产生的电流作为温度转换模块的偏置电流，采用时域数字量化法设计出极低功耗的温度传感器。通过仿真结果表明，所设计温度传感器的功耗仅为100nW。集成温度传感器的RFID标签的电路仿真及FPGA验证结果表在-20℃~80℃，有效分辨率为0.4℃。

关键词：射频识别；传感标签；CMOS工艺；低功耗；温度传感器

Design and Verification of Passive UHF RFID Tag with Integrated Temperature Se

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Abstract:

A passive RFID tag with an integrated ultralow-power temperature sensor is designed for the EPC C1 Gen-2 protocol in the UHF frequency band. The system architecture includes an analog/RF front-end, a logic control circuit, a digital temperature sensor circuit, and EEPROM memory in a standard CMOS process. By reusing the current generated by the analog front-end circuit as the bias current for the temperature sensor, a low-power temperature sensor is designed using time-domain digital quantization. Simulation results show that the average power dissipation of the temperature sensor is only 100nW. The simulation and FPGA verification results show that the designed passive UHF RFID tag with temperature sensor can meet the expected sensor function.

Keywords: RF identification; sensor tag; CMOS process; low power; temperature sensor

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