

集成于无源UHF RFID标签的宽温测范围CMOS温度传感器

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摘要:

针对无源UHF RFID标签温度测量范围小、功耗等问题, 本文提出了一种集成于无源UHF RFID标签的宽温测范围CMOS温度传感器。本文设计采用UMC 0.18 μm 1P6 M CMOS工艺进行设计, 提出一种新温度脉冲转换电路结构产生随温度变化的脉冲, 从而实现了宽温度测量。仿真结果表明: 当温度范围在 -75°C ~ 125°C 时, 温度脉冲宽度变化近220us, 标签芯片供电电压为1.5V时, 室温时新增的温度传感器模块功耗仅为200nw, 温度传感器精度为 $0.45^{\circ}\text{C}/\text{LSB}$ 。测试结果: 在室温 25°C 左右振荡器频率2.087MHz, 脉冲宽度大约110us, 异步计数器显示为011011000。

关键词: 无源RFID; 温度传感器; 宽温测范围; 新型温度补偿性振荡器

An wide temperature measuring range CMOS Temperature Sensor Integrated in Passive UHF RFID tag

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Abstract:

In allusion to temperature measurement range small and power consumption of Passive UHF RFID tag, This paper presents an wide temperature measuring range CMOS Temperature Sensor Integrated in Passive UHF RFID tag. It is implemented in UMC 0.18 μm 1P6M CMOS process. In this paper, a new temperature pulse convert circuit structure is presented with the temperature' s change, so as to implement the wide temperature measurement. The simulation results shows that the change of temperature pulse width is nearly 220us when temperature is from -75°C to 125°C under supply voltage 1.5V. At room temperature this new temperature sensor module' s power consumption is only 200nw. The temperature sensor resolution is $0.45^{\circ}\text{C}/\text{LSB}$. Test results shows the frequency of oscillator is 2.087 MHz around 25°C , pulse width is about 110 us, asynchronous counter displays 011011000.

Keywords: Passive UHF RFID; Temperature sensor; Wide temperature measuring range; temperature compensating oscillator

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