

集成CMOS温度传感器设计、实现和测试

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摘要:

基于MOS管的阈值电压和载流子迁移率随温度的变化关系, 设计了一种与CMOS工艺兼容的集成温度传感器。该温度传感器选用chartered 0.35 μm 工艺库, 以Cadence进行电路图、版图设计, 并以Cadence Spectre工具进行仿真, 最后经流片、测试, 实测与仿真对比结果显示: 温度在25 $^{\circ}\text{C}$ ~105 $^{\circ}\text{C}$ 之间变化时, 输出频率的变化范围为10.19~5.81MHz, 且有较好的线性。此传感器对片上系统温度的监测、过热报警和振荡器频率漂移的补偿等均有重要的意义。

关键词: 互补对称金属-氧化物半导体; 温度传感器; 频率; 测试; 分析

Achievement and Test on the Integrated CMOS Temperature Sensor

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Abstract:

A integrated temperature sensor compatible with general CMOS process is designed based on the change of threshold voltage and carrier mobility in MOS transistor caused by temperature. Using 0.35 μm file of charter, this temperature sensor circuit is simulated with Cadence Spectre, the circuit diagram and layout is designed by Cadence. After been taped-out and tested, the result of comparing simulation with test shows that the temperature changes between 25 $^{\circ}\text{C}$ ~105 $^{\circ}\text{C}$, the output frequency's range of variation is 10.19~5.81MHz, and has the good linearity. It has the important significance for on-chip system temperature monitoring, thermal alarm and oscillator frequency drift compensation.

Keywords: CMOS; Temperature sensor; Frequency; Test; Analysis

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