一种低电压低功耗射频接收前端电路的设计

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摘　要：介绍了一种工作在 900 MHz ISM 频段的低电压低功耗射频接收前端，包括一个自偏置反相器结构的低噪声放大器和一个开关跨导型混频器.低噪声放大器利用电流复用技术以有限的电流实现较高的增益.混频器采用开关跨导技术、电流复用技术以及动态阈值电压技术以实现低电压低功耗.该射频接收前端在 180 nm CMOS 工艺下流片并测试，测试结果显示，该射频接收前端在 840~960 MHz 频段内 S11＜-10 dB，实现了 22.5 dB 转换增益及 8.5 dB 单边带噪声系数，输入三阶交调点为-10.1 dBm，在 0.8 V 电源电压下消耗 2 mW 功耗.

关键词：射频接收前端；低电压；低功耗；动态阈值电压；开关跨导型混频器

A Low Voltage Low Power RF Receiver Front-End

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Abstract：A low voltage low power RF receiver front-end at 900 MHz ISM band is described. It includes a self-biased inverter low noise amplifier (LNA) and a switched transconductance (switched-g_m) mixer. The current-reuse technique is employed to achieve a high gain with restricted current consumption in the design of LNA. The mixer adopts switched-g_m, current-reuse and dynamic threshold voltage techniques for low voltage low power applications. The RF receiver front-end was fabricated and measured in 180nm CMOS process. The measurement results show the RF receiver front-end achieves a conversion gain of 22.5dB with S11＜-10 dB in the 840~960 MHz band, a single side band noise figure of 8.5 dB, and an input referenced third intercept point of －10.1 dBm with only 2 mW power consumption from 0.8 V supply.

Key words：RF receiver front-end; low voltage; low power; dynamic threshold voltage; switched-g m mixer

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