

基于反嵌套共源共栅米勒补偿的 LDO 设计

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摘要: 基于反嵌套式共源共栅米勒补偿提出了单极点系统的无电容型 LDO 线性稳压器. 该稳压器采用由反相增益级和反相可变增益级组成的可变增益缓冲器, 可提高 LDO 的压摆率和负载瞬态变化时的稳定性. 基于 TSMC 0.25 μm CMOS 工艺, 设计了一款 2.5 V 200 mA 的适合 SoC 应用的无电容型 LDO, 仿真结果表明其漏失电压为 150 mV, 在 1 mA 到 200 mA 的负载电流范围内, 该 LDO 在输出电容为 0~1 μF 的范围内都能稳定, 负载电流为 200 mA 时, 环路的最大相位裕度可达 86° , 最小相位裕度高达 76° .

关键词: 低压差线性稳压器; 无电容型; 反嵌套式共源共栅米勒补偿; 可变增益缓冲器

A Capacitor-free Low-dropout Regulator Based on Reversed Nested Cascode Miller Compensation

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Abstract: Based on reversed nested cascode miller compensation (RNCMC), a single pole system of capacitor-free low-dropout regulator is presented. The LDO adopts a variable-gain-buffer that consists of an inverting stage and a variable gain inverting stage to improve the slew rate and the stability of load stepping. A 2.5 V 200 mA capacitor-free LDO for SoC application is targeted by TSMC 0.25 μm CMOS process in this paper. Simulation results shows that the dropout voltage is 150 mV, the LDO's load current is from 1 mA to 200 mA and the LDO can be stable in the range of 0 to 1 μF for output capacitance, the maximum phase margin is up to 86 degrees and the minimum is 76 degrees when the load is at 200 mA.

Key words: LDO; capacitor-free; RNCMC; variable-gain-buffer

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