

14位200MS/s电流舵式D/A转换器的设计

宁可庆,戴澜,孙海燕

(北方工业大学微电子系,北京100144)

摘要:设计了一款基于SMIC 0.18 μm 标准CMOS工艺的14-bit CMOS分段式数模转换芯片.采用5+4+5分段式结构,通过二进制计码和温度计码结合的方法对输入数字量进行译码.通过使用高输出阻抗的共源共栅电流源结构提高了DAC整体性能.采用了Q2随机漫步选择方法对电流源和开关阵列进行版图布局,保证了版图的对称性和减少梯度误差的影响.最终在信号频率为0.9993 MHz,采样频率为200 MHz的情况下,SFDR后仿真结果超过90 dB.
关键词: CMOS; 电流舵; 数模转换; SFDR

A 14-bit 200 MS/s Current-steering D/A Converter

NING Ke-qing, DAI Lan, SUN Hai-yan

(Department of Microelectronics, North China University of Technology, Beijing 100144, China)

Abstract: A 14-bit current-steering digital to analog converter with segmented structure is designed and fabricated by SMIC 0.18 μm technology in this paper. It adopts 5+4+5 segmented architecture and both binary and thermometer decoder are resulted in this design. Cascode current source construction is adopted to improve its output impedance which is crucial to the performance of the proposed DAC. Q2 Random Walk switching scheme is applied to ensure the systematic and decrease the graded errors in the layout of current source. With 0.9993 MHz input signal and 200 MHz sample clock the SFDR of the DAC is over 90 dB.

Key words: CMOS; current steering; digital-to-analog; SFDR

作者简介:

宁可庆 男, (1983-), 博士研究生, 实验师.研究方向为大规模集成电路设计与测试.

戴澜 (通讯作者) 男, (1975-), 副教授.研究方向为大规模集成电路设计. E-mail: per_fectdai@163.com.