应用于4G的两级BiCMOS射频功率放大器设计

王 巍,蔡文琪,莫 啸,胡 凤,王明耀,杨正琳,袁 军
(重庆邮电大学 光电工程学院,重庆 400065)

摘 要:设计一个基于SiGe BiCMOS工艺的共源共栅结构的两级功率放大器.第一级采用差分共源放大器,将输入匹配送来的信号进行预放大,同时抑制噪声.第二级主功放采用BiFET共源共栅结构,以提高线性度.基于JAZZ 0.18 μm SiGe BiCMOS工艺库,采用Cadence Spectre RF对功率放大器进行仿真.实验结果表明,在3.3 V电源电压下,最高功率增益达到32 dB,输出1 dB压缩点处功率为29 dBm,有较好地线性度,在2.3~2.7 GHz频段内S11和S22均小于-10 dB,匹配良好.最大功率附加效率为22.1%,可用于WIMAX无线通信的2.3~2.7 GHz频段.

关键词:射频功率放大器;SiGe;BiFET
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Design of Tow Stage SiGe BiCMOS RF Power Amplifier for 4G Applications

WANG Wei, CAI Wen-qi, MO Xiao, HU Feng, WANG Ming-yao, YANG Zheng-lin, YUAN Jun
(College of Electronics Engineering, Chongqing University of Posts and Telecommunications, Chongqing 400065, China)

Abstract: A 2-stage cascode structure power amplifier(PA) with SiGe BiCMOS technology is proposed. The first stage is a differential common-source amplifier, which is used to amplify the signal from the input matching, meanwhile, it can suppress noise. And the second stage is a BiFET cascade amplifier which is used as main power amplifier to improve the linearity. The proposed PA is designed with Jazz's 0.18 μm SiGe BiCMOS technology. The simulation results with Spectre RF show that the PA achieved a Gain of 32 dB, a P1dB of 29 dBm. Within the operating frequency rage of 2.3~2.7 GHz, the PA has an S11 and S22 below -10 dB, and the peak PAE is 22.1%.

Key words: RF PA; SiGe; BiFET

作者简介:

王 巍 男,(1967-),博士,教授.研究方向为集成电路设计、半导体器件.

蔡文琪(通讯作者) 女,(1991-),硕士.研究方向为微波与射频集成电路.E-mail:747169109@qq.com.

莫 啸 男,(1990-),硕士.研究方向为模拟预设IC设计.

胡 凤 女,(1991-),硕士.研究方向为射频集成电路.