吉首大学学报自然科学版 » 2011, **Vol. 32** » Issue (3): 51-54 DOI:

基于吉尔伯特型的CMOS射频混频器的设计

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Design of CMOS RF Mixer Based on Gilbert Cell

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摘要 采用多晶电阻作为输出负载、开关对的源极注入电流、共源节点串联电感、驱动级的源简并阻抗方法，提出了一种新型的双通道正交混频器，并采用Candence完成了电路设计.仿真结果表明：在电源电压为1.8V,本振信号输入功率为3 dBm的时,混频器在1 MHz中频处的单边带噪声系数为7.47 dB，在100 kHz中频处为9.35 dB，在10 kHz中频处为16.39 dB；变频增益降为8.46 dB.提高了线性度,且其三阶交调点为8.42 dBm.

关键词： 吉尔伯特型混频器 正交混频器 CMOS工艺

Abstract: A novel double channel quadrature mixer is proposed in the paper.In this mixer,polycrystal resistance,source injection current of switch transistor,series inductor of common source node,degeneration impedance in driving stage were adopted.The circuit was designed and simulated by Candence.The results indicated that the SSB noise factors were 7.47 dB/Hz@ 1 MHz,9.35 dB/Hz@ 1 MHz and 16.39 dB/Hz@10 kHz when the input power was equal to 3 dBm with VDD=1.8 V.In addition,the conversion gain decreased to 8.46 dB to increase linearity,and the 3th point of intermodulation was 8.42 dBm.

Key words: Gilbert mixer quadrature mixer CMOS process

基金资助:

湖南省教育厅科学研究资助项目(10C0109)

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引用本文:

周少华. 基于吉尔伯特型的CMOS射频混频器的设计[J]. 吉首大学学报自然科学版, 2011, 32(3): 51-54.

ZHOU Shao-Hua. Design of CMOS RF Mixer Based on Gilbert Cell[J]. Journal of Jishou University（Natural Sciences Edit, 2011, 32(3): 51-54.

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