

一种 25 Gbps 硅基 MZ 电光调制器驱动电极的设计

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摘要: 为了满足高带宽、高密度的数据互联需求, 本文基于 IMEC 的硅光子 SOI 工艺提出了一种紧凑型行波驱动电极的马赫-曾德 (MZ) 调制器结构. 本文详细分析了设计高速行波电极需解决的问题, 包括考虑阻抗匹配、微波损耗以及电光信号的速度匹配问题. 设计实现了单通道 MZ 调制器电光调制 3 dB 带宽 17 GHz, 可支持 25 Gbps 的传输速率. 同时为了应用于多通道高密度的电光集成互联中, 优化了电极结构, 使得 MZ 调制器面积节省 25%.

关键词: 硅基光互联; 电光调制器; 高速行波电极

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Design of 25 Gbps Silicon MZ Electro-optic Modulator Driving Electrodes

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Abstract: In order to meet the needs of high-bandwidth and high-density data interconnection, this paper proposes a compact Mach-Zehnder modulator structure based on IMEC's Silicon Photonic SOI process. The paper analyzes the problems in the design of high speed traveling wave electrodes in detail, including RF loss and the matching of impedance and velocity. The electro-optical modulation 3 dB bandwidth is achieved 17 GHz, and can working at 25 Gbps data rate. At the same time, in order to be applied to multi-channel high-density electro-optic integrated interconnection, the electrode structure is optimized so that the area of the MZ modulator is saved by 25%.

Key words: silicon photonics interconnect; electro-optic modulator; high-speed traveling-wave electrodes

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