光子学报 2009, 38(8) 1914-1919 DOI: ISSN: 1004-4213 CN: 61-1235/O4

论文

1×|N 信道聚合物微环谐振器电光开关阵列的开关特性

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摘要：

利用耦合模理论、电光调制理论和微环谐振理论，提出了一个完善合理的聚合物微环谐振器电光开关阵列模型.该器件由1条水平信道、N条竖直信道和N个微环构成，在微环上施加不同方式的驱动电压，可以实现N＋1条信道的开关功能.以1×8信道结构为例，在1 550 nm谐振波长下对该器件进行了优化设计和模拟分析.其结果是：微环波导芯的截面尺寸为1.7×1.7 μm2，波导芯与电极间的缓冲层厚度为2.5 μm，电极厚度为0.2 μm，微环半径为13.76 μm，微环与信道间的耦合间距为0.14 μm，输出光谱的3 dB带宽约为0.05 nm，开关电压约为12.6 V，插入损耗约为0.67~1.26 dB，串扰小于－20 dB，开关时间约为11.35 ps.

关键词： 光通信 微环阵列 电光开关 开关电压 开关时间

Switching Characteristics of a 1×N Electro-optic PolymerMicroring Resonator Switch Array

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Abstract:

In terms of the coupled mode theory, microring resonance theory and electro-optic modulation theory, a reasonable project is proposed for designing an electro-optic polymer microring resonator switch array. This device consists of 1 horizontal channel, N vertical channels and N microrings. By applying different manners of the operation voltage on the microrings, the switching functions can be realized in the N+1 channels. Taking 1×8 channels as an example, the optimization and simulation are performed under the resonant wavelength of 1550 nm. The results are as follows: the core size of the microring is 1.7×1.7 μm2, the buffer layer thickness between the core and the electrode is 2.5 μm, the electrode thickness is 0.2 μm, the microring radius is 13.76 μm, the coupling gap between the micoring and the channel is 0.14 μm, the 3-dB bandwidth of the output spectrum is about 0.05 nm, the switching voltage is about 12.6 V, the insertion loss is about 0.67~1.26 dB, and the crosstalk is less than -20 dB, and the switching time is about 11.35 ps.

Keywords: Optical communications Microring resonator array Electro-optic switch Operation voltage Switching time

收稿日期 2009-01-14 修回日期 2009-04-01 网络版发布日期 2009-08-25

DOI:

基金项目:

国家973项目;国家自然科学基金资助

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