Compact 16 × 16 channels Routers based on Silicon-On-Insulator AWGs.


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We demonstrate an ultra small 16 × 16 channels 400 GHz wavelength Router on SOI. Insertion loss from center channel input to center channel output, non-uniformity over outer most output channel to center channel output and non-uniformity over outer most input channel to center channel input are −3.00 dB, 2.09 dB and 1.79 dB respectively. Crosstalk of the device is 20 dB. The device size is only 475 × 330 μm².

Introduction

Arrayed Waveguide Gratings (AWG) are one of the most components in WDM systems, which have high commercial interest because of high transmission capacity and more flexibility in the telecommunication network. AWG works as both wavelength division multiplexer and demultiplexer. With an appropriate combination of two free propagation regions (FPR) and an array of waveguides with a linear increment of length makes an AWG. Dragone in 1991 extended the concept of AWG from 1 × N channels to N × N channels device, which is popular as a wavelength router [1] [2]. Figure 1 shows a schematic diagram of a 16 × 16 channels 400 GHz wavelength Routers.

Figure 1: Schematic diagram of a 16 × 16 channels 400 GHz wavelength Routers.

In SOI due to the sharp bend radius [3] and the high group index of the waveguides makes the router very compact but sensitive to phase noise. So demonstration of such a device in SOI platform is difficult.

Working Principle

The operation of the regular AWG is described as follows. A light beam propagating through the waveguide enters into the first star-coupler and diverges. This diverging light beam is coupled in the arrayed waveguides and propagates to the second star-coupler. The
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