Common coupling methods in silicon photonics technology include



Overview

Generally, there are two main approaches of fiber-to-chip coupling, namely vertical coupling (or off-plane coupling) and butt coupling (or edge coupling/in-plane coupling) [12, 13], according to the relative position of fiber and the photonic chip. Optical interconnects is an important issue in silicon photonic integrated circuits for transmitting light, and fiber-to-chip optical interconnects is vital in application scenarios such as data centers and optical transmission systems. The large mismatch in mode field size and refractive index between standard single-mode fibres and. This study introduces low-loss coupling strategies and their implementation for a silicon nitride integrated platform. Here we present an overview of coupling technologies, optimized designs, and a tutorial on manufacturing techniques for inverted tapers, which enable effective coupling for both. Fiber-to-silicon photonic chip interfaces can be broadly divided into two principle categories: in-plane and out-of-plane couplers. Devices falling into the first category typically offer relatively high coupling efficiency, broad coupling bandwidth (in wavelength), and low polarization dependence. Photonic integrated circuit technology (silicon photonics) is used for many applications including optical data communications, optical and quantum computing, and sensing including LiDAR, biomedical and environmental. In “end-fire” configurations the optical coupling takes place at the edge of the chip.

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Article Content

Edge Couplers in Silicon Photonic Integrated Circuits: A

There are mainly two categories of fiber-to-chip optical coupling: off-plane coupling and in-plane coupling. Grating couplers work under the former

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Two principal classes of coupling methods have emerged. Grating couplers employ diffractive elements patterned on the silicon surface to redirect light vertically into the chip, offering...

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Tutorial on Silicon Photonics Integrated Platform Fiber Edge Coupling

Here we present an overview of coupling technologies, optimized designs, and a tutorial on manufacturing techniques for inverted tapers, which enable effective coupling for both transverse

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In this work, we designed a fiber-to-chip grating coupler whose spot size and coupling position are tailored to maximize coupling efficiency and to

Photonic Wire Bond Packaging for Silicon Photonics, Optical Fibers

Capabilities and advantages of the PWB technique include: gain chip integration with existing ''known good die'', dense optical I/O connections to the chip, scalability from prototyping to high-volume, and

Coupling Strategies for Silicon Photonics Integrated Chips

To overcome this issue, the scientific community has proposed different solutions over the last 20 years, which can be schematically divided into two main categories: “end-fire” and “vertical” coupling

Coupling strategies for silicon photonics integrated

As fiber-to-chip couplers are inherently related to packaging technologies and the co-design of optical packages has become essential, we also review the main

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Coupling strategies for silicon photonics integrated

Over the last 20 years, silicon photonics has revolutionized the field of integrated optics, providing a novel and powerful platform to build mass

A comprehensive analysis of silicon photonic switching chips

Recently, interest has increased in the flexibility of silicon-integrated photonic system design with the complementary metal-oxide semiconductor (CMOS) advancements, which enables

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Basic Concept of Silicon Integrated Photonics Plug-and-Play: silicon photonics module converts electronic data to photons and back again. Silicon circuitry helps optical modulators encode

Silicon photonics

Silicon photonics is the study and application of photonic systems which use silicon as an optical medium. The silicon is usually patterned with sub

Edge Couplers in Silicon Photonic Integrated Circuits: A

Silicon photonics has drawn increasing attention in the past few decades and is a promising key technology for future daily applications due to its

Handbook of Silicon Photonics

To reach these goals, efficient passive and active silicon photonic devices, including waveguide, modulators, photodetectors, multiplexers, light sources, and various subsystems, have been

10.8 Coupling to Optical Devices

Content preview from Silicon Photonics: Fundamentals and Devices 10.8 Coupling to Optical Devices One of the challenging tasks in optical systems is efficiently coupling light into and out of the OEIC. In

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Leveraging on the mature processing infrastructure of silicon microelectronics, silicon photonic integrated circuits may be readily scaled to large volume production for low-cost high-volume ...

Review Grating Couplers on Silicon Photonics: Design Principles ...

Abstract: Silicon photonics is an enabling technology that provides integrated photonic devices and systems with low-cost mass manufacturing capability. It has attracted increasing attention in ...

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