

Fiber Optic V-groove Coupler



AI Overview

A fiber optic V-groove coupler precisely aligns optical fibers in V-shaped grooves to enable low-loss, stable coupling with photonic devices or fiber arrays. Overview A fiber optic V-groove coupler is a device in which optical fibers are seated in microscopic V-shaped grooves etched into a substrate, typically silicon or Pyrex, to achieve precise alignment with photonic components or other fibers. The bare fiber cores rest in these grooves and are secured using adhesives or pressure, with the end faces polished to ensure minimal insertion loss. This structure allows passive alignment, reducing the need for time-consuming active alignment during assembly. Design and Fabrication V-grooves are fabricated using precision etching techniques on silicon or Pyrex substrates. In silicon photonics, CMOS-compatible etching can integrate V-grooves with inverted taper waveguides, improving fiber-to-chip coupling efficiency. The grooves define the fiber pitch and orientation, enabling high-density fiber arrays and reproducible geometry for linear modules. For polarization-sensitive applications, PANDA-type polarization-maintaining fibers can be aligned in the grooves with sub-degree accuracy to minimize polarization-dependent loss (PDL) and polarization mode dispersion (PMD). Alignment and Coupling The V-groove geometry ensures that fibers are passively aligned along the desired optical path. Epoxy or adhesive is carefully dispensed to avoid lifting the fiber due to buoyancy, and a cover plate may be used to press the fiber against the groove walls for stability. This method achieves sub-micron alignment accuracy, critical for low-loss coupling to photonic integrated circuits or fiber arrays. In silicon photonics, V-grooves can be combined with inverted taper structures to further reduce coupling loss, with reported losses around 7.5 dB at 1.55 μm . Applications Fiber V-groove couplers are widely used in: Silicon photonic integrated circuits (PICs) for edge or vertical coupling High-density fiber arrays in optical communication systems Sensing systems and co...

Article Content

Co-Packaged Optics (CPO) Market Analysis: 1.6T Transition & AI

Assembly and Processing: Yield Arbitrage V-Groove Etching and Bonding: The integrity of fiber fixation relies on the V-groove substrate. Premium manufacturing platforms have achieved

V-Groove assisted passive assembly of single-mode fibers to ultra ...

We demonstrate SiN-based edge couplers with better than -1.5dB/fiber coupling efficiency to SMF28 fibers for both TE and TM polarization in O- and C-band. V-Groove assisted passive assembly of 80

CMOS Compatible Silicon Etched V-Grooves Integrated with an SOI

Here we report experimental realization on the integration of silicon etched V-grooves with a SOI inverted taper based fiber coupling structure fabricated with CMOS fabrication tools, allowing an

Fiber Array Units | FAUs for Next-Generation (Next-Gen

Corning fiber array units (FAUs) are engineered for long-haul, metro, and data center applications, delivering ultra-precise fiber alignment with low insertion loss

Enhancing Optical Integration with Fiber V-Groove Arrays

Because this structure allows stable positioning and reproducible geometry, fiber V-groove arrays serve as building blocks in linear fiber modules, allowing compact,

Optical on-wafer probing with v-groove couplers

“V-groove” couplers are features in optical circuitry to connect optical fibers to an integrated circuit (IC) device. These couplers include v-shaped grooves or channels in close...

V-groove Fiber Alignment-FutureFiber Solutions

Precision fiber optic V-Groove is mainly used for coupling the optical fiber link testing, experimentation and construction of optical fiber and optical fiber. Which has a simple structure, reliable, easy to

SQS | Fiber Optics & Laser Systems

SQS specializes in custom fiber optic products and laser systems. Discover our V-groove & 2D matrix fiber arrays, feedthroughs, bundles, light guides, collimators,

Transceiver V-Groove Assemblies | Optical Fiber

OFP manufactures a wide range of specialty fiber vee groove arrays (FVAs) for coupling optical fiber channels with extreme precision.

Custom Fiber Array, PBS, Optical Switch And Other

MEISU is a designer & producer of custom optical fiber array sub-assembly in China, providing optical assemblies including 2D fiber arrays, linear v groove

What Is a V-Groove Fiber Array? Applications and

In the ever-evolving landscape of photonics and fiber optic technologies, V-groove fiber arrays have emerged as a crucial component for achieving precision

Fiber V Groove Array (FVA)

for coupling optical fiber channels with extreme precision and reliability to active devices such as PIC's, VCSELs, free space collimating arrays, and MLAs. FVA assemblies are commonly used in

Corning and GF to launch detachable fibre connectors

Corning and GlobalFoundries have announced a collaborative effort to develop a detachable fibre connector solution for the GF Fotonix™ silicon

Fiber array Coupling Solutions for Silicon Photonics Chip

In this coupling scheme, the end face of the silicon chip is etched to form a V groove array for placing the fiber array, as shown in Figure. The green cuboid is polymer

How Intel Foundry Packaging Technologies Redefine AI

Suitable for wafer level and package level assembly, this architecture will potentially enable energy efficient, high bandwidth AI scale-up networks in

Enhancing Optical Integration with Fiber V-Groove Arrays

As optical systems push toward higher density, tighter integration, and more precise coupling, fiber V-groove arrays will continue to serve as a core enabler of

CMOS Compatible Silicon Etched V-Grooves Integrated with an SOI Fiber ...

In conclusion, the demonstration of the integration of an inverted taper-based fiber coupling structure with silicon etched V-grooves is reported. Fabrication has been carried out using CMOS fabrication

Advanced 2D Fiber Array Assemblies for Silicon Photonics, OXC, and ...

The performance of a fiber-optic system depends not only on the optical chip itself but also on the precision of the fiber array alignment process. High-quality fiber optic array assemblies provide

Fiber Optic Solutions for High-Performance | Diamond SA

Innovating High-Performance Fiber Optic Solutions At DIAMOND, we combine decades of experience in high-performance fiber optic solutions with state-of-the

High power optical fiber laser array holographic coupler manufacturing ...

Current approaches of injecting high power pump light into optical fibers include end-pumping, tapered fiber bundles, V-groove side pumping, embedded-mirror side pumping, geometrically multiplexed

Fabrication of a V-groove on the optical fiber connector using a ...

The V-groove for fiber optic component is fabricated by the traditional method using the miniaturized machine tool. Our study shows that the machined V-groove can be obtained on both

400nm R10 T90 Non-Polarizing Beamsplitter Plate-Laser Line Beam ...

Name: 400nm R10 T90 Non-Polarizing Beamsplitter Plate P/N:
NPBSP-400-R10-R-05080200Keywords: Dia50.8xT2.0mm,BK7,400nm,R10T90,45deg
Unit Price: S\$580.00/pc Available:

V-grooves: Solving the Fiber Coupling Problem

Discover how Atomica's V-groove technology can facilitate low cost, high volume manufacturing of low loss, stable connections between silicon photonic

Custom Fiber Arrays

We manufacture high-precision custom V-groove fiber arrays for SM, MM, PM, MCF, and UHNA fibers. Our portfolio includes standard arrays, collimated arrays with microlens arrays (MLA), lidless or

V-grooves: Solving the Fiber Coupling Problem

eBook V-grooves: Solving the Fiber Coupling Problem As we move to terabit ethernet, fiber arrays will become increasingly important to hyperscale data

FiberLife V-Groove Fiber Aligner – High-Precision Fiber

With a V-Groove design, these tools ensure stable alignment, reducing signal loss and enhancing coupling efficiency. Ideal for fiber optic communication, laser

GlobalFoundries and Corning Collaborate To Deliver Detachable Fiber ...

Other coupling mechanisms are also being developed, including a vertically-coupled detachable fiber-to-PIC (Photonic Integrated Circuit) solution—demonstrating GlobalFoundries and

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