

# Full-duplex single-core optical module



## AI Overview

Full-duplex single-core optical modules, also known as BiDi SFP or QSFP transceivers, enable simultaneous bidirectional data transmission over a single optical fiber using wavelength division multiplexing (WDM). Overview A full-duplex single-core optical module allows data to be transmitted and received at the same time over a single strand of optical fiber, unlike traditional duplex modules that require two fibers—one for transmitting (TX) and one for receiving (RX) data. These modules are commonly referred to as BiDi (bidirectional) SFP or QSFP modules and are widely used in environments where fiber resources are limited or expensive, such as data centers, metro networks, and enterprise campus links. How It Works The core technology behind these modules is Wavelength Division Multiplexing (WDM). Each module uses two distinct wavelengths: one for transmitting and another for receiving. For example, one end may transmit at 1310 nm and receive at 1550 nm, while the opposite end uses the complementary wavelengths. Inside the module, a WDM coupler separates and combines the wavelengths, allowing a single LC optical interface to carry both directions simultaneously. Each BiDi module typically integrates: DFB or FP laser for stable wavelength output PIN photodiode receiver for signal detection Internal WDM coupler to separate inbound and outbound optical paths This setup supports full-duplex communication while reducing fiber usage by up to 50%. Benefits Fiber Savings: Cuts fiber requirements in half, ideal for fiber-constrained networks Cost Efficiency: Reduces CAPEX and OPEX by minimizing fiber procurement, trenching, and maintenance High-Speed Transmission: Available in speeds from 1.25G SFP modules up to 100G QSFP28 modules Simplified Deployment: Fewer physical connections reduce cabling complexity and potential failure points Hot-Swappable & Standards-Compliant: Compatible with SFP/SFP+ MSA, QSFP28 standards, and common networking protocols Applications Full-duplex single-core o...

## Article Content

### Cisco SFP Modules for Gigabit Ethernet Applications

This data sheet describes the benefits, specifications, and ordering information for the Cisco SFP Modules for Gigabit Ethernet Applications.

### Cisco 10GBASE SFP+ Modules Data Sheet

The Cisco® 10GBASE SFP+ modules (Figure 1) give you a wide variety of 10 Gigabit Ethernet connectivity options for data center, enterprise

### Optical Interconnect Technology Analysis: LPO, NPO,

Exploring optical interconnects for AI data centers: LPO for low-power, short-distance links, NPO for high-density, near-package connections,

### Legrand AV | C2G | USB-C Docking Stations, HDMI, HDBaseT,

The C2G Thunderbolt™ 5 USB-C Cable is Intel®-certified and designed for ultra-fast data transfer, high-resolution video, and powerful device charging.

### Simplex vs Duplex Fiber Cable: Key Differences and How to Choose

Check the Optical Module Type The first step is to determine whether the optical transceiver is designed for single-fiber or dual-fiber transmission. If the link uses standard optical modules with separate

fiber optic cable multimode versus singlemode duplex vs simplex

Workstations, fiber switches and servers, fiber modems, and similar hardware require duplex cable. Duplex fiber is available in singlemode and multimode. Simplex Simplex fiber optic cable consists of

### Ericsson RPM 253 1610 CPRI FTTA Duplex LC Single Mode Outdoor

The Ericsson RPM 253 1610/50M is a professional-grade outdoor duplex single-mode FTTA fiber optic cable designed for CPRI/eCPRI signal transmission between BBU and RRU equipment in LTE and

### 1G BiDi SFP Module High-Speed Fiber Optic Connectivity

Our 1G BiDi SFP transceivers enable full-duplex communication over a single fiber, reducing fiber usage while maintaining reliable performance. Ideal for enterprise networks, data centers, and telecom

### Cisco 40GBASE QSFP Modules Data Sheet

The Cisco® 40GBASE QSFP (Quad Small Form-Factor Pluggable) portfolio offers customers a wide variety of high-density and low-power 40 Gigabit Ethernet connectivity options for

## Simplex vs Duplex Fiber Optic Cables: Key Differences & Guide

Confused about simplex vs duplex fiber optic cables? Learn key differences, BiDi & WDM technology, FTTH vs data center use cases, and how to choose the right fiber.

## Guide to 10G BiDi SFP+ Optical Transceivers

In this guide, we dive into Fibrecross's portfolio of 10G SFP+ Optical Transceivers, explain how BiDi optics work, compare module options, and share best practices

## BiDi Optical Modules: Unlocking Single-Fiber

BiDi modules deliver a powerful approach to fiber savings and cost reductions through full-duplex communication over a single fiber strand. BiDi

## 100G QSFP28 Single Fiber (BiDi) Modules: Technology, Benefits ...

Single fiber QSFP28 modules (commonly called BiDi transceivers) enable full-duplex 100G communication over a single optical strand. They do this by using Wavelength Division

## 10G X2 ZR Module Guide: Specs, Compatibility & Sourcing

The phrase "10G X2 ZR" refers to a specialized 10 Gigabit Ethernet optical transceiver module designed for ultra-long-haul connectivity, reaching up to 80 km over single-mode fiber Fibermall Exaoptics. Key

## The Ultimate Guide to SFP Modules (2026): Types,

Read the definitive 2026 guide on SFP modules. We explain Single Mode vs Multimode, DDM diagnostics, and how to choose the right transceiver for Cisco,

## The Most Comprehensive Guide Of Optical Modules

Explore the ultimate guide to optical modules. Learn types, functions, performance metrics & how to choose the right module for your fiber network.

## Optic Modules Datasheet

Features and Benefits The following table lists the different pluggable optic modules and supported platforms, along with the technical specifications for each.

## Cisco Transceiver Modules

Cisco Transceiver Modules - Learn product details such as features and benefits, as well as hardware and software specifications.

## Simplex vs Duplex Fiber Optic Cable – Key Differences

Fiber optic cables are divided into single-mode, multimode, simplex, and duplex. For information on single-mode and multimode fiber, please refer to

## Differences Between Dual Fiber SFP and Simplex SFP

Dual fiber SFP and simplex SFP modules are two different SFP types, and understanding their differences is crucial for making informed

Comprehensive Guide to FS 10G BiDi SFP Modules

10G BiDi SFP+ modules utilize a unique optical mechanism that enables full-duplex data transmission over a single strand of single-mode fiber (SMF). This is achieved using two different

BiDi SFP: The Complete Guide to Bidirectional SFP Transceivers and ...

Learn everything about BiDi SFP and BiDi fiber, including working principles, 1310nm/1550nm wavelength design, single fiber advantages, wiring diagrams, and key differences

Single Fiber vs Dual Fiber Transceivers Understanding

In fiber optic communication systems, optical transceivers play a critical role in ensuring seamless data transmission. Among these devices, single

Understanding 100G Single Fiber QSFP28 Module for

A 100G single fiber QSFP28 module sends 100-gigabit Ethernet data using one optical fiber. This device helps networks get faster without needing

HTF DWDM equipment,OTN Solution,QSFP28 OSFP

HTFuture offers industry-leading fiber optic products and WDM system solutions with global recognition for excellence and innovation.

Optical Fibre SFP Module for 5G Networks An SFP (Small Form-factor ...

Optical Fibre SFP Module for 5G Networks An SFP (Small Form-factor Pluggable) is a hot-swappable optical transceiver module that converts electrical signals into optical signals (and vice versa ...

## Contact Us

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