Ukrainian Single-Fiber Bidirectional QSFP

Overview

NEC''s 100G QSFP28 BiDi optical transceiver enables the transmission and reception of 100Gb/s high-speed data over a single optical fiber.

Key Takeaways

Single-fiber bidirectional QSFP modules provide 100G full-duplex connectivity over a single SMF, saving fiber resources while supporting high-speed data center, enterprise, and telecom applications. OverviewSingle-fiber bidirectional (BiDi) QSFP transceivers use wavelength division multiplexing (WDM) to transmit and receive data simultaneously over a single optical fiber. This approach reduces fiber usage by 50% compared to traditional duplex modules, which require separate fibers for transmit and receive signals.

These modules are typically hot-swappable, compact (QSFP28 form factor), and compatible with high-density switch ports, making them ideal for network upgrades without extensive cabling changes.

Key Specifications

Data Rate: 100Gbps full-duplexFiber Type: Single-mode fiber (SMF)Distance: Up to 20 km for Cisco QSFP-100G-B20U4-I/B20D4-I; other modules can range from 10 km to 30 km depending on model Wavelengths: Typically two wavelengths per fiber (e.g., 1270/1330 nm or 1296/1309 nm) for bidirectional transmission Modulation: NRZ (Non-Return-to-Zero) for Cisco modules; PAM4 (four-level pulse amplitude modulation) for some QSFP28 BIDI modules to increase bandwidth efficiency Connector: LC duplex interfaceCompatibility: Works in QSFP28 ports and interoperates with mainstream switch brands Operational PrinciplesCisco QSFP-100G-B20U4-I and B20D4-I modules operate in pairs, with one transceiver at each end of the fiber.

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Each module contains four transmitters and four receivers, multiplexed into a single fiber using a diplexer filter, enabling full-duplex 100G transmission over a single fiber. Using two pairs on the same fiber can provide 200Gbps bandwidth and network resiliency.

YX

Fiber QSFP28-BIDI modules achieve bidirectional transmission by assigning uplink and downlink wavelengths to the same fiber, preventing interference and allowing simultaneous two-way communication. PAM4 modulation doubles the data rate per wavelength compared to NRZ, supporting 100G over a single fiber efficiently.

Applications

Data Centers: High-density interconnects, regional or metro linksTelecom Operators: Aggregating 4G/5G front-, mid-, and backhaul trafficEnterprise Networks: Connecting metro offices or campus buildingsService Providers: Linking business customers to central offices or headendsAdvantagesReduces fiber infrastructure costs by using a single fiber for bidirectional trafficSupports long-distance 100G transmission (up to 20 km or more)Compatible with existing QSFP28 ports and mainstream switchesProvides network resiliency when deployed in redundant pairs In summary, Ukrainian single-fiber bidirectional QSFP transceivers are high-performance, fiber-efficient modules suitable for modern high-speed networks, leveraging WDM and advanced modulation to deliver 100G full-duplex connectivity over a single SMF, with applications spanning data centers, telecom, and enterprise networks.

Article Content

Cisco QSFP-100G-B20U4-I and QSFP-100G-B20D4-I 100G 20km Bidirectional ...

Whether it''s building a network or upgrading an existing network, the Cisco QSFP-100G- B20U4-I and QSFP-100G-B20D4-I transceivers provide 100G connectivity for platforms at up to

Industry''s First 100G ZR QSFP28 for Bi-Directional Application

The Coherent 100G ZR QSFP-DCO is the industry''s first dual laser QSFP28 digital coherent optics (DCO) module for single fiber, bi-directional applications – a breakthrough for

Small Form-factor Pluggable

Using a simple adapter or a special direct attached cable it is possible to connect those interfaces together using just one lane instead of four provided by the

The Complete Guide to BiDi Transceiver

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Unlike traditional optical modules that use separate fibers for transmitting and receiving data, BiDi modules accomplish this bidirectional data transfer on a single fiber, optimizing space

100G QSFP28 BiDi : Optical Transceiver Module | NEC

NEC''s 100G QSFP28 BiDi optical transceiver enables the transmission and reception of 100Gb/s high-speed data over a single optical fiber. By enabling bidirectional transmission over a single fiber, this

100G QSFP28 Cable and Transceiver Modules Data Sheet | FS

It uses single-fibre bi-directional technology to transmit different wavelengths over a single fiber. Multiplexing and demultiplexing of the eight wavelengths are managed within the device.

Arista 100G Transceivers and Cables: Q&A

Arista''s 100G connectivity solutions include copper cables and Active Optical Cables (AOCs) to enable cost effective short reach options, as well as a wide range of optical transceivers in QSFP form

Walsun 100G QSFP28 Full Range BIDI Solution

To meet the demand for long-distance transmission in scenarios where optical fiber resources are scarce in edge access networks, Walsun has launched the 100G QSFP28 ZR4 BIDI

100G Over Single Fiber, Simplified

Upgrading from 10G to 100G no longer requires complex fiber builds. Our QSFP28 Bidirectional (Bidi) transceivers delivers high-speed 100G connectivity over a single strand of fiber,

Introduction About BiDi SFP and BiDi Fiber

How Does BiDi SFP Work? As the above-mentioned introduction about BiDi SFP, we have learned the modules separate different transmission wavelengths over a single fiber to achieve

Bidirectional SFP Modules | Bidirectional SFP Transceivers

Versitron offers single-mode and multimode Bidirectional SFP Modules suitable for point-to-point networking, metro access ring, PON, and FDDI. Get IEEE Compliant SFP transceivers Integrated

40G QSFP BIDI vs 40G QSFP SR4 vs 40G QSFP UNIV: What Is the

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The 40GBASE-BiDi SR (Bidirectional Short Reach) module is a type of 40G optical transceiver that utilizes a single pair of multimode fibers for bidirectional transmission. The 40G

The Latest Research on 100G QSFP28 and SFP112 | FiberMall

In application scenarios where fiber resources are relatively tight, single-fiber bidirectional optical modules can save 50% of fiber resources compared to dual-fiber bidirectional optical

Understanding 100G Single Fiber QSFP28 Module for Modern Networks

100G single fiber QSFP28 modules enable fast, cost-effective network upgrades using one fiber strand, ideal for scalable modern data centers.

Optical Transceiver Buying Guide: SFP/QSFP Explained for

Understanding Fiber Compatibility: Single-Mode vs Multimode The choice between single-mode fiber (SMF) and multimode fiber (MMF) directly impacts the optical transceiver type: Multimode

40G BiDi QSFP+: Single-fiber Bidirectional Transmission

The interfaces of optical modules are mainly divided into single-fiber bidirectional BiDi and dual-fiber bidirectional (Deplux). In the wavelength division multiplexing system, the line transmission

The Ultimate Guide to BiDi Transceiver

The full name of BiDi is Bi-Directional. BiDi transceiver (Bi-Directional transceiver)is a kind of special optical transceiver because it enables full-duplex data transmission via a single optical

Meaning of Optical Module Pull Tap Colors

2. BIDI SFP Single-fiber Bidirectional Optical Module Pull Tap Color The characteristic of a single-fiber bidirectional optical module is that it can realize signal transmission in two directions

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