Single-fiber single-mode optical module specifications



Overview

SFP transceiver that supports 1G connections up to 3 km using single-mode fiber with a simplex LC UPC connector.

Key Takeaways

Single-mode single-fiber optical modules are standardized primarily by ITU-T G. 652/G. 657 for fiber characteristics and IEEE 802.

3 for Ethernet transmission, with SFP modules designed for OS2 fiber supporting long-distance, high-speed applications. ITU-T Fiber StandardsG. 652 is the most widely used standard for single-mode optical fibers, specifying fibers optimized for the 1310 nm zero-dispersion wavelength and compatible with 1550 nm transmission.

Key parameters include mode field diameter, cladding diameter, core concentricity, cut-off wavelength, macrobending loss, chromatic dispersion, and polarization mode dispersion. The G. 652.

D variant is considered "future-proof," supporting Dense Wavelength Division Multiplexing (DWDM) and broadband applications without fiber replacement. G. 657 defines bend-insensitive single-mode fibers, with subcategories A1 and A2 offering enhanced and maximum bend performance, respectively, while remaining compatible with G.

652 infrastructure. These fibers are ideal for tight installation spaces, such as FTTH deployments.

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IEE

E 802. 3 Ethernet StandardsSingle-mode optical fiber Ethernet standards under IEEE 802. 3 specify transmission over low-water peak fibers, ensuring minimal attenuation across the 1310–1383 nm range, which is critical for WDM applications.

Single-mode Ethernet supports long-distance links, including hyperscale data centers, backbone, WAN, and metropolitan area networks. Engineered links longer than 30 km must adhere to strict insertion loss limits.

SFP Module Standards

Small Form-factor Pluggable (SFP) modules are standardized transceivers for single-mode fiber, supporting speeds from 1G to 100G.

Single-mode SF

Ps operate over OS2 fiber with ~9 µm core diameter, minimizing modal dispersion and enabling long-distance transmission. Key considerations include insertion loss, fiber type matching, and temperature grade.

Single-mode SF

Ps are preferred for distances above 100 meters, while multimode SFPs are limited to short-range applications due to higher modal dispersion.

Summary of Key Points

Fiber Type: OS2 single-mode fiber (~9 µm core)Standards: ITU-T G. 652 (D variant) for general single-mode, G. 657 for bend-insensitive fibersEthernet Compliance: IEEE 802.

3 for single-mode transmissionApplications: Long-haul, metro, data center interconnects, FTTH, DWDM systemsSFP Modules: Single-mode SFP, SFP+, SFP28, SFP56, SFP-DD for 1G–100G speeds These standards ensure compatibility, low attenuation, minimal dispersion, and high reliability for single-mode optical networks, making them suitable for both current and future high-speed communication systems.

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Article Content

Single-Mode Optical Fiber (SMF)

Draka Single-Mode Fiber (SMF) provides optimum performance in both the 1310 nm and 1550 nm wavelength operation ranges (including the 1565 – 1625 nm L-band), with a low dispersion in the

Single Mode Fiber

Thorlabs offers these single mode fibers for operating wavelengths from 320 nm to 2200 nm. Details on the physical and optical properties of these fibers are

UniFi 1G Bidirectional Single-Mode Optical Module

SFP transceiver that supports 1G connections up to 3 km using single-mode fiber with a simplex LC UPC connector.

Recommendation ITU-T G.652 (08/2024)

This document outlines the specifications for a single-mode optical fiber and cable designed for use around the 1310 nm zero-dispersion wavelength, suitable for both the 1310 nm and 1550 nm regions,

Single-Mode Fiber Cable Guide: Types, Specs & Selection

This comprehensive guide explores Single-Mode Fiber Optic Cable, covering technical specifications, deployment scenarios, and best practices to help you optimize your fiber infrastructure

SINGLE-MODE OPTICAL FIBER IN LOOSE TUBE AND RIBBON

This ultra-low-loss single-mode fiber with advanced bend capability for long haul terrestrial applications utilized in optical fiber cable shall meet ITU Recommendations G.654 (Tables A, B, and C) and the

Optic Modules Datasheet

Data Sheet datasheet is intended to guide the user through the various options available when choosing an optic module for a given platform depending on the architecture.

U®Fiber Modules and FiberCable Datasheet

Build your outdoor fiber network using our FiberCable. Lightweight and flexible, FiberCable is ideal for tower deployments of our outdoor routing and switching products, such as the EdgePoint.

UniFi 10G Single-Mode Optical Module

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SFP+ transceiver that supports 10G connections up to 10 km using single-mode fiber with a duplex LC UPC connector.

SFP Optical Transceiver | SFP Optical Module | Perle

Multimode and single-mode fiber Gigabit Ethernet, Fast Ethernet, Fiber channel, ATM/SONET, SDH Hot-pluggable with durable metal enclosure Can be installed

Gigabit single-mode single-core fiber optic module

Gigabit single-mode single-core optical fiber modules usually have the following specifications: multi-mode 550m, single-mode 15km, 40km, 80km, 120km, etc. In addition to the

1G SFP LX 1310nm 20km Single mode Transceiver

Generic SFP-1G-LX Compatible 1000BASE-LX/LH SFP Transceiver Module (SMF, 1310nm, 10km-20km, LC, DOM) This Generic SFP-1G-LX compatible SFP

Fiber Optic Cable Types Explained

Our comprehensive guide to types of fiber optic cables. Learn all about the differences between single mode and multimode cables, as well as the various fiber wavelengths and standard core sizes used

CCH-CP24-A9 | Closet Connector Housing (CCH) Panel, LC Adapters

CCH-CP24-A9 Closet Connector Housing (CCH) Panel, LC Adapters Duplex, UPC, 24 F, Single-mode (OS2) Typically ships in 14 day (s) Actual lead time confirmed upon receipt of order.

Ubiquiti 10G Single-Mode Optical Module UACC-OM-SM-10G-D-2

Ubiquiti 10G Single-Mode Optical Module SFP+ transceiver that supports 10G connections up to 10 km using single-mode fiber with a duplex LC UPC connector. Max data rate: 10 Gbps Compatible with

NVIDIA/Mellanox MMS4A00 Compatible 1.6T 2 x DR4/DR8 OSFP224

Overview The NVIDIA/Mellanox MMS4A00 compatible OSFP224 optical transceiver is a twin-port module designed for InfiniBand XDR network architectures. It delivers 1.6Tb/s aggregate bandwidth

Ubiquiti 10 Gbps Bidirectional Single-Mode Optical Module

Single-mode, simplex, fiber transceiver module. The 10 Gbps Bidirectional Single-mode Optical Module is a simplex transceiver that delivers up to 10 Gbps speed over distances up to 10 kilometers.

Ubiquiti 25 Gbps Single-Mode Optical Module UACC-OM-SFP28-LR

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25 Gbps Single-mode Optical Module is an optical transceiver module capable of providing 25 Gbps speeds over a ber connection. After connecting the module to a compatible ber line, simply

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This document is for preliminary research. Verify specifications against current standards, product documentation and project requirements.

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