

DML Selection Guide for Subway-Grade Pluggable Optical Modules



AI Overview

Selecting subway-grade pluggable optical modules requires balancing form factor, data rate, environmental tolerance, and modulation type to ensure reliable metro and urban fiber network performance.

Key Considerations for Subway-Grade Optical Modules

- Module Form Factor and Compatibility**
 - SFP/SFP+:** Suitable for 1–10 Gbps links, compact, widely supported, and ideal for short to medium metro spans.
 - QSFP/QSFP28/QSFP56:** Supports 40–200 Gbps, often used in high-density aggregation points or backbone links.
 - CFP/CFP2/CXP:** Designed for 100 Gbps and above, suitable for long-haul or high-capacity metro rings.
 - OSFP/OSFP-RHS:** Emerging form factors for 400–800 Gbps, optimized for thermal management in dense deployments.
- Modulation Type (DML vs. Coherent)**
 - Directly Modulated Lasers (DML):** Cost-effective, simple, and suitable for short to medium metro distances (up to ~10–20 km). Ideal for subway-grade networks where fiber spans are relatively short and cost efficiency is critical.
 - Coherent Modules (e.g., COLORZ 400/800):** Use advanced DSP and coherent detection for longer metro or regional spans (up to 2000 km), higher spectral efficiency, and better tolerance to fiber impairments. Coherent modules are more expensive and power-intensive, so they are typically reserved for backbone or inter-data-center links.
- Data Rate and Bandwidth Requirements**
 - 10–25 Gbps:** SFP+/SFP28 modules for access and aggregation nodes.
 - 40–100 Gbps:** QSFP+/QSFP28 for high-capacity metro rings.
 - 200–800 Gbps:** QSFP56, QSFP-DD, OSFP, or DCO modules for dense urban backbones or AI/data-intensive networks.
- Environmental and Mechanical Considerations**

Subway-grade modules must tolerate vibration, temperature fluctuations, and humidity. Look for modules rated for extended temperature ranges (e.g., -40°C to +85°C) and ruggedized packaging.

Article Content

Introduction to DML and EML Modulation for Optical

In the introduction of product parameters of optical modules, we often mention the modulation mode as a key indicator. DML (Directly Modulation

XPO: Redefining Pluggable Optics for AI Networking

The XPO pluggable module preserves the advantages of field pluggability, enabling quick replacement or upgrades of optical modules without servicing the entire switch and minimizing downtime.

EML vs DML Lasers: Key Differences and How to

At its core, an optical module performs (opto-electronic conversion), transforming electrical signals into optical signals for transmission over fiber, and

BRKOPT-2699

Pluggable Optical Modules: QSFP-DD or OSFP Both variants support all the technical

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High-Speed Interconnects: Backend network requires high speed 100G/200G or 800G optics to connect servers and network switches. These high bandwidth connections are essential for handling the data

Optical Transceivers

Broadcom's Optical Transceivers are products that support insertion and removal of fiber optic connectors - for applications requiring flexibility in user handling, cable types and link distances.

Panduit Breakout Cable Ordering Guide For Cisco Pluggable Optics

This module can be used for native 40G optical links over 12-fiber parallel cables with MPO connectors or in a 4x10G breakout mode with parallel to duplex fiber breakout cables for connectivity to four

800G Client Optics in the Data Center

When hyperscale data center operators start deploying a new generation of client optics, they immediately require massive volumes of optical modules to build out switching fabric and router

Unveiling The Core Technologies Of Optical Modules: DML Vs. EML

DML or EML - which leads in high-speed optical transmission? This article dives into the core technologies of optical modules, comparing direct modulated lasers (DML) and electro

Optical & IC Products

Semtech is also investing in leading-edge technologies to enable communication systems at 800Gbps and beyond. For our optical component and module customers, this highly differentiated set of

OSFP1600_and_OSFP-XD

The OSFP MSA roadmap provides an excellent mechanical and electrical solution for 800G, 1.6T, and 3.2T pluggable optics with best-in-class thermal performance and support for break-out applications,

Coherent Optics at 400G, 800G, and Beyond

The divergence of coherent pluggable and embedded optics trajectories and the convergence of IP and optical in IPoDWDM architectures create new opportunities, along with many questions. Heavy

Pluggable Transceivers: Types, Uses, and Best Practices

In the sections that follow, we will examine the different types of pluggable transceivers, how they are classified by form factor and speed, and what practical considerations should guide selection and

Relay Protection Grade AOC Active Optical Cable DML Selection Guide

Relay Protection Grade AOC Active Optical Cable DML Selection Guide An Active Optical Cable (AOC) is an integrated optical transceiver assembly that uses fiber optics to transmit high-speed data over

The Most Comprehensive Guide Of Optical Modules

In the upcoming sections, we will delve into the classification of optical modules, future trends, and guidelines for selecting the appropriate optical module for your network.

Understanding Pluggable Optical Modules

A CXP optical module is a hot-pluggable high-density parallel optical module, which provides 12 channels of traffic in each of the Tx and Rx directions. It applies only to short-distance multimode links.

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

Confused by SFP vs SFP+? Read the definitive 2026 guide on SFP modules. We explain Single Mode vs Multimode, DDM diagnostics, and how to choose the

SFP module specification and selection guide (EN)

CXR SFP modules are based on industrial grade components to deliver higher reliability and to enable extended operating temperature range in any host equipment and integration conditions.

The Complete Guide to the Best Choice of 10G SFP

The Complete Guide to the Best Choice of 10G SFP+ Optical Modules 10G SFP+ Function Introduction 10G SFP+ (Small Form-Factor Pluggable Plus) optical

Pluggable Optical Transceivers Continue to Evolve

As communications applications approach THz frequencies, current 5G and future 6G introduce new RF connectors. System engineers must balance

Pluggable Transceivers: Types, Uses, and Best Practices

Pluggable transceivers are hot-swappable optical or electrical modules that enable network devices to transmit and receive data over fiber or copper cabling. By separating the transceiver from the host

Pluggable Optical Modules: Transceivers for the Cisco

The table below lists the Cisco Pluggable modules in the Cisco ONS family that have reached end-of-sale or end-of-life status, followed by their

EML vs VCSEL vs CW Laser: Optical Transceiver

Compare EML, VCSEL, and CW laser technologies in optical transceivers. Covers cost, reach, speed, the 2025 EML shortage, and silicon

5 Minutes To Understand The Types Of Lasers In

Summarize The selection and use of optical modules are completely different according to different scenarios. The most important thing is to select

400G, 800G, and Terabit Pluggable Optics:

Equipment and electrical serdes can evolve through 3 generations (25 Gb/s, 50 Gb/s or 100 Gb/s) without changing the optical interface that interconnects your equipment.

EML vs DML Laser: What Are the Differences?

When people talk about high-speed optical modules, they usually focus on specific numbers: 25G, 100G, 400G, 10km, 40km. But behind every

Pluggable Optical Modules – GIGALIGHT

GIGALIGHT provides 100G, 200G, 400G and 800G pluggable digital coherent optical transceiver modules (DCO) and non-coherent transceivers for data center interconnection (DCI), 5G backhaul,

What Is an SFP Module? — Complete Guide to SFP, SFP+ & SFP28

An SFP (Small Form-factor Pluggable) is a compact, hot-pluggable transceiver module that allows networking equipment — including switches, routers, servers, and media converters — to support

Contact Us

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