

Power Consumption Comparison of Long-Distance Optical Transceivers OSFP



Overview

OSFP vs. OSFP-XD: Choosing the Right 1.6T Explore the differences between 1.6T OSFP and OSFP-XD optical transceivers, including OSFP vs. OSFP-XD: Choosing.

Key Takeaways

OSFP transceiver power consumption varies widely, from under 8W for low-power 800G LPO modules to over 25W for long-distance coherent 800G or 1.6T DSP-based modules, with higher data rates and longer reach driving significantly higher power usage. Overview of OSFP Power Consumption

OSFP (Octal Small Form-factor Pluggable) modules are designed to support 400G, 800G, and 1.6T data rates using eight electrical lanes. The form factor is slightly larger than QSFP-DD to accommodate higher thermal loads, making it suitable for high-speed, long-distance deployments. Power consumption is influenced by module type, transmission distance, DSP complexity, and optical engine design.

- Short-reach multimode modules: Typically consume less than 8W, suitable for intra-rack or short-distance interconnects.



- Long-distance coherent modules: Can exceed 25W, especially at 800G or 1.6T, due to DSP processing and advanced modulation formats required for signal integrity over extended distances .

DSP vs LPO Modules

- DSP-based modules: Provide versatile signal processing for long-distance and high-speed links but incur higher power consumption, heat generation, and latency .
- Linear Pluggable Optics (LPO): DSP-free design optimized for energy efficiency and low latency, consuming significantly less power, making them ideal for short-reach, high-density AI or data center interconnects .

Data Rate Impact

- 400G OSFP: Entry-level power consumption, generally lower than 8–10W for short-reach modules .
- 800G OSFP: Power varies widely; low-power LPO modules may stay under 8W, while coherent DSP modules can reach 25W or more .
- 1.6T OSFP: Expected to consume even more power due to higher lane count and DSP complexity, requiring careful thermal planning and rack power budgeting .

Practical Implications

- In fully loaded 32-port 800G switches, optics alone can account for over 50% of total power draw, highlighting the importance of module selection for energy efficiency .
- Rack density and cooling: Higher-power modules increase thermal load, necessitating enhanced airflow and cooling strategies .
- Cost considerations: Power-efficient modules reduce electricity costs and carbon footprint, especially in hyperscale or AI-focused data centers .

Summary

For long-distance OSFP deployments, coherent DSP modules provide the necessary signal integrity but at the cost of high power consumption (20–25W+), while LPO modules offer a lower-power alternative for shorter distances. As data rates increase from 400G to 1.6T, careful power budgeting, thermal management, and module selection are critical to maintain operational efficiency and minimize total cost of ownership .

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Cisco Transceiver Modules

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400G Modules Compared: QSFP-DD, OSFP & QSFP112

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A Comprehensive Guide to 800G Optical Transceivers

An in-depth guide to 800G and OSFP transceivers, explaining form factors, core features, key advantages,

OSFP vs. OSFP-XD, Which Delivers Better 1.6T Transceiver

Discover 1.6T optical transceivers and compare OSFP vs. OSFP-XD. Learn how QSFPTEK's 1.6T modules enhance

The Ultimate Guide to OSFP Transceivers: Unveiling 400G Optical ...

A: An optical transceiver OSFP (Octal Small Form-Factor Pluggable) is a module of highly efficient transceivers

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Comparison Analysis of OSFP-XD vs. OSFP in 1.6T

Compare OSFP and OSFP-XD for 1.6T optical transceivers, including power, thermal design

Technology from 400G to 800G to 1.6T Transceivers | FiberMall

Current Status of 200G Lambda 1.6T Pluggable Optical Transceiver Module OSFP Advantages of QSFP-XD How to

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1.6T Optical Transceiver Form Factor Comparison: OSFP1600 vs.

This article provides a system-level comparison of OSFP1600 vs. OSFP-XD, examining their electrical architectures,

QSFP-DD vs OSFP vs QSFP56 vs QSFP112 | FiberMall

While the OSFP transceiver is larger in size, its thermal capacity can reach 12 to 15 watts.

QSFP+ vs. OSFP: A Comprehensive Comparison of Optical

This article provides a detailed, fact-checked comparison of these two transceiver types, highlighting their technical

Co Packaged Optics (CPO) – Scaling with Light for the Next Wave of ...

This can be easily seen by comparing the power used in just one 800G DSP transceiver to the power consumed by

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