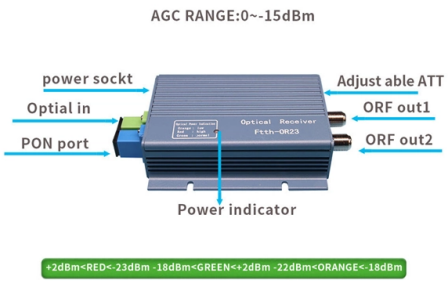
How to use liquid cooling in optical modules



Article Overview

Liquid cooling in optical modules enhances thermal management, enabling high-speed, high-density, and energy-efficient operation in data centers and HPC environments.

Overview of Liquid Cooling in Optical Modules

Liquid cooling is increasingly applied to optical modules to address the thermal challenges of high-power, high-speed optical transceivers. As data center power densities rise due to AI, HPC, and 5G workloads, traditional air cooling becomes insufficient, especially for modules operating at 400G, 800G, and future 1.6T speeds . Liquid cooling uses fluids with high thermal conductivity to rapidly remove heat, maintaining stable performance and extending module lifespan .

Types of Liquid Cooling

• Cold Plate Cooling (Indirect Liquid Cooling)
• A metal cold plate with internal coolant channels contacts the optical module via a thermal interface material (TIM).

• Heat is conducted from the module to the coolant, enabling rapid heat transfer while maintaining hot-pluggable serviceability .

• Advantages: easier retrofitting, lower cost, compatible with existing infrastructure.

• Limitations: only the top surface is cooled; side or bottom heat sources may remain less efficiently managed .

Article Content

Immersion Liquid Cooling Interconnect Solutions

Immersion Liquid Cooling Solutions Learn about immersion liquid cooling optical transceivers, active optical cables (AOC) and direct

Immersion Liquid Cooling Optical Transceivers

GIGALIGHT offers 10G to 800G rates immersion pluggable optical modules for liquid cooling data centers and 5G fronthaul networks.

Simulation and experimental investigation of liquid-cooling thermal ...

Abstract This study explores the application of cold plate liquid cooling technology in co-packaged optics (CPO). By integrating

Understanding Liquid-Cooled Optical Modules and Heat Sinks

What is a Liquid-Cooled Optical Module and How Does Its Heat Sink Work A liquid-cooled optical module helps control heat in fast

Liquid Cooling for Optical Networking Equipment

This article provides insights into a successful upgrade of an air-cooled coherent metro router into a Hybrid Liquid/Air-cooled system.

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Additionally, an innovative solution is presented for integrating liquid-cooling into the body of pluggable optical modules.

Active Cooling of Optical Transceivers

The objective was to design a thermoelectric cooler assembly that can remove heat generated by optical transceivers running in

Active Cooling of Optical Transceivers

Laird Thermal Systems'' active cooling solution optimized the performance and efficiency by developing a custom thermoelectric

Advanced Thermal Management Strategies | Molex

Thermal management plays a pivotal role in enhancing the reliability and efficiency of high-power pluggable optical modules. Explore

Deep Dive into Direct Liquid Cooling

Direct liquid cooling (DLC) specifically refers to liquid cooling technologies that bring the coolant directly to the heat sources. In Dell''s

Contact Us

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