



Lightmatter Expands Photonic Interconnect Roadmap with Passage™ L20 Unified Optical Engine for NPO and OBO Applications

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New BiDi platform accelerates mass deployment of high-bandwidth-density optical connectivity for next-generation AI infrastructure

MOUNTAIN VIEW, Calif. — March 11, 2026 — [Lightmatter](#), the leader in photonic (super)computing, today announced the Passage™ L20, a 6.4 Tbps (each direction) optical engine (OE) designed to accelerate the AI data center transition to high-density optical interconnect for multi-rack scale-up and high-bandwidth scale-out. Engineered as a unified module supporting Near-Package Optics (NPO) and On-Board Optics (OBO) applications, the Passage L20 OE achieves double the fiber bandwidth density through BiDi (bidirectional) multiplexing, while ensuring seamless PCB integration through industry-standard electrical interfaces. This expansion of the Passage portfolio provides the architectural flexibility for customers to choose the integration strategy that best fits their specific XPU and switch roadmaps.

As AI models grow in complexity, interconnect bandwidth and reach requirements have outpaced the performance of traditional electrical signaling. As next-generation switch bandwidth surpasses 100 Tbps and port counts exceed 576, existing optical interconnects also face bottlenecks in data center rack space utilization. To address this challenge, the Passage L20 module leverages BiDi optical transmission to reduce fiber management requirements by 50% as compared to existing unidirectional Data center Reach (DR) optical standards, which requires separate fibers for transmit and receive. It also utilizes IEEE 802.3dj-compliant electrical signaling to enable flexible rack-level integration inside the compute or switch chassis.

“The demand for our photonic technology is expanding rapidly across a wide range of AI applications that require immediate, large-scale deployment,” said Nick Harris, Ph.D., Founder and CEO of Lightmatter. “With the introduction of the Passage L20 optical engine, we are offering a versatile, standards-based platform that complements our advanced 3D-integrated roadmap. This allows our partners to accelerate their time-to-market using existing chassis architectures, providing a validated and highly efficient path to mass deployment of photonic interconnects across the entire data center.”

“The transition from pluggables to photonic interconnects is no longer a question of ‘if’ or ‘when,’ but how to prepare for deployment at hyperscale volumes,” said Alan Weckel, founder and technology analyst at 650 Group.

“Lightmatter’s strategy of complementing its 3D photonic engines with NPO/OBO offerings—featuring key differentiators like BiDi—presents best-in-breed solutions for every market tier. By leveraging established electrical interfaces, Lightmatter removes adoption barriers and facilitates high-volume integration into existing rack systems without requiring changes to XPU or switch chip designs.”

By utilizing standards-based 224G PAM4 interfaces, the Passage L20 OE enables “drop-in” compatibility for existing XPU and switch packages. This provides a high-performance bridge for diverse interconnect topologies—including XPU-to-XPU clusters, XPU-to-switch scale-up, and hierarchical switch fabrics. The expanded Passage portfolio supports a wide range of customer adoption strategies for high-density optics, from L20-based NPO/OBO solutions to advanced 3D co-packaged optics. The Passage L20 platform can also be used to enhance bandwidth density in advanced pluggable applications.

The Passage L20 OE accelerates deployment and seamless integration by offering flexible PCB integration strategies:

- **Near-Packaged Optics (NPO):** The L20 module integrates directly next to the ASIC on the PCB or a mezzanine board, delivering exceptional configuration flexibility.
- **On-Board Optics (OBO):** The L20 module can be mounted directly on the PCB out to the far edge, with or without a retimer, depending on the channel budget.

Each Passage L20 module provides 32 optical ports at 200 Gbps per lane DR data rates, ensuring compatibility with the latest high-volume XPU and switch designs.

Passage L20 Preliminary Specifications:

- **Total Bandwidth:** 6.4 Tbps (each direction)
- **SerDes Line Rate:** 212.5 Gbps PAM4
- **Transmission:** 2 wavelength BiDi (1311, 1331nm), IEEE 802.3dj, DR compatible
- **TDP (max):** 30W
- **Form Factor:** 2000-pin BGA (BiDi)

Availability

The Passage L20 module is expected to begin sampling in late 2026.

Lightmatter will showcase its latest innovations at the Optical Fiber Communication conference in Los Angeles, from March 15-19, 2026. For more information, please visit <https://lightmatter.com/event/ofc-2026/>.

About Lightmatter

Lightmatter® is leading a revolution in AI data center infrastructure, enabling the next giant leaps in human progress. The company's groundbreaking Passage™ platform—the world's first 3D-stacked silicon photonics engine—and Guide®—the industry's first VLSP™ light engine—connect thousands to millions of processors. Designed to eliminate critical data bottlenecks, Lightmatter's technology delivers unprecedented bandwidth density and energy efficiency for the most advanced AI and high-performance computing workloads, fundamentally redefining the architecture of next-generation AI infrastructure. Visit www.lightmatter.co to learn more.

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