Can optical modules be completely domestically produced



Overview

Domestic manufacturers, particularly in China, have focused on 400G, 800G, and even 1.6T optical modules, covering form factors like SFP, QSFP, QSFP-DD, OSFP, and CFP.

Key Takeaways

Yes, optical modules can be produced domestically, and significant progress has been made in localizing both low-speed and high-speed optical module technologies.

Feasibility and Motivation

Domestic production of optical modules has become a strategic priority for countries aiming to reduce reliance on imported components, particularly for data centers, telecom networks, and high-performance computing (HPC) applications. Optical modules rely on critical chips such as lasers, modulators, photodetectors, driver ICs, TIAs, and DSP ICs, which determine performance, reliability, and efficiency. Producing these components domestically enhances supply chain security, lowers costs, and fosters technological sovereignty, enabling local innovation in high-speed optical transmission and modulation technologies (Weyland).

Technological Progress



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Domestic manufacturers have achieved substantial breakthroughs across different speeds and form factors. For low-speed optical chips (2. 5G/10G), localization rates have reached 90% and 60%, respectively, while high-speed modules such as 100G QSFP28 ZR4 and 25G SFP28 BIDI 80km have been successfully developed with performance comparable to international standards.

These modules support advanced features like wavelength division multiplexing and single-fiber bidirectional transmission, which are critical for 5G fronthaul networks and large-scale AI computing infrastructure (ETU-Link Technology).

Policy and Industrial Support

National policies actively support domestic production. Initiatives from the Ministry of Industry and Information Technology (MIIT) and regional programs encourage collaboration between industry, academia, and research institutions to develop high-end optical chips. Projects like "East Data West Computing" create strong demand for locally produced high-speed optical modules, further accelerating domestic adoption (X-Linkit).

Examples of Domestic Manufacturing

Several companies have successfully established domestic production lines for optical modules and related components. ETU-Link, for instance, has built a full production chain covering chip selection, module integration, and scenario adaptation, achieving high on-time delivery rates. Additionally, companies like SMI are supplying domestically made optical sensors to global semiconductor plants, demonstrating the capability to meet international quality standards (Chosun Biz).

AT&S has also advanced high-speed optical module PCB manufacturing, supporting 100G to 800G modules and conducting research on 1. 6T modules and Co-Packaged Optics (CPO) (AT&S).

Conclusion

Domestic production of optical modules is not only feasible but is actively being implemented with increasing technological sophistication. From low-speed to high-speed modules, domestic manufacturers are achieving performance comparable to global leaders, supported by policy incentives, industrial collaboration, and growing market demand. This trend enhances supply chain resilience, reduces dependency on imports, and positions domestic industries to innovate in next-generation optical communication technologies.

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Driven by the explosive growth of AI computing power and the large-scale application of 5G, optical modules, as a core component of communication infrastructure, are entering a critical

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Domestic manufacturers, particularly in China, have focused on 400G, 800G, and even 1.6T optical modules, covering form factors like SFP, QSFP, QSFP-DD, OSFP, and CFP.

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At this point, the production process of the optical modules is complete. The finished products are placed into anti-static bags and blister packs, then packaged and shipped via courier to customers around

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Domestic companies are strong in the low-to-mid-range market segments such as passive devices and low-speed optical transceiver modules, but there is still significant room for improvement in high-end

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Manufacturing Processes of Optical Materials

There are many traditional processing methods for optical materials. But the processing cycle is generally long, and the control of processing accuracy is difficult. If you want to carry out

Optical Module Industry_Baiduwiki

During the 14th Five-Year Plan period, it focused on high-end development and domestic substitution. Leveraging the demands of 5th-Generation Mobile Communication Technology and computing

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On new wafer-fab production lines, domestically made equipment accounted for 55 percent of total procurement value by the end of 2025, exceeding the national 50-percent target

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Annual report forecasts a 231.24% to 248.86% year-on-year increase in net profit attributable to shareholders in 2025. Core Advantages: Domestically leading silicon photonics

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