Domestic Optical Module Speed



Overview

Chinese IC design companies are actively developing high-speed communication chips, but the 800G DSP market is still dominated by international leaders such as Broadcom and Marvell.

Key Takeaways

Domestic optical modules currently support speeds from 2. 5G up to 100G, with ongoing development toward higher-speed solutions like 400G and beyond.

Current Speed Capabilities

Domestic optical modules have achieved significant localization in low- and medium-speed ranges. 2. 5G modules have a localization rate of about 90%, while 10G modules reach around 60% in domestic production, reflecting strong progress in low-speed optical chip manufacturing.

For higher-speed modules, domestic companies have successfully mass-produced 25G and 50G laser chips, and some 100G-level chips, enabling SFP28, QSFP28, and similar high-speed transceivers. These modules are widely used in 5G fronthaul networks, data centers, and enterprise LANs.

Technological Advances

Domestic manufacturers have implemented advanced technologies to support higher speeds: 25G SFP28 BIDI modules: Single-fiber bidirectional transmission reduces cabling costs and supports up to 80 km distances. 100G QSFP28 ZR4 modules: Utilize four-channel 28G NRZ wavelength division multiplexing, achieving 80 km transmission with power consumption below 5. 5W, comparable to international top-tier modules.

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DS

P and silicon photonics integration: High-speed DSP chips and silicon photonics enable better signal integrity, thermal management, and higher integration for future 400G+ modules. Speed vs.

Distance Considerations

Optical module speed is inversely related to transmission distance due to attenuation, chromatic dispersion, and modal dispersion. Higher-speed modules like 100G require precise digital signal processing (DSP) and high-quality TOSA/ROSA components to maintain signal integrity over long distances. Domestic modules increasingly incorporate these technologies to match international performance standards.

Future Outlook

The domestic optical module industry is moving toward ultra-high-speed solutions (400G, 800G, and beyond) with a focus on: Full-cycle independence: From materials to chips to modules. Advanced packaging technologies: Such as Co-Packaged Optics (CPO) and Linear Drive Pluggable Optics (LPO) for lower power and latency. Breaking high-end DSP chip bottlenecks: To achieve fully autonomous high-speed module production.

Domestic optical modules are now competitive in both low-speed (2. 5G–10G) and high-speed (25G–100G) ranges, with ongoing R&D targeting next-generation 400G+ networks. This progress ensures that domestic solutions can meet the growing demands of 5G, AI computing, and hyperscale data centers.

Article Content

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MCU chips for optical modules emerge as a critical semiconductor segment as AI data center buildout drives 800G/1.6T demand, with domestic players GigaDevice and Nations

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Chinese IC design companies are actively developing high-speed communication chips, but the 800G DSP market is still dominated by international leaders such as Broadcom and Marvell.

Analysis of the Trend Toward Domestic Production of Optical Modules

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Domestically produced optical modules have achieved a step-by-step breakthrough from low-speed to high-speed. Currently, the localization rate of 2.5G/10G low-speed optical chips has reached 90%

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In the future, as the industry moves toward the 800G and even higher-speed optical module era, domestic chips are expected to play an increasingly important role in the global optical

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Behind them, Hisense Broadband holds a full chain from optical chips to terminal devices, HG Genuine has secured cost advantages through in-house EML chips and SiPh solutions, and TFC

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