

Low-power-consuming compact optical transmitter for next-generation optical interconnect

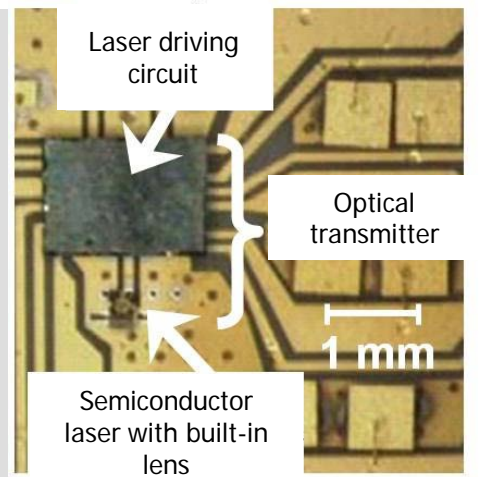


Photo of optical transmitter

We developed a high-speed and low-power-consuming compact optical transmitter for next-generation optical interconnect by replacing electric wires with optical wires between and inside IT devices, such as servers and storage devices in data centers.

Through transmission tests conducted using this transmitter and a previously developed receiver, we succeeded in achieving data transmission over a 100-m distance at a speed of 25 Gbit/s, 2.5 times faster than conventional devices. We also proved that operation is possible at 9-mW power consumption for every Gbit/s.

Part of the research was conducted under the "Next-generation high-efficiency network device technology development" project commissioned by New Energy and Industrial Technology Development Organization (NEDO) to Photonics and Electronics Convergence Technology Research Association (PETRA).

■ Features of the technology

- ① Increasing reflectance of light inside resonators needed for generation of laser beams enabled reducing operating power to 1/2 as well as increasing operating speed of transmitters to 25 Gbit/s.
- ② Using silicon semiconductors (CMOS) for laser driving circuit enabled generating high-quality waveforms even at 25 Gbit/s and stable high-speed operation.

■ Future plans

We performed data transmission experiments for only one channel (25 Gbit/s). Going forward, we will develop a 4-channel module to enable 100 Gbit/s optical transmission between and within devices for future commercialization.

■ Presentation in conferences

This technology has been presented in the European Conference and Exhibition on Optical Communication (ECOC).

■ A word from the researchers

These results have been achieved using laser driving circuit technologies that use Hitachi's proprietary semiconductor lasers with built-in lens and silicon semiconductors (CMOS). We will continue research aimed at increasing performance and energy efficiency of IT devices to achieve future commercialization.