

# Overview



Author: *Hitoshi Watanabe\**

## Status and Outlook of Optical & High-Frequency Devices

With the global spread of smartphones and other information devices, we now live in an environment where not only data communication but also images and sounds are available any time, anywhere, causing an exponential increase in the amount of data handled. The communications infrastructure relies on high-frequency devices and optical devices using compound-semiconductor that can handle large amount of data. In the field of mobile communication, discussions on communications standards for the 5th generation (5G) following the 4th generation (4G) have already started. This standardization will require high-frequency devices using GaN (gallium nitride) which enable efficient operation at high-frequencies (3.5 GHz to millimeter wavebands) due to the wide communication bandwidth and downsized equipments. And optical devices, that can operate at high speed (25 Gbps to 400 Gbps) yet low power consumption, will be also required.

Meanwhile, in the field of access networks, which are at the end of an optical communication network, 40 Gbps-class next-generation passive optical network systems are being developed. In the field of data centers, which are making remarkable progress, 400 Gbps standards are going to be established. Accordingly, in both fields, optical communication devices that can operate at high speed with low power consumption will also become the key components. In other fields, GaAs (gallium arsenide) semiconductor laser for projector light sources, laser processing machines, etc. is steadily being developed. Thus, the demand for high-frequency devices and optical devices using compound semiconductors is growing, and such devices will become increasingly critical in various scenes in the society.