

# Overview



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## The Status and Future Outlook of High-frequency & Optical Devices

Mobile communication devices such as smartphones and tablet terminals have become popular and their functions have been improved with each generation. Therefore, the total amount of mobile communication data in the world has been continuously increasing, further boosted by the age of vehicle automatic driving systems and the Internet of Things (IoT). New businesses are emerging with the growth of automatic driving and IoT, fueling new demand. These factors help improve productivity and solve the problems of the declining population and rising production costs, assuring the continued growth of society. Mobile communication systems support these developments, and fifth-generation (5G) mobile communication standards have now been developed. Furthermore, wireless communication at high frequencies (3.5 GHz to millimeter wave band) to achieve high speeds and large communication capacities is progressing. In this frequency band, gallium nitride (GaN) devices which can control power consumption efficiently are being developed at a fast pace.

In optical communication networks which are a core part of the communication infrastructure, systems with even higher speed and larger capacity are rapidly being developed. In the networks used for data centers, devices supporting 100 Gbps have been actively introduced and work on introducing 400 Gbps is progressing. As a result, for the optical devices mounted on these units, there is strong demand for compact size and reasonable cost in addition to high speed, low power consumption and high reliability. Research and development is underway to meet such requirements.

New applications of high-frequency devices and optical devices using compound semiconductors in diverse fields such as for projector light sources, lights including vehicle headlights, sensors, laser processing machines, and power supply devices have emerged in addition to the communications field. Thus, high-frequency devices and optical devices will serve as key components for the continued growth of society.