

Overview



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The Latest Trends and Future Outlook of High Frequency and Optical Devices

Digital transformation (DX) is becoming increasingly important in various ways, including for suppressing COVID-19 by helping to shift to economic activities with less physical contact with other people and new lifestyles. DX requires the fifth generation mobile communication system (5G), Internet of Things (IoT) using 5G infrastructure, and optical communication networks for transmitting large volumes of data. 5G uses technologies including enhanced mobile broadband (eMBB), ultra-reliable and low latency communications (URLLC), and massive machine type communications (mMTC). Base stations having antennas with massive multi-input multi-output (massive MIMO) are being constructed and many of these antennas emit radio waves whose phases and amplitudes are controlled. The transmission of such radio waves to many users concurrently achieves both mMTC and high-speed large-capacity communications. Mitsubishi Electric Corporation has developed and commercialized small low-heat high-efficiency gallium nitride (GaN) amplifiers for this application. In addition, optical communication networks are the core of communication infrastructure; in order to cope with greater total communication traffic volume with the spread of larger data centers, cloud services and the Internet in addition to 5G, the speed and transmission capacity of all layers of the network have been enhanced. We have achieved operation at 25 gigabits per second (Gbps) for distributed feedback laser diodes (DFB-LDs) and 100 Gbps for electro-absorption modulated lasers (EMLs). Furthermore, we have commercialized small high-performance, low-cost infrared sensor modules, MeDIR. These modules reduce costs and increase the number of pixels, and are expected to be used for the IoT.