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FOR IMMEDIATE RELEASE **No. 2920**

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Mitsubishi Electric Develops DFB Laser Diode for 25Gbps Optical-fiber Communication in 100Gbps Systems

Will contribute to low power consumption, high performance, and simplified design for optical-fiber communication transceivers

TOKYO, March 19, 2015 – Mitsubishi Electric Corporation (TOKYO: 6503) announced today that it has developed a distributed feed-back (DFB) laser diode for 25Gbps optical-fiber communication in 100Gbps systems operating in a wide range of temperatures from -20 to 85 degree Celsius. Four DFB laser diodes can be mounted on 100Gbps high-speed communication transceivers for optical fiber communication to achieve lower power consumption and enhanced communication performance for increased efficiency in data centers. The new DFB laser diode will also help to simplify the requirements for transceiver design.

Mitsubishi Electric will present its new laser diode at the Optical Fiber Communication Conference and Exposition 2015 (OFC 2015), which is scheduled to be held at the Los Angeles Convention Center in Los Angeles, California from March 22 to 26.

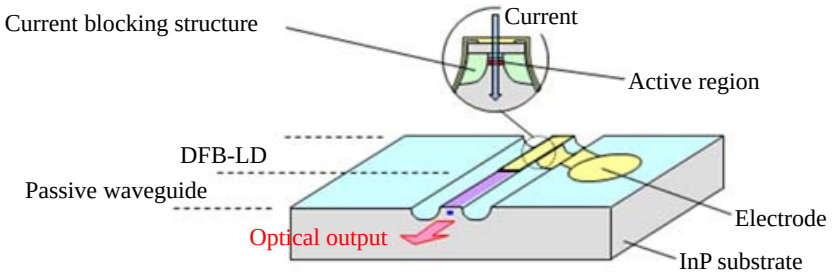


Fig.1 Schematic of DFB laser for 25Gbps optical-fiber communication

Features

1) High output power even at high temperatures, low power consumption and high performance

- New current-blocking structure achieves low capacitance for efficient current injection without degrading high-speed response.

- Current injection efficiency in active region improved 12% compared with company's existing products. More than 10mW output power at 85°C is obtained.
- High-temperature operability eliminates the need for cooling, helping to reduce power consumption.
- Transmitter Optical Sub Assembly (TOSA) for 100Gbps transmission includes 4-wavelength 25Gbps DFB lasers. The DFB lasers' high output power compensates for the optical loss caused by an optical multiplexer inside the TOSA.

2) ***Wide-ranging temperature operability and high-quality modulation waveform help to simplify the designs of 100Gbps transmission systems***

- Current-blocking structure with low capacitance and short laser length (75% the length of the company's existing products) enables top-quality modulation waveform with mask margin of more than 20%.
- High-quality modulation waveform simplifies laser-driving circuit design and therefore communication transceiver design.

In the effort to develop a DFB laser with high-speed response suited to 25Gbps operation, a current-blocking structure with semi-insulating semiconductors that have high electrical resistance by doping impurity showed promise, but high output power was not possible because of poor current injection efficiency in the active region. In response, Mitsubishi Electric developed the new current-blocking structure with semi-insulating semiconductors that realize efficient current injection in the active region.

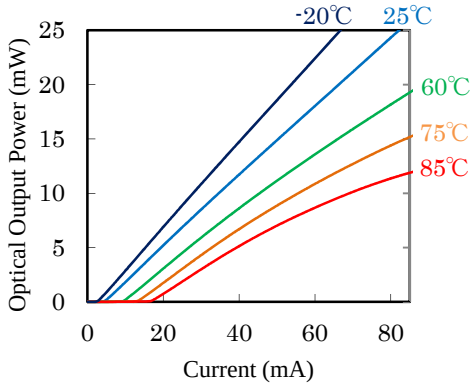
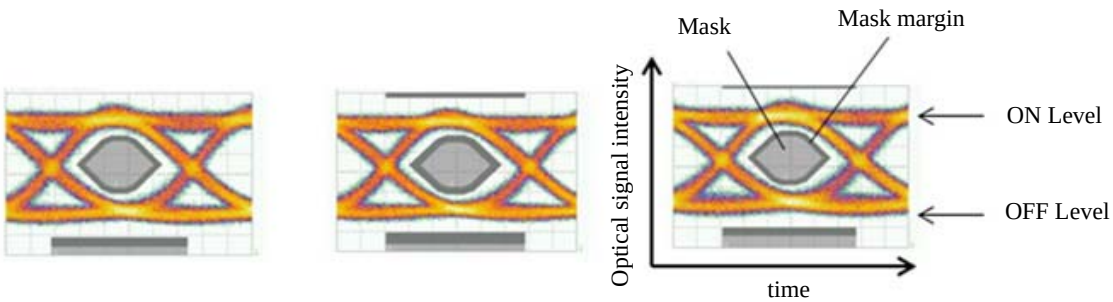


Fig.2 Current dependence of optical output power



–20°C
Mask margin=24%

25°C
Mask margin=34%

85°C
Mask margin=24%

Fig.3 Modulation waveform

Future Development

We will continue to develop DFB lasers to realize wider temperature range operation and higher conversion efficiency from electric current to optical output power. It attributes to high-density packaging and low power consumption of communication transceivers.

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About Mitsubishi Electric Corporation

With over 90 years of experience in providing reliable, high-quality products, Mitsubishi Electric Corporation (TOKYO: 6503) is a recognized world leader in the manufacture, marketing and sales of electrical and electronic equipment used in information processing and communications, space development and satellite communications, consumer electronics, industrial technology, energy, transportation and building equipment. Embracing the spirit of its corporate statement, Changes for the Better, and its environmental statement, Eco Changes, Mitsubishi Electric endeavors to be a global, leading green company, enriching society with technology. The company recorded consolidated group sales of 4,054.3 billion yen (US$ 39.3 billion*) in the fiscal year ended March 31, 2014. For more information visit http://www.MitsubishiElectric.com

*At an exchange rate of 103 yen to the US dollar, the rate given by the Tokyo Foreign Exchange Market on March 31, 2014