QDLASER

QD Laser Commercializes Quantum Dot Laser QLF-13 Series Featuring 10Gbps High-speed Operation for Optical Telecom Applications

- Enables realization of optical telecom modules with small form factors, power efficiency and ease of use as a world's first with speeds up to 10Gbps at 1310nm wavelength -

Tokyo, March 23, 2009 --- QD Laser, Inc. today announced, as a world first, its plans for commercial launch of a quantum dot (QD)(*1)-Fabry-Perot(FP)(*2)-type (QD-FP-type) laser operable at 10 gigabits-per-second (10 Gbps), to be available from early June 2009. By employing proprietary QD laser technologies, QD Laser succeeded in being the first to develop and commercialize temperature-insensitive QD lasers with 1310 nanometer (1310nm) (Figure 1) 2.5Gbps TO-CAN packaging (Figure 2) and 10Gbps high speed version as the QLF-13 series, for practical-use applications such as fiber-to-the-home (FTTH), optical LAN, and fiber channels for optical fiber telecommunication. QD Laser also announced that engineering samples of its temperature-insensitive QD-DFB (*3) laser operable at 2.5Gbps for long-reach transmissions will be available from early June of this year.

QD Laser will present the following papers at the Optical Fiber Communication Conference and Exposition 2009 (OFC 2009), being held in San Diego, California from March 22 - 26: Related work on 10Gbps QD-FP Lasers entitled "High-speed and temperature-insensitive operation in 1.3-um InAs/GaAs high-density quantum dot lasers (Paper number: OWJ1); related work on 2.5Gbps QD-DFB lasers entitled "Temperature-stable 10.3Gbps/ Operation of 1.3um Quantum dot FP Lasers with GaInP/GaAs Gratings" (Paper number: JWA28).

Background

Nowadays, in view of environmental consciousness, the telecom industry requires products that feature low power consumption and small form factor, in keeping with the trend of increasingly faster transmission speeds which result in higher power consumption.

Given these circumstances, optical module and system vendors are experiencing difficulties in controlling temperature in products that feature continually smaller form factors and faster data transmission rates.

Results

By employing proprietary leading-edge QD technologies, compared to conventional lasers, QD Laser has succeed in reducing power consumption by approximately 30% for lasers used in optical modules at 85°C. Furthermore, QD Laser's realization of high-temperature operation at 100°C is effective to enable high-density packaging, resulting in a reduction of overall power consumption of optical telecommunication systems.

By leveraging the temperature-insensitivity characteristics, QD lasers have the potential to eliminate the need for automatic power control (APC)(*4) features, while also being able to function at temperatures ranging from room temperature to 100°C without complex bias current adjustments, thereby enabling cost reductions through fewer components and fewer adjustment processes. (Figure 3)

In terms of temperature insensitivity, Figure 4 shows characteristic temperatures(To) (*5) of the 10Gbps QD-FP, which achieved a characteristic temperature of 500K at 20°C to 100°C, a world record for a commercialized 1310nm semiconductor laser and approximately ten times higher insensitivity to temperature compared to conventional lasers.

Some of the research for this work was conducted as part of the following projects:
the Special Coordination Funds for Promoting Science and Technology (includes partial funding) of the Ministry of Education, Culture, Sports, Science and Technology (MEXT) of Japan; the “Photonic Network Technology Project” contracted to the Optoelectronic Industry and Technology Development Association (OITDA) by the New Energy and Industrial Technology Development Organization (NEDO) of Japan, and the “NEDO Grant for Technological Development by R&D Venture Businesses.”

Availability

2.5Gbps QD-DFB laser:
*Engineering Samples : Available from early June 2009

*Commercial Products : Available from early 2010

10Gbps QD-FP laser:
*Commercial Products : Available from early June 2009

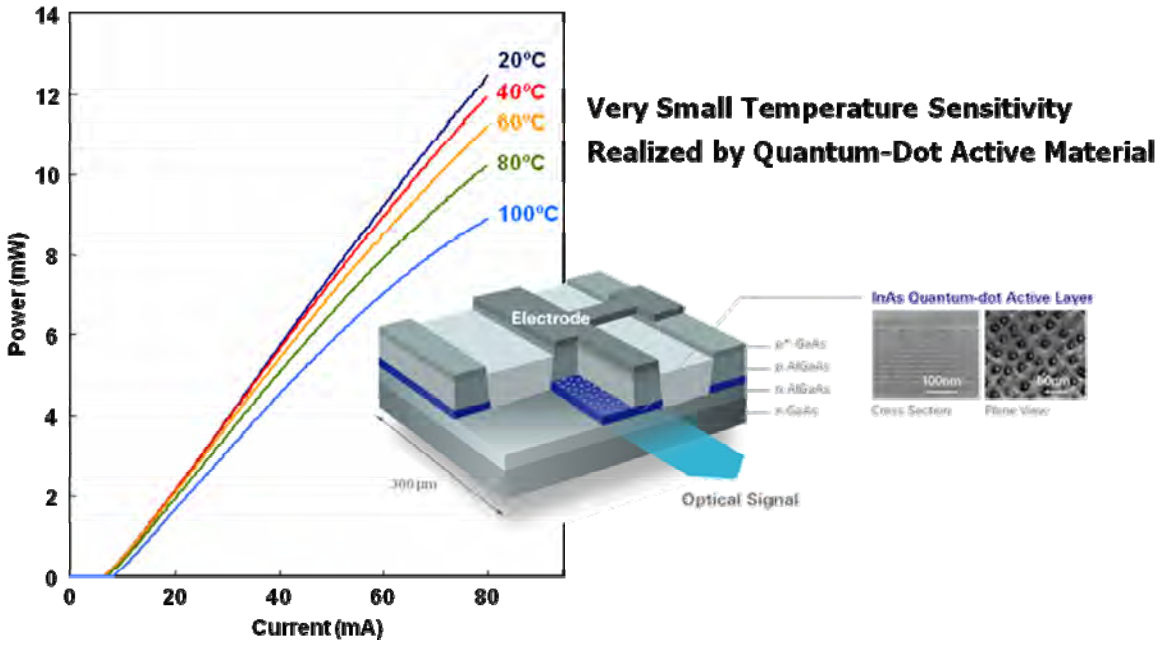

Figure 1: Structure of QD FP laser and LI curve in 10Gbps operation

Figure 2: QD-FP laser by TO-CAN package : QLF13 series

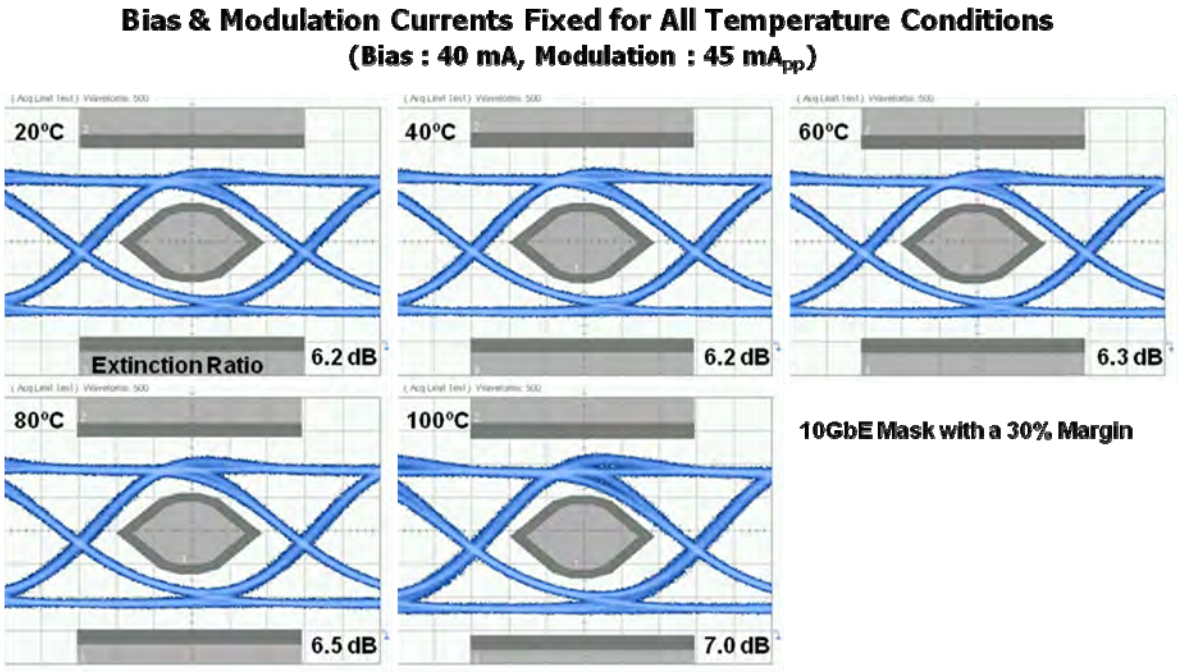

Figure 3: Eye diagram of a QD-FP laser in 10Gbps operation

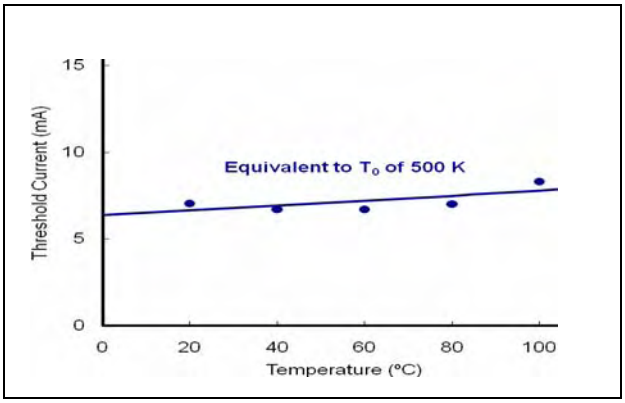

Figure 4: Characteristic temperatures of threshold currents (conventional lasers achieved approximately only 50K; QDL's new lasers feature 10 times higher temperature insensitivity)

Glossary and Notes

*1: Quantum Dots:
Semiconductor particles that are a few to several tens of nanometers in size (a nanometer is one billionth of a meter).

*2: FP (Fabry-Perot) laser:
A laser that has a structure that is most commonly used for semiconductor lasers, in which light is amplified through modulation back and forth within the inner active layers (resonator).

*3: DFB (Distributed feedback) laser:

A laser that has a structure which enables it to handle long-range transmissions, in which diffraction grating is formed near the laser's inner active layers (resonator) to limit the oscillation bandwidth of the laser.

*4: APC (Automatic Power Control):

Feature in laser drivers that uses feedback from the laser to adjust the drive, to keep the laser's output constant.

*5: Characteristic Temperature (T_0):

Parameter that indicates temperature stability level (temperature insensitivity). Calculated from fluctuations of the threshold current within a specific temperature range.

About QD Laser, Inc.

Founded in April 2006 with capital funded by Fujitsu Limited & Mitsui Ventures, with headquarters located in Tokyo, Japan. QD Laser, Inc. is a technology leader in the field of quantum dot based semiconductor optical devices, based on more than ten years of research on semiconductor quantum dot technologies in collaboration between Fujitsu Laboratories Ltd. and the University of Tokyo in Japan. For more information: www.qdlaser.com

Press and Customer Contact:
Michael Usami
VP, Sales & Marketing
QD Laser, Inc.
usami@qdlaser.com