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MITSUBISHI ELECTRIC DEVELOPS 10 Gbps HIGH OUTPUT ELCTROABSORPTION MODULATOR (EAM) CAPABLE OF 80 KM TRANSMISSION AND OPTICAL MODULE FU-653 SEA

Tokyo, March 18, 2005 – Mitsubishi Electric Corporation (President and CEO: Tamotsu Nomakuchi) announced today successful development of an electroabsorption modulator integrated DFB-LD¹ (EAM-LD²) for use as a light source in small optical transceivers for optical fiber telecommunication as well as an optical module FU-653 SEA. This EAM-LD (ML9XX41) achieves 10Gbps³-80km (standard single mode fiber) transmission, and the industry's highest average fiber launched power of +3dBm. Samples will begin shipping in April to select customers.

¹Distributed Feedback Laser Diode (DFB-LD). Grating is formed in the cavity of the laser diode, which feeds back the light with a specified wavelength. The DFB-LD emits monochromatic light, which is suitable for the light source in long distance optical communication

² Electroabsorption modulator (EAM): A waveguide optical modulator based on quantum-confined Stark effect (QCSE) of quantum well structure. Upon applying a reverse bias voltage to EAM, the absorption coefficient of the quantum well is increased due to shrinkage of its effective band gap

³Equivalent to transfer of about 1.8 Compact Disks of data in one second

| Model name | Summary | Price of sample (ex. tax) | Sample shipment date | Start of mass production |
|------------|--|---------------------------|----------------------|--------------------------|
| ML9xx41 | Bit rate: 10Gbps Max transmission distance: 80km Fiber output power: +3dBm (average fiber launched power) 10mW(facet output power) | US\$500 | April 1 | August 2005 |
| FU-653SEA | Fiber output power: +3dBm (under modulation) Chromatic dispersion : 1600ps/nm (equivalent to 80km normal dispersion single mode fiber) Butterfly package GPO Connector Built-in optical isolator | US\$1300 | April 1 | August 2005 |

Applications

Mitsubishi's new ML9xx41 EAM-LD is suitable for small-form-factor optical transceivers (XENPAK⁴, XFP⁵) as well as small form factor 300-pin optical transponders, enabling cost-effective 10Gbps optical links for long distance and metropolitan-area applications with high board density. Combining the high-power EAM-LD with a high-sensitivity APD-based optical receiver extends link budget, and enables amplifier-free low-cost 80km optical links with a large loss margin. FU-653SEA is a butterfly type optical module that has ML9xx41 EAM-LD.

⁴ A specification based on IEEE 802.3ae established for optical receivers that use 10Gbps ethernet

⁵ A standard specification that is similar to OC-192, ITU-TG.709, 10Gbps fiber channel, etc. Used in efforts to realize a standard for optical receivers, and smaller and less energy consuming than XENPAK

Main characteristics

(1) The ML9xx41 EAM-LD utilizes an InGaAsP quantum well (QW) EAM absorption layer that has been optimized so that ultralow frequency chirp⁶ is obtained even under high optical output power conditions and at low reverse bias voltages. Positively charged holes, which normally are confined in QWs and deteriorate chirp under high optical output power conditions, are evacuated efficiently at low electric fields. This enables 80km transmission with low optical absorption loss, leading to high optical output power (average fiber launched power of +3dBm).

⁶ Deviation of instantaneous optical frequency accompanied with optical intensity modulation. Chirp is due to deviation of the real part of the complex refractive index of the EAM absorption layer that is closely related to the modulation of the imaginary part of the complex refractive index, i.e. optical absorption

(2) The ML9xx41 supports "protocol-agnostic" 80km transmission, including SONET/SDH, 10GbE, and ITU-T G.709 forward error correction (FEC) from 9.95Gbps to 10.7Gbps.

(3) ML9xx41 achieves a high extinction ratio (>10.5dB) at a low driving voltage amplitude of 2.0V.

About Mitsubishi Electric

With over 80 years of experience in providing reliable, high-quality products to both corporate clients and general consumers all over the world, Mitsubishi Electric Corporation (TSE: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. The company recorded consolidated group sales of 3,309 billion yen (US\$ 31.2billion*) in the fiscal year ended March 31, 2004. For more information visit <http://global.mitsubishielectric.com>

*At an exchange rate of 106 yen to the US dollar, the rate given by the Tokyo Foreign Exchange Market on March 31, 2004.



Optical Module (FU-653SEA)