News Release

Furukawa Electric CPO ELS Wins Best Paper Award from ICSJ2022

Contributes to the realization of next-generation network switch servers in data centers

Tokyo, Japan, October 31, 2022 -- Furukawa Electric Co., Ltd. presents and exhibits the technologies of Electronic Laser Source (ELS) to be adopted for Co-Packaged Optics (CPO) at the 11th Institute of Electrical and Electronics (IEEE) CPMT Symposium Japan (ICSJ2022), sponsored by IEEE Electronics Packaging Society in Japan. ICSJ2022 will be held at Kyoto University, Japan, from November 9th to 11th as a hybrid event of onsite and online meetings.

There has been a strong demand to expand the bandwidths for both hyperscale data centers that process big data and edge data centers that realize low latency Beyond 5G. Per these market trends, power saving has been a challenge for network switch servers.

Hence, a new server architecture employing CPO has been expected. CPO has a unique packaging structure where high-density silicon photonics transceivers are mounted with a switch ASIC on the same substrate. As the bandwidth of the switch ASIC is expanded, the power consumption is increased, and higher heat is generated. If a compound semiconductor laser is integrated in the optical transceiver, it will be operated in a high-temperature environment, which will deteriorate its characteristics and affect its reliability.

Therefore, ELS is placed on the front panel, which is outside the housing with a low ambient temperature, and the laser beam is supplied to the optical transceiver via a multi-lane polarization-maintaining fiber cable. (Fig. 1)

To operate ELS with high optical output and low power consumption, we optimized the design of ELS to achieve a high optical coupling efficiency and suppress the temperature increase in an uncooled condition.

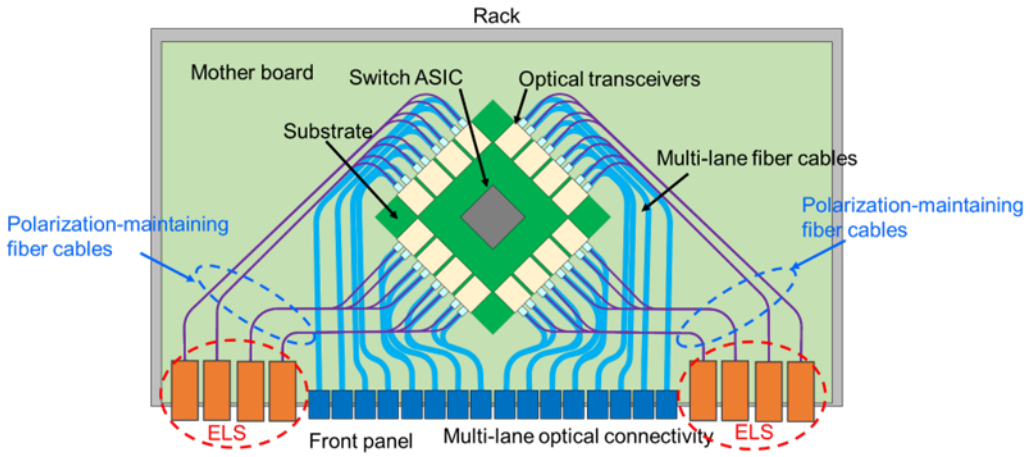

Fig. 1 Schematic top view of network switch server employing CPO

Furukawa Electric presents and exhibits an 8-channel CWDM TOSA and a pigtailed-QSFP ELS employing the TOSA at ICSJ2022. We utilize the high-power and wavelength-selected compound semiconductor laser technologies and optical packaging technologies we have built over the past 20 years.

We optimized the structural design of the TOSA to suppress the temperature increase of a high optical power semiconductor optical amplifier (SOA) integrated with a distributed feedback (DFB) laser diode (LD). We also realized a high optical coupling efficiency between the SOA-integrated DFB LD and the PMF cable. These attributes contribute to realize a high fiber-coupled power in an uncooled condition. At a case temperature of 55 °C, an optical output power of >100mW can be obtained with an LD bias current of 350mA or higher. (Fig. 2)

The mechanical size of the TOSA is as small as 23.5 mm ´ 13.0 mm ´ 4.0 mm, which enables it to be built in a QSFP housing with other components. (Fig. 3)

In addition, the optimization of the heat dissipation structure suppresses the temperature difference between the housing of the pigtail-QSFP ELS and the case of the TOSA as low as 0.7 °C. Therefore, the pigtailed-QSFP ELS can keep the same optical output power characteristics as well as the TOSA.

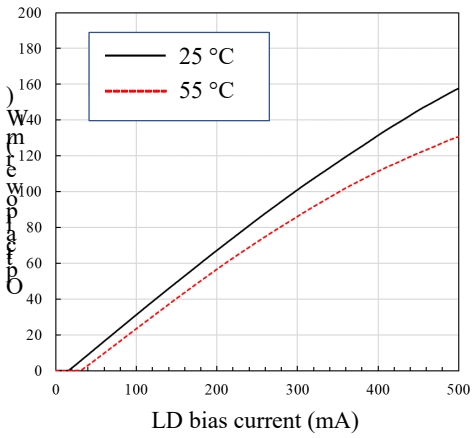

Fig. 2 L-I curves

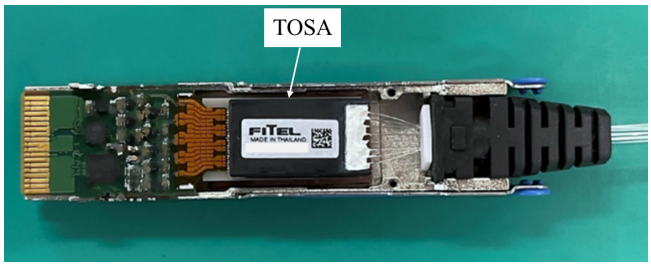

Fig. 3 Photograph of pigtailed-QSFP ELS

Key Characteristics

Parameter	Characteristics
Number of channels	8
Operating case temperature	0 ºC to 55 ºC
Wavelength allocation	4-λ CWDM x 2
Output power	>100mW/channel
Polarization Extinction Ration	>20 dB (Slow axis)
Relative Intensity Noise	<-150 dB/Hz

Furukawa Electric Group's efforts toward the SDGs

Based on the "Sustainable Development Goals (SDGs)" adopted by the United Nations, Furukawa Electric Group has formulated the "Furukawa Electric Group Vision 2030" which sets the year 2030 as its target and is advancing efforts with the aim to "Build a sustainable world and make people's life safe, peaceful and rewarding, Furukawa Electric Group will create solutions for the new generation of global infrastructure combining information, energy, and mobility." Toward the achievement of our Vision 2030, we will take open, agile, and innovative approaches to promote ESG management that aims to increase corporate value over the medium to long term and will contribute to the achievement of the SDGs.

Furukawa Electric Group’s efforts towards the SDGs

https://furukawaelectric.disclosure.site/en/themes/182

About Furukawa Electric Co., Ltd.

Furukawa Electric Co., Ltd. (www.furukawaco.jp/english) is a global leader in the design, manufacture, and supply of fiber optic products, network products, electronics components, power cables, nonferrous metals, and other advanced technology products. Headquartered in Tokyo, Japan, Furukawa operates production facilities on six continents around the globe, including OFS in the U.S.A., Europe, Africa, and China.

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