

Furukawa Electric Announces Development of New Pump Laser for High Output Power, Lower Consumption Raman Amplifiers to Support the S-band and L-band

Contributes to the realization of ultra-high speed, large volume networks

OFC 2023, Booth 3229, San Diego, California, March 2, 2023 - Furukawa Electric Co., Ltd. (FEC) has expanded its product lineup through the development of new applications for the S-band and L-band by extending the normal C-band range of the FRL1441U Series pump laser of high output power, low power consumption for Raman amplifiers.

The development of a pump laser for Raman amplifiers that support the S-band and L-band was conducted and achieved as part of the National Institute of Information and Communications Technology (NICT) commissioned research “Beyond 5G – Development of extended range optical node technology for realizing ultra-high speed, large volume networks” (Key Issue 045).

■ Background

As data transmission speed increases, the transmission distance decreases due to the degradation of the OSNR (Note 1) on the receiving side. In particular, when existing communication systems are used at faster transmission speeds the role of the Raman amplifier, which can amplify optical output power without attenuation of the signal light quality, has become even more important. Also, because the bandwidth of the signal expands as a result of high-speed transmission, it is necessary to extend the bandwidth in order to enable high-volume transmission. Thus, Raman amplifiers, which make it possible to amplify the signal light source based on the selection of the pump laser wavelength, offer the most flexibility for optical amplification.

Furukawa has contributed to the advancement of optical communications for over 20 years as a leading company in the manufacture of pump lasers, a key component of Raman amplifiers.

■ Details

Concerning our FRL1441U Series pump laser for Raman amplifiers, in addition to the 700mW C-band pump laser developed last year, the new lineup will be expanded to include products for S-band and L-

band applications. With consideration for the energy shift from short wavelength to long wavelength due to the impact of stimulated Raman scattering during optical transmission, we focused on high output power, low power consumption for S-band applications and lower power consumption design for L-band applications. The designs were optimized accordingly, and we developed pump lasers with 700mW output for S-band applications (Fig. 2) and 500mW output, low power consumption (33% lower compared to existing Furukawa Electric products, Fig. 3) for L-band applications. The higher output power and extended bandwidth were realized as a result of the high accuracy fiber coupling technology and optical semiconductor processing technology using InP (Note 2) semiconductor materials developed over the past 25 years, as well as the application of our unique low loss, high-efficiency semiconductor laser device structure (Patented). Product samples will start being shipped from April, with mass production to commence from September.

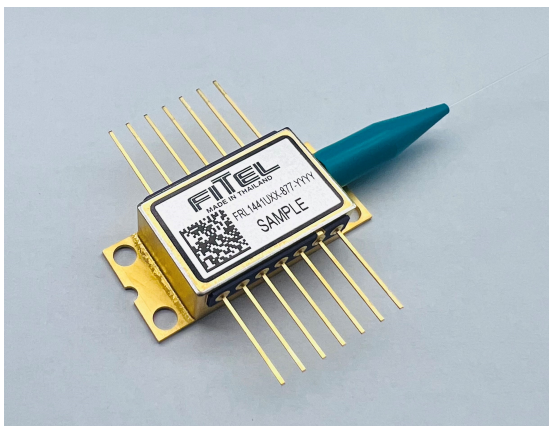


Fig. 1 FRL1441U Series

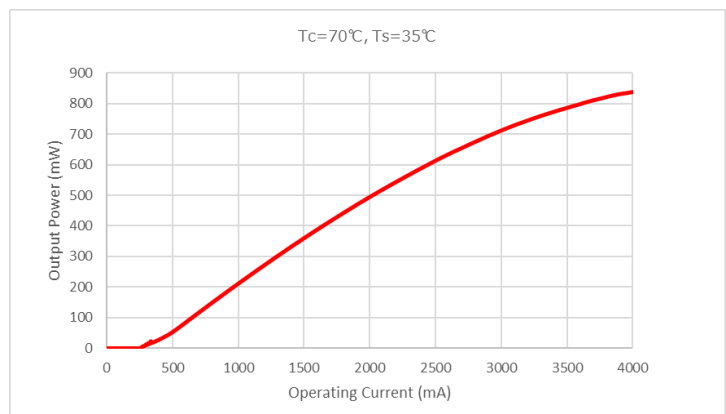


Fig. 2 Electrical current –
Optical output characteristics (S-band)
@ 35°C chip temperature

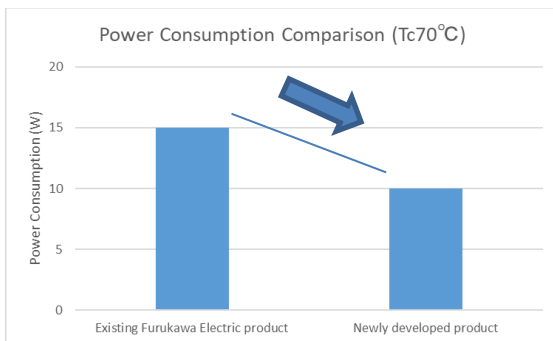


Fig. 3 Reduced power consumption (L-band)

Using this product, it will be possible to reduce the space required by using a single pump laser instead of the previous two pump lasers required for achieving higher output power. At the same time, the reduced power consumption will contribute to reducing the power consumption of the Raman amplifier. Also, with the expanded lineup, it will be possible to supply components for Raman amplifiers that can selectively amplify the signal light source from the S-band through the L-band, thus contributing to the realization of ultra-high speed, high-volume transmission networks.

Main characteristics

Model	FRL1441U Series (Characteristics of the newly developed pump laser for the S-band and L-band)		
Bandwidth	S-band		L-band
Optical output power (mW)	700	600	500
Power consumption (W)	Max. 14	Max. 10	Max. 10
Operating conditions	Ts=35°C, Tc=70°C (EOL)		

(Note 1) OSNR (Optical Signal to Noise Ratio): Parameter that indicates the signal-to-noise ratio.

(Note 2) InP (Indium Phosphide): A III-V compound semiconductor that is used in the manufacture of laser diode chips and high-speed transistors.

■ Related new releases

Achieved 800mW output with a pump laser for C-band Raman amplifiers

https://www.furukawa.co.jp/release/2022/comm_20221018.html

Furukawa will exhibit this new product at OFC 2023, March 7-9, 2023, in San Diego at OFS booth 3229.

Product samples will be available from April 2023 with mass production beginning in September 2023.

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 forth 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 achieving 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 achieving the SDGs.

Furukawa Electric Group's efforts towards the SDGs

<https://furukawaelectric.disclosure.site/ja/themes/182>

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