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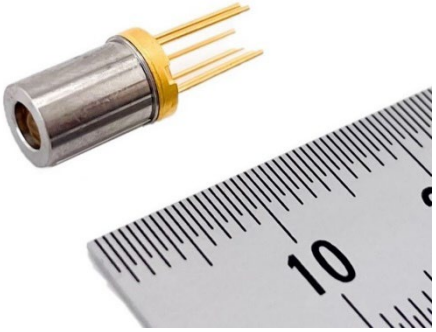
Mitsubishi Electric to Ship Samples of DFB-CAN with Built-in Wavelength Monitor for Digital Coherent Communication

Small-package TO-56CAN will contribute to miniaturized, low-power consumption of optical transceiver modules



DFB-CAN with built-in wavelength monitor (ML973A71)

TOKYO, March 21, 2024 – Mitsubishi Electric Corporation (TOKYO: 6503) announced today that it will begin shipping samples of its latest optical device, a DFB[1]-CAN with built-in wavelength monitor, on April 1. This innovative new light source, the industry's first[2] to use the TO-56CAN[3] package for digital coherent communication capable of high-speed, long-distance transmission, is expected to contribute to the realization of ultra-small, low-power consumption of optical transceiver modules.

Communication traffic is growing rapidly due to advances in IoT technology, high-resolution video streaming, and generative AI technology, requiring networks to deliver ever-higher speeds and capacities. However, faster optical communication signal speeds can cause waveform distortion due to chromatic dispersion, which limits signal transmission distances. Digital coherent communication corrects such distortions using digital signal processing technology, allowing optical signals to be transmitted at higher speeds and over longer distances compared to conventional intensity modulation methods. In parallel, the use of optical transceiver modules is increasing as optical communication traffic grows. Both trends are driving demand for optical transceiver

[1] Distributed Feedback laser diodes
[2] According to Mitsubishi Electric research as of March 21, 2024
[3] An inexpensive package often used in optical networks with low-speed optical signals, such as passive optical network

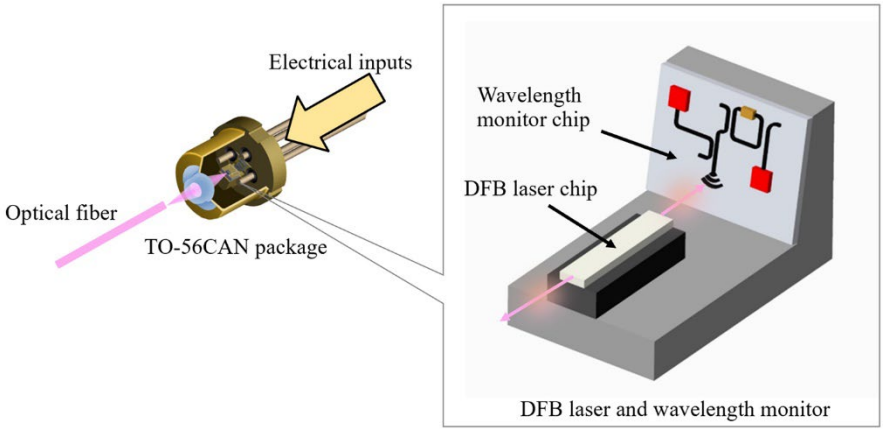
modules and related components that combine small footprints and low power consumption.

Mitsubishi Electric's new DFB-CAN's compact package includes a DFB laser chip and a wavelength monitor chip. Its unprecedented low-power consumption of only 1W was achieved by improving the thermal exchange element for temperature control in the DFB laser chip and optimizing the design for heat dissipation. In addition, the newly designed wavelength monitor chip enables high accuracy wavelength control of the laser output at 1,547.72nm. The device is expected to contribute to miniaturization and low-power consumption in both widely deployed 400Gbps[4] digital coherent optical transceiver modules and next-generation 800Gbps modules currently under consideration by the Optical Internetworking Forum (OIF).[5]

Product Features

1) ***New DFB-CAN will enable small, low-power consumption of optical transceivers for digital coherent communication***

- The compact TO-56CAN package, used for first time in a light source for digital coherent communication, is combined with both a DFB laser chip and a wavelength monitor chip to achieve a volume of only 0.2ml, or 80% smaller[6] than existing devices.
- Reduced heat from the DFB laser chip, an improved thermoelectric conversion element for adjusting the DFB laser chip temperature, and an optimized heat dissipation structure reduce total power consumption to just 1W, 66% less[6] than existing devices.



2) ***1,547.72nm wavelength suitable for next-generation digital coherent communication***

- The output laser with a fixed wavelength of 1,547.72nm is suitable for both existing 400Gbps digital coherent optical transceiver modules and next-generation 800Gbps modules being considered by the OIF.
- The DFB laser chip and wavelength monitor chip integrated in the same package enable accurate measurement of the output laser wavelength and can be used in combination with a wavelength-error correction circuit to achieve highly stable laser output.

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[4] Giga (one billion) bits per second

[5] Non-profit industry organization working to standardize electrical, optical, and control interoperability of optical networks

[6] Comparison with Mitsubishi Electric's existing butterfly-type wavelength tunable light source (discontinued FU-679PDF)

Main Specifications

Model	ML973A71
Application	Light source for digital coherent communication
Optical output	+17dBm (typical)
Wavelength (frequency)	1,547.72nm (193.7THz)
Operating temperature	-5ºC to +75ºC (contact temperature)
Power consumption	1W (typical)
Dimensions (volume)	φ5.6mm by 8.3mm (0.2ml) (without heat sink)
Sample shipments	From April 1, 2024
Patents	2 filed

Future Developments

The signal wavelength for digital coherent communication systems is expected to expand two wavelength bands, such as 1,550nm and 1,310nm wavelength band in the future, as the latter exhibits less waveform distortion due to chromatic dispersion, thereby reducing the amount of power required for correction. Going forward, Mitsubishi Electric expects to develop a 1,310nm band light source and eventually begin supplying samples.

Environmental Awareness

This product is compliant with the Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment (RoHS) directive 2011/65/EU and (EU) 2015/863.

Website

For more about optical devices, visit www.MitsubishiElectric.com/semiconductors/opt/

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About Mitsubishi Electric Corporation

With more than 100 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. Mitsubishi Electric enriches society with technology in the spirit of its "Changes for the Better." The company recorded a revenue of 5,003.6 billion yen (U.S.$ 37.3 billion*) in the fiscal year ended March 31, 2023. For more information, please visit www.MitsubishiElectric.com

*U.S. dollar amounts are translated from yen at the rate of ¥134=U.S.$1, the approximate rate on the Tokyo Foreign Exchange Market on March 31, 2023