# TO-CAN Based Tunable Laser Optical Sub-Assembly

## TOSA TLCBD

## Key Features

- **Up to 16 channels at 100 GHz spacing or up to 32 channels at 50GHz spacing**
- **C- or L-band**
- **Simple tuning algorithm**
- **2.5 Gbps direct modulation**
- **Low-cost TO-can based optical subassembly**

## Applications

- **NGPON2**
- **WDM-PON**
- **Optical interconnects**
- **DWDM sparing**

Widely wavelength tunable semiconductor lasers are key components for next-generation optical networks. Conventional tunable lasers require complex fabrication processes such as non-uniform gratings and multiple epitaxial growths, and need multiple electrodes with complex control algorithms for wavelength tuning. As the dense wavelength division multiplexing (DWDM) technology extends towards access and data center networks, the cost reduction and operational simplicity have become more and more important.

We has developed a simple and compact tunable laser based on patented proprietary technologies. It consists of a half-wave coupled V-cavity laser with only three electrodes: one for gain and direct modulation, one for channel selection corresponding to the ITU grid, and the third for fine tuning when needed. The laser structure does not involve any grating or epitaxial regrowth, and has a size of only about 500μm × 300μm. The advantages of compactness, fabrication simplicity and easy wavelength control offer cost-effective tunable laser solutions for many applications in access and data center networks, and beyond.

These series Transmitter Optical Sub-Assembly (TOSA) is based on an 8-pin TO-CAN package that offers further cost reduction compared to our previously released TLDX15 series tunable TOSA. It comprises a V-cavity edge-emitting tunable laser, a power monitoring photodiode, an isolator, and a TEC controller, with an LC connector. Currently it can provide up to 16 channels at 100GHz spacing or 32 channels at 50GHz spacing in C- or L- band (other wavelength bands available on request), with a customer specified starting wavelength. The laser chip can be operated in semi-cooled condition at 40-60℃ while the ambient operating temperature is between 0 and 70℃.

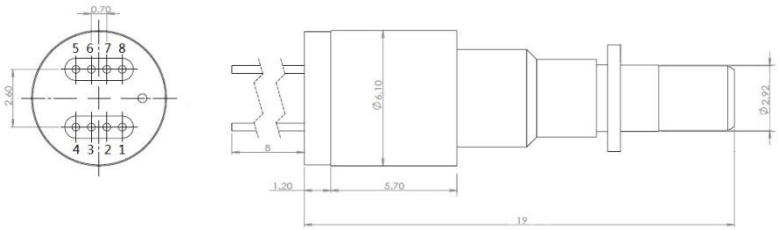
## Specifications

| Parameters | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|
| Optical Output Power | | ≥ 0 | | dBm |
| Ambient Operating Temperature | 0 | - | 70 | ℃ |
| Gain Forward Bias Current | 25 | 30 | 50 | mA |
| Channel Selector Current | 20 | - | 100 | mA |
| Fine Tuning Current | 20 | 25 | 40 | mA |
| LD Forward Bias Voltage | - | - | 2.3 | V |
| Modulation Data Rate | 2.5 (higher data rates under development) | | | Gbps |
| Wavelength | C- or L-band (other wavelengths available on request) | | | |
| Channel Spacing | 50 or 100 | | | GHz |
| Number of Channels | Up to 16@100GHz, or 32@50GHz | | | |
| Side Mode Suppression Ratio | 35 | 38-40 | - | dB |
| Optical Isolation | 25 | - | - | dB |
| Relative Intensity Noise | - | - | -135 | dB/Hz |
| Power Monitor Current | 20 | - | 500 | μA |
| Power Monitor Dark Current | - | - | 100 | nA |
| TEC Current | - | 0.5 | 0.9 | A |
| TEC Voltage | - | - | 1.2 | V |
| Total Power Consumption ($P_{LD}$ + $P_{TEC}$) | - | 0.8 | 1.5 | W |
| Thermistor B constant | - | 4050 | - | K |
| Thermistor Resistance @25°C | 9.5 | 10 | 10.5 | kΩ |

* Product specifications are subject to change without notice.

## Dimensions

(in millimeters)




## Pin Assignments

| Pin | Symbol | Description |
|---|---|---|
| 1 | TEC+ | TEC anode |
| 2 | $R_{th}$ | Thermistor |
| 3 | LD3+ | Fine tuning |
| 4 | PD- | PD cathode |
| 5 | LD1+ | Gain bias and modulation signal |
| 6 | Common | LD3-/LD1-/PD+/LD2-/$R_{th}$ |
| 7 | LD2+ | Channel selector |
| 8 | TEC- | TEC cathode |