

# TLB-3010-C

10 mW Full Band Tunable CW Laser Butterfly

## Full C Band Tunable CW Laser

### Features

- Wide tuning range using highly reliable DFB laser arrays
- Excellent wavelength stability
- CW output power of 10 mW
- High Side Mode Suppression Ratio (SMSR): 50 dB typical
- Reduced package size and pin count

### Applications

- LR, LR2 and LH DWDM optical transport
- Large form factor full band tunable transponders

### Benefits

- DFB laser performance
- Simple control loops
- Integrated laser switch IC

*The **TLB-3010-C** is the third generation of compact 20 mW widely tunable transmission lasers built with Santur's own proprietary DFB laser array, MEMs coupling and packaging technology. Santur's technology provides for a highly efficient, small form factor full band tunable butterfly with the lowest power dissipation in the industry.*

*Ideally suited for use in a wide variety of DWDM Metro and LH systems, the Santur **TLB-3010-C** provides the best combination of performance features available, offering a unique combination of optical power, wide tunability, and low power dissipation. The **TLB-3010-C** includes an integrated wavelength locker a stable DFB laser array and an integrated laser switch IC.*

*High-power performance, reliability, ease of control, and economies of scale derived from the exclusive, proven technology, differentiate this product from others in the industry.*



TLB-3010-C-DS

This is a technical data sheet – parameters are subject to change without notice.

## Specifications:

| <b>Absolute Maximum Ratings</b> |                                   |                   |             |             |             |   |
|---------------------------------|-----------------------------------|-------------------|-------------|-------------|-------------|---|
| <b>#</b>                        | <b>Parameter</b>                  | <b>Symbol</b>     | <b>Min.</b> | <b>Max.</b> | <b>Unit</b> | <b>Comments</b>                             |
| 1                               | Storage temperature               | $T_{stg}$         | -40         | 85          | C           |   |
| 2                               | Laser diode reverse voltage       | $V_{R\_max}$      |             | 2           | V           |   |
| 3                               | Laser diode forward current       | $I_{f\_max}$      |             | 400         | mA          |   |
| 4                               | Etalon photodiode reverse voltage | $V_{EPD\_max}$    |             | 10          | V           |   |
| 5                               | Etalon photodiode reverse current | $I_{EPD\_max}$    |             | 3           | mA          |   |
| 6                               | Quad detector reverse voltage     | $V_{quad\_max}$   |             | 5           | V           |   |
| 7                               | Quad detector reverse current     | $I_{quad\_max}$   |             | 3           | mA          |   |
| 8                               | MEMs voltage X                    | $V_{X\_max}$      |             | 210         | V           |   |
| 9                               | MEMs voltage Y                    | $V_{Y\_max}$      |             | 175         | V           |   |
| 10                              | MEMs current                      | $I_{MEMS\_max}$   |             | 100         | $\mu$ A     |   |
| 11                              | Laser TEC current                 | $I_{OSATEC\_max}$ |             | 3           | A           |   |
| 12                              | Locker TEC current                | $I_{WLTEC\_max}$  |             | 1.5         | A           |   |
| 13                              | Lead Soldering                    |                   |             | 250C, 5sec  |             |   |
| 14                              | Electrostatic discharge (ESD)     | $V_{ESD}$         |             | 500         | V           | C=100pF, R=1.5k $\Omega$ , Human Body Model |

| #  | Parameter                           | Symbol           | Test Condition   | Min.               | Typical | Max.    | Unit       |
|----|-------------------------------------|------------------|------------------|--------------------|---------|---------|------------|
| 1  | Fiber-coupled power                 | $P_{op}$         | CW               |                    | 20      |         | mW         |
| 2  | Wavelength range                    | $\lambda_{min}$  |                  | 1528.77            |         | 1563.86 | nm         |
| 4  | Total Tuning Range                  |                  |                  | 35                 |         |         | nm         |
| 5  | Laser Set Temperature               | $T_{set}$        |                  | 17                 |         | 52      | C          |
| 6  | Case Temperature                    | $T_{case}$       | TEC Active       | -5                 | -       | 75      | C          |
| 7  | Power variation over case temp      |                  |                  | -0.5               |         | 0.5     | dBm        |
| 8  | Laser Forward Current @ rated power | $I_{op}$         | -                | -                  | -       | 320     | mA         |
| 9  | Laser Forward Voltage @ rated power | $V_{op}$         | -                | -                  | -       | 2.5     | V          |
| 10 | Threshold Current                   | $I_{th}$         | -                | -                  | 75      | -       | mA         |
| 11 | Spectral Width                      | $\Delta\lambda$  | FWHM             | -                  | 2       | 5       | MHz        |
| 12 | Side-mode Suppression Ratio         | SMSR             | -                | 40                 | 50      | -       | dB         |
| 13 | Relative Intensity Noise            | RIN              | 20 MHz to 10 GHz | -                  | -135    | -130    | dB/Hz      |
| 14 | Extinction Ratio                    | TE/TM            | -                | 20                 | -       | -       | dB         |
| 15 | Optical Isolation                   | ISO              | -                | 30                 | 35      | -       | dB         |
| 16 | MEMS X Voltage                      | $V_{xp}, V_{xn}$ | -                | -                  | -       | 205     | V          |
| 17 | MEMS Y Voltage                      | $V_{yp}, V_{yn}$ | -                | -                  | -       | 170     | V          |
| 18 | MEMS X snapdown Voltage*            | $V_{x snap}$     | -                | $ V_{x cal}  + 10$ | -       | -       | V          |
| 19 | Laser TEC Current                   | $I_{TEC}$        | -                | -                  | -       | 2.1     | A          |
| 20 | Laser TEC Voltage                   | $V_{TEC}$        | -                | -                  | -       | 2.5     | V          |
| 21 | Laser Thermistor Resistance         | $R_{TH}$         | @ 25 C           | 9.5                | 10      | 10.5    | k $\Omega$ |
| 22 | Laser Thermistor Beta               | $\beta$          |                  | 3800               |         | 4000    | K          |
| 23 | Locker TEC Current                  | $I_{TEC}$        | -                | -                  | -       | 0.8     | A          |
| 24 | Locker TEC Voltage                  | $V_{TEC}$        | -                | -                  | -       | 1.3     | V          |
| 25 | Locker Thermistor Resistance        | $R_{TH}$         | @ 25 C           | 9.5                | 10      | 10.5    | k $\Omega$ |
| 26 | Locker Thermistor Beta              | $\beta$          |                  | 3800               |         | 4000    | K          |
| 27 | Etalon max/min ratio                |                  |                  | 3                  |         | 8       |            |
| 28 | Total quad detector photocurrent    | $I_{quad}$       |                  |                    | 0.6     |         | mA         |
| 29 | Peak etalon photodiode photocurrent | $I_{EPD}$        |                  |                    | 0.02    |         | mA         |
| 30 | Power Dissipation                   | $P_{dis}$        | 70 C             |                    |         | 4.0     | W          |
|    |                                     |                  | 75 C             |                    |         | 4.8     | W          |

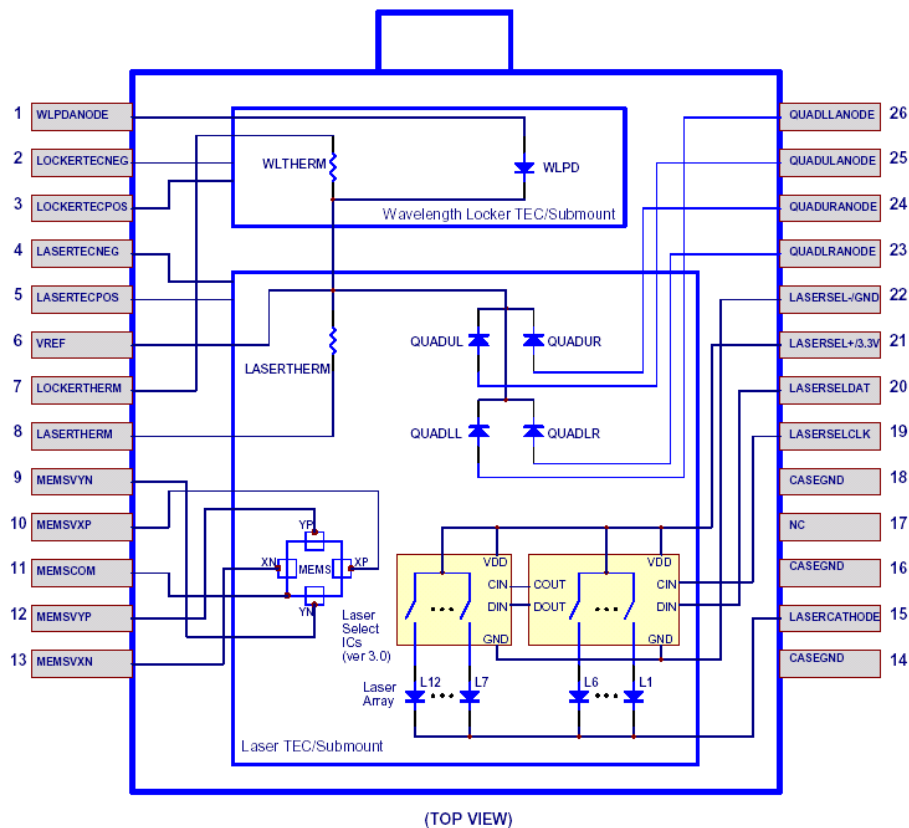
| #  | Parameter  | Symbol                         | Test Condition                                 | Min.  | Typical | Max. | Unit   |
|----|--|--------------------------------|--|-------|---------|------|--------|
| 31 | Change of emission frequency with chip temperature   |                                |  | -15   |         | -10  | GHz/C  |
| 32 | Change of emission frequency with laser bias current |                                |  | -1.5  |         | 0    | GHz/mA |
| 33 | Etalon photodiode linearity                          | $\Delta I_{EPD}/\Delta P_{op}$ |  | -5    |         | +5   | %      |
| 34 | Etalon photodiode dark current                       |                                | $V_{EPD}=5V,$<br>$T_{laser}=25C$               |       |         | 10   | nA     |
| 35 | Quad photodiode dark current                         |                                | $V_{quad}=5V,$<br>$T_{laser}=25C$              |       |         | 25   | nA     |
| 36 | Etalon photodiode capacitance                        |                                | $V_{EPD}=5V,$<br>$f=1MHz,$<br>$T_{laser}=25C$  |       | 90      |      | pF     |
| 37 | Quad photodiode capacitance                          |                                | $V_{quad}=5V,$<br>$f=1MHz,$<br>$T_{laser}=25C$ |       | 50      |      | pF     |
| 38 | Frequency capture range                              |                                |  | +/-20 |         |      | GHz    |
| 39 | Thermal crosstalk                                    | $\alpha$                       |  | 0     | 0.02    | 0.06 |        |

## Fiber Pigtail

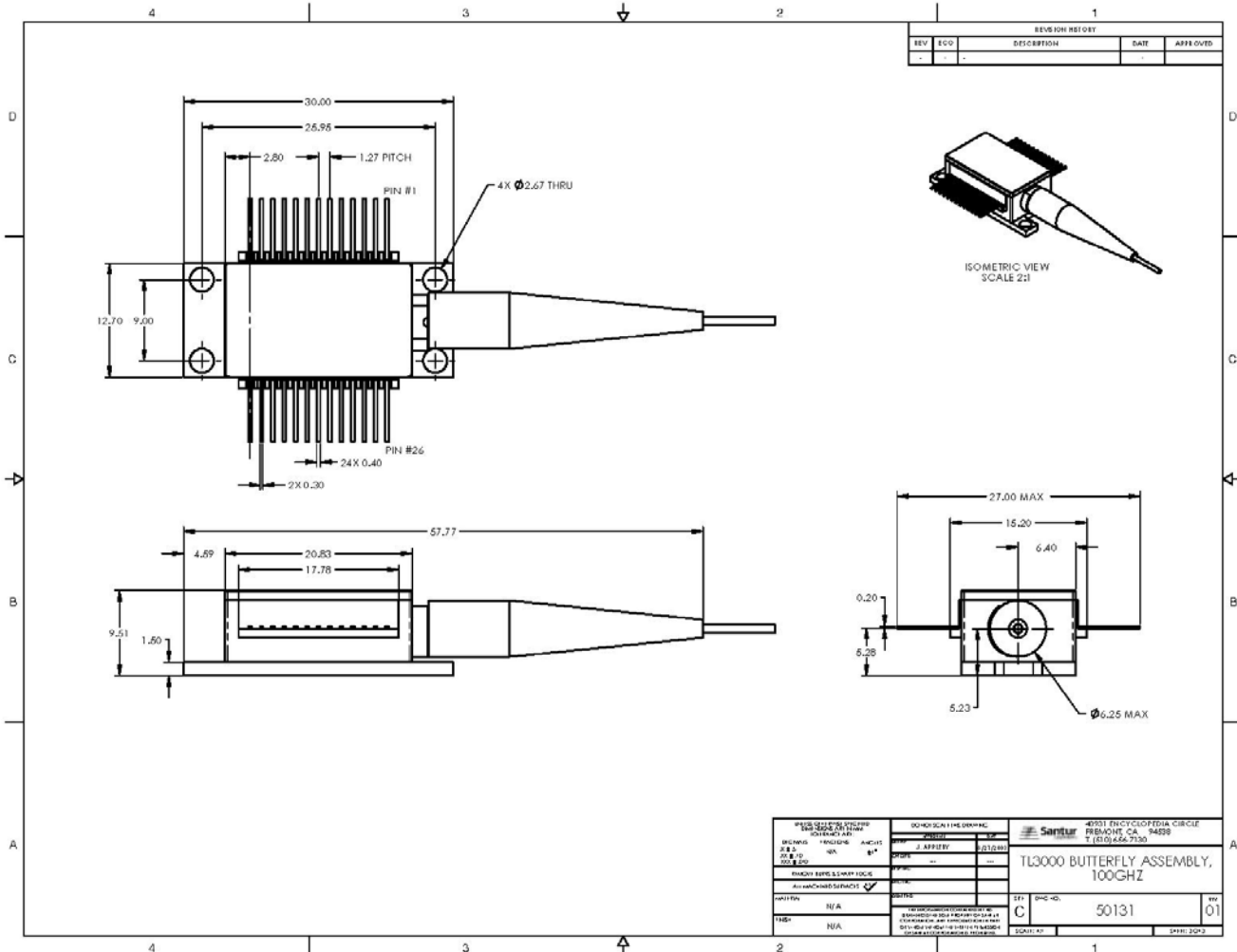
| # | Parameter              | Notes                 | Min | Max  | Unit    |
|---|------------------------|-----------------------|-----|------|---------|
| 1 | Fiber type             | Fujikura Panda PM     |     |      |         |
| 2 | Connector type         | FC/UPC                |     |      |         |
| 3 | Pigtail length         |                       | 0.8 | 2.1  | m       |
| 4 | Jacket diameter        | 900 $\mu$ m           |     |      |         |
| 5 | Mode field diameter    |                       | 9.5 | 10.5 | $\mu$ m |
| 6 | Cladding diameter      |                       | 122 | 128  | $\mu$ m |
| 7 | Bending radius         |                       | 15  |      | mm      |
| 8 | Fiber proof strength   |                       | 100 |      | Kpsi    |
| 9 | Polarization alignment | Parallel to slow axis |     |      |         |
|   |                        |                       |     |      |         |

## Pin Assignment

| Pin | Description   | Pin | Description                    |
|-----|---|-----|--------------------------------|
| 1   | Locker PD anode   | 14  | Case Ground                    |
| 2   | Locker TEC (-)  | 15  | Laser Cathode                  |
| 3   | Locker TEC (+)  | 16  | Case Ground                    |
| 4   | Laser TEC (-)   | 17  | NC                             |
| 5   | Laser TEC (+)   | 18  | Case Ground                    |
| 6   | Locker PD cathode/Quad Cathode/<br>Locker / Laser Thermistors (-) | 19  | Laser Select CLK               |
| 7   | Locker Thermistor (+)   | 20  | Laser Select serial DATA input |
| 8   | Laser Thermistor (+)  | 21  | Laser Select (+)               |
| 9   | MEMs $V_{yn}$   | 22  | Laser Select (-)               |
| 10  | MEMs $V_{xp}$   | 23  | Quad LR Anode                  |
| 11  | MEMs Ground   | 24  | Quad UR Anode                  |
| 12  | MEMs $V_{yp}$   | 25  | Quad UL Anode                  |
| 13  | MEMs $V_{xn}$   | 26  | Quad LL Anode                  |



# Mechanical Outline





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This is an OEM product that does not comply with the requirements of 21 CFR Subchapter 1 as applicable. It is the responsibility of the user to report the end product and to certify that it meets all applicable requirements.



**DANGER:** Fiber output is >10 mWatt at 1555 nm.  
Do not look into fiber end.

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TLB-3010-C-DS

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