**Tunable Lasers**

The Optoplex TL-MC040TA101 tunable laser is a high performance continuous wave (CW) tunable laser source for various test and measurement applications the C-band wavelength range covering from 1528nm (196.25 THz) to 1568nm (191.25 THz).

This tunable laser source is based on the OIF micro-iTLA standard. The laser and control electronics are pre-mounted on a dedicated circuit board for easy production installation. The tunable laser is featuring shuttered tuning, optical power control, off-grid tuning, adjustable grid spacing and narrow linewidth. A Labview software program and an RS232/USB cable are provided together with the tunable laser module. Users can plus and play with a computer (PC) to control the tunable laser very conveniently.

The TL-MC040TA101 tunable laser designed on a fully monolithic InP chip without moving parts, it is a low voltage electronically tuned device enabling channel switching with straightforward control electronics. The integrated semiconductor optical amplifier (SOA) provisions the optical power control and also acts as a shutter to allow dark tuning when reverse biased.

Laser tuning is implemented with thermal control. It can be tuned on grid or off-grid with a minimum tuning step of 0.1GHz. When operated in ON-Grid tuning, the tuning is shuttered. While in fine-tuning (+/-9GHz) mode, it is un-shuttered operation.

The TL-MC040TA101 tunable laser has a wavelength accuracy about 3.5pm max and a power stability of 0.02dB max (both measured in a period of 60 minutes).

With accurate wavelength and stable power output, the laser is ideal for many test and measurement applications, optical component and material characterization, and optical monitoring applications such as optical monitoring in optical thin film coating.

![Figure 1, Photo of the Tunable Laser OEM Module, Model: TL-MC040TA101](image)
Features:

- Full C-Band tunable laser source
- Narrow line-width, <= 400kHz
- High output power +15.5dBm nominal
- Variable output power range, 8.0dB
- Electronic shutter for dark tuning
- Gridless operation
- Wavelength stabilized for 0.1GHz
- Un-shuttered frequency fine tuning capability ±9GHz
- Large SMSR, >40dB
- Low RIN
- Low phase noise
- Low power dissipation, 4.5W
- Case operating temperature range -5ºC to +75ºC
- Simple RS232 interface
- RS232/USB conversion cable available (optional)
- RoHS compliant 6/6
- Telcordia GR 468 Qualified
- Low-cost alternative solution in manufacturing line test and measurement
- Custom-software available for material and component characterization purpose upon request

Applications:

- Coherent optical communication systems
- Low-Cost alternative laser source in manufacturing line test and measurement
- Optical characterization of materials and components
- Optical monitoring system (OMS) in optical thin film coating

Operating Conditions

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Symbol</th>
<th>Unit</th>
<th>Conditions</th>
<th>Ratings</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating Temperature</td>
<td>$T_c$</td>
<td>ºC</td>
<td></td>
<td>Min 0</td>
<td>+65</td>
</tr>
<tr>
<td>Operating Humidity</td>
<td>-</td>
<td>%RH</td>
<td></td>
<td>5</td>
<td>85</td>
</tr>
<tr>
<td>Storage Temperature</td>
<td>$T_{stg}$</td>
<td>ºC</td>
<td>-40</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Storage Humidity</td>
<td>-</td>
<td>%RH</td>
<td></td>
<td>5</td>
<td>85</td>
</tr>
</tbody>
</table>

Mechanical Specifications

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Unit</th>
<th>Specifications</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dimensions (L x W x H)</td>
<td>mm</td>
<td>100 X 120 X 22</td>
<td>Specified by Customer</td>
</tr>
<tr>
<td>Connector Type</td>
<td></td>
<td>FC/APC Standard</td>
<td>Specified by Customer</td>
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</table>
Optical Performance Specifications

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Unit</th>
<th>Specification</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wavelength Range</td>
<td>nm</td>
<td>1528</td>
<td>1567</td>
</tr>
<tr>
<td>Output Power</td>
<td>dBm</td>
<td>8</td>
<td>17</td>
</tr>
<tr>
<td>Power Stability(^1)</td>
<td>dB</td>
<td>±0.5</td>
<td></td>
</tr>
<tr>
<td>Power Repeatability(^2)</td>
<td>dB</td>
<td>±0.5</td>
<td></td>
</tr>
<tr>
<td>Tuning Speed</td>
<td>sec</td>
<td>3</td>
<td>10</td>
</tr>
<tr>
<td>SMSR (side mode suppression ratio)</td>
<td>dB</td>
<td>40</td>
<td>Measured over ±2.5nm range around the target frequency with 0.06nm RBW</td>
</tr>
<tr>
<td>Line width</td>
<td>kHz</td>
<td>400</td>
<td></td>
</tr>
<tr>
<td>RIN (10MHz-1GHZ)</td>
<td>dB/Hz</td>
<td>-140</td>
<td>-145</td>
</tr>
<tr>
<td>RIN (1-10GHz)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OSNR</td>
<td>dB</td>
<td>55</td>
<td>0.1nm optical bandwidth</td>
</tr>
<tr>
<td>PER</td>
<td>dB</td>
<td>20</td>
<td></td>
</tr>
<tr>
<td>Back Reflection Tolerance</td>
<td>dB</td>
<td>27</td>
<td></td>
</tr>
<tr>
<td>Shuttered Output Power</td>
<td>dBm</td>
<td>-35</td>
<td></td>
</tr>
</tbody>
</table>

1. After 30 minute warm up, within 15 minutes at constant temperature.
2. After 30 minute warm up, within 1 hour at constant temperature.

Electrical Performance Specifications

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Unit</th>
<th>Specification</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power Supply Voltage</td>
<td>V</td>
<td>4.5</td>
<td>5.0</td>
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<tr>
<td>Power Consumption</td>
<td>W</td>
<td></td>
<td>6</td>
</tr>
<tr>
<td>Cold Start Settle Time</td>
<td>s</td>
<td></td>
<td>10</td>
</tr>
<tr>
<td>Warm Start Settle Time</td>
<td>s</td>
<td></td>
<td>0.1</td>
</tr>
<tr>
<td>Transient Settle Time</td>
<td>(\mu s)</td>
<td>150</td>
<td>250</td>
</tr>
</tbody>
</table>

Full Function Pin Assignment

<table>
<thead>
<tr>
<th>Pin Number</th>
<th>Pin Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>/Reset</td>
</tr>
<tr>
<td>2</td>
<td>+5V VCC</td>
</tr>
<tr>
<td>3</td>
<td>Device Rx (LVTTL)</td>
</tr>
<tr>
<td>4</td>
<td>Device Tx (LVTTL)</td>
</tr>
<tr>
<td>5</td>
<td>Ground</td>
</tr>
</tbody>
</table>
Appendix: Measured Performance

Output Power Stability

Power (dBm)

Time (second)

Wavelength Stability

Wavelength Stability (nm)

Time (second)

Wavelength Repeatability

Stdev (pm)

Max-Min (pm)

Laser Spectrum

3 Individual wavelengths plotted together
Ordering Information

TL - M C 0 4 0 T A 1 0 1

TL: Tunable Laser

Package Type
“M” – Module
“S” – Bench-top Instrument

Band
“C” – C-Band
“L” – L-band
“T” – C+L Band
“S” – S-Band
“O” – O-Band
“E” – Band

Operating Wavelength Range
“040” – 40nm
“080” – 80nm
“100” – 100nm

Mode
“T” - Tuning
“S” – Sweeping
“D” – Dual-Mode

Sequential Number
Starting from 101

Electrical Interface
R: RS232
U: USB
C: I2C
A: R+U

Contact Information

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