

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



Caution - use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

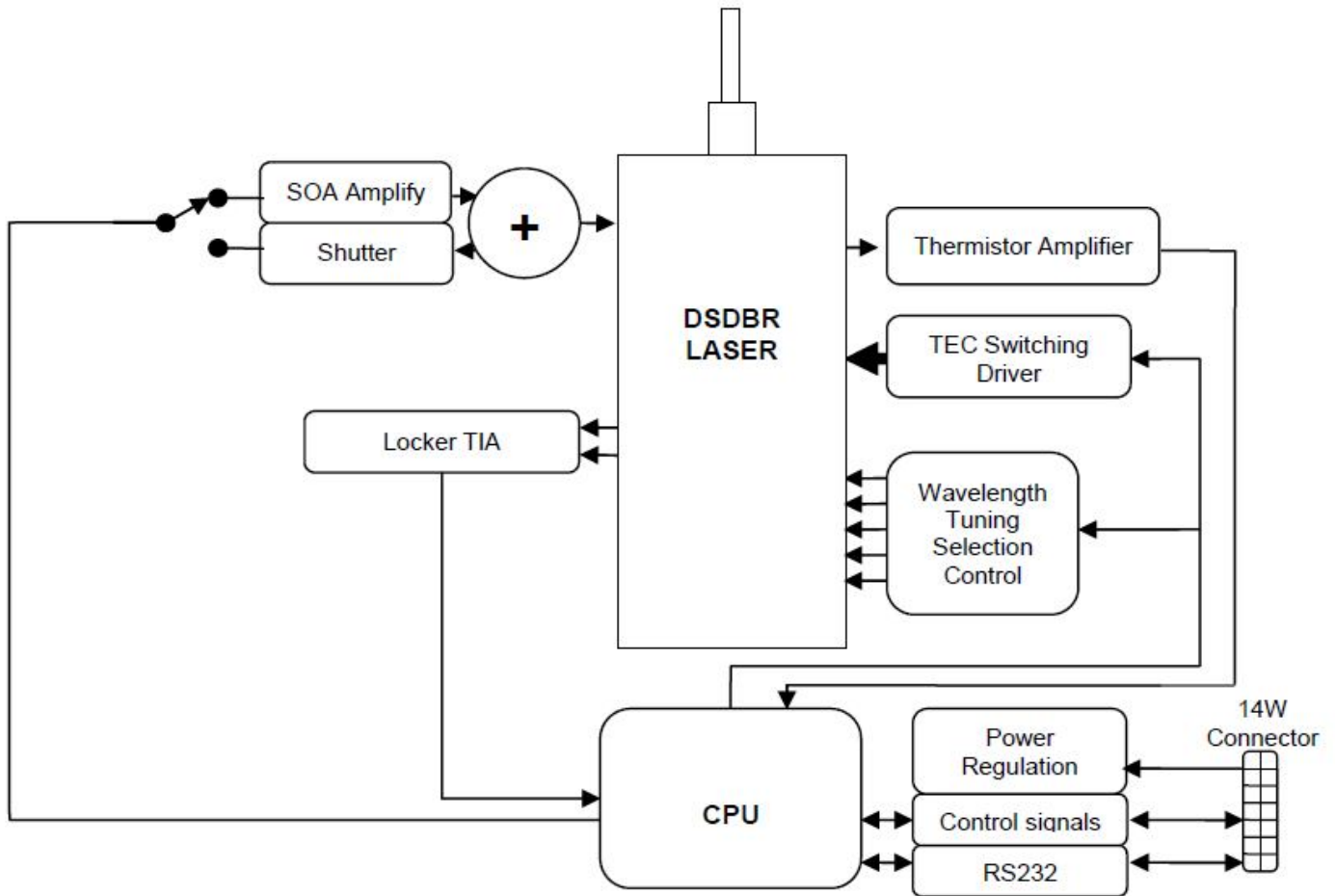
Features:

- Full C-Band tunable laser source
- Narrow line-width, $\leq 400\text{kHz}$
- 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 $\pm 9\text{GHz}$
- Large SMSR, $>40\text{dB}$
- Low RIN
- Low phase noise
- Low power dissipation, 4.5W
- Case operating temperature range -5°C to $+75^{\circ}\text{C}$
- 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

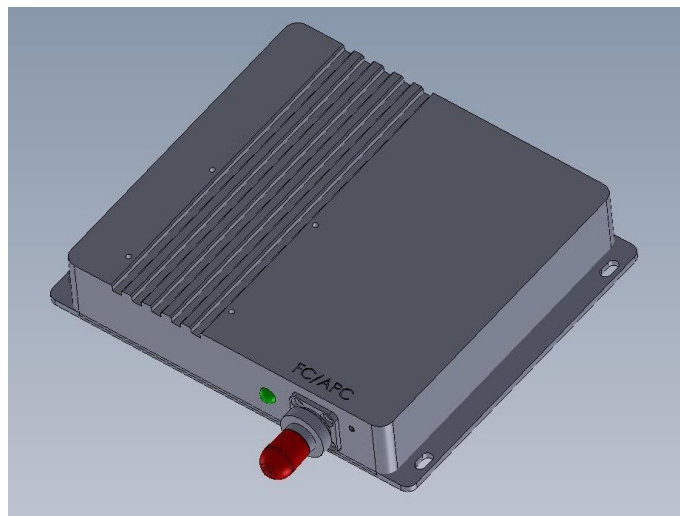
Applications:

- 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

Functional Block Diagram



Mechanical Drawing



(Detailed mechanical drawing available upon request)

Absolute Maximum Ratings

Parameter	Min	Typ	Max	Unit	Conditions
Storage Temperature	-40		85	°C	
Operating Relative Humidity	5		85	%RH	95% max, short term, humidity ratio of 0.026 kg Water/kg Dry air not to be exceeded [10]
Storage Relative Humidity	5		95	%RH	central office applications, non-condensing 90% max, short term, humidity ratio of 0.026 kg Water/kg Dry air not to be exceeded [10]
Electrostatic Discharge	500			V	MIL-STD-883 Method 3015 (HBM)
Flammability	V0				Fiber coat UL94-HB <1gm mass
Signal Pin Voltage	-0.5		V _{cc} +0.3		
iTLA Module V _{cc}	-0.3		3.6		
iTLA Module V _{ee}	-5.5		0.3		
Signal Output Currents			50	mA	

Operating Conditions

Parameter	Min	Typ	Max	Unit	Conditions
+3V3 supply voltage	3.1	3.3	3.45	V	
+3V3 supply current		1.1	1.2	A	Worst case condition
-5.2V supply voltage	-5.45		-4.92	V	
-5.2V supply current		0.05	0.1	A	
Power Dissipation			4.5	W	75°C, EOL
LVTTL Input V _{IN} LOW			0.8	V	
LVTTL Input V _{IN} HIGH	2			V	
LVTTL Output V _{OUT} LOW			0.5	V	I _{OL} = 10mA
LVTTL Output V _{OUT} HIGH	2.4			V	I _{OH} = 10mA
Power Supply Noise			1	%rms	100Hz to 20MHz
RS232 Interface	9600		115200	Baud	Default 9600 baud
Storage Temperature	-40		85	°C	
Operating Temperature	-5		75	°C	Requires sufficient thermal management to ensure 75C case at 4.5W
Operating Relative Humidity	30		60	%RH	Constant humidity ratio of 0.026 kg Water/Kg Dry air not to be exceeded ₁₀
Flammability	V0				Fiber coat UL94-HB <1gm mass

Performance Specifications

Parameter	Min	Typ	Max	Unit	Conditions
Output Power	8		16	<i>dBm</i>	Pset value, @25C case temperature
Power Deviation Over Band			±0.5	<i>dB</i>	
Power Adjustment Range		8		<i>dB</i>	
Power Adjustment Step Size		0.1		<i>dB</i>	
Power accuracy			±0.5	<i>dB</i>	
Frequency Range	191.25		196.25	<i>THz</i>	C-band
Wavelength Range	1527.6		1567.55	<i>nm</i>	C Band
Minimum Frequency Tuning Step	0.1			<i>GHz</i>	
Channel Tuning Speed	3	5	10	<i>s</i>	
Frequency Fine Tuning Range	-9		9	<i>GHz</i>	
SMSR (Side mode suppression Ratio)	40	45		<i>dB</i>	Measured over ±2.5nm range around the target frequency with 0.06nm RBW
SuMSR (Supermode Suppression Ratio)	40			<i>dB</i>	Measured over full C-band with 0.1nm RBW
Line width		250	400	<i>kHz</i>	Lorentzian, FWHM
RIN (10MHz-1GHz)			-140		Average RIN (-40dBc optical back reflection)
RIN (1-10GHz)			-145	<i>dB/Hz</i>	
OSNR	55			<i>dB</i>	0.1nm optical bandwidth
Polarization extinction ratio	20			<i>dB</i>	
Return Loss	27			<i>dB</i>	
Back Reflection Tolerance			-27	<i>dBc</i>	
Locked frequency accuracy	-1.5		1.5	<i>GHz</i>	
Shuttered output power			-35	<i>dBm</i>	
Optical Ramp Up	50	500	5000	<i>ms</i>	User configurable [1]
Cold-start' initialization time			30	<i>s</i>	Note [2]

Notes:

[1] The optical ramp up is measured from the end of the iTLA response packet to the end of the SOA ramp.

[2] Time required from application of Vcc and Vee supplies for the Micro-iTLA to reach an operational state.

Connector Signal Function

Name	Function	Active	Description
DIS	Disable Laser	LOW	Optical output terminated
SRQ	Service Request	LOW	Service interrupt poll
MS	Module I/O reset	L→H edge	Resets I/O physical interface
TXD	RS232 transmit data		LVTTTL RS232 Tx, Default 9600 baud
RXD	RS232 receive data		LVTTTL RS232 Rx, Default 9600 baud
RST	Reset	LOW	Laser off, module in reset
DitherAA	External Amplitude dither		Not used, leave isolated.
OIF	Reserved	LVTTTL input	For future use

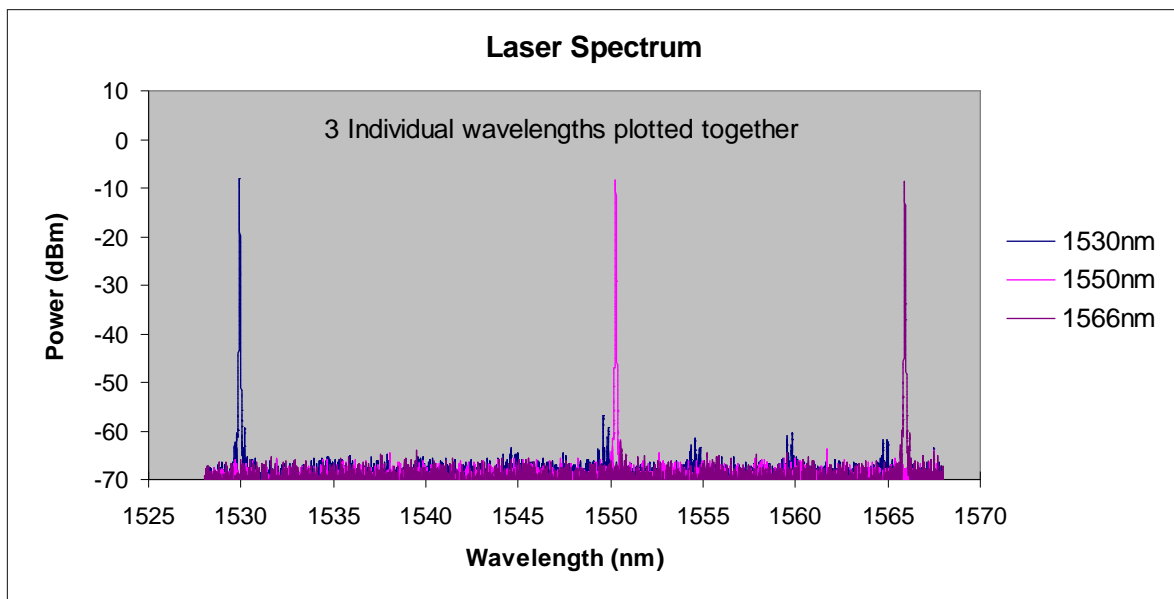
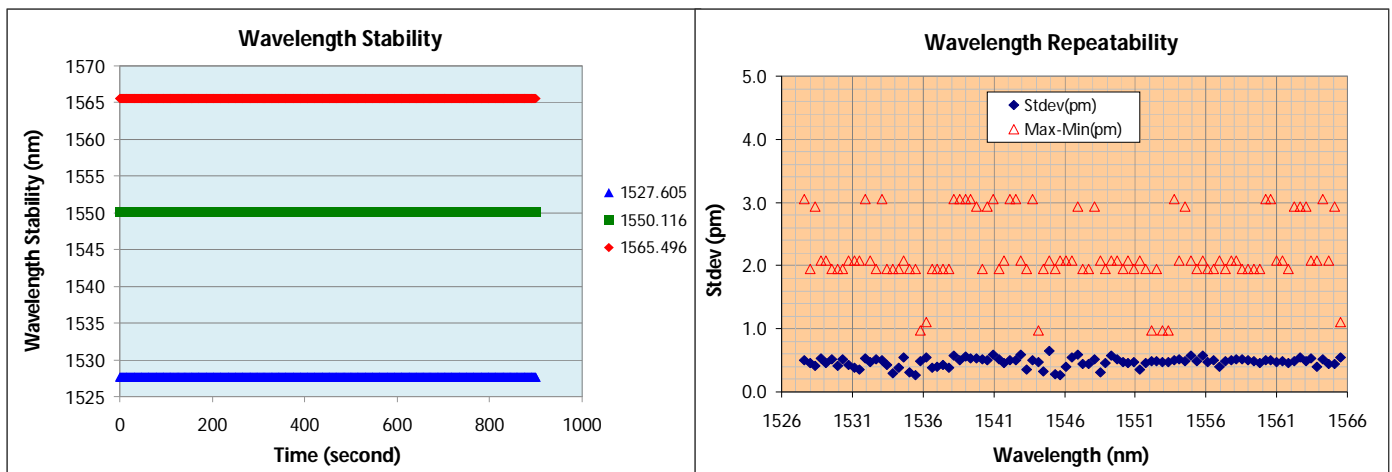
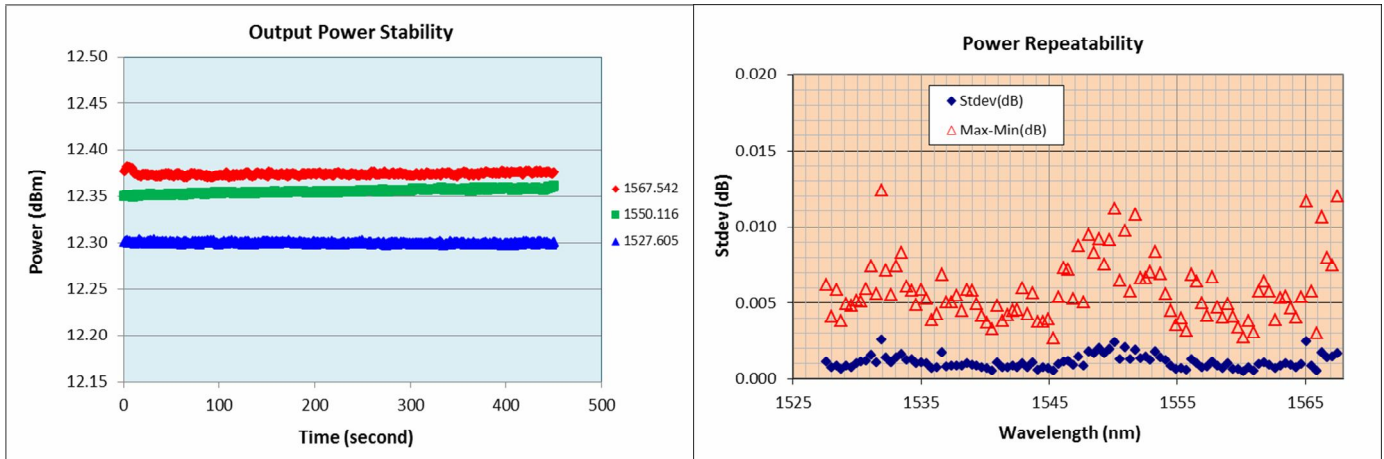
Electrical Pin Assignment

Pin #	Function	Pin #	Function
1	3V3	2	DIS
3	3V3	4	SRQ
5	GND	6	MS
7	GND	8	TXD
9	-5.2V	10	RXD
11	-5.2V	12	RST
13	OIF	14	DitherAA

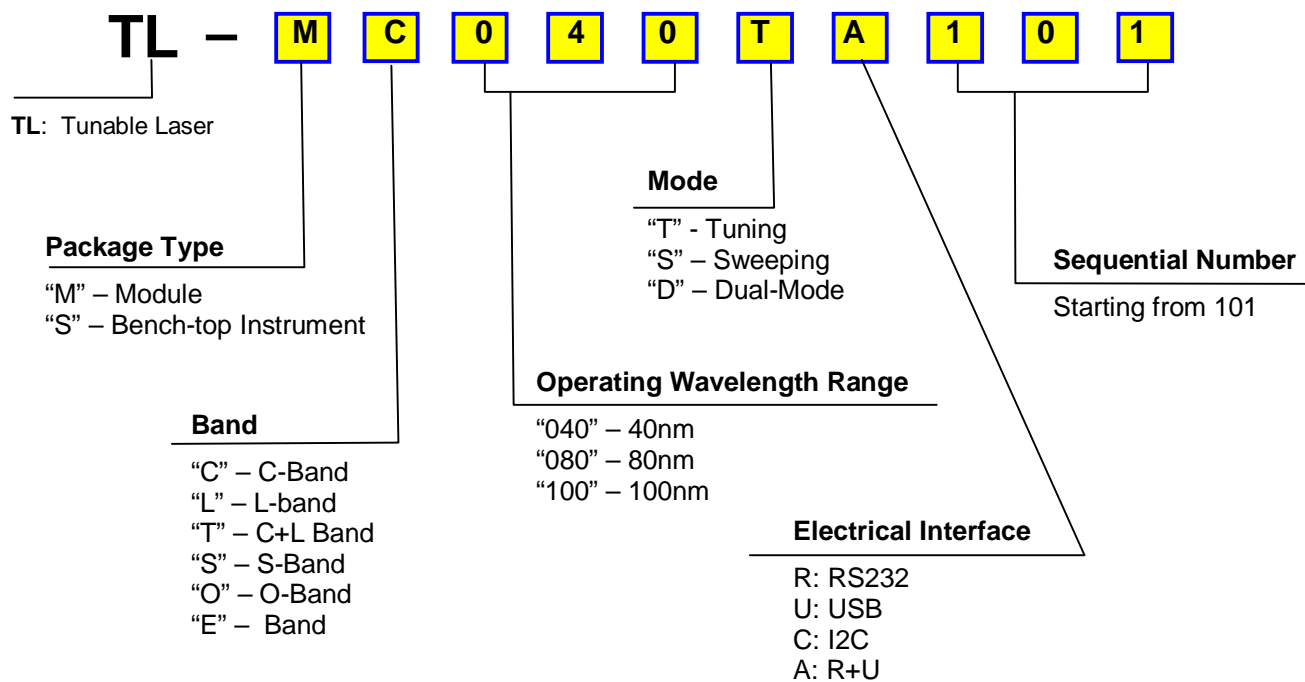
Optical Fiber

Parameter	Specification	Notes
Fiber Length	1000mm +/- 100mm	measured from the front face of the package to the end of the ferrule of the optical connector
Fiber Diameter	400um	
Fiber coating	Clear color 900um PVDF split loose tube	400 um-diameter coating without buffer and 900 um-diameter loose tube sections: 2 x 70 mm-long tubes attached to Fiber ends and 2 additional 350mm long loose tubes
Fiber Type	Single mode 9/125 polarization maintaining Fiber aligned to slow axis	MFD is 9.5 um
Minimum Bend Radius	15mm	The insertion loss and reliability of the Fiber may be compromised if the minimum bend radius of the Fiber is exceeded
Connector	FC-UPC	Or customer specific

Appendix: Measured Performance



Ordering Information



Contact Information

Headquarter

Optoplex Corporation
3374 Gate Boulevard
Fremont, CA 94538
USA
Tel: (510) 490-9930
Fax: (510) 490-9330
www.optoplex.com
info@optoplex.com

Sales

sales@optoplex.com

Technical Support

support@optoplex.com

