

Integrable DFB Tunable Laser

98 DWDM Channels, PM Fiber, 10mW



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The TLMC tunable laser component is a high-performance source operating in the C-band from 1530 nm to 1565 nm, with the laser and control electronics integrated on a dedicated circuit board for simplified system integration and high-volume manufacturing. It features shuttered tuning, trace tone functionality, and SBS suppression via dither circuitry, along with comprehensive control and status monitoring through an RS232 interface. The TLMC incorporates a wideband tunable laser based on a fully monolithic InP chip, enabling low-voltage electronic tuning, rapid wavelength switching, and high reliability with no moving parts. An integrated semiconductor optical amplifier (SOA) provides precise optical power control and also functions as a shutter to enable dark tuning under reverse bias. The laser operates at a fixed temperature, with wavelength stability maintained by an internal wavelength locker that locks to a 50 GHz or 100 GHz ITU grid, while also providing front-facet power monitoring for feedback control through the SOA. The device is equipped with polarization-maintaining fiber for use with external modulators, and is available in two package sizes to accommodate different form factors, with an optional driver PCB and GUI offered for convenient operation and rapid evaluation.

Features

- High power +10dBm EOL
- High speed electronic tuning control
- Electronic shutter for dark tuning
- Low power dissipation, 3.8W typical
- Narrow line-width, 5MHz maximum
- Excellent SMSR >40dB
- Low RIN

Applications

- Long Haul / Ultra Long Haul
- Regional Metro
- Test and Measurement

Specifications

Parameter		Min	Typical	Max	Unit
Wavelength Range	L band	1568.77		1607.47	nm
	C band	1527.60		1565.5	
Output Power	L band	+10	+10.8	+11.5	dBm
	C band	7		14.5	
Power deviation over band			0.3	0.5	+/-dB
Frequency Range		186.5		191.1	THz
No of Channels (50GHz spacing)	L band	92			
	C band		80		
SMSR		40	45		dB
Linewidth			1	5	MHz
RIN	10MHz - 1GHz			-110	dB/Hz
	1-10 GHz			-145	
OSNR		50	55		dB
Polarization extinction ratio		20			dB
Return Loss			-50	-40	dB
Back Reflection Tolerance		-8.2			dB
Locked frequency accuracy		-2.5		+2.5	GHz
Shuttered output power			-35	-30	dBm
Linewidth for Brillouin suppression		250		1000	MHz
Brillouin frequency selection ^[1]		10		100	kHz
Trace Tone Frequency ^[1]		10		500	kHz
Trace Tone Modulation Depth			4	10	%
Tuning Speed ^[2]				10	ms
Cold-start Time ^[3]				60	s
Operating Temperature		-5		+75	°C

Note:

- [1]. The device incorporates a single onboard oscillator which is used to provide either SBS suppression or Trace Tone functionality, but cannot provide both functions simultaneously. However the MFR1 input can be used to enable an external frequency source to be applied enabling both SBS suppression and Trace Tone functionality.
- [2]. The laser is guaranteed to tune within 10ms which is to comply with the OIF "Application A" (SONET/SDH Protection). However, this applies only for tuning between channels with or without the laser enabled. Enabling the laser from a disabled state will take longer ~180ms as the tuning has to be executed more slowly in order to maintain frequency accuracy and comply with the power/frequency mask.
- [3]. Time required from application of Vcc and Vee supplies for the laser to reach an operational state. Complies with the OIF MSA module warm up time.



CAUTION: Device is highly sensitive to electrostatic discharge. Solder temperature <350°C <10 seconds

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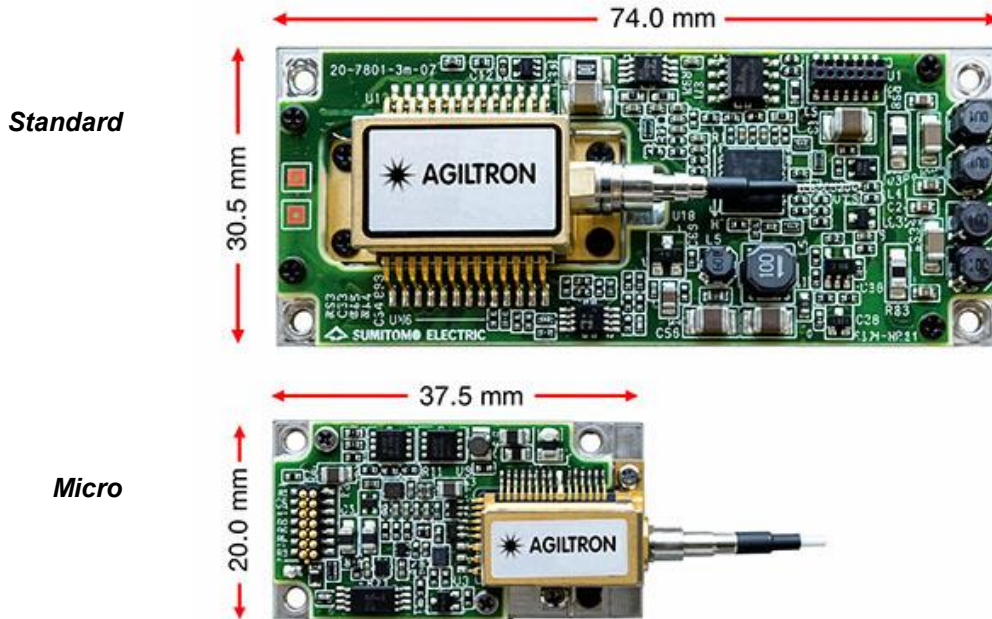
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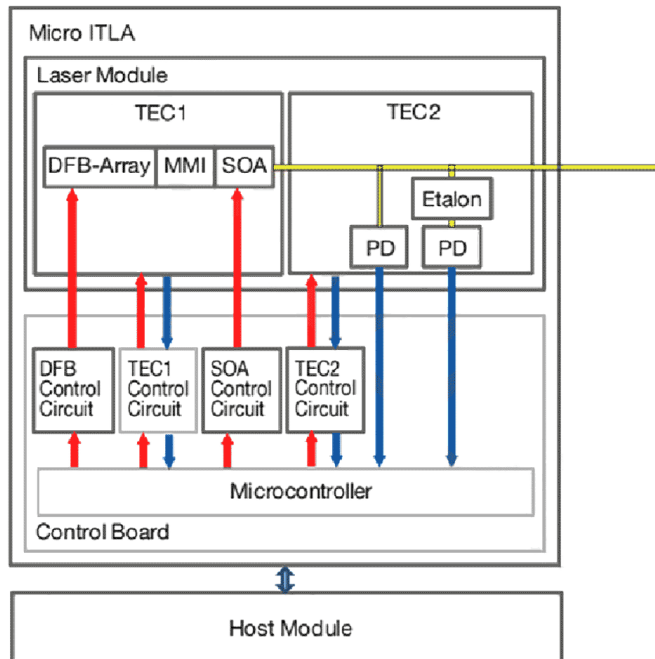
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Mechanical Dimensions (mm) (C Band)



*Product dimensions may change without notice. This is sometimes required for non-standard specifications.

Control Circuit Block (C Band)



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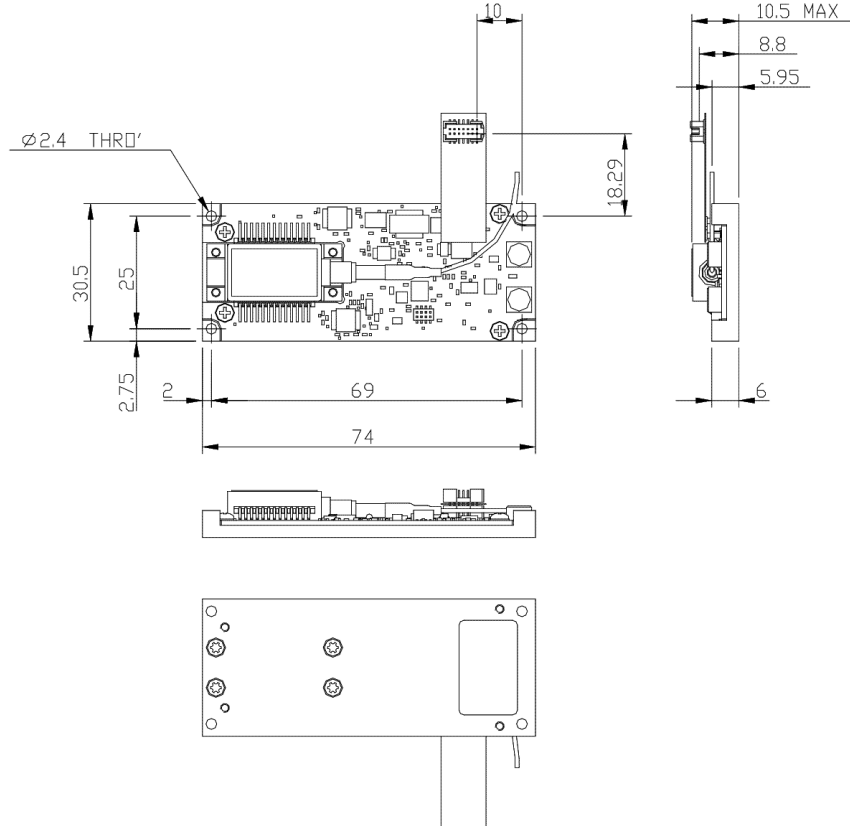
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Mechanical Dimensions (mm) (L Band)

Standard



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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 T _x
RXD	RS232 receive data		LVTTTL RS232 R _x
RST	Reset	LOW	Laser off, module in reset
MFR1	See note below		Manufacturers connection only
OIF	Reserved	LVTTTL input	For future use

Integrable DFB Tunable Laser

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Component with Driver



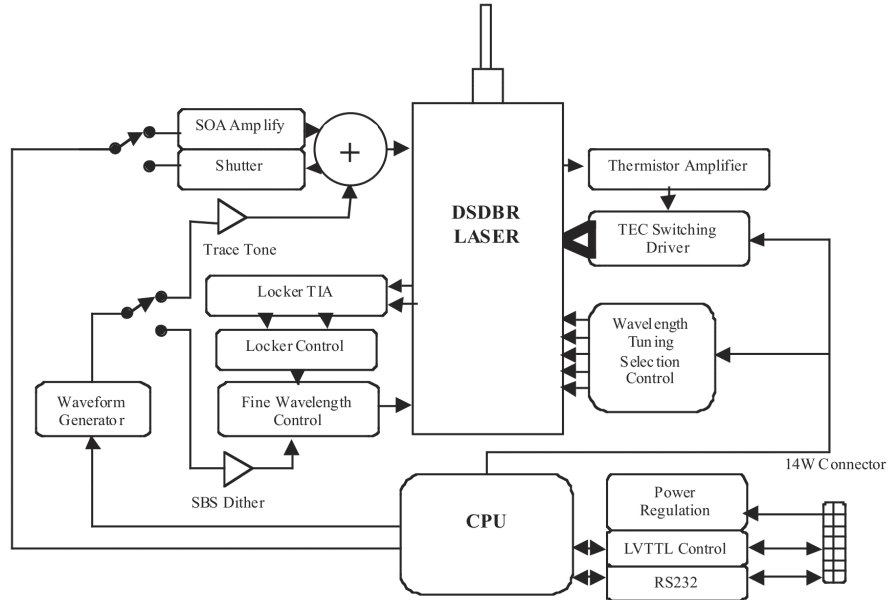
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98 DWDM Channels, PM Fiber, 10mW



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ITLA Block Diagram (L Band)



Physical Connectivity (L Band)

Pin Out Table

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	MFR1

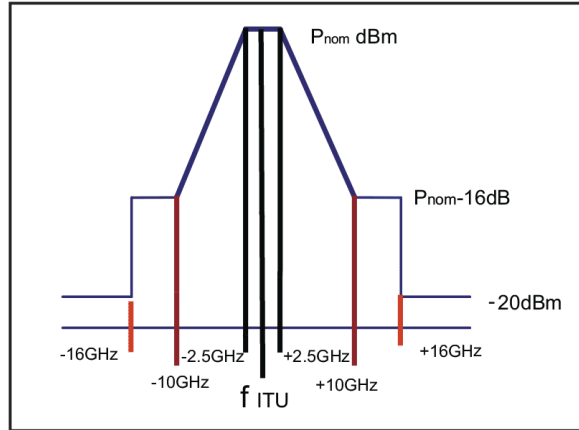
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98 DWDM Channels, PM Fiber, 10mW



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iTLA Frequency versus Power Mask (L Band)



Electrical Characteristics (L Band)

Parameter	Min	Typ	Max	Unit	Conditions
+3V3 supply voltage	3.15	3.3	3.45	V	
+3V3 supply current		1100	1500	mA	
-5.2V supply voltage	-5.45		-4.94	V	
-5.2V supply current		30	100	mA	For shuttered operation only
Power Dissipation		3.8	5.5	W	
LVTTTL Input V_{IN} LOW			0.8	V	
LVTTTL Input V_{IN} HIGH	2			V	
LVTTTL Output V_{OUT} LOW			0.5	V	
LVTTTL Output V_{OUT} HIGH	2.4			V	
Power Supply Noise			1	%rms	100Hz to 20MHz
RS232 Interface	9600		115200	Baud	Default 9600 baud

Environmental Characteristics (L Band)

Parameter	Min	Typ	Max	Unit	Conditions
Storage Temperature	-40		+85	°C	
Operating Temperature	-5		+75	°C	With suitable heatsink
Operating Humidity	5		85	%RH	
Electrostatic Discharge	500			V	MIL-STD-883, Method 4
Flammability	V0				Fiber coat UL94-HB <1gm mass

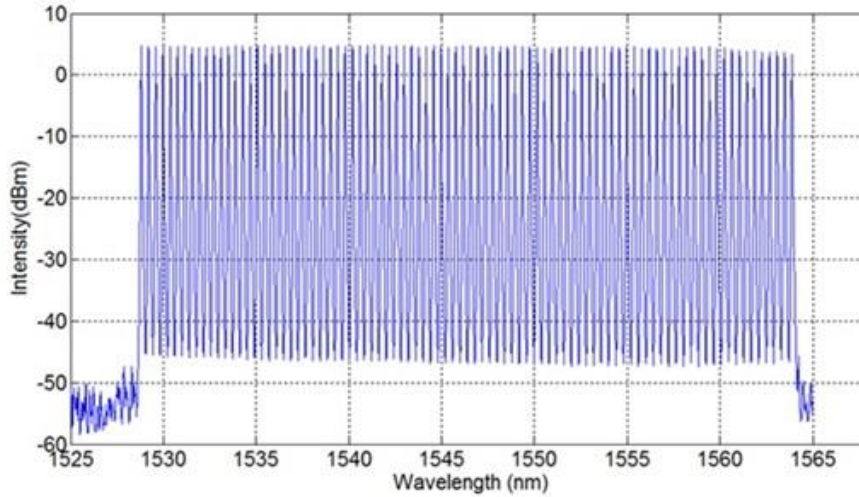
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98 DWDM Channels, PM Fiber, 10mW



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Typical Spectrum



Ordering Information (Part Number)

Prefix	Config	Wavelength	Linewidth	Power	Package	Fiber Length	Connector ^[1]
TLCM-	Standard = 1 Mini = 2	C-band = C L-band = L	500kHz = 1 100kHz = 2	10mW = 1	Component = 1 Component/Driver = 2 Module = 3 Benchtop = 4 Special = 0	0.1m = 1	Bare = 1 FC/APC = 2 Special = 0

[1]. The connector cannot be installed directly onto bare fiber, as it is prone to damage during shipping. However, the connector can be assembled on bare fiber if a 3 cm protective loose tube is added for reinforcement. The customer can remove this protective tube after testing. The optical power handling of a standard connector is less than 0.5 W for SM28 fiber and decreases further with smaller core fibers.

Red is special order

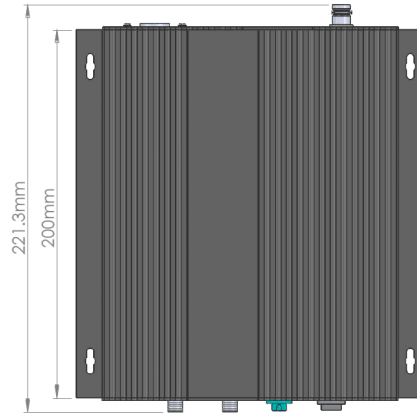
Integrable DFB Tunable Laser

98 DWDM Channels, PM Fiber, 10mW

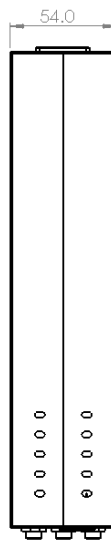
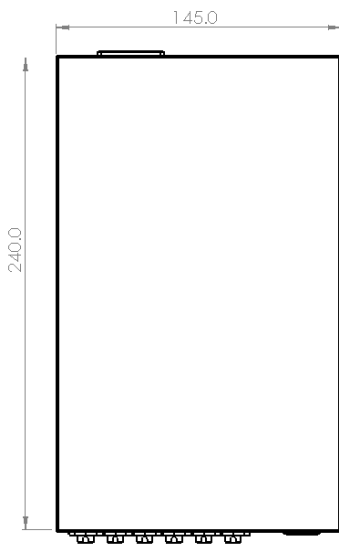


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Module (mm): Plug-Play (Power Supply Included)



Benchtop (mm): Plug-Play 100-240VAC, USB



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Fiber Coupled Tunable Laser Source C-Band DFB

(1527-1565 nm tunable range, 100kHz, SM, PM)



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Operating On The Front Panel

There are 3 knobs on the front panel to operate laser source and control output power

- Wavelength knob: switch ITU channel.
- The channel number is unique to this instrument, actual frequencies specified by the ITU standard are displayed on screen. There are 96 channels.
For C-band, Wavelength Range: 1528 - 1566 nm or Frequency Range: 191.50 - 196.25 THz.
For L-band, Wavelength Range: 1570 - 1608 nm or Frequency Range: 186.35 - 190.95 THz
- To adjust the ITU channel, use the knob buttons to increment or decrement the channel.
- Power knob: adjusting and stabilizing the optical output power.
- The power range is 0-14.50 dBm or 0-28.18 mW.
- On/Off buttons: turn laser ON or OFF.
- While pressed, the power buttons turn green to indicate the function is ON, and turn off to indicate the function is disabled. Power On/Off status is also Indicated on screen.



GUI Instructions



The GUI has three main sections.

- The top side shows device status: channel number, power, laser on/off.
- The central section controls ITU channel and Sweep function. Scan is user adjustable by setting dwell time and wavelength tuning range.
- The bottom side sets output power in dBm and turn On/Off laser output. It provides the means for adjusting the optical output power.

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98 DWDM Channels, PM Fiber, 10mW



DATASHEET

Remote Control Interface Summary

USB-to-UART Bridge Controller (virtual COM port), Baud rate: 115200, Parity: None, Data bits: 8, Stop bits: 1, Mode: Binary (not ASCII)

Command List

Command	Reply	Description
01 A0 00 xx	01 A0 00 xx	Set Laser Channel (1-86)
01 A1 xx xx	01 A1 00 00	Set Laser Power The optical output power set point is encoded as an unsigned integer in dBm*100+10000. Therefore, a value of 0x2AFB (11000) represents 10dBm
01 A2 00 xx	01 A2 00 xx	Turn on/off laser power xx=0x00 turnoff, xx=0x08 turn on
01 AF 00 00	xx xx xx xx	Get Laser Status Bit 31:28 – Error field – Error condition for last completed command. 0x00 no errors 0x04 Command ignored due to pending operation 0x05 Command ignored while module is initializing, warming up, or contains an invalid configuration. 0x08 Execution general failure Bit 27-24 – Laser is on/off When “1” indicates that the module is ready for its output to be enabled When “0” indicates that the module is not ready for its output to be enabled. Bits 23:16 – Channel Bits 15:0 – The optical output power set point

API Service Option

We provide an API service package for \$750 (includes example PC driver + command wrappers + basic test utility)

Integrable DFB Tunable Laser

98 DWDM Channels, PM Fiber, 10mW



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Caution Electrostatic Sensitivity



- Never touch laser diode and the module using hands
- Always use protections when handle a laser diode
- Recommend mounting the laser diode using an ionic gun and ESD finger cots



Laser Safety

This product meets the appropriate standard in Title 21 of the Code of Federal Regulations (CFR). FDA/CDRH Class 1M laser product. This device has been classified with the FDA/CDRH under accession number 0220191. All versions of this laser are Class 1M laser products, tested according to IEC 60825-1:2007 / EN 60825-1:2007. An additional warning for Class 1M laser products. For diverging beams, this warning shall state that viewing the laser output with certain optical instruments (for example eye loupes, magnifiers, and microscopes) within a distance of 100 mm may pose an eye hazard. For collimated beams, this warning shall state that viewing the laser output with certain instruments designed for use at a distance (for example telescopes and binoculars) may pose an eye hazard.

Wavelength = 1.3/1.5 μm .

Maximum power = 30 mW.



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

*IEC is a registered trademark of the International Electrotechnical Commission.