

Fiber Coupled Tunable Laser VCSEL – 1030nm

(40nm tuning range, linewidth 470MHz, 100kHz tuning speed)



DATASHEET

[Return to the Webpage](#)



Features

- 40 nm Wavelength Tuning Range
- 0.1 mW CW Single Mode Output
- Isolator Integrated
- Mode Hopping Free Tuning
- 100 kHz Fast Wavelength Scan
- TEC Cooler Integrated
- SM and PM Fiber-Coupled

Applications

- Sensor Systems
- OTC
- LIDAR
- Instrument
- Communications



The TVCS series of fiber-coupled tunable lasers combines an electrically movable MEMS mirror with a Vertical Cavity Surface Emitting Laser (VCSEL), providing a cost-effective single-mode laser source with fast wavelength tuning capability. The wavelength sweep is mode hopping-free, ensuring smooth operation. The compact design integrates an optical isolator and TEC cooler for enhanced stability. It is available with single-mode, polarization-maintaining (PM), or multimode fiber. This device requires mounting on a heat sink. A dedicated driver is available, offering stable laser output, 10kHz fast wavelength sweep, and digital laser modulation up to GHz. The TVCS can be driven at or beyond resonance, with resonance frequencies ranging from 250 to 320 kHz, depending on the batch. For higher output power, up to 1W in both single-mode (SM) and polarization maintaining (PM) configurations, we offer integration with an erbium-doped fiber amplifier (EDFA), which also provides output intensity stability through a precision feedback control loop.

The device is highly ESD-sensitive to electrostatic discharge due to its thin active laser layer configuration; consequently, only the protected benchtop has a warranty.

Due to their high sensitivity to electrostatic discharge, warranty coverage applies only to fully metal covered modules the benchtops, which include proper protection. Other versions of the lasers and photodetectors are not covered by any warranty. Please use them with great caution.

The TVSEL is designed for high speed wavelength scanning applications.

Specifications

Parameter	Min	Typical	Max	Unit
Start Wavelength	1000	1030	1040	nm
Wavelength Tuning Rang (move towards short wavelength)		40	50	nm
Tuning Speed	0		200	kHz
Spectral Width (-3dB FWHM, CW)		470		MHz
Side-Mode Suppression Ratio (SMSR)	30	40		dB
Polarization Extinction Ratio (PM Fiber)	20		25	dB
Relative Intensity Noise (RIN)			-128	dB/Hz
Output Optical Power *	0.1		0.5	mW
Threshold Current Over Tuning Range		1	4.5	mA
Output Laser Power Difference			10	dB
Laser Operation Current		3	4.5	mA
Laser Driving Voltage		3	6	V
Wavelength Tuning Current		0.1		mA
Wavelength Tuning Voltage			9	V
TEC Voltage			0.9	V
TEC Current		0.35	0.5	A
TEC Operating temperature	5	23	30	°C
Thermistor Resistance		10		kΩ
Operating Temperature	-25		65	°C
Storage Temperature	-45		85	°C

* Higher power is available with integrated optical amplifier

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

Legal notices: All product information is believed to be accurate and is subject to change without notice. Information contained herein shall legally bind Agiltron only if it is specifically incorporated into the terms and conditions of a sales agreement. Some specific combinations of options may not be available. The user assumes all risks and liability whatsoever in connection with the use of a product or its application.

Rev 06/15/26

[+1 781-935-1200](tel:+17819351200)

sales@agiltron.com

www.agiltron.com

Information contained herein is deemed to be reliable and accurate as of the issue date. We reserve the right to change the design or specifications at any time without notice. Agiltron is a registered trademark of Optowares Corporation in the U.S. and other countries.

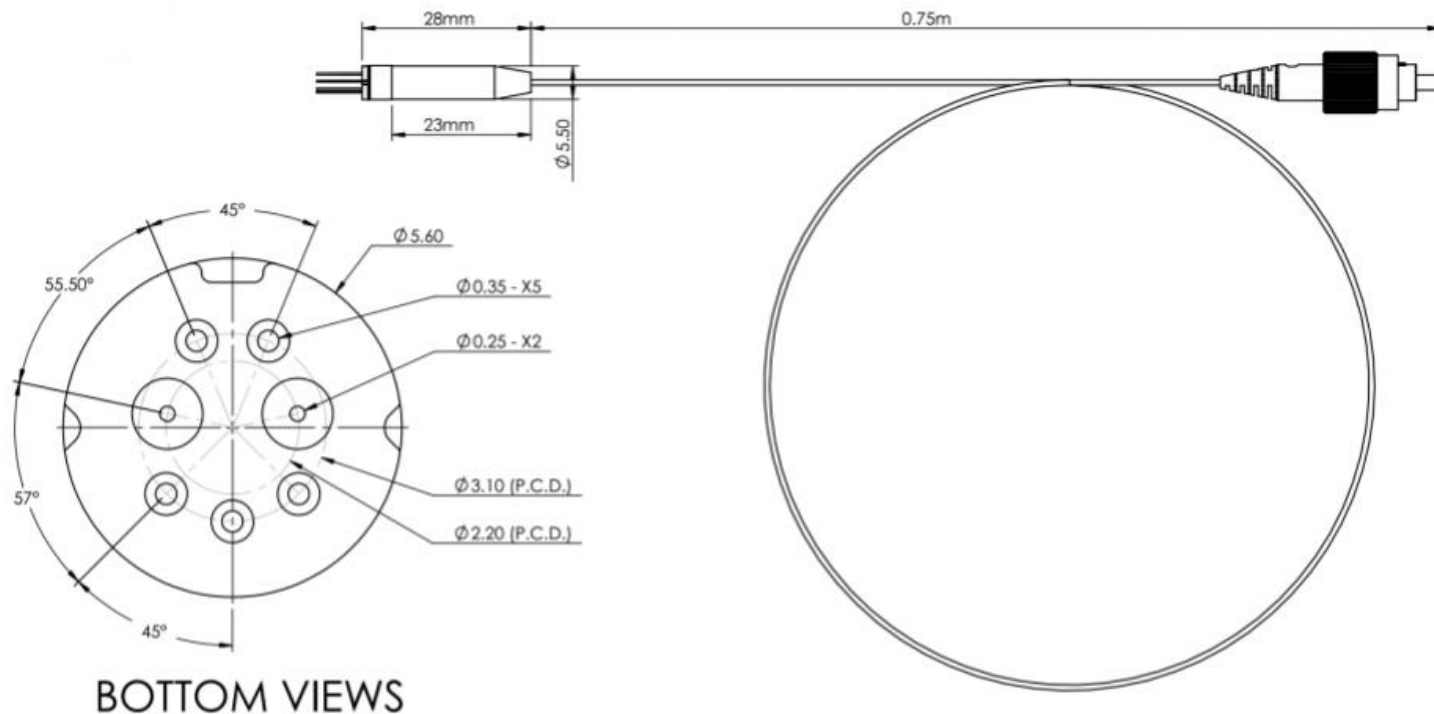
Fiber Coupled Tunable Laser VCSEL – 1030nm

(40nm tuning range, linewidth 470MHz, 100kHz tuning speed)



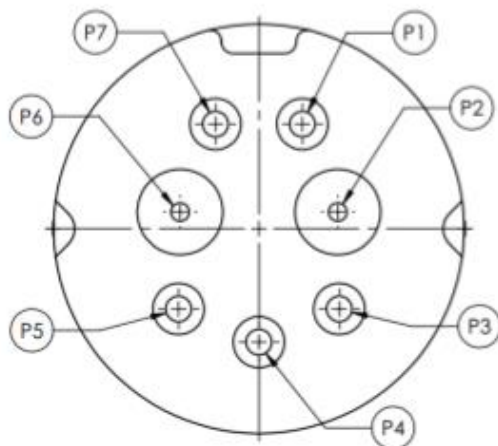
DATASHEET

Mechanical Dimensions (mm)



BOTTOM VIEWS

Electrical Connection



PIN NO.	ASSIGNMENT
P1	TEC +
P2	LD -
P3	TUNING Vt +
P4	THERMISTOR -
P5	THERMISTOR +
P6	LD + / TUNING Vt -
P7	TEC -

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

+1 781-935-1200

sales@agiltron.com

www.agiltron.com

Information contained herein is deemed to be reliable and accurate as of the issue date. We reserve the right to change the design or specifications at any time without notice. Agiltron is a registered trademark of Optowares Corporation in the U.S. and other countries.

Fiber Coupled Tunable Laser VCSEL – 1030nm

(40nm tuning range, linewidth 470MHz, 100kHz tuning speed)



DATASHEET

Ordering Information (Part Number)

	3 0	☐	☐	☐	☐	☐	☐	☐
Prefix	Wavelength	Tuning Range	Optical Power ^[1]	Driver ^[2]	Fiber Type	Fiber Cover	Fiber Length	Connector ^{[3][4]}
TVSE-	1030nm = 30 Special = 0	40nm = 2 50nm = 3 Special = 0	0.1mW = 1 10mW = 2 100mW = 3 500mW = 5 Special = 0	Non = 0 PCB = 1 Benchtop = 2	Hi1060 = 6 PM980 = 9 Special = 0	0.9mm tube = 3 Special = 0	1m = 1 Special = 0	FC/APC = 3 FC/PC = 2 SC/PC = 4 SC/APC = 5 ST/PC = 6 LC/PC = 7 LC/APC = A LC/UPC = U Special = 0

[1]. Red indicate incorporated with a fiber amplifier. The unit is turkey box with controller

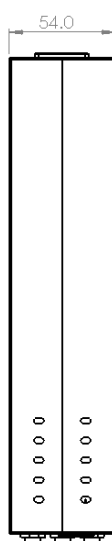
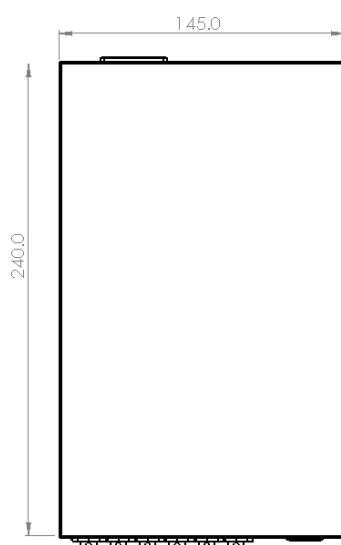
[2]. PCB (with power supply) is ESD unprotected for OEM application. The benchtop is ESD protected plug-play unit that integrates a power supply compatible with 100-240 VAC, features an optical output connector on the front panel, and power/control interfaces on the rear panel.

[3]. Regular fiber connector has PER ~22dB. Connector with PER >27 dB is available using special process

[4]. The default connector configuration uses fiber with 0.9 mm buffer protection. The connector cannot be installed directly onto bare fiber because the bare fiber 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 may remove this protective tube after testing. The optical power handling of a standard connector is less than 0.5 W for SMF-28 fiber and decreases further for smaller-core fibers.

Marked in red on special order

Benchtop Box Mechanical Dimension



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

+1 781-935-1200

sales@agiltron.com

www.agiltron.com

Information contained herein is deemed to be reliable and accurate as of the issue date. We reserve the right to change the design or specifications at any time without notice. Agiltron is a registered trademark of Optowares Corporation in the U.S. and other countries.

Fiber Coupled Tunable Laser VCSEL – 1030nm

(40nm tuning range, linewidth 470MHz, 100kHz tuning speed)



DATASHEET

ESD Test

ESD - Discharge to housing	IEC 61000-4-2 Performance class B contact 4kV, air 8kV	ESD test setup	3	Link test during exposure	9/9/20	10/9/20	Pass	Class A 4kV (contact) Class B 8kV (contact) Class A 15kV (air)
ESD - Discharge to electrical pins - Trx	JEDEC/EIA JESD22-A114-B HBM class 1C ± 1kV	ESD test setup	3	E/O test	9/10/20	9/10/20	Pass	

Application Notes

Fiber Core Alignment

Note that the minimum attenuation for these devices depends on excellent core-to-core alignment when the connectors are mated. This is crucial for shorter wavelengths with smaller fiber core diameters that can increase the loss of many decibels above the specification if they are not perfectly aligned. Different vendors' connectors may not mate well with each other, especially for angled APC.

Fiber Cleanliness

Fibers with smaller core diameters (<5 µm) must be kept extremely clean, contamination at fiber-fiber interfaces, combined with the high optical power density, can lead to significant optical damage. This type of damage usually requires re-polishing or replacement of the connector.

Maximum Optical Input Power

Due to their small fiber core diameters for short wavelength and high photon energies, the damage thresholds for device is substantially reduced than the common 1550nm fiber. To avoid damage to the exposed fiber end faces and internal components, the optical input power should never exceed 20 mW for wavelengths shorter 650nm. We produce a special version to increase the how handling by expanding the core side at the fiber ends.

+1 781-935-1200

sales@agiltron.com

www.agiltron.com

Information contained herein is deemed to be reliable and accurate as of the issue date. We reserve the right to change the design or specifications at any time without notice.
Agiltron is a registered trademark of Optowares Corporation in the U.S. and other countries.

Fiber Coupled Tunable Laser VCSEL – 1030nm

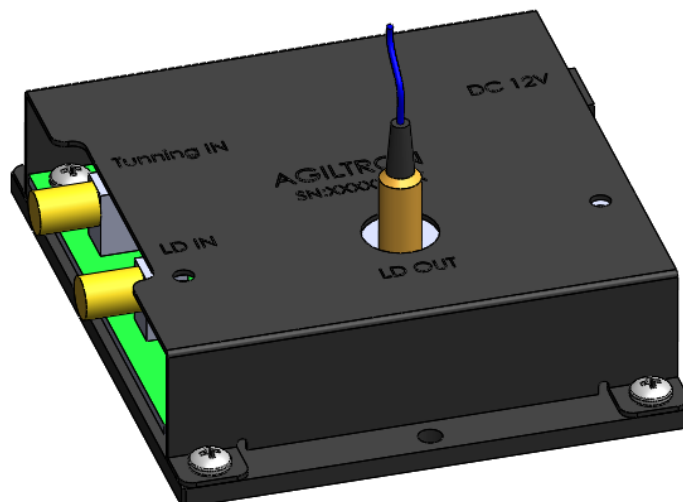
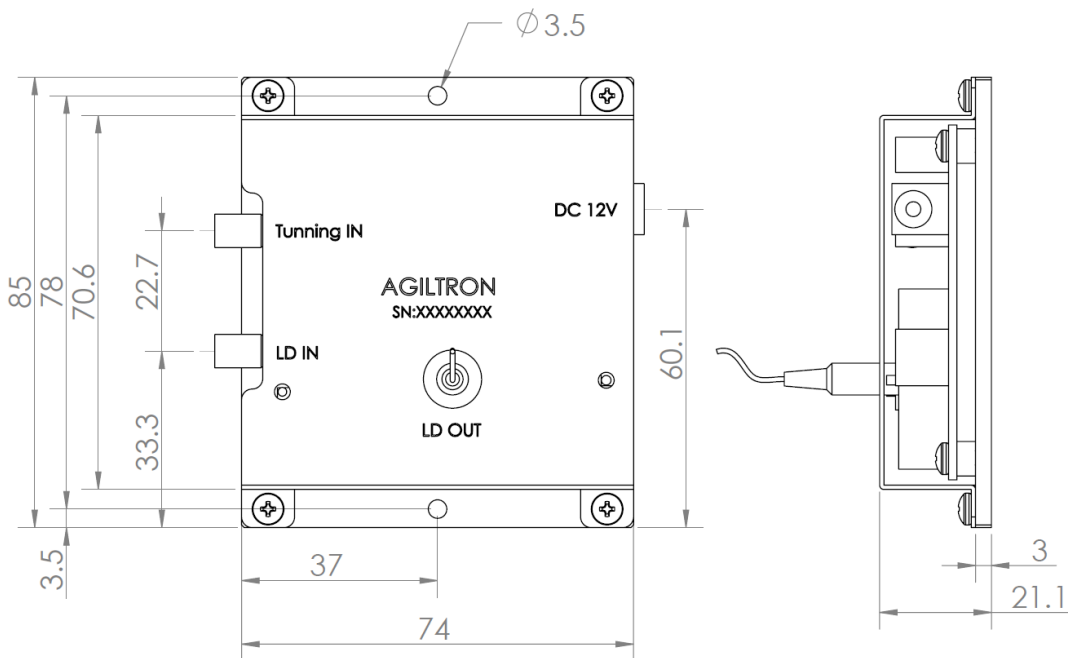
(40nm tuning range, linewidth 470MHz, 100kHz tuning speed)



DATASHEET

Driver – Mechanical Dimensions (mm)

- TEC Cooling – with temperature setting
- Laser Current Control – constant current that is settable
- Constant Output Power Control – add an external tap detector to perform feedback
- 100 kHz Fast Wavelength Scan
- TEC Cooler Integrated



+1 781-935-1200

sales@agiltron.com

www.agiltron.com

Information contained herein is deemed to be reliable and accurate as of the issue date. We reserve the right to change the design or specifications at any time without notice. Agiltron is a registered trademark of Optowares Corporation in the U.S. and other countries.

Fiber Coupled Tunable Laser VCSEL – 1030nm

(40nm tuning range, linewidth 470MHz, 100kHz tuning speed)



DATASHEET

Driver Operation Manual

The TVCS driver integrates a low-noise laser driver with a modulation speed of up to 200MHz, a TEC cooler, and MEMS wavelength tuning circuitry. The TEC temperature is preset at factory to 15°C

Operation Instructions:

1. **Power Up:** Connect the included 12V DC power supply (5.5 x 2.1mm connector).
2. **Laser Diode Power/Modulation Control:** Apply a 0-5V control signal to the SMA connector labeled "LD IN." Ensure no negative voltage is applied.
3. **Wavelength Tuning:** Apply a 0-5V control signal to the SMA connector labeled "TUNING IN." Ensure no negative voltage is applied.
4. **Laser Output:** The laser output is available through the FC/APC connector labeled "LD OUT."
5. **Driven at Resonance or Beyond:** The resonance is between 250 and 320KHz, depends on the batch. Driving with sinusoidal signal at resonance achieve widest tuning. One can increase the sweep rate and adjust min and max tuning voltage for optimizing the optical spectrum. Do not exceed the max / min tuning voltage. When driving beyond resonance the optical spectrum is decreased. At 1MHz sinusoidal the tuning range is about 1nm.

Caution: Do not share the ground between the laser power control input and the laser tuning input. Doing so can cause permanent damage to the laser.

Benchtop



Agiltron cost-effective LDCB series benchtop control kit is designed for easy laser diode mounting and precise control. It incorporates a high-precision, low-noise auto-feedback drive electronics to ensure constant output power or a constant driving current and an integrated temperature control unit maintains optimal operating conditions. The system provides up to 1A driving current and up to 2A TEC cooling current. Each system features a front fiber output connector. The user interface includes an intuitive LCD display for independent control of output power and temperature via two front rotating knobs. The LDCB also includes a universal power supply compatible with 100 to 240 VAC. The LDCB has a built-in isolator option to prevent reflection-induced laser emissions instability. The LDCB is designed as a laser diode and TEC controller kit for customer to install laser diode.

P +1 781-935-1200

E sales@agiltron.com

W www.agiltron.com

Information contained herein is deemed to be reliable and accurate as of the issue date. We reserve the right to change the design or specifications at any time without notice.
Agiltron is a registered trademark of Optowares Corporation in the U.S. and other countries.