Fiber Coupled Tunable Laser VCSEL – 1060nm

(30nm 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.

Specifications

Parameter	Min	Typical	Max	Unit
Start Wavelength	1030		1070	nm
Wavelength Tuning Rang (move towards short wavelength)		30	40	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

Rev 11/26/25

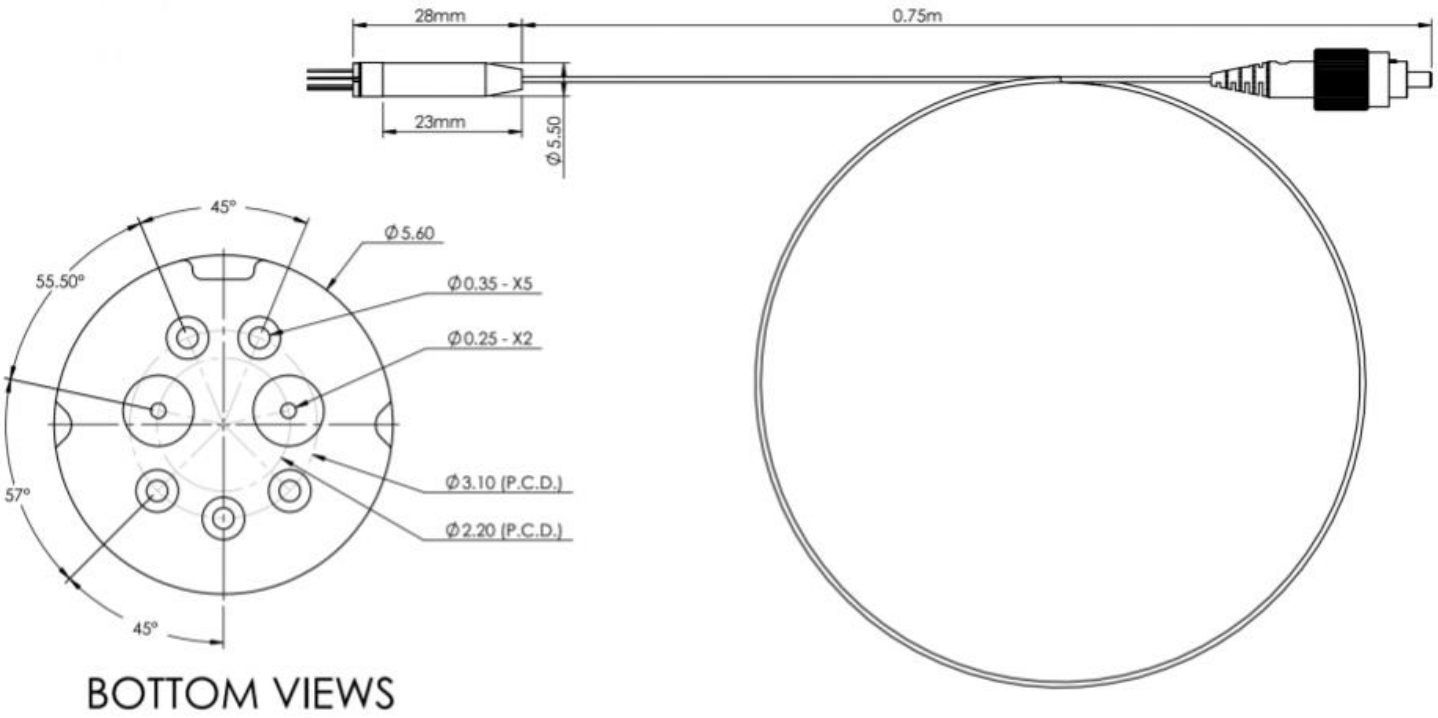
P +1 781-935-1200 E sales@agiltron.com W www.agiltron.com

Fiber Coupled Tunable Laser VCSEL – 1060nm

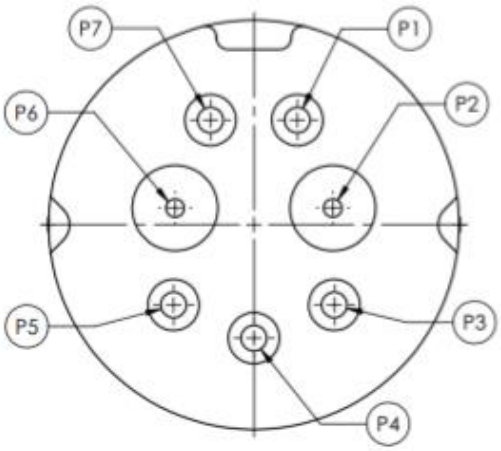
(30nm tuning range, linewidth 470MHz, 100kHz tuning speed)

DATASHEET

Mechanical Dimensions (mm)



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.

P +1 781-935-1200 E sales@agiltron.com W www.agiltron.com

Fiber Coupled Tunable Laser VCSEL – 1060nm

(30nm tuning range, linewidth 470MHz, 100kHz tuning speed)

DATASHEET

Ordering Information

	6 0	☐	☐	☐	☐	☐	☐	☐	☐
Prefix	**Wavelength**	**Tuning Range**	**Optical Power [1]**	**Driver**	**Fiber Type**	**Fiber Cover**	**Fiber Length**	**Connector [2]**	**Benchtop [3]**
TVSE-	1060nm = 60 Special = 0	30nm = 1 40nm = 2 50nm = 3 Special = 0	0.1mW = 1 10mW = 2 100mW = 3 500mW = 5 1W = A 2W = B 5W = C Special = 0	No = 0 Yes = 1	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	Non = 1 Yes = 2

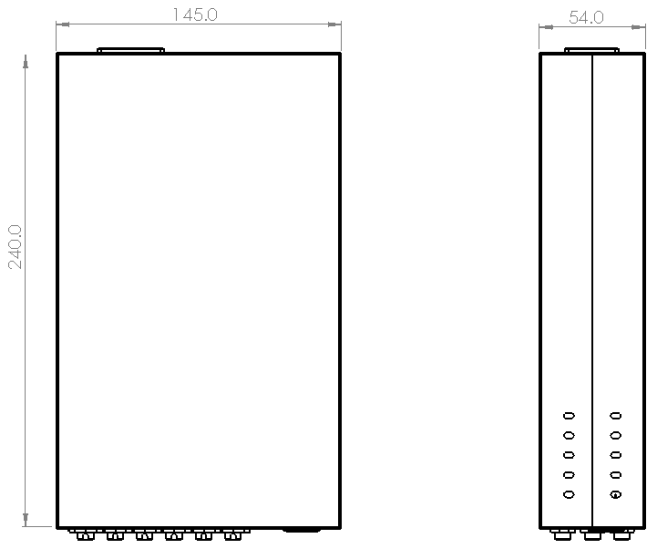
[1]. Red indicate incorporated with a fiber amplifier. The unit is turkey box with controller

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

[3]. The benchtop unit 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.

Marked in red on special order

Benchtop Box Mechanical Dimension



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

P +1 781-935-1200 E sales@agiltron.com W www.agiltron.com

Fiber Coupled Tunable Laser VCSEL – 1060nm

(30nm 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.

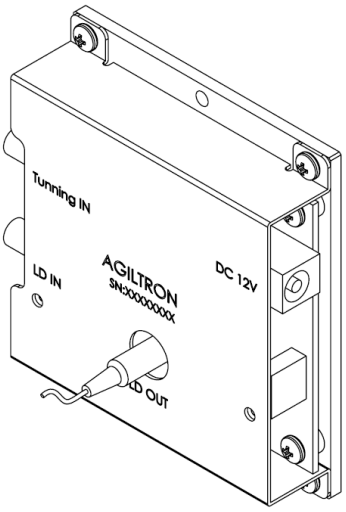
Fiber Coupled Tunable Laser VCSEL – 1060nm

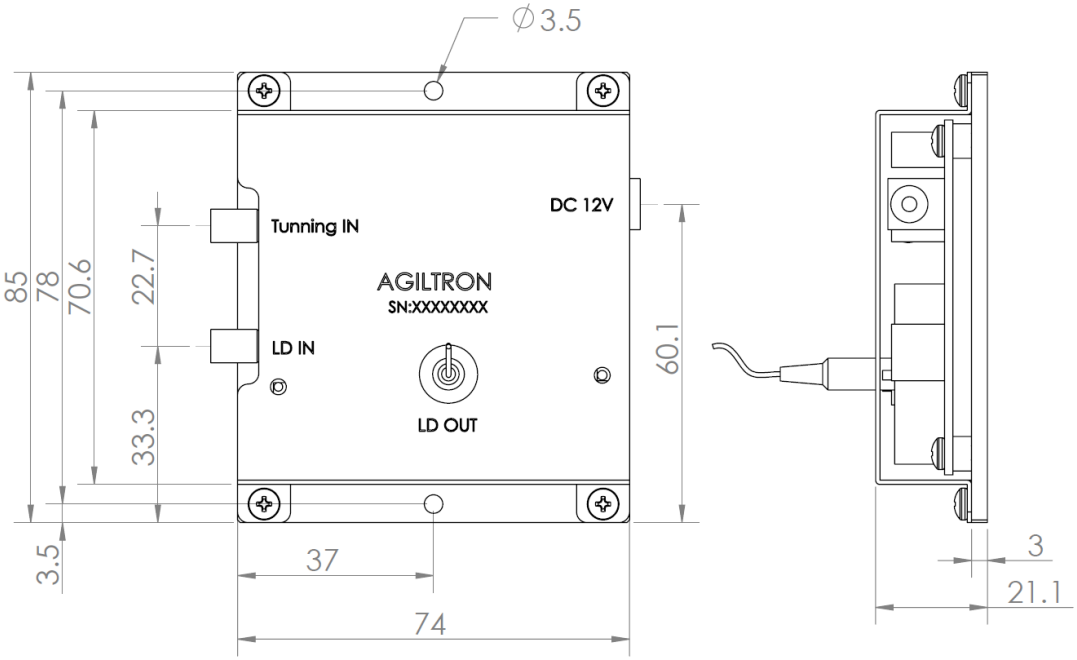
(30nm tuning range, linewidth 470MHz, 100kHz tuning speed)

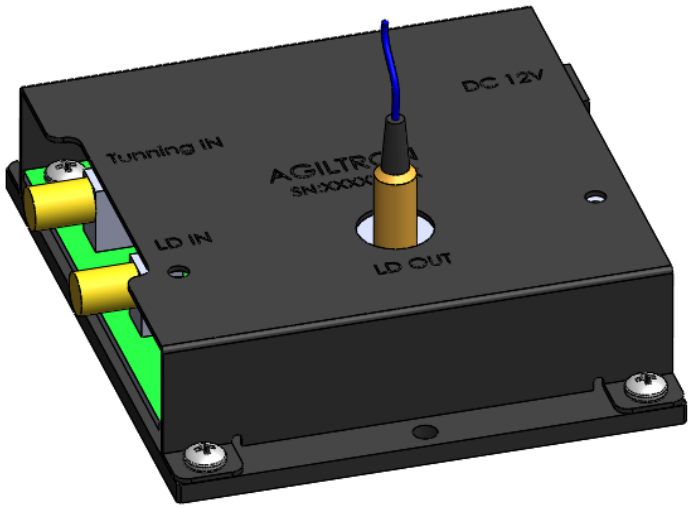
DATASHEET

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







P +1 781-935-1200 E sales@agiltron.com W www.agiltron.com

Fiber Coupled Tunable Laser VCSEL – 1060nm

(30nm tuning range, linewidth 470MHz, 100kHz tuning speed)

DATASHEET

Driver Operation Manual

The TVCS driver contains a low noise laser driver with modulation speed up to 200MHz, a TEC laser chip cooler, and a MEMS wavelength tuning circuity.

Operation Instruction

1. ***Power Up*** – Plug in the accompanied wall pluggable DC 12V having connector size 5.5 x 2.1mm.
2. ***Laser Diode Power Control*** – Applying 0-5v control signal into the SMA connector marked (**LD IN**). Do not input a negative voltage.
3. ***Tune Output Wavelength*** – Applying 0-5v control signal into the SMA connector marked (**TUNING IN**). Do not input a negative voltage.
4. ***Laser Output*** – **LD OUT**: FC/APC connector

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.