794.7nm SM VCSEL Laser diode for Rb Atom D1 Line CPT

Description

PL -VCSEL-0795-1-A8X-TO46 794.7nm VCSEL is a vertical emitting MOVPE grown GaAsP/AlGaAs Single Mode diode laser. The chips are mounted in TO5 can. Wavelength tuning can be achieved via laser current and temperature tuning. package with TEC and PD Built in. It is special designed for TDLAS Application. Good Narrow linewidth and wide tunability with TEC made it a great low cost choice for Rubidium Spectroscopy D1 transition.

Features

- Vertical Cavity Surface-Emitting Laser
- Internal TEC and Thermistor, ESD protection
- Narrow linewidth
- 2 nm tunability with TEC
- Selection for Rubidium D1 transition

Application

- Tunable diode laser absorption spectroscopy
- Rubidium Spectroscopy
- Optical Clock (Rubidium)

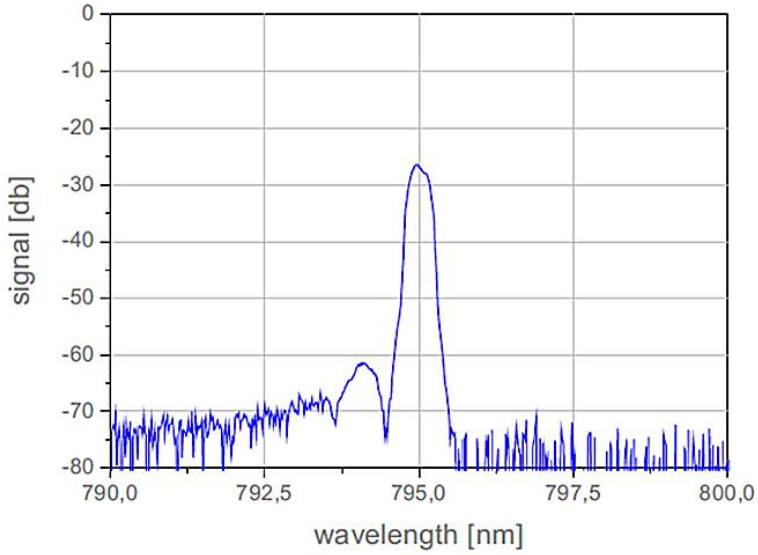
Laser Specifications

Condition:TO P = 20°C, IO P = 2.0 mA unless otherwise stated
(TO P = chip backside temperature, controlled by the TEC)

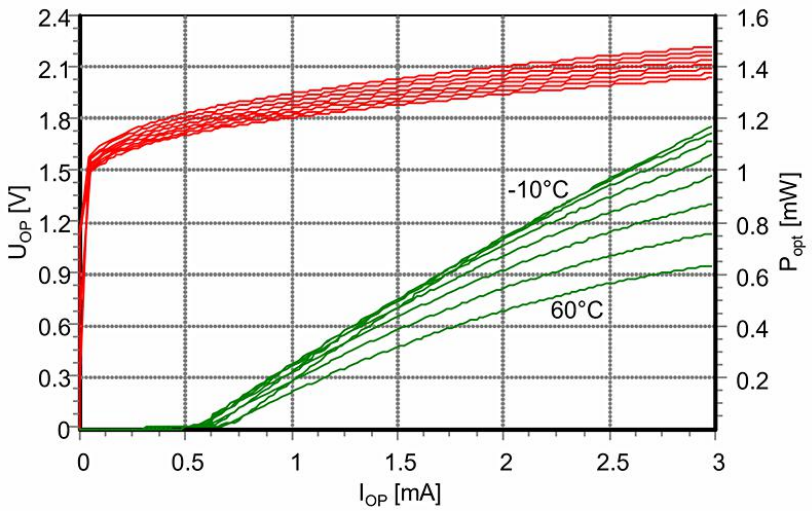
Parameters	Symbol	Min	Typ	Max	Unit	Remark
Emission Wavelength	λ_R	794.7nm				
Threshold current	I_{TH}		0.5		mA	
Output Power	P_{opt}	0.25			mW	
Threshold Voltage	U_{TH}		1.8		V	
Driving Current	IOP			2	mA	Popt = 0.3 mW
Laser voltage	UOP		2		V	Popt = 0.3 mW
Electro optic conversion rate	ηWP		12		%	Popt = 0.3 mW
Slope efficiency	ηS		0.3		W/A	
Differential series resistance	RS		250		Ω	Popt = 0.3 mW
3dB bandwidth	v3dB	0.10			GHz	Popt = 0.3 mW Due to ESD protection diode
Relative intensity noise	RIN		-130	-120	dB/Hz	Popt = 0.3 mW @ 1 GHz
Wavelength tuning over current			0.6		nm/mA	
Wavelength tuning over temperature			0.06		nm/K	
Thermal resistance (VCSEL chip)	$R_{thermal}$	3		5	K/mW	
Side mode supression		25			dB	I = 2 mA
Beam divergence	θ	10		25	°	Popt = 0.3 mW, full width 1/e2
Spectral Width			100		MHz	Popt = 0.3 mW

Tec Characteristics	Unit	Min	Typ	Max	Remark
Tec Current	mA	-150(Heating)		+300(Cooling)	Proper Heart Sink Required
NTC Thermistor Resistance	KΩ	9.5	10.0	10.5	T=25°C@10 KΩ
NTC Thermistor Resistance	KΩ	$10/\exp\{3892-(1/289K-I/T_{OP})\}$			

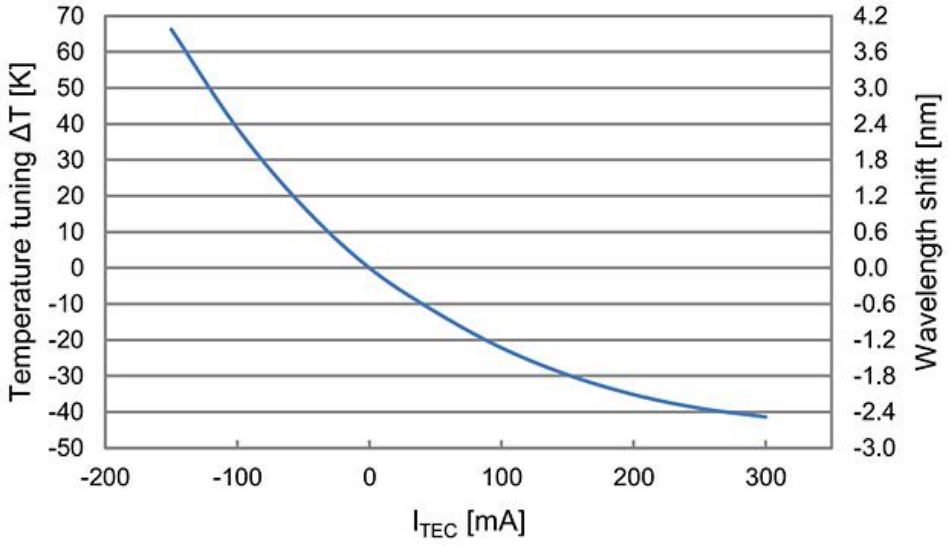
Spectrum



L-I Curve(T@25°C)

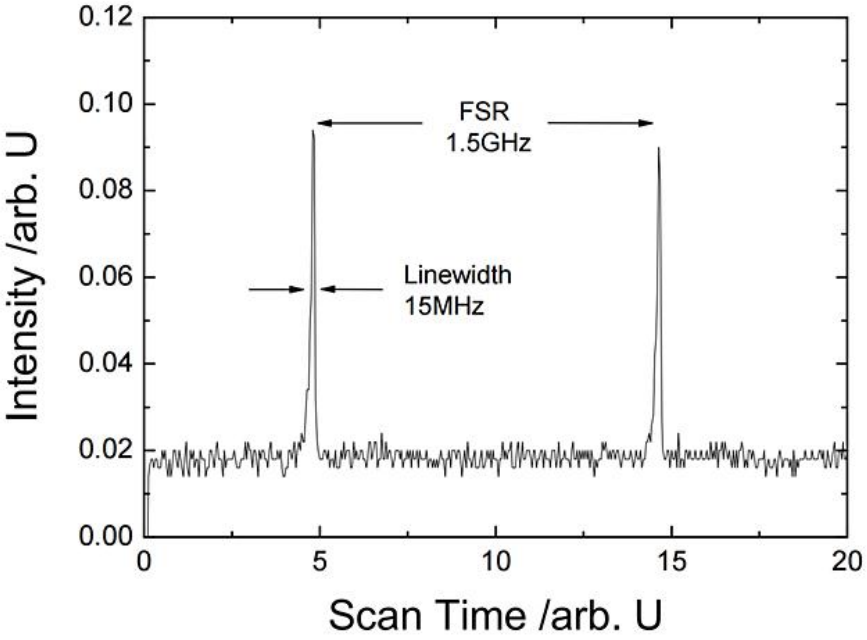


Temperature / wavelength tuning over TEC current*

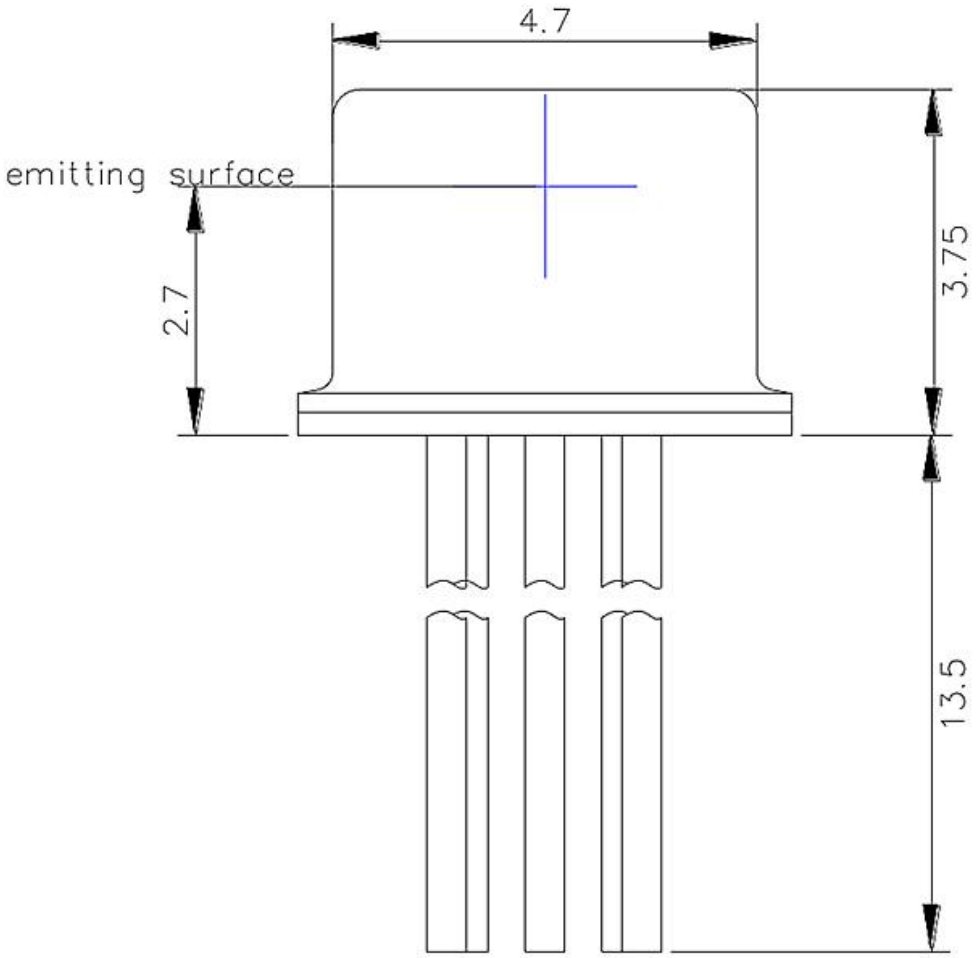


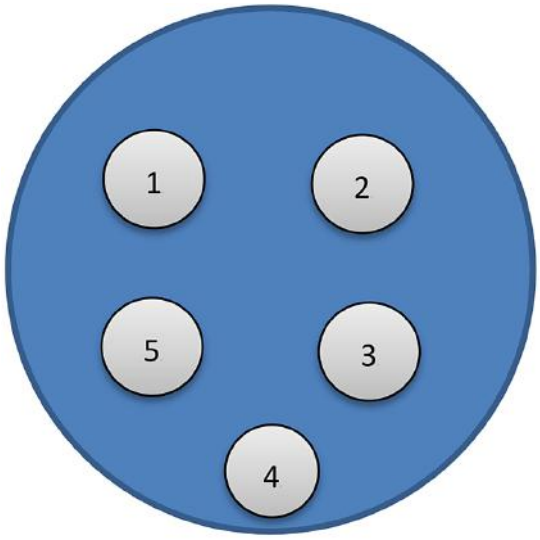
* TEC performance is dependent on heat load, ambient temperature and heatsink properties

Fabry Perot Spectrum



Package Size and Pin definition





Absolute Maximum Ratings

Item	Unit	Min	Typ	Max
Store Temperature	℃	-40	25	125
Chip Temperature	℃	+10	25	40
Operating Current	mA	0	2	2.5
Forward Voltage	V	0.8	1.2	1.8
TEC Current	mA	-150	-	+300
Soldering Temperature*	℃	100	130	270
Electrical Power Dissipation	mW	-	-	5

(*TEC temperature must be below 150°C)

Ordering Info

PL -VCSEL-□□□□-☆-A8▽-XX

□□□□:Wavelength

0760:760nm

0795:794.7nm

*****

1653.7:1653.7nm

☆ :TEC

0:Without TEC

1:With TEC

▽:Wavelength Tolerance

1:±0.5nm

2:±1.5nm

XX: Package

TO46

User Safety

Safety and Operating Considerations

This device operates under reverse bias voltage, and the polarity of the device can’ t be reversed.

Operating the Photodiode outside of its maximum ratings may cause device failure or a safety hazard. Power supplies used with this component cannot exceed maximum peak optical power.

ESD PROTECTION—Electrostatic discharge (ESD) is the primary cause of unexpected laser diode failure. Take extreme precaution to prevent ESD. Use wrist straps, grounded work surfaces, and rigorous antistatic techniques when handling Photodiodes.