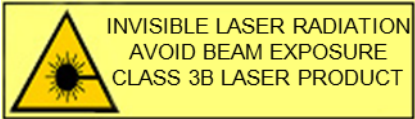


760/763 nm single-mode VCSEL



TO5 & TEC

- Vertical Cavity Surface-Emitting Laser
- internal TEC and Thermistor, ESD protection
- Narrow linewidth
- 2 nm tunability with TEC



PRELIMINARY

ELECTRO-OPTICAL CHARACTERISTICS

$T_{OP} = 20^{\circ}\text{C}$, $I_{OP} = 2.0 \text{ mA}$ unless otherwise stated (T_{OP} = chip backside temperature, controlled by the TEC)

PARAMETER	SYMBOL	UNITS	MIN	TYP	MAX	TEST CONDITIONS
Emission wavelength	λ_R	different wavelength selections are specified on the next page				
Laser current	I_{OP}	mA			2	
Threshold current	I_{TH}	mA		0.5		
Laser voltage	U_{OP}	V		2		
Output power	P_{opt}	mW	0.2			
Slope efficiency	η_s	W/A		0.3		
Differential series resistance	R_s	Ω		250		
3dB modulation bandwidth	ν_{3dB}	GHz	0.1			(due to ESD protection diode)
Relative intensity noise	RIN	dB/Hz		-130	-120	@ 1 GHz
Wavelength tuning over current		nm/mA		0.5		
Wavelength tuning over temperature		nm/K		0.06		
Thermal resistance (VCSEL chip)	$R_{thermal}$	K/mW	3		5	
Side mode supression		dB	25			
Beam divergence	θ	°	10		25	full width $1/e^2$
Spectral bandwidth		MHz		100		
TEC/THERMISTOR CHARACTERISTICS		UNITS	MIN	TYP	MAX	TEST CONDITIONS
TEC current		mA	-150 for heating		+300 for cooling	proper heatsink required
NTC Thermistor Resistance		k Ω	9.5	10.0	10.5	$T = 25^{\circ}\text{C}$
NTC Temperature Dependence		k Ω	$10/\exp[3892 \cdot (1/298K - 1/T_{op})]$			

NOTICE: Stresses greater than those listed under „Absolute Maximum Ratings“ may cause permanent damage to the device. These are stress ratings only and functional operation of the device at these or any other condition beyond those indicated for extended periods of time may effect device reliability.



ATTENTION: Electrostatic Sensitive Devices
Observe Precautions for Handling

Absolute Maximum Ratings

Storage Temperature	-40 ... 125°C
Operating Temperature	-40 ... 85°C
Electrical Power Dissipation	5 mW
Continous forward laser current	2.5 mA
Continuous reverse current	10 mA
Soldering Temperature*	270°C

(*TEC temperature must be below 150°C)

WAVELENGTH SELECTIONS

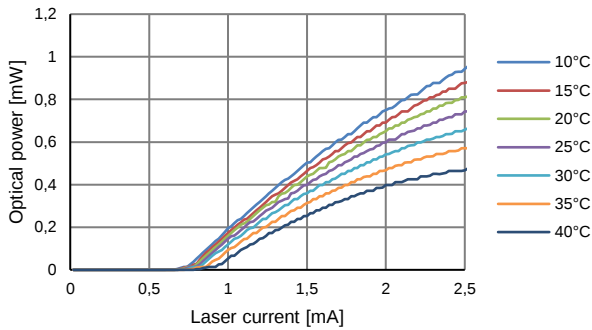
	typ. emission wavelength λ_0 @ $T_{OP} = 20^\circ\text{C}$, $I_{OP} = 2\text{ mA}$		target wavelength λ_t tuned by TEC and I_{OP}		
	MIN	MAX	MIN	MAX	UNITS
760 nm range					
Selection I *	759.7	760.7	760.2	761.2	nm
Selection II **	759.1	761.5	760.2	761.4	nm
763 nm range					
Selection I *	762.4	763.4	762.9	763.9	nm
Selection II **	761.8	764.8	762.9	764.7	nm

*The wavelength can be tuned by temperature and current to **all** wavelengths within target wavelength range.

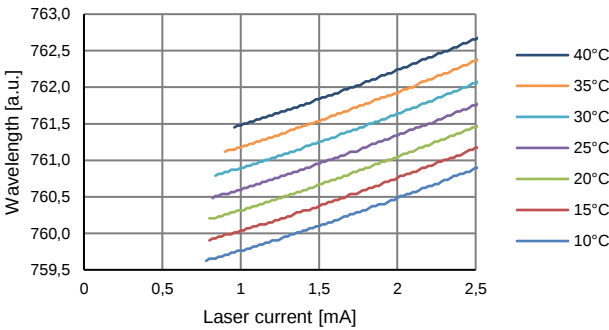
**The wavelength can be tuned by temperature and current by typically 0.4 nm within the target wavelength range.

Recommended operating conditions to reach the target wavelength range: $I_{OP} = 1.5 \dots 2\text{ mA}$, $T_{OP} = 15 \dots 45^\circ\text{C}$

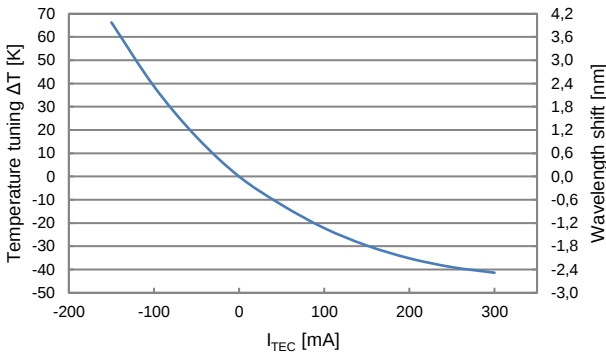
Typical characteristic curve



Spectral characteristics

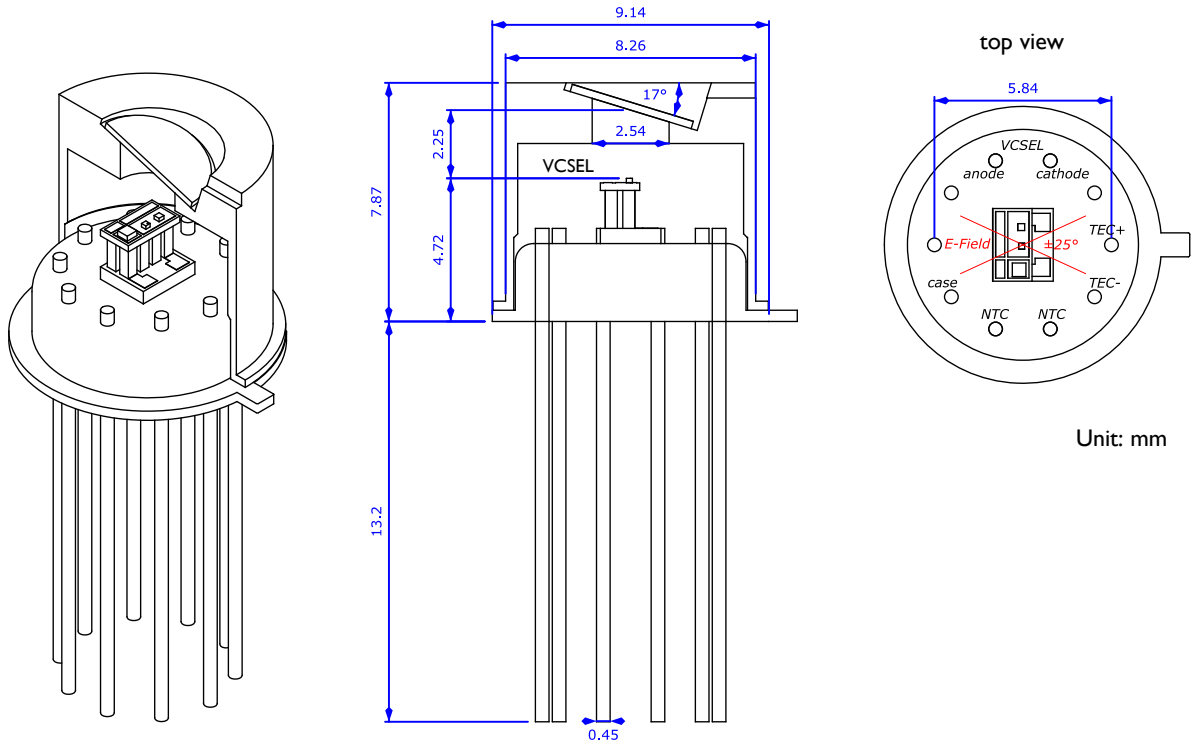


Temperature / wavelength tuning over TEC current*



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

TO dimensions / Pin configuration



For order please use:

	Selection I	Selection II
760 nm range	ULM760-01-PL-S05TTT	ULM760-02-PL-S05TTT
763 nm range	ULM763-01-PL-S05TTT	ULM763-02-PL-S05TTT

OPTION:

- Customer specific wavelength selection on request