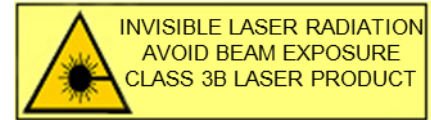
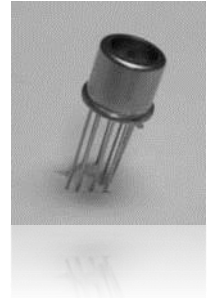


## TO5 & TEC

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



## PRELIMINARY

### ELECTRO-OPTICAL CHARACTERISTICS

T = 20°C unless otherwise stated

PARAMETER	SYMBOL	UNITS	MIN	TYP	MAX	TEST CONDITIONS
Emission wavelength	$\lambda_R$	different wavelength selections are specified on the next page				
Threshold current	$I_{TH}$	mA		0.5		
Output power	$P_{opt}$	mW	0.25			
Threshold voltage	$U_{TH}$	V		1.8		
Laser current	$I_{OP}$	mA			2	$P_{opt} = 0.3$ mW
Laser voltage	$U_{OP}$	V		2		$P_{opt} = 0.3$ mW
Wallplug efficiency	$\eta_{WP}$	%		12		$P_{opt} = 0.3$ mW
Slope efficiency	$\eta_S$	W/A		0.3		
Differential series resistance	$R_S$	$\Omega$		250		$P_{opt} = 0.3$ mW
3dB modulation bandwidth	$\nu_{3dB}$	GHz	0.1			$P_{opt} = 0.3$ mW (due to ESD protection diode)
Relative intensity noise	RIN	dB/Hz		-130	-120	$P_{opt} = 0.3$ mW @ 1 GHz
Wavelength tuning over current		nm/mA		0.6		
Wavelength tuning over temperature		nm/K		0.06		
Thermal resistance (VCSEL chip)	$R_{thermal}$	K/mW	3		5	
Side mode suppression		dB	25			I = 2 mA
Beam divergence	$\theta$	°	10		25	$P_{opt} = 0.3$ mW, full width $1/e^2$
Spectral bandwidth		MHz		100		$P_{opt} = 0.3$ mW
TEC/THERMISTOR CHARACTERISTICS		UNITS	MIN	TYP	MAX	TEST CONDITIONS
TEC current		mA	-150		+300	proper heatsink required
			for heating		for cooling	
NTC Thermistor Resistance		k $\Omega$	9.5	10.0	10.5	T = 25°C
NTC Temperature Dependence		k $\Omega$	$10/\exp[3892 \cdot (1/298K - 1/T_{op})]$			

**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
Continuous forward laser current	2 mA
Continuous reverse current	10 mA
Soldering Temperature*	270°C

(\*TEC temperature must be below 150°C)

**WAVELENGTH SELECTION CRITERIA**

Emission wavelength  $\lambda_R$  @ T = 20°C, I<sub>TEC</sub> = 0, P<sub>OP</sub> = 0.3 mW

**760 nm range** MIN MAX UNITS

± 1 nm 759.0 761.0 nm

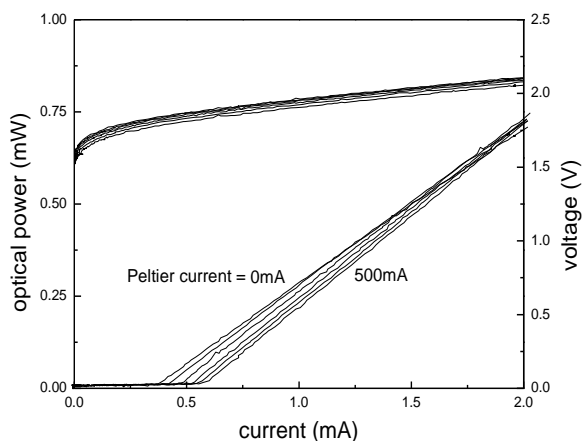
± 3 nm 757.0 763.0 nm

**763 nm range**

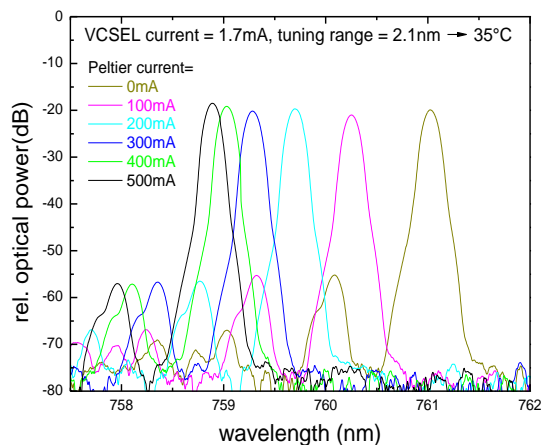
± 1 nm 762.0 764.0 nm

± 3 nm 760.0 766.0 nm

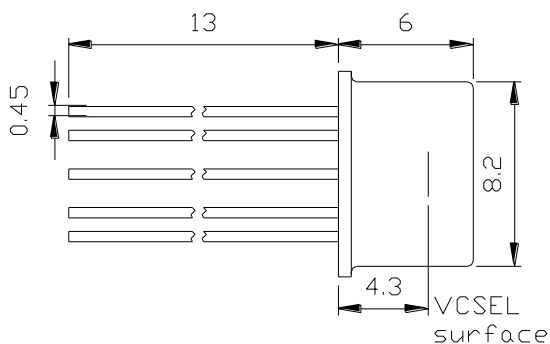
**LIV**



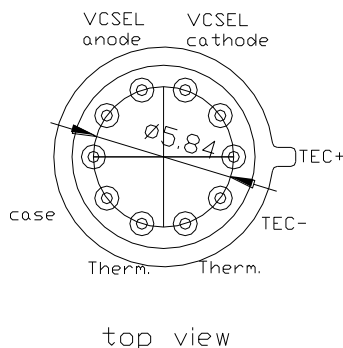
**Spectral characteristics**



**TO dimensions**



**Pin configuration**



Unit: mm

**For order please use:**

± 1 nm	± 3 nm
ULM760-01-TN-S05FTT	ULM760-03-TN-S05FTT
ULM763-01-TN-S05FTT	ULM763-03-TN-S05FTT

**OPTION:**

- Customer specific wavelength selection on request



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Philips GmbH U-L-M Photonics  
Tel +49 731 550194-011  
Fax +49 731 550194-026  
philips.photonics.ulm@philips.com  
www.photonics.philips.com