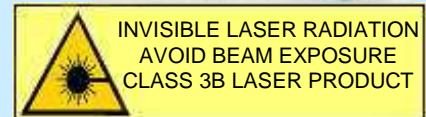


# 948 $\pm$ 1 nm Single Mode VCSEL TO46 & TEC

- ◆ internal TEC and Thermistor
- ◆ Narrow linewidth
- ◆ 2nm tunability with TEC
- ◆ High performance and reliability
- ◆ ESD protection diode



## ELECTRO-OPTICAL CHARACTERISTICS

**Preliminary**

PARAMETER	SYMBOL	UNITS	MIN	TYP	MAX	TEST CONDITIONS
Emission wavelength	$\lambda_R$	nm	947	948	949	T=20°C, I <sub>TEC</sub> =0, P <sub>OP</sub> =0.5mW
Threshold current	I <sub>TH</sub>	mA		0.5		T=20°C
Output power	P <sub>opt</sub>	mW	0.5			T=0 .. 50°C
Threshold voltage	U <sub>TH</sub>	V		1.6		
Laser current	I <sub>OP</sub>	mA			2.0	P <sub>opt</sub> =0.5 mW
Laser voltage	U <sub>OP</sub>	V		2.0		P <sub>opt</sub> =0.5 mW
Wallplug efficiency	$\eta_{WP}$	%		12		P <sub>opt</sub> =0.5mW
Slope efficiency	$\eta_S$	W/A		0.3		T= 20°C
Differential series resistance	R <sub>S</sub>	$\Omega$		250		P <sub>opt</sub> =0.5 mW
3dB modulation bandwidth	$\nu_{3dB}$	GHz	0.1			P <sub>opt</sub> =0.3 mW (due to ESD protection diode)
Relative intensity noise	RIN	dB/Hz		-130.0	-120.0	P <sub>opt</sub> = 0.5 mW @ 1 GHz
Wavelength tuning over current		nm/mA		0.60		
Wavelength tuning over temperature		nm/K		0.06		
Thermal resistance (VCSEL chip)	R <sub>thermal</sub>	K/mW	3		5	
Side mode suppression		dB	30			
Beam divergence	$\theta$	°	10		25	P <sub>opt</sub> =0.5 mW, full width 1/e <sup>2</sup>
Spectral bandwidth	$\Delta\lambda$	MHZ		100.0		P <sub>opt</sub> =0.5 mW
TEC current		mA			500	appropriate heatsink required
NTC Thermistor Resistance		K $\Omega$	9.5	10.0	10.5	T=25°C
NTC Temperature Dependence		K $\Omega$	10/exp[3892*(1/298K-1/T <sub>op</sub> )]			
Wavelength tuning over TEC current		nm/mA		0.008		TEC current < 200 mA

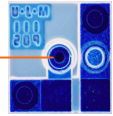
## ABSOLUTE MAXIMUM RATINGS

Storage temperature	-40 .. 125°C
Operating temperature	-20 .. 80°C
Electrical power dissipation	5 mW
Continuous forward laser current	2 mA
Laser reverse voltage	8V
Soldering temperature*:	270°C
(*TEC temperature must be below 150°C)	

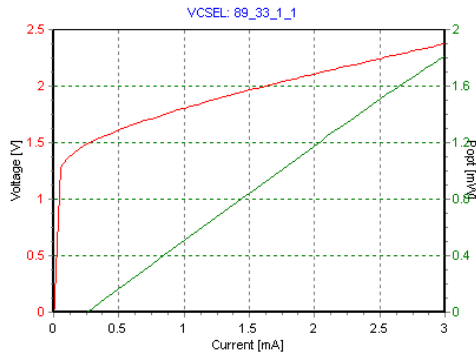
**NOTICE:** Stresses greater than those listed under „Absolute Maximum Ratings“ may cause permanent damage to the device. These are stress ratings only and functional operation of the device at these or any other condition beyond those indicated for extended periods of time may effect device reliability.



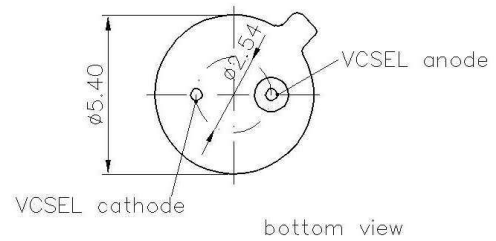
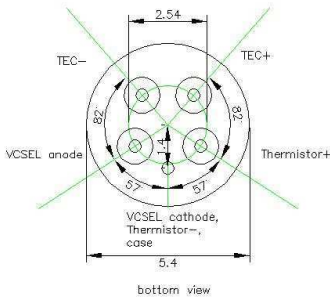
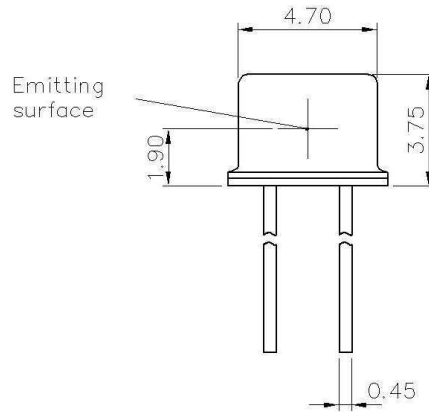
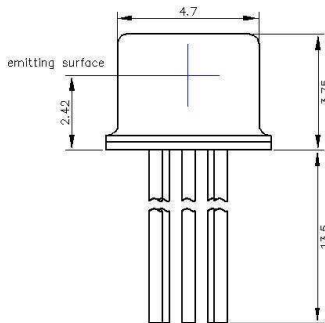
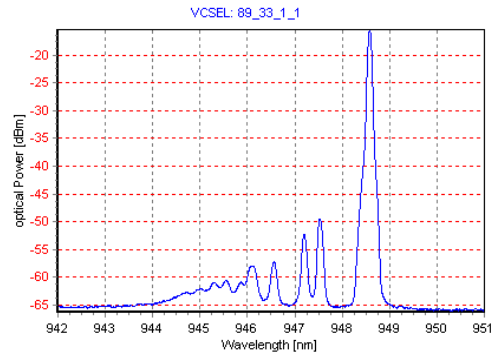
**ATTENTION:** Electrostatic Sensitive Devices  
Observe Precautions for Handling



## LIV



## Spectral Characteristics



For order please use:

	±1nm	±3nm
with TEC/Thermistor:	ULM948-01-TN-S46FTT	ULM948-03-TN-S46FTT
without TEC/Thermistor:	ULM948-01-TN-S46FZP	ULM948-03-TN-S46FZP

**OPTION: Wide range of TO headers & caps (flat, tilted, ball)**  
**Customer specific wavelength selection on request**