

## 850nm Multi-Mode VCSEL

Part number code: 850M-0000-X002

### PRODUCT DESCRIPTION

A Multi- transverse mode 850nm Infrared VCSEL designed for OEM applications such as perceptual computing, industrial position and motion sensing.

### Major Applications:

- Biometric sensing
- Free space data links
- Industrial sensors
- Pulse oximetry

### Features:

- Low divergence angle
- Narrow Spectral width
- Low operating current
- Linear polarization orientated along chip edge

### Package options include:

- TO-46 hermetic can (Minimum quantity order of 100 pcs)
- TO-46 non-hermetic can
- PLCC-2 with encapsulant

**Package Details:** See separate packages datasheet at <http://www.vixarinc.com/pdf/PackagesDS.pdf> .



COMPLIES WITH IEC 60825-1, 2<sup>nd</sup> Edition 2007.  
COMPLIES WITH 21 CFR 1040.10 AND 1040-10.11 EXCEPT FOR DEVIATIONS PURSUANT TO LASER  
NOTICE NO.50 DATED 27 MAY 2001.

## Absolute Maximum Ratings

Parameter	Rating	Notes
Storage temperature	-40 to 125 °C	For PLCC packages: -40 to 100°C
Operating temperature (VCSEL)	-20°C to 90 °C	
Lead solder temperature	260°C, 10 seconds	
CW current (VCSEL)	25 mA	(Note 1) at room temperature
Maximum pulsed current	80 mA	(Note 2) <100ns pulse width, 1% duty cycle T=30°C
Laser reverse voltage	5 V	(Note 3)

Note 1: The maximum CW laser current in the Absolute Maximum Ratings is valid for the operating temperature noted at the top of this table; however, the maximum CW laser current decreases with increasing temperature. Contact Vixar for maximum CW laser current values at other temperatures.

Note 2: For details refer to the Vixar Application Note "Operation of VCSELs Under Pulsed Conditions".

Note 3: For details refer to the Vixar Application Note "VCSEL EOS/ESD Considerations and Lifetime Optimization".

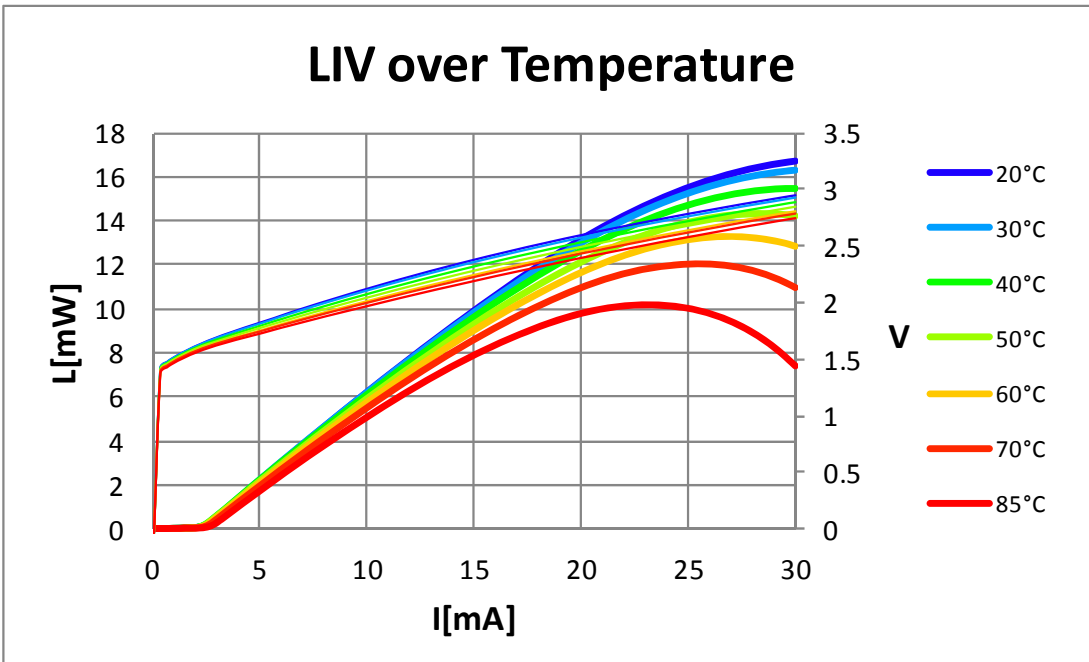
Stresses beyond those listed under Absolute Maximum Ratings may cause permanent damage to the device. These are stress ratings only. Functional operation of the device at these or any other conditions beyond those indicated for extended periods of time may affect device reliability.

## Electro-Optical Characteristics

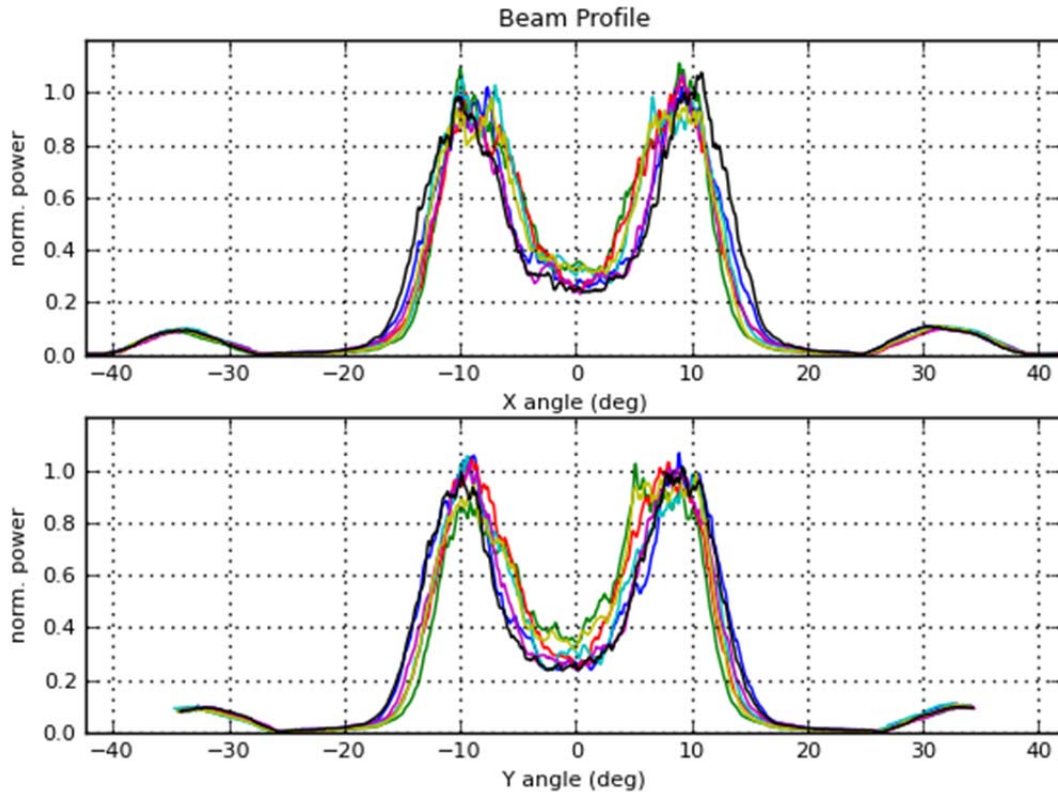
VCSEL Operating Temp (Tv) =30°C & Operating Current=16mA unless otherwise stated)

Parameter	Symbol	Units	Minimum	Typical	Maximum	Notes
Threshold current	I <sub>th</sub>	mA	1.8	2.5	3.2	
Operating voltage	V <sub>f</sub>	Volts	--	2.3	2.8	
Series resistance (VCSEL)	R <sub>s</sub>	Ohms	--	35	--	
Slope efficiency	SE	mW/mA	--	0.8	--	
Optical output power	L <sub>op</sub>	mW	8.0	10.5	12.0	T=30°C
Optical output power	L <sub>op</sub>	mW	--	9.5	--	T=50°C
Optical output power	L <sub>op</sub>	mW	--	8.5	--	T=85°C
Reverse breakdown voltage		V	10	--	--	I <sub>r</sub> ≤ 1nA
Operating wavelength	λ <sub>op</sub>	nm	840	850	860	
Spectral width (RMS)	Δλ	nm	--	--	1.5	
Beam divergence 1/e <sup>2</sup>		deg	26	30	34	Whole angle
Beam divergence FWHM	FWHM	deg	21	25	28	Whole angle
Current tuning		nm/mA		0.1		
Wavelength temp. coefficient		nm/°C		0.06		

## TYPICAL PERFORMANCE CURVES:



### Beam Divergence at room temperature (Independent of Current & Temperature)





## ORDERING INFORMATION

Description	ESD Diode (1)	Package	Hermetically Sealed (2)	Part Number
850 nm Multi-mode VCSEL bare die		Die only <sup>(3)</sup>		850M-0000-A002
850 nm Multi-mode VCSEL on a TO can package		TO-46		850M-0000-B002
850 nm Multi-mode VCSEL on a TO can package with ESD diode	✓	TO-46		850M-0000-B092
850 nm Multi-mode VCSEL on a hermetic sealed TO can package		TO-46	✓ <sup>(2)</sup>	850M-0000-G002
850 nm Multi-mode VCSEL on a hermetic sealed TO can package with ESD diode	✓	TO-46	✓ <sup>(2)</sup>	850M-0000-G092
850 nm Multi-mode VCSEL on a PLCC-2 package		PLCC-2		850M-0000-D002
850 nm Multi-mode VCSEL on a PLCC-2 package with ESD diode	✓	PLCC-2		850M-0000-D092

<sup>(1)</sup> Do not include an ESD diode if the part will be modulation frequency  $\geq 35$  MHz.

<sup>(2)</sup> Hermetically sealed (highly recommended for production or reliability testing). Minimum quantity order is 100 pieces

### Special notes:

For some applications, a burn-in period for VCSEL die is recommended to stabilize the output power. Please contact Vixar for a recommendation.



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