

680nm Multi-Mode VCSEL

Part number code: 680M-0000-X002

PRODUCT DESCRIPTION

A Multi- transverse mode 680nm VCSEL designed for applications that requires efficient optical power source along with visible range of light. This product can create a small sized spot with high resolution.

Major Applications:

- Point of care medical devices
- Biometric sensors
- Low light laser therapy
- 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 50 pcs)
- TO-46 non-hermetic can
- TO can with TEC and Thermistor for Temperature Control Applications
- PLCC-2 with encapsulant
- Other packages upon request.

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



COMPLIES WITH IEC 60825-1, 2nd 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 50 °C	
Lead solder temperature	260°C, 10 seconds	
CW current (VCSEL)	12 mA	(Note 1)
Maximum pulsed current	35 mA	(Note 2) <1µs 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".

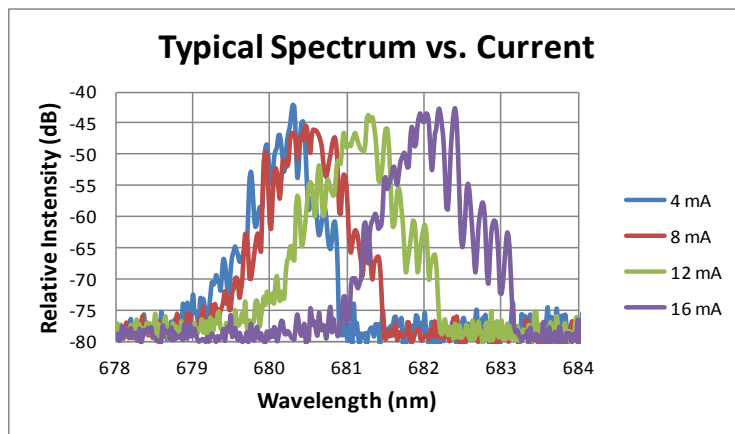
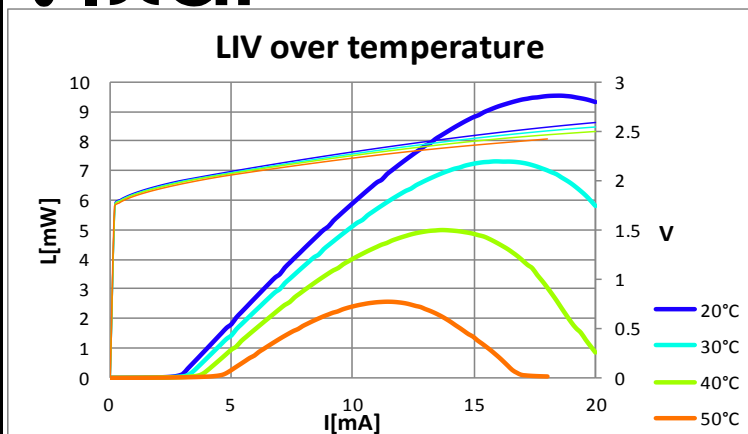
Stresses beyond those listed under Absolute Maximum Ratings may cause permanent damage to the device. These are stress ratings only. Functional operation of the device at these or any other conditions beyond those indicated for extended periods of time may affect device reliability.

Electro-Optical Characteristics

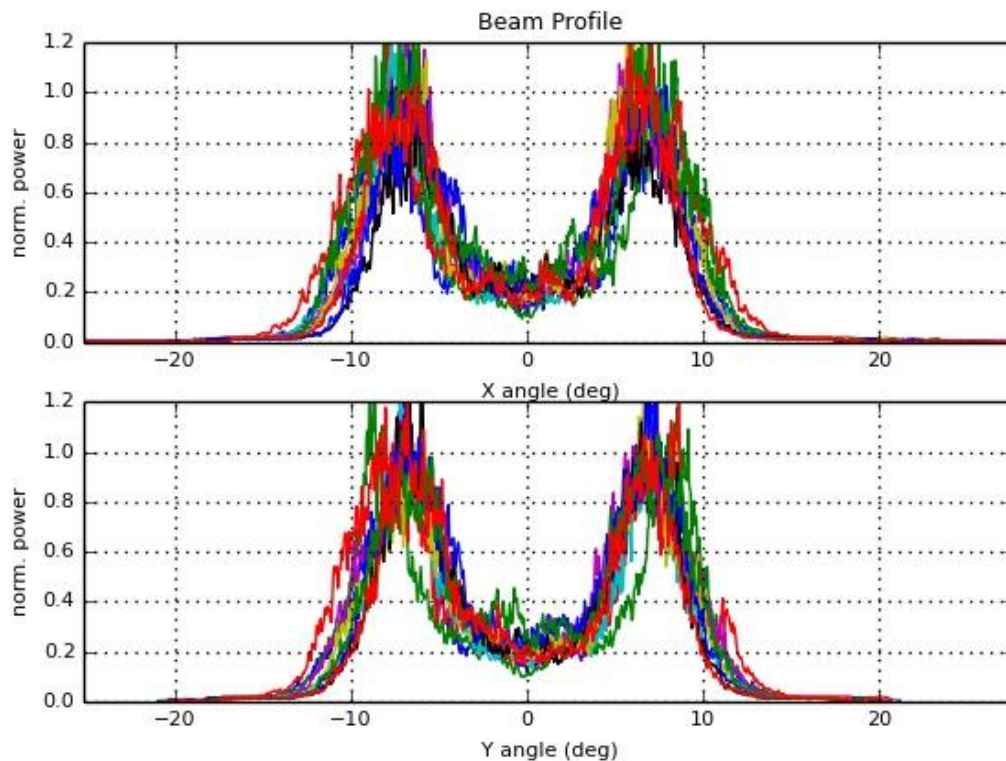
VCSEL Operating Temp (Tv) =30°C & Operating Current=8mA unless otherwise stated)

Parameter	Symbol	Units	Minimum	Typical	Maximum	Notes
Threshold current	I _{th}	mA	1.8	2.5	4.0	
Operating voltage	V _f	Volts	--	2.2	2.8	
Series resistance (VCSEL)	R _s	Ohms	--	40	--	
Slope efficiency	SE	mW/mA	--	0.7	--	
Optical output power	L _{op}	mW	3	3.8	4.8	T=30°C
Optical output power	L _{op}	mW	--	1.7	--	T=50°C
Reverse breakdown voltage		V	10	--	--	I _r ≤ 1nA
Operating wavelength	λ _{op}	nm	670	680	690	
Spectral width (RMS)	Δλ	nm	--	--	1.5	
Beam divergence 1/e ²		deg	23	25	27	Whole angle
Beam divergence FWHM	FWHM	deg	18	21	23	Whole angle
Wavelength temp. coefficient		nm/°C		0.045		
Rise time		ps	--	--	150	20%-80%
Fall time		ps	--	--	150	20%-80%

TYPICAL PERFORMANCE CURVES:



Beam Divergence at room temperature





ORDERING INFORMATION

Description	ESD Diode ⁽¹⁾	Package	Hermetically Sealed ⁽²⁾	Part Number
680 nm Multi-mode VCSEL bare die		Die only ⁽³⁾		680M-0000-A002
680 nm Multi-mode VCSEL on a TO can package		TO-46		680M-0000-B002
680 nm Multi-mode VCSEL on a TO can package with ESD diode	✓	TO-46		680M-0000-B092
680 nm Multi-mode VCSEL on a hermetic sealed TO can package		TO-46	✓ ⁽²⁾	680M-0000-G002
680 nm Multi-mode VCSEL on a hermetic sealed TO can package with ESD diode	✓	TO-46	✓ ⁽²⁾	680M-0000-G092
680 nm Multi-mode VCSEL on a PLCC-2 package		PLCC-2		680M-0000-D002
680 nm Multi-mode VCSEL on a PLCC-2 package with ESD diode	✓	PLCC-2		680M-0000-D092
680 nm Multi-mode VCSEL on a TO can six leaded can with TEC & Thermistor		TO-46 6 Leaded		680M-0000-BC02
680 nm Multi-mode VCSEL on a TO can six leaded can with TEC, Thermistor & ESD diode	✓	TO-46 6 Leaded		680M-0000-BC92
680 nm Multi-mode VCSEL on a hermetic sealed TO can six leaded can with TEC & Thermistor		TO-46 6 Leaded	✓ ⁽²⁾	680M-0000-GC02
680 nm Multi-mode VCSEL on a hermetic sealed TO can six leaded can with TEC, Thermistor & ESD diode	✓	TO-46 6 Leaded	✓ ⁽²⁾	680M-0000-GC92
680 nm Multi-mode VCSEL on a TO can 8 leaded can with TEC & Thermistor		TO-5		680M-0000-EC02
680 nm Multi-mode VCSEL on a TO can 8 leaded can with TEC, Thermistor & ESD diode	✓	TO-5		680M-0000-EC92
680 nm Multi-mode VCSEL on a hermetic sealed TO can 8 leaded can with TEC & Thermistor		TO-5	✓ ⁽²⁾	680M-0000-IC02
680 nm Multi-mode VCSEL on a hermetic sealed TO can 8 leaded can with TEC, Thermistor & ESD diode	✓	TO-5	✓ ⁽²⁾	680M-0000-IC92

⁽¹⁾ Do not include an ESD diode if the part will be modulation frequency ≥ 35 MHz.

⁽²⁾ Hermetically sealed (highly recommended for production or reliability testing). Minimum quantity order is 50 pieces

⁽³⁾ To burn them the bare die, operate them at 10mA for 5 hours at 85°C after packaging. Contact Vixar regarding recommendations for epoxy attachment materials, curing time and temperatures.

Vixar

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