

680nm Gaussian beam VCSEL

Part number code: 680Q-0000-X002

PRODUCT DESCRIPTION

A Quasi (Gaussian beam shape; but multi spectral mode) 680nm VCSEL, with single linear polarized emission also designed for modulated applications. The red wavelength is ideal for applications requiring beam visibility such as aligning sensors & high resolution applications requiring a small spot size.

Major Applications:

- Laser Printing
- Medical devices
- Bar code scanners
- Holography

Features:

- Low operating current
- Low divergence angle
- Circular beam profile
- Linear polarization orientated along chip edge

Package options include:

- TO-46 hermetic can (Minimum quantity order of 100 pcs. Option available only for qualified customers)
- TO-46 non-hermetic can
- PLCC packages with clear encapsulant

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 to 70 °C	
Lead solder temperature	260°C, 10 seconds	
CW current (VCSEL)	5 mA	(Note 1) at room temperature
Maximum pulsed current	10 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 table above. 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

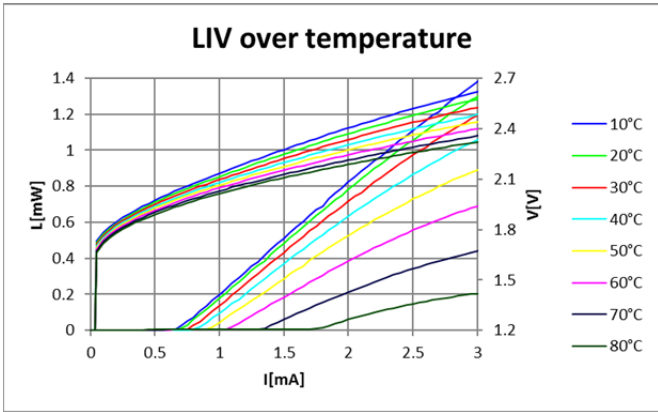
VCSEL Operating Temp (T_v) =30°C & Operating Current=3mA unless otherwise stated)

Parameter	Symbol	Units	Minimum	Typical	Maximum	Notes
Threshold current	I _{th}	mA	0.5	0.8	1.4	
Operating voltage	V _f	Volts	--	2.5	3.0	
Series resistance (VCSEL)	R _s	Ohms	--	175	--	
Slope efficiency	SE	mW/mA	--	0.5	--	
Quasi Single mode behavior		mA			3.0	For Gaussian beam
Optical output power	L _{op}	mW	0.8	1.2	--	T=30°C
Optical output power	L _{op}	mW	--	0.8	--	T=50°C
Optical output power	L _{op}	mW	--	0.4	--	T=70°C
Reverse breakdown voltage		V	10	--	--	I _r ≤ 1nA
Operating wavelength	λ _{op}	nm	670	680	690	
Spectral width (RMS)	Δλ	nm	--	--	1.0	
Beam divergence 1/e ²		deg	16	20	24	Whole angle
Beam divergence FWHM	FWHM	deg	12	14	16	Whole angle
RMSE value			--	--	0.06	
Wavelength current coefficient		nm/mA	0.15	0.30	0.5	
Wavelength temp. coefficient		nm/°C	0.044	0.045	0.05	



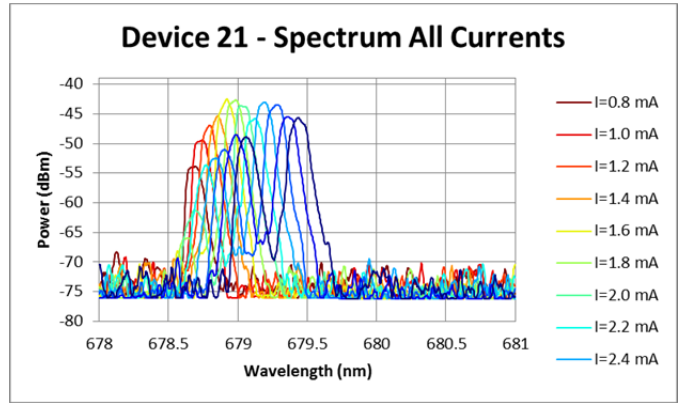
TYPICAL PERFORMANCE CURVES:

Output Power vs. Current over Temperature

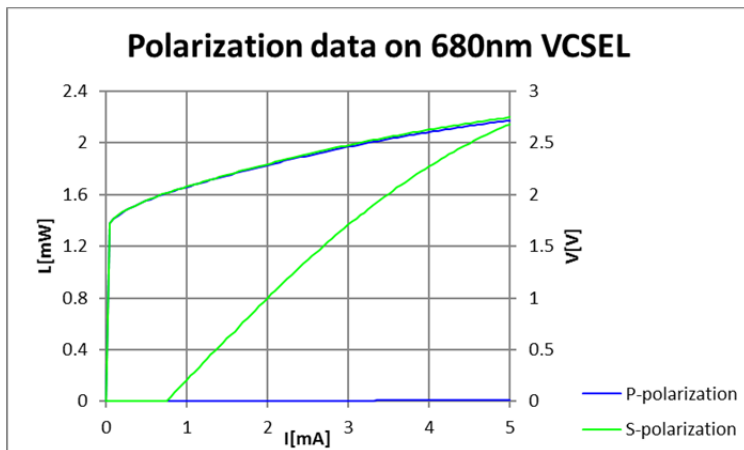
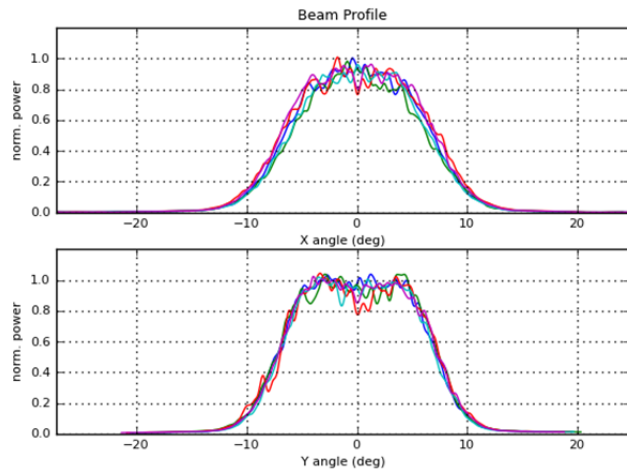


Single Mode Wavelength Spectrum vs. Current

Note that side modes appear at higher currents.



**Far Field Beam Divergence at Room Temperature
(Independent of Temperature & Current)**





ORDERING INFORMATION

Description	ESD Diode ⁽¹⁾	Package	Part Number
680 nm Quasi single-mode VCSEL bare die		Die only ⁽³⁾	680Q-0000-A002
680 nm Quasi single-mode VCSEL on a TO can package		TO-46	680Q-0000-B002
680 nm Quasi single-mode VCSEL on a PLCC-2 package with ESD diode	✓	PLCC-2	680Q-0000-D092

⁽¹⁾ Do not include an ESD diode if the part will be modulated to a frequency \geq 35 MHz.

Special Note:

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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