670nm Gaussian beam VCSEL

Part number code: VCSEL-680nM-Q

PRODUCT DESCRIPTION

A Quasi-single mode (Gaussian beam shape; but multi spectral mode) 670nm VCSEL, with 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)
- TO-46 non-hermetic can

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	
Operating temperature (VCSEL)	-20 to 70 °C	
Lead solder temperature	260°C, 10 seconds	
CW current (VCSEL)	3 mA	(Note 1) at room temperature
Maximum pulsed current	8 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 YesLED for maximum CW laser current values at other temperatures.

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

Note 3: For details refer to the YesLED 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.

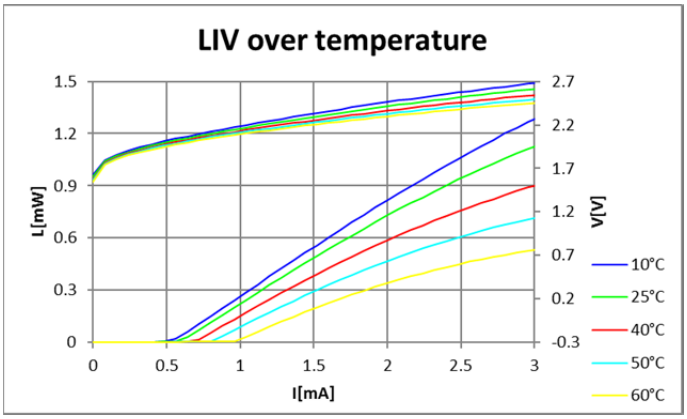
Electro-Optical Characteristics

VCSEL Operating Temp (Tv) =25°C & Operating Current=3mA unless otherwise stated)

Parameter	Symbol	Units	Minimum	Typical	Maximum	Notes
Threshold current	Ith	mA	0.5	0.7	1.0	
Operating voltage	Vf	Volts	--	2.6	3.0	
Series resistance (VCSEL)	Rs	Ohms	--	175	--	
Slope efficiency	SE	mW/mA	--	0.5	--	
Quasi Single mode behavior		mA			3.0	For Gaussian beam
Optical output power	Lop	mW	0.8	1.0	--	T=25°C
Optical output power	Lop	mW	--	0.8	--	T=50°C
Reverse breakdown voltage		V	10	--	--	Ir ≤ 1nA
Operating wavelength	λop	nm	660	670	680	
Spectral width (RMS)	Δλ	nm	--	--	1.0	
Beam divergence 1/e2		deg	14	16	20	Whole angle
Beam divergence FWHM	FWHM	deg	6	10	14	Whole angle
RMSE value			--	--	0.06	
Wavelength current coefficient		nm/mA	0.25	0.40	0.55	
Wavelength temp. coefficient		nm/°C	0.044	0.045	0.05	

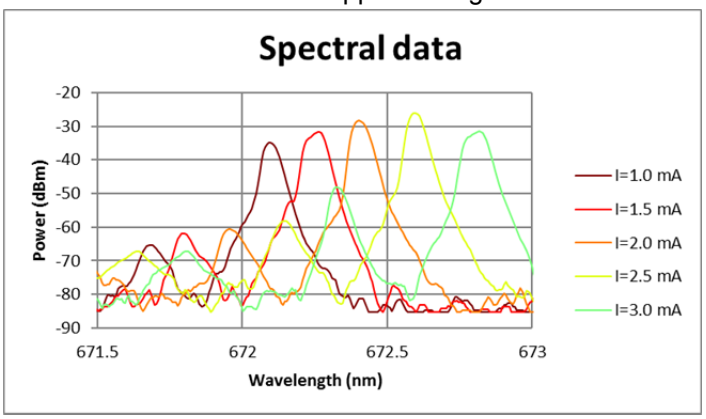
TYPICAL PERFORMANCE CURVES:

Output Power vs. Current over Temperature



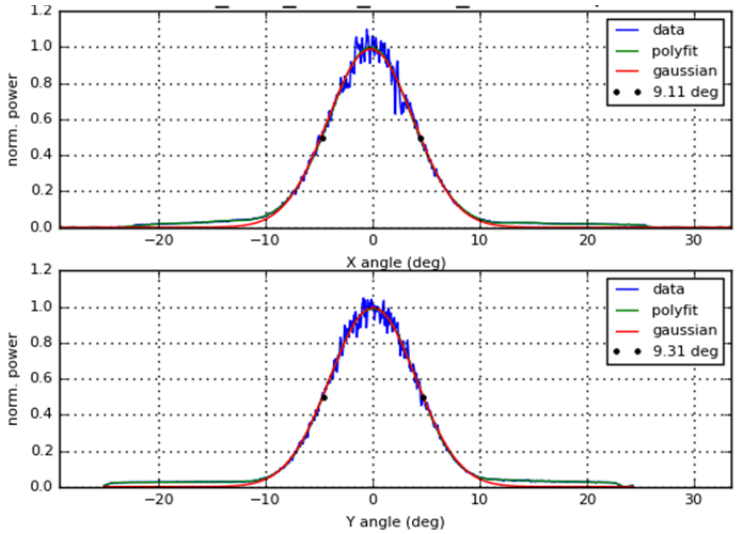
Single Mode Wavelength Spectrum vs. Current

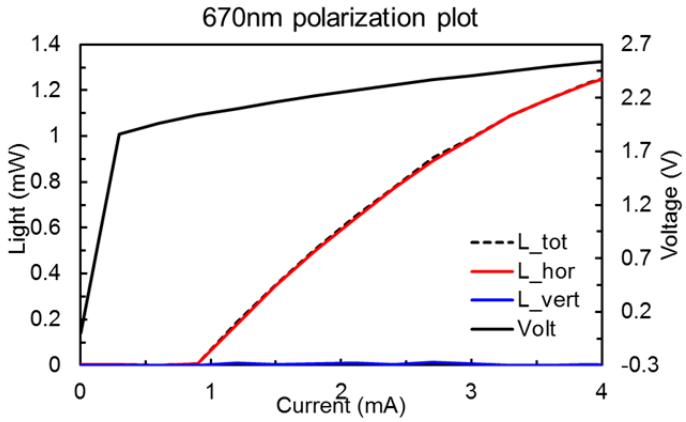
Note that side modes appear at higher currents.



Far Field Beam Divergence at Room Temperature

(Independent of Temperature & Current)





ORDERING INFORMATION

Description	ESD Diode [1]	Package	Part Number
670 nm Quasi single-mode VCSEL bare die		Die only [3]	YL-VCSELCQ--A002
670 nm Quasi single-mode VCSEL on a non-hermetic TO can package		TO-46	YL-TO46Q-B002
670 nm Quasi single-mode VCSEL on a hermetic TO can package with ESD diode		TO-46	YL-TO46Q-G092

[1] Do not include an ESD diode if the part will be modulated to a frequency ≥ 35 MHz.

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