

High efficiency, Three-Wavelength VCSEL (680nm/795nm/850nm in a Single TO-46 package) MULTM-0000-B0x1*



PRODUCT DESCRIPTION

High efficiency three color (680nm/795nm/850nm) VCSELs in a TO-46 package

This tri-color coherent optical source is designed for OEM spectroscopic applications in the medical, industrial and security industries:

- Pulse, tissue or regional oximetry applications
- Diffuse optical spectroscopic sensing and imaging
- Molecular sensing and imaging
- Gas or chemical sensing

Features:

- Three wavelengths in a very compact packaging (5mm diameter)
- Other packaging options available
- Each wavelength can be modulated independently at high speeds (~1GHz)
- Low divergence angle with a circular beam profile
- Low operating current (<3-5mA at 1mW output power) for each wavelength
- Narrow spectral width (<1nm) for each of the three wavelengths

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

* -- "x" denotes the character position of option designators. See "Ordering Information" at end of datasheet for details.

**RoHS
Compliant**



INVISIBLE LASER RADIATION
DO NOT VIEW DIRECTLY WITH OPTICAL INSTRUMENTS (MAGNIFYING GLASSES)
CLASS 1M LASER PRODUCT PER IEC 60825-007

Absolute Maximum Ratings

Storage temperature	-40°C to +125°C
Operating temperature	0°C to +60°C
Lead solder temperature	260°C, 10 sec
Laser continuous average current	5-10 mA
Laser reverse voltage	5V

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

680nm VCSEL

Parameter	Symbol	Units	Minimum	Typical	Maximum	Notes
Threshold current	I_{th}	mA	0.7	0.9	1.2	Room temperature
Operating Voltage	V_f	Volts	--	2.7	--	$I_f = 3$ mA
Device series resistance	R_s	Ohms	--	200	--	$I_f = 3$ mA
Operating Wavelength	λ_1	nm	670	680	690	$I_f = 3$ mA
Wavelength temp coefficient	$d\lambda/dT$	nm/C	--	0.05	--	
Optical output power (25C)	$P_o(25)$	mW	--	1.4	--	$I_f = 3$ mA
Slope efficiency	η	mW/mA	--	0.4	--	$I_f = 3$ mA
Spectral bandwidth-RMS	$\Delta\lambda$	nm	--	--	1	
Risetime/Falltime	t_r	ps	--	100	--	20-80 %

795nm VCSEL

Parameter	Symbol	Units	Minimum	Typical	Maximum	Notes
Threshold current	I_{th}	mA	--	2.2	--	Room temperature
Operating Voltage	V_f	Volts	--	2.4	--	$I_f = 5$ mA
Device series resistance	R_s	Ohms	--	100	--	$I_f = 5$ mA
Operating Wavelength	λ_2	nm	780	790	800	$I_f = 5$ mA
Wavelength temp coefficient	$d\lambda/dT$	nm/C	--	0.05	--	
Optical output power (25C)	$P_o(25)$	mW	--	1.1	--	$I_f = 5$ mA
Slope efficiency	η	mW/mA	--	0.32	--	$I_f = 5$ mA
Spectral bandwidth-RMS	$\Delta\lambda$	nm	--	--	1	
Risetime/Falltime	t_r	ps	--	100	--	20-80 %

850nm VCSEL

Parameter	Symbol	Units	Minimum	Typical	Maximum	Notes
Threshold current	I_{th}	mA	--	1.5	--	Room temperature
Operating Voltage	V_f	Volts	--	2.5	--	$I_f = 5$ mA
Device series resistance	R_s	Ohms	--	150	--	$I_f = 5$ mA
Operating Wavelength	λ_3	nm	840	850	860	$I_f = 5$ mA
Wavelength temp coefficient	$d\lambda/dT$	nm/C	--	0.06	--	
Optical output power (25C)	$P_o(25)$	mW	--	2.1	--	$I_f = 5$ mA
Slope efficiency	η	mW/mA	--	0.7	--	$I_f = 5$ mA
Spectral bandwidth-RMS	$\Delta\lambda$	nm	--	--	1	
Risetime/Falltime	t_r	ps	--	100	--	20-80 %

ESD Survival (Notes 1, 2)		V	400	--	--	per IEC61000-4-2
---------------------------	--	---	-----	----	----	------------------



PRELIMINARY

Note 1: Applies only to parts that include an ESD diode. ESD diodes cannot be used if the device is being modulated.

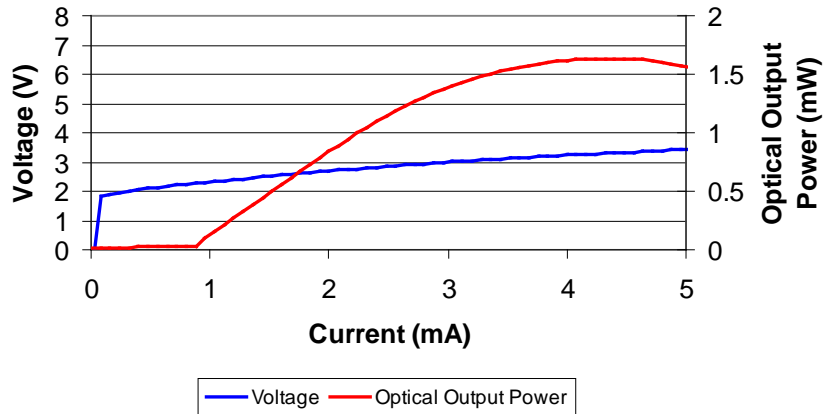
Note 2: VCSEL shall survive 3 ESD events applied in both the positive and negative polarity. ESD failures are defined as more than a 15% drop in output power or a 10% increase in reverse leakage current. This test is considered destructive and shall not be conducted on prototype or production parts that are shipped for use by the customer.

PRELIMINARY

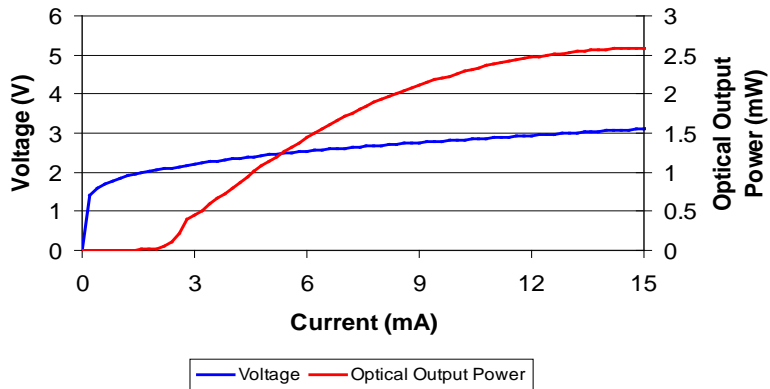
TYPICAL PERFORMANCE CURVES:

VCSEL Output Power and Voltage Versus Drive Current

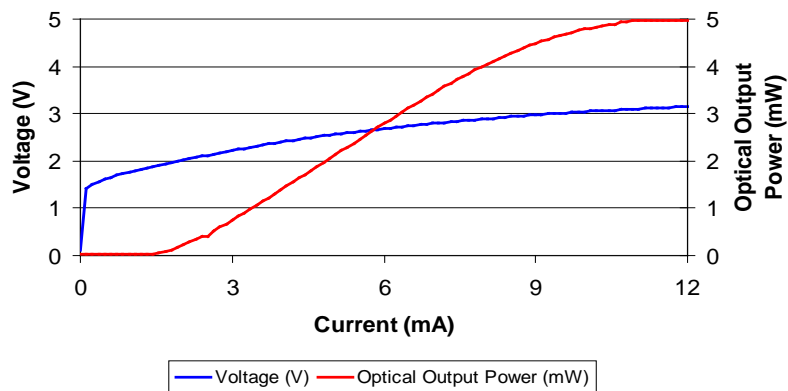
670nm Optical Output Power Vs Current

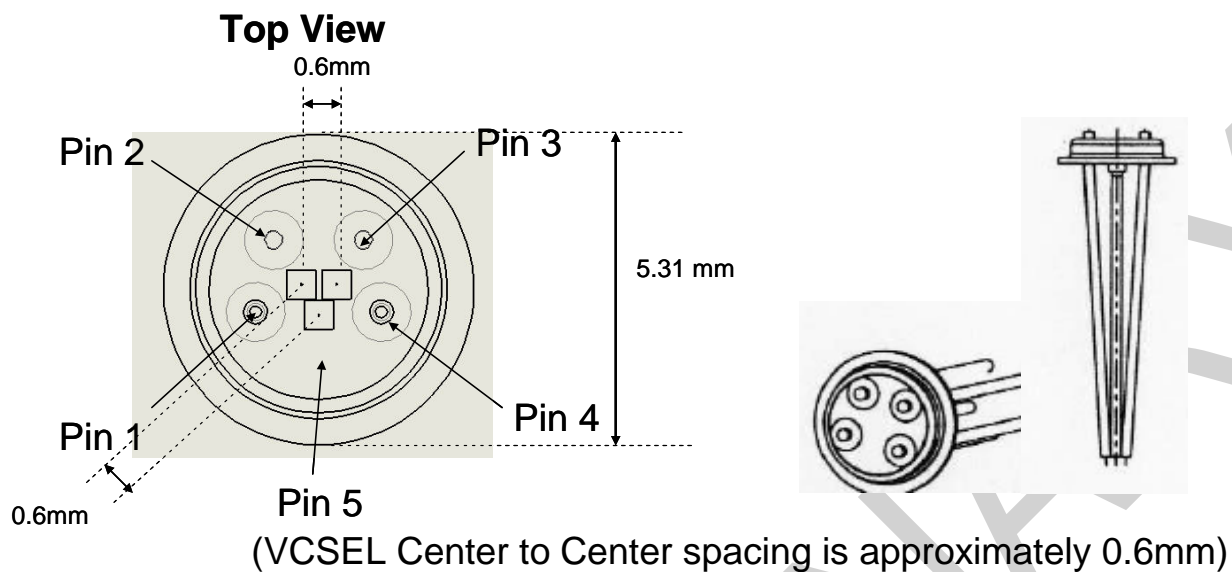


795nm Optical Output Power Vs Current



850nm Optical Output Power Vs Current



Die Placement in TO-46 Package

Pin Number	Connection
1	Anode – 680nm VCSEL
2	Anode – 795nm VCSEL
3	Anode – 850nm VCSEL
4	Not Assigned
5	Cathode – All VCSELs



PRELIMINARY

ORDERING INFORMATION

Description	Part Number
1mW 680nm/795nm/850nm VCSELs TO-46 package	MULTM-0000-B001
1mW 680nm/795nm/850nm VCSELs with ESD diode TO-46 package	MULTM-0000-B091



2950 Xenium Lane, Suite 104
Plymouth, MN 55441

763-746-8045

email: info@vixarinc.com

website: www.vixarinc.com

Copyright ©VIXAR 2008