

## High power, Three-Wavelength VCSEL (680nm/795nm/850nm in a Single TO-46 package) MULTM-0000-B0x2\*



### PRODUCT DESCRIPTION

High power (~8mW per laser) 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

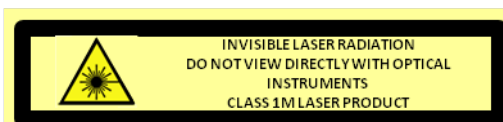
### Features:

- 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 (<20-27) 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





## 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	30-40 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

### 670nm VCSEL

Parameter	Symbol	Units	Minimum	Typical	Maximum	Notes
Threshold current	$I_{th}$	mA	--		8.5	Room temperature
Operating Voltage	$V_f$	Volts	--	2.4	--	$I_f = 20$ mA
Device series resistance	$R_s$	Ohms	--	18	--	$I_f = 20$ mA
Operating Wavelength	$\lambda_1$	nm	670	680	690	$I_f = 20$ mA
Wavelength temp coefficient	$d\lambda/dT$	nm/C	--	0.05	--	
Optical output power (25C)	$P_o(25)$	mW	--	8	--	$I_f = 20$ mA
Slope efficiency	$\eta$	mW/mA	0.5	0.6	0.8	$I_f = 20$ 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	--	9.5	--	Room temperature
Operating Voltage	$V_f$	Volts	--	2.5	--	$I_f = 27$ mA
Device series resistance	$R_s$	Ohms	--	15	--	$I_f = 27$ mA
Operating Wavelength	$\lambda_2$	nm	780	790	800	$I_f = 27$ mA
Wavelength temp coefficient	$d\lambda/dT$	nm/C	--	0.05	--	
Optical output power (25C)	$P_o(25)$	mW	--	8	--	$I_f = 27$ mA
Slope efficiency	$\eta$	mW/mA	0.3	0.4	0.6	$I_f = 27$ 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	--	2.8	--	Room temperature
Operating Voltage	$V_f$	Volts	--	2.6	--	$I_f = 18$ mA
Device series resistance	$R_s$	Ohms	--	30	--	$I_f = 18$ mA
Operating Wavelength	$\lambda_3$	nm	840	850	860	$I_f = 18$ mA
Wavelength temp coefficient	$d\lambda/dT$	nm/C	--	0.06	--	
Optical output power (25C)	$P_o(25)$	mW	--	8	--	$I_f = 18$ mA
Slope efficiency	$\eta$	mW/mA	0.3	0.4	0.6	$I_f = 18$ mA
Spectral bandwidth-RMS	$\Delta\lambda$	nm	--	--	1	
Rise time/Fall time	$t_r$	ps	--	100	--	20-80 %

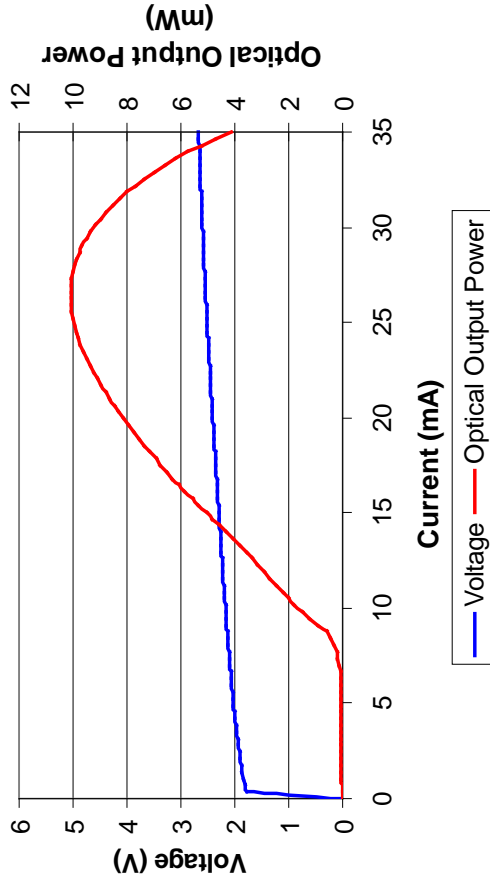
ESD Survival (Notes 1, 2)		V	400	--	--	per IEC61000-4-2
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Note 1: Applies only to parts that include an ESD diode. ESD diodes cannot be used if the device is being modulated.

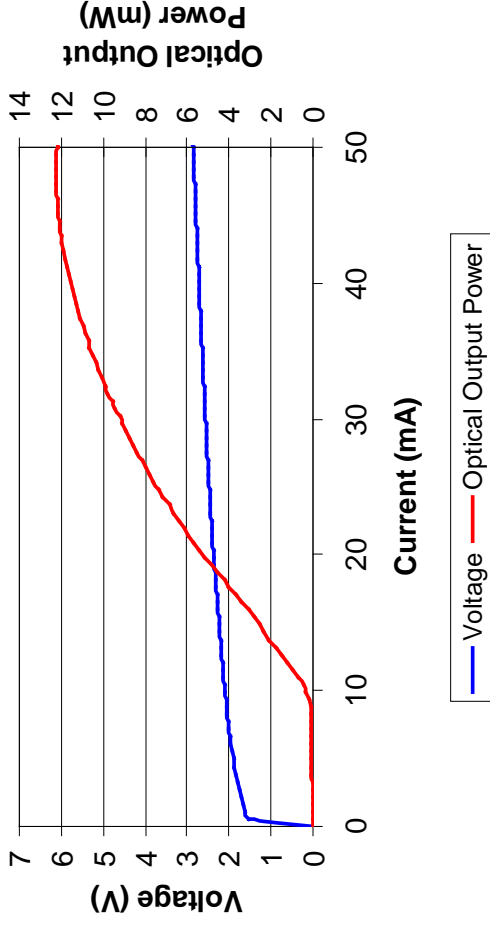
Note 2: VCSEL shall survive 3 ESD events applied in both the positive and negative polarity. ESD failures are defined as more than a 15% drop in output power or a 10% increase in reverse leakage current. This test is considered destructive and shall not be conducted on prototype or production parts that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

**TYPICAL PERFORMANCE CURVES:**

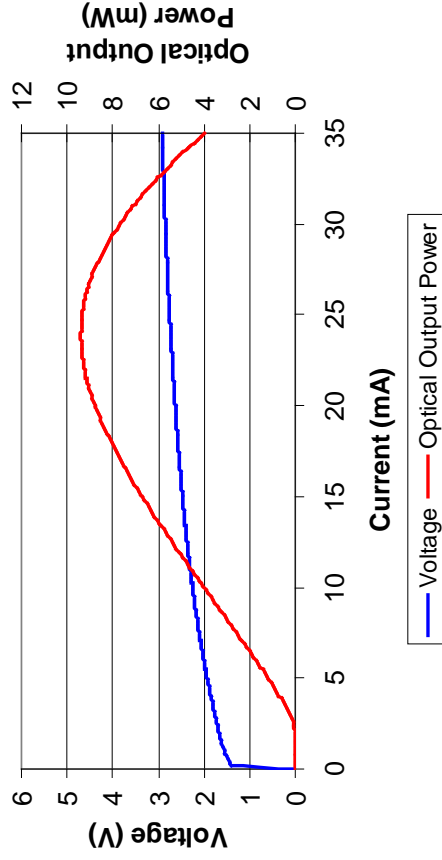
**670nm VCSEL Light Output Vs Current**



**795nm Optical Output Power Vs Current**



**850nm Optical Output Power Vs Current**





## ORDERING INFORMATION

Description	Part Number
8mW 680nm/795nm/850nm VCSELs TO-46 package	MULTM-0000-B002
8mW 680nm/795nm/850nm VCSELs with ESD diode TO-46 package	MULTM-0000-B092



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