

# 795nm Narrow $\lambda$ Tolerance Single-Mode VCSEL

Part number code: 795S-0000-X002

## PRODUCT DESCRIPTION

A true (both spectrally single mode and Gaussian beam shape) single transverse mode 795nm Near- Infrared VCSEL, with single linear polarized emission designed for pulsed & modulated applications. Qualities such as low power dissipation, polarization & spectral stability make this product ideal for OEM applications.

## Major Applications:

- Spectroscopic sensors
- Atomic clock
- Magnetometer
- Interferometry

## Features:

- Low divergence angle
- Circular beam profile
- Single Spectral & Spatial mode
- Narrow spectral width
- Stable SM beam divergence emission over both temperature and current
- Linear stable 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
- Other packages upon request.

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



COMPLIES WITH IEC 60825-1, 2<sup>nd</sup> 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 110 °C	
Lead solder temperature	260°C, 10 seconds	
CW current (VCSEL)	3 mA	(Note 1)
Maximum pulsed current	7mA	(Note 2) <1µs pulse width, 1% duty cycle
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.

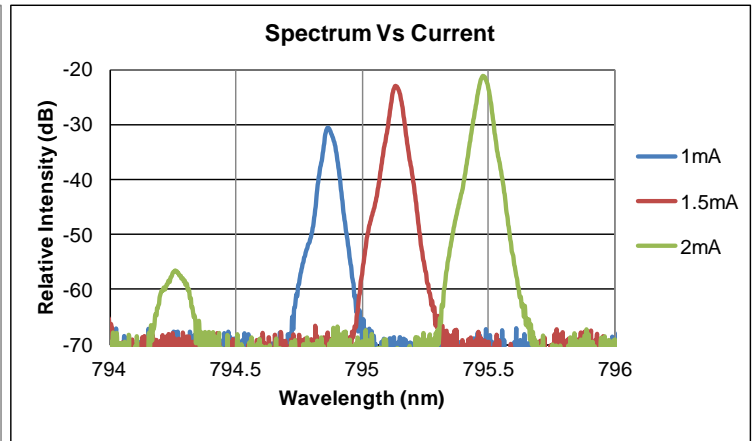
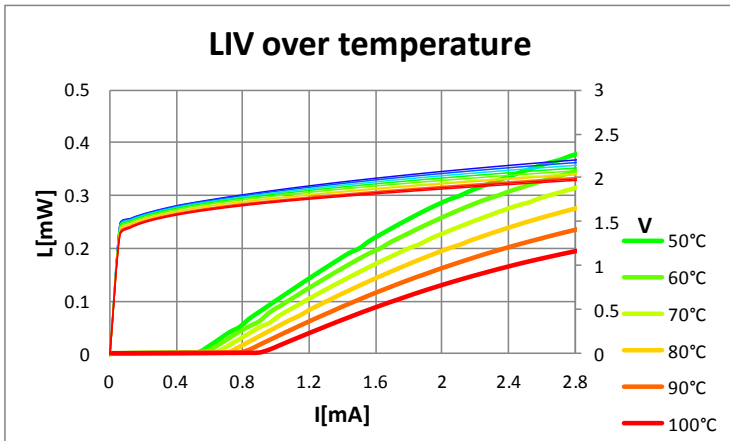
## Electro-Optical Characteristics

VCSEL Operating Temp (Tv) =80°C & Operating Current=1.2mA unless otherwise stated)

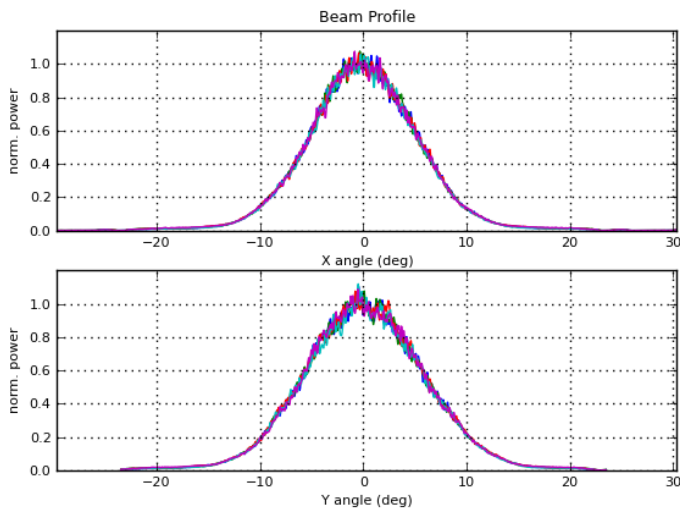
Parameter	Symbol	Units	Minimum	Typical	Maximum	Notes
Maximum DC current (CW)		mA	--	--	1.2	To remain single mode & polarization stable
Threshold current	I <sub>th</sub>	mA	0.5	0.7	1.0	
Operating voltage	V <sub>f</sub>	Volts	--	1.85	2.3	
Series resistance (VCSEL)	R <sub>s</sub>	Ohms	--	185	--	
Slope efficiency	SE	mW/mA	--	0.15	--	
Optical output power	L <sub>op</sub>	mW	0.1	0.13	0.16	T=50°C
Optical output power	L <sub>op</sub>	mW	0.05	0.08	0.1	T=80°C
Reverse breakdown voltage		V	10	--	--	I <sub>r</sub> ≤ 1nA
Operating wavelength	λ <sub>op</sub>	nm	794.5	795	795.5	
Single mode Suppression Ratio	SMSR	dB	20	--	--	Unmodulated
Spectral width (RMS)	Δλ	MHz	--	--	100	Unmodulated
Polarization Extinction ratio	PER	dB	16	--	--	
Beam divergence 1/e <sup>2</sup>		deg	18	20	23	
Beam divergence FWHM	FWHM	deg	10	12	14	
Wavelength current coefficient		nm/mA	0.2	0.4	0.6	
Wavelength temp. coefficient		nm/°C	--	0.055	0.06	
Modulation Bandwidth	BW	Gbps	4.0	--	--	
Rise time		ps	--	--	100	20%-80%
Fall time		Ps	--	--	100	20%-80%



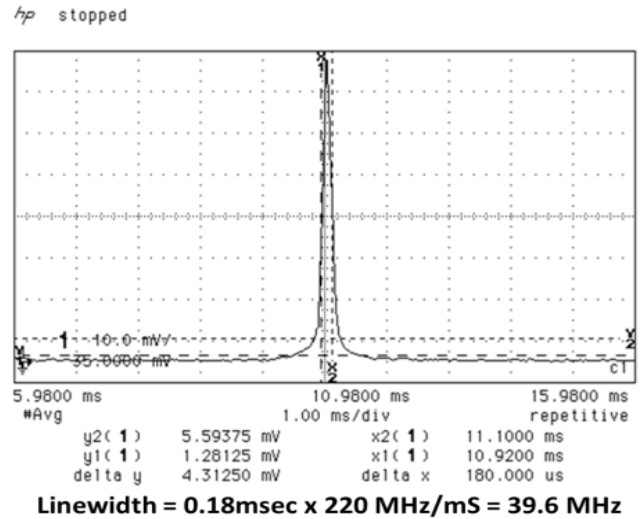
**TYPICAL PERFORMANCE CURVES:**



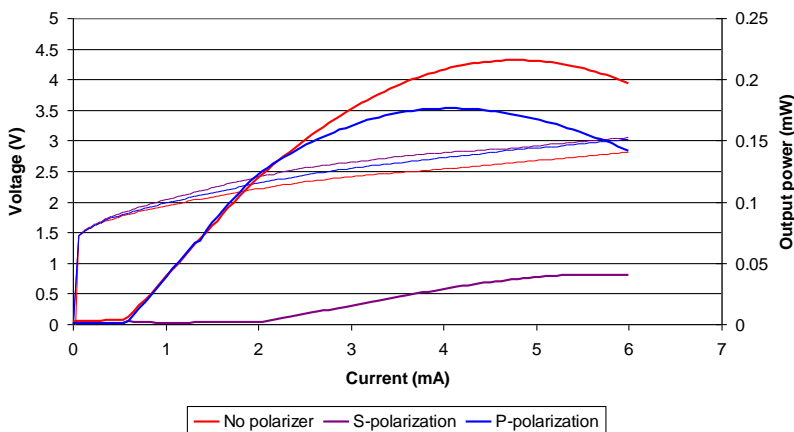
**Far Field Beam Divergence**  
(Independent of Temperature & Current)



**Sample Line-width data on a single mode VCSEL**



**Output Power and Polarization at 70°C**





## ORDERING INFORMATION

Description	ESD Diode <sup>(1)</sup>	Package	Hermetically Sealed <sup>(2)</sup>	Part Number
795±0.5nm single-mode VCSEL bare die		Die only <sup>(3)</sup>		795S-0000-A002
795±0.5nm single-mode VCSEL on a TO can package		TO-46		795S-0000-B002
795±0.5nm single-mode VCSEL on a TO can package with ESD diode	✓ <sup>(1)</sup>	TO-46		795S-0000-B092
795±0.5nm single-mode VCSEL on a hermetic sealed TO can package		TO-46	✓ <sup>(2)</sup>	795S-0000-G002
795±0.5nm single-mode VCSEL on a hermetic sealed TO can package with ESD diode	✓ <sup>(1)</sup>	TO-46	✓ <sup>(2)</sup>	795S-0000-G092
795±0.5nm single-mode VCSEL on a TO can six leaded can with TEC & Thermistor		TO-46 6 Leaded		795S-0000-BC02
795±0.5nm single-mode VCSEL on a TO can six leaded can with TEC, Thermistor & ESD diode	✓ <sup>(1)</sup>	TO-46 6 Leaded		795S-0000-BC92
795±0.5nm single-mode VCSEL on a hermetic sealed TO can six leaded can with TEC & Thermistor		TO-46 6 Leaded	✓ <sup>(2)</sup>	795S-0000-GC02
795±0.5nm single-mode VCSEL on a hermetic sealed TO can six leaded can with TEC, Thermistor & ESD diode	✓ <sup>(1)</sup>	TO-46 6 Leaded	✓ <sup>(2)</sup>	795S-0000-GC92
795±0.5nm single-mode VCSEL on a TO can 8 leaded can with TEC & Thermistor		TO-5		795S-0000-EC02
795±0.5nm single-mode VCSEL on a TO can 8 leaded can with TEC, Thermistor & ESD diode	✓ <sup>(1)</sup>	TO-5		795S-0000-EC92
795±0.5nm single-mode VCSEL on a hermetic sealed TO can 8 leaded can with TEC & Thermistor		TO-5	✓ <sup>(2)</sup>	795S-0000-IC02
795±0.5nm single-mode VCSEL on a hermetic sealed TO can 8 leaded can with TEC, Thermistor & ESD diode	✓ <sup>(1)</sup>	TO-5	✓ <sup>(2)</sup>	795S-0000-IC92

<sup>(1)</sup> Do not include an ESD diode if the part will be modulation frequency  $\geq$  35 MHz.

<sup>(2)</sup> Hermetically sealed. Minimum quantity order is 50 pieces

<sup>(3)</sup> To burn in VCSEL die, operate the devices at 3mA for 72 hours at 120°C. Die attach procedures can affect the polarization. Contact Vixar for advice regarding die attach materials and process temperatures and times.

# Vixar

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