

## 775nm Communications Grade VCSEL

Part number code: 775C-0000-X002

### PRODUCT DESCRIPTION

A high speed Multi-mode 775nm VCSEL specifically designed for high temperature modulated applications. This product is particularly useful when using PMMA (Poly methyl methacrylate) and PCP (partially chlorinated POF) formulations of Polymer Optical Fiber (POF).

### Major Applications:

- Data communications
- Plastic Optical Fiber
- Industrial data links

### Features:

- High temperature operation
- Up to 10Gbps modulation rate
- Narrow Spectral width
- Low operating current
- Linear polarization orientated along chip edge

### Package options include:

- TO-46 hermetic can (Minimum quantity order of 100 pcs)
- TO-46 non-hermetic can
- PLCC-2 with encapsulant
- 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	For PLCC packages: -40 to 100°C
Operating temperature (VCSEL)	-20 to 90 °C	
Lead solder temperature	260°C, 10 seconds	
CW current (VCSEL)	10 mA	(Note 1) at room temperature
Maximum pulsed current	15 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 top of this table; however, 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.

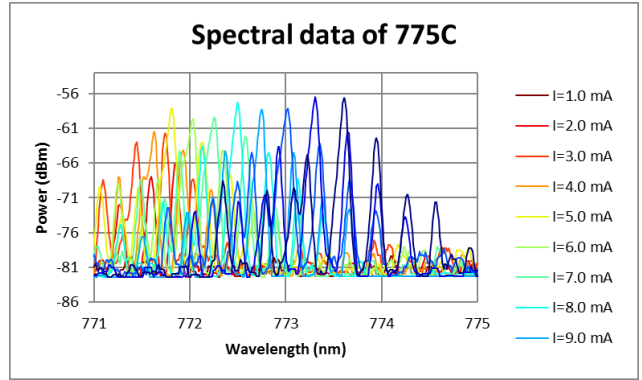
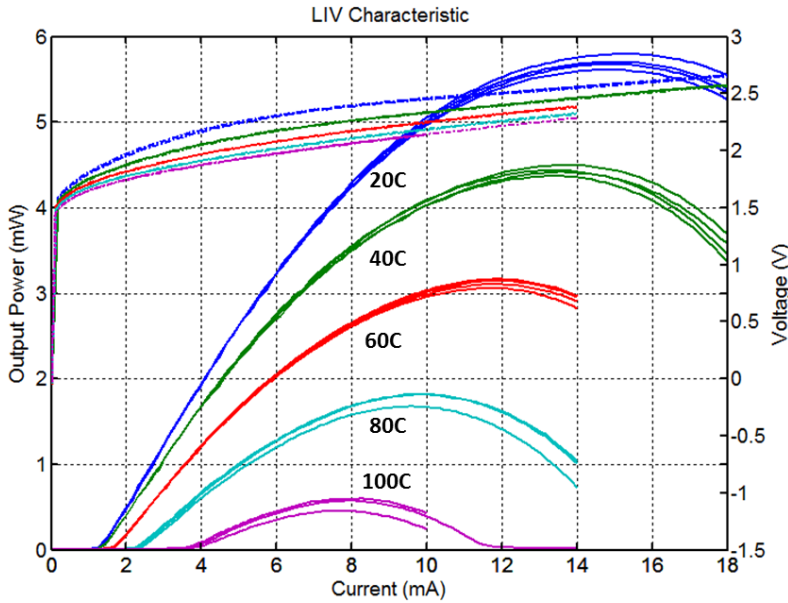
## Electro-Optical Characteristics

VCSEL Operating Temp (Tv) =30°C & Operating Current=6mA unless otherwise stated)

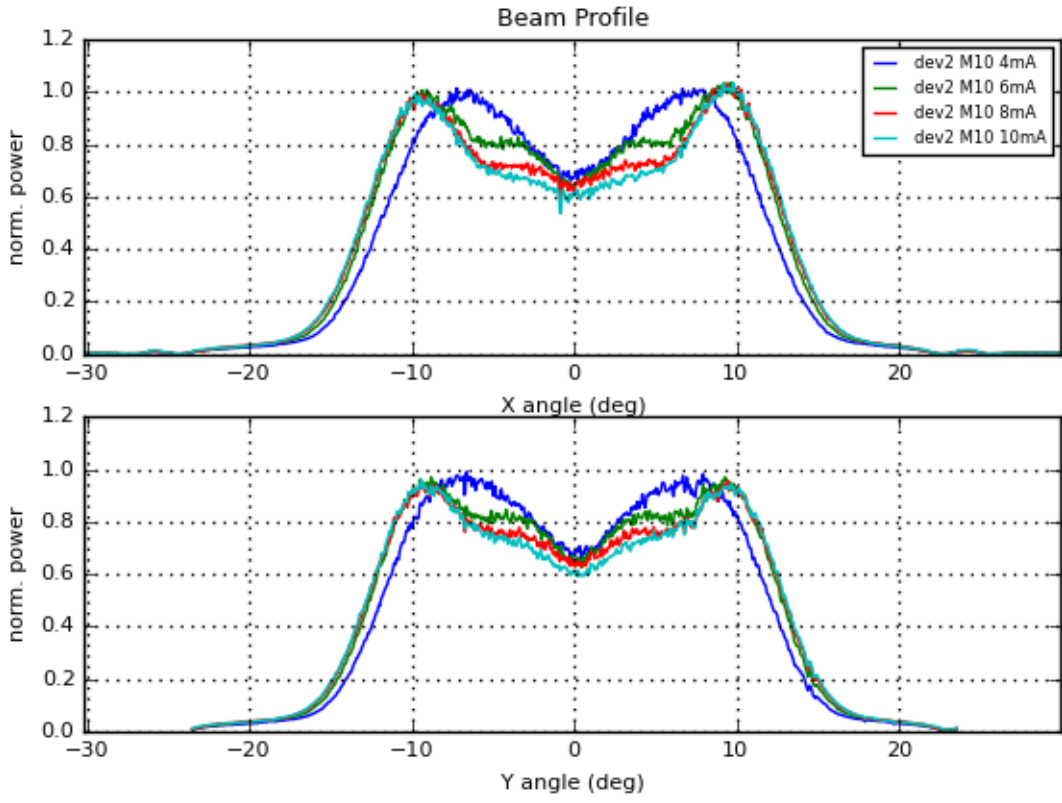
Parameter	Symbol	Units	Minimum	Typical	Maximum	Notes
Threshold current	I <sub>th</sub>	mA	1.0	1.3	2.0	
Operating voltage	V <sub>f</sub>	Volts	--	2.5	3.0	
Series resistance (VCSEL)	R <sub>s</sub>	Ohms	--	45	--	
Slope efficiency	SE	mW/mA	--	0.5	--	
Optical output power	L <sub>op</sub>	mW	2.5	3.2	--	T=30°C
Optical output power	L <sub>op</sub>	mW	--	2.0	--	T=60°C
Optical output power	L <sub>op</sub>	mW	--	1.2	--	T=80°C
Reverse breakdown voltage		V	10	--	--	I <sub>r</sub> ≤ 1nA
Operating wavelength	λ <sub>op</sub>	nm	765	775	785	
Spectral width (RMS)	Δλ	nm	--	--	1.5	
Beam divergence 1/e <sup>2</sup>		deg	25	28	30	Whole angle
Beam divergence FWHM	FWHM	deg	20	24	28	Whole angle
Wavelength tuning		nm/°C	--	0.053	--	
Current tuning		nm/mA	--	0.25	--	
Modulation Bandwidth	BW	Gbps	3	--	--	
Rise time		ps	--	--	40	20%-80%
Fall time		ps	--	--	40	20%-80%
Relative intensity noise	RIN		--	-130	--	DC to 3GHz



### TYPICAL PERFORMANCE CURVES:



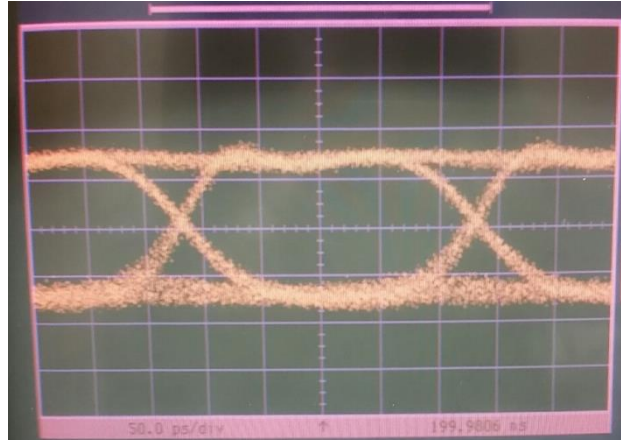
### Far Field Beam Divergence at Room Temperature





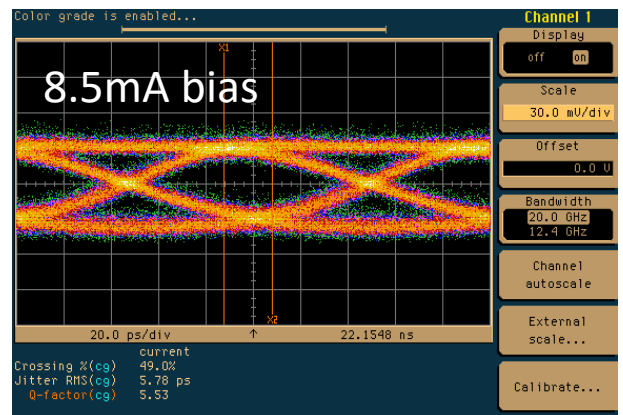
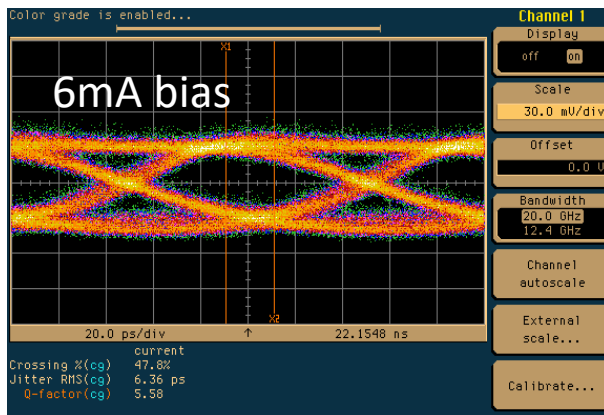
# Eye diagrams at different temperature and modulation rate

## 4 Gpbs @ 20°C, 6.4mA

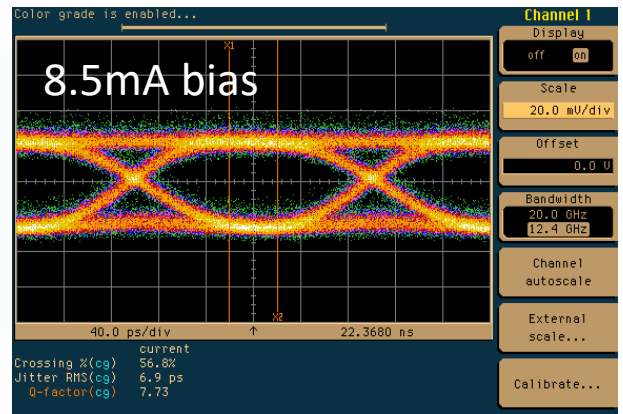
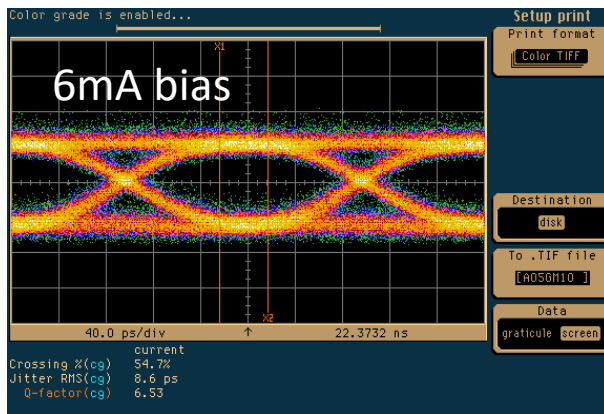


## 5 Gbps & 10Gbps @ 25°C

10Gbps



5Gbps





## ORDERING INFORMATION

Description	Package	Hermetically Sealed <sup>(1)</sup>	Part Number
775 nm Communication grade VCSEL bare die	Die only		775C-0000-A002
775 nm Communication grade VCSEL on a TO can package	TO-46		775C-0000-B002
775 nm Communication grade VCSEL on a hermetic sealed TO can package	TO-46	✓	775C-0000-G002
775 nm Communication grade VCSEL on a PLCC-2 package	PLCC-2		775C-0000-D002

<sup>(1)</sup> Hermetically sealed. Minimum quantity order is 100 pieces

**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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