

# HFE4080-32X-XBA

## High Speed Fiber Optic VCSEL

### FEATURES

- Industry standard ST®-LP fiber connector
- Designed for drive currents between 5 and 15 mA
- Optimized for low dependence of electrical properties over temperature
- High speed > 1 Ghz



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### DESCRIPTION

The HFE4080-32X-XBA is a high-performance 850 nm VCSEL (Vertical Cavity Surface-Emitting Laser) intended for high-speed data communications. It combines many of the desirable features of an LED with the desirable features of a laser diode operating in a single longitudinal mode, but with multiple transverse modes reducing coherence and consequent modal noise in multimode fiber applications.

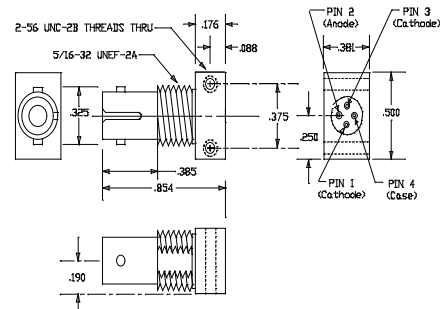
### APPLICATION

The HFE4080-32X-XBA is a high radiance VCSEL packaged on a TO-46 header with a metal can. Data rates can vary from DC to above 2 GB/s depending upon component application. The VCSEL is designed to convert electrical current into optical power that can be used in fiber optic communications and other applications. As the current varies above threshold, the light intensity increases proportionally.

The component produces a circularly symmetric, narrow divergence beam. The stability of operating characteristics with temperature potentially allows operation without continuous photodiode feedback control, simplifying drive circuits considerably. The HFE4080-32X-XBA is designed to be used with inexpensive silicon or gallium arsenide detectors, but excellent performance can also be achieved with some indium gallium arsenide detectors.

The low drive current requirement of the HFE4080-32X-XBA makes direct drive from PECL or ECL logic gates feasible and eases driver design.

### OUTLINE DIMENSIONS in inches (mm)



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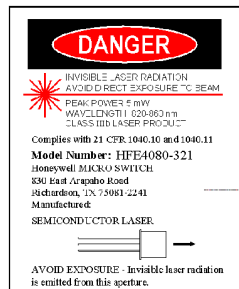
# HFE4080-32X-XBA

## High Speed Fiber Optic VCSEL

### APPLICATION (continued)



The VCSEL is a class IIIb laser and should be treated as a potential eye Hazard. Due to the size of the component, the applicable warning logo type, aperture label, and certification/identification label cannot be placed on the component itself. The labels can be found inserted into the individual envelope in which the VCSEL unit is packaged, or attached to the envelope.



This product has been manufactured under a process license from Rockwell for U.S. PATENT # 4,368,098.

# HFE4080-32X-XBA

## High Speed Fiber Optic VCSEL

### ELECTRO-OPTICAL CHARACTERISTICS (0°C<T<70°C unless otherwise specified)

PARAMETER	SYMBOL	MIN	TYP	MAX	UNITS	TEST CONDITIONS
Output power						
HFE4080-321/XBA	P <sub>O</sub>	400	800	1000	μW	I <sub>F</sub> = 10 mA <sup>(1)</sup>
		-4.0	-1.0	0.0	dBm	<sup>(1)</sup>
HFE4080-322/XBA	P <sub>O</sub>	800	1000	1500	μW	I <sub>F</sub> = 10 mA <sup>(1)</sup>
		-1.0	0.0	+1.8	dBm	<sup>(1)</sup>
Threshold current	I <sub>TH</sub>		3.5	6	mA	<sup>(1)</sup>
Slope Efficiency	η		0.3		mW/mA	I <sub>F</sub> = 10 mA
Forward Voltage	V <sub>F</sub>		1.75	2.10	V	I <sub>F</sub> = 10 mA
Reverse Breakdown Voltage	BVR	5.0	10.0		V	I <sub>R</sub> = 10 μA
Peak Wavelength	λ <sub>P</sub>	820	850	860	nm	I <sub>F</sub> = 10 mA DC
Spectral Bandwidth	Δλ		0.5		nm	I <sub>F</sub> = 10 mA DC
Rise and fall time	t <sub>R</sub> , t <sub>F</sub>		100	400	ps	Prebias above threshold, T = 25°C, 10-90%
Analog bandwidth <sup>(2)</sup>						I <sub>F</sub> = 10 mA DC
Analog bandwidth <sup>1</sup>	BW		6		GHz	Small signal sinusoidal modulation
Relative Intensity Noise	RIN		-125	-116	dB/Hz	Measured into 1 GHz noise bandwidth
I <sub>TH</sub> Temperature Coefficient	ΔI <sub>TH</sub> /ΔT	-0.042	0	.042	mA/°C	I <sub>F</sub> = 10 mA
η Temperature Coefficient	Δη/ΔT		-0.001		mW/mA/°C	I <sub>F</sub> = 10 mA
P <sub>O</sub> Temperature Coefficient	ΔP <sub>O</sub> /ΔT		0		dB/°C	I <sub>F</sub> = 10 mA
λ <sub>P</sub> Temperature Coefficient	Δλ <sub>P</sub> /ΔT		0.06		nm/°C	I <sub>F</sub> = 10 mA
V <sub>F</sub> Temperature Coefficient	ΔV <sub>F</sub> /ΔT		-0.2		mV/°C	I <sub>F</sub> = 10 mA
Series Resistance	r <sub>S</sub>		30.0		Ω	DC
Thermal Resistance	θ <sub>JA</sub>		900		°C/W	

#### Notes

1. This product is tested with a 50/125 micron fiber.
2. Packaged components are limited by the electrical parasitics of the package.

### ABSOLUTE MAXIMUM RATINGS

Storage temperature	-40 to +100°C
Case operating temperature	0 to +70°C
Lead solder temperature	260°C, 10 sec.
Continuous forward current (heat sunked)	15 mA
Reverse voltage	5 V @ 10 μA

Stresses greater than those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. This is a stress rating only and functional operation of the device at these or any other conditions above those indicated in the operational section of this specification is not implied. Exposure to absolute maximum rating conditions for extended periods of time may affect reliability.

# HFE4080-32X-XBA

## High Speed Fiber Optic VCSEL

### ORDER GUIDE

Description	Catalog Listing
High speed VCSEL, 800 $\mu$ w typ. Po	HFE4080-321-XBA
High speed VCSEL, 1000 $\mu$ w typ. Po	HFE4080-322-XBA

### CAUTION

The inherent design of this component causes it to be sensitive to electrostatic discharge (ESD). To prevent ESD-induced damage and/or degradation to equipment, take normal ESD precautions when handling this product.



### FIBER INTERFACE

Honeywell VCSELs are specifically designed to interface with 50/125 and 62.5/125 multimode fiber. While larger fiber sizes are possible, essentially all of the VCSEL power can be coupled into even the 50/125 fiber.

Fig. 1 Typical Power Output vs Forward Current

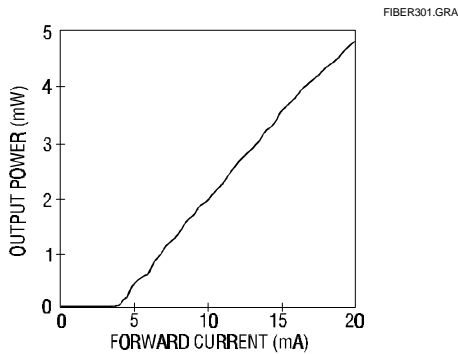


Fig. 2 Typical Threshold Current vs Temperature

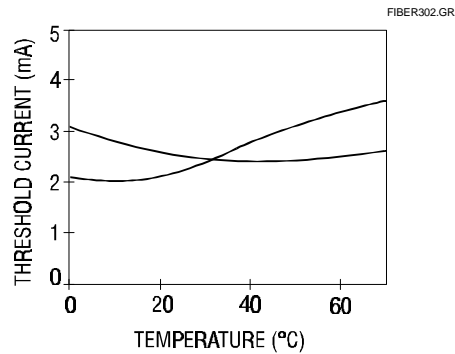


Fig. 3 Typical Spectral Output vs Wavelength

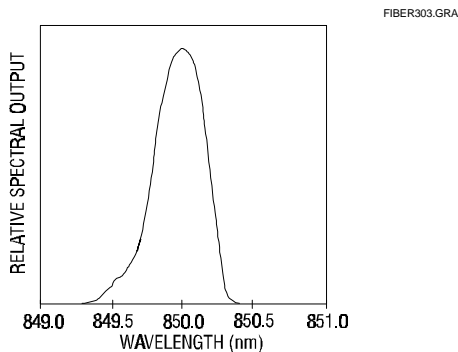
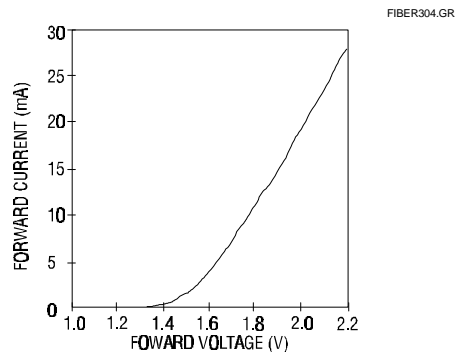


Fig. 4 Typical Current vs Forward Voltage



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