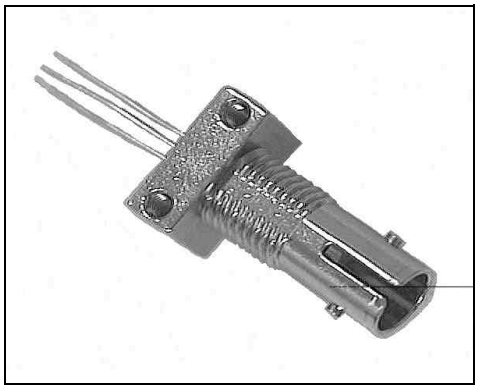
02 October 1997

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



OPHO_229.doc

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.

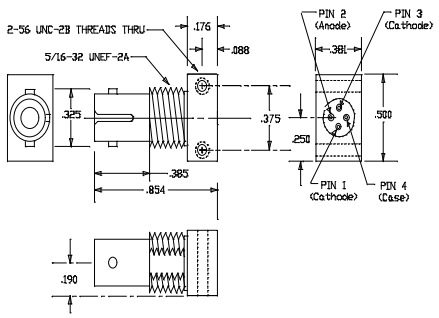
APPLICATION

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)



ODIM_229.DOC

ST is a registered trademark of AT & T.

Honeywell

02 October 1997

HFE4080-32X-XBA

High Speed Fiber Optic VCSEL

APPLICATION (continued)

DANGER

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.

02 October 1997

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_O	400	800	1000	µW	I_F = 10 mA (1)
		-4.0	-1.0	0.0	dBm	(1)
HFE4080-322/XBA	P_O	800	1000	1500	µW	I_F = 10 mA (1)
		-1.0	0.0	+1.8	dBm	(1)
Threshold current	I_{TH}		3.5	6	mA	(1)
Slope Efficiency	η		0.3		mW/mA	I_F = 10 mA
Forward Voltage	V_F		1.75	2.10	V	I_F = 10 mA
Reverse Breakdown Voltage	BVR	5.0	10.0		V	I_R = 10 µA
Peak Wavelength	λ_P	820	850	860	nm	I_F = 10 mA DC
Spectral Bandwidth	$\Delta\lambda$		0.5		nm	I_F = 10 mA DC
Rise and fall time	t_R, t_F		100	400	ps	Prebias above threshold, T = 25°C, 10-90%
Analog bandwidth (2)						I_F = 10 mA DC
Analog bandwidth¹	BW		6		GHz	Small signal sinusoidal modulation
Relative Intensity Noise	RIN		-125	-116	dB/Hz	Measured into 1 GHz noise bandwidth
I_{TH} Temperature Coefficient	$\Delta I_{TH}/\Delta T$	-.042	0	.042	mA/°C	I_F = 10 mA
η Temperature Coefficient	$\Delta\eta/\Delta T$		-0.001		mW/mA/°C	I_F = 10 mA
P_O Temperature Coefficient	$\Delta P_O/\Delta T$		0		dB/°C	I_F = 10 mA
λp Temperature Coefficient	$\Delta\lambda p/\Delta T$		0.06		nm/°C	I_F = 10 mA
V_F Temperature Coefficient	$\Delta V_F/\Delta T$		-0.2		mV/°C	I_F = 10 mA
Series Resistance	r_S		30.0		Ω	DC
Thermal Resistance	θ_{JA}		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 sinked)	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.

Honeywell

02 October 1997

HFE4080-32X-XBA

High Speed Fiber Optic VCSEL

ORDER GUIDE

Description	Catalog Listing
High speed VCSEL, 800µw typ. Po	HFE4080-321-XBA
High speed VCSEL, 1000µw 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

FIBER301.GRA

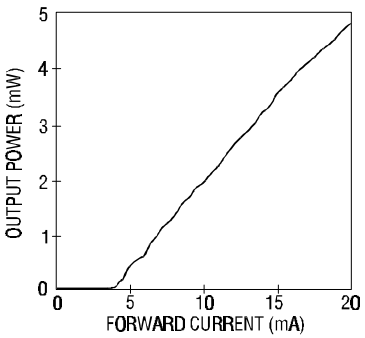


Fig. 2 Typical Threshold Current vs Temperature

FIBER302.GR

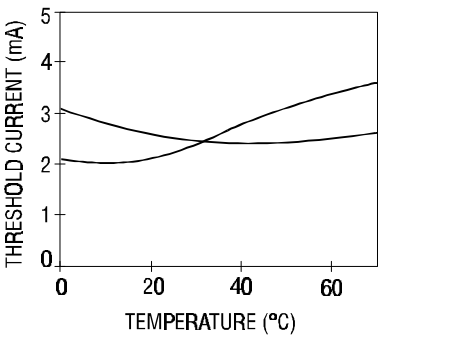


Fig. 3 Typical Spectral Output vs Wavelength

FIBER303.GRA

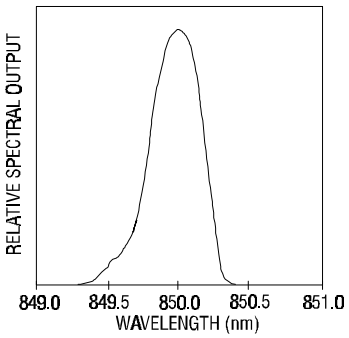
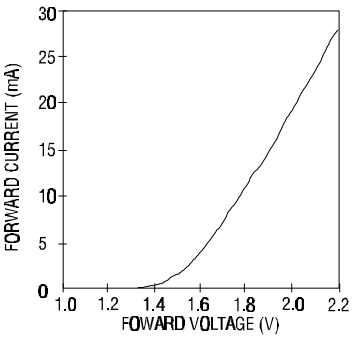


Fig. 4 Typical Current vs Forward Voltage

FIBER304.GR



Honeywell reserves the right to make changes in order to improve design and supply the best products possible.

Honeywell